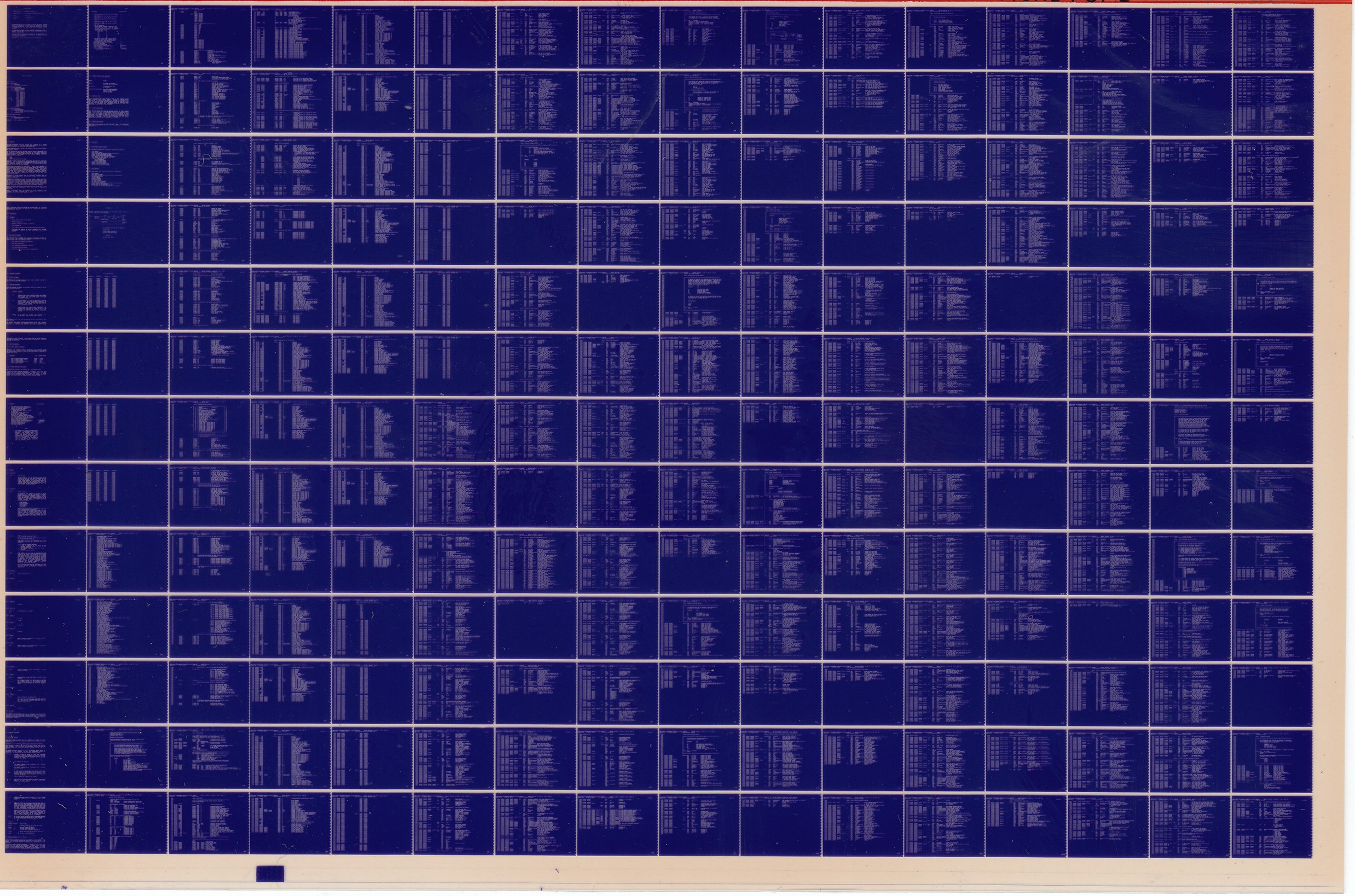
RK611/RK06

RK611/RK06 PERFORMANCE
MD-11-DZR6P-B
EXERCISER

EP DZR6P B DL

FICHE 1 OF 2

JAN 1978
digital
MADE IN USA



RK611/RK06

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EXERCISER

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FICHE 2 OF 2

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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZR6P-B

PRODUCT NAME: RK611/RK06 PERFORMANCE EXERCISER

DATE: AUG, 1976

MAINTAINER: DIAGNOSTIC GROUP

AUTHOR: ROY SPITZER

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1.0 ABSTRACT

THE RK06 PERFORMANCE EXERCISER PROGRAM WILL EXERCISE IN A RANDOM OVERLAPPED MANNER 1 TO 8 RK06 DISK DRIVES ATTACHED TO THE SAME RK06 UNIBUS CONTROLLER IN A DEDICATED STAND-ALONE MODE.

DRIVES UNDER TEST CAN BE ADDED TO OR DROPPED FROM THE TESTING SEQUENCE BY OPERATOR COMMAND.

AT ANY GIVEN POINT IN TIME, THE NEXT DRIVE ON WHICH AN OPERATION IS TO BE INITIATED IS CHOSEN RANDOMLY FROM AMONG THE RK06 DRIVES UNDER TEST NOT HAVING ANY ERROR CONDITIONS PRESENT AND NOT CURRENTLY UNDERGOING ERROR RECOVERY. THE COMMAND IS THEN CHOSEN RANDOMLY FROM THE FOLLOWING SET OF COMMANDS:

READ
WRITE
WRITE FOLLOWED BY WRITE CHECK

THEN THE CYLINDER, TRACK, SECTOR, WORD COUNT, AND DATA ARE DETERMINED RANDOMLY. THE DATA WRITTEN IS RANDOMLY SELECTED FROM A SET OF FIXED DATA PATTERNS. TO OPTIMIZE THE THROUGHPUT ON THE RK06 CONTROLLER EACH DATA TRANSFER COMMAND IS TRANSLATED TO AN EXPLICIT SEEK COMMAND FOLLOWED BY THE DATA TRANSFER COMMAND.

DRIVE ERRORS ARE QUEUED UP AS THEY OCCUR. WHILE ERROR RECOVERY IS BEING PROCESSED ON ONE DRIVE ALL OTHER DRIVES HAVING NO ERRORS WILL BE EXECUTING ORDERS GENERATED RANDOMLY AS DESCRIBED ABOVE. EACH DRIVE ERROR IS PROCESSED ON A FIRST-IN-FIRST-OUT BASIS. THIS MEANS THAT A DRIVE ERROR WILL BE REPORTED AND ERROR RECOVERY COMPLETELY PROCESSED BEFORE THE NEXT DRIVE ERROR IS REPORTED AND ERROR PROCESSING HAS BEGUN. ERROR RECOVERY IS PROCESSED AS DESCRIBED IN THE RK06 DISK DRIVE SPECIFICATION.

REPORTING OF SYSTEM ERRORS SUCH AS CONTROLLER PROBLEMS WILL BE IMMEDIATE UPON OCCURRENCE, NOT DEFFERRED, PERHAPS CAUSING PREMATURE PROGRAM TERMINATION.

PERFORMANCE STATISTICS ARE KEPT ON EACH DRIVE. THESE STATISTICS INCLUDE BOTH OPERATION COUNTS AND ERROR SUMMARY INFORMATION. (SEE SECTION 6.1) THESE STATISTICS WILL BE INITIALIZED WHEN TESTING BEGINS ON A DRIVE. AT ANY TIME AFTER TESTING BEGINS ON THE DRIVE(S) UNDER PERFORMANCE EVALUATION, THE OPERATOR CAN DEMAND THESE PERFORMANCE STATISTICS. IF A REAL TIME CLOCK IS AVAILIBLE, THE OPERATOR HAS THE OPTION OF HAVING THE PROGRAM GIVE PERIODIC PERFORMANCE SUMMARIES.

ONCE A PARTICULAR DRIVE HAS AN UNRECOVERABLE ERROR (OTHER THAN A DATA TRANSFER AND SEEK INCOMPLETE), THAT DRIVE WILL BE AUTOMATICLY DEASSIGNED.

ONCE A PARATICULAR DRIVE HAS EXCEEDED AN ERROR THRESHOLD (DATA TRANSFER OR SEEK) SPECIFIED FOR A DRIVE, THAT DRIVE WILL BE AUTOMATICLY DEASSIGNED UNLESS SWITCH 4 IS SET.

C1

ONCE A PARTICULAR DRIVE HAS EXCEEDED THE MAXIMUM NUMBER OF PERMITTED OPERATIONS FOR THAT DRIVE, THE DRIVE WILL BE AUTOMATICALLY DESELECTED UNLESS SWITCH 5 IS SET.

2.0 REQUIREMENTS

2.1 EQUIPMENT

- PDP-11 WITH AT LEAST 16K OF MEMORY
- CONSOLE TERMINAL
- DECTAPE, PAPER TAPE READER; OR DECDISK
- RK611 CONTROLLER
- 1 TO 8 RK06 DISK DRIVE WITH FORMATTED PACK (16 BIT FORMAT)
- REAL TIME CLOCK (KW11-P OR KW11-L OPTIONAL) FOR INTERVAL PERFORMANCE REPORTING AND TIME ASSOCIATIONS WITH ERROR REPORTS

2.2 PRELIMINARY PROGRAMS

THE RK06 SUBSYSTEM IS ASSUMED TO BE BASICALLY OPERATIONAL AND FREE OF HARD FAULTS. THE FOLLOWING RK06 PROGRAMS ARE ASSUMED TO BE RUNNING WITHOUT ERROR BEFORE THIS PROGRAM IS RUN:

- RK611 DISKLESS CONTROLLER DIAGNOSTICS
- RK06 DRIVE DIAGNOSTICS
- RK611 FUNCTIONAL CONTROLLER DIAGNOSTIC
- RK06 SUBSYSTEM VERIFICATION
- RK06 PACK FORMATTER (IF PACKS ARE UNFORMATTED)

3.0 OPERATING PROCEDURE

3.1 LOADING PROCEDURE

THE PROGRAM CAN BE LOADED FROM PAPER TAPE USING APSOLUTE LOADER OR FROM ANY MEDIA SUPPORTED BY XXDP.

3.2 STARTING PROCEDURES

AFTER THE PROGRAM IS LOADED, THE OPERATOR STARTS THE PROGRAM AT ONE OF THE FOLLOWING LOCATIONS:

LOCATION	FUNCTION
200	INITIALIZE ALL DRIVE STATISTIC TABLES, THE RANDOM NUMBER SEED, AND USE DEFAULT SYSTEM PARAMETERS. THE PROGRAM WILL THEN TYPE READY TO BEGIN PERFORMANCE TESTING.
204	RESTART PROGRAM. IF DRIVE IS UNDER TEST, CONTINUE TESTING DRIVE AND DO NOT DESTROY STATISTICS. IF PACK IS BEING WRITTEN, START WRITING PACK FROM THE BEGINNING. THE PROGRAM WILL THEN TYPE READY TO BEGIN PERFORMANCE TESTING.
214	START PROGRAM AND ALTER SYSTEM PARMETERS. THE PROGRAM WILL THEN IDENTIFY ITSELF AND ASK FOR THE PARAMETERS AS DESCRIBED IN SECTION 3.3.2. THE PROGRAM WILL THEN TYPE READY TO BEGIN PERFORMANCE TESTING.
NOTE:	IF A POWER FAIL OCCURS, THE PROGRAM WILL AUTOMATICALLY PERFORM THE RESTART FUNCTION.

THE PROGRAM IS NOW IN AN IDLE LOOP WAITING FOR THE INITIATION OF RK06 DRIVE TESTING.

THE OPERATOR THEN STARTS PERFORMANCE EVALUATION OF THE RK06 DRIVE(S) BY TYPING A CONTROL-C <C> FOLLOWED BY A TN OR PN AS DESCRIBED IN SECTION 4.1. IF THE PACK DOES NOT HAVE THE PROPER RANDOMLY CHOSEN

PREDETERIMED TEST PATTERNS, THE OPERATOR MUST USE THE WW COMMAND AS DESCRIBED IN SECTION 4.1 BEFORE INITIATING THE PERFORMANCE EVALUATION SEQUENCE ON THAT DRIVE.

3.3 SYSTEM PARAMETERS

3.3.1 DIRECT MEMORY ALTERATION

AS PART OF THE PROGRAM START-UP PROCEDURE, THE FOLLOWING SYSTEM PARMETERS WILL BE LOADED BY THE OPERATOR OR DEFAULTED BY THE PROGRAM. THE OPERATOR MUST PHYSICALLY ALTER THE APPROIATE MEMORY LOCATIONS TO CHANGE THESE VALUES.

PARAMETER	TAG	DEFAULT VALUE
- KW11-P STATUS REGISTER ADDRESS	$LKCSR	172540
- KW11-P COUNTER BUFFER ADDRESS	$LKCSB	172542
- KW11-P VECTOR ADDRESS	$LPVEC	104
- KW11-L STATUS REGISTER ADDRESS	$LKS	177506
- KW11-L VECTOR ADDRESS	$LLVEC	100
- SYSTEM POWER (HERTZ)	HZ	60(DECIMAL)

3.3.2 PROGRAM MODIFIED PARAMETERS

THE FOLLOWING PARAMETERS ARE MODIFIED BY A 214 PROGRAM START.

A <CR> WILL DEFAULT CURRENT PARAMETERS. A CONTROL Z <^Z> <CR> WILL DEFAULT ALL THE REST OF THE PARAMETERS. A CONTROL C <^C> <CR> WILL RETURN TO FIRST PARAMETER ENTRY REQUEST FOR THIS DRIVE. A RUBOUT CANCELS THE LAST CHARACTER TYPED. A CONTROL U <^U> CANCELS LINE BEING TYPED. ALL ENTRIES MUST BE TERMINATED WITH CARRIAGE RETURN.

PARMETER	DEFAULT VALUE
- CPU IDENTIFIER (OCTAL NUMBER 0-377 FOR DUAL ACCESS PORT DISCRIMINATION)	0
- OVERLAY OF LOADER BY PROGRAM? (ALLOWS GREATER EXPANSION OF MEMORY FOR BUFFER SPACE IF LOADER IS OVERLAYED)	NO
- MAXIMUM DATA BUFFER (SEE NOTE) UP TO 5888 (23 SECTORS)	SEE NOTE
- NUMBER OF DATA WORDS COMPARED PER READ (0 - MAXIMUM BUFFER LENGTH) EACH READ COMMAND ISSUED BY THE PROGRAM HAS AN IMPLICIT DATA COMPARISON ASSOCIATED WITH IT VERIFYING THAT THE DATA READ IS ONE OF LEGAL RANDOM PATTERNS.	? WORDS
- INTERVAL BETWEEN AUTOMATIC PERFORMANCE TYPE-OUTS (EVERY 1-255 MINUTES OR NO AUTOMATIC PERFORMANCE TYPE-OUTS)	NO AUTOMATIC PERFORMANCE TYPE-OUTS
- RK611/RK06 UNIBUS ADDRESS	177440
- RK611/RK06 VECTOR ADDRESS	210
- RK611/RK06 PRIORITY	5

NOTE

THE PROGRAM WILL SELECT A MAXIMUM BUFFER SIZE WHICH IS DETERMINED BY THE MEMORY AVAILABLE. THE MAXIMUM BUFFER SIZE ASSIGNED BY THE PROGRAM WILL BE 5888 WORDS. THE DEFAULT VALUE OF THIS PARAMETER WEIGHTS THE OPERATIONS TOWARDS MAXIMIZING DATA TRANSFERS PER UNIT OF TIME. BY CHANGING THIS PARAMETER TO 1 SECTOR (2^8 WORDS), THE OPERATIONS WILL BE WEIGHTED TOWARDS MAXIMIZING SEEKS PER UNIT OF TIME.

3.4 SWITCHES

3.4.1 SWITCH 15

SW<15> = 1 HALT ON ERROR

IF THIS SWITCH IS SET, THE PROGRAM WILL NOT ISSUE ANOTHER COMMAND TO THE RK06 SUBSYSTEM WHEN AN ERROR OCCURS AND THE PROGRAM WILL HALT IN THE SYSMAC ERROR HANDLER. IF THE OPERATOR DESIRES TO CONTINUE FROM WHERE THE PROGRAM LEFT OFF, THE OPERATOR SIMPLY PRESSES THE CONTINUE SWITCH ON THE CONSOLE PANEL AND THE PROGRAM CONTINUES WITH THE NEXT RANDOMLY GENERATED COMMAND.

3.4.2 SWITCH 14

SW<14> = 0 NORMAL OPERATION

THE OPERATION THE PROGRAM IN REGARD TO DRIVE SELECTION AND COMMAND GENERATION IS NORMAL. NORMAL OPERATION IS TO RANDOMLY SELECT A DRIVE, STORE THE PREVIOUS OPERATION EXECUTED ON THAT DRIVE, AND GENERATE A NEW RANDOM OPERATION TO BE EXECUTED ON THAT DRIVE. THE GENERATED OPERATION INCLUDES RANDOMLY GENERATED VALUES FOR THE FOLLOWING PARAMETERS:

- DRIVE COMMAND
- CYLINDER ADDRESS
- TRACK ADDRESS
- SECTOR ADDRESS
- WORD COUNT
- DATA PATTERN

THESE VALUES ARE STORED AS THE PREVIOUS OPERATION WHEN A NEW OPERATION IS GENERATED.
IT IS IMPORTANT TO NOT THAT AT ANY POINT IN TIME THERE IS BOTH A CURRENT OPERATION AND A STORED PREVIOUS OPERATION ASSOCIATED WITH EACH DRIVE UNDER TEST. THE CURRENT OPERATION MAY HAVE ALREADY BEEN EXECUTED AND A NEW COMMAND HAS NOT YET BEEN GENERATED OR THE COMMAND IS WAITING TO BE EXECUTED.

SW<14> = 1 LOOP ON CURRENT OPERATIONS (TEST)

DO NOT GENERATE NEW RANDOM OPERATION BUT CONTINUE TO EXECUTE CURRENT OPERATIONS.

WHEN SWITCH 14 IS SET THE GENERATION OF A NEW OPERATION IS INHIBITED AND THE PROGRAM OPERATES AS FOLLOWS:

1.) A DRIVE IS RANDOMLY SELECTED.
2.) A SEEK IS EXECUTED ON THE DRIVE TO THE CYLINDER ADDDRESS STORED IN THAT DRIVE'S PREVIOUS OPERATION.
3.) THE CURRENT OPERATION FOR THAT DRIVE IS EXECUTED.
4.) REPEAT THE ENTIRE PROCESS.

USEAGE THIS SWITCH CAN BE USED IN CONJUNCTION WITH SWITCH 15 TO ENABLE THE REPETITION OF A RANDOMLY GENERATED OPERATION. THE OPERATOR WOULD START WITH SWITCH 15 SET AND SWITCH 14 RESET. WHEN THE PROGRAM HAS INDICATED THAT AN ERROR HAS OCCURRED BY HALTING. THE CURRENT OPERATION FOR THE DRIVE IN ERROR WILL NOT HAVE BEEN MODIFIED WHEN THE PROGRAM HALTS. THE OPERATOR CAN THEN CAUSE ALL DRIVES TO LOOP ON THEIR INDIVIDUAL CURRENT OPERATIONS BY SETTING SWITCH 14, RESETTING SWITCH 15, AND HITTING CONTINUE.

TO HELP ISOLATE PROBLEMS, THE OPERATOR CAN DROP THE RK06 DRIVE(S) FROM THE TEST SEQUENCE AT ANY TIME BY USING THE DN COMMAND AS DESCRIBED IN SECTION 4.1.

3.4.3 SWITCH 13

SW<13> = 1 INHIBIT ERROR TYPE OUT

3.4.4 SWITCH 12

NO EFFECT.

3.4.5 SWITCH 11

NO EFFECT.

3.4.6 SWITCH 10

SW<10> = 1 RING TELETYPE BELL IF ERROR

3.4.7 SWITCH 9

NO EFFECT.

3.4.8 SWITCH 8

NO EFFECT.

3.4.9 SWITCH 7

NO EFFECT.

3.4.10 SWITCH 6

SW<6> = 1 INHIBIT AUTOMATIC DESELECT FOR CLEARABLE UNSAFES, SPEED LOSS, AND AC LOW.

3.4.11 SWITCH 5

SW<5> = 1 INHIBIT AUTOMATIC DRIVE DEASSIGNMENT IF OPERATION COUNT THRESHOLD IS EXCEEDED.

3.4.12 SWITCH 4

SW<4> = 1 INHIBIT AUTOMATIC DRIVE DEASSIGNMENT IF ERROR THRESHOLD EXCEEDED.

3.4.13 SWITCH 3

SW<3> = 1 DISPLAY ENTIRE SECTOR READ BEFORE STARTING RETRY SEQUENCE

ALL HARDWARE DETECTED DATA ERRORS WILL BE RETRIED ON A SECTOR BASIS. IF THIS SWITCH IS SET, THE DATA SECTOR IN ERROR WILL BE DISPLAYED ENTIRELY BEFORE THE RETRY SEQUENCE BEGINS ON THE SECTOR IN ERROR.

3.4.14 SWITCH 2

NO EFFECT.

3.4.15 SWITCH 1

SW<1> = 1 INHIBIT SOFTWARE DATA COMPARISONS

THE IMPLICIT DATA COMPARISONS ASSOCIATED WITH EACH READ WILL NOT BE PERFORMED WHEN THIS SWITCH IS SET. THE ONLY DATA CHECKING PERFORMED WILL BE HARDWARE DATA CHECKING.

3.4.16 SWITCH 0

NO EFFECT.

3.5 RUN TIME

THIS PROGRAM IS DESIGNED TO RUN FOR AN EXTENDED PERIOD OF TIME. (ESTIMATED RUN TIME WITH PRESENT DEFAULT PARAMETERS IS APPROXIMATELY 250 HOURS PER DRIVE.) MEANINGFUL INFORMATION CAN STILL BE DERIVED BY RUNNING THIS PROGRAM FOR AN HOUR OR LESS SINCE STATISTICS ARE TAKEN AS THE PROGRAM IS RUNNING.

4.0 OPERATING PROCEDURE

4.1 OPERATOR COMMANDS

AFTER THE PROGRAM IS LOADED AND HAS PRINTED OUT "READY TO BEGIN PERFORMANCE TESTING", THE OPERATOR CAN ONLY TYPE A CONTROL-G <G> OR A CONTROL-C <C>.

A CONTROL-G <G> IS USED FOR SOFTWARE SWITCH REGISTER MODIFICATION.

UPON RECEIVING A CONTROL-C <C> THE PROGRAM WILL RESPOND WITH "PLEASE TYPE COMMAND". THE FOLLOWING TWO CHARACTER COMMANDS FOLLOWED BY CARRIAGE RETURN WILL BE THE ONLY COMMANDS ACCEPTED: TN, PN, DN, SN, WN.

THE SECOND CHARACTER N=0,1,...,7 OR A DESIGNATES WHICH DRIVE IS REFERENCED BY THE COMMAND. IF N=A, ALL ADDRESSABLE DRIVES ARE REFERENCED. THE DESCRIPTION OF EACH OPERATOR COMMAND FOLLOWS:

- TN — INITIATE TESTING OF DRIVE N AND USE PREVIOUS PARAMETERS. (DEFAULT PARMETERS ARE USED IF PN COMMAND HAS NOT PREVIOUSLY BEEN ISSUED TO THE DRIVE(S) AT THE BEGINNING OF THEIR TEST SEQUENCE.) IF N=A, INITIATE TESTING ON ALL DRIVES.

- PN — THIS COMMAND HAS TWO USES:

  1.) CHANGE CURRENT DRIVE PARAMETERS AND INITIATE TESTING ON DRIVE N.

  2.) CHANGE CURRENT DRIVE PARAMETERS AND CONTINUE TESTING ON DRIVE N.

  IN BOTH CASES THE PROGRAM WILL THEN ASK FOR PARMAFTERS IN THE ORDER AS DESCRIBED IN SECTION 5.5. A <CR> INDICATES DEFAULT THIS PARAMETER AND A CONTROL-Z <Z> INDICATES THE THE REST OF THE PARAMETERS FOR THIS DRIVE ARE TO BE DEFAULTED.

  IF N=A, PERFORM PN COMMAND ON ALL DRIVES.

- DN — DROP DRIVE FROM TESTING SEQUENCE AND PRINT PERFORMANCE SUMMARY. IF N=A, DROP ALL CURRENTLY BEING TESTED DRIVES FROM TESTING SEQUENCE

L1

- SN DEMAND PERFORMANCE SUMMARY ON DRIVE N. IF N=A DEMAND PERFORMANCE SUMMARY ON ALL CURRENTLY BEING TESTED DRIVES.

- WN WRITE AND VERIFY THE RP06 DISK PACK ON DRIVE N WITH A RANDOM SET OF LEGAL PATTERNS. THIS IS USED PRIOR TO THE START OF THE TEST SEQUENCE TO GUARENTEE THAT THE PROPER PREDETERMINED TEST PATTERNS HAVE BEEN WRITTEN ON THE PACK. (SEE APPENDIX A FOR DETAILS) AFTER THE PACK HAS BEEN COMPLETELY WRITTEN TESTING WILL BEGIN USING THE PREVIOUS PARAMETERS AS DESCRIBED IN THE TN COMMAND.

  WRITING OF THE PACKS WILL TAKE 4 TO 5 MINUTES PER PACK WITH MAXIMUM BUFFER SIZE. THE WRITING OF THE PACK MAY TAKE LONGER IF THE MAXIMUM BUFFER SIZE SPECIFIED IS SMALL. RANDOM EXERCISE CAN BE DONE ON SOME DRIVES WHILE EXERCISE ON OTHER DRIVES ARE IN PROGRESS.

NOTE: IF AN ERROR OCCURS DURING THE DRIVE ASSIGNMENT SEQUENCE OR WHILE WRITING THE RANDOM SET OF LEGAL PATTERNS, THE ERROR WILL BE REPORTED AND TESTING WILL NOT START.

EXAMPLES:

COMMAND SEQUENCE	ACTION TAKEN
TA<CR>	INITIATE TESTING ON ALL DRIVES ON SYSTEM
T1<CR>	INITIATE TESTING ON DRIVE 1
T3<CR>	INITIATE TESTING ON DRIVE 3 (TESTING STILL CONTINUES ON DRIVE 1)
SA<CR>	GATHER STATISTICS ON ALL DRIVES UNDER TEST.
DA<CR>	DROP ALL DRIVES UNDER TEST.

4.2 DRIVE PARAMETERS (PER EACH DRIVE)

A SET OF THESE PARAMETERS EXISTS FOR EACH DRIVE. A TN COMMAND WILL UTILIZE THE PREVIOUSLY ESTABLISHED PARAMETERS FOR THE DRIVE(S). A PN COMMAND WILL ALLOW THE OPERATOR TO ALTER ALL THE PARAMETERS FOR THE DRIVE(S).

A <CR> WILL DEFAULT CURRENT PARAMETERS. A CONTROL Z <^Z> <CR> WILL DEFAULT ALL THE REST OF THE PARAMETERS. A CONTROL C <^C> <CR> WILL RETURN TO FIRST PARAMETER ENTRY REQUEST. FOR THIS DRIVE. A RUBOUT CANCELS THE LAST CHARACTER TYPED. A CONTROL U <^U> CANCELS LINE BEING TYPED. ALL ENTRIES MUST BE TERMINATED WITH CARRIAGE RETURN.

M1

PARAMETER	DEFAULT VALUE
- MAXIMUM CYLINDER FOR START OF DATA TRANSFER 0 - 632	632
- MINIMUM CYLINDER FOR START OF DATA TRANSFER 0 - 632	0
- MAXIMUM TRACK FOR START OF DATA TRANSFER 0 - 2	2
- MINIMUM TRACK FOR START OF DATA TRANSFER 0 - 2	0
- MAXIMUM SECTOR FOR START OF DATA TRANSFER 0 - 25	25
- MINIMUM SECTOR FOR START OF DATA TRANSFER 0 - 25	0
- RATIO OF READ/WRITE EVERY COMMAND RANDOMLY GENERATED BY THE PROGRAM WILL BE EITHER A READ OR A WRITE. FOR EACH DRIVE ONE CAN WEIGHT THE COMMANDS TOWARDS READING OR WRITING. THE POSSIBLE WEIGHTING RATIO'S ARE: READ ONLY =0 7/1 =1 3/1 =2 5/3 =3 1/1 =4 3/5 =5 1/3 =6 1/7 =7	5/3
- DO WRITE CHECK AFTER EVERY WRITE COMMAND OTHERWISE, WRITE CHECK COMMANDS WILL BE ISSUED RANDOMLY AFTER WRITE COMMANDS.	NO
- CORRECTABLE READ ERROR THRESHOLD	10
- UNCORRECTABLE READ ERROR THRESHOLD	5
- SEEK ERROR THRESHOLD	5
- INHIBIT ERROR CORRECTION	NO
- OPERATION COUNT THRESHOLD*65K	4.290*10**9
- DATA TRANSFER THRESHOLD*520F WORDS	291*10**12
- SAMPLED COMPARES	YES
- UP TO 5 EXCLUDED PACK AREAS (NO DATA TRANSFER WILL BE DONE TO THESE AREAS.)	NO EXCLUDED PACK AREAS

A2

4.2.1 FORMATS FOR PACK AREA EXCLUSION

FORMAT	ACTION
CYL<CR>	ALL TRACK ON CYLINDER SPECIFIED WILL BE EXCLUDED.
CYL,TRK<CR>	THE ENTIRE TRACK WILL BE EXCLUDED.
CYL1,TRK1,CYL2,TRK2<CR>	ALL TRACKS FROM CYLINDER 1 TRACK 1 TO AND INCLUDING CYLINDER 2 TRACK 2 WILL BE EXCLUDED.

4.3 DIAGNOSTIC DUMP

DUE TO THE COMPLEXITY OF THIS PROGRAM A DUMP OF THE PROGRAM TABLES MUST ACCOMPANY EACH PROBLEM REPORT. THIS DUMP IS PROVIDED IN THE PROGRAM AND IS ACTIVATED BY STARTING THE PROGRAM AT LOCATION 220. THIS DUMP WILL PRINT THE PROCESSOR REGISTERS WHEN THE DUMP IS CALLED. IT WILL THEN PRINT ABOUT 12-15 TELETYPE PAGES OF SOFTWARE TABES NECESSARY TO DETERMINE WHAT THE PROBRAM WAS DOING AT A GIVEN TIME. APPROXIMATE TIME OF DUMP IS 10-12 MINUTES.

5.0 PROGRAM DESCRIPTION

THIS PROGRAM ASSUMES THAT ONLY THE PATTERNS WRITTEN BY THIS PROGRAM WILL BE ON THE PACK. TO PRECONDITION THE PACK A WN COMMAND MUST BE DONE. PACK SERIAL, DRIVE SERIAL NUMBER, THE TIME, AND DRIVE N UNDER TEST WILL BE PRINTED AT THE END OF PACK PRECONDITIONING. THE OPERATION OF THE PROGRAM IS DEPENDENT ON THE SWITCH REGISTER, SYSTEM PARAMETERS, AND DRIVE PARAMETERS. DRIVES MAY BE DROPPED FROM TEST BY USING THE DN COMMAND. IF A DRIVE IS DROPPED FOR ANY REASON, PERFORMANCE STATISTICS WILL AUTOMATICALLY BE PRINTED.

5.1 PROGRAM RESTRICTIONS

THIS PROGRAM WILL NOT RUN IN CHAIN MODE UNDER XXDP. NO END-OF-PASS INDICATOR IS PROVIDED FOR ACT. THE APT PROTOCOL HAS NOT BEEN DETERMINED YET.

6.0 PRINT OUTS

6.1 PERFORMANCE SUMMARY TYPEOUT

THE PERFORMANCE SUMMARY WILL CONTAIN THE FOLLOWING INFORMATION:

- DRIVE NUMBER
- DRIVE SERIAL NUMBER
- TIME OF REPORT (IF REAL TIME CLOCK IS AVAILIABLE)
- NUMBER OF ORDERS PERFORMED BY DRIVE
- NUMBER OF SEEK OPERATIONS PERFORMED
- TOTAL NUMBER OF WORDS WRITTEN BY DRIVE*65K
- TOTAL NUMBER OF WORDS READ BY DRIVE*65K
- NUMBER OF SOFT DATA ERRORS
  - (ECC CORRECTABLE)
  - (REREAD CORRECTABLE)
  - (OFFSET CORRECTABLE)
- NUMBER OF HARD DATA ERRORS
- NUMBER OF SEEK INCOMPLETES
- NUMBER OF MISPOSITIONING ERRORS
- TOTAL NUMBER OF ALL OTHER ERRORS.

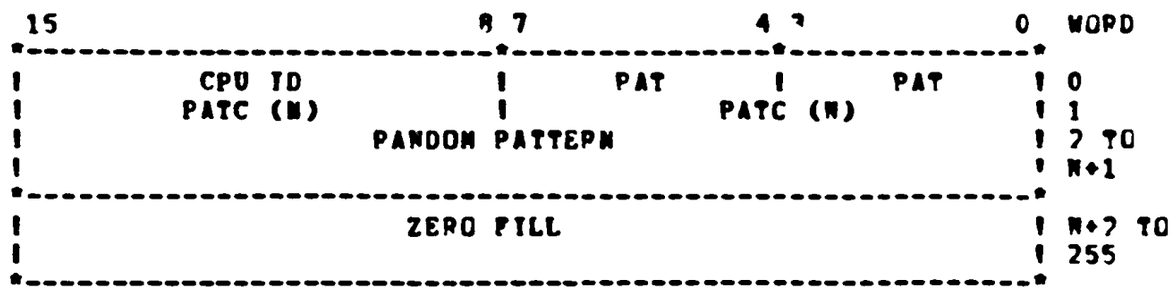
6.2 ERROR REPORTS

THE ERROR REPORTS WILL CONTAIN THE FOLLOWING INFORMATION:

- DRIVE NUMBER
- DRIVE SERIVAL NUMBER
- TIME ERROR OCCURRED (IF REAL TIME CLOCK IS AVAILIAPLE)
- DESCPIPTION OF ERROR
- PRESENT COMMAND
- PREVIOUS COMMAND
- PRESENT POSITION
- PREVIOUS POSITION
- ALL DRIVE STATUS REGISTERS
- ALL CONTROLLER REGISTERS
- MEMORY ADDRESS, GOOD DATA AND BAD DATA (IF DATA ERROR)
- OFFSET VALUE (IF APPLICABLE)
- HEADER READ (IF MISPOSITIONING ERROR)
- ECC PATTERN AND POSITION REGISTER IF DATA CHECKED

APPENDIX A

FIGURE A-1 SHOWS THE DATA EXPECTED BY THIS PROGRAM FOR EACH SECTOR OF THE RF06 PACK USED BY THIS PROGRAM.



CPU ID — CPU IDENTIFIER SUPPLED BY THE OPERATOR

PAT — PATTERN USED

PATC — PATTERN COUNT (NUMBERR OF WORDS OF PATTERN WRITTEN)

FIGURE A-1

EXPECTED DATA FORMAT

DATA PATTERNS USED

PATTERN 0	PATTERN 1	PATTERN 2	PATTERN 3
165555	026455	007417	052525
133333	151322	170360	125252
165555	026455	007417	052525
133333	026455	007417	052525
165555	151322	170360	125252
133333	151322	170360	125252
165555	026455	007417	052525
133333	026455	007417	052525
165555	026455	007417	052525
133333	151322	170360	125252
165555	151322	170360	125252
133333	151322	170360	125252
165555	026455	007417	052525
133333	026455	007417	052525
165555	026455	007417	052525
133333	026455	007417	052525
165555	151322	170360	125252
133333	151322	170360	125252
165555	151322	170360	125252
133333	151322	170360	125252
165555	026455	007417	052525
133333	026455	007417	052525
165555	026455	007417	052525
133333	026455	007417	052525
165555	151322	170360	125252
133333	151322	170360	125252
165555	026455	007417	052525
133333	151322	170360	125252
165555	026455	007417	052525
133333	151322	170360	125252
165555	026455	007417	052525
133333	151322	170360	125252
165555	026455	007417	052525
133333	151322	170360	125252
165555	026455	007417	052525
133333	151322	170360	125252
165555	026455	007417	052525
133333	151322	170360	125252

PATTERN 4	PATTERN 5	PATTERN 6	PATTERN 7
000000	000000	000001	000001
010421	177777	000003	000002
021042	000000	000007	000004
031463	000000	000017	000010
042104	177777	000037	000020
052525	177777	000077	000040
063146	000000	000177	000100
073567	000000	000377	000200
104210	000000	000777	000400
114631	177777	001777	001000
125252	177777	003777	002000
135673	177777	007777	004000
146314	000000	017777	010000
156735	000000	037777	020000
167356	000000	077777	040000
177777	000000	177777	100000
177777	177777	177776	100000
167356	177777	177774	040000
156735	177777	177770	020000
146314	177777	177760	010000
135673	000000	177740	004000
125252	000000	177700	002000
114631	000000	177600	001000
104210	177777	177400	000400
073567	177777	177000	000200
063146	177777	176000	001000
052525	000000	174000	000040
042104	000000	170000	000020
031463	177777	160000	000010
021042	177777	140000	000004
010421	000000	100000	000002
000000	177777	000000	000001

PATTERN 10	PATTERN 11	PATTERN 12	PATTERN 13
177776	172666	153333	000000
177775	155555	066667	177777
177773	172666	153333	177777
177767	155555	066667	177777
177757	172666	153333	177777
177737	155555	066667	177777
177677	172666	153333	177777
177577	155555	066667	177777
177377	172666	153333	177777
176777	155555	066667	177777
175777	172666	153333	177777
173777	155555	066667	177777
167777	172666	153333	177777
157777	155555	066667	177777
137777	172666	153333	177777
077777	155555	066667	177777
077777	172666	153333	177777
177777	155555	066667	177777
157777	172666	153333	177777
167777	155555	066667	177777
173777	172666	153333	177777
175777	155555	066667	177777
176777	172666	153333	177777
177377	155555	066667	177777
177577	172666	153333	177777
177677	155555	066667	177777
177737	172666	153333	177777
177757	155555	066667	177777
177767	172666	153333	177777
177773	155555	066667	177777
177775	172666	153333	177777
177776	155555	066667	177777

PATTERN 14	PATTERN 15	PATTERN 16	PATTERN 17
177777	172304	070627	133467
000000	172304	113431	133467
000000	172304	014561	133467
000000	172304	070627	133467
000000	172304	113431	133467
000000	172304	014561	133467
000000	172304	070627	133467
000000	172304	113431	133467
000000	172304	014561	133467
000000	172304	070627	133467
000000	172304	113431	133467
000000	172304	014561	133467
000000	172304	070627	133467
000000	172304	113431	133467
000000	172304	014561	133467
000000	172304	070627	133467
000000	172304	113431	133467
000000	172304	014561	133467
000000	172304	070627	133467
000000	172304	113431	133467
000000	172304	014561	133467
000000	172304	070627	133467
000000	172304	113431	133467
000000	172304	014561	133467
000000	172304	070627	133467
000000	172304	113431	133467
000000	172304	014561	133467
000000	172304	070627	133467
000000	172304	113431	133467
000000	172304	014561	133467
000000	172304	070627	133467
000000	172304	113431	133467

H2

I2

K2

```
                        .TITLE  RK611/RK06 PERFORMANCE EXERCISER MAINDEC DZR6P-B
                        ;*COPYRIGHT (C) 1976
                        ;*DIGITAL EQUIPMENT CORP.
                        ;*MAYNARD, MASS. 01754
                        ;*
                        ;*PROGRAM BY ROY SPITZER
                        ;*
                        ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                        ;*PACKAGE (MAINDEC-11-DZQAC-C1),MAR 24, 1976.
                        ;*

                        ;;*****************************************************************
                        ;*
                        ;*      THE RK06 PERFORMANCE EXERCISER WILL EXERCISE 1 TO 8
                        ;*      RK06 DISK DRIVES ATTACHED TO THE SAME RK06
                        ;*      UNIBUS CONTROLLER IN A DEDICATED STAND ALONE MODE.
                        ;*
                        ;*      UNDER NORMAL OPERATION SITUATIONS, THE DRIVE IS
                        ;*      CHOSEN RANDOMLY FROM ANY ONE OF THE RK06 DRIVES UNDER TEST
                        ;*      WHICH IS NOT CURRENTLY UNDERGOING ERROR RECOVERY.
                        ;*      TO OPTIMIZE THE THROUGHOUT ON THE RK06 CONTROLLER EACH
                        ;*      DATA TRANSFER COMMAND IS TRANSLATED INTO A SEEK FOLLOWED
                        ;*      BY THE DATA TRANSFER COMMAND.
                        ;*
                        ;;*****************************************************************
                        .SBTTL  OPERATIONAL SWITCH SETTINGS
                        ;*
                        ;*      SWITCH              USE
                        ;*      ------      --------------------
                        ;*        15        HALT ON ERROR
                        ;*        14        LOOP ON TEST
                        ;*        13        INHIBIT ERROR TYPEOUTS
                        ;*        10        BELL ON ERROR
                        ;*         6        INHIBIT AUTOMATIC DRIVE DEASSIGNMENT IF UNSAFE,
                        ;*                  AC LOW, OR SPEED LOSS OCCURS
                        ;*         5        INHIBIT AUTOMATIC DRIVE DEASSIGNMENT WHEN
                        ;*                  MAXIMUM COMMAND COUNT FOR DRIVE IS EXCEEDED
                        ;*         4        INHIBIT AUTOMATIC DRIVE DEASSIGNMENT WHEN
                        ;*                  ERROR THRESHOLD EXCEEDED
                        ;*         3        DUMP ENTIRE SECTOR BEFORE BEGINNING RETRY SEQUENCE
                        ;*         1        INHIBIT SOFTWARE DATA COMPARISONS
```

```
                        .SBTTL  BASIC DEFINITIONS

                        ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
001100                  STACK=  1100
                        .EQUIV  EMT,ERROR       ;;BASIC DEFINITION OF ERROR CALL
                        .EQUIV  IOT,SCOPE       ;;BASIC DEFINITION OF SCOPE CALL

                        ;*MISCELLANEOUS DEFINITIONS
000011                  HT=     11              ;;CODE FOR HORIZONTAL TAB
000012                  LF=     12              ;;CODE FOR LINE FEED
000015                  CR=     15              ;;CODE FOR CARRIAGE RETURN
000200                  CRLF=   200             ;;CODE FOR CARRIAGE RETURN-LINE FEED
177776                  PS=     177776          ;;PROCESSOR STATUS WORD
                        .EQUIV  PS,PSW
177774                  STKLMT= 177774          ;;STACK LIMIT REGISTER
177772                  PIRQ=   177772          ;;PROGRAM INTERRUPT REQUEST REGISTER
177570                  DSWR=   177570          ;;HARDWARE SWITCH REGISTER
177570                  DDISP=  177570          ;;HARDWARE DISPLAY REGISTER

                        ;*GENERAL PURPOSE REGISTER DEFINITIONS
000000                  R0=     %0              ;;GENERAL REGISTER
000001                  R1=     %1              ;;GENERAL REGISTER
000002                  R2=     %2              ;;GENERAL REGISTER
000003                  R3=     %3              ;;GENERAL REGISTER
000004                  R4=     %4              ;;GENERAL REGISTER
000005                  R5=     %5              ;;GENERAL REGISTER
000006                  R6=     %6              ;;GENERAL REGISTER
000007                  R7=     %7              ;;GENERAL REGISTER
000006                  SP=     %6              ;;STACK POINTER
000007                  PC=     %7              ;;PROGRAM COUNTER

                        ;*PRIORITY LEVEL DEFINITIONS
000000                  PR0=    0               ;;PRIORITY LEVEL 0
000040                  PR1=    40              ;;PRIORITY LEVEL 1
000100                  PR2=    100             ;;PRIORITY LEVEL 2
000140                  PR3=    140             ;;PRIORITY LEVEL 3
000200                  PR4=    200             ;;PRIORITY LEVEL 4
000240                  PR5=    240             ;;PRIORITY LEVEL 5
000300                  PR6=    300             ;;PRIORITY LEVEL 6
000340                  PR7=    340             ;;PRIORITY LEVEL 7

                        ;**SWITCH REGISTER" SWITCH DEFINITIONS
100000                  SW15=   100000
040000                  SW14=   40000
020000                  SW13=   20000
010000                  SW12=   10000
004000                  SW11=   4000
002000                  SW10=   2000
001000                  SW09=   1000
000400                  SW08=   400
000200                  SW07=   200
000100                  SW06=   100
000040                  SW05=   40
000020                  SW04=   20
000010                  SW03=   10
000004                  SW02=   4
```

M2

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000002          SW01=   2
000001          SW00=   1
                .EQUIV  SW09,SW9
                .EQUIV  SW08,SW8
                .EQUIV  SW07,SW7
                .EQUIV  SW06,SW6
                .EQUIV  SW05,SW5
                .EQUIV  SW04,SW4
                .EQUIV  SW03,SW3
                .EQUIV  SW02,SW2
                .EQUIV  SW01,SW1
                .EQUIV  SW00,SW0

                ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
100000          BIT15=  100000
040000          BIT14=  40000
020000          BIT13=  20000
010000          BIT12=  10000
004000          BIT11=  4000
002000          BIT10=  2000
001000          BIT09=  1000
000400          BIT08=  400
000200          BIT07=  200
000100          BIT06=  100
000040          BIT05=  40
000020          BIT04=  20
000010          BIT03=  10
000004          BIT02=  4
000002          BIT01=  2
000001          BIT00=  1
                .EQUIV  BIT09,BIT9
                .EQUIV  BIT08,BIT8
                .EQUIV  BIT07,BIT7
                .EQUIV  BIT06,BIT6
                .EQUIV  BIT05,BIT5
                .EQUIV  BIT04,BIT4
                .EQUIV  BIT03,BIT3
                .EQUIV  BIT02,BIT2
                .EQUIV  BIT01,BIT1
                .EQUIV  BIT00,BIT0

                ;*BASIC "CPU" TRAP VECTOR ADDRESSES
000004          ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
000010          RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
000014          TBITVEC=14              ;;"T" BIT
000014          TRTVEC= 14              ;;TRACE TRAP
000014          BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
000020          IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
000024          PWRVEC= 24              ;;POWER FAIL
000030          EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
000034          TRAPVEC=34              ;;"TRAP" TRAP
000060          TKVEC=  60              ;;TTY KEYBOARD VECTOR
000064          TPVEC=  64              ;;TTY PRINTER VECTOR
000240          PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR
000240          APRIOR= PR5                     ;RK611 PRIORITY
120210          AVECT1= 120210                  ;RK611 VECTOR
```

A3

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                        ABASE=  177440          ;RK611 BASE
                        MEMVEC= 114             ;VECTOR FOR MEMORY CHECK ENABLE
                        MEMBAS= 172100          ;BUS ADDRESS FOR MEMORY CHECK ENABLE
                        PAR.EN= 1               ;MEMORY ENABLE MEMORY CHECKING

                        .SBTTL  RK06 CONTROLLER REGISTER DEFINITION

                        RKCS1=  0               ;CONTROL AND STATUS REGISTER 1
                        RKWC=   2               ;WORD COUNT REGISTER
                        RKBA=   4               ;BUS ADDRESS REGISTER
                        RKDA=   6               ;DESIRED TRACK SECTOR REGISTER
                        RKCS2=  10              ;CONTROL AND STATUS REGISTER 2
                        RKDS=   12              ;DRIVE STATUS REGISTER
                        RKER=   14              ;ERROR REGISTER
                        RKASOF= 16              ;ATTENTION SUMMARY AND OFFSET REGISTER
                        RKDC=   20              ;DESIRED CYLINDER REGISTER
                        RKDCYL= 20              ;DESIRED CYLINDER REGISTER
                        RKDB=   24              ;DATA BUFFER
                        RKMR1=  26              ;MAINTENANCE REGISTER 1
                        RKMR2=  34              ;MAINTENANCE REGISTER 2
                        RKMR3=  36              ;MAINTENANCE REGISTER 3
                        RKPOS=  30              ;ECC POSITION INFORMATION
                        RKECPS= 30              ;ECC POSITION INFORMATION
                        RKPAT=  32              ;ECC PATTERN INFORMATION
                        RKECPT= 32              ;ECC PATTERN INFORMATION

                        .SBTTL  DRIVE COMMANDS

                        SELDRV= 101             ;SELECT DRIVE
                        PACK=   103             ;PACK ACKNOWLEDGE
                        CLEAR=  105             ;DRIVE CLEAR
                        UNLOAD= 107             ;UNLOAD
                        SPTSPL= 111             ;START SPINDLE
                        RECAL=  113             ;RECALIBRATE
                        OFFSET= 115             ;OFFSET
                        SEEK=   117             ;SEEK
                        RDDATA= 121             ;READ DATA
                        WRDATA= 123             ;WRITE DATA
                        RDHEAD= 125             ;READ HEADER
                        WRHEAD= 127             ;WRITE HEADER AND DATA
                        WRTCHK= 131             ;WRITE CHECK

                        ;       THE FOLLOWING ARE NOT DRIVE COMMANDS BUT ARE USED BY THE DRIVER
                        ;       TO SIMULATE A SPECIFIC DESIRED OPERATION

                        RELEAS= 140             ;RELEASE DRIVE
                        RDSTAT= 141             ;GET ALL STATUS FROM DRIVE
                        RDALHD= 164             ;READ ALL HEADERS
                        CONCLR= 176             ;CONTROLLER CLEAR (BIT 15 OF CS1)
                        SUBCLR= 177             ;SUBSYSTEM CLEAR (BIT 5 OF CS2)
                        INTR=   300             ;GENERATE INTERRUPT TO CPU

                        ;       DRIVER ISSUED SERVICE COMMANDS

                        DR.SEL= 001             ;DRIVE SELECT
                        DR.CLR= 005             ;DRIVE CLEAR
```

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                        .SBTTL  CONTROL AND STATUS REGISTER 1 BITS

000001          GO=     BIT0                    ;GO BIT
000100          IE=     BIT6                    ;INTERRUPT ENABLE
000200          RDY=    BIT7                    ;CONTROLLER READY
000400          BA16=   BIT8                    ;BUS ADDRESS BIT 16
001000          BA17=   BIT9                    ;BUS ADDRESS BIT 17
002000          CDT=    BIT10                   ;CONTROLLER DRIVE TYPE (0=RK06)
004000          CTO=    BIT11                   ;CONTROLLER TIMED OUT WAITING FOR
                                                ;  DRIVE RESPONSE
010000          CFMT=   BIT12                   ;CONTROLLER DRIVE FORMAT (0=22 SECTOR, 1=20 SECTOR)
020000          SPAR=   BIT13                   ;DRIVE BUS PARITY ERROR DETECTED BY CONTROLLER
040000          DI=     BIT14                   ;DRIVE INTERRUPT
100000          CERR=   BIT15                   ;CONTROLLER ERROR
100000          CCLR=   BIT15                   ;CONTROLLER CLEAR

                ;       THESE BIT DEFINITIONS ARE USED FOR ADDRESS
                ;       THE HIGH BYTE OF RKCS1

000001          B.BA16= BIT0                    ;BUS ADDRESS BIT 16
000002          B.BA17= BIT1                    ;BUS ADDRESS BIT 17
000004          B.CDT=  BIT2                    ;CONTROLLER DRIVE TYPE (0=RK06)
000020          B.CFMT= BIT4                    ;CONTROLLER DRIVE FORMAT (0=22 SECTOR, 1=20 SECTOR)

                        .SBTTL  CONTROL AND STATUS REGISTER 2 BITS

000007          DRVMSK= 7                       ;MASK FOR DRIVE SELECTION CODE
000010          DESL=   BIT3                    ;DESELECT OR RELEASE DRIVE IN BITS 0-2
000010          RLS=    BIT3                    ;DESELECT OR RELEASE DRIVE IN BITS 0-2
000020          BAI=    BIT4                    ;BUS ADDRESS INCREMENT INHIBIT
000040          CLR=    BIT5                    ;CLEAR CONTROLLER AND ALL DRIVES
000040          SCLR=   BIT5                    ;CLEAR CONTROLLER AND ALL DRIVES
000100          IR=     BIT6                    ;INPUT READY
000200          OR=     BIT7                    ;OUTPUT READY
000400          UPE=    BIT8                    ;UNIT FIELD ERROR
001000          MDS=    BIT9                    ;MULTIPLE DRIVE SELECT
002000          PGE=    BIT10                   ;PROGRAMMING ERROR
004000          NEM=    BIT11                   ;NON-EXISTENT MEMORY
010000          NED=    BIT12                   ;NON-EXISTENT DRIVE
020000          UPE=    BIT13                   ;UNIBUS PARITY ERROR
040000          WCE=    BIT14                   ;WRITE CHECK ERROR
100000          DLT=    BIT15                   ;DATA LATE ERROR

                        .SBTTL  ERROR REGISTER BIT DEFINITION

000001          ILC=    BIT0                    ;ILLEGAL FUNCTION CODE
                ;*ILF=  BIT0                    ;ILLEGAL FUNCTION CODE
000002          SKI=    BIT1                    ;SEEK INCOMPLETE
000004          ILF=    BIT2                    ;ILLEGAL DRIVE FUNCTION
000004          NXF=    BIT2                    ;ILLEGAL DRIVE FUNCTION
000010          DRPAR=  BIT3                    ;DRIVE DETECTED DRIVE BUS PARITY ERROR
000020          FMTE=   BIT4                    ;FORMAT ERROR
000040          DTYE=   BIT5                    ;DRIVE TYPE ERROR
000100          ECH=    BIT6                    ;ECC HARD
000200          BSE=    BIT7                    ;BAD SECTOR ERROR
```

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000400                  HCRC=   BIT8            ;HEADER CRC ERROR
000400                  HVRC=   BIT8            ;HEADER VRC ERROR
001000                  COE=    BIT9            ;CYLINDER ADDRESS OVERFLOW ERROR
002000                  IDAE=   BIT10           ;INVALID DISK ADDRESS ERROR
004000                  WLE=    BIT11           ;WRITE LOCK ERROR
010000                  DTE=    BIT12           ;DRIVE TIMING ERROR
020000                  OPI=    BIT13           ;OPERATION (SEARCH) INCOMPLETE
040000                  UNS=    BIT14           ;DRIVE UNSAFE
100000                  DCK=    BIT15           ;DATA CHECK

                        .SBTTL  STATUS REGISTER BIT DEFINITION

000001                  DRA=    BIT0            ;DRIVE AVAILABLE (CONTROLLER IS SET IF
                                                ;  THIS BIT IS RESET)
000004                  OFST=   BIT2            ;DRIVE OFFSET
000010                  ACLO=   BIT3            ;AC LOW
000020                  SPDLSS= BIT4            ;SPEED LOSS
000020                  DCLO=   BIT4            ;DC LOW
000040                  DROT=   BIT5            ;DRIVE OFF TRACK
000100                  VV=     BIT6            ;VOLUME VALID
000200                  DRY=    BIT7            ;DRIVE READY
000200                  DRDY=   BIT7            ;DRIVE READY
000400                  DDT=    BIT8            ;DRIVE TYPE (0=RK06)
004000                  WRL=    BIT11           ;WRITE LOCK
020000                  PIP=    BIT13           ;POSITIONING IN PROGRESS
040000                  DSC=    BIT14           ;DRIVE STATUS CHANGE
100000                  SVAL=   BIT15           ;STATUS VALID

                        .SBTTL  MAINTENANCE REGISTER 1 BIT DEFINITION

000017                  MESMSK= 17              ;MESSAGE MASK

000020                  PAT=    BIT4            ;FORCE EVEN PARITY ON DRIVE BUS MESSAGE LINES
000040                  DMD=    BIT5            ;DIAGNOSTIC MODE
000100                  MSP=    BIT6            ;MAINTENANCE SECTOR PULSE
000200                  MIND=   BIT7            ;MAINTENANCE INDEX
000400                  MCLK=   BIT8            ;MAINTENANCE CLOCK
001000                  MERD=   BIT9            ;MAINTENANCE ENCODED READ DATA
002000                  MEWD=   BIT10           ;MAINTENANCE ENCODED WRITE DATA
004000                  PCA=    BIT11           ;PRECOMPENSATION ADVANCE
010000                  PCD=    BIT12           ;PRECOMPENSATION DELAY
020000                  ECCM=   BIT13           ;ECC WORD IS BEING READ OR WRITTEN
040000                  WRTGAT= BIT14           ;WRITE GATE
100000                  RDGATE= BIT15           ;READ GATE

                        .SBTTL  DEFINITION OF DRIVE STATUS BYTE 00 MESSAGE A

000040                  S.DRA=  BIT5            ;DRIVE AVAILIABLE
000100                  S.VV=   BIT6            ;VOLUME VALID
000200                  S.DRY=  BIT7            ;DRIVE READY
000400                  S.TYPE= BIT8            ;DRIVE TYPE
001000                  S.FORM= BIT9            ;DRIVE FORMAT
002000                  S.OFF=  BIT10           ;OFFSET
004000                  S.WRL=  BIT11           ;WRITE LOCK
010000                  S.SPIN= BIT12           ;SPINDLE ON
020000                  S.PIP=  BIT13           ;POSITIONING IN PROGRESS
```

D3

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                040000          S.DSC=  BIT14                   ;DRIVE STATUS CHANGE

                                .SBTTL  DEFINITION OF DRIVE STATUS BYTE 00 MESSAGE B

                000040          S.ICYL= BIT5                    ;ILLEGAL CYLINDER ADDRESS
                000100          S.ACLO= BIT6                    ;AC LOW
                000200          S.FLT=  BIT7                    ;DRIVE FAULT
                000400          S.ILF=  BIT8                    ;ILLEGAL FUNCTION
                001000          S.PAR=  BIT9                    ;DRIVE DETECTED DRIVE BUS PARITY ERROR
                002000          S.SKI=  BIT10                   ;SEEK INCOMPLETE
                004000          S.WLE=  BIT11                   ;WRITE LOCK ERROR
                010000          S.SPLS= BIT12                   ;SPEED LOSS
                010000          S.DCLO= BIT12                   ;DC LOW
                020000          S.DROT= BIT13                   ;DRIVE OFF TRACK
                040000          S.UNS=  BIT14                   ;DRIVE UNSAFE

                                .SBTTL  DEFINITION OF DRIVE STATUS BYTE 01 MESSAGE A

                000020          S.XDOK= BIT4                    ;TRANSDUCER OK
                000040          S.HDHM= BIT5                    ;HEADS HOME
                000100          S.BRHM= BIT6                    ;BRUSHES HOME
                000200          S.DOOR= BIT7                    ;DOOR INTERLOCKED
                000400          S.CART= BIT8                    ;CARTRAGE INTERLOCK
                001000          S.SPOK= BIT9                    ;SPEED OK
                002000          S.FWD=  BIT10                   ;FORWARD
                004000          S.REV=  BIT11                   ;REVERSE
                010000          S.LOAD= BIT12                   ;HEADS LOADING
                020000          S.RTZ=  BIT13                   ;RETURN TO ZERO
                040000          S.UNLD= BIT14                   ;HEADS UNLOADING

                                .SBTTL  DEFINITION OF DRIVE STATUS BYTE 01 MESSAGE B

                000020          S.SECT= BIT4                    ;SECTOR ERROR
                000040          S.WCLK= BIT5                    ;WRITE CLOCK AND NO WRITE GATE
                000100          S.WGAT= BIT6                    ;WRITE GATE AND NO TRANSISTIONS
                000200          S.HDFL= BIT7                    ;HEAD FAULT
                000400          S.MHD=  BIT8                    ;MULTIPLE HEAD SELECT
                001000          S.XFER= BIT9                    ;INDEX ERROR
                002000          S.DIB=  BIT10                   ;DIBIT ERROR
                004000          S.PLO=  BIT11                   ;PLO ERROR
                010000          S.NMOV= BIT12                   ;SEEK AND NO MOTION
                020000          S.LIMD= BIT13                   ;LIMIT DETECT ON SEEK
                040000          S.BRKE= BIT14                   ;SERVO-BRAKE

                                .SBTTL  COMMON MASKS

                000007          M.DRV=  7                       ;DRIVE CODE
                100000          M.PAR=  BIT15                   ;PARITY
                000003          M.ID=   3                       ;BYTE ID
                017760          M.CDIF= 17760                   ;CYLINDER DIFFERENCE/OFFSET
                017760          M.CADD= 17760                   ;CYLINDER ADDRESS
                077770          M.SER=  77770                   ;DRIVE SERIAL NUMBER
                000760          M.SECT= 760                     ;SECTOR COUNT
                007000          M.HEAD= 7000                    ;HEAD DECODE

                                .SBTTL  DEFAULT DRIVE VALUES
```

```
                        
000000                  D.MNCL= 0                       ;MINIMUM CYLINDER
000632                  D.MXCL= 410.                    ;MAXIMUM CYLINDER
000000                  D.MNTR= 0                       ;MINIMUM TRACK
000002                  D.MXTR= 2                       ;MAXIMUM TRACK
000000                  D.MNSC= 0                       ;MINIMUM SECTOR
000025                  D.MXSC= 21.                     ;MAXIMUM SECTOR
000003                  D.RATE= 3                       ;READ/WRITE RATIO (5/3)
000000                  D.AWCK= 0                       ;NO AUTOMATIC WRITE-CHECK AFTER EVERY WRITE
000012                  D.CERT= 10.                     ;CORRECTABLE READ ERROR THRESHOLD
000005                  D.UERT= 5                       ;UNCORRECTABLE READ ERROR THRESHOLD
000005                  D.SKET= 5                       ;SEEK ERROR THRESHOLD
077777                  D.CTRH= 77777                   ;COMMAND COUNT THRESHOLD
177770                  D.CTRL= 177770                  ;  (MAXIMUM OF COMMANDS ISSUED TO DRIVE)
077777                  D.WTHI= 77777                   ;WORDS TRANSFERRED THRESHOLD
177770                  D.WTLO= 177770                  ;  (MAXIMUM NUMBER OF WORDS READ OR WRITTEN
                                                        ;  ON PACK)
000020                  T.MER=  20                      ;THRESHOLD OF OTHER DRIVE ERRORS
                        
                        .SBTTL  OFFSET VALUES
                        
000060                  OFFP12= 060                     ;OFFSET +1200 MICRO-INCHES
000040                  OFFP8=  040                     ;OFFSET +800 MICRO-INCHES
000020                  OFFP4=  020                     ;OFFSET +400 MICRO-INCHES
000220                  OFFM4=  220                     ;OFFSET -400 MICRO-INCHES
000240                  OFFM8=  240                     ;OFFSET -800 MICRO-INCHES
000260                  OFFM12= 260                     ;OFFSET -1200 MICRO-INCHES
                        
                        .SBTTL  DEFAULT CONTROLLER THRESHOLD
                        
001000                  T.DLT=  1000                    ;THRESHOLD FOR DATA LATE
000012                  T.CONT= 10.                     ;THRESHOLD FOR OTHER CONTROLLER ERRORS
```

F3

```
                        .SBTTL  PARAMETER BLOCK ALLOCATION

                        ;*      ************************************************
                        ;*  1   ! COMMAND                ! DRIVE NO.           !  0
                        ;*  3   ! CYLINDER ADDRESS                             !  2
                        ;*  5   ! TRACK                  ! SECTOR              !  4
                        ;*  7   !BA16-17,FORMAT,DRV TYPE! OFFSET               !  6
                        ;* 11   ! BUS ADDRESS (LOW 16 BITS)                    ! 10
                        ;* 13   ! WORD COUNT (2'S COMPLEMENT)                  ! 12
                        ;* 15   ! PROGRAM DRIVE STATUS INFORMATION             ! 14
                        ;* 17   ! COMMAND AND STATUS REGISTER 1                ! 16
                        ;* 21   ! COMMAND AND STATUS REGISTER 2                ! 20
                        ;* 23   ! WORD COUNT REGISTER                          ! 22
                        ;* 25   ! BUS ADDRESS REGISTER                         ! 24
                        ;* 27   ! DESIRED TRACK AND SECTOR                     ! 26
                        ;* 31   ! DESIRED CYLINDER                             ! 30
                        ;* 33   ! ATTENTION SUMMARY AND DRIVE OFFSET           ! 32
                        ;* 35   ! ERROR REGISTER                               ! 34
                        ;* 37   ! STATUS REGISTER                              ! 36
                        ;* 41   ! MESSAGE LINE A STATUS BYTE 00                ! 40
                        ;* 43   ! MESSAGE LINE B STATUS BYTE 00                ! 42
                        ;* 45   ! MESSAGE LINE A STATUS BYTE 01                ! 44
                        ;* 47   ! MESSAGE LINE B STATUS BYTE 01                ! 46
                        ;* 51   ! MESSAGE LINE A STATUS BYTE 10                ! 50
                        ;* 53   ! MESSAGE LINE B STATUS BYTE 10                ! 52
                        ;* 55   ! MESSAGE LINE A STATUS BYTE 11                ! 54
                        ;* 57   ! MESSAGE LINE B STATUS BYTE 11                ! 56
                        ;* 61   ! ECC POSITION INFORMATION                     ! 60
                        ;* 63   ! ECC PATTERN INFORMATION                      ! 62
                        ;*      ************************************************

                        .SBTTL  PARAMETERS PASSED TO THE DRIVER

                        ;       THE FOLLOWING DEFINITIONS ARE USED TO PASS PARAMETERS
                        ;         TO THE RK06 DRIVER

000000                  P.DRVN= 0                       ;DRIVE NUMBER
000001                  P.CMND= 1                       ;COMMAND
000002                  P.CYLN= 2                       ;CYLINDER ADDRESS
000004                  P.SECT= 4                       ;SECTOR
000005                  P.TRCK= 5                       ;TRACK
000006                  P.OFST= 6                       ;OFFSET
000007                  P.CS1H= 7                       ;RKCS1 BITS 8-15
000007                  P.BAHI= 7                       ;BUS ADDRESS (BITS 16 AND 17)
000010                  P.BALO= 10                      ;BUS ADDRESS (BITS 0-15)
000012                  P.WC=   12                      ;WORD COUNT (2'S COMPLEMENT)
000014                  P.PRST= 14                      ;PROGRAM DRIVE STATUS INFORMATION

                        .SBTTL  PROGRAM DEVICE STATUS REGISTER DEFINITION

000001                  DRVUSE= BIT0                    ;DRIVE IN USE
000002                  DRVPOS= BIT1                    ;DRIVE POSITIONING
000004                  DRVPDT= BIT2                    ;DRIVE POSITIONED FOR DATA TRANSFER
000010                  UEXATT= BIT3                    ;UNEXPECTED ATTENTION
000020                  DRVHRD= BIT4                    ;DRIVE HAS HARD ERROR
000040                  DRVDSC= BIT5                    ;DRIVE STATUS CHANGE DID NOT CLEAR
```

```
000100                  CMDTO=  BIT6                    ;NO TERMINATION TO COMMAND FOR AT
                                                        ;  LEAST 1 SECOND
000200                  W.WCK=  BIT7                    ;WRITE PCR WRITE WRITE CHECK
000400                  NOCHK=  BIT8                    ;NO CHECK, DO NOT SET INTERRUPT ENABLE
001000                  PRSVAL= BIT9                    ;PARAMETER STATUS WORDS VALID
                                                        ;  (SET WHEN ERROR TERMINATION OR
                                                        ;  READ STATUS COMMAND)
002000                  DRPDRV= BIT10                   ;DROP DRIVE FROM TEST SEQUENCE
004000                  NODSC=  BIT11                   ;ATTENTION SET BUT DCS AND FAULT RESET
010000                  DRVSZD= BIT12                   ;DRIVE SEIZED BY OTHER PORT
020000                  E.UNLD= BIT13                   ;DRIVE UNLOADED DUE TO ERROR
040000                  Q.INIT= BIT14                   ;PARAMETER BLOCK ENQUEUED IN INITIATION QUEUE
100000                  DTBAII= BIT15                   ;INHIBIT BUS ADDRESS INCREMENT

                        .SBTTL  PARAMETERS PASSED FROM DRIVER TO PROGRAM

                        ;       THE FOLLOWING DEFINITIONS ARE USED FOR REGISTER RETURNS
                        ;         FROM THE DRIVER TO THE CALLING PROGRAM

000016                  P.CS1=  16                      ;COMMAND AND STATUS REGISTER 1
000020                  P.CS2=  20                      ;COMMAND AND STATUS REGISTER 2
000022                  P.WCR=  22                      ;WORD COUNT REGISTER
000024                  P.BAR=  24                      ;BUS ADDRESS REGISTER
000026                  P.DTS=  26                      ;DESIRED TRACK SECTOR REGISTER
000030                  P.DCYL= 30                      ;DESIRED CYLINDER REGISTER
000032                  P.ASOF= 32                      ;ATTENTION SUMMARY/OFFSET REGISTER
000034                  P.ER=   34                      ;ERROR REGISTER
000036                  P.DS=   36                      ;STATUS REGISTER
000040                  P.A00=  40                      ;MESSAGE A STATUS BYTE 00
000042                  P.B00=  42                      ;MESSAGE B STATUS BYTE 00
000044                  P.A01=  44                      ;MESSAGE A STATUS BYTE 01
000046                  P.B01=  46                      ;MESSAGE B STATUS BYTE 01
000050                  P.A10=  50                      ;MESSAGE A STATUS BYTE 10
000052                  P.B10=  52                      ;MESSAGE B STATUS BYTE 10
000054                  P.A11=  54                      ;MESSAGE A STATUS BYTE 11
000056                  P.B11=  56                      ;MESSAGE B STATUS BYTE 11
000060                  P.EPOS= 60                      ;ECC POSITION INFORMATION
000062                  P.EPAT= 62                      ;ECC PATTERN INFORMATION

                        .SBTTL  DRIVE SPECIFIC PARAMETERS

000064                  P.QLNK= 64                      ;QUEUE LINK
```

H3

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                        ;       THE FOLLOWING DEFINITIONS ARE USED FOR DRIVE PARAMETER ACCESS
                        
000066                  P.MNCL= 66              ;MINIMUM CYLINDER
000070                  P.MXCL= 70              ;MAXIMUM CYLINDER
000072                  P.MNTR= 72              ;MINIMUM TRACK
000073                  P.MXTR= 73              ;MAXIMUM TRACK
000074                  P.MNSC= 74              ;MINIMUM SECTOR
000075                  P.MXSC= 75              ;MAXIMUM SECTOR
000076                  P.RATE= 76              ;READ/WRITE RATIO
000077                  P.AWCK= 77              ;AUTOMATIC WRITE CHECK
000100                  P.CERT= 100             ;CORRECTABLE HEAD ERROR THRESHOLD
000102                  P.UERT= 102             ;UNCORRECTABLE READ ERROR THRESHOLD
000104                  P.SKET= 104             ;SEEK ERROR THRESHOLD
000106                  P.MXCD= 106             ;MAXIMUM COMMANDS ISSUED TO DRIVE
000112                  P.MXWT= 112             ;MAXIMUM NUMBER WORDS TRANSFERRED
000116                  P.SMPL= 116             ;SAMPLE COMPARE FLAG
000117                  P.ECMP= 117             ;ECC COMPARE FLAG
000120                  P.IERC= 120             ;INHIBIT ERROR CORRECTION
000121                  P.DPAT= 121             ;DATA PATTERN USED
                        
                        ;       THE FOLLOWING DEFINITIONS ARE USED IN STORING
                        ;         CURRENT RANDOMLY GENERATED COMMAND
                        
000122                  P.RDPT= 122             ;CURRENT RANDOMLY GENERATED DATA PATTERN
000123                  P.RCMD= 123             ;CURRENT RANDOMLY GENERATED COMMAND
000124                  P.RCYL= 124             ;CURRENT RANDOMLY GENERATED CYLINDER
000126                  P.RSEC= 126             ;CURRENT RANDOMLY GENERATED SECTOR
000127                  P.RTRK= 127             ;CURRENT RANDOMLY GENERATED TRACK
000130                  P.RWC=  130             ;CURRENT RANDOMLY GENERATED WORD COUNT
000132                  P.RBAL= 132             ;CURRENT RANDOMLY GENERATED BUS ADDRESS
000134                  P.RBAH= 134
                        
                        ;       THE FOLLOWING DEFINITIONS ARE USED IN STORING
                        ;         LAST ISSUED
                        
000135                  P.LCMD= 135             ;LAST COMMAND
000136                  P.LCYL= 136             ;LAST CYLINDER
000140                  P.LSEC= 140             ;LAST SECTOR
000141                  P.LTRK= 141             ;LAST TRACK
000142                  P.LWC=  142             ;LAST WORD COUNT
000144                  P.LDPT= 144             ;LAST DATA PATTERN
000145                  P.BUFF= 145             ;BUFFER ALLOCATED
```

```
                        ;       THE FOLLOWING IS USED FOR THE RETRY SEQUENCE
                        
000146                  P.RPCT= 146             ;RETRY COUNT
000147                  P.RERD= 147             ;RETRY INDICATION FOR DATA ERRORS
                                                ;0      NOT IN RETRY SEQUENCE
                                                ;1-20   REREAD AT CENTER LINE
                                                ;21     OFFSET +400 MICRO-INCHES
                                                ;22-23  REREAD OFFSET +400 MICRO-INCHES
                                                ;24     OFFSET -400 MICRO-INCHES
                                                ;25-26  REREAD OFFSET -400 MICRO-INCHES
                                                ;27     OFFSET +800 MICRO-INCHES
                                                ;30-31  REREAD OFFSET +800 MICRO-INCHES
                                                ;32     OFFSET -800 MICRO-INCHES
                                                ;33-34  REREAD OFFSET -800 MICRO-INCHES
                                                ;35     OFFSET +1200 MICRO-INCHES
                                                ;36-37  REREAD OFFSET +1200 MICRO-INCHES
                                                ;40     OFFSET -1200 MICRO-INCHES
                                                ;41-42  REREAD OFFSET -1200 MICRO-INCHES
                        
000150                  P.DSTT= 150             ;DRIVE STATUS INFORMATION FOR ERROR PROCESSING
                                                ;BIT 0  INITIAL DATA ERROR
                                                ;BIT 1  DATA ERROR BEING PROCESSED
                                                ;BIT 2  NON-DATA ERROR BEING PROCESSED
                                                ;BIT 3  SECTOR ID ERROR PRINTED
                                                ;BIT 4  READ HEADER ISSUED
                                                ;BIT 6  WAITING FOR READ STATUS FOR
                                                ;       POSITIONING TIME OUT
                                                ;BIT 7  FIRST ERROR
                                                ;BIT 11 RECALIBRATE HAS BEEN ISSUED
                                                ;BIT 12 SEEK WAS BEEN ISSUED
                                                ;BIT 13 OFFSET WAS BEEN ISSUED
                                                ;BIT 14 BAD SECTOR PROCESSING FOR WRITE CHECK
                                                ;BIT 15 ERROR ENCOUNTERED
                        
                        ;       THE FOLLOWING DEFINITIONS ARE USED IN STATISTICAL GATHERING
                        
000152                  P.NODR= 152             ;NUMBER OF ORDERS (2 WORDS)
000156                  P.NWRT= 156             ;NUMBER OF WORDS WRITTEN (3 WORDS)
000164                  P.NRD=  164             ;NUMBER OF WORDS READ (3 WORDS)
000172                  P.SRRD= 172             ;NUMBER SOFT ERRORS (REREAD CORRECTABLE)
000174                  P.SOFF= 174             ;NUMBER SOFT ERRORS (OFFSET CORRECTABLE)
000176                  P.SECC= 176             ;NUMBER SOFT ERRORS (ECC CORRECTABLE)
000200                  P.HARD= 200             ;NUMBER OF HARD DATA ERRORS
000202                  P.NSKI= 202             ;NUMBER OF SEEK INCOMPLETE
000204                  P.NOPI= 204             ;NUMBER OF OPERATION INCOMPLETES
000206                  P.NER=  206             ;NUMBER OF ALL OTHER ERRORS
```

```
                        ;       THE FOLLOWING IS USED FOR THE DRIVE ASSIGNMENT SEQUENCE

000210          P.ASSN= 210                     ;ASSIGNMENT COMMAND SEQUENCE
                                                ;0      INITIAL STATE
                                                ;BIT 0  DRIVE SERIAL NUMBER
                                                ;BIT 1  START SPINDLE
                                                ;BIT 2  PACK ACKNOWLEDGE
                                                ;BIT 3  READ PACK SERIAL NUMBER
                                                ;BIT 4  WRITE PACK COMMAND ISSUED
                                                ;BIT 5  END OF PACK WRITE
                                                ;BIT 6  RECAL
                                                ;BIT 7  RECAL AND RETRY READ PACK
                                                ;       SERIAL NUMBER

000211          P.SEEK= 211                     ;SEEK TO PREVIOUS CYLINDER FLAG

                        ;       THE FOLLOWING LOCATION IS USED TO INDICATE ERRORS

000212          P.ERR=  212                     ;BIT 2  DATA COMPARISON ERROR
                                                ;BIT 3  DRIVE ERROR NOT REPORTED
                                                ;BIT 4  DRIVE SEIZED TIME OUT
                                                ;BIT 5  DRIVE POSITIONING TIME OUT
                                                ;BIT 6  ERROR WHILE ENQUEUED
                                                ;BIT 7  ATTENTION WHEN DRIVE NOT IN USE
                                                ;BIT 8  TIME OUT WHILE WAITING FOR READS
                                                ;       TO LOAD AFTER ERROR
                                                ;BIT 10 DRIVE NOT READY AFTER START SPINDLE
                                                ;BIT 11 PACK ACKNOWLEDGE DID NOT SET VOLUME
                                                ;       VALID

000214          P.ERHD= 214                     ;HEADER ADDRESS OF FIRST DATA MISCOMPARE (3 BYTES)
000217          P.ERAD= 217                     ;OFFSET COUNT FROM HEADER ADDRESS
000220          P.CMLG= 220                     ;COMPARISON LENGTH
000222          P.BFCP= 222                     ;BUFFER COMPARE LENGTH

                        ;       THE FOLLOWING LOCATIONS ARE USED FOR DRIVE SERIAL NUMBER,
                        ;         PACK SERIAL NUMBER, AND TRACK EXCLUSIONS

000224          P.SERL= 224                     ;DRIVE SERIAL NUMBER
000226          P.PKSR= 226                     ;CARTRIAGE SERIAL NUMBER
000232          P.EXAR= 232                     ;EXCLUDED AREA INFORMATION
```

K3

```
                        .SBTTL  TRAP CATCHER

000000                          .=0
                        ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
                        ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
                        ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
000174                          .=174
000174  000000          DISPREG: .WORD  0               ;;SOFTWARE DISPLAY REGISTER
000176  000000          SWREG:   .WORD  0               ;;SOFTWARE SWITCH REGISTER
                        .SBTTL  STARTING ADDRESS(ES)
000200  000137  006656          JMP     @#START ;;JUMP TO STARTING ADDRESS OF PROGRAM
000204  000137  006646          JMP     RESTRT          ;BRANCH TO RESTART
000214                          .=214
000214  000137  006636          JMP     PARSRT          ;GET SYSTEM PARAMETERS AND START TESTING
000220  000137  061052          JMP     ..DUMP          ;  *** MEMORY DUMP (DEBUG ONLY)
000224  000700          ..LOW:  700                     ;START OF DUMP
000226  004574          ..HIGH: PATTAB-2                ;LAST ADDRESS OF DUMP
001000                          .=1000
                        .SBTTL  APT PARAMETER BLOCK

                        ;;*****************************************************************
                        ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                        ;;*****************************************************************
001000                          .$X=.   ;;SAVE CURRENT LOCATION
000024                          .=24    ;;SET POWER FAIL TO POINT TO START OF PROGRAM
000024  000200                  200     ;;FOR APT START UP
000044                          .=44    ;;POINT TO APT INDIRECT ADDRESS PNTR.
000044  001000                  $APTHDR ;;POINT TO APT HEADER BLOCK
001000                          .=.$X   ;;RESET LOCATION COUNTER
                        ;;*****************************************************************
                        ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
                        ;INTERFACE SPEC.

001000                  $APTHD:
001000  000000          $HIBTS: .WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
001002  001170          $MBADR: .WORD   $MAIL   ;;ADDRESS OF APT MAILBOX (BITS 0-15)
001004  003000          $TSTM:  .WORD   3000    ;;RUN TIM OF LONGEST TEST
001006  003000          $PASTM: .WORD   3000    ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
001010  003000          $UNITM: .WORD   3000    ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
001012  000052                  .WORD   $FTEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
```

```
                                .SBTTL  COMMON TAGS

                                ;;*****************************************************************
                                ;*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
                                ;*USED IN THE PROGRAM.

                        001100          .=1100
001100                  $CMTAG:                         ;;START OF COMMON TAGS
001100  000000                  .WORD   0
001102     000          $TSTNM: .BYTE   0               ;;CONTAINS THE TEST NUMBER
001103     000          $ERFLG: .BYTE   0               ;;CONTAINS ERROR FLAG
001104  000000          $ICNT:  .WORD   0               ;;CONTAINS SUBTEST ITERATION COUNT
001106  000000          $LPADR: .WORD   0               ;;CONTAINS SCOPE LOOP ADDRESS
001110  000000          $LPERR: .WORD   0               ;;CONTAINS SCOPE RETURN FOR ERRORS
001112  000000          $ERTTL: .WORD   0               ;;CONTAINS TOTAL ERRORS DETECTED
001114     000          $ITEMB: .BYTE   0               ;;CONTAINS ITEM CONTROL BYTE
001115     001          $ERMAX: .BYTE   1               ;;CONTAINS MAX. ERRORS PER TEST
001116  000000          $ERRPC: .WORD   0               ;;CONTAINS PC OF LAST ERROR INSTRUCTION
001120  000000          $GDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'GOOD' DATA
001122  000000          $BDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'BAD' DATA
001124  000000          $GDDAT: .WORD   0               ;;CONTAINS 'GOOD' DATA
001126  000000          $BDDAT: .WORD   0               ;;CONTAINS 'BAD' DATA
001130  000000                  .WORD   0               ;;RESERVED--NOT TO BE USED
001132  000000                  .WORD   0
001134     000          $AUTOR: .BYTE   0               ;;AUTOMATIC MODE INDICATOR
001135     000          $INTAG: .BYTE   0               ;;INTERRUPT MODE INDICATOR
001136  000000                  .WORD   0
001140  177570          SWR:    .WORD   DSWR            ;;ADDRESS OF SWITCH REGISTER
001142  177570          DISPLAY: .WORD  DDISP           ;;ADDRESS OF DISPLAY REGISTER
001144  177560          $TKS:   177560                  ;;TTY KBD STATUS
001146  177562          $TKB:   177562                  ;;TTY KBD BUFFER
001150  177564          $TPS:   177564                  ;;TTY PRINTER STATUS REG. ADDRESS
001152  177566          $TPB:   177566                  ;;TTY PRINTER BUFFER REG. ADDRESS
001154     000          $NULL:  .BYTE   0               ;;CONTAINS NULL CHARACTER FOR FILLS
001155     002          $FILLS: .BYTE   2               ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
001156     012          $FILLC: .BYTE   12              ;;INSERT FILL CHARS. AFTER A "LINE FEED"
001157     000          $TPFLG: .BYTE   0               ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
001160  177607  000377  $BELL:  .ASCIZ  <207><377><377> ;;CODE FOR BELL
001164     077          $QUES:  .ASCII  /?/             ;;QUESTION MARK
001165     015          $CRLF:  .ASCII  <15>            ;;CARRIAGE RETURN
001166  000012          $LF:    .ASCIZ  <12>            ;;LINE FEED
                                ;;*****************************************************************
                                .SBTTL  APT MAILBOX-ETABLE

                                ;;*****************************************************************
                                .EVEN
001170                  $MAIL:                          ;;APT MAILBOX
001170  000000          $MSGTY: .WORD   AMSGTY          ;;MESSAGE TYPE CODE
001172  000000          $FATAL: .WORD   AFATAL          ;;FATAL ERROR NUMBER
001174  000000          $TESTN: .WORD   ATESTN          ;;TEST NUMBER
001176  000000          $PASS:  .WORD   APASS           ;;PASS COUNT
001200  000000          $DEVCT: .WORD   ADEVCT          ;;DEVICE COUNT
001202  000000          $UNIT:  .WORD   AUNIT           ;;I/O UNIT NUMBER
001204  000000          $MSGAD: .WORD   AMSGAD          ;;MESSAGE ADDRESS
001206  000000          $MSGLG: .WORD   AMSGLG          ;;MESSAGE LENGTH
001210                  $ETABLE:                        ;;APT ENVIRONMENT TABLE
```

M3

```
733  001210  000                $ENV:   .BYTE   AENV    ;;ENVIRONMENT BYTE
734  001211  000                $ENVM:  .BYTE   AENVM   ;;ENVIRONMENT MODE BITS
735  001212  000000             $SWREG: .WORD   ASWREG  ;;APT SWITCH REGISTER
736  001214  000000             $USWR:  .WORD   AUSWR   ;;USER SWITCHES
737  001216  000000             $CPUOP: .WORD   ACPUOP  ;;CPU TYPE,OPTIONS
738                             ;*                      BITS 15-11=CPU TYPE
739                             ;*                              11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
740                             ;*                              11/70=06,PDQ=07,Q=10
741                             ;*                      BIT 10=REAL TIME CLOCK
742                             ;*                      BIT  9=FLOATING POINT PROCESSOR
743                             ;*                      BIT  8=MEMORY MANAGEMENT
744  001220  000                $MAMS1: .BYTE   AMAMS1  ;;HIGH ADDRESS,M.S. BYTE
745  001221  000                $MTYP1: .BYTE   AMTYP1  ;;MEM. TYPE,BLK#1
746                             ;*                      MEM.TYPE BYTE   --  (HIGH BYTE)
747                             ;*                              900 NSEC CORE=001
748                             ;*                              300 NSEC BIPOLAR=002
749                             ;*                              500 NSEC MOS=003
750  001222  000000             $MADR1: .WORD   AMADR1  ;;HIGH ADDRESS,BLK#1
751                             ;*                        MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF "TYPE" BYTE
752  001224  000                $MAMS2: .BYTE   AMAMS2  ;;HIGH ADDRESS,M.S. BYTE
753  001225  000                $MTYP2: .BYTE   AMTYP2  ;;MEM.TYPE,BLK#2
754  001226  000000             $MADR2: .WORD   AMADR2  ;;MEM.LAST ADDRESS,BLK#2
755  001230  000                $MAMS3: .BYTE   AMAMS3  ;;HIGH ADDRESS,M.S.BYTE
756  001231  000                $MTYP3: .BYTE   AMTYP3  ;;MEM.TYPE,BLK#3
757  001232  000000             $MADR3: .WORD   AMADR3  ;;MEM.LAST ADDRESS,BLK#3
758  001234  000                $MAMS4: .BYTE   AMAMS4  ;;HIGH ADDRESS,M.S.BYTE
759  001235  000                $MTYP4: .BYTE   AMTYP4  ;;MEM.TYPE,BLK#4
760  001236  000000             $MADR4: .WORD   AMADR4  ;;MEM.LAST ADDRESS,BLK#4
761  001240  120210             $VECT1: .WORD   AVECT1  ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
762  001242  000000             $VECT2: .WORD   AVECT2  ;;INTERRUPT VECTOR#2BUS PRIORITY#2
763  001244  177440             $BASE:  .WORD   ABASE   ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
764  001246  000000             $DEVM:  .WORD   ADEVM   ;;DEVICE MAP
765  001250  000000             $CDW1:  .WORD   ACDW1   ;;CONTROLLER DESCRIPTION WORD#1
766  001252  000000             $CDW2:  .WORD   ACDW2   ;;CONTROLLER DESCRIPTION WORD#2
767  001254  000000             $DDW0:  .WORD   ADDW0   ;;DEVICE DESCRIPTOR WORD#0
768  001256  000000             $DDW1:  .WORD   ADDW1   ;;DEVICE DESCRIPTOR WORD#1
769  001260  000000             $DDW2:  .WORD   ADDW2   ;;DEVICE DESCRIPTOR WORD#2
770  001262  000000             $DDW3:  .WORD   ADDW3   ;;DEVICE DESCRIPTOR WORD#3
771  001264  000000             $DDW4:  .WORD   ADDW4   ;;DEVICE DESCRIPTOR WORD#4
772  001266  000000             $DDW5:  .WORD   ADDW5   ;;DEVICE DESCRIPTOR WORD#5
773  001270  000000             $DDW6:  .WORD   ADDW6   ;;DEVICE DESCRIPTOR WORD#6
774  001272  000000             $DDW7:  .WORD   ADDW7   ;;DEVICE DESCRIPTOR WORD#7
775  001274  000000             $DDW8:  .WORD   ADDW8   ;;DEVICE DESCRIPTOR WORD#8
776  001276  000000             $DDW9:  .WORD   ADDW9   ;;DEVICE DESCRIPTOR WORD#9
777  001300  000000             $DDW10: .WORD   ADDW10  ;;DEVICE DESCRIPTOR WORD#10
778  001302  000000             $DDW11: .WORD   ADDW11  ;;DEVICE DESCRIPTOR WORD#11
779  001304  000000             $DDW12: .WORD   ADDW12  ;;DEVICE DESCRIPTOR WORD#12
780  001306  000000             $DDW13: .WORD   ADDW13  ;;DEVICE DESCRIPTOR WORD#13
781  001310  000000             $DDW14: .WORD   ADDW14  ;;DEVICE DESCRIPTOR WORD#14
782  001312  000000             $DDW15: .WORD   ADDW15  ;;DEVICE DESCRIPTOR WORD#15
783
784
785  001314                     $ETEND:
786
```

```
                        .SBTTL  QUEUE HEAD AND TAIL ALLOCATIONS

001314  000000  000000  AVAILQ: .WORD   0,0             ;HEAD AND TAIL OF AVAILABLE QUEUE
001320  000000  000000  BWAITQ: .WORD   0,0             ;HEAD AND TAIL OF BUFFER WAIT QUEUE
001324  000000  000000  CINITQ: .WORD   0,0             ;HEAD AND TAIL OF COMMAND INITIATION QUEUE
001330  000000  000000  ERRPRQ: .WORD   0,0             ;HEAD AND TAIL OF ERROR PROCESSING QUEUE

                        .SBTTL  SYSTEM PARAMETERS

001334  172540          $LKCSP: .WORD   172540          ;ADDRESS OF KW11-P STATUS REGISTER
001336  172542          $LKCSB: .WORD   172542          ;ADDRESS OF KW11-P COUNTER BUFFER
001340  000104          $LPVEC: .WORD   104             ;KW11-P VECTOR ADDRESS
001342  177546          $LKS:   .WORD   177546          ;ADDRESS OF KW11-L STATUS REGISTER
001344  000100          $LLVEC: .WORD   100             ;KW11-L VECTOR ADDRESS
001346  177514          $LSCS:  .WORD   177514          ;ADDRESS OF PRINTER STATUS WORD
001350  177516          $LSDB:  .WORD   177516          ;ADDRESS OF PRINTER DATA BUFFER
001352     074          HZ:     .BYTE   60.             ;74 (60 DECIMAL) IF SYSTEM IS 60 HZ.
                                                        ;62 (50 DECIMAL) IF SYSTEM IS 50 HZ.
001353     000          CLKFRQ: .BYTE   0               ;COUNT PER SECOND
001354  013400          MAXBUF: .WORD   256.*23.        ;MAXIMUM BUFFER FOR READ OR WRITE
001356  177777          PASCNT: .WORD   177777          ;PASS COUNT
001360     000          PERINV: .BYTE   0               ;INTERVAL BETWEEN PERFORMANCE SUMMARIES
001361     000          FLAG:   .BYTE   0               ;RESTART AND PARAMETER FLAG
001362  000003          SOFCMP: .WORD   3               ;NUMBER OF SOFTWARE COMPARES
001364     000          CPUID:  .BYTE   0               ;CPU DESIGNATION FOR PACK WRITING WITH DUAL ACCESS
001365     000          OVLYLD: .BYTE   0               ;OVERLAY LOADER
001366  000000          HOUR:   .WORD   0               ;TIMER HOUR
001370  000000          MINUTE: .WORD   0               ;TIMER MINUTE
001372  000000          SECOND: .WORD   0               ;TIMER SECOND
001374     000          CLKFLG: .BYTE   0               ;KW11-P OR KW11-L PRESENT
001375     000          PERIOD: .BYTE   0               ;PERIOD SINCE LAST SATISTIC PRINT OUT
001376  000000          TIMHR:  .WORD   0               ;HOUR COUNT FOR PRINT OUT
001400  000000          TIMMIN: .WORD   0               ;MINUTE COUNT FOR PRINT OUT
001402  000000          TIMSEC: .WORD   0               ;SECOND COUNT FOR PRINT OUT
001404  000000          SAVSWR: .WORD   0               ;SAVED SWITCH REGISTER FROM POWER FAIL

                        .SBTTL  TEMPORARY CONTROLLER REGISTER STORAGE

001406  000000  T.CS1:  .WORD   0               ;TEMPORARY STORAGE FOR COMMAND AND STATUS
                                                ;  REGISTER 1
001410  000000  T.CS2:  .WORD   0               ;TEMPORARY STORAGE FOR COMMAND AND STATUS
                                                ;  REGISTER 2
001412  000000  T.WCR:  .WORD   0               ;TEMPORARY STORAGE FOR WORD COUNT REGISTER
001414  000000  T.BA:   .WORD   0               ;TEMPORARY STORAGE FOR BUS ADDRESS REGISTER
001416  000000  T.DA:   .WORD   0               ;TEMPORARY STORAGE FOR DISK TRACK AND SECTOR
001420  000000  T.DC:   .WORD   0               ;TEMPORARY STORAGE FOR DRIVE CYLINDER
001422  000000  T.ASCF: .WORD   0               ;TEMPORARY STORAGE FOR ATTENTION SUMMARY
                                                ;  AND OFFSET
001424  000000  T.ER:   .WORD   0               ;TEMPORARY STORAGE FOR ERROR REGISTER
001426  000000  T.DS:   .WORD   0               ;TEMPORARY STORAGE FOR DRIVE STATUS REGISTER
001430  000000  T.MR1:  .WORD   0               ;TEMPORARY STORAGE FOR MAINTENANCE REGISTER 1
001432  000000  T.MR2:  .WORD   0               ;TEMPORARY STORAGE FOR MAINTENANCE REGISTER 2
001434  000000  T.MR3:  .WORD   0               ;TEMPORARY STORAGE FOR MAINTENANCE REGISTER 3
001436  000000  T.POS:  .WORD   0               ;TEMPORARY STORAGE FOR ECC POSITION
001440  000000  T.PAT:  .WORD   0               ;TEMPORARY STORAGE FOR ECC PATTERN
001442  000000  T.DB:   .WORD   0               ;TEMPORARY STORAGE FOR DATA BUFFER REGISTER
```

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                                .SBTTL  DRIVER PARAMETERS
001444  177440          RKBAS:  .WORD   177440          ;ADDRESS OF RK611 UNIBUS ADDRESS BLOCK
001446  000210          RKVEC:  .WORD   210             ;ADDRESS OF R611 VECTOR
001450  000240          RKPRI:  .WORD   PR5             ;RK611 INTERRUPT PRIORITY
001452  023676          A.NORM: NORMAL                  ;ADDRESS OF NORMAL RETURN FROM DRIVER
001454  024766          A.ABNL: APNORM                  ;ADDRESS OF ABNORMAL RETURN FROM DRIVER
001456  026022          A.CONT: CONTRL                  ;ADDRESS OF CONTROLLER ERROR RETURN
001460  000000          E.CONT: .WORD   0               ;CONTROLLER ERROR STATUS
                                                        ;  THIS LOCATION IS CLEARED WHEN EVERY COMMAND
                                                        ;  IS INITIATED.  IF A CONTROLLER ERROR
                                                        ;  OCCURS THE FOLLOWING BIT ASSIGNMENT IS
                                                        ;  USED:
                                                        ;
        000001          E.CCLR= BIT0                    ;CLEAR CONTROLLER DID NOT CLEAR ERROR
        000002          E.NOAT= BIT1                    ;NO ATTENTION IN ATTENTION SUMMARY REG
        000004          E.UATT= BIT2                    ;UNSOLICATED ATTENTION (SEQUENTIAL ONLY)
        000010          E.UDAT= BIT3                    ;UNEXPECTED DATA TYPE ERROR
        000020          E.CLAT= BIT4                    ;ATTENTION DID NOT RESET WITH CLEAR
        000040          E.SCLR= BIT5                    ;SUBSYSTEM CLEAR DID NOT CLEAR DRIVE
                                                        ;  ATTENTION
        000100          E.ILLD= BIT6                    ;ILLEGAL DRIVER COMMAND
        000400          E.DLT=  BIT8                    ;DATA LATE WHEN UNLOADING HEADER
        001000          E.CERR= BIT9                    ;CONTROLLER ERROR DURING DRIVER SERVICING
        002000          E.DPAR= BIT10                   ;DRIVE DETECTED PARITY ERROR
        040000          E.CMTO= BIT14                   ;CONTROLLER COMMAND TIME OUT (QUEUED ONLY)
        100000          E.MDS=  BIT15                   ;MULTIPLE DRIVE SELECT

001462  000000          O.WAIT: .WORD   0               ;PARAMETER BLOCK OF THE DRIVE
                                                        ;WAITING FOR COMMAND COMPLETION
001464  000400          W.MTIM: .WORD   400             ;LOOP COUNTER FOR MILISECOND SCAN OF DRIVE
001466  000400          W.MILI: .WORD   400             ;16 MILISECOND TIME FOR PROGRAM
                                                        ;
                                                        ;       CPU     VALUE
                                                        ;       ---     -----
                                                        ;
                                                        ;       11/05   100
                                                        ;       11/10
                                                        ;       11/20
                                                        ;       11/34
                                                        ;       11/40
                                                        ;       11/45   400
                                                        ;       11/50
                                                        ;       11/70
001470  000100          W.SEC:  .WORD   100             ;SECOND COUNT COUNT FOR ALL COMMANDS
                                                        ;  EXCEPT START SPINDLE
001472  001000          W.8SEC: .WORD   1000            ;8 SECOND FOR DRIVE CYCLE DOWN
001474  010000          W.MIN:  .WORD   10000           ;MINUTE TIME FOR START SPINDLE
001476  000000          HDR.AD: .WORD   0               ;ADDRESS USED FOR READ ALL HEADERS
001500  000000          HDR.CT: .WORD   0               ;NUMBER OF HEADERS LEFT TO READ FOR READ
                                                        ;  ALL HEADERS
001502      000         I.ISRL: .BYTE   0               ;INTERRUPT OK RELEASED COMMAND ISSUED
001503      002 004 010 H.HEAD: .BYTE   2,4,10          ;HEAD OFCODES
001506      000         W.TIMF: .BYTE   0               ;DRIVES BEING WATCH-DOG TIMED
001507      377         O.OVER: .BYTE   -1              ;OVERLAPPED OPERATIONS
```

C4

```
                                .SBTTL  TABLE OF INTERRUPT MASKS

001510  001                   INTMSK: .BYTE   1               ;INTERRUPT FOR DRIVE 0
001511  002                           .BYTE   2               ;INTERRUPT FOR DRIVE 1
001512  004                           .BYTE   4               ;INTERRUPT FOR DRIVE 2
001513  010                           .BYTE   10              ;INTERRUPT FOR DRIVE 3
001514  020                           .BYTE   20              ;INTERRUPT FOR DRIVE 4
001515  040                           .BYTE   40              ;INTERRUPT FOR DRIVE 5
001516  100                           .BYTE   100             ;INTERRUPT FOR DRIVE 6
001517  200                           .BYTE   200             ;INTERRUPT FOR DRIVE 7

                                .SBTTL  PARAMETER BLOCK TABLE

001520  001732                PRLKT:  PARM0                   ;ADDRESS OF DRIVE 0'S PARAMETER BLOCK
001522  002210                        PARM1                   ;ADDRESS OF DRIVE 1'S PARAMETER BLOCK
001524  002466                        PARM2                   ;ADDRESS OF DRIVE 2'S PARAMETER BLOCK
001526  002744                        PARM3                   ;ADDRESS OF DRIVE 3'S PARAMETER BLOCK
001530  003222                        PARM4                   ;ADDRESS OF DRIVE 4'S PARAMETER BLOCK
001532  003500                        PARM5                   ;ADDRESS OF DRIVE 5'S PARAMETER BLOCK
001534  003756                        PARM6                   ;ADDRESS OF DRIVE 6'S PARAMETER BLOCK
001536  004734                        PARM7                   ;ADDRESS OF DRIVE 7'S PARAMETER BLOCK

                                .SBTTL  WATCH-DOG TIMER COUNTS

001540  000000                W.DRV:  .WORD   0               ;WATCH-DOG FOR DRIVE 0
001542  000000                        .WORD   0               ;WATCH-DOG FOR DRIVE 1
001544  000000                        .WORD   0               ;WATCH-DOG FOR DRIVE 2
001546  000000                        .WORD   0               ;WATCH-DOG FOR DRIVE 3
001550  000000                        .WORD   0               ;WATCH-DOG FOR DRIVE 4
001552  000000                        .WORD   0               ;WATCH-DOG FOR DRIVE 5
001554  000000                        .WORD   0               ;WATCH-DOG FOR DRIVE 6
001556  000000                        .WORD   0               ;WATCH-DOG FOR DRIVE 7
```

```
                        .SBTTL  PERFORMANCE EXERCISER STATUS INFORMATION

001560  000000          ERCONT: .WORD   0               ;CONTROLLER ERROR (RECOVERABLE)
                                                        ;BIT 0  CONTROLLER ERROR NOT FLAGGED
                                                        ;BIT 1  WORD COUNT NOT EQUAL 0
                                                        ;BIT 2  BUS ADDRESS INCORRECT
                                                        ;BIT 3  CYLINDER, TRACK, SECTOR INCORRECT
                                                        ;BIT 15 CONTROLLER ERROR DETECTED

001562  000000          ERRPRO: .WORD   0               ;ADDRESS OF PARAMETER BLOCK PROCESSING ERROR
001564  000000          TMPCNT: .WORD   0               ;TRANSFER COUNT CALCULATIONS
001566  000000  000000  TMPTRK: .WORD   0,0             ;RANDOM TRACK CALCUATIONS
001572  000000  000000  TMPSEC: .WORD   0,0             ;RANDOM SECTOR CALCULATIONS
001576  000000  000000  PARCYL: .WORD   0,0             ;PARAMETER CYLINDER MODIFICATION
001602  000000  000000  PARTRK: .WORD   0,0             ;PARAMETER TRACK MODIFICATION
001606  000000  000000  PARSEC: .WORD   0,0             ;PARAMETER SECTOR MODIFICATION
001612  000000  000000  EXAREA: .WORD   0,0             ;EXCLUDED AREA CALCULATIONS
001616  000000  000000  ECCPAT: .WORD   0,0             ;ECC PATTERN FOR ECC CORRECTION
001622  000000          DLTCNT: .WORD   0               ;DATA LATE COUNT
001624  000000          CNTCNT: .WORD   0               ;OTHER CONTROLLER ERRORS COUNT
001626     000          DRVCNT: .BYTE   0               ;DRIVE COUNT FOR OPERATOR COMPARE
001627     000          STATIS: .BYTE   0               ;REPORT INTERVAL STATISTICS
001630  000000          RTYBA:  .WORD   0               ;RETRY BUS ADDRESS
001632  000000          RTYWC:  .WORD   0               ;RETRY WORD COUNT
001634     000          RTYSEC: .BYTE   0               ;SECTOR ADDRESS RETRY
001635     000          RTYTRK: .BYTE   0               ;TRACK ADDRESS RETRY
001636  000000          RTYCYL: .WORD   0               ;CYLINDER ADDRESS RETRY
001640     000          RTYSCN: .BYTE   0               ;NUMBER OF SECTORS TO BE TRANSFERRED IN RETRY
001641     000          RTYCMD: .BYTE   0               ;COMMAND BEING RETRIED
001642  000000          HEAD1:  .WORD   0               ;TEMPORARY STORAGE FOR FIRST WORD OF HEADER
001644  000000          HEAD2:  .WORD   0               ;TEMPORARY STORAGE FOR SECOND WORD OF HEADER
001646  000000          HEAD3:  .WORD   0               ;TEMPORARY STORAGE FOR THIRD WORD OF HEADER
001650     000          BSSECT: .BYTE   0               ;SECTOR IN BAD SECTOR SERVICING
001651     000          BSTRCK: .BYTE   0               ;TRACK IN BAD SECTOR SERVICING
001652  000000          BSCYLN: .WORD   0               ;CYLINDER IN BAD SECTOR SERVICING
001654  000000          BSWC:   .WORD   0               ;WORD COUNT IN BAD SECTOR SERVICING
001656  000000          BSBA:   .WORD   0               ;BUS ADDRESS IN BAD SECTOR SERVICING
001660  000000          BSWORD: .WORD   0               ;WORDS TRANSFERRED IN BAD SECTOR SERVICING
001662  000000          POSCMD: .WORD   0               ;POSITIONING TIME OUT COMMAND

                        .SBTTL  FREE SPACE BLOCK

001664  000001          FBLKC:  .WORD   1               ;FREE BLOCK COUNT

001666  000000  000000  FBLKT:  .WORD   0,0             ;FREE BLOCK 0
001672  000000  000000          .WORD   0,0             ;FREE BLOCK 1
001676  000000  000000          .WORD   0,0             ;FREE BLOCK 2
001702  000000  000000          .WORD   0,0             ;FREE BLOCK 3
001706  000000  000000          .WORD   0,0             ;FREE BLOCK 4
001712  000000  000000          .WORD   0,0             ;FREE BLOCK 5
001716  000000  000000          .WORD   0,0             ;FREE BLOCK 6
001722  000000  000000          .WORD   0,0             ;FREE BLOCK 7
001726  000000  000000          .WORD   0,0             ;FREE BLOCK 8
```

```
                        .SBTTL  PARAMETER BLOCK FOR DRIVE 0

001732  000             PAR%0:  .BYTE   0               ;DRIVE 0
001733  000                     .BYTE   0               ;COMMAND
001734  000000                  .WORD   0               ;CYLINDER ADDRESS
001736  000                     .BYTE   0               ;SECTOR ADDRESS
001737  000                     .BYTE   0               ;TRACK ADDRESS
001740  000                     .BYTE   0               ;OFFSET VALUE
001741  000                     .BYTE   0               ;BUS ADDRESS (BITS 16 AND 17)
001742  000000                  .WORD   0               ;BUS ADDRESS (BITS 0 - 15)
001744  000000                  .WORD   0               ;WORD COUNT (2'S COMPLEMENT)
001746  000000                  .WORD   0               ;PROGRAM DRIVE STATUS INFORMATION
001750  000000                  .WORD   0               ;COMMAND AND STATUS REGISTER 1
001752  000000                  .WORD   0               ;COMMAND AND STATUS REGISTER 2
001754  000000                  .WORD   0               ;WORD COUNT REGISTER
001756  000000                  .WORD   0               ;BUS ADDRESS REGISTER
001760  000000                  .WORD   0               ;DESIRED TRACK AND SECTOR REGISTER
001762  000000                  .WORD   0               ;DESIRED CYLINDER REGISTER
001764  000000                  .WORD   0               ;ATTENTION SUMMARY/OFFSET REGISTER
001766  000000                  .WORD   0               ;ERROR REGISTER
001770  000000                  .WORD   0               ;STATUS REGISTER
001772  000000                  .WORD   0               ;MESSAGE LINE A STATUS BYTE 00
001774  000000                  .WORD   0               ;MESSAGE LINE B STATUS BYTE 00
001776  000000                  .WORD   0               ;MESSAGE LINE A STATUS BYTE 01
002000  000000                  .WORD   0               ;MESSAGE LINE B STATUS BYTE 01
002002  000000                  .WORD   0               ;MESSAGE LINE A STATUS BYTE 10
002004  000000                  .WORD   0               ;MESSAGE LINE B STATUS BYTE 10
002006  000000                  .WORD   0               ;MESSAGE LINE A STATUS BYTE 11
002010  000000                  .WORD   0               ;MESSAGE LINE B STATUS BYTE 11
002012  000000                  .WORD   0               ;FCC POSITION INFORMATION
002014  000000                  .WORD   0               ;ECC PATTERN INFORMATION
002016  000000                  .WORD   0               ;QUEUE LINK
002020  000000                  .WORD   0               ;MINIMUM CYLINDER
002022  000632                  .WORD   410.            ;MAXIMUM CYLINDER
002024  000                     .BYTE   0               ;MINIMUM TRACK
002025  002                     .BYTE   2               ;MAXIMUM TRACK
002026  000                     .BYTE   0               ;MINIMUM SECTOR
002027  025                     .BYTE   21.             ;MAXIMUM SECTOR
002030  003                     .BYTE   3               ;READ/WRITE RATIO
002031  000                     .BYTE   0               ;AUTOMATIC WRITE CHECK
002032  000012                  .WORD   10.             ;CORRECTABLE READ ERROR THRESHOLD
002034  000005                  .WORD   5               ;UNCORRECTABLE READ ERROR THRESHOLD
002036  000005                  .WORD   5               ;SEEK ERROR THRESHOLD
002040  177770  177777          .WORD   177770,177777   ;MAXIMUM NUMBER OF COMMANDS TO DRIVE
002044  177770  177777          .WORD   177770,177777   ;MAXIMUM NUMBER OF WORDS TRANSFERRED TO DRIVE
002050  000                     .BYTE   0               ;SAMPLE COMPARE FLAG
002051  000                     .BYTE   0               ;FCC COMPARE FLAG
002052  000                     .BYTE   0               ;INHIBIT ERROR CORRECTION
002053  000                     .BYTE   0               ;DATA PATTERN USED
002054  000                     .BYTE   0               ;CURRENT GENERATED DATA PATTERN
002055  000                     .BYTE   0               ;CURRENT RANDOMLY GENERATED COMMAND
002056  000000                  .WORD   0               ;CURRENT RANDOMLY GENERATED CYLINDER
002060  000                     .BYTE   0               ;CURRENT RANDOMLY GENERATED SECTOR
002061  000                     .BYTE   0               ;CURRENT RANDOMLY GENERATED TRACK
002062  000000                  .WORD   0               ;CURRENT RANDOMLY GENERATED WORD COUNT
```

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```
1041  002064  000000                    .WORD   0               ;CURRENT RANDOMLY GENERATED BUS ADDRESS
1042  002066     000                    .BYTE   0
1043  002067     000                    .BYTE   0               ;LAST COMMAND
1044  002070  000000                    .WORD   0               ;LAST CYLINDER
1045  002072     000                    .BYTE   0               ;LAST SECTOR
1046  002073     000                    .BYTE   0               ;LAST TRACK
1047  002074  000000                    .WORD   0               ;LAST WORD COUNT
1048  002076     000                    .BYTE   0               ;LAST DATA PATTERN USED
1049  002077     000                    .BYTE   0               ;BUFFER ALLOCATED
1050  002100     000                    .BYTE   0               ;RETRY COUNT
1051  002101     000                    .BYTE   0               ;REREAD STATUS
1052  002102  000000                    .WORD   0               ;DRIVE STATUS FLAGS
1053  002104  000000  000000            .WORD   0,0             ;NUMBER OF ORDERS
1054  002110  000000  000000  000000    .WORD   0,0,0           ;NUMBER OF WORDS WRITTEN
1055  002116  000000  000000  000000    .WORD   0,0,0           ;NUMBER OF WORDS READ
1056  002124  000000                    .WORD   0               ;NUMBER OF SOFT ERRORS (REREAD CORRECTABLE)
1057  002126  000000                    .WORD   0               ;NUMBER OF SOFT ERRORS (OFFSET CORRECTABLE)
1058  002130  000000                    .WORD   0               ;NUMBER OF SOFT ERRORS (ECC CORRECTABLE)
1059  002132  000000                    .WORD   0               ;NUMBER OF HARD DATA ERRORS
1060  002134  000000                    .WORD   0               ;NUMBER OF SEEK INCOMPLETES
1061  002136  000000                    .WORD   0               ;NUMBER OF MISPOSITIONING ERRORS
1062  002140  000000                    .WORD   0               ;NUMBER OF ALL OTHER ERRORS
1063  002142     000                    .BYTE   0               ;ASSIGNMENT COMMAND SEQUENCE
1064  002143     000                    .BYTE   0               ;SEEK TO PREVIOUS COMMAND FLAG
1065  002144  000000                    .WORD   0               ;ERROR STATUS INFORMATION
1066  002146  000000                    .WORD   0               ;HEADER ADDRESS OF FIRST MISCOMPARE ERROR
1067  002150     000                    .BYTE   0
1068  002151     000                    .BYTE   0               ;OFFSET ADDRESS FROM HEADER ADDRESS
1069  002152  000000                    .WORD   0               ;COMPARISON LENGTH
1070  002154  000000                    .WORD   0               ;BUFFER COMPARISON LENGTH
1071  002156  007777                    .WORD   007777          ;DRIVE SERIAL NUMBER
1072  002160  000000  000000            .WORD   0,0             ;CARIAGE SERIAL NUMBER
1073  002164  000000  000000            .WORD   0,0             ;FIRST EXCLUSION AREA
1074  002170  000000  000000            .WORD   0,0             ;SECOND EXCLUSION AREA
1075  002174  000000  000000            .WORD   0,0             ;THIRD EXCLUSION AREA
1076  002200  000000  000000            .WORD   0,0             ;FOURTH EXCLUSION AREA
1077  002204  000000  000000            .WORD   0,0             ;FIFTH EXCLUSION AREA
```

```
1078
1079                                    .SBTTL  PARAMETER BLOCK FOR DRIVE 1
1080
1081  002210     001                    PARM1:  .BYTE   1               ;DRIVE 1
1082  002211     000                            .BYTE   0               ;COMMAND
1083  002212  000000                            .WORD   0               ;CYLINDER ADDRESS
1084  002214     000                            .BYTE   0               ;SECTOR ADDRESS
1085  002215     000                            .BYTE   0               ;TRACK ADDRESS
1086  002216     000                            .BYTE   0               ;OFFSET VALUE
1087  002217     000                            .BYTE   0               ;BUS ADDRESS (BITS 16 AND 17)
1088  002220  000000                            .WORD   0               ;BUS ADDRESS (BITS 0 - 15)
1089  002222  000000                            .WORD   0               ;WORD COUNT (2'S COMPLEMENT)
1090  002224  000000                            .WORD   0               ;PROGRAM DRIVE STATUS INFORMATION
1091  002226  000000                            .WORD   0               ;COMMAND AND STATUS REGISTER 1
1092  002230  000000                            .WORD   0               ;COMMAND AND STATUS REGISTER 2
1093  002232  000000                            .WORD   0               ;WORD COUNT REGISTER
1094  002234  000000                            .WORD   0               ;BUS ADDRESS REGISTER
1095  002236  000000                            .WORD   0               ;DESIRED TRACK AND SECTOR REGISTER
1096  002240  000000                            .WORD   0               ;DESIRED CYLINDER REGISTER
1097  002242  000000                            .WORD   0               ;ATTENTION SUMMARY/OFFSET REGISTER
1098  002244  000000                            .WORD   0               ;ERROR REGISTER
1099  002246  000000                            .WORD   0               ;STATUS REGISTER
1100  002250  000000                            .WORD   0               ;MESSAGE LINE A STATUS BYTE 00
1101  002252  000000                            .WORD   0               ;MESSAGE LINE B STATUS BYTE 00
1102  002254  000000                            .WORD   0               ;MESSAGE LINE A STATUS BYTE 01
1103  002256  000000                            .WORD   0               ;MESSAGE LINE B STATUS BYTE 01
1104  002260  000000                            .WORD   0               ;MESSAGE LINE A STATUS BYTE 10
1105  002262  000000                            .WORD   0               ;MESSAGE LINE B STATUS BYTE 10
1106  002264  000000                            .WORD   0               ;MESSAGE LINE A STATUS BYTE 11
1107  002266  000000                            .WORD   0               ;MESSAGE LINE B STATUS BYTE 11
1108  002270  000000                            .WORD   0               ;ECC POSITION INFORMATION
1109  002272  000000                            .WORD   0               ;ECC PATTERN INFORMATION
1110  002274  000000                            .WORD   0               ;QUEUE LINK
1111  002276  000000                            .WORD   0               ;MINIMUM CYLINDER
1112  002300  000632                            .WORD   410.            ;MAXIMUM CYLINDER
1113  002302     000                            .BYTE   0               ;MINIMUM TRACK
1114  002303     002                            .BYTE   2               ;MAXIMUM TRACK
1115  002304     000                            .BYTE   0               ;MINIMUM SECTOR
1116  002305     025                            .BYTE   21.             ;MAXIMUM SECTOR
1117  002306     003                            .BYTE   3               ;READ/WRITE RATIO
1118  002307     000                            .BYTE   0               ;AUTOMATIC WRITE CHECK
1119  002310  000012                            .WORD   10.             ;CORRECTABLE READ ERROR THRESHOLD
1120  002312  000005                            .WORD   5               ;UNCORRECTABLE READ ERROR THRESHOLD
1121  002314  000005                            .WORD   5               ;SEEK ERROR THRESHOLD
1122  002316  177770  177777                   .WORD   177770,177777   ;MAXIMUM NUMBER OF COMMANDS TO DRIVE
1123  002322  177770  177777                   .WORD   177770,177777   ;MAXIMUM NUMBER OF WORDS TRANSFERRED TO DRIVE
1124  002326     000                            .BYTE   0               ;SAMPLE COMPARE FLAG
1125  002327     000                            .BYTE   0               ;ECC COMPARE FLAG
1126  002330     000                            .BYTE   0               ;INHIBIT ERROR CORRECTION
1127  002331     000                            .BYTE   0               ;DATA PATTERN USED
1128  002332     000                            .BYTE   0               ;CURRENT GENERATED DATA PATTERN
1129  002333     000                            .BYTE   0               ;CURRENT RANDOMLY GENERATED COMMAND
1130  002334  000000                            .WORD   0               ;CURRENT RANDOMLY GENERATED CYLINDER
1131  002336     000                            .BYTE   0               ;CURRENT RANDOMLY GENERATED SECTOR
1132  002337     000                            .BYTE   0               ;CURRENT RANDOMLY GENERATED TRACK
1133  002340  000000                            .WORD   0               ;CURRENT RANDOMLY GENERATED WORD COUNT
```

```
1134  002342  000000                        .WORD   0               ;CURRENT RANDOMLY GENERATED BUS ADDRESS
1135  002344     000                        .BYTE   0
1136  002345     000                        .BYTE   0               ;LAST COMMAND
1137  002346  000000                        .WORD   0               ;LAST CYLINDER
1138  002350     000                        .BYTE   0               ;LAST SECTOR
1139  002351     000                        .BYTE   0               ;LAST TRACK
1140  002352  000000                        .WORD   0               ;LAST WORD COUNT
1141  002354     000                        .BYTE   0               ;LAST DATA PATTERN USED
1142  002355     000                        .BYTE   0               ;BUFFER ALLOCATED
1143  002356     000                        .BYTE   0               ;RETRY COUNT
1144  002357     000                        .BYTE   0               ;REREAD STATUS
1145  002360  000000                        .WORD   0               ;DRIVE STATUS FLAGS
1146  002362  000000  000000                .WORD   0,0             ;NUMBER OF ORDERS
1147  002366  000000  000000  000000        .WORD   0,0,0           ;NUMBER OF WORDS WRITTEN
1148  002374  000000  000000  000000        .WORD   0,0,0           ;NUMBER OF WORDS READ
1149  002402  000000                        .WORD   0               ;NUMBER OF SOFT ERRORS (REREAD CORRECTABLE)
1150  002404  000000                        .WORD   0               ;NUMBER OF SOFT ERRORS (OFFSET CORRECTABLE)
1151  002406  000000                        .WORD   0               ;NUMBER OF SOFT ERRORS (ECC CORRECTABLE)
1152  002410  000000                        .WORD   0               ;NUMBER OF HARD DATA ERRORS
1153  002412  000000                        .WORD   0               ;NUMBER OF SEEK INCOMPLETES
1154  002414  000000                        .WORD   0               ;NUMBER OF MISPOSITIONING ERRORS
1155  002416  000000                        .WORD   0               ;NUMBER OF ALL OTHER ERRORS
1156  002420     000                        .BYTE   0               ;ASSIGNMENT COMMAND SEQUENCE
1157  002421     000                        .BYTE   0               ;SEEK TO PREVIOUS COMMAND FLAG
1158  002422  000000                        .WORD   0               ;ERROR STATUS INFORMATION
1159  002424  000000                        .WORD   0               ;HEADER ADDRESS OF FIRST MISCOMPARE ERROR
1160  002426     000                        .BYTE   0
1161  002427     000                        .BYTE   0               ;OFFSET ADDRESS FROM HEADER ADDRESS
1162  002430  000000                        .WORD   0               ;COMPARISON LENGTH
1163  002432  000000                        .WORD   0               ;BUFFER COMPARISON LENGTH
1164  002434  007777                        .WORD   007777          ;DRIVE SERIAL NUMBER
1165  002436  000000  000000                .WORD   0,0             ;CARIAGE SERIAL NUMBER
1166  002442  000000  000000                .WORD   0,0             ;FIRST EXCLUSION AREA
1167  002446  000000  000000                .WORD   0,0             ;SECOND EXCLUSION AREA
1168  002452  000000  000000                .WORD   0,0             ;THIRD EXCLUSION AREA
1169  002456  000000  000000                .WORD   0,0             ;FOURTH EXCLUSION AREA
1170  002462  000000  000000                .WORD   0,0             ;FIFTH EXCLUSION AREA
```

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1171
1172                                    .SBTTL  PARAMETER BLOCK FOR DRIVE 2
1173
1174  002466     002                    PARM2:  .BYTE   2               ;DRIVE 2
1175  002467     000                            .BYTE   0               ;COMMAND
1176  002470  000000                            .WORD   0               ;CYLINDER ADDRESS
1177  002472     000                            .BYTE   0               ;SECTOR ADDRESS
1178  002473     000                            .BYTE   0               ;TRACK ADDRESS
1179  002474     000                            .BYTE   0               ;OFFSET VALUE
1180  002475     000                            .BYTE   0               ;BUS ADDRESS (BITS 16 AND 17)
1181  002476  000000                            .WORD   0               ;BUS ADDRESS (BITS 0 - 15)
1182  002500  000000                            .WORD   0               ;WORD COUNT (2'S COMPLEMENT)
1183  002502  000000                            .WORD   0               ;PROGRAM DRIVE STATUS INFORMATION
1184  002504  000000                            .WORD   0               ;COMMAND AND STATUS REGISTER 1
1185  002506  000000                            .WORD   0               ;COMMAND AND STATUS REGISTER 2
1186  002510  000000                            .WORD   0               ;WORD COUNT REGISTER
1187  002512  000000                            .WORD   0               ;BUS ADDRESS REGISTER
1188  002514  000000                            .WORD   0               ;DESIRED TRACK AND SECTOR REGISTER
1189  002516  000000                            .WORD   0               ;DESIRED CYLINDER REGISTER
1190  002520  000000                            .WORD   0               ;ATTENTION SUMMARY/OFFSET REGISTER
1191  002522  000000                            .WORD   0               ;ERROR REGISTER
1192  002524  000000                            .WORD   0               ;STATUS REGISTER
1193  002526  000000                            .WORD   0               ;MESSAGE LINE A STATUS BYTE 00
1194  002530  000000                            .WORD   0               ;MESSAGE LINE B STATUS BYTE 00
1195  002532  000000                            .WORD   0               ;MESSAGE LINE A STATUS BYTE 01
1196  002534  000000                            .WORD   0               ;MESSAGE LINE B STATUS BYTE 01
1197  002536  000000                            .WORD   0               ;MESSAGE LINE A STATUS BYTE 10
1198  002540  000000                            .WORD   0               ;MESSAGE LINE B STATUS BYTE 10
1199  002542  000000                            .WORD   0               ;MESSAGE LINE A STATUS BYTE 11
1200  002544  000000                            .WORD   0               ;MESSAGE LINE B STATUS BYTE 11
1201  002546  000000                            .WORD   0               ;ECC POSITION INFORMATION
1202  002550  000000                            .WORD   0               ;ECC PATTERN INFORMATION
1203  002552  000000                            .WORD   0               ;QUEUE LINK
1204  002554  000000                            .WORD   0               ;MINIMUM CYLINDER
1205  002556  000632                            .WORD   410.            ;MAXIMUM CYLINDER
1206  002560     000                            .BYTE   0               ;MINIMUM TRACK
1207  002561     002                            .BYTE   2               ;MAXIMUM TRACK
1208  002562     000                            .BYTE   0               ;MINIMUM SECTOR
1209  002563     025                            .BYTE   21.             ;MAXIMUM SECTOR
1210  002564     003                            .BYTE   3               ;READ/WRITE RATIO
1211  002565     000                            .BYTE   0               ;AUTOMATIC WRITE CHECK
1212  002566  000012                            .WORD   10.             ;CORRECTABLE READ ERROR THRESHOLD
1213  002570  000005                            .WORD   5               ;UNCORRECTABLE READ ERROR THRESHOLD
1214  002572  000005                            .WORD   5               ;SEEK ERROR THRESHOLD
1215  002574  177770  177777                   .WORD   177770,177777   ;MAXIMUM NUMBER OF COMMANDS TO DRIVE
1216  002600  177770  177777                   .WORD   177770,177777   ;MAXIMUM NUMBER OF WORDS TRANSFERRED TO DRIVE
1217  002604     000                            .BYTE   0               ;SAMPLE COMPARE FLAG
1218  002605     000                            .BYTE   0               ;ECC COMPARE FLAG
1219  002606     000                            .BYTE   0               ;INHIBIT ERROR CORRECTION
1220  002607     000                            .BYTE   0               ;DATA PATTERN USED
1221  002610     000                            .BYTE   0               ;CURRENT GENERATED DATA PATTERN
1222  002611     000                            .BYTE   0               ;CURRENT RANDOMLY GENERATED COMMAND
1223  002612  000000                            .WORD   0               ;CURRENT RANDOMLY GENERATED CYLINDER
1224  002614     000                            .BYTE   0               ;CURRENT RANDOMLY GENERATED SECTOR
1225  002615     000                            .BYTE   0               ;CURRENT RANDOMLY GENERATED TRACK
1226  002616  000000                            .WORD   0               ;CURRENT RANDOMLY GENERATED WORD COUNT
```

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1227  002620  000000                          .WORD   0               ;CURRENT RANDOMLY GENERATED BUS ADDRESS
1228  002622     000                          .BYTE   0
1229  002623     000                          .BYTE   0               ;LAST COMMAND
1230  002624  000000                          .WORD   0               ;LAST CYLINDER
1231  002626     000                          .BYTE   0               ;LAST SECTOR
1232  002627     000                          .BYTE   0               ;LAST TRACK
1233  002630  000000                          .WORD   0               ;LAST WORD COUNT
1234  002632     000                          .BYTE   0               ;LAST DATA PATTERN USED
1235  002633     000                          .BYTE   0               ;BUFFER ALLOCATED
1236  002634     000                          .BYTE   0               ;RETRY COUNT
1237  002635     000                          .BYTE   0               ;REREAD STATUS
1238  002636  000000                          .WORD   0               ;DRIVE STATUS FLAGS
1239  002640  000000  000000                  .WORD   0,0             ;NUMBER OF ORDERS
1240  002644  000000  000000  000000          .WORD   0,0,0           ;NUMBER OF WORDS WRITTEN
1241  002652  000000  000000  000000          .WORD   0,0,0           ;NUMBER OF WORDS READ
1242  002660  000000                          .WORD   0               ;NUMBER OF SOFT ERRORS (REREAD CORRECTABLE)
1243  002662  000000                          .WORD   0               ;NUMBER OF SOFT ERRORS (OFFSET CORRECTABLE)
1244  002664  000000                          .WORD   0               ;NUMBER OF SOFT ERRORS (ECC CORRECTABLE)
1245  002666  000000                          .WORD   0               ;NUMBER OF HARD DATA ERRORS
1246  002670  000000                          .WORD   0               ;NUMBER OF SEEK INCOMPLETES
1247  002672  000000                          .WORD   0               ;NUMBER OF MISPOSITIONING ERRORS
1248  002674  000000                          .WORD   0               ;NUMBER OF ALL CYBER ERRORS
1249  002676     000                          .BYTE   0               ;ASSIGNMENT COMMAND SEQUENCE
1250  002677     000                          .BYTE   0               ;SEEK TO PREVIOUS COMMAND FLAG
1251  002700  000000                          .WORD   0               ;ERROR STATUS INFORMATION
1252  002702  000000                          .WORD   0               ;HEADER ADDRESS OF FIRST MISCOMPARE ERROR
1253  002704     000                          .BYTE   0
1254  002705     000                          .BYTE   0               ;OFFSET ADDRESS FROM HEADER ADDRESS
1255  002706  000000                          .WORD   0               ;COMPARISON LENGTH
1256  002710  000000                          .WORD   0               ;BUFFER COMPARISON LENGTH
1257  002712  007777                          .WORD   007777          ;DRIVE SERIAL NUMBER
1258  002714  000000  000000                  .WORD   0,0             ;CARIAGE SERIAL NUMBER
1259  002720  000000  000000                  .WORD   0,0             ;FIRST EXCLUSION AREA
1260  002724  000000  000000                  .WORD   0,0             ;SECOND EXCLUSION AREA
1261  002730  000000  000000                  .WORD   0,0             ;THIRD EXCLUSION AREA
1262  002734  000000  000000                  .WORD   0,0             ;FOURTH EXCLUSION AREA
1263  002740  000000  000000                  .WORD   0,0             ;FIFTH EXCLUSION AREA
```

```
1264
1265                            .SBTTL  PARAMETER BLOCK FOR DRIVE 3
1266
1267  002744     003        PARM3:  .BYTE   3               ;DRIVE #
1268  002745     000                .BYTE   0               ;COMMAND
1269  002746  000000                .WORD   0               ;CYLINDER ADDRESS
1270  002750     000                .BYTE   0               ;SECTOR ADDRESS
1271  002751     000                .BYTE   0               ;TRACK ADDRESS
1272  002752     000                .BYTE   0               ;OFFSET VALUE
1273  002753     000                .BYTE   0               ;BUS ADDRESS (BITS 16 AND 17)
1274  002754  000000                .WORD   0               ;BUS ADDRESS (BITS 0 - 15)
1275  002756  000000                .WORD   0               ;WORD COUNT (2'S COMPLEMENT)
1276  002760  000000                .WORD   0               ;PROGRAM DRIVE STATUS INFORMATION
1277  002762  000000                .WORD   0               ;COMMAND AND STATUS REGISTER 1
1278  002764  000000                .WORD   0               ;COMMAND AND STATUS REGISTER 2
1279  002766  000000                .WORD   0               ;WORD COUNT REGISTER
1280  002770  000000                .WORD   0               ;BUS ADDRESS REGISTER
1281  002772  000000                .WORD   0               ;DESIRED TRACK AND SECTOR REGISTER
1282  002774  000000                .WORD   0               ;DESIRED CYLINDER REGISTER
1283  002776  000000                .WORD   0               ;ATTENTION SUMMARY/OFFSET REGISTER
1284  003000  000000                .WORD   0               ;ERROR REGISTER
1285  003002  000000                .WORD   0               ;STATUS REGISTER
1286  003004  000000                .WORD   0               ;MESSAGE LINE A STATUS BYTE 00
1287  003006  000000                .WORD   0               ;MESSAGE LINE B STATUS BYTE 00
1288  003010  000000                .WORD   0               ;MESSAGE LINE A STATUS BYTE 01
1289  003012  000000                .WORD   0               ;MESSAGE LINE B STATUS BYTE 01
1290  003014  000000                .WORD   0               ;MESSAGE LINE A STATUS BYTE 10
1291  003016  000000                .WORD   0               ;MESSAGE LINE B STATUS BYTE 10
1292  003020  000000                .WORD   0               ;MESSAGE LINE A STATUS BYTE 11
1293  003022  000000                .WORD   0               ;MESSAGE LINE B STATUS BYTE 11
1294  003024  000000                .WORD   0               ;ECC POSITION INFORMATION
1295  003026  000000                .WORD   0               ;ECC PATTERN INFORMATION
1296  003030  000000                .WORD   0               ;QUEUE LINK
1297  003032  000000                .WORD   0               ;MINIMUM CYLINDER
1298  003034  000632                .WORD   410.            ;MAXIMUM CYLINDER
1299  003036     000                .BYTE   0               ;MINIMUM TRACK
1300  003037     002                .BYTE   2               ;MAXIMUM TRACK
1301  003040     000                .BYTE   0               ;MINIMUM SECTOR
1302  003041     025                .BYTE   21.             ;MAXIMUM SECTOR
1303  003042     003                .BYTE   3               ;READ/WRITE RATIO
1304  003043     000                .BYTE   0               ;AUTOMATIC WRITE CHECK
1305  003044  000012                .WORD   10.             ;CORRECTABLE READ ERROR THRESHOLD
1306  003046  000005                .WORD   5               ;UNCORRECTABLE READ ERROR THRESHOLD
1307  003050  000005                .WORD   5               ;SEEK ERROR THRESHOLD
1308  003052  177770  177777        .WORD   177770,177777   ;MAXIMUM NUMBER OF COMMANDS TO DRIVE
1309  003056  177770  177777        .WORD   177770,177777   ;MAXIMUM NUMBER OF WORDS TRANSFERRED TO DRIVE
1310  003062     000                .BYTE   0               ;SAMPLE COMPARE FLAG
1311  003063     000                .BYTE   0               ;ECC COMPARE FLAG
1312  003064     000                .BYTE   0               ;INHIBIT ERROR CORRECTION
1313  003065     000                .BYTE   0               ;DATA PATTERN USER
1314  003066     000                .BYTE   0               ;CURRENT GENERATED DATA PATTERN
1315  003067     000                .BYTE   0               ;CURRENT RANDOMLY GENERATED COMPARE
1316  003070  000000                .WORD   0               ;CURRENT RANDOMLY GENERATED CYLINDER
1317  003072     000                .BYTE   0               ;CURRENT RANDOMLY GENERATED SECTOR
1318  003073     000                .BYTE   0               ;CURRENT RANDOMLY GENERATED TRACK
1319  003074  000000                .WORD   0               ;CURRENT RANDOMLY GENERATED WORD COUNT
```

```
1320  003076  000000                    .WORD   0               ;CURRENT RANDOMLY GENERATED BUS ADDRESS
1321  003100     000                    .BYTE   0
1322  003101     000                    .BYTE   0               ;LAST COMMAND
1323  003102  000000                    .WORD   0               ;LAST CYLINDER
1324  003104     000                    .BYTE   0               ;LAST SECTOR
1325  003105     000                    .BYTE   0               ;LAST TRACK
1326  003106  000000                    .WORD   0               ;LAST WORD COUNT
1327  003110     000                    .BYTE   0               ;LAST DATA PATTERN USED
1328  003111     000                    .BYTE   0               ;BUFFER ALLOCATED
1329  003112     000                    .BYTE   0               ;RETRY COUNT
1330  003113     000                    .BYTE   0               ;REREAD STATUS
1331  003114  000000                    .WORD   0               ;DRIVE STATUS FLAGS
1332  003116  000000  000000            .WORD   0,0             ;NUMBER OF ORDERS
1333  003122  000000  000000  000000    .WORD   0,0,0           ;NUMBER OF WORDS WRITTEN
1334  003130  000000  000000  000000    .WORD   0,0,0           ;NUMBER OF WORDS READ
1335  003136  000000                    .WORD   0               ;NUMBER OF SOFT ERRORS (REREAD CORRECTABLE)
1336  003140  000000                    .WORD   0               ;NUMBER OF SOFT ERRORS (OFFSET CORRECTABLE)
1337  003142  000000                    .WORD   0               ;NUMBER OF SOFT ERRORS (ECC CORRECTABLE)
1338  003144  000000                    .WORD   0               ;NUMBER OF HARD DATA ERRORS
1339  003146  000000                    .WORD   0               ;NUMBER OF SEEK INCOMPLETES
1340  003150  000000                    .WORD   0               ;NUMBER OF MISPOSITIONING ERRORS
1341  003152  000000                    .WORD   0               ;NUMBER OF ALL OTHER ERRORS
1342  003154     000                    .BYTE   0               ;ASSIGNMENT COMMAND SEQUENCE
1343  003155     000                    .BYTE   0               ;SEEK TO PREVIOUS COMMAND FLAG
1344  003156  000000                    .WORD   0               ;ERROR STATUS INFORMATION
1345  003160  000000                    .WORD   0               ;HEADER ADDRESS OF FIRST MISCOMPARE ERROR
1346  003162     000                    .BYTE   0
1347  003163     000                    .BYTE   0               ;OFFSET ADDRESS FROM HEADER ADDRESS
1348  003164  000000                    .WORD   0               ;COMPARISON LENGTH
1349  003166  000000                    .WORD   0               ;BUFFER COMPARISON LENGTH
1350  003170  007777                    .WORD   007777          ;DRIVE SERIAL NUMBER
1351  003172  000000  000000            .WORD   0,0             ;CARIAGE SERIAL NUMBER
1352  003176  000000  000000            .WORD   0,0             ;FIRST EXCLUSION AREA
1353  003202  000000  000000            .WORD   0,0             ;SECOND EXCLUSION AREA
1354  003206  000000  000000            .WORD   0,0             ;THIRD EXCLUSION AREA
1355  003212  000000  000000            .WORD   0,0             ;FOURTH EXCLUSION AREA
1356  003216  000000  000000            .WORD   0,0             ;FIFTH EXCLUSION AREA
```

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1357
1358                                    .SBTTL  PARAMETER BLOCK FOR DRIVE 4
1359
1360  003222     004                   PARM4:  .BYTE   4               ;DRIVE 4
1361  003223     000                           .BYTE   0               ;COMMAND
1362  003224  000000                           .WORD   0               ;CYLINDER ADDRESS
1363  003226     000                           .BYTE   0               ;SECTOR ADDRESS
1364  003227     000                           .BYTE   0               ;TRACK ADDRESS
1365  003230     000                           .BYTE   0               ;OFFSET VALUE
1366  003231     000                           .BYTE   0               ;BUS ADDRESS (BITS 16 AND 17)
1367  003232  000000                           .WORD   0               ;BUS ADDRESS (BITS 0 - 15)
1368  003234  000000                           .WORD   0               ;WORD COUNT (2'S COMPLEMENT)
1369  003236  000000                           .WORD   0               ;PROGRAM DRIVE STATUS INFORMATION
1370  003240  000000                           .WORD   0               ;COMMAND AND STATUS REGISTER 1
1371  003242  000000                           .WORD   0               ;COMMAND AND STATUS REGISTER 2
1372  003244  000000                           .WORD   0               ;WORD COUNT REGISTER
1373  003246  000000                           .WORD   0               ;BUS ADDRESS REGISTER
1374  003250  000000                           .WORD   0               ;DESIRED TRACK AND SECTOR REGISTER
1375  003252  000000                           .WORD   0               ;DESIRED CYLINDER REGISTER
1376  003254  000000                           .WORD   0               ;ATTENTION SUMMARY/OFFSET REGISTER
1377  003256  000000                           .WORD   0               ;ERROR REGISTER
1378  003260  000000                           .WORD   0               ;STATUS REGISTER
1379  003262  000000                           .WORD   0               ;MESSAGE LINE A STATUS BYTE 00
1380  003264  000000                           .WORD   0               ;MESSAGE LINE B STATUS BYTE 00
1381  003266  000000                           .WORD   0               ;MESSAGE LINE A STATUS BYTE 01
1382  003270  000000                           .WORD   0               ;MESSAGE LINE B STATUS BYTE 01
1383  003272  000000                           .WORD   0               ;MESSAGE LINE A STATUS BYTE 10
1384  003274  000000                           .WORD   0               ;MESSAGE LINE B STATUS BYTE 10
1385  003276  000000                           .WORD   0               ;MESSAGE LINE A STATUS BYTE 11
1386  003300  000000                           .WORD   0               ;MESSAGE LINE B STATUS BYTE 11
1387  003302  000000                           .WORD   0               ;ECC POSITION INFORMATION
1388  003304  000000                           .WORD   0               ;ECC PATTERN INFORMATION
1389  003306  000000                           .WORD   0               ;CURVE LINK
1390  003310  000000                           .WORD   0               ;MINIMUM CYLINDER
1391  003312  000632                           .WORD   410.            ;MAXIMUM CYLINDER
1392  003314     000                           .BYTE   0               ;MINIMUM TRACK
1393  003315     002                           .BYTE   2               ;MAXIMUM TRACK
1394  003316     000                           .BYTE   0               ;MINIMUM SECTOR
1395  003317     025                           .BYTE   21.             ;MAXIMUM SECTOR
1396  003320     003                           .BYTE   3               ;READ/WRITE RATIO
1397  003321     000                           .BYTE   0               ;AUTOMATIC WRITE CHECK
1398  003322  000012                           .WORD   10.             ;CORRECTABLE READ ERROR THRESHOLD
1399  003324  000005                           .WORD   5               ;UNCORRECTABLE READ ERROR THRESHOLD
1400  003326  000005                           .WORD   5               ;SEEK ERROR THRESHOLD
1401  003330  177770  177777                   .WORD   177770,177777   ;MAXIMUM NUMBER OF COMMANDS TO DRIVE
1402  003334  177770  177777                   .WORD   177770,177777   ;MAXIMUM NUMBER OF WORDS TRANSFERRED TO DRIVE
1403  003340     000                           .BYTE   0               ;SAMPLE COMPARE FLAG
1404  003341     000                           .BYTE   0               ;ECC COMPARE FLAG
1405  003342     000                           .BYTE   0               ;INHIBIT ERROR CORRECTION
1406  003343     000                           .BYTE   0               ;DATA PATTERN USED
1407  003344     000                           .BYTE   0               ;CURRENT GENERATED DATA PATTERN
1408  003345     000                           .BYTE   0               ;CURRENT RANDOMLY GENERATED COMPARE
1409  003346  000000                           .WORD   0               ;CURRENT RANDOMLY GENERATED CYLINDER
1410  003350     000                           .BYTE   0               ;CURRENT RANDOMLY GENERATED SECTOR
1411  003351     000                           .BYTE   0               ;CURRENT RANDOMLY GENERATED TRACK
1412  003352  000000                           .WORD   0               ;CURRENT RANDOMLY GENERATED WORD COUNT
```

A5

```
1413  003354  000000                    .WORD   0               ;CURRENT RANDOMLY GENERATED BUS ADDRESS
1414  003356     000                    .BYTE   0
1415  003357     000                    .BYTE   0               ;LAST COMMAND
1416  003360  000000                    .WORD   0               ;LAST CYLINDER
1417  003362     000                    .BYTE   0               ;LAST SECTOR
1418  003363     000                    .BYTE   0               ;LAST TRACK
1419  003364  000000                    .WORD   0               ;LAST WORD COUNT
1420  003366     000                    .BYTE   0               ;LAST DATA PATTERN USED
1421  003367     000                    .BYTE   0               ;BUFFER ALLOCATED
1422  003370     000                    .BYTE   0               ;RETRY COUNT
1423  003371     000                    .BYTE   0               ;REREAD STATUS
1424  003372  000000                    .WORD   0               ;DRIVE STATUS FLAGS
1425  003374  000000  000000            .WORD   0,0             ;NUMBER OF ORDERS
1426  003400  000000  000000  000000    .WORD   0,0,0           ;NUMBER OF WORDS WRITTEN
1427  003406  000000  000000  000000    .WORD   0,0,0           ;NUMBER OF WORDS READ
1428  003414  000000                    .WORD   0               ;NUMBER OF SOFT ERRORS (REREAD CORRECTABLE)
1429  003416  000000                    .WORD   0               ;NUMBER OF SOFT ERRORS (OFFSET CORRECTABLE)
1430  003420  000000                    .WORD   0               ;NUMBER OF SOFT ERRORS (ECC CORRECTABLE)
1431  003422  000000                    .WORD   0               ;NUMBER OF HARD DATA ERRORS
1432  003424  000000                    .WORD   0               ;NUMBER OF SEEK INCOMPLETES
1433  003426  000000                    .WORD   0               ;NUMBER OF MISPOSITIONING ERRORS
1434  003430  000000                    .WORD   0               ;NUMBER OF ALL OTHER ERRORS
1435  003432     000                    .BYTE   0               ;ASSIGNMENT COMMAND SEQUENCE
1436  003433     000                    .BYTE   0               ;SEEK TO PREVIOUS COMMAND FLAG
1437  003434  000000                    .WORD   0               ;ERROR STATUS INFORMATION
1438  003436  000000                    .WORD   0               ;HEADER ADDRESS OF FIRST MISCOMPARE ERROR
1439  003440     000                    .BYTE   0
1440  003441     000                    .BYTE   0               ;OFFSET ADDRESS FROM HEADER ADDRESS
1441  003442  000000                    .WORD   0               ;COMPARISON LENGTH
1442  003444  000000                    .WORD   0               ;BUFFER COMPARISON LENGTH
1443  003446  007777                    .WORD   007777          ;DRIVE SERIAL NUMBER
1444  003450  000000  000000            .WORD   0,0             ;CARIAGE SERIAL NUMBER
1445  003454  000000  000000            .WORD   0,0             ;FIRST EXCLUSION AREA
1446  003460  000000  000000            .WORD   0,0             ;SECOND EXCLUSION AREA
1447  003464  000000  000000            .WORD   0,0             ;THIRD EXCLUSION AREA
1448  003470  000000  000000            .WORD   0,0             ;FOURTH EXCLUSION AREA
1449  003474  000000  000000            .WORD   0,0             ;FIFTH EXCLUSION AREA
```

```
1450
1451                                    .SBTTL  PARAMETER BLOCK FOR DRIVE 5
1452
1453  003500     005                    PARM5:  .BYTE   5               ;DRIVE 5
1454  003501     000                            .BYTE   0               ;COMMAND
1455  003502  000000                            .WORD   0               ;CYLINDER ADDRESS
1456  003504     000                            .BYTE   0               ;SECTOR ADDRESS
1457  003505     000                            .BYTE   0               ;TRACK ADDRESS
1458  003506     000                            .BYTE   0               ;OFFSET VALUE
1459  003507     000                            .BYTE   0               ;BUS ADDRESS (BITS 16 AND 17)
1460  003510  000000                            .WORD   0               ;BUS ADDRESS (BITS 0 - 15)
1461  003512  000000                            .WORD   0               ;WORD COUNT (2'S COMPLEMENT)
1462  003514  000000                            .WORD   0               ;PROGRAM DRIVE STATUS INFORMATION
1463  003516  000000                            .WORD   0               ;COMMAND AND STATUS REGISTER 1
1464  003520  000000                            .WORD   0               ;COMMAND AND STATUS REGISTER 2
1465  003522  000000                            .WORD   0               ;WORD COUNT REGISTER
1466  003524  000000                            .WORD   0               ;BUS ADDRESS REGISTER
1467  003526  000000                            .WORD   0               ;DESIRED TRACK AND SECTOR REGISTER
1468  003530  000000                            .WORD   0               ;DESIRED CYLINDER REGISTER
1469  003532  000000                            .WORD   0               ;ATTENTION SUMMARY/OFFSET REGISTER
1470  003534  000000                            .WORD   0               ;ERROR REGISTER
1471  003536  000000                            .WORD   0               ;STATUS REGISTER
1472  003540  000000                            .WORD   0               ;MESSAGE LINE A STATUS BYTE 00
1473  003542  000000                            .WORD   0               ;MESSAGE LINE B STATUS BYTE 00
1474  003544  000000                            .WORD   0               ;MESSAGE LINE A STATUS BYTE 01
1475  003546  000000                            .WORD   0               ;MESSAGE LINE B STATUS BYTE 01
1476  003550  000000                            .WORD   0               ;MESSAGE LINE A STATUS BYTE 10
1477  003552  000000                            .WORD   0               ;MESSAGE LINE B STATUS BYTE 10
1478  003554  000000                            .WORD   0               ;MESSAGE LINE A STATUS BYTE 11
1479  003556  000000                            .WORD   0               ;MESSAGE LINE B STATUS BYTE 11
1480  003560  000000                            .WORD   0               ;ECC POSITION INFORMATION
1481  003562  000000                            .WORD   0               ;ECC PATTERN INFORMATION
1482  003564  000000                            .WORD   0               ;QUEUE LINK
1483  003566  000000                            .WORD   0               ;MINIMUM CYLINDER
1484  003570  000632                            .WORD   410.            ;MAXIMUM CYLINDER
1485  003572     000                            .BYTE   0               ;MINIMUM TRACK
1486  003573     002                            .BYTE   2               ;MAXIMUM TRACK
1487  003574     000                            .BYTE   0               ;MINIMUM SECTOR
1488  003575     025                            .BYTE   21.             ;MAXIMUM SECTOR
1489  003576     003                            .BYTE   3               ;READ/WRITE RATIO
1490  003577     000                            .BYTE   0               ;AUTOMATIC WRITE CHECK
1491  003600  000012                            .WORD   10.             ;CORRECTABLE READ ERROR THRESHOLD
1492  003602  000005                            .WORD   5               ;UNCORRECTABLE READ ERROR THRESHOLD
1493  003604  000005                            .WORD   5               ;SEEK ERROR THRESHOLD
1494  003606  177770  177777                   .WORD   177770,177777   ;MAXIMUM NUMBER OF COMMANDS TO DRIVE
1495  003612  177770  177777                   .WORD   177770,177777   ;MAXIMUM NUMBER OF WORDS TRANSFERRED TO DRIVE
1496  003616     000                            .BYTE   0               ;SAMPLE COMPARE FLAG
1497  003617     000                            .BYTE   0               ;ECC COMPARE FLAG
1498  003620     000                            .BYTE   0               ;INHIBIT ERROR CORRECTION
1499  003621     000                            .BYTE   0               ;DATA PATTERN USED
1500  003622     000                            .BYTE   0               ;CURRENT GENERATED DATA PATTERN
1501  003623     000                            .BYTE   0               ;CURRENT RANDOMLY GENERATED COMPARE
1502  003624  000000                            .WORD   0               ;CURRENT RANDOMLY GENERATED CYLINDER
1503  003626     000                            .BYTE   0               ;CURRENT RANDOMLY GENERATED SECTOR
1504  003627     000                            .BYTE   0               ;CURRENT RANDOMLY GENERATED TRACK
1505  003630  000000                            .WORD   0               ;CURRENT RANDOMLY GENERATED WORD COUNT
```

C5

```
1506  003632  000000                          .WORD   0               ;CURRENT RANDOMLY GENERATED BUS ADDRESS
1507  003634     000                          .BYTE   0
1508  003635     000                          .BYTE   0               ;LAST COMMAND
1509  003636  000000                          .WORD   0               ;LAST CYLINDER
1510  003640     000                          .BYTE   0               ;LAST SECTOR
1511  003641     000                          .BYTE   0               ;LAST TRACK
1512  003642  000000                          .WORD   0               ;LAST WORD COUNT
1513  003644     000                          .BYTE   0               ;LAST DATA PATTERN USED
1514  003645     000                          .BYTE   0               ;BUFFER ALLOCATED
1515  003646     000                          .BYTE   0               ;RETRY COUNT
1516  003647     000                          .BYTE   0               ;REREAD STATUS
1517  003650  000000                          .WORD   0               ;DRIVE STATUS FLAGS
1518  003652  000000  000000                  .WORD   0,0             ;NUMBER OF ORDERS
1519  003656  000000  000000  000000          .WORD   0,0,0           ;NUMBER OF WORDS WRITTEN
1520  003664  000000  000000  000000          .WORD   0,0,0           ;NUMBER OF WORDS READ
1521  003672  000000                          .WORD   0               ;NUMBER OF SOFT ERRORS (REREAD CORRECTABLE)
1522  003674  000000                          .WORD   0               ;NUMBER OF SOFT ERRORS (OFFSET CORRECTABLE)
1523  003676  000000                          .WORD   0               ;NUMBER OF SOFT ERRORS (ECC CORRECTABLE)
1524  003700  000000                          .WORD   0               ;NUMBER OF HARD DATA ERRORS
1525  003702  000000                          .WORD   0               ;NUMBER OF SEEK INCOMPLETES
1526  003704  000000                          .WORD   0               ;NUMBER OF MISPOSITIONING ERRORS
1527  003706  000000                          .WORD   0               ;NUMBER OF ALL OTHER ERRORS
1528  003710     000                          .BYTE   0               ;ASSIGNMENT COMMAND SEQUENCE
1529  003711     000                          .BYTE   0               ;SEEK TO PREVIOUS COMMAND FLAG
1530  003712  000000                          .WORD   0               ;ERROR STATUS INFORMATION
1531  003714  000000                          .WORD   0               ;HEADER ADDRESS OF FIRST MISCOMPARE ERROR
1532  003716     000                          .BYTE   0
1533  003717     000                          .BYTE   0               ;OFFSET ADDRESS FROM HEADER ADDRESS
1534  003720  000000                          .WORD   0               ;COMPARISON LENGTH
1535  003722  000000                          .WORD   0               ;BUFFER COMPARISON LENGTH
1536  003724  007777                          .WORD   007777          ;DRIVE SERIAL NUMBER
1537  003726  000000  000000                  .WORD   0,0             ;CARIAGE SERIAL NUMBER
1538  003732  000000  000000                  .WORD   0,0             ;FIRST EXCLUSION AREA
1539  003736  000000  000000                  .WORD   0,0             ;SECOND EXCLUSION AREA
1540  003742  000000  000000                  .WORD   0,0             ;THIRD EXCLUSION AREA
1541  003746  000000  000000                  .WORD   0,0             ;FOURTH EXCLUSION AREA
1542  003752  000000  000000                  .WORD   0,0             ;FIFTH EXCLUSION AREA
```

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1543
1544                                    .SBTTL  PARAMETER BLOCK FOR DRIVE 6
1545
1546  003756     006                    PARM6:  .BYTE   6               ;DRIVE 6
1547  003757     000                            .BYTE   0               ;COMMAND
1548  003760  000000                            .WORD   0               ;CYLINDER ADDRESS
1549  003762     000                            .BYTE   0               ;SECTOR ADDRESS
1550  003763     000                            .BYTE   0               ;TRACK ADDRESS
1551  003764     000                            .BYTE   0               ;OFFSET VALUE
1552  003765     000                            .BYTE   0               ;BUS ADDRESS (BITS 16 AND 17)
1553  003766  000000                            .WORD   0               ;BUS ADDRESS (BITS 0 - 15)
1554  003770  000000                            .WORD   0               ;WORD COUNT (2'S COMPLEMENT)
1555  003772  000000                            .WORD   0               ;PROGRAM DRIVE STATUS INFORMATION
1556  003774  000000                            .WORD   0               ;COMMAND AND STATUS REGISTER 1
1557  003776  000000                            .WORD   0               ;COMMAND AND STATUS REGISTER 2
1558  004000  000000                            .WORD   0               ;WORD COUNT REGISTER
1559  004002  000000                            .WORD   0               ;BUS ADDRESS REGISTER
1560  004004  000000                            .WORD   0               ;DESIRED TRACK AND SECTOR REGISTER
1561  004006  000000                            .WORD   0               ;DESIRED CYLINDER REGISTER
1562  004010  000000                            .WORD   0               ;ATTENTION SUMMARY/OFFSET REGISTER
1563  004012  000000                            .WORD   0               ;ERROR REGISTER
1564  004014  000000                            .WORD   0               ;STATUS REGISTER
1565  004016  000000                            .WORD   0               ;MESSAGE LINE A STATUS BYTE 00
1566  004020  000000                            .WORD   0               ;MESSAGE LINE B STATUS BYTE 00
1567  004022  000000                            .WORD   0               ;MESSAGE LINE A STATUS BYTE 01
1568  004024  000000                            .WORD   0               ;MESSAGE LINE B STATUS BYTE 01
1569  004026  000000                            .WORD   0               ;MESSAGE LINE A STATUS BYTE 10
1570  004030  000000                            .WORD   0               ;MESSAGE LINE B STATUS BYTE 10
1571  004032  000000                            .WORD   0               ;MESSAGE LINE A STATUS BYTE 11
1572  004034  000000                            .WORD   0               ;MESSAGE LINE B STATUS BYTE 11
1573  004036  000000                            .WORD   0               ;ECC POSITION INFORMATION
1574  004040  000000                            .WORD   0               ;ECC PATTERN INFORMATION
1575  004042  000000                            .WORD   0               ;ODDUP LINK
1576  004044  000000                            .WORD   0               ;MINIMUM CYLINDER
1577  004046  000632                            .WORD   410.            ;MAXIMUM CYLINDER
1578  004050     000                            .BYTE   0               ;MINIMUM TRACK
1579  004051     002                            .BYTE   2               ;MAXIMUM TRACK
1580  004052     000                            .BYTE   0               ;MINIMUM SECTOR
1581  004053     025                            .BYTE   21.             ;MAXIMUM SECTOR
1582  004054     003                            .BYTE   3               ;READ/WRITE RATIO
1583  004055     000                            .BYTE   0               ;AUTOMATIC WRITE CHECK
1584  004056  000012                            .WORD   10.             ;CORRECTABLE READ ERROR THRESHOLD
1585  004060  000005                            .WORD   5               ;UNCORRECTABLE READ ERROR THRESHOLD
1586  004062  000005                            .WORD   5               ;SEEK ERROR THRESHOLD
1587  004064  177770  177777                   .WORD   177770,177777   ;MAXIMUM NUMBER OF COMMANDS TO DRIVE
1588  004070  177770  177777                   .WORD   177770,177777   ;MAXIMUM NUMBER OF WORDS TRANSFERRED TO DRIVE
1589  004074     000                            .BYTE   0               ;SAMPLE COMPARE FLAG
1590  004075     000                            .BYTE   0               ;ECC COMPARE FLAG
1591  004076     000                            .BYTE   0               ;INHIBIT ERROR CORRECTION
1592  004077     000                            .BYTE   0               ;DATA PATTERN USER
1593  004100     000                            .BYTE   0               ;CURRENT GENERATED DATA PATTERN
1594  004101     000                            .BYTE   0               ;CURRENT RANDOMLY GENERATED COMMAND
1595  004102  000000                            .WORD   0               ;CURRENT RANDOMLY GENERATED CYLINDER
1596  004104     000                            .BYTE   0               ;CURRENT RANDOMLY GENERATED SECTOR
1597  004105     000                            .BYTE   0               ;CURRENT RANDOMLY GENERATED TRACK
1598  004106  000000                            .WORD   0               ;CURRENT RANDOMLY GENERATED WORD COUNT
```

E5

```
1599  004110  000000                          .WORD   0               ;CURRENT RANDOMLY GENERATED BUS ADDRESS
1600  004112     000                          .BYTE   0
1601  004113     000                          .BYTE   0               ;LAST COMMAND
1602  004114  000000                          .WORD   0               ;LAST CYLINDER
1603  004116     000                          .BYTE   0               ;LAST SECTOR
1604  004117     000                          .BYTE   0               ;LAST TRACK
1605  004120  000000                          .WORD   0               ;LAST WORD COUNT
1606  004122     000                          .BYTE   0               ;LAST DATA PATTERN USED
1607  004123     000                          .BYTE   0               ;BUFFER ALLOCATED
1608  004124     000                          .BYTE   0               ;RETRY COUNT
1609  004125     000                          .BYTE   0               ;REREAD STATUS
1610  004126  000000                          .WORD   0               ;DRIVE STATUS FLAGS
1611  004130  000000  000000                  .WORD   0,0             ;NUMBER OF ERRORS
1612  004134  000000  000000  000000          .WORD   0,0,0           ;NUMBER OF WORDS WRITTEN
1613  004142  000000  000000  000000          .WORD   0,0,0           ;NUMBER OF WORDS READ
1614  004150  000000                          .WORD   0               ;NUMBER OF SOFT ERRORS (REREAD CORRECTABLE)
1615  004152  000000                          .WORD   0               ;NUMBER OF SOFT ERRORS (OFFSET CORRECTABLE)
1616  004154  000000                          .WORD   0               ;NUMBER OF SOFT ERRORS (ECC CORRECTABLE)
1617  004156  000000                          .WORD   0               ;NUMBER OF HARD DATA ERRORS
1618  004160  000000                          .WORD   0               ;NUMBER OF SEEK INCOMPLETES
1619  004162  000000                          .WORD   0               ;NUMBER OF MISPOSITIONING ERRORS
1620  004164  000000                          .WORD   0               ;NUMBER OF ALL OTHER ERRORS
1621  004166     000                          .BYTE   0               ;ASSIGNMENT COMMAND SEQUENCE
1622  004167     000                          .BYTE   0               ;SEEK TO PREVIOUS COMMAND FLAG
1623  004170  000000                          .WORD   0               ;ERROR STATUS INFORMATION
1624  004172  000000                          .WORD   0               ;HEADER ADDRESS OF FIRST MISCOMPARE ERROR
1625  004174     000                          .BYTE   0
1626  004175     000                          .BYTE   0               ;OFFSET ADDRESS FROM HEADERS ADDRESS
1627  004176  000000                          .WORD   0               ;COMPARISON LENGTH
1628  004200  000000                          .WORD   0               ;BUFFER COMPARISON LENGTH
1629  004202  007777                          .WORD   007777          ;DRIVE SERIAL NUMBER
1630  004204  000000  000000                  .WORD   0,0             ;CARIAGE SERIAL NUMBER
1631  004210  000000  000000                  .WORD   0,0             ;FIRST EXCLUSION AREA
1632  004214  000000  000000                  .WORD   0,0             ;SECOND EXCLUSION AREA
1633  004220  000000  000000                  .WORD   0,0             ;THIRD EXCLUSION AREA
1634  004224  000000  000000                  .WORD   0,0             ;FOURTH EXCLUSION AREA
1635  004230  000000  000000                  .WORD   0,0             ;FIFTH EXCLUSION AREA
```

```
1636
1637                                    .SBTTL  PARAMETER BLOCK FOR DRIVE 7
1638
1639  004234     007                    PARM7:  .BYTE   7               ;DRIVE 7
1640  004235     000                            .BYTE   0               ;COMMAND
1641  004236  000000                            .WORD   0               ;CYLINDER ADDRESS
1642  004240     000                            .BYTE   0               ;SECTOR ADDRESS
1643  004241     000                            .BYTE   0               ;TRACK ADDRESS
1644  004242     000                            .BYTE   0               ;OFFSET VALUE
1645  004243     000                            .BYTE   0               ;BUS ADDRESS (BITS 16 AND 17)
1646  004244  000000                            .WORD   0               ;BUS ADDRESS (BITS 0 - 15)
1647  004246  000000                            .WORD   0               ;WORD COUNT (2'S COMPLEMENT)
1648  004250  000000                            .WORD   0               ;PROGRAM DRIVE STATUS INFORMATION
1649  004252  000000                            .WORD   0               ;COMMAND AND STATUS REGISTER 1
1650  004254  000000                            .WORD   0               ;COMMAND AND STATUS REGISTER 2
1651  004256  000000                            .WORD   0               ;WORD COUNT REGISTER
1652  004260  000000                            .WORD   0               ;BUS ADDRESS REGISTER
1653  004262  000000                            .WORD   0               ;DESIRED TRACK AND SECTOR REGISTER
1654  004264  000000                            .WORD   0               ;DESIRED CYLINDER REGISTER
1655  004266  000000                            .WORD   0               ;ATTENTION SUMMARY/OFFSET REGISTER
1656  004270  000000                            .WORD   0               ;ERROR REGISTER
1657  004272  000000                            .WORD   0               ;STATUS REGISTER
1658  004274  000000                            .WORD   0               ;MESSAGE LINE A STATUS BYTE 00
1659  004276  000000                            .WORD   0               ;MESSAGE LINE B STATUS BYTE 00
1660  004300  000000                            .WORD   0               ;MESSAGE LINE A STATUS BYTE 01
1661  004302  000000                            .WORD   0               ;MESSAGE LINE B STATUS BYTE 01
1662  004304  000000                            .WORD   0               ;MESSAGE LINE A STATUS BYTE 10
1663  004306  000000                            .WORD   0               ;MESSAGE LINE B STATUS BYTE 10
1664  004310  000000                            .WORD   0               ;MESSAGE LINE A STATUS BYTE 11
1665  004312  000000                            .WORD   0               ;MESSAGE LINE B STATUS BYTE 11
1666  004314  000000                            .WORD   0               ;ECC POSITION INFORMATION
1667  004316  000000                            .WORD   0               ;ECC PATTERN INFORMATION
1668  004320  000000                            .WORD   0               ;QUEUE LINK
1669  004322  000000                            .WORD   0               ;MINIMUM CYLINDER
1670  004324  000632                            .WORD   410.            ;MAXIMUM CYLINDER
1671  004326     000                            .BYTE   0               ;MINIMUM TRACK
1672  004327     002                            .BYTE   2               ;MAXIMUM TRACK
1673  004330     000                            .BYTE   0               ;MINIMUM SECTOR
1674  004331     025                            .BYTE   21.             ;MAXIMUM SECTOR
1675  004332     003                            .BYTE   3               ;READ/WRITE RATIO
1676  004333     000                            .BYTE   0               ;AUTOMATIC WRITE CHECK
1677  004334  000012                            .WORD   10.             ;CORRECTABLE READ ERROR THRESHOLD
1678  004336  000005                            .WORD   5               ;UNCORRECTABLE READ ERROR THRESHOLD
1679  004340  000005                            .WORD   5               ;SEEK ERROR THRESHOLD
1680  004342  177770  177777                  .WORD   177770,177777   ;MAXIMUM NUMBER OF COMMANDS TO DRIVE
1681  004346  177770  177777                  .WORD   177770,177777   ;MAXIMUM NUMBER OF WORDS TRANSFERRED TO DRIVE
1682  004352     000                            .BYTE   0               ;SAMPLE COMPARE FLAG
1683  004353     000                            .BYTE   0               ;ECC COMPARE FLAG
1684  004354     000                            .BYTE   0               ;INHIBIT ERROR CORRECTION
1685  004355     000                            .BYTE   0               ;DATA PATTERN USED
1686  004356     000                            .BYTE   0               ;CURRENT GENERATED DATA PATTERN
1687  004357     000                            .BYTE   0               ;CURRENT RANDOMLY GENERATED COMMAND
1688  004360  000000                            .WORD   0               ;CURRENT RANDOMLY GENERATED CYLINDER
1689  004362     000                            .BYTE   0               ;CURRENT RANDOMLY GENERATED SECTOR
1690  004363     000                            .BYTE   0               ;CURRENT RANDOMLY GENERATED TRACK
1691  004364  000000                            .WORD   0               ;CURRENT RANDOMLY GENERATED WORD COUNT
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1692  004366  000000                    .WORD   0               ;CURRENT RANDOMLY GENERATED BUS ADDRESS
1693  004370     000                    .BYTE   0
1694  004371     000                    .BYTE   0               ;LAST COMMAND
1695  004372  000000                    .WORD   0               ;LAST CYLINDER
1696  004374     000                    .BYTE   0               ;LAST SECTOR
1697  004375     000                    .BYTE   0               ;LAST TRACK
1698  004376  000000                    .WORD   0               ;LAST WORD COUNT
1699  004400     000                    .BYTE   0               ;LAST DATA PATTERN USED
1700  004401     000                    .BYTE   0               ;BUFFER ALLOCATED
1701  004402     000                    .BYTE   0               ;RETRY COUNT
1702  004403     000                    .BYTE   0               ;REREAD STATUS
1703  004404  000000                    .WORD   0               ;DRIVE STATUS FLAGS
1704  004406  000000  000000            .WORD   0,0             ;NUMBER OF ORDERS
1705  004412  000000  000000  000000    .WORD   0,0,0           ;NUMBER OF WORDS WRITTEN
1706  004420  000000  000000  000000    .WORD   0,0,0           ;NUMBER OF WORDS READ
1707  004426  000000                    .WORD   0               ;NUMBER OF SOFT ERRORS (REREAD CORRECTABLE)
1708  004430  000000                    .WORD   0               ;NUMBER OF SOFT ERRORS (OFFSET CORRECTABLE)
1709  004432  000000                    .WORD   0               ;NUMBER OF SOFT ERRORS (ECC CORRECTABLE)
1710  004434  000000                    .WORD   0               ;NUMBER OF HARD DATA ERRORS
1711  004436  000000                    .WORD   0               ;NUMBER OF SEEK INCOMPLETES
1712  004440  000000                    .WORD   0               ;NUMBER OF MISPOSITIONING ERRORS
1713  004442  000000                    .WORD   0               ;NUMBER OF ALL OTHER ERRORS
1714  004444     000                    .BYTE   0               ;ASSIGNMENT COMMAND SEQUENCE
1715  004445     000                    .BYTE   0               ;SEEK TO PREVIOUS COMMAND FLAG
1716  004446  000000                    .WORD   0               ;ERROR STATUS INFORMATION
1717  004450  000000                    .WORD   0               ;HEADER ADDRESS OF FIRST MISCOMPARE ERROR
1718  004452     000                    .BYTE   0
1719  004453     000                    .BYTE   0               ;OFFSET ADDRESS FROM HEADER ADDRESS
1720  004454  000000                    .WORD   0               ;COMPARISON LENGTH
1721  004456  000000                    .WORD   0               ;BUFFER COMPARISON LENGTH
1722  004460  007777                    .WORD   007777          ;DRIVE SERIAL NUMBER
1723  004462  000000  000000            .WORD   0,0             ;CARIAGE SERIAL NUMBER
1724  004466  000000  000000            .WORD   0,0             ;FIRST EXCLUSION AREA
1725  004472  000000  000000            .WORD   0,0             ;SECOND EXCLUSION AREA
1726  004476  000000  000000            .WORD   0,0             ;THIRD EXCLUSION AREA
1727  004502  000000  000000            .WORD   0,0             ;FOURTH EXCLUSION AREA
1728  004506  000000  000000            .WORD   0,0             ;FIFTH EXCLUSION AREA
```

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                        .SBTTL  --- RETRY PARAMETER BLOCK ---

                        .SBTTL  PARAMETER BLOCK 10 FOR DRIVE

004512  000     PARM10: .BYTE   0               ;DRIVE NUMBER
004513  000             .BYTE   0               ;COMMAND
004514  000000          .WORD   0               ;CYLINDER ADDRESS
004516  000             .BYTE   0               ;SECTOR ADDRESS
004517  000             .BYTE   0               ;TRACK ADDRESS
004520  000             .BYTE   0               ;OFFSET VALUE
004521  000             .BYTE   0               ;BUS ADDRESS (BITS 16 AND 17)
004522  000000          .WORD   0               ;BUS ADDRESS (BITS 0 - 15)
004524  000000          .WORD   0               ;WORD COUNT (2'S COMPLEMENT)
004526  000000          .WORD   0               ;PROGRAM DRIVE STATUS INFORMATION
004530  000000          .WORD   0               ;COMMAND AND STATUS REGISTER 1
004532  000000          .WORD   0               ;COMMAND AND STATUS REGISTER 2
004534  000000          .WORD   0               ;WORD COUNT REGISTER
004536  000000          .WORD   0               ;BUS ADDRESS REGISTER
004540  000000          .WORD   0               ;DESIRED TRACK AND SECTOR REGISTER
004542  000000          .WORD   0               ;DESIRED CYLINDER REGISTER
004544  000000          .WORD   0               ;ATTENTION SUMMARY/OFFSET REGISTER
004546  000000          .WORD   0               ;ERROR REGISTER
004550  000000          .WORD   0               ;STATUS REGISTER
004552  000000          .WORD   0               ;MESSAGE LINE A STATUS BYTE 00
004554  000000          .WORD   0               ;MESSAGE LINE B STATUS BYTE 00
004556  000000          .WORD   0               ;MESSAGE LINE A STATUS BYTE 01
004560  000000          .WORD   0               ;MESSAGE LINE B STATUS BYTE 01
004562  000000          .WORD   0               ;MESSAGE LINE A STATUS BYTE 10
004564  000000          .WORD   0               ;MESSAGE LINE B STATUS BYTE 10
004566  000000          .WORD   0               ;MESSAGE LINE A STATUS BYTE 11
004570  000000          .WORD   0               ;MESSAGE LINE B STATUS BYTE 11
004572  000000          .WORD   0               ;FCC POSITION INFORMATION
004574  000000          .WORD   0               ;FCC PATTERN INFORMATION
```

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                        .SBTTL  DATA PATTERNS AND DATA PATTERN TABLE

004576  004636          PATTAB: PAT0
004600  004736                  PAT1
004602  005036                  PAT2
004604  005136                  PAT3
004606  005236                  PAT4
004610  005336                  PAT5
004612  005436                  PAT6
004614  005536                  PAT7
004616  005636                  PAT10
004620  005736                  PAT11
004622  006036                  PAT12
004624  006136                  PAT13
004626  006236                  PAT14
004630  006336                  PAT15
004632  006436                  PAT16
004634  006536                  PAT17

004636  165555          PAT0:   .WORD   165555
004640  133333                  .WORD   133333
004642  165555                  .WORD   165555
004644  133333                  .WORD   133333
004646  165555                  .WORD   165555
004650  133333                  .WORD   133333
004652  165555                  .WORD   165555
004654  133333                  .WORD   133333
004656  165555                  .WORD   165555
004660  133333                  .WORD   133333
004662  165555                  .WORD   165555
004664  133333                  .WORD   133333
004666  165555                  .WORD   165555
004670  133333                  .WORD   133333
004672  165555                  .WORD   165555
004674  133333                  .WORD   133333
004676  165555                  .WORD   165555
004700  133333                  .WORD   133333
004702  165555                  .WORD   165555
004704  133333                  .WORD   133333
004706  165555                  .WORD   165555
004710  133333                  .WORD   133333
004712  165555                  .WORD   165555
004714  133333                  .WORD   133333
004716  165555                  .WORD   165555
004720  133333                  .WORD   133333
004722  165555                  .WORD   165555
004724  133333                  .WORD   133333
004726  165555                  .WORD   165555
004730  133333                  .WORD   133333
004732  165555                  .WORD   165555
004734  133333                  .WORD   133333

004736  026455          PAT1:   .WORD   026455
004740  151322                  .WORD   151322
004742  026455                  .WORD   026455
004744  026455                  .WORD   026455
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1818  004746  151322                    .WORD   151322
1819  004750  151322                    .WORD   151322
1820  004752  026455                    .WORD   026455
1821  004754  026455                    .WORD   026455
1822  004756  026455                    .WORD   026455
1823  004760  151322                    .WORD   151322
1824  004762  151322                    .WORD   151322
1825  004764  151322                    .WORD   151322
1826  004766  026455                    .WORD   026455
1827  004770  026455                    .WORD   026455
1828  004772  026455                    .WORD   026455
1829  004774  026455                    .WORD   026455
1830  004776  151322                    .WORD   151322
1831  005000  151322                    .WORD   151322
1832  005002  151322                    .WORD   151322
1833  005004  151322                    .WORD   151322
1834  005006  026455                    .WORD   026455
1835  005010  026455                    .WORD   026455
1836  005012  026455                    .WORD   026455
1837  005014  151322                    .WORD   151322
1838  005016  151322                    .WORD   151322
1839  005020  151322                    .WORD   151322
1840  005022  026455                    .WORD   026455
1841  005024  026455                    .WORD   026455
1842  005026  151322                    .WORD   151322
1843  005030  151322                    .WORD   151322
1844  005032  026455                    .WORD   026455
1845  005034  151322                    .WORD   151322
1846
1847  005036  007417            PAT2:   .WORD   007417
1848  005040  170360                    .WORD   170360
1849  005042  007417                    .WORD   007417
1850  005044  007417                    .WORD   007417
1851  005046  170360                    .WORD   170360
1852  005050  170360                    .WORD   170360
1853  005052  007417                    .WORD   007417
1854  005054  007417                    .WORD   007417
1855  005056  007417                    .WORD   007417
1856  005060  170360                    .WORD   170360
1857  005062  170360                    .WORD   170360
1858  005064  170360                    .WORD   170360
1859  005066  007417                    .WORD   007417
1860  005070  007417                    .WORD   007417
1861  005072  007417                    .WORD   007417
1862  005074  007417                    .WORD   007417
1863  005076  170360                    .WORD   170360
1864  005100  170360                    .WORD   170360
1865  005102  170360                    .WORD   170360
1866  005104  170360                    .WORD   170360
1867  005106  007417                    .WORD   007417
1868  005110  007417                    .WORD   007417
1869  005112  007417                    .WORD   007417
1870  005114  170360                    .WORD   170360
1871  005116  170360                    .WORD   170360
1872  005120  170360                    .WORD   170360
1873  005122  007417                    .WORD   007417
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K5

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 1874  005124  007417                    .WORD   007417
 1875  005126  170360                    .WORD   170360
 1876  005130  170360                    .WORD   170360
 1877  005132  007417                    .WORD   007417
 1878  005134  170360                    .WORD   170360
 1879
 1880  005136  052525            PAT3:   .WORD   052525
 1881  005140  125252                    .WORD   125252
 1882  005142  052525                    .WORD   052525
 1883  005144  052525                    .WORD   052525
 1884  005146  125252                    .WORD   125252
 1885  005150  125252                    .WORD   125252
 1886  005152  052525                    .WORD   052525
 1887  005154  052525                    .WORD   052525
 1888  005156  052525                    .WORD   052525
 1889  005160  125252                    .WORD   125252
 1890  005162  125252                    .WORD   125252
 1891  005164  125252                    .WORD   125252
 1892  005166  052525                    .WORD   052525
 1893  005170  052525                    .WORD   052525
 1894  005172  052525                    .WORD   052525
 1895  005174  052525                    .WORD   052525
 1896  005176  125252                    .WORD   125252
 1897  005200  125252                    .WORD   125252
 1898  005202  125252                    .WORD   125252
 1899  005204  125252                    .WORD   125252
 1900  005206  052525                    .WORD   052525
 1901  005210  052525                    .WORD   052525
 1902  005212  052525                    .WORD   052525
 1903  005214  125252                    .WORD   125252
 1904  005216  125252                    .WORD   125252
 1905  005220  125252                    .WORD   125252
 1906  005222  052525                    .WORD   052525
 1907  005224  052525                    .WORD   052525
 1908  005226  125252                    .WORD   125252
 1909  005230  125252                    .WORD   125252
 1910  005232  052525                    .WORD   052525
 1911  005234  125252                    .WORD   125252
 1912
 1913  005236  000000            PAT4:   .WORD   000000
 1914  005240  010421                    .WORD   010421
 1915  005242  021042                    .WORD   021042
 1916  005244  031463                    .WORD   031463
 1917  005246  042104                    .WORD   042104
 1918  005250  052525                    .WORD   052525
 1919  005252  063146                    .WORD   063146
 1920  005254  073567                    .WORD   073567
 1921  005256  104210                    .WORD   104210
 1922  005260  114631                    .WORD   114631
 1923  005262  125252                    .WORD   125252
 1924  005264  135673                    .WORD   135673
 1925  005266  146314                    .WORD   146314
 1926  005270  156735                    .WORD   156735
 1927  005272  167356                    .WORD   167356
 1928  005274  177777                    .WORD   177777
 1929  005276  177777                    .WORD   177777
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 1930  005300  167356                    .WORD   167356
 1931  005302  156735                    .WORD   156735
 1932  005304  146314                    .WORD   146314
 1933  005306  135673                    .WORD   135673
 1934  005310  125252                    .WORD   125252
 1935  005312  114631                    .WORD   114631
 1936  005314  104210                    .WORD   104210
 1937  005316  073567                    .WORD   073567
 1938  005320  063146                    .WORD   063146
 1939  005322  052525                    .WORD   052525
 1940  005324  042104                    .WORD   042104
 1941  005326  031463                    .WORD   031463
 1942  005330  021042                    .WORD   021042
 1943  005332  010421                    .WORD   010421
 1944  005334  000000                    .WORD   000000
 1945
 1946  005336  000000            PAT5:   .WORD   000000
 1947  005340  177777                    .WORD   177777
 1948  005342  000000                    .WORD   000000
 1949  005344  000000                    .WORD   000000
 1950  005346  177777                    .WORD   177777
 1951  005350  177777                    .WORD   177777
 1952  005352  000000                    .WORD   000000
 1953  005354  000000                    .WORD   000000
 1954  005356  000000                    .WORD   000000
 1955  005360  177777                    .WORD   177777
 1956  005362  177777                    .WORD   177777
 1957  005364  177777                    .WORD   177777
 1958  005366  000000                    .WORD   000000
 1959  005370  000000                    .WORD   000000
 1960  005372  000000                    .WORD   000000
 1961  005374  000000                    .WORD   000000
 1962  005376  177777                    .WORD   177777
 1963  005400  177777                    .WORD   177777
 1964  005402  177777                    .WORD   177777
 1965  005404  177777                    .WORD   177777
 1966  005406  000000                    .WORD   000000
 1967  005410  000000                    .WORD   000000
 1968  005412  000000                    .WORD   000000
 1969  005414  177777                    .WORD   177777
 1970  005416  177777                    .WORD   177777
 1971  005420  177777                    .WORD   177777
 1972  005422  000000                    .WORD   000000
 1973  005424  000000                    .WORD   000000
 1974  005426  177777                    .WORD   177777
 1975  005430  177777                    .WORD   177777
 1976  005432  000000                    .WORD   000000
 1977  005434  177777                    .WORD   177777
 1978
 1979  005436  000001            PAT6:   .WORD   000001
 1980  005440  000003                    .WORD   000003
 1981  005442  000007                    .WORD   000007
 1982  005444  000017                    .WORD   000017
 1983  005446  000037                    .WORD   000037
 1984  005450  000077                    .WORD   000077
 1985  005452  000177                    .WORD   000177
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M5

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1986  005454  000377                    .WORD   000377
1987  005456  000777                    .WORD   000777
1988  005460  001777                    .WORD   001777
1989  005462  003777                    .WORD   003777
1990  005464  007777                    .WORD   007777
1991  005466  017777                    .WORD   017777
1992  005470  037777                    .WORD   037777
1993  005472  077777                    .WORD   077777
1994  005474  177777                    .WORD   177777
1995  005476  177776                    .WORD   177776
1996  005500  177774                    .WORD   177774
1997  005502  177770                    .WORD   177770
1998  005504  177760                    .WORD   177760
1999  005506  177740                    .WORD   177740
2000  005510  177700                    .WORD   177700
2001  005512  177600                    .WORD   177600
2002  005514  177400                    .WORD   177400
2003  005516  177000                    .WORD   177000
2004  005520  176000                    .WORD   176000
2005  005522  174000                    .WORD   174000
2006  005524  170000                    .WORD   170000
2007  005526  160000                    .WORD   160000
2008  005530  140000                    .WORD   140000
2009  005532  100000                    .WORD   100000
2010  005534  000000                    .WORD   000000
2011
2012  005536  000001            PAT7:   .WORD   000001
2013  005540  000002                    .WORD   000002
2014  005542  000004                    .WORD   000004
2015  005544  000010                    .WORD   000010
2016  005546  000020                    .WORD   000020
2017  005550  000040                    .WORD   000040
2018  005552  000100                    .WORD   000100
2019  005554  000200                    .WORD   000200
2020  005556  000400                    .WORD   000400
2021  005560  001000                    .WORD   001000
2022  005562  002000                    .WORD   002000
2023  005564  004000                    .WORD   004000
2024  005566  010000                    .WORD   010000
2025  005570  020000                    .WORD   020000
2026  005572  040000                    .WORD   040000
2027  005574  100000                    .WORD   100000
2028  005576  100000                    .WORD   100000
2029  005600  040000                    .WORD   040000
2030  005602  020000                    .WORD   020000
2031  005604  010000                    .WORD   010000
2032  005606  004000                    .WORD   004000
2033  005610  002000                    .WORD   002000
2034  005612  001000                    .WORD   001000
2035  005614  000400                    .WORD   000400
2036  005616  000200                    .WORD   000200
2037  005620  000100                    .WORD   000100
2038  005622  000040                    .WORD   000040
2039  005624  000020                    .WORD   000020
2040  005626  000010                    .WORD   000010
2041  005630  000004                    .WORD   000004
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AG

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2042  005632  000002                  .WORD   000002
2043  005634  000001                  .WORD   000001
2044
2045  005636  177776          PAT10:  .WORD   177776
2046  005640  177775                  .WORD   177775
2047  005642  177773                  .WORD   177773
2048  005644  177767                  .WORD   177767
2049  005646  177757                  .WORD   177757
2050  005650  177737                  .WORD   177737
2051  005652  177677                  .WORD   177677
2052  005654  177577                  .WORD   177577
2053  005656  177377                  .WORD   177377
2054  005660  176777                  .WORD   176777
2055  005662  175777                  .WORD   175777
2056  005664  173777                  .WORD   173777
2057  005666  167777                  .WORD   167777
2058  005670  157777                  .WORD   157777
2059  005672  137777                  .WORD   137777
2060  005674  077777                  .WORD   077777
2061  005676  077777                  .WORD   077777
2062  005700  137777                  .WORD   137777
2063  005702  157777                  .WORD   157777
2064  005704  167777                  .WORD   167777
2065  005706  173777                  .WORD   173777
2066  005710  175777                  .WORD   175777
2067  005712  176777                  .WORD   176777
2068  005714  177377                  .WORD   177377
2069  005716  177577                  .WORD   177577
2070  005720  177677                  .WORD   177677
2071  005722  177737                  .WORD   177737
2072  005724  177757                  .WORD   177757
2073  005726  177767                  .WORD   177767
2074  005730  177773                  .WORD   177773
2075  005732  177775                  .WORD   177775
2076  005734  177776                  .WORD   177776
2077
2078  005736  172666          PAT11:  .WORD   172666
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2080  005742  172666                  .WORD   172666
2081  005744  155555                  .WORD   155555
2082  005746  172666                  .WORD   172666
2083  005750  155555                  .WORD   155555
2084  005752  172666                  .WORD   172666
2085  005754  155555                  .WORD   155555
2086  005756  172666                  .WORD   172666
2087  005760  155555                  .WORD   155555
2088  005762  172666                  .WORD   172666
2089  005764  155555                  .WORD   155555
2090  005766  172666                  .WORD   172666
2091  005770  155555                  .WORD   155555
2092  005772  172666                  .WORD   172666
2093  005774  155555                  .WORD   155555
2094  005776  172666                  .WORD   172666
2095  006000  155555                  .WORD   155555
2096  006002  172666                  .WORD   172666
2097  006004  155555                  .WORD   155555
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2098  006006  172666                    .WORD   172666
2099  006010  155555                    .WORD   155555
2100  006012  172666                    .WORD   172666
2101  006014  155555                    .WORD   155555
2102  006016  172666                    .WORD   172666
2103  006020  155555                    .WORD   155555
2104  006022  172666                    .WORD   172666
2105  006024  155555                    .WORD   155555
2106  006026  172666                    .WORD   172666
2107  006030  155555                    .WORD   155555
2108  006032  172666                    .WORD   172666
2109  006034  155555                    .WORD   155555
2110
2111  006036  153333            PAT12:  .WORD   153333
2112  006040  066667                    .WORD   066667
2113  006042  153333                    .WORD   153333
2114  006044  066667                    .WORD   066667
2115  006046  153333                    .WORD   153333
2116  006050  066667                    .WORD   066667
2117  006052  153333                    .WORD   153333
2118  006054  066667                    .WORD   066667
2119  006056  153333                    .WORD   153333
2120  006060  066667                    .WORD   066667
2121  006062  153333                    .WORD   153333
2122  006064  066667                    .WORD   066667
2123  006066  153333                    .WORD   153333
2124  006070  066667                    .WORD   066667
2125  006072  153333                    .WORD   153333
2126  006074  066667                    .WORD   066667
2127  006076  153333                    .WORD   153333
2128  006100  066667                    .WORD   066667
2129  006102  153333                    .WORD   153333
2130  006104  066667                    .WORD   066667
2131  006106  153333                    .WORD   153333
2132  006110  066667                    .WORD   066667
2133  006112  153333                    .WORD   153333
2134  006114  066667                    .WORD   066667
2135  006116  153333                    .WORD   153333
2136  006120  066667                    .WORD   066667
2137  006122  153333                    .WORD   153333
2138  006124  066667                    .WORD   066667
2139  006126  153333                    .WORD   153333
2140  006130  066667                    .WORD   066667
2141  006132  153333                    .WORD   153333
2142  006134  066667                    .WORD   066667
2143
2144  006136  000000            PAT13:  .WORD   000000
2145  006140  177777                    .WORD   177777
2146  006142  177777                    .WORD   177777
2147  006144  177777                    .WORD   177777
2148  006146  177777                    .WORD   177777
2149  006150  177777                    .WORD   177777
2150  006152  177777                    .WORD   177777
2151  006154  177777                    .WORD   177777
2152  006156  177777                    .WORD   177777
2153  006160  177777                    .WORD   177777
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2154  006162  177777                    .WORD   177777
2155  006164  177777                    .WORD   177777
2156  006166  177777                    .WORD   177777
2157  006170  177777                    .WORD   177777
2158  006172  177777                    .WORD   177777
2159  006174  177777                    .WORD   177777
2160  006176  177777                    .WORD   177777
2161  006200  177777                    .WORD   177777
2162  006202  177777                    .WORD   177777
2163  006204  177777                    .WORD   177777
2164  006206  177777                    .WORD   177777
2165  006210  177777                    .WORD   177777
2166  006212  177777                    .WORD   177777
2167  006214  177777                    .WORD   177777
2168  006216  177777                    .WORD   177777
2169  006220  177777                    .WORD   177777
2170  006222  177777                    .WORD   177777
2171  006224  177777                    .WORD   177777
2172  006226  177777                    .WORD   177777
2173  006230  177777                    .WORD   177777
2174  006232  177777                    .WORD   177777
2175  006234  177777                    .WORD   177777
2176
2177  006236  177777            PAT14:  .WORD   177777
2178  006240  000000                    .WORD   000000
2179  006242  000000                    .WORD   000000
2180  006244  000000                    .WORD   000000
2181  006246  000000                    .WORD   000000
2182  006250  000000                    .WORD   000000
2183  006252  000000                    .WORD   000000
2184  006254  000000                    .WORD   000000
2185  006256  000000                    .WORD   000000
2186  006260  000000                    .WORD   000000
2187  006262  000000                    .WORD   000000
2188  006264  000000                    .WORD   000000
2189  006266  000000                    .WORD   000000
2190  006270  000000                    .WORD   000000
2191  006272  000000                    .WORD   000000
2192  006274  000000                    .WORD   000000
2193  006276  000000                    .WORD   000000
2194  006300  000000                    .WORD   000000
2195  006302  000000                    .WORD   000000
2196  006304  000000                    .WORD   000000
2197  006306  000000                    .WORD   000000
2198  006310  000000                    .WORD   000000
2199  006312  000000                    .WORD   000000
2200  006314  000000                    .WORD   000000
2201  006316  000000                    .WORD   000000
2202  006320  000000                    .WORD   000000
2203  006322  000000                    .WORD   000000
2204  006324  000000                    .WORD   000000
2205  006326  000000                    .WORD   000000
2206  006330  000000                    .WORD   000000
2207  006332  000000                    .WORD   000000
2208  006334  000000                    .WORD   000000
2209
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2210  006336  172304                  PAT15:  .WORD   172304
2211  006340  172304                          .WORD   172304
2212  006342  172304                          .WORD   172304
2213  006344  172304                          .WORD   172304
2214  006346  172304                          .WORD   172304
2215  006350  172304                          .WORD   172304
2216  006352  172304                          .WORD   172304
2217  006354  172304                          .WORD   172304
2218  006356  172304                          .WORD   172304
2219  006360  172304                          .WORD   172304
2220  006362  172304                          .WORD   172304
2221  006364  172304                          .WORD   172304
2222  006366  172304                          .WORD   172304
2223  006370  172304                          .WORD   172304
2224  006372  172304                          .WORD   172304
2225  006374  172304                          .WORD   172304
2226  006376  172304                          .WORD   172304
2227  006400  172304                          .WORD   172304
2228  006402  172304                          .WORD   172304
2229  006404  172304                          .WORD   172304
2230  006406  172304                          .WORD   172304
2231  006410  172304                          .WORD   172304
2232  006412  172304                          .WORD   172304
2233  006414  172304                          .WORD   172304
2234  006416  172304                          .WORD   172304
2235  006420  172304                          .WORD   172304
2236  006422  172304                          .WORD   172304
2237  006424  172304                          .WORD   172304
2238  006426  172304                          .WORD   172304
2239  006430  172304                          .WORD   172304
2240  006432  172304                          .WORD   172304
2241  006434  172304                          .WORD   172304
2242
2243  006436  070627                  PAT16:  .WORD   070627
2244  006440  113431                          .WORD   113431
2245  006442  014561                          .WORD   014561
2246  006444  070627                          .WORD   070627
2247  006446  113431                          .WORD   113431
2248  006450  014561                          .WORD   014561
2249  006452  070627                          .WORD   070627
2250  006454  113431                          .WORD   113431
2251  006456  014561                          .WORD   014561
2252  006460  070627                          .WORD   070627
2253  006462  113431                          .WORD   113431
2254  006464  014561                          .WORD   014561
2255  006466  070627                          .WORD   070627
2256  006470  113431                          .WORD   113431
2257  006472  014561                          .WORD   014561
2258  006474  070627                          .WORD   070627
2259  006476  113431                          .WORD   113431
2260  006500  014561                          .WORD   014561
2261  006502  070627                          .WORD   070627
2262  006504  113431                          .WORD   113431
2263  006506  014561                          .WORD   014561
2264  006510  070627                          .WORD   070627
2265  006512  113431                          .WORD   113431
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  2266  006514  014561                    .WORD   014561
  2267  006516  070627                    .WORD   070627
  2268  006520  113431                    .WORD   113431
  2269  006522  014561                    .WORD   014561
  2270  006524  070627                    .WORD   070627
  2271  006526  113431                    .WORD   113431
  2272  006530  014561                    .WORD   014561
  2273  006532  070627                    .WORD   070627
  2274  006534  113431                    .WORD   113431
  2275
  2276  006536  133467            PAT17:  .WORD   133467
  2277  006540  133467                    .WORD   133467
  2278  006542  133467                    .WORD   133467
  2279  006544  133467                    .WORD   133467
  2280  006546  133467                    .WORD   133467
  2281  006550  133467                    .WORD   133467
  2282  006552  133467                    .WORD   133467
  2283  006554  133467                    .WORD   133467
  2284  006556  133467                    .WORD   133467
  2285  006560  133467                    .WORD   133467
  2286  006562  133467                    .WORD   133467
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  2288  006566  133467                    .WORD   133467
  2289  006570  133467                    .WORD   133467
  2290  006572  133467                    .WORD   133467
  2291  006574  133467                    .WORD   133467
  2292  006576  133467                    .WORD   133467
  2293  006600  133467                    .WORD   133467
  2294  006602  133467                    .WORD   133467
  2295  006604  133467                    .WORD   133467
  2296  006606  133467                    .WORD   133467
  2297  006610  133467                    .WORD   133467
  2298  006612  133467                    .WORD   133467
  2299  006614  133467                    .WORD   133467
  2300  006616  133467                    .WORD   133467
  2301  006620  133467                    .WORD   133467
  2302  006622  133467                    .WORD   133467
  2303  006624  133467                    .WORD   133467
  2304  006626  133467                    .WORD   133467
  2305  006630  133467                    .WORD   133467
  2306  006632  133467                    .WORD   133467
  2307  006634  133467                    .WORD   133467
```

```
2308                                    .SBTTL  PROGRAM SETUP
2309
2310  006636  112737  000001  001361  PARSRT: MOVB    #1,FLAG         ;SET FLAG FOR PARAMETER ENTRY
2311  006644  000406                          BR      PRGSRT          ;START PROGRAM
2312
2313  006646  112737  177777  001361  RESTRT: MOVB    #-1,FLAG        ;SET FLAG FOR RETRY
2314  006654  000402                          BR      PRGSRT          ;START PROGRAM
2315
2316  006656  105037  001361          START:  CLRB    FLAG            ;SET FOR NORMAL PROGRAM START
2317  006662  012737  000340  177776  PRGSRT: MOV     #PR7,PS         ;LOCK OUT ALL INTERRUPTS
2318                                    .SBTTL  INITIALIZE THE COMMON TAGS
2319                                    ;;CLEAR THE COMMON TAGS (SCMTAG) AREA
2320  006670  012706  001100                  MOV     #SCMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
2321  006674  005026                          CLR     (R6)+           ;;CLEAR NEXT LOCATION
2322  006676  022706  001140                  CMP     #SWR,R6 ;;DONE?
2323  006702  001374                          BNE     .-6             ;;LOOP BACK IF NO
2324  006704  012706  001100                  MOV     #STACK,SP       ;;SETUP THE STACK POINTER
2325                                    ;;INITIALIZE A FEW VECTORS
2326  006710  012737  055034  000034          MOV     #STRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
2327  006716  012737  000340  000036          MOV     #340,@#TRAPVEC+2;LEVEL 7
2328  006724  012737  053722  000024          MOV     #SPWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
2329  006732  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;LEVEL 7
2330                                    ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
2331                                    ;;EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.
2332  006740  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
2333  006744  012737  007000  000004          MOV     #64$,@#ERRVEC   ;;SET UP ERROR VECTOR
2334  006752  012737  177570  001140          MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
2335  006760  012737  177570  001142          MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
2336  006766  022777  177777  172144          CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
2337  006774  001012                          BNE     66$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
2338                                                                  ;;AND  THE HARDWARE SWR IS NOT = -1
2339  006776  000403                          BR      65$             ;;BRANCH IF AC TIMEOUT
2340  007000  012716  007006          64$:    MOV     #65$,(SP)       ;;SET UP FOR TRAP RETURN
2341  007004  000002                          RTI
2342  007006  012737  000176  001140  65$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
2343  007014  012737  000174  001142          MOV     #DISPREG,DISPLAY
2344  007022  012637  000004          66$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR
2345
2346  007026  005037  001176                  CLR     $PASS           ;;CLEAR PASS COUNT
2347  007032  132737  000200  001211          BITB    #APTSIZE,$ENVM  ;;TEST USER SIZE UNDER APT
2348  007040  001403                          BEQ     67$             ;;YES,USE NON-APT SWITCH
2349  007042  012737  001212  001140          MOV     #SSWREG,SWR     ;;NO,USE APT SWITCH REGISTER
2350  007050                          67$:
2351                                    .SBTTL  TYPE PROGRAM NAME
2352                                    ;;TYPE THE NAME OF THE PROGRAM IF FIRST PASS
2353  007050  005227  177777                  INC     #-1             ;;FIRST TIME?
2354  007054  001035                          BNE     68$             ;;BRANCH IF NO
2355  007056  104401  007064                  TYPE    ,69$            ;;TYPE ASCIZ STRING
2356  007062  000432                          BR      68$             ;;GET OVER THE ASCIZ
2357                                    ;;69$:  .ASCIZ  <CRLF>"PK611/RK06 PERFORMANCE EXERCISER: MAINDEC DZR6P-B"<CRLF>
2358  007150                          68$:
2359  007150  000005          PWRSRT: RESET                           ;RESET SYSTEM
2360  007152  012737  007224  000004          MOV     #20$,ERRVEC     ;SET VECTOR FOR MEMORY PARITY CHECK
2361  007160  012737  000340  000006          MOV     #PR7,ERRVEC+2
2362  007166  012703  172100                  MOV     #MEMBAS,R3      ;LOAD REGISTER TO DTERMIN IF
2363                                                                  ;  MEMORY CHECK ENABLE ABAILIABLE
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2364  007172  012704  000014                  MOV     #12.,R4          ;LOAD COUNT
2365  007176  012723  000001          16$:    MOV     #PAR.EN,(R3)+    ;ENABLE MEMORY CHECK VECTORY
2366  007202  012737  051642  000114          MOV     #MEMERR,MEMVEC   ;LOAD MEMORY CHECK VECTOR
2367  007210  012737  000340  000116          MOV     #PR7,MEMVEC+2
2368  007216  005304                          DEC     R4               ;CHECK IF FINISHED
2369  007220  001366                          BNE     16$              ;NO, SET UP NEXT MEMORY PARITY MODULE
2370  007222  000401                          BR      22$              ;RESTORE TRAP VECTOR
2371
2372  007224  022626                  20$:    CMP     (SP)+,(SP)+      ;ADJUST STACK
2373  007226  012737  000006  000004  22$:    MOV     #ERRVEC+2,ERRVEC ;RESTORE TRAP CATCHER
2374  007234  005037  000006                  CLR     ERRVEC+2
2375  007240  004737  053624          START$: JSR     PC,$SIZE         ;GET MAXIMUM MEMORY ADDRESS
2376  007244  012737  000001  001664          MOV     #1,FBLKC         ;INITIALIZE FREE BLOCK COUNT
2377  007252  012703  001666                  MOV     #FBLKT,R3        ;STORE FREE BLOCK TABLE ADDRESS
2378  007256  012704  000022                  MOV     #18.,R4          ;LOAD COUNT FOR FREE BLOCK CLEAR
2379  007262  005023                  2$:     CLR     (R3)+            ;CLEAR FREE BLOCK TABLE
2380  007264  005304                          DEC     R4               ;DECREMENT COUNT
2381  007266  001375                          BNE     2$               ;CHECK IF FINISHED
2382  007270  012737  065202  001666          MOV     #BUFADD,FBLKT    ;LOAD FIRST ENTRY IN FREE BLOCK TABLE
2383  007276  105037  001640                  CLRB    RTYSCN           ;CLEAR RETRY SECTOR COUNT
2384  007302  005037  001567                  CLR     ERRPRO           ;CLEAR ADDRESS OF PARAMETER BLOCK
2385                                                                   ;  PROCESSING ERROR
2386  007306  005037  001460                  CLR     E.CONT           ;CLEAR CONTROLLER ERROR FLAGS
2387  007312  005037  001560                  CLR     ERCONT           ;CLEAR RECOVERABLE CONTROLLER ERROR FLAGS
2388  007316  005037  001622                  CLR     DLTCNT           ;CLEAR DATA LATE COUNT
2389  007322  005037  001624                  CLR     CNTCNT           ;CLEAR OTHER ERRORS COUNT
2390  007326  105037  001627                  CLRB    STATIS           ;CLEAR INTERVAL STATISTICS FLAG
2391  007332  112737  177777  001507          MOVB    #-1,O.OVER       ;SET ALL DRIVES FOR IMPLIED SEEKS
2392  007340  012703  001314                  MOV     #AVAILQ,R3       ;STORE QUEUE BASE ADDRESS
2393  007344  012704  000010                  MOV     #8.,R4           ;LOAD QUEUE COUNT
2394  007350  005023                  3$:     CLR     (R3)+            ;CLEAR QUEUE HEADS AND TAILS
2395  007352  005304                          DEC     R4               ;DECREMENT COUNT
2396  007354  001375                          BNE     3$               ;CHECK IF FINISHED
2397  007356  012704  001540                  MOV     #W.DRV,R4        ;LOAD ADDRESS OF TIME OUT COUNTS
2398  007362  012703  000010                  MOV     #8.,R3           ;LOAD COUNT
2399  007366  005024                  4$:     CLR     (R4)+            ;CLEAR DRIVE TIME OUT COUNTS
2400  007370  005303                          DEC     R3               ;DECREMENT COUNT
2401  007372  001375                          BNE     4$               ;CHECK IF FINISHED
2402  007374  004737  042574                  JSR     PC,CHKCLK        ;CHECK IF CLOCK IS PRESENT
2403  007400  105037  001506                  CLRB    W.TIMF           ;CLEAR DRIVES BEING TIMED
2404  007404  013737  001466  001464          MOV     W.MTLT,W.MTIM    ;INITIALIZE MILT-SECOND TIMER
2405  007412  005037  001462                  CLR     O.WAIT           ;CLEAR PARAMETER BLOCK FOR DRIVE
2406                                                                   ;  WAITING COMMAND COMPLETION
2407  007416  105037  001502                  CLRB    I.ISRL           ;RESET RELEASE OR CONTROLLER CLEAR ISSUED
2408  007422  105737  001361                  TSTB    FLAG             ;CHECK IF RESTART
2409  007426  100072                          BPL     RESTO            ;NO, CONTINUE
2410
2411  007430  013737  053720  001670          MOV     $LSTAD,FBLKT+2   ;LOAD MAX. ADD IF FREE BLOCK TABLE
2412  007436  105737  001365                  TSTB    OVLYLD           ;CHECK IF OVERLAY LOADER
2413  007442  001012                          BNE     20$              ;YES, LOAD RK06 VECTOR ADDRESS
2414  007444  105737  000041                  TSTB    41               ;SEE WHO LOADED THE PROBLEM
2415  007450  001004                          BNE     10$              ;BRANCH IF XXDP
2416  007452  162737  000300  001670          SUB     #96.*2.,FBLKT+2  ;SUBTRACT APS LOADER SIZE
2417  007460  000403                          BR      20$              ;LOAD VECTOR ADDRESS
2418
2419  007462  162737  004004  001670  10$:    SUB     #1026.*2.,FBLKT+2 ;SUBTRACT XXDP LOADER
```

H6

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 2420  007470  013704  001446          20$:    MOV     RKVEC,R4        ;STORE VECTOR ADDRESS
 2421  007474  012724  043470                  MOV     #I.INTR,(R4)+   ;LOAD RK06 VECTOR ADDRESS
 2422  007500  013714  001450                  MOV     RKPRI,(R4)      ;  AND INTERRUPT PRIORITY
 2423  007504  012703  001520                  MOV     #PBLKT,R3       ;LOAD PARAMETER BLOCK TABLE ADDRESS
 2424  007510  012704  000011                  MOV     #9.,R4          ;LOAD COUNT
 2425
 2426  007514  005304                  21$:    DEC     R4              ;DECREMENT COUNT AND CHECK IF DONE
 2427  007516  001434                          BEQ     30$             ;YES, SET UP TTY INTERRUPT
 2428  007520  012305                          MOV     (R3)+,R5        ;GET PARAMETER BLOCK ADDRESS
 2429  007522  105065  000145                  CLRB    P.BUFF(R5)      ;CLEAR BUFFER ALLOCATED
 2430  007526  005065  000212                  CLR     P.ERR(R5)       ;CLEAR ERROR FLAGS AND RETRY COUNTS
 2431  007532  005065  000150                  CLR     P.DSTT(R5)
 2432  007536  005065  000146                  CLR     P.RECT(R5)
 2433
 2434
 2435                          ;       RESET THE FOLLOWING DRIVER FLAGS
 2436                          ;               DRIVE POSITIONING
 2437                          ;               DRIVE POSITIONING FOR DATA TRANSFER
 2438                          ;               DRIVE SEIZED
 2439                          ;               DRIVE UNLOADED DUE TO ERROR
 2440                          ;               PARAMETER BLOCK ENQUEUED IN INITIATION QUEUE
 2441  007542  042765  070006  000014          BIC     #DRVPOS!DRVPDT!DRVSZD!E.UNLD!Q.INIT,P.PRST(R5)
 2442
 2443  007550  032765  000001  000014          BIT     #DRVUSE,P.PRST(R5) ;CHECK IF DRIVE IN USE
 2444  007556  001756                          BEQ     21$             ;NO, GET NEXT PARAMETER BLOCK
 2445  007560  105765  000210                  TSTB    P.ASSN(R5)      ;CHECK IF DRIVE IS BEING ASSIGNED
 2446  007564  001003                          BNE     22$             ;YES, RESTART ASSIGNMENT SEQUENCE
 2447  007566  004737  013324                  JSR     PC,TEST1        ;ISSUE A START SPINDLE IF NECESSARY
 2448  007572  000750                          BR      21$             ;GET NEXT PARAMETER BLOCK
 2449
 2450  007574  142765  177757  000210  22$:    BICB    #^C<BIT4>,P.ASSN(R5) ;KEEP WRITE PACK BIT
 2451  007602  004737  013250                  JSR     PC,TEST         ;INITIATE DRIVE ASSIGNMENT SEQUENCE
 2452  007606  000742                          BR      21$             ;GET NEXT PARAMETER BLOCK
 2453
 2454  007610  000137  011230          30$:    JMP     REST2           ;SET TTY INTERRUPT
 2455
 2456  007614  012737  176543  054276  REST0:  MOV     #176543,$HINUM  ;INITIALIZE RANDOM NUMBER GENERATOR
 2457  007622  012737  123456  054300          MOV     #123456,$LONUM
 2458  007630  005037  001372                  CLR     SECOND          ;INITIALIZE INTERNAL CLOCK
 2459  007634  005037  001370                  CLR     MINUTE
 2460  007640  005037  001366                  CLR     HOUR
 2461  007644  012703  001520                  MOV     #PBLKT,R3       ;LOAD PARAMETER BLOCK TABLE ADDRESS
 2462  007650  012704  000010                  MOV     #8.,R4          ;LOAD COUNT
 2463  007654  012305                  4$:     MOV     (R3)+,R5        ;GET PARAMETER BLOCK ADDRESS
 2464  007656  005065  000014                  CLR     P.PRST(R5)      ;CLEAR RK06 PROGRAM DEVICE STATUS REG.
 2465  007662  005065  000212                  CLR     P.ERR(R5)       ;CLEAR DRIVE ERROR FLAGS
 2466  007666  105065  000210                  CLRB    P.ASSN(R5)      ;CLEAR DRIVE ASSIGNMENT CODE
 2467  007672  010500                          MOV     R5,R0           ;STORE R0 FOR TRACK EXCLUSIONS
 2468  007674  062700  000232                  ADD     #P.EXAR,R0      ;DETERMINE TRACK EXCLUSION BLOCK
 2469  007700  012701  000012                  MOV     #10.,R1         ;LOAD COUNT FOR CLEARING TRACK EXCLUSION
 2470                                                                  ;  BLOCK
 2471  007704  005020                  5$:     CLR     (R0)+           ;CLEAR TRACK EXCLUSION ENTRY
 2472  007706  005301                          DEC     R1              ;DECREMENT COUNT
 2473  007710  001375                          BNE     5$              ;CHECK IF WHOLE BLOCK CLEARED
 2474  007712  005304                          DEC     R4              ;DECREMENT COUNT
 2475  007714  001357                          BNE     4$              ;TEST IF DONE
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2476  007716  122737  000001  001361          CMPB    #1,FLAG         ;CHECK IF PARAMETER START
2477  007724  001402                          BEQ     10$             ;YES, ASK FOR PARAMETERS
2478  007726  000137  011060                  JMP     S1$             ;USE DEFAULT VALUES
2479
2480  007732  104401  056250          10$:    TYPE    ,SYS000         ;TYPE "CPU ID"
2481  007736  004037  020116                  JSR     R0,TSTDEF       ;CHECK FOR DEFAULT PARAMETERS
2482  007742  007772                          11$                     ;COMMA DETECTED
2483  007744  010010                          13$                     ;CARRIAGE RETURN DETECTED
2484  007746  011060                          S1$                     ;CONTROL Z <^Z> DETECTED
2485  007750  007732                          10$                     ;CONTROL C <^C> DETECTED
2486  007752  010346                          MOV     R3,-(SP)        ;LOAD BUFFER ADDRESS ON STACK
2487  007754  004737  053316                  JSR     PC,OCTBIN       ;CONVERT TO BINARY
2488  007760  007772                          11$                     ;ERROR RETURN
2489  007762  012604                          MOV     (SP)+,R4        ;STORE INPUT VALUE
2490  007764  022704  000400                  CMP     #400,R4         ;CHECK IF 0-377
2491  007770  101010                          BHI     14$             ;YES, LOAD CPU ID
2492  007772                          11$:
2493  007772  010337  010000                  MOV     R3,64$          ;LOAD BUFFER ADDRESS
2494  007776  104401                          TYPE                    ;TYPE RECEIVED INPUT
2495  010000  000000                  64$:    .WORD   0               ;BUFFER ADDRESS
2496  010002  104401  001164                  TYPE    ,$QUES          ;TYPE QUESTION MARK
2497  010006  000751                          BR      10$             ;TRY AGAIN
2498
2499  010010  005004                  13$:    CLR     R4              ;CLEAR CPU ID (R4)
2500  010012  110437  001364          14$:    MOVB    R4,CPUID        ;LOAD CPU ID
2501
2502  010016  013737  053720  001670  15$:    MOV     $LSTAD,FBLKT+2  ;LOAD LAST ADDRESS IN FIRST
2503                                          ;  FREE BLOCK ENTRY
2504  010024  104401  056260                  TYPE    ,SYS001         ;TYPE "OVERLAY LOADER"
2505  010030  004037  020116                  JSR     R0,TSTDEF       ;CHECK FOR DEFAULT PARAMETERS
2506  010034  010104                          18$                     ;COMMA DETECTED
2507  010036  010052                          16$                     ;CARRIAGE RETURN DETECTED
2508  010040  011072                          S2$                     ;CONTROL Z <^Z> DETECTED
2509  010042  007732                          10$                     ;CONTROL C <^C> DETECTED
2510  010044  122713  000131                  CMPB    #'Y,(R3)        ;CHECK IF YES
2511  010050  001424                          BEQ     19$             ;YES, INDICATE THAT LOADER HAS BEEN OVERLAYED
2512  010052  105037  001365          16$:    CLRB    OVLYLD          ;INDICATE THAT LOADER HAS NOT BEEN OVERLAYED
2513  010056  105737  000041                  TSTB    41              ;SEE WHO LOADED THE PROGRAM
2514  010062  001004                          BNE     17$             ;BRANCH IF XXDP
2515  010064  162737  000300  001670          SUB     #96.*2.,FBLKT+2 ;SUBTRACT ABS LOADER SIZE
2516  010072  000416                          BR      20$             ;ASK FOR MAXIMUM TRANSFER SIZE
2517
2518  010074  162737  006000  001670  17$:    SUB     #1536.*7.,FBLKT+2 ;SUBTRACT XXDP LOADER SIZE
2519  010102  000412                          BR      20$             ;ASK FOR TRANSFER SIZE
2520
2521  010104                          18$:
2522  010104  010337  010112                  MOV     R3,65$          ;LOAD BUFFER ADDRESS
2523  010110  104401                          TYPE                    ;TYPE RECEIVED INPUT
2524  010112  000000                  65$:    .WORD   0               ;BUFFER ADDRESS
2525  010114  104401  001164                  TYPE    ,$QUES          ;TYPE QUESTION MARK
2526  010120  000736                          BR      15$             ;TRY AGAIN
2527
2528  010122  112737  177777  001365  19$:    MOVB    #-1,OVLYLD      ;INDICATE THAT LOADER HAS BEEN OVERLAYED
2529
2530  010130  104401  056300          20$:    TYPE    ,SYS002         ;TYPE "MAXIMUM TRANSFER"
2531  010134  013746  001670                  MOV     FBLKT+2,-(SP)   ;STORE LAST USABLE MEMORY LOCATION
```

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2532  010140  163716  001666              SUB     FBLRT,(SP)          ;CALCULATE MEMORY LEFT
2533  010144  022716  027000              CMP     #256.*23.*2.,(SP) ;CHECK IF GREATER THAN OR EQUAL TO 5808
2534  010150  101402                     BLOS    21$                 ;YES, USE 5808
2535  010152  006216                     ASR     (SP)                ;DETERMINE NUMBER OF WORDS
2536  010154  000402                     BR      22$                 ;TYPE VALUE
2537
2538  010156  012716  013400    21$:    MOV     #256.*23.,(SP)  ;LOAD 5808
2539
2540  010162  012637  001564    22$:    MOV     (SP)+,TMPCNT    ;SAVE TRANSFER COUNT
2541  010166  013746  001564            MOV     TMPCNT,-(SP)    ;SAVE TRANSFER COUNT FOR TYPE OUT
2542  010172  004737  052144            JSR     PC,BINOCT       ;CONVERT TO OCTAL
2543  010176  104401  056332            TYPE    ,SYS003
2544  010202  004037  020116            JSR     R0,TSTDEF       ;CHECK FOR DEFAULT PARAMETERS
2545  010206  010250                     24$                     ;COMMA DETECTED
2546  010210  010266                     26$                     ;CARRIAGE RETURN DETECTED
2547  010212  011122                     S3$                     ;CONTROL Z <^Z> DETECTED
2548  010214  007732                     10$                     ;CONTROL C <^C> DETECTED
2549  010216  010346                     MOV     R3,-(SP)        ;STORE BUFFER ADDRESS ON STACK
2550  010220  004737  053316            JSR     PC,OCTBIN       ;CONVERT TO BINARY
2551  010224  010246                     23$                     ;ERROR RETURN
2552  010226  012604                     MOV     (SP)+,R4        ;STORE INPUT
2553  010230  001407                     BEQ     24$             ;CHECK IF ZERO
2554  010232  020437  001564            CMP     R4,TMPCNT       ;CHECK IF LEGAL ENTRY
2555  010236  101004                     BHI     24$             ;NO, TRY AGAIN
2556  010240  010437  001354            MOV     R4,MAXBUF       ;LOAD MAXIMUM TRANSFER
2557  010244  000422                     BR      27$             ;GET    NO. OF SOFT COMPARES
2558
2559  010246  005726            23$:    TST     (SP)+           ;ADJUST STACK
2560  010250                    24$:
2561  010250  010337  010256            MOV     R3,66$          ;LOAD BUFFER ADDRESS
2562  010254  104401                     TYPE                    ;TYPE RECEIVED INPUT
2563  010256  000000            66$:    .WORD   0               ;BUFFER ADDRESS
2564  010260  104401  001164            TYPE    ,$QUES          ;TYPE QUESTION MARK
2565  010264  000721                     BR      20$             ;TRY AGAIN
2566
2567  010266  013737  001564  001354  26$:    MOV     TMPCNT,MAXBUF ;LOAD MAXIMUM TRANSFER
2568  010274  022737  013400  001354          CMP     #256.*23.,MAXBUF ;CHECK IF LESS THAN OR EQUAL TO 23 SECTORS
2569  010302  103003                     BHIS    27$             ;YES, USE CALCULATED VALUE
2570  010304  012737  013400  001354          MOV     #256.*23.,MAXBUF ;USE 23 SECTORS
2571
2572  010312  104401  056336    27$:    TYPE    ,SYS004         ;TYPE "NO. OF SOFTWARE COMPARISONS"
2573  010316  004037  020116            JSR     R0,TSTDEF       ;CHECK FOR DEFAULT PARAMETERS
2574  010322  010360                     29$                     ;COMMA DETECTED
2575  010324  010376                     30$                     ;CARRIAGE RETURN DETECTED
2576  010326  011160                     S4$                     ;CONTROL Z <^Z> DETECTED
2577  010330  007732                     10$                     ;CONTROL C <^C> DETECTED
2578  010332  010346                     MOV     R3,-(SP)        ;STORE PARMETER
2579  010334  004737  053452            JSR     PC,DECBIN       ;CONVERT TO BINARY
2580  010340  010360                     29$                     ;ERROR RETURN
2581  010342  023716  001354            CMP     MAXBUF,(SP)     ;CHECK IF LEGAL INPUT
2582  010346  103403                     BLO     28$             ;TYPE VALUE AND RETRY
2583  010350  012637  001362            MOV     (SP)+,SOFCMP    ;LOAD NUMBER OF SOFTWARE COMPARES
2584  010354  000413                     BR      31$             ;DETERMINE RK06 UNIBUS ADDRESS
2585
2586  010356  005726            28$:    TST     (SP)+           ;ADJUST STACK
2587  010360                    29$:
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K6

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2588  010360  010337  010366                  MOV     R3,67$          ;LOAD BUFFER ADDRESS
2589  010364  104401                          TYPE                    ;TYPE RECEIVED INPUT
2590  010366  000000                  67$:    .WORD   0               ;BUFFER ADDRESS
2591  010370  104401  001164                  TYPE    ,$QUES          ;TYPE QUESTION MARK
2592  010374  000746                          BR      27$             ;TRY AGAIN
2593
2594  010376  012737  000003  001362  30$:    MOV     #3,SOFCNP       ;LOAD DEFAULT VALUE
2595
2596  010404  105737  001374          31$:    TSTB    CLKFLG          ;CHECK IF CLOCK ON SYSTEM
2597  010410  001434                          BEQ     41$             ;NO, CONTINUE
2598  010412  104401  056517                  TYPE    ,SYS009         ;TYPE "STATISTIC INTERVAL="
2599  010416  004037  020116                  JSR     R0,TSTDEF       ;CHECK FOR DEFAULT PARAMETERS
2600  010422  010460                          34$                     ;COMMA DETECTED
2601  010424  010476                          35$                     ;CARRIAGE RETURN DETECTED
2602  010426  011166                          55$                     ;CONTROL Z <^Z> DETECTED
2603  010430  007732                          10$                     ;CONTROL C <^C> DETECTED
2604  010432  010346                          MOV     R3,-(SP)        ;STORE NUMBER FOR CONVERSION
2605  010434  004737  053452                  JSR     PC,DECBIN       ;CONVERT TO BINARY
2606  010440  010460                          34$                     ;ILLEGAL NUMBER
2607  010442  012604                          MOV     (SP)+,R4        ;STORE NUMBER
2608  010444  022704  000377                  CMP     #255.,R4        ;CHECK IF GREATER THAN 255
2609  010450  103403                          BLO     34$             ;NO, TRY AGAIN
2610  010452  110437  001360                  MOVB    R4,PERINV       ;LOAD PERFORMANCE INTERVAL
2611  010456  000411                          BR      41$             ;CONTINUE
2612
2613  010460                          34$:
2614  010460  010337  010466                  MOV     R3,68$          ;LOAD BUFFER ADDRESS
2615  010464  104401                          TYPE                    ;TYPE RECEIVED INPUT
2616  010466  000000                  68$:    .WORD   0               ;BUFFER ADDRESS
2617  010470  104401  001164                  TYPE    ,$QUES          ;TYPE QUESTION MARK
2618  010474  000743                          BR      31$             ;TRY AGAIN
2619
2620  010476  105037  001360          35$:    CLRB    PERINV          ;SET UP FOR NO INTERVAL STATISTICS
2621
2622  010502  104401  056370          41$:    TYPE    ,SYS005         ;TYPE "RK06 BUS ADD."
2623  010506  004037  020116                  JSR     R0,TSTDEF       ;CHECK FOR DEFAULT PARAMETERS
2624  010512  010626                          44$                     ;COMMA DETECTED
2625  010514  010644                          45$                     ;CARRIAGE RETURN DETECTED
2626  010516  011172                          56$                     ;CONTROL Z <^Z> DETECTED
2627  010520  007732                          10$                     ;CONTROL C <^C> DETECTED
2628  010522  010346                          MOV     R3,-(SP)        ;STORE PARAMETER
2629  010524  004737  053316                  JSR     PC,OCTBIN       ;CONVERT TO BINARY
2630  010530  010626                          44$                     ;ERROR RETURN
2631  010532  012604                          MOV     (SP)+,R4        ;STORE INPUT
2632  010534  022704  160000                  CMP     #160000,R4      ;CHECK IF I/O PAGE
2633  010540  101032                          BHI     44$             ;NO,TRY AGAIN
2634  010542  012737  010602  000004          MOV     #42$,ERRVEC     ;LOAD ERRVEC TO NON-EXISTENT MEMORY
2635  010550  013737  000340  000006          MOV     PR7,ERRVEC+2    ;  PRIORITY 7
2636  010556  005714                          TST     (P4)            ;CHECK FOR NON-EXISTENT MEMORY
2637  010560  012737  000000  000006          MOV     #<HALT>,ERRVEC+2 ;REINSTATE TRAP CATCHER
2638  010566  012737  000006  000004          MOV     #ERRVEC+2,ERRVEC
2639  010574  010437  001444                  MOV     R4,RKBAS        ;LEGAL I/O ADDRESS, LOAD RK06 BASE
2640  010600  000424                          BR      48$             ;GET VECTOR ADDRESS
2641
2642  010602  012737  000000  000006  42$:    MOV     #<HALT>,ERRVEC+2 ;REINSTATE TRAP CATCHER
2643  010610  012737  000006  000004          MOV     #ERRVEC+2,ERRVEC
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2644  010616  062706  000004                  ADD     #4,SP           ;ADJUST STACK
2645  010622  104401  056424                  TYPE    ,SYS007         ;TYPE "NON-EXISTENT MEMORY"
2646  010626                          44$:
2647  010626  010337  010634                  MOV     R3,69$          ;LOAD BUFFER ADDRESS
2648  010632  104401                          TYPE                    ;TYPE RECEIVED INPUT
2649  010634  000000                  69$:    .WORD   0               ;BUFFER ADDRESS
2650  010636  104401  001164                  TYPE    ,$QUES          ;TYPE QUESTION MARK
2651  010642  000717                          BR      41$             ;TRY AGAIN
2652
2653  010644  012737  177440  001444  45$:    MOV     #177440,RKBAS   ;LOAD DEFAULT BUS ADDRESS
2654
2655  010652  104401  056406          48$:    TYPE    ,SYS006         ;TYPE "RK06 VEC ADD"
2656  010656  004037  020116                  JSR     R0,TSTDEF       ;CHECK FOR DEFAULT PARAMETERS
2657  010662  010720                          50$                     ;COMMA DETECTED
2658  010664  010736                          51$                     ;CARRIAGE RETURN DETECTED
2659  010666  011200                          57$                     ;CONTROL Z <^Z> DETECTED
2660  010670  007732                          10$                     ;CONTROL C <^C> DETECTED
2661  010672  010346                          MOV     R3,-(SP)        ;STORE PARAMETER
2662  010674  004737  053316                  JSR     PC,OCTBIN       ;CONVERT TO BINARY
2663  010700  010720                          50$                     ;ERROR RETURN
2664  010702  022716  001000                  CMP     #1000,(SP)      ;CHECK IF VECTOR SPACE
2665  010706  101403                          BLOS    49$             ;NO, TRY AGAIN
2666  010710  012637  001446                  MOV     (SP)+,RKVEC     ;LOAD VECTOR ADDRESS
2667  010714  000413                          BR      53$             ;GET PRIORITY
2668
2669  010716  005726                  49$:    TST     (SP)+           ;ADJUST STACK
2670  010720                          50$:
2671  010720  010337  010726                  MOV     R3,70$          ;LOAD BUFFER ADDRESS
2672  010724  104401                          TYPE                    ;TYPE RECEIVED INPUT
2673  010726  000000                  70$:    .WORD   0               ;BUFFER ADDRESS
2674  010730  104401  001164                  TYPE    ,$QUES          ;TYPE QUESTION MARK
2675  010734  000746                          BR      48$             ;TRY AGAIN
2676
2677  010736  012737  000210  001446  51$:    MOV     #210,RKVEC      ;LOAD DEFAULT RK06 VECTOR
2678  010744  104401  056543          53$:    TYPE    ,SYS010         ;TYPE "RK06 PRIOR="
2679  010750  004037  020116                  JSR     R0,TSTDEF       ;CHECK FOR DEFAULT PARAMETERS
2680  010754  011037                          56$                     ;COMMA DETECTED
2681  010756  011050                          57$                     ;CARRIAGE RETURN DETECTED
2682  010760  011206                          58$                     ;CONTROL Z <^Z> DETECTED
2683  010762  007732                          10$                     ;CONTROL C <^C> DETECTED
2684  010764  010346                          MOV     R3,-(SP)        ;STORE PARAMETER
2685  010766  004737  053316                  JSR     PC,OCTBIN       ;CONVERT TO BINARY
2686  010772  011032                          56$                     ;ERROR RETURN
2687  010774  022716  000007                  CMP     #7,(SP)         ;CHECK IF OCTAL
2688  011000  103413                          BLO     55$
2689  011002  022716  000004                  CMP     #4,(SP)
2690  011006  101010                          BHI     55$
2691  011010  006316                          ASL     (SP)            ;SHIFT 5 BITS LEFT
2692  011012  006316                          ASL     (SP)
2693  011014  006316                          ASL     (SP)
2694  011016  006316                          ASL     (SP)
2695  011020  006316                          ASL     (SP)
2696  011022  012637  001450                  MOV     (SP)+,RKPRI     ;LOAD PRIORITY
2697  011026  000472                          BR      REST1           ;LOAD RK06 VECTOR AND TTY VECTOR
2698
2699  011030  005726                  55$:    TST     (SP)+           ;ADJUST STACK
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2700  011032                          56$:
2701  011032  010337  011040                MOV     R3,71$          ;LOAD BUFFER ADDRESS
2702  011036  104401                      TYPE                    ;TYPE RECEIVED INPUT
2703  011040  000000                71$:   .WORD   0               ;BUFFER ADDRESS
2704  011042  104401  001164              TYPE    ,$QUES          ;TYPE QUESTION MARK
2705  011046  000736                      BR      53$             ;TRY AGAIN
2706
2707  011050  012737  000240  001450 57$:   MOV     #PR5,RKPRI      ;LOAD PRIORITY
2708  011056  000456                      BR      REST1           ;LOAD RK06 VECTOR AND TTY VECTOR
2709
2710  011060  105037  001364        S1$:   CLRB    CPUID           ;LOAD DEFAULT CPU ID
2711  011064  013737  053720  001670        MOV     $LSTAD,FBLKT+2  ;LOAD LAST ADDRESS
2712  011072  105037  001365        S2$:   CLRB    OVLYLD          ;INDICATE THAT THE LOADER IS NOT OVERLAYED
2713  011076  105737  000041              TSTB    41              ;SEE WHO LOADED PROGRAM
2714  011102  001004                      BNE     1$              ;BRANCH IF XXDP
2715  011104  162737  000900  001670        SUB     #96.*2.,FBLKT+2 ;SUBTRACT ABS LOADER SIZE
2716  011112  000403                      BR      S3$             ;GO DETERMINE MAX BUFFER SIZE
2717
2718  011114  162737  006000  001670 1$:    SUB     #1536.*2.,FBLKT+2 ;SUBTRACT XXDP LOADER SIZE
2719  011122  013746  001670        S3$:   MOV     FBLKT+2,-(SP)   ;STORE MAXIMUM ADDRESS
2720  011126  163716  001666              SUB     FBLKT,(SP)      ;DETERMINE MEMORY AVAILIABLE
2721  011132  022716  027000              CMP     #256.*23.*2.,(SP) ;CHECK IF ENOUGH ROOM
2722  011136  101005                      BHI     1$              ;NO,LOAD MEMORY AVILIABLE
2723  011140  005726                      TST     (SP)+           ;ADJUST STACK
2724  011142  012737  013400  001354        MOV     #256.*23.,MAXBUF ;LOAD MAXIMUM BUFFER SIZE
2725  011150  000403                      BR      S4$             ;LOAD NUMBER OF SOFTWARE COMPARES
2726
2727  011152  006216                1$:    ASR     (SP)            ;CHANGE TO WORDS
2728  011154  012637  001354              MOV     (SP)+,MAXBUF    ;LOAD MAXIMUM WORDS TRANSFERRED
2729  011160  012737  000003  001362 S4$:    MOV     #3,SOFCMP       ;LOAD NO. OF SOFTWARE COMPARES
2730  011166  105037  001360        S5$:   CLRB    PERINV          ;SET UP FOR NO INTERVAL STATISTICS
2731  011172  012737  177440  001444 S6$:    MOV     #177440,RKBAS   ;LOAD DEFAULT BUS ADDRESS
2732  011200  012737  000210  001446 S7$:    MOV     #210,RKVEC      ;LOAD DEFAULT VECTOR ADDRESS
2733  011206  012737  000240  001450 S8$:    MOV     #PR5,RKPRI      ;LOAD RK06 PRIORITY
2734
2735  011214  013704  001446        REST1: MOV     RKVEC,R4        ;STORE VECTOR ADDRESS
2736  011220  012724  043470              MOV     #I.INTR,(R4)+   ;LOAD RK06 VECTOR ADDRESS
2737  011224  013714  001450              MOV     RKPRI,(R4)      ;  AND INTERRUPT PRIORITY
2738  011230  004737  042666        RKST2: JSR     PC,CLKINT       ;INITIALIZE CLOCK VECTOR ADDRESS
2739  011234  104401  056451              TYPE    ,SYS008         ;TYPE "READY TO BEGIN TESTING"
2740  011240  005227  177777              INC     #-1             ;TYPE HELP MESSAGE ON FIRST PASS
2741  011244  001002                      BNE     5$
2742  011246  104401  064776              TYPE    ,HELP
2743  011252  004737  052712        5$:    JSR     PC,$TTINT       ;SET UP TTY INTERRUPT
2744  011256  013737  001450  000036        MOV     RKPRI,TRAPVEC+2 ;ALLOW L AND P CLOCK INTERRUPTS
2745  011264  005037  177776              CLR     PS              ;ALLOW RK06 INTERRUPTS
2746
```

```
                                .SBTTL  MAIN IDLE LOOP
                        
011270  022706  001100    MAIN:   CMP     #STACK,SP       ;CHECK IF STACK PROBLEM
011274  001401                    BEQ     1$              ;NO, CONTINUE
011276  000000                    HALT                    ; *** PROGRAM PROBLEM
011300  004737  051240    1$:     JSR     PC,C.OPT        ;CALL COMMAND OPTIMIZER
011304  004737  043314            JSR     PC,W.WTCH       ;CALL WATCH DOG TIMER
011310  005737  001560            TST     ERCONT          ;CHECK IF IN SPECIAL ERROR SEQUENCE
011314  100765                    BMI     MAIN            ;YES, DO NOT PRINT INTERVAL STATISTICS OR
                                                        ;  ADD DRIVES TO TESTING SEQUENCE
011316  032777  060000  167614    BIT     #SW14!SW13,@SWR ;CHECK IF LOOP ON OPERATION OR
                                                        ;  INHIBIT PRINT OUT
011324  001022                    BNE     11$             ;YES, DO NOT PRINT OUT INTERVAL STATISTICS
011326  105737  001627            TSTB    STATIS          ;CHECK FOR INTERVAL STATISTICS
011332  001417                    BEQ     11$             ;NO, CONTINUE SCAN
011334  005004                    CLR     R4              ;START WITH DRIVE 0
011336  016405  001520    2$:     MOV     PRLST(R4),R5    ;GET PARAMETER BLOCK ADDRESS
011342  032765  000001  000014    BIT     #DRVUSE,P.PRST(R5) ;CHECK IF DRIVE IS IN USE
011350  001402                    BEQ     3$              ;NO, LOOK AT NEXT PARAMETER BLOCK
011352  004737  012772            JSR     PC,STAT         ;GET STATISTICS
011356  005724            3$:     TST     (R4)+           ;INCREMENT DRIVE INDEX
011360  022704  000020            CMP     #20,R4          ;CHECK IF ALL DRIVES SCANNED
011364  101364                    BHI     2$              ;NO, DO NEXT DRIVE
011366  105037  001627            CLRB    STATIS          ;RESET FLAG
                        
011372  004037  050766    11$:    JSR     R0,Q.POP        ;GET FIRST DRIVE FROM DRIVE
011376  001314                    AVAILQ                  ;  AVAILABLE QUEUE
011400  012605                    MOV     (SP)+,R5        ;STORE PARAMETER BLOCK ADDRESS
011402  001732                    BEQ     MAIN            ;IF QUEUE EMPTY WAIT
011404  032765  002000  000014    BIT     #DRPDRV,P.PRST(R5)  ;CHECK IF DROP DRIVE
011412  001403                    BEQ     12$             ;NO, GENERATE NEW COMMAND
011414  004737  012716            JSR     PC,DROP         ;DROP DRIVE
011420  000723                    BR      MAIN            ;GET NEXT AVAILABLE DRIVE
                        
011422  032777  040000  167510    BIT     #SW14,@SWR      ;CHECK IF LOOP ON OPERATION
011430  001002                    BNE     15$             ;YES, DO NOT CLEAR SEEK TO PREVIOUS
                                                        ;  CYLINDER FLAG
011432  105065  000211            CLRB    P.SEEK(R5)      ;CLEAR SEEK TO PREVIOUS CYLINDER
011436  004737  020640    15$:    JSR     PC,GENERT       ;GENERATE NEW COMMAND
011442  105765  000211            TSTB    P.SEEK(R5)      ;CHECK IF SEEK TO PREIOUS CYLINDER
011446  001310                    BNE     MAIN            ;YES, GET NEXT AVAILIABLE DRIVE
011450  013737  001450  177776    MOV     RKPRI,PS        ;LOCK OUT RK06 INTERRUPTS
011456  005737  001320            TST     BWAITQ          ;CHECK IF BUFFER WAIT QUEUE EMPTY
011462  001013                    BNE     25$             ;NO, ENQUEUE PARAMETER BLOCK
011464  004037  022114            JSR     R0,BUFFAL       ;ALLOCATE BUFFER
011470  011512                    25$                     ;NOT ENOUGH BLOCK RETURN
011472  005037  177776            CLR     PS              ;ALLOW RK06 INTERRUPTS
011476  004737  022532            JSR     PC,LDDATA       ;LOAD BUFFER
011502  004037  050706            JSR     R0,Q.PUSH       ;PUT PARAMETER BLOCK ON COMMAND
011506  001324                    CINITQ                  ;  INITIATION QUEUE
011510  000667                    BR      MAIN            ;GET NEXT AVAILABLE DRIVE
                        
011512  004037  050706    25$:    JSR     R0,Q.PUSH       ;PUT PARAMETER BLOCK ON BUFFER
011516  001320                    BWAITQ                  ;  WAIT QUEUE
011520  005037  177776            CLR     PS              ;ALLOW RK06 INTERRUPTS
011524  000661                    BR      MAIN            ;GET NEXT AVAILABLE DRIVE
```

```
                        .SBTTL  OPERATOR COMMAND DECODER

                        ;;*****************************************************************
                        ;*
                        ;*      THE LEGAL COMMANDS ARE:
                        ;*              TN-     INITIATE TESTING ON DRIVE N
                        ;*              PN-     CHANGE PARAMETER AND INITIATE TEST ON
                        ;*                      DRIVE N
                        ;*              DN-     DROP DRIVE FROM TESTING SEQUENCE
                        ;*              SN-     DEMAND PERFORMANCE SUMMARY ON DRIVE N
                        ;*              WN-     WRITE RANDOM DATA PATTERNS ON DRIVE N
                        ;*                      AND INITIATE TESTING.
                        ;*
                        ;*CALL  JSR     PC,OPRCMD
                        ;*      RETURN
                        ;*
                        ;*
                        ;*      COMMAND         ROUTINE
                        ;*      -------         -------
                        ;*
                        ;*      TN              TESTDV
                        ;*      PN              PARMDV
                        ;*      DN              DROPDV
                        ;*      SN              STATDV
                        ;*      WN              WRTEPR
                        ;*
                        ;;*****************************************************************

011526  010446          OPRCMD: MOV     R4,-(SP)        ;STORE R4 ON STACK
011530  104401  055317          TYPE    ,OPR007         ;TYPE "PLEASE ENTER COMMAND"
011534  104403                  RDLIN                   ;READ LINE FROM TTY
011536  012604                  MOV     (SP)+,R4        ;STORE ADDRESS OF INPUT STRING
011540  116437  000001  055154  MOVB    1(R4),OPR001    ;MOVE SECOND CHARACTER TO DRIVE
                                                        ;  REQUEST STORAGE
011546  122737  000101  055154  CMPB    #'A,OPR001      ;CHECK IF ALL DRIVES
011554  001421                  BEQ     4$              ;YES, PROCESS ALL DRIVES
011556  122737  000060  055154  CMPB    #'0,OPR001      ;CHECK IF LEGAL DRIVE NUMBER
011564  101004                  BHI     2$              ;NO, PRINT ERROR
011566  122737  000067  055154  CMPB    #'7,OPR001      ;CHECK IF 0-7
011574  103006                  BHIS    3$              ;YES, PROCESS DRIVE COMMAND
011576  104401  055137  2$:     TYPE    ,OPR000         ;TYPE "DRIVE NUMBER N ILLEGAL?"
011602  104401  055157          TYPE    ,OPR002
011606  012604                  MOV     (SP)+,R4        ;RESTORE R4
011610  000207                  RTS     PC              ;RETURN

011612  142737  000370  055154  3$:     BICB    #370,OPR001     ;CLEAR UNIMPORTANT BITS
011620  010546          4$:     MOV     R5,-(SP)        ;STORE R5 ON STACK
011622  122714  000124          CMPB    #'T,(R4)        ;CHECK IF TEST DRIVE
011626  001427                  BEQ     TESTDV          ;YES, GO TO TEST DRIVE
011630  122714  000120          CMPB    #'P,(R4)        ;CHECK IF TEST AND CHANGE PARAMETERS
011634  001512                  BEQ     PARMDV          ;YES, GO TEST AND CHANGE PARAMETERS
011636  122714  000104          CMPB    #'D,(R4)        ;CHECK IF DROP DRIVE
011642  001553                  BEQ     DROPDV          ;YES, GO DROP DRIVE
011644  122714  000123          CMPB    #'S,(R4)        ;CHECK IF DEMAND STATISTICS
011650  001002                  BNE     5$
011652  000137  012352          JMP     STATDV          ;YES, GO TO DEMAND STATISTICS
```

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2859
2860  011656  122714  000127          5$:     CMPB    #'W,(R4)        ;CHECK IF WRITE PACK AND TEST
2861  011662  001002                          BNE     6$
2862  011664  000137  012526                  JMP     WRTEPK          ;YES, GO WRITE PACK AND TEST
2863
2864  011670  111437  055131          6$:     MOVB    (R4),ILLCMD     ;STORE COMMAND FOR PRINT OUT
2865  011674  104401  055100                  TYPE    ,ILLCOM         ;TYPE ERROR MESSAGE
2866  011700  012605                          MOV     (SP)+,R5        ;RESTORE R5
2867  011702  012604                          MOV     (SP)+,R4        ;RESTORE R4
2868  011704  000207                          RTS     PC              ;RETURN
```

```
                                .SBTTL  TEST DRIVE COMMAND

011706  122737  000101  055154  TESTDV: CMPP    #'A,OPR001      ;CHECK IF ALL DRIVES ARE TO BE TESTED
011714  001027                          BNE     10$             ;NO, DO SPECIFIC DRIVE
011716  105037  001626                  CLRB    DRVCNT          ;CLEAR DRIVE COUNT
011722  005004                          CLR     R4              ;CLEAR DRIVE COUNT
011724  016405  001520          1$:     MOV     PRLST(R4),R5    ;GET PARAMETER BLOCK ADDRESS
011730  032765  000001  000014          BIT     #DRVUSE,P.PRST(R5)  ;CHECK IF DRIVE IN USE
011736  001004                          BNE     2$              ;YES, GO TO NEXT DRIVE
011740  004737  013250                  JSR     PC,TEST         ;GO TEST DRIVE
011744  105237  001626                  INCB    DRVCNT          ;INCREMENT DRIVE COUNT
011750  005724                  2$:     TST     (R4)+           ;ADDRESS NEXT DRIVE (ADD 2)
011752  022704  000020                  CMP     #20,R4          ;CHECK IF FINISHED
011756  001362                          BNE     1$              ;NO, SET UP NEXT DRIVE
011760  105737  001626                  TSTB    DRVCNT          ;CHECK IF ANY DRIVE IN ASSIGNMENT SEQUENCE
011764  001033                          BNE     15$             ;YES, RETURN
011766  104401  055476                  TYPE    ,OPR013         ;TYPE "ALL DRIVES CURRENTLY UNDER TEST?"
011772  000430                          BR      15$             ;RETURN

011774  113704  055154          10$:    MOVB    OPR001,R4       ;STORE DRIVE NUMBER
012000  006304                          ASL     R4              ;MULTIPLY DRIVE NUMBER BY 2
012002  016405  001520                  MOV     PRLST(R4),R5    ;GET PARAMETER ADDRESS
012006  032765  000001  000014          BIT     #DRVUSE,P.PRST(R5)  ;CHECK IF DRIVE ASSIGNED
012014  001003                          BNE     11$             ;YES, PRINT DRIVE ALREADY ASSIGNED
012016  004737  013250                  JSR     PC,TEST         ;GO TEST DRIVE
012022  000414                          BR      15$             ;RETURN

012024  013737  001450  177776  11$:    MOV     RKPRI,PS        ;LOCK OUT RK06 INTERRUPTS
012032  152737  000060  055154          BISB    #60,OPR001      ;MAKE NUMBER ASCIZ
012040  104401  055137                  TYPE    ,OPR000         ;TYPE "DRIVE # ALREADY ASSIGNED?"
012044  104401  055205                  TYPE    ,OPR004
012050  005037  177776                  CLR     PS              ;ALLOW RK06 INTERRUPTS
012054  012605                  15$:    MOV     (SP)+,R5        ;RESTORE R5
012056  012604                          MOV     (SP)+,R4        ;RESTORE R4
012060  000207                          RTS     PC              ;RETURN

                                .SBTTL  CHANGE PARAMETERS COMMAND

012062  122737  000101  055154  PARMDV: CMPP    #'A,OPR001      ;CHECK IF PARAMETERS FOR ALL DRIVES
012070  001020                          BNE     10$             ;NO, DO SPECIFIC DRIVE
012072  005004                          CLR     R4              ;CLEAR DRIVE COUNT
012074  016405  001520          1$:     MOV     PRLST(R4),R5    ;GET PARAMETER BLOCK ADDRESS
012100  004737  015756                  JSR     PC,PARM         ;ASK FOR PARAMETERS
012104  032765  000001  000014          BIT     #DRVUSE,P.PRST(R5)  ;CHECK IF DRIVE IN USE
012112  001002                          BNE     2$              ;YES, GO TO NEXT DRIVE
012114  004737  013250                  JSR     PC,TEST         ;GO TEST DRIVE
012120  005724                  2$:     TST     (R4)+           ;ADDRESS NEXT DRIVE (ADD 2)
012122  022704  000020                  CMP     #20,R4          ;CHECK IF FINISHED
012126  001362                          BNE     1$              ;NO, SET UP NEXT DRIVE
012130  000415                          BR      15$             ;RETURN

012132  113704  055154          10$:    MOVB    OPR001,R4       ;STORE DRIVE NUMBER
012136  006304                          ASL     R4              ;MULTIPLY DRIVE NUMBER BY 2
012140  016405  001520                  MOV     PRLST(R4),R5    ;GET PARAMETER ADDRESS
012144  004737  015756                  JSR     PC,PARM         ;GET NEW PARAMETERS
012150  032765  000001  000014          BIT     #DRVUSE,P.PRST(R5) ;CHECK IF DRIVE IN USE
```

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2925  012156  001002                          BNE     15$             ;YES, RETURN
2926  012160  004737  013750                  JSR     PC,TEST         ;GO TEST DRIVE
2927  012164  012605                  15$:    MOV     (SP)+,R5        ;RESTORE R5
2928  012166  012604                          MOV     (SP)+,R4        ;RESTORE R4
2929  012170  000207                          RTS     PC              ;RETURN
2930
2931                                  .SBTTL  DROP DRIVE COMMAND
2932
2933  012172  122737  000101  055154  DROPDV: CMPB    #'A,OPR001      ;CHECK IF ALL DRIVES ARE TO BE DROPPED
2934  012200  001030                          BNE     10$             ;NO, DO SPECIFIC DRIVE
2935  012202  105037  001626                  CLRB    DRVCNT          ;CLEAR DRIVE COUNT
2936  012206  005004                          CLR     R4              ;CLEAR DRIVE COUNT
2937  012210  016405  001520          1$:     MOV     PRLST(R4),R5    ;GET PARAMETER BLOCK ADDRESS
2938  012214  032765  000001  000014          BIT     #DRVUSE,P.PRST(R5)  ;CHECK IF DRIVE IN USE
2939  012222  001405                          BEQ     2$              ;NO, GO TO NEXT DRIVE
2940  012224  052765  002000  000014          BIS     #DRPDRV,P.PRST(R5)  ;INDICATE DRIVE IS TO BE DROPPED
2941  012232  105237  001626                  INCB    DRVCNT          ;INCREMENT DRIVE COUNT
2942  012236  005724                  2$:     TST     (R4)+           ;ADDRESS NEXT DRIVE (ADD 2)
2943  012240  022704  000020                  CMP     #20,R4          ;CHECK IF FINISHED
2944  012244  001361                          BNE     1$              ;NO, SET UP NEXT DRIVE
2945  012246  105737  001626                  TSTB    DRVCNT          ;CHECK IF ANY DRIVES AVAILIABLE
2946  012252  001034                          BNE     15$             ;YES, RETURN
2947  012254  104401  055540                  TYPE    ,OPR014         ;TYPE "NO DRIVES IN USE?"
2948  012260  000431                          BR      15$             ;RETURN
2949
2950  012262  113704  055154          10$:    MOVB    OPR001,R4       ;STORE DRIVE NUMBER
2951  012266  006304                          ASL     R4              ;MULTIPLY DRIVE NUMBER BY 2
2952  012270  016405  001520                  MOV     PRLST(R4),R5    ;GET PARAMETER ADDRESS
2953  012274  032765  000001  000014          BIT     #DRVUSE,P.PRST(R5)  ;CHECK IF DRIVE ASSIGNED
2954  012302  001404                          BEQ     11$             ;NO, PRINT DRIVE N NOT ASSIGNED
2955  012304  052765  002000  000014          BIS     #DRPDRV,P.PRST(R5)  ;INDICATE DRIVE IS TO BE DROPPED
2956  012312  000414                          BR      15$             ;RETURN
2957
2958  012314  013737  001450  177776  11$:    MOV     @#PSPRI,PS      ;LOCK OUT RK06 INTERRUPTS
2959  012322  152737  000060  055154          BISB    #60,OPR001      ;MAKE NUMBER ASCII
2960  012330  104401  055137                  TYPE    ,OPR000         ;TYPE "DRIVE N NOT ASSIGNED?"
2961  012334  104401  055231                  TYPE    ,OPR005
2962  012340  005037  177776                  CLR     PS              ;ALLOW RK06 INTERRUPTS
2963  012344  012605                  15$:    MOV     (SP)+,R5        ;RESTORE R5
2964  012346  012604                          MOV     (SP)+,R4        ;RESTORE R4
2965  012350  000207                          RTS     PC              ;RETURN
2966
2967                                  .SBTTL  GET DRIVE STATISTICS COMMAND
2968
2969  012352  122737  000101  055154  STATDV: CMPB    #'A,OPR001      ;CHECK IF STATISTICS FOR ALL DRIVES
2970  012360  001027                          BNE     10$             ;NO, DO SPECIFIC DRIVE
2971  012362  105037  001626                  CLRB    DRVCNT          ;CLEAR DRIVE COUNT
2972  012366  005004                          CLR     R4              ;CLEAR DRIVE COUNT
2973  012370  016405  001520          1$:     MOV     PRLST(R4),R5    ;GET PARAMETER BLOCK ADDRESS
2974  012374  032765  000001  000014          BIT     #DRVUSE,P.PRST(R5)  ;CHECK IF DRIVE IN USE
2975  012402  001404                          BEQ     2$              ;NO, GO TO NEXT DRIVE
2976  012404  004737  012772                  JSR     PC,STAT         ;GATHER STATISTICS
2977  012410  105237  001626                  INCB    DRVCNT          ;INCREMENT DRIVE COUNT
2978  012414  005724                  2$:     TST     (R4)+           ;ADDRESS NEXT DRIVE (ADD 2)
2979  012416  022704  000020                  CMP     #20,R4          ;CHECK IF FINISHED
2980  012422  001362                          BNE     1$              ;NO, SET UP NEXT DRIVE
```

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2981  012424  105737  001626              TSTB    DRVCNT          ;CHECK IF ANY DRIVES AVAILIABLE
2982  012430  001033                      BNE     15$             ;YES, RETURN
2983  012432  104401  055540              TYPE    ,OPR014         ;TYPE "NO DRIVES IN USE?"
2984  012436  000430                      BR      15$             ;RETURN
2985
2986  012440  113704  055154      10$:    MOVB    OPR001,R4       ;STORE DRIVE NUMBER
2987  012444  006304                      ASL     R4              ;MULTIPLY DRIVE NUMBER BY 2
2988  012446  016405  001520              MOV     PRLRT(R4),R5    ;GET PARAMETER ADDRESS
2989  012452  032765  000001  000014      BIT     #DRVUSE,P.PRST(R5)  ;CHECK IF DRIVE ASSIGNED
2990  012460  001403                      BEQ     11$             ;PRINT DRIVE N NOT ASSIGNED
2991  012462  004737  012777              JSR     PC,STAT         ;GO GATHER DRIVE STATISTICS
2992  012466  000414                      BR      15$             ;RETURN
2993
2994  012470  013737  001450  177776  11$:    MOV     RKPRI,PS        ;LOCK OUT RK06 INTERRUPTS
2995  012476  152737  000060  055154          BISB    #60,OPR001      ;MAKE NUMBER ASCII
2996  012504  104401  055137                  TYPE    ,OPR000         ;TYPE "DRIVE N NOT ASSIGNED?"
2997  012510  104401  055231                  TYPE    ,OPR005
2998  012514  005037  177776                  CLR     PS              ;ALLOW RK06 INTERRUPTS
2999  012520  012605              15$:    MOV     (SP)+,R5        ;RESTORE R5
3000  012522  012604                      MOV     (SP)+,R4        ;RESTORE R4
3001  012524  000207                      RTS     PC              ;RETURN
3002
3003                          .SBTTL  WRITE PACK AND TEST COMMAND
3004
3005  012526  122737  000101  055154  WRTEPK: CMPB    #'A,OPR001      ;CHECK IF ALL DRIVES ARE TO BE TESTED
3006  012534  001032                      BNE     10$             ;NO, DO SPECIFIC DRIVE
3007  012536  105037  001626              CLRB    DRVCNT          ;CLEAR DRIVE COUNT
3008  012542  005004                      CLR     R4              ;CLEAR DRIVE COUNT
3009  012544  016405  001520      1$:     MOV     PRLRT(R4),R5    ;GET PARAMETER BLOCK ADDRESS
3010  012550  032765  000001  000014      BIT     #DRVUSE,P.PRST(R5)  ;CHECK IF DRIVE IN USE
3011  012556  001007                      BNE     2$              ;YES, GO TO NEXT DRIVE
3012  012560  112765  000020  000210      MOVB    #BIT4,P.ASSN(R5) ;SET FLAG FOR WRITE PACK
3013  012566  004737  013750              JSR     PC,TEST         ;GO ASSIGN DRIVE
3014  012572  105237  001626              INCB    DRVCNT          ;INCREMENT DRIVE COUNT
3015  012576  005724              2$:     TST     (R4)+           ;ADDRESS NEXT DRIVE (ADD 2)
3016  012600  022704  000020              CMP     #20,R4          ;CHECK IF FINISHED
3017  012604  001357                      BNE     1$              ;NO, SET UP NEXT COMMAND
3018  012606  105737  001626              TSTB    DRVCNT          ;CHECK IF ANY DRIVES NOT IN USE
3019  012612  001436                      BEQ     15$             ;NO, RETURN
3020  012614  104401  055476              TYPE    ,OPR013         ;TYPE "ALL DRIVES CURRENTLY UNDER TEST"
3021  012620  000433                      BR      15$             ;RETURN
3022
3023  012622  113704  055154      10$:    MOVB    OPR001,R4       ;STORE DRIVE NUMBER
3024  012626  006304                      ASL     R4              ;MULTIPLY DRIVE NUMBER BY 2
3025  012630  016405  001520              MOV     PRLRT(R4),R5    ;GET PARAMETER ADDRESS
3026  012634  032765  000001  000014      BIT     #DRVUSE,P.PRST(R5)  ;CHECK IF DRIVE ASSIGNED
3027  012642  001006                      BNE     11$             ;YES, PRINT DRIVE ALREADY ASSIGNED
3028  012644  112765  000020  000210      MOVB    #BIT4,P.ASSN(R5) ;SET FLAG FOR WRITE PACK
3029  012652  004737  013250              JSR     PC,TEST         ;GO ASSIGN DRIVE
3030  012656  000414                      BR      15$             ;RETURN
3031
3032  012660  013737  001450  177776  11$:    MOV     RKPRI,PS        ;LOCK OUT RK06 INTERRUPTS
3033  012666  152737  000060  055154          BISB    #60,OPR001      ;MAKE NUMBER ASCII
3034  012674  104401  055137                  TYPE    ,OPR000         ;TYPE "DRIVE N ALREADY ASSIGNED?"
3035  012700  104401  055205                  TYPE    ,OPR004
3036  012704  005037  177776                  CLR     PS              ;ALLOW RK06 INTERRUPTS
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  3037  012710  012605                  15$:    MOV     (SP)+,R5        ;RESTORE R5
  3038  012712  012604                          MOV     (SP)+,R4        ;RESTORE R4
  3039  012714  000207                          RTS     PC              ;RETURN
  3040
```

```
3041                                    .SBTTL  DROP DRIVE AND GATHER STATISTICS ROUTINES
3042
3043  012716  013746  177776          DROP:   MOV     PS,-(SP)        ;STORE PSW
3044  012722  013737  001450  177776          MOV     RKPRI,PS        ;LOCK OUT TTY AND RK06 INTERRUPTS
3045  012730  005065  000014                  CLR     P.PRST(R5)      ;CLEAR PROGRAM STAUS REGISTER
3046  012734  105065  000210                  CLRB    P.ASSN(R5)      ;CLEAR ASSIGNMENT CODE
3047  012740  005065  000212                  CLR     P.ERR(R5)       ;CLEAR ERROR FLAGS
3048  012744  116537  000000  055446          MOVB    P.DRVN(R5),OPR011  ;LOAD DRIVE NUMBER
3049  012752  152737  000060  055446          BISB    #60,OPR011      ;MAKE IT ASCII
3050  012760  104401  055427                  TYPE    ,OPR010         ;TYPE "DRIVE # HAS BEEN DROPPED
3051  012764  104401  055251                  TYPE    ,OPR006         ;  FROM TEST SEQUENCE"
3052  012770  000405                          BR      STAT00          ;GO PRINT STATISTICS
3053
3054  012772  013746  177776          STAT:   MOV     PS,-(SP)        ;STORE PSW
3055  012776  013737  001450  177776          MOV     RKPRI,PS        ;LOCK OUT TTY AND RK06 INTERRUPTS
3056  013004  104401  055615          STAT00: TYPE    ,DRVSTT         ;**DRIVE STATISTICS
3057  013010  116537  000000  055446          MOVB    P.DRVN(R5),OPR011 ;LOAD DRIVE NUMBER FOR PRINT OUT
3058  013016  152737  000060  055446          BISB    #60,OPR011      ;MAKE IT ASCII
3059  013024  104401  055427                  TYPE    ,OPR010         ;TYPE "DRIVE #"
3060  013030  004737  027060                  JSR     PC,PRISER       ;PRINT DRIVE AND PACK SERIAL NUMBERS
3061  013034  004737  043072                  JSR     PC,PRITIM       ;PRINT TIME IF CLOCK AVAILIABLE
3062  013040  104401  055673                  TYPE    ,STT001         ;TYPE "ORDERS PERFORMED"
3063  013044  010546                          MOV     R5,-(SP)        ;GET PARAMETER BLOCK ADDRESS
3064  013046  062716  000152                  ADD     #P.NODR,(SP)    ;CALCULATE ADDRESS FOR PRINT OUT
3065  013052  004737  054344                  JSR     PC,$DB2D        ;CONVERT TO ASCII
3066  013056  104401  055715                  TYPE    ,STT002         ;TYPE "WORDS WRITTEN*65K"
3067  013062  010546                          MOV     R5,-(SP)        ;GET PARAMETER BLOCK ADDRESS
3068  013064  062716  000160                  ADD     #P.NWRT+2,(SP)  ;CALCULATE ADDRESS FOR PRINT OUT
3069  013070  004737  054344                  JSR     PC,$DB2D        ;CONVERT TO ASCII
3070  013074  104401  055742                  TYPE    ,STT003         ;TYPE "WORDS READ*65K"
3071  013100  010546                          MOV     R5,-(SP)        ;GET PARAMETER BLOCK ADDRESS
3072  013102  062716  000166                  ADD     #P.NRD+2,(SP)   ;CALCULATE ADDRESS FOR PRINT OUT
3073  013106  004737  054344                  JSR     PC,$DB2D        ;CONVERT TO ASCII
3074  013112  104401  055764                  TYPE    ,STT004         ;TYPE "SOFT DATA ERRORS"
3075                                                                  ;  "ECC"
3076  013116  016546  000176                  MOV     P.SECC(R5),-(SP) ;STORE SOFT ECC ERROR COUNT
3077  013122  004737  054302                  JSR     PC,$SB2D        ;CONVERT TO DECIMAL
3078  013126  104401  056017                  TYPE    ,STT005         ;TYPE "#REREAD"
3079  013132  016546  000172                  MOV     P.SRRD(R5),-(SP) ;SAVE SOFT REREAD CORRECTABLE
3080  013136  004737  054302                  JSR     PC,$SB2D        ;CONVERT TO DECIMAL
3081  013142  104401  056033                  TYPE    ,STT006         ;TYPE "OFFSET"
3082  013146  016546  000174                  MOV     P.SOFF(R5),-(SP) ;SAVE SOFT OFFSET CORRECTABLE
3083  013152  004737  054302                  JSR     PC,$SB2D        ;CONVERT TO DECIMAL
3084  013156  104401  056047                  TYPE    ,STT007         ;TYPE "HARD DATA ERRORS"
3085  013162  016546  000200                  MOV     P.HARD(R5),-(SP) ;SAVE HARD DATA ERRORS
3086  013166  004737  054302                  JSR     PC,$SB2D        ;CONVERT TO DECIMAL
3087  013172  104401  056073                  TYPE    ,STT008         ;TYPE "SEEK INCOMPLETES"
3088  013176  016546  000202                  MOV     P.NSKI(R5),-(SP) ;TYPE NUMBER OF SEEK INCOMPLETES
3089  013202  004737  054302                  JSR     PC,$SB2D        ;CONVERT TO DECIMAL
3090  013206  104401  056117                  TYPE    ,STT009         ;TYPE "OPERATION INCOMPLETES"
3091  013212  016546  000204                  MOV     P.NOPI(R5),-(SP) ;SAVE NUMBER OF OPERATION INCOMPLETES
3092  013216  004737  054302                  JSR     PC,$SB2D        ;CONVERT TO DECIMAL
3093  013222  104401  056165                  TYPE    ,STT010         ;TYPE "OTHER ERRORS"
3094  013226  016546  000206                  MOV     P.NFR(R5),-(SP) ;SAVE NUMBER OF OTHER ERRORS
3095  013232  004737  054302                  JSR     PC,$SB2D        ;CONVERT TO DECIMAL
3096  013236  104401  001165                  TYPE    ,SCRLF          ;TYPE <CR><LF>
```

```
 3097  013242  012637  177776                MOV     (SP)+,PS        ;RESTORE PSW
 3098  013246  000207                        RTS     PC              ;RETURN
 3099
```

```
3100                                    .SBTTL  INITIATE DRIVE ASSIGNMENT SEQUENCE
3101
3107  013250  116546  000710            TEST:   MOVB    P.ASSN(R5),-(SP) ;SAVE ASSIGNMENT CODE
3103  013254  010446                            MOV     R4,-(SP)        ;STORE R4 ON STACK
3104  013256  010346                            MOV     R3,-(SP)        ;STORE R3 ON STACK
3105  013260  010503                            MOV     R5,R3           ;LOAD PARAMETER BLOCK ADDRESS INTO R3
3106  013262  062703  000122                    ADD     #P.RDPT,R3      ;CALCULATE BEGINNING OF STATISTICS AND
3107                                                                    ;  ERROR AREA
3108  013266  010504                            MOV     R5,R4           ;LOAD PARAMETER BLOCK ADDRESS INTO R4
3109  013270  062704  000232                    ADD     #P.EXAR,R4      ;CALCULATE END OF STATISTICS AND
3110                                                                    ;  ERROR AREA
3111  013274  005023                    1$:     CLR     (R3)+           ;CLEAR STATISTIC AND ERROR AREA
3112  013276  020304                            CMP     R3,R4           ;CHECK IF FINISHED
3113  013300  001375                            BNE     1$              ;NO, CONTINUE
3114  013302  116504  000000                    MOVB    P.DRVN(R5),R4   ;STORE DRIVE NUMBER
3115  013306  156437  001510  001507            BISB    INTMSK(R4),@.OVER ;SET UP FOR OVERLAPPING SEEKS
3116  013314  012603                            MOV     (SP)+,R3        ;RESTORE R3
3117  013316  012604                            MOV     (SP)+,R4        ;RESTORE R4
3118  013320  112665  000210                    MOVB    (SP)+,P.ASSN(R5) ;RESTORE ASSIGNMENT CODE
3119
3120  013324  105065  000117            TEST1:  CLRB    P.ECMP(R5)      ;CLEAR ECC COMPARE FLAG
3121  013330  152765  000001  000210            BISB    #BIT0,P.ASSN(R5) ;SET READ STATUS COMMAND FLAG
3122  013336  052765  000001  000014            BIS     #DRVUSE,P.PRST(R5) ;SET DRIVE IN USE
3123  013344  112765  000141  000001            MOVB    #RDSTAT,P.CMND(R5) ;READ ALL DRIVE STATUS
3124  013352  112765  000141  000123            MOVB    #RDSTAT,P.RCMD(R5)
3125  013360  004037  050706                    JSR     R0,@.PUSH       ;ENQUEUE PARAMETER BLOCK IN
3126  013364  001324                            CINITQ                  ;  COMMAND INITIATION QUEUE
3127  013366  000207                            RTS     PC              ;RETURN
```

```
                                .SBTTL  DRIVE ASSIGNMENT SEQUENCE
                        
013370  132765  000001  000210  ASNORM: BITB    #BIT0,P.ASSN(R5) ;CHECK IF READ STATUS
013376  001460                          BEQ     ASN4$            ;NO, CHECK IF START SPINDLE
013400  142765  000001  000210          BICB    #BIT0,P.ASSN(R5) ;CLEAR READ STATUS COMMAND ISSUED
013406  016565  000054  000224          MOV     P.A11(R5),P.SERL(R5) ;STORE SERIAL NUMBER
013414  042765  100007  000224          BIC     #^C<M.SER>,P.SERL(R5) ;KEEP SERIAL NUMBER
013422  006265  000224                  ASR     P.SERL(R5)       ;SHIFT 3 BITS RIGHT
013426  006265  000224                  ASR     P.SERL(R5)
013432  006265  000224                  ASR     P.SERL(R5)
013436  032765  000200  000036          BIT     #DRDY,P.DS(R5)  ;CHECK IF DRIVE READY
013444  001415                          BEQ     ASN2$            ;NO, ISSUE START SPINDLE
013446  116565  000123  000135  ASN1$:  MOVB    P.RCMD(R5),P.LCMD(R5) ;STORE PREVIOUS COMMAND
013454  112765  000103  000001          MOVB    #PACK,P.CMND(R5) ;ISSUE PACK ACKNOWLEDGE
013462  112765  000103  000123          MOVB    #PACK,P.RCMD(R5)
013470  152765  000004  000210          BISB    #BIT2,P.ASSN(R5) ;SET PACK ACKNOWLEDGE FLAG
013476  000414                          BR      ASN3$            ;ISSUE PACK ACKNOWLEDGE AND WAIT
                        
013500  116565  000123  000135  ASN2$:  MOVB    P.RCMD(R5),P.LCMD(R5) ;STORE PREVIOUS COMMAND
013506  112765  000111  000001          MOVB    #SRTSPL,P.CMND(R5) ;ISSUE START SPINDLE
013514  112765  000111  000123          MOVB    #SRTSPL,P.RCMD(R5)
013522  152765  000002  000210          BISB    #BIT1,P.ASSN(R5) ;SET START SPINDLE FLAG
013530  004037  050706          ASN3$:  JSR     R0,Q.PUSH        ;ENQUEUE PARAMETER BLOCK IN
013534  001324                          CINITQ                   ;  COMMAND INITIATION QUEUE
013536  000207                          RTS     PC               ;RETURN
                        
013540  132765  000002  000210  ASN4$:  BITB    #BIT1,P.ASSN(R5) ;CHECK IF START SPINDLE
013546  001414                          BEQ     15$              ;NO, CHECK IF PACK ACKNOWLEDGE
013550  142765  000002  000210          BICB    #BIT1,P.ASSN(R5) ;CLEAR START SPINDLE FLAG
013556  032765  000200  000036          BIT     #DRDY,P.DS(R5)  ;CHECK IF DRIVE READY
013564  001330                          BNE     ASN1$            ;YES, ISSUE PACK ACKNOWLEDGE
013566  052765  002000  000212          BIS     #BIT10,P.ERR(R5) ;SET DRIVE NOT READY AFTER START SPINDLE
013574  000137  024766                  JMP     ABNORM           ;REPORT ERROR
                        
013600  132765  000004  000210  15$:    BITB    #BIT2,P.ASSN(R5) ;CHECK IF PACK ACKNOWLEDGE
013606  001431                          BEQ     18$              ;NO, CHECK IF RECAL
013610  142765  000004  000210          BICB    #BIT2,P.ASSN(R5) ;CLEAR PACK ACKNOWLEDGE FLAG
013616  032765  000100  000036          BIT     #VV,P.DS(R5)     ;CHECK IF VOLUME VALID IS SET
013624  001005                          BNE     16$              ;YES, CHECK IF PACK IS TO BE WRITTEN
013626  052765  004000  000212          BIS     #BIT11,P.ERR(R5) ;SET VOLUME VALID NOT SET AFTER PACK
                                                                 ;  ACKNOWLEDGE
013634  000137  024766                  JMP     ABNORM           ;REPORT ERROR
                        
013640  116565  000123  000135  16$:    MOVB    P.RCMD(R5),P.LCMD(R5) ;STORE PREVIOUS COMMAND
013646  112765  000113  000001          MOVB    #RECAL,P.CMND(R5) ;ISSUE RECAL
013654  112765  000113  000123          MOVB    #RECAL,P.RCMD(R5)
013662  152765  000100  000210          BISB    #BIT6,P.ASSN(R5) ;SET RECAL ISSUED
013670  000717                          BR      ASN3$
                        
013672  132765  000100  000210  18$:    BITB    #BIT6,P.ASSN(R5) ;CHECK IF RECAL
013700  001455                          BEQ     23$              ;NO, CHECK IF READ PACK SERIAL NUMBER
013702  142765  000100  000210          BICB    #BIT6,P.ASSN(R5) ;RESET RECAL ISSUED
013710  152765  000010  000210          BISB    #BIT3,P.ASSN(R5) ;SET ASSIGNMENT CODE FOR PACK
                                                                 ;  SERIAL NUMBER READ
013716  012765  001000  000004          MOV     #1000,P.SECT(R5) ;  TRACK 2 SECTOR 0
013724  116565  000123  000135          MOVB    P.RCMD(R5),P.LCMD(R5) ;STORE PREVIOUS COMMAND
```

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3184  013732  112765  000121  000001  20$:    MOVB    #RDDATA,P.CMND(R5) ;LOAD READ COMMAND FOR PACK
3185  013740  112765  000121  000123          MOVB    #RDDATA,P.RCMD(R5) ;  SERIAL NUMBER
3186  013746  012765  177774  000012          MOV     #-4,P.WC(R5)    ;LOAD WORD COUNT FOR THE FIRST FOUR WORDS
3187  013754  012765  000632  000002          MOV     #410.,P.CYLN(R5) ;SET CYLINDER TO 410
3188  013762  012765  000632  000124          MOV     #410.,P.RCYL(R5)
3189  013770  016565  000004  000126          MOV     P.SECT(R5),P.RSEC(R5) ;STORE TRACK AND SECTOR
3190  013776  005737  001320                  TST     BWAITQ          ;CHECK IF BUFFER WAIT QUEUE IS EMPTY
3191  014002  001010                          BNE     22$             ;NO, ENQUEUE PARAMETER BLOCK IN BUFFER
3192                                                                  ;  WAIT QUEUE
3193  014004  004037  022114                  JSR     R0,BUFFAL       ;ALLOCATE BUFFER
3194  014010  014024                          22$                     ;NOT ENOUGH ROOM RETURN
3195  014012  005037  177776                  CLR     PS              ;ALLOW RK06 INTERRUPTS
3196  014016  004737  022532                  JSR     PC,LDDATA       ;CLEAR BUFFER
3197  014022  000642                          BR      ASN3$           ;ISSUE COMMAND
3198
3199  014024  004037  050706          22$:    JSR     R0,Q.PUSH       ;PUT PARAMETER BLOCK ON BUFFER
3200  014030  001320                          BWAITQ                  ;  WAIT QUEUE
3201  014032  000207                          RTS     PC              ;RETURN
3202
3203  014034  032777  040000  165076  23$:    BIT     #SW14,@SWR      ;CHECK IS CYCLE ON OPERATION
3204  014042  001542                          BEQ     43$             ;NO, CONTINUE WITH ASSIGNMENT PROCESS
3205  014044  105765  000211                  TSTB    P.SEEK(R5)      ;CHECK IF SEEK TO PREVIOUS POSITION
3206  014050  001444                          BEQ     28$             ;NO, SERVICE INTERRUPT
3207  014052  105065  000211                  CLRB    P.SEEK(R5)      ;CLEAR FLAG
3208  014056  116565  000123  000001          MOVB    P.RCMD(R5),P.CMND(R5) ;REISSUE LAST COMMAND
3209  014064  016565  000124  000002          MOV     P.RCYL(R5),P.CYLN(R5) ;LOAD CYLINDER ADDRESS
3210  014072  016565  000126  000004          MOV     P.RSEC(R5),P.SECT(R5) ;LOAD PREVIOUS TRACK AND SECTOR
3211  014100  016565  000130  000012          MOV     P.RWC(R5),P.WC(R5) ;LOAD PREVIOUS WORD COUNT
3212  014106  116565  000122  000121          MOVB    P.RDPT(R5),P.DPAT(R5) ;LOAD PREVIOUS PATTERN
3213  014114  132765  000010  000210          BITB    #BIT3,P.ASSN(R5) ;CHECK IF READ PACK SERIAL NUMBER
3214  014122  001003                          BNE     25$             ;YES, DO NOT SET WRITE BEFORE WRITE CHECK
3215  014124  052765  000200  000014          BIS     #W.WCK,P.PRST(R5) ;SET WRITE BEFORE WRITE CHECK
3216  014132  005737  001320          25$:    TST     BWAITQ          ;CHECK IF ANY DRIVE WAITING FOR BUFFER
3217  014136  001332                          BNE     22$             ;YES, ENQUEUE PARAMETER BLOCK
3218  014140  004037  022114                  JSR     R0,BUFFAL       ;GO ALLOCATE BUFFER
3219  014144  014024                          22$                     ;NOT ENOUGH ROOM RETURN
3220  014146  005037  177776                  CLR     PS              ;ALLOW RK06 INTERRUPTS
3221  014152  004737  022532                  JSR     PC,LDDATA       ;GO LOAD DATA
3222  014156  000137  013530                  JMP     ASN3$           ;GO ISSUE COMMAND
3223
3224  014162  004037  024506          28$:    JSR     R0,CHKADD       ;CHECK SECTOR, TRACK, CYLINDER,
3225                                                                  ;  WORD COUNT, AND BUS ADDRESS
3226  014166  015074                          60$                     ;ERROR RETURN
3227  014170  132765  000010  000210          BITB    #BIT3,P.ASSN(R5) ;CHECK IF READ PACK SERIAL NUMBER
3228  014176  001424                          BEQ     35$             ;NO, RELEASE BUFFER
3229  014200  010446                          MOV     R4,-(SP)        ;STORE R4 ON STACK
3230  014202  016504  000010                  MOV     P.BALC(R5),R4   ;LOAD R4 TO GET PACK SERIAL NUMBER
3231  014206  012465  000226                  MOV     (R4)+,P.PKSP(R5) ;GET PACK SERIAL NUMBER
3232  014212  012465  000230                  MOV     (R4)+,P.PKSR+2(R5)
3233  014216  005724                          TST     (R4)+           ;ADJUST R4 TO ADDRESS ALLIGNMENT INDICATION
3234  014220  005714                          TST     (R4)            ;CHECK IF DATA PACK
3235  014222  001423                          BEQ     37$             ;YES, CONTINUE
3236  014224  012604                  30$:    MOV     (SP)+,R4        ;RESTORE R4
3237  014226  004737  022316                  JSR     PC,BUFREL       ;RELEASE BUFFER
3238  014232  104401  055562                  TYPE    ,OPR015         ;TYPE "ALLIGNMENT PACK IN DRIVE"
3239  014236  004737  012716                  JSR     PC,DROP         ;GO DROP DRIVE
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3240  014242  004737  022016                    JSR     PC,GETBUF       ;GO GET BUFFER FOR NEXT COMMAND
3241  014246  000207                            RTS     PC              ;RETURN
3242
3243  014250  032765  000700  000014  35$:      BIT     #W.WCK,P.PRST(R5) ;CHECK IF WRITE CHECK HAS BEEN ISSUED
3244  014256  001406                            BEQ     38$             ;YES, GO RELEASE BUFFER
3245  014260  042765  000200  000014            BIC     #W.WCK,P.PRST(R5) ;CLEAR WRITE BEFORE WRITE CHECK
3246  014266  000137  013530                    JMP     ASN3$           ;GO ISSUE COMMAND
3247
3248  014272  012604                    37$:    MOV     (SP)+,R4        ;RESTORE R4
3249  014274  004737  022316            38$:    JSR     PC,RUPREL       ;RELEASE BUFFER
3250  014300  032765  002000  000014            BIT     #DRPDRV,P.PRST(R5) ;CHECK IF DROP DRIVE
3251  014306  001402                            BEQ     40$             ;NO, SEEK TO PREVIOUS POSITION
3252  014310  000137  015626                    JMP     MV1$            ;GO DROP DRIVE
3253
3254  014314  112765  177777  000211  40$:     MOVB    #-1,P.SEEK(R5)  ;SET FLAG
3255  014322  016565  000136  000002            MOV     P.LCYL(R5),P.CYLN(R5) ;LOAD LAST CYLINDER
3256  014330  016565  000140  000004            MOV     P.LSEC(R5),P.SECT(R5) ;LOAD LAST SECTOR AND TRACK
3257  014336  112765  000117  000001            MOVB    #SEEK,P.CMND(R5) ;ISSUE SEEK
3258  014344  000137  013530                    JMP     ASN3$           ;GO SEEK TO PREVICUS POSITION
3259
3260  014350  132765  000010  000210  43$:      BITB    #BIT3,P.ASSN(R5) ;CHECK IF READ PACK SERIAL NUMBER
3261  014356  001002                            BNE     45$             ;YES, SET UP FOR READ
3262  014360  000137  015076                    JMP     WRTVER          ;CHECK IF WRITE PACK
3263
3264  014364  132765  000200  000210  45$:     BITB    #BIT7,P.ASSN(R5) ;CHECK IF RECAL AND RETRY
3265                                                                    ;  READ OF PACK SERIAL NUMBER
3266  014372  001427                            BEQ     48$             ;NO, SERVICE READ OF PACK SERIAL NUMBER
3267  014374  142765  000200  000210            BICB    #BIT7,P.ASSN(R5) ;RESET RECAL FOR REREAD OF PACK SERIAL NO.
3268  014402  116565  000123  000135            MOVB    P.RCMD(R5),P.LCMD(R5) ;STORE LAST COMMAND
3269  014410  016565  000124  000136            MOV     P.RCYL(R5),P.LCYL(R5) ;STORE LAST CYLINDER
3270  014416  016565  000126  000140            MOV     P.RSEC(R5),P.LSEC(R5) ;STORE LAST SECTOR AND TRACK
3271  014424  016565  000130  000142            MOV     P.RWC(R5),P.LWC(R5) ;STORE LAST WORD COUNT
3272  014432  062765  000002  000126            ADD     #2,P.RSEC(R5)   ;TRY NEXT 16-BIT FORMAT SECTOR
3273  014440  016565  000126  000004            MOV     P.RSEC(R5),P.SECT(R5) ;STORE SECTOR TO BE READ
3274  014446  000137  013732                    JMP     20$             ;GO ISSUE READ OF PACK SERIAL NUMBER
3275
3276  014452  142765  000010  000210  48$:     BICB    #BIT3,P.ASSN(R5) ;CLEAR FLAG
3277  014460  004037  024506                    JSR     R0,CHKADD       ;CHECK IF DATA TRANSFER CORRECT
3278  014464  015074                            60$                     ;ERROR RETURN
3279  014466  010446                            MOV     R4,-(SP)        ;STORE R4
3280  014470  016504  000132                    MOV     P.RPAL(R5),R4   ;LOAD R4 TO ADDRESS SERIAL NUMBER
3281  014474  012465  000226                    MOV     (R4)+,P.PRSP(R5) ;LOAD LEAST SIGNIFICANT BITS
3282                                                                    ;  OF SERIAL NUMBER
3283  014500  012465  000230                    MOV     (R4)+,P.PRSP+2(R5) ;LOAD MOST SIGNIFICANT BITS
3284                                                                    ;  OF SERIAL NUMBER
3285  014504  005724                            TST     (R4)+           ;ADJUST R4 TO ADDRESS ALLIGNMENT INDICATION
3286  014506  005714                            TST     (R4)            ;CHECK IF ALLIGNMENT PACK
3287  014510  001245                            BNE     30$             ;YES, DROP DRIVE
3288  014512  012604                            MOV     (SP)+,R4        ;RESTORE R4
3289  014514  004737  022316                    JSR     PC,RUPREL       ;RELEASE BUFFER
3290  014520  132765  000020  000210            BITB    #BIT4,P.ASSN(R5) ;CHECK IF WRITE PACK
3291  014526  001042                            BNE     55$             ;YES, SET UP PATTERN AND ALLOCATE BUFFER
3292  014530  105765  000076                    TSTB    P.RATE(R5)      ;CHECK IF READ ONLY MODE
3293  014534  001413                            BEQ     52$             ;YES, START TESTING
3294  014536  032765  004000  000036            BIT     #WRL,P.DS(R5)   ;CHECK IF WRITE LOCKED
3295  014544  001407                            BEQ     52$             ;NO, START TESTING
```

```
3296
3297  014546  104401  055451          50$:    TYPE    ,OPR012         ;TYPE "DRIVE WRITE LOCKED"
3298  014552  004737  012716                  JSR     PC,DROP         ;DROP DRIVE FROM TEST SEQUENCE
3299  014556  004737  022016                  JSR     PC,GETBUF       ;GET BUFFER FOR NEXT COMMAND
3300  014562  000207                          RTS     PC              ;RETURN
3301
3302  014564  116537  000000  055446  52$:    MOVB    P.DRVN(R5),OPR011 ;LOAD DRIVE NUMBER
3303  014572  152737  000060  055446          BISB    #60,OPR011      ;MAKE IT ASCII
3304  014600  104401  055427                  TYPE    ,OPR010         ;TYPE "DRIVE NUMBER 4 UNDER TEST"
3305  014604  104401  055172                  TYPE    ,OPR003
3306  014610  004737  027060                  JSR     PC,PRTSER       ;PRINT DRIVE AND PACK SERIAL NUMBERS
3307  014614  004737  043072                  JSR     PC,PRTTIM       ;PRINT TIME
3308  014620  104401  001165                  TYPE    ,SCRLF
3309  014624  004037  050706                  JSR     R0,Q.PUSH       ;PUT PARAMETER BLOCK IN DRIVE
3310  014630  001314                          AVAILQ                  ;  AVAILIABLE QUEUE
3311  014632  000207                          RTS     PC              ;RETURN
3312
3313                                  .SBTTL  WRITE WHOLE PACK WITH RANDOM DATA
3314
3315  014634  032765  004000  000036  55$:    BIT     #WRL,P.DS(R5)   ;CHECK IF WRITE LOCKED
3316  014642  001341                          BNE     50$             ;YES, DROP DRIVE
3317  014644  005037  177776                  CLR     PS              ;ALLOW RK06 INTERRUPTS
3318  014650  116565  000123  000135          MOVB    P.RCMD(R5),P.LCMD(R5) ;STORE LAST COMMAND
3319  014656  016565  000124  000136          MOV     P.RCYL(R5),P.LCYL(R5) ;STORE LAST CYLINDER
3320  014664  016565  000126  000140          MOV     P.RSEC(R5),P.LSEC(R5) ;STORE LAST TRACK AND SECTOR
3321  014672  016565  000130  000142          MOV     P.RWC(R5),P.LWC(R5) ;STORE LAST WORD COUNT
3322  014700  112765  000131  000001          MOVB    #WRTCHK,P.CMND(R5) ;LOAD WRITE COMMAND
3323  014706  112765  000131  000123          MOVB    #WRTCHK,P.RCMD(R5)
3324  014714  052765  000200  000014          BIS     #W.WCK,P.PRST(R5) ;SET WRITE BEFORE WRITE CHECK
3325  014722  005065  000002                  CLR     P.CYLN(R5)      ;CLEAR CYLINDER ADDRESS
3326  014726  005065  000124                  CLR     P.RCYL(R5)
3327  014732  005065  000004                  CLR     P.SECT(R5)      ;CLEAR TRACK AND SECTOR
3328  014736  005065  000126                  CLR     P.RSEC(R5)
3329  014742  105065  000121                  CLRB    P.DPAT(R5)      ;LOAD RANDOM PATTERN
3330  014746  013765  001354  000012          MOV     MAXBUF,P.WC(R5) ;LOAD WORD COUNT
3331  014754  042765  000377  000012          BIC     #377,P.WC(R5)   ;MAKE IT AN EVEN NUMBER OF SECTORS
3332  014762  001003                          BNE     57$             ;IF NOT ZERO USE THIS AS WORD COUNT
3333  014764  012765  000400  000012          MOV     #256.,P.WC(R5)  ;TRANSFER AT LEAST 256 WORDS
3334  014772  062765  000002  000152  57$:    ADD     #2,P.NODR(R5)   ;INCREMENT NUMBER OF ORDERS
3335  015000  066565  000012  000156          ADD     P.WC(R5),P.NWRT(R5) ;ADD NUMBER OF WORDS WRITTEN
3336  015006  005565  000160                  ADC     P.NWRT+2(R5)
3337  015012  066565  000012  000164          ADD     P.WC(R5),P.NRD(R5) ;ADD NUMBER OF WORDS READ
3338  015020  005565  000166                  ADC     P.NRD+2(R5)
3339  015024  005465  000012                  NEG     P.WC(R5)        ;MAKE THE WORD COUNT NEGITIVE
3340  015030  013737  001450  177776          MOV     RKPRI,PS        ;LOCK RK06 INTERRUPTS
3341  015036  005737  001320                  TST     BWAITQ          ;CHECK IF COMMANDS WAITING FOR BUFFER
3342  015042  001011                          BNE     59$             ;YES, ENQUEUE COMMAND IN BUFFER WAIT QUFUE
3343  015044  004037  022114                  JSR     R0,BUFFAL       ;GO ALLOCATE BUFFER
3344  015050  015066                          59$                     ;NOT ENOUGH ROOM, ENQUEUE IN BUFFER WAIT QUELE
3345  015052  005037  177776                  CLR     PS              ;ALLOW RK06 INTERRUPTS
3346  015056  004737  022532                  JSR     PC,LDDATA       ;LOAD BUFFER
3347  015062  000137  013530                  JMP     ASN3$           ;GO ISSUE COMMAND
3348
3349  015066  004037  050706          59$:    JSR     R0,Q.PUSH       ;PUT PARAMETER BLOCK IN BUFFER
3350  015072  001320                          BWAITQ                  ;  WAIT QUEUE
3351  015074  000207          60$:    RTS     PC              ;RETURN
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3352
3353  015076  132765  000020  000210  WRTVER: BITB    #BIT4,P.ASSW(R5) ;CHECK IF WRITE PACK IN PROGRESS
3354  015104  001001                  BNE     1$              ;YES, CONTINUE
3355  015106  000000                  HALT                    ; **** PROGRAM PROBLEM
3356  015110  004037  024506          1$:     JSR     R0,CHKADD       ;CHECK SECTOR, TRACK, CYLINDER,
3357                                                          ;  WORD COUNT, AND BUS ADDRESS
3358  015114  015754                  WV9$                    ;ERROR RETURN ADDRESS
3359  015116  032765  000200  000014          BIT     #W.WCK,P.PRST(R5) ;CHECK IF WRITE CHECK ISSUED
3360  015124  001405                  BEQ     WV0$            ;YES, CHECK FOR DROP DRIVE
3361  015126  042765  000200  000014          BIC     #W.WCK,P.PRST(R5) ;CLEAR ISSUE WRITE BEFORE WRITE CHECK
3362  015134  000137  013530                  JMP     ASN3$           ;GO ISSUE WRITE CHECK
3363
3364  015140  032765  002000  000014  WV0$:   BIT     #DRPDRV,P.PRST(R5) ;CHECK IF DROP DRIVE
3365  015146  001402                  BEQ     10$             ;NO, CONTINUE
3366  015150  000137  015616                  JMP     30$             ;YES, TERMINATE PACK WRITING
3367
3368  015154  132765  000040  000210  10$:    BITB    #BIT5,P.ASSW(R5) ;CHECK IF END OF PACK
3369  015162  001402                  BEQ     15$             ;NO, CONTINUE
3370  015164  000137  015640                  JMP     WV2$            ;YES, RETURN BUFFER
3371
3372  015170  112737  177777  001502  15$:    MOVB    #-1,I.ISRL      ;INDICATE THAT AN INTERRUPT HAS BEEN ISSUED
3373  015176  012762  000300  000000          MOV     #INTR,RKCS1(R2) ;GO SCAN FOR DRIVE INTERRUPTS
3374  015204  005037  177776                  CLR     PS              ;ALLOW RK06 INTERRUPTS
3375  015210  116565  000123  000135          MOVB    P.RCMD(R5),P.LCMD(R5) ;STORE PREVIOUS COMMAND
3376  015216  016565  000124  000136          MOV     P.RCYL(R5),P.LCYL(R5) ;STORE PREVIOUS CYLINDER
3377  015224  016565  000126  000140          MOV     P.RSEC(R5),P.LSEC(R5) ;STORE PREVIOUS TRACK AND SECTOR
3378  015232  116565  000122  000144          MOVB    P.RDPT(R5),P.LDPT(R5) ;STORE PREVIOUS DATA PATTERN
3379  015240  016565  000130  000142          MOV     P.RWC(R5),P.LWC(R5) ;STORE PREVIOUS WORD COUNT
3380  015246  016565  000026  000004          MOV     P.DTS(R5),P.SECT(R5) ;LOAD NEW SECTOR AND TRACK
3381  015254  016565  000026  000126          MOV     P.DTS(R5),P.RSEC(R5)
3382  015262  016565  000030  000002          MOV     P.DCYL(R5),P.CYLN(R5) ;LOAD NEW CYLINDER
3383  015270  016565  000030  000124          MOV     P.DCYL(R5),P.RCYL(R5)
3384  015276  016565  000132  000010          MOV     P.RPAL(R5),P.PALC(R5) ;REINITIALIZE BUS ADDRESS FOR POSSIBLE
3385                                                          ;  BAD SECTOR RECOVERY ON LAST COMMAND
3386  015304  052765  000200  000014          BIS     #W.WCK,P.PRST(R5) ;SET ISSUE WRITE BEFORE WRITE CHECK
3387  015312  016546  000002                  MOV     P.CYLN(R5),-(SP) ;STORE CYLINDER ADDRESS ON STACK
3388  015316  006316                          ASL     (SP)            ;MULTIPLY CYLINDER BY 3
3389  015320  066516  000002                  ADD     P.CYLN(R5),(SP)
3390  015324  005046                          CLR     -(SP)           ;MAKE ROOM ON STACK FOR TRACK
3391  015326  116516  000005                  MOVB    P.TRCK(R5),(SP) ;STORE TRACK ON STACK
3392  015332  061666  000002                  ADD     (SP),2(SP)      ;ADD TRACK
3393  015336  012716  000026                  MOV     #22.,(SP)       ;STORE 22 ON STACK (MULTIPLIER)
3394  015342  004737  054064                  JSR     PC,$MULT        ;CALCULATE NUMBER OF SECTORS TRANSFERRED
3395  015346  012616                          MOV     (SP)+,(SP)      ;THROW AWAY MOST SIGNIFICANT BITS
3396  015350  005046                          CLR     -(SP)           ;CLEAR LOCATION FOR SECTOR
3397  015352  116516  000004                  MOVB    P.SECT(R5),(SP) ;STORE SECTOR COUNT
3398  015356  061666  000002                  ADD     (SP),2(SP)      ;DETERMINE TOTAL NUMBER OF SECTORS TRANSFERRED
3399  015362  012716  064740                  MOV     #<410.*22.*2.>+<22.*2.>,(SP) ;STORE NUMBER OF SECTORS ON DISK
3400  015366  166616  000002                  SUB     2(SP),(SP)      ;DETERMINE NUMBER OF SECTORS LEFT ON
3401                                                          ;  ON PACK TO BE WRITTEN
3402  015372  016546  000130                  MOV     P.RWC(R5),-(SP) ;STORE WORD COUNT
3403  015376  011665  000012                  MOV     (SP),P.WC(R5)
3404  015402  005416                          NEG     (SP)            ;MAKE IT POSITIVE
3405  015404  116616  000001                  MOVB    1(SP),(SP)      ;KEEP SECTOR COUNT
3406  015410  105066  000001                  CLRB    1(SP)           ;CLEAR MOST SIGNIFICANT BITS
3407  015414  021666  000002                  CMP     (SP),2(SP)      ;CHECK IF PACK OVERRUN
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3408  015420  103413                    BLC     20$             ;NO, GO ISSUE COMMAND
3409  015422  001407                    BEQ     19$             ;CHECK IF NO NEW WORD COUNT NEEDED
3410  015424  005016                    CLR     (SP)            ;MAKE ROOM FOR NEW WORD COUNT
3411  015426  116666  000002  000001    MOVB    2(SP),1(SP)     ;MOVE IN NUMBER OF SECTORS LEFT
3412  015434  005416                    NEG     (SP)            ;MAKE WORD COUNT NEGATIVE
3413  015436  011665  000012            MOV     (SP),P.WC(R5)   ;LOAD NEW WORD COUNT
3414  015442  152765  000040  000210  19$:  BISB    #BIT5,P.ASSN(R5) ;SET END OF PACK TRANSFER
3415
3416  015450  062706  000006          20$:  ADD     #6,SP           ;ADJUST STACK
3417  015454  016546  000012                MOV     P.WC(R5),-(SP)  ;STORE PRESENT WORD COUNT
3418  015460  005416                    NEG     (SP)            ;MAKE IT POSITIVE
3419  015462  062765  000002  000150        ADD     #2,P.NODR(R5)   ;INCREMENT NUMBER OF ORDERS
3420  015470  061665  000156            ADD     (SP),P.NWRT(R5) ;ADD NUMBER OF WORDS WRITTEN
3421  015474  005565  000160            ADC     P.NWRT+2(R5)
3422  015500  062665  000164            ADD     (SP)+,P.NRD(R5) ;ADD NUMBER OF WORDS READ
3423  015504  005565  000166            ADC     P.NRD+2(R5)
3424  015510  105265  000122            INCB    P.RDPT(R5)      ;GENERATE NEXT DATA PATTERN TO BE WRITTEN
3425  015514  142765  000360  000122    BICB    #360,P.RDPT(R5) ;KEEP 4 LEAST SIGNIFICANT BITS
3426  015522  116565  000122  000121    MOVB    P.RDPT(R5),P.DPAT(R5) ;STORE DATA PATTERN USED
3427  015530  013737  001450  177776    MOV     @#PI,PS         ;LOCK OUT RK06 INTERRUPTS
3428  015536  132765  000040  000210    BITB    #BIT5,P.ASSN(R5) ;CHECK IF WRITE TO END OF PACK
3429  015544  001014                    BNE     25$             ;YES, RELEASE BUFFER
3430  015546  005737  001320            TST     @#WAITQ         ;CHECK IF BUFFER WAIT QUEUE EMPTY
3431  015552  001011                    BNE     25$             ;NO, RELEASE BUFFER
3432  015554  016565  000012  000130    MOV     P.WC(R5),P.PWC(R5) ;STORE CURRENT GENERATED WORD COUNT
3433  015562  005037  177776            CLR     @#PS            ;ALLOW RK06 INTERRUPTS
3434  015566  004737  022532            JSR     PC,LDDATA       ;LOAD NEW RANDOM DATA
3435  015572  000137  013530            JMP     ASN3$           ;GO ISSUE COMMAND
3436
3437  015576  004737  022316          25$:  JSR     PC,RUFREL       ;RELEASE BUFFER FOR OTHER DRIVES
3438  015602  004037  050706            JSR     R0,Q.PUSH       ;PUT PARAMETER BLOCK ON BUFFER WAIT QUEUE
3439  015606  001320                    .WORD   WAITQ
3440  015610  004737  022016            JSR     PC,GETBUF       ;GET NEW BUFFER
3441  015614  000207                    RTS     PC              ;RETURN
3442
3443  015616  105065  000210          30$:  CLRB    P.ASSN(R5)      ;CLEAR ASSIGNMENT CODE
3444  015622  004737  022316            JSR     PC,RUFREL       ;RELEASE BUFFER
3445  015626  104401  055347          WV1$: TYPE    ,OPR008         ;TYPE "OPERATOR INITIATED DROP DRIVE"
3446  015632  004737  012716            JSR     PC,DROP         ;GO DROP DRIVE
3447  015636  000444                    BR      WV5$            ;GO ALLOCATE BUFFER
3448
3449  015640  105065  000210          WV2$: CLRB    P.ASSN(R5)      ;CLEAR ASSIGNMENT FLAGS
3450  015644  116537  000000  055446    MOVB    P.DRVN(R5),OPR011 ;GET DRIVE NUMBER
3451  015652  152737  000060  055446    BISB    #60,OPR011      ;MAKE IT ASCII
3452  015660  104401  055427            TYPE    ,OPR010         ;TYPE "DRIVE NUMBER ? UNDER TEST"
3453  015664  104401  055172            TYPE    ,OPR003
3454  015670  004737  027060            JSR     PC,PRISER       ;PRINT DRIVE AND PACK SERIAL NUMBERS
3455  015674  004737  043072            JSR     PC,PRITIM       ;PRINT TIME
3456  015700  104401  001165            TYPE    ,$CRLF
3457  015704  010346                    MOV     R3,-(SP)        ;STORE R3 ON STACK
3458  015706  010446                    MOV     R4,-(SP)        ;STORE R4 ON STACK
3459  015710  010503                    MOV     R5,R3           ;LOAD PARAMETER BLOCK BASE
3460  015712  062703  000152            ADD     #P.NODR,R3      ;CALCULATE BEGINNING OF STATISTICS
3461  015716  010504                    MOV     R5,R4           ;LOAD PARAMETER BLOCK BASE
3462  015720  062704  000210            ADD     #P.ASSN,R4      ;CALCULATE END OF STATISTICS
3463  015724  005023                7$: CLR     (R3)+           ;CLEAR STATISTICS BEFORE STARTING TEST
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 3464  015726  020304                        CMP     R3,R4           ;CHECK IF FINISHED
 3465  015730  001375                        BNE     7$              ;NO, CONTINUE
 3466  015732  012604                        MOV     (SP)+,R4        ;RESTORE R4
 3467  015734  012603                        MOV     (SP)+,R3        ;RESTORE R3
 3468  015736  004737  022316                JSR     PC,RUPRFL       ;RELEASE BUFFER
 3469  015742  004037  050706                JSR     R0,Q.PUSH       ;ENQUEUE PARAMETER BLOCK IN DRIVE
 3470  015746  001314                        AVAILQ                  ;  AVAILIABLE QUEUE
 3471  015750  004737  022016        MV5$:   JSR     PC,GETBUF       ;GET NEW BUFFER
 3472  015754  000207                MV9$:   RTS     PC              ;RETURN
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                                        .SBTTL  ALTER DRIVE PARAMETERS

015756  010446                  PARM:   MOV     R4,-(SP)        ;STORE R4 ON STACK
015760  010346                          MOV     R3,-(SP)        ;STORE R3 ON STACK
015762  116537  000000  056603  P0$:    MOVB    P.DPVM(R5),PAR001 ;LOAD DRIVE NUMBER FOR PRINT OUT
015770  152737  000060  056603          BISB    #60,PAR001      ;MAKE IT ASCII
015776  104401  056557                  TYPE    ,PAR000         ;TYPE "PARAMETERS FOR DRIVE N"
016002  104401  056610          2$:     TYPE    ,PAR002         ;TYPE "CYLINDER MAX,MIN"
016006  004037  020116                  JSR     R0,TSTDEF       ;CHECK FOR DEFAULT PARAMETERS
016012  016124                          5$                      ;COMMA DETECTED
016014  016140                          6$                      ;CARRIAGE RETURN DETECTED
016016  017756                          P1$                     ;CONTROL Z <^Z> DETECTED
016020  015762                          P0$                     ;CONTROL C <^C> DETECTED
016022  010346                          MOV     R3,-(SP)        ;STORE BUFFER ADDRESS
016024  004737  053316                  JSR     PC,OCTBIN       ;CONVERT TO BINARY
016030  016106                          4$                      ;ERROR RETURN
016032  012637  001576                  MOV     (SP)+,PARCYL    ;STORE MAX CYLINDER ENTRY
016036  022737  000632  001576          CMP     #D.MXCL,PARCYL  ;CHECK IF LESS OR EQUAL TO
                                                                ;  MAXIMUM CYLINDER ADDRESS
016044  103420                          BLO     4$              ;NO, TRY AGAIN
016046  010304                          MOV     R3,R4           ;STORE R3 IN R4 FOR LINE SCAN
016050  105714                  64$:    TSTB    (R4)            ;CHECK FOR CARRIAGE RETURN
016052  001435                          BEQ     7$              ;YES, EXIT
016054  122427  000054                  CMPB    (R4)+,#',       ;CHECK FOR COMMA
016060  001373                          BNE     64$             ;NO, GO TEST NEXT CHARACTER
016062  010446                  3$:     MOV     R4,-(SP)        ;STORE BUFFER ADDRESS
016064  004737  053316                  JSR     PC,OCTBIN       ;CONVERT TO BINARY
016070  016106                          4$                      ;ERROR RETURN
016072  012637  001600                  MOV     (SP)+,PARCYL+2  ;STORE MIN CYLINDER ENTRY
016076  023737  001576  001600          CMP     PARCYL,PARCYL+2 ;CHECK IF LEGAL ENTRY
016104  103022                          BHIS    8$              ;YES, LOAD MAX AND MIN CYLINDER
016106                          4$:
016106  010337  016114                  MOV     R3,65$          ;LOAD BUFFER ADDRESS
016112  104401                          TYPE                    ;TYPE RECEIVED INPUT
016114  000000                  65$:    .WORD   0               ;BUFFER ADDRESS
016116  104401  001164                  TYPE    ,$QUES          ;TYPE QUESTION MARK
016122  000727                          BR      2$              ;TRY AGAIN

016124  012737  000632  001576  5$:     MOV     #D.MXCL,PARCYL  ;LOAD MAX CYLINDER = 410
016132  010304                          MOV     R3,R4           ;STORE R3 IN R4 FOR LINE SCAN
016134  105724                          TSTB    (R4)+           ;ADJUST R4
016136  000751                          BR      3$              ;GET MINIMUM CYLINDER

016140  012737  000632  001576  6$:     MOV     #D.MXCL,PARCYL  ;LOAD MAX CYLINDER = 410
016146  005037  001600          7$:     CLR     PARCYL+2        ;LOAD MIN CYLINDER = 0
016152  013765  001576  000070  8$:     MOV     PARCYL,P.MXCL(R5) ;LOAD MAX CYLINDER
016160  013765  001600  000066          MOV     PARCYL+2,P.MNCL(R5) ;LOAD MIN CYLINDER

016166  104401  056633          10$:    TYPE    ,PAR003         ;TYPE "TRACE MAX,MIN"
016172  004037  020116                  JSR     R0,TSTDEF       ;CHECK FOR DEFAULT PARAMETERS
016176  016310                          13$                     ;COMMA DETECTED
016200  016324                          14$                     ;CARRIAGE RETURN DETECTED
016202  017770                          P2$                     ;CONTROL Z <^Z> DETECTED
016204  015762                          P0$                     ;CONTROL C <^C> DETECTED
016206  010346                          MOV     R3,-(SP)        ;STORE BUFFER ADDRESS
016210  004737  053316                  JSR     PC,OCTBIN       ;CONVERT TO BINARY
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3529  016214  016272                        12$                     ;ERROR RETURN
3530  016216  012637  001602                MOV     (SP)+,PARTRK    ;STORE MAX TRACK ENTRY
3531  016222  022737  000002  001602        CMP     #D.MXTR,PARTRK  ;CHECK IF LESS OR EQUAL TO
3532                                                                ;  MAXIMUM TRACK ADDRESS
3533  016230  103420                        BLO     12$             ;NO, TRY AGAIN
3534  016232  010304                        MOV     R3,R4           ;STORE R3 IN R4 FOR LINE SCAN
3535  016234  105714                66$:    TSTB    (R4)            ;CHECK FOR CARRIAGE RETURN
3536  016236  001435                        BEQ     15$             ;YES, EXIT
3537  016240  122427  000054                CMPB    (R4)+,#',       ;CHECK FOR COMMA
3538  016244  001373                        BNE     66$             ;NO, GO TEST NEXT CHARACTER
3539  016246  010446                11$:    MOV     R4,-(SP)        ;STORE BUFFER ADDRESS
3540  016250  004737  053316                JSR     PC,OCTBIN       ;CONVERT TO BINARY
3541  016254  016272                        12$                     ;ERROR RETURN
3542  016256  012637  001604                MOV     (SP)+,PARTRK+2  ;STORE MIN TRACK ENTRY
3543  016262  023737  001602  001604        CMP     PARTRK,PARTRK+2 ;CHECK IF LEGAL ENTRY
3544  016270  103022                        BHIS    16$             ;YES, LOAD MAX AND MIN TRACK
3545  016272                         12$:
3546  016272  010337  016300                MOV     R3,67$          ;LOAD BUFFER ADDRESS
3547  016276  104401                        TYPE                    ;TYPE RECEIVED INPUT
3548  016300  000000                67$:    .WORD   0               ;BUFFER ADDRESS
3549  016302  104401  001164                TYPE    ,$QUES          ;TYPE QUESTION MARK
3550  016306  000727                        BR      10$             ;TRY AGAIN
3551
3552  016310  012737  000002  001602  13$:  MOV     #D.MXTR,PARTRK  ;LOAD MAX TRACK = 2
3553  016316  010304                        MOV     R3,P4           ;STORE R3 IN P4 FOR LINE SCAN
3554  016320  105724                        TSTB    (R4)+           ;ADJUST R4
3555  016322  000751                        BR      11$             ;GET MINIMUM TRACK
3556
3557  016324  012737  000002  001602  14$:  MOV     #D.MXTR,PARTRK  ;LOAD MAX TRACK = 2
3558  016332  005037  001604          15$:  CLR     PARTRK+2        ;LOAD MIN TRACK = 0
3559  016336  113765  001602  000073  16$:  MOVB    PARTRK,P.MXTR(R5) ;LOAD MAX TRACK
3560  016344  113765  001604  000072        MOVB    PARTRK+2,P.MNTR(R5) ;LOAD MIN TRACK
3561
3562  016352  104401  056653          18$:  TYPE    ,PAR004         ;TYPE "SECTOR MAX,MIN"
3563  016356  004037  020116                JSR     R0,TSTDEF       ;CHECK FOR DEFAULT PARAMETERS
3564  016362  016474                        21$                     ;COMMA DETECTED
3565  016364  016510                        22$                     ;CARRIAGE RETURN DETECTED
3566  016366  020002                        P3$                     ;CONTROL 7 <^7> DETECTED
3567  016370  015762                        P0$                     ;CONTROL C <^C> DETECTED
3568  016372  010346                        MOV     R3,-(SP)        ;STORE BUFFER ADDRESS
3569  016374  004737  053316                JSR     PC,OCTBIN       ;CONVERT TO BINARY
3570  016400  016456                        20$                     ;ERROR RETURN
3571  016402  012637  001606                MOV     (SP)+,PARSEC    ;STORE MAX SECTOR ENTRY
3572  016406  022737  000025  001606        CMP     #D.MXSC,PARSEC  ;CHECK IF LESS OR EQUAL TO
3573                                                                ;  MAXIMUM SECTOR ADDRESS
3574  016414  103420                        BLO     20$             ;NO, TRY AGAIN
3575  016416  010304                        MOV     R3,P4           ;STORE P3 IN R4 FOR LINE SCAN
3576  016420  105714                68$:    TSTB    (R4)            ;CHECK FOR CARRIAGE RETURN
3577  016422  001435                        BEQ     23$             ;YES, EXIT
3578  016424  122427  000054                CMPB    (R4)+,#',       ;CHECK FOR COMMA
3579  016430  001373                        BNE     68$             ;NO, GO TEST NEXT CHARACTER
3580  016432  010446                19$:    MOV     R4,-(SP)        ;STORE BUFFER ADDRESS
3581  016434  004737  053316                JSR     PC,OCTBIN       ;CONVERT TO BINARY
3582  016440  016456                        20$                     ;ERROR RETURN
3583  016442  012637  001610                MOV     (SP)+,PARSEC+2  ;STORE MIN SECTOR ENTRY
3584  016446  023737  001606  001610        CMP     PARSEC,PARSEC+2 ;CHECK IF LEGAL ENTRY
```

```
3585  016454  103022                        BRIS    24$             ;YES, LOAD MAX AND MIN SECTOR
3586  016456                        20$:
3587  016456  010337  016464                MOV     R3,69$          ;LOAD BUFFER ADDRESS
3588  016462  104401                        TYPE                    ;TYPE RECEIVED INPUT
3589  016464  000000                69$:    .WORD   0               ;BUFFER ADDRESS
3590  016466  104401  001164                TYPE    ,$QUES          ;TYPE QUESTION MARK
3591  016472  000727                        BR      18$             ;TRY AGAIN
3592
3593  016474  012737  000025  001606  21$:  MOV     #D.MXSC,PARSEC  ;LOAD MAX SECTOR = 21
3594  016502  010304                        MOV     R3,R4           ;STORE R3 IN R4 FOR LINE SCAN
3595  016504  105724                        TSTB    (R4)+           ;ADJUST R4
3596  016506  000751                        BR      19$             ;GET MINIMUM SECTOR
3597
3598  016510  012737  000025  001606  22$:  MOV     #D.MXSC,PARSEC  ;LOAD MAX SECTOR = 21
3599  016516  005037  001610          23$:  CLR     PARSEC+2        ;LOAD MIN SECTOR = 0
3600  016522  113765  001606  000075  24$:  MOVB    PARSEC,P.MXSC(R5) ;LOAD MAX SECTOR
3601  016530  113765  001610  000074        MOVB    PARSEC+2,P.MNSC(R5) ;LOAD MIN SECTOR
3602
3603  016536  104401  056674          26$:  TYPE    ,PAR005         ;TYPE "READ/WRITE RATIO ="
3604  016542  004037  020116                JSR     R0,TSTDEF       ;CHECK FOR DEFAULT PARAMETERS
3605  016546  016576                        27$                     ;COMMA DETECTED
3606  016550  016622                        29$                     ;CARRIAGE RETURN DETECTED
3607  016552  020014                        P4$                     ;CONTROL Z <^Z> DETECTED
3608  016554  015762                        P0$                     ;CONTROL C <^C> DETECTED
3609  016556  010346                        MOV     R3,-(SP)        ;STORE BUFFER ADDRESS
3610  016560  004737  053316                JSR     PC,OCTBIN       ;CONVERT BINARY
3611  016564  016576                        27$                     ;ERROR RETURN
3612  016566  012504                        MOV     (SP)+,R4        ;STORE INPUT
3613  016570  022704  000010                CMP     #10,R4          ;CHECK IF 0-7
3614  016574  101007                        BHI     28$             ;YES, LOAD READ/WRITE RATIO
3615  016576                        27$:
3616  016576  010337  016604                MOV     R3,70$          ;LOAD BUFFER ADDRESS
3617  016602  104401                        TYPE                    ;TYPE RECEIVED INPUT
3618  016604  000000                70$:    .WORD   0               ;BUFFER ADDRESS
3619  016606  104401  001164                TYPE    ,$QUES          ;TYPE QUESTION MARK
3620  016612  000751                        BR      26$             ;TRY AGAIN
3621
3622  016614  110465  000076          28$:  MOVB    R4,P.RATE(R5)   ;LOAD READ/WRITE RATIO
3623  016620  000403                        BR      30$             ;ASK "WRITE CHECK AFTER WRITE ="
3624
3625  016622  112765  000003  000076  29$:  MOVB    #D.RATE,P.RATE(R5) ;LOAD DEFAULT READ/WRITE
3626
3627  016630  104401  056717          30$:  TYPE    ,PAR006         ;TYPE "WRITE CHECK AFTER WRITE ="
3628  016634  004037  020116                JSR     R0,TSTDEF       ;CHECK FOR DEFAULT PARAMETERS
3629  016640  016666                        31$                     ;COMMA DETECTED
3630  016642  016704                        32$                     ;CARRIAGE RETURN DETECTED
3631  016644  020022                        P5$                     ;CONTROL Z <^Z> DETECTED
3632  016646  015762                        P0$                     ;CONTROL C <^C> DETECTED
3633  016650  122713  000131                CMPB    #'Y,(R3)        ;CHECK IF YES
3634  016654  001013                        BNE     32$             ;NO, LOAD DEFAULT
3635  016656  112765  177777  000077        MOVB    #-1,P.AWCK(R5)  ;SET WRITE CHECK AFTER WRITE
3636  016664  000411                        BR      34$             ;GET CORRECTABLE READ ERROR
3637                                                                ;  THRESHOLD
3638
3639  016666                        31$:
3640  016666  010337  016674                MOV     R3,71$          ;LOAD BUFFER ADDRESS
```

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3641  016672  104401                    TYPE                    ;TYPE RECEIVED INPUT
3642  016674  000000            71$:    .WORD   0               ;BUFFER ADDRESS
3643  016676  104401  001164            TYPE    ,$QUES          ;TYPE QUESTION MARK
3644  016702  000752                    BR      30$             ;TRY AGAIN
3645
3646  016704  105065  000077    32$:    CLRB    P.AWCR(R5)      ;CLEAR WRITE CHECK AFTER WRITE
3647
3648  016710  104401  056751    34$:    TYPE    ,PAR007         ;TYPE "CORRECTABLE READ ERROR
3649                                                            ;  THRESHOLD
3650  016714  004037  020116            JSR     R0,TSTDEF       ;CHECK FOR DEFAULT PARAMETERS
3651  016720  016746                    35$                     ;COMMA DETECTED
3652  016722  016764                    36$                     ;CARRIAGE RETURN DETECTED
3653  016724  020026                    P6$                     ;CONTROL Z <^Z> DETECTED
3654  016726  015762                    P0$                     ;CONTROL C <^C> DETECTED
3655  016730  010346                    MOV     R3,-(SP)        ;STORE BUFFER ADDRESS
3656  016732  004737  053452            JSR     PC,DECBIN       ;CONVERT TO BINARY
3657  016736  016746                    35$                     ;ERROR RETURN
3658  016740  012665  000100            MOV     (SP)+,P.CERT(R5) ;LOAD CORRECTABLE READ ERROR
3659                                                            ;  THRESHOLD
3660  016744  100017                    BPL     38$             ;IF NOT NEGATIVE, GET UNCORRECTABLE
3661                                                            ;  READ ERROR THRESHOLD
3662
3663  016746                    35$:
3664  016746  010337  016754            MOV     R3,72$          ;LOAD BUFFER ADDRESS
3665  016752  104401                    TYPE                    ;TYPE RECEIVED INPUT
3666  016754  000000            72$:    .WORD   0               ;BUFFER ADDRESS
3667  016756  104401  001164            TYPE    ,$QUES          ;TYPE QUESTION MARK
3668  016762  000752                    BR      34$             ;TRY AGAIN
3669
3670  016764  012765  000012  000100  36$:    MOV     #D.CERT,P.CERT(R5) ;LOAD DEFAULT CORRECTABLE READ
3671                                                            ;  ERROR THRESHOLD
3672
3673  016772  104401  057014    38$:    TYPE    ,PAR008         ;TYPE "UNCORRECTABLE READ ERROR
3674                                                            ;  THRESHOLD ="
3675  016776  004037  020116            JSR     R0,TSTDEF       ;CHECK FOR DEFAULT PARAMETERS
3676  017002  017030                    39$                     ;COMMA DETECTED
3677  017004  017046                    40$                     ;CARRIAGE RETURN DETECTED
3678  017006  020034                    P7$                     ;CONTROL Z <^Z> DETECTED
3679  017010  015762                    P0$                     ;CONTROL C <^C> DETECTED
3680  017012  010346                    MOV     R3,-(SP)        ;STORE BUFFER ADDRESS
3681  017014  004737  053452            JSR     PC,DECBIN       ;CONVERT TO BINARY
3682  017020  017030                    39$                     ;ERROR RETURN
3683  017022  012665  000102            MOV     (SP)+,P.UERT(R5) ;LOAD UNCORRECTABLE READ ERROR
3684                                                            ;  THRESHOLD
3685  017026  100012                    BPL     42$             ;IF NOT NEGATIVE, GET SEEK
3686                                                            ;  ERROR THRESHOLD
3687  017030                    39$:
3688  017030  010337  017036            MOV     R3,73$          ;LOAD BUFFER ADDRESS
3689  017034  104401                    TYPE                    ;TYPE RECEIVED INPUT
3690  017036  000000            73$:    .WORD   0               ;BUFFER ADDRESS
3691  017040  104401  001164            TYPE    ,$QUES          ;TYPE QUESTION MARK
3692  017044  000752                    BR      38$             ;TRY AGAIN
3693
3694  017046  012765  000005  000102  40$:    MOV     #D.UERT,P.UERT(R5) ;LOAD DEFAULT UNCORRECTABLE READ
3695                                                            ;  ERROR THRESHOLD
3696
```

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 3697  017054  104401  057061          42$:    TYPE    ,PAR009         ;TYPE "SEEK ERROR THRESHOLD ="
 3698  017060  004037  020116                  JSR     R0,TSTDEF       ;CHECK FOR DEFAULT PARAMETERS
 3699  017064  017112                          43$                     ;COMMA DETECTED
 3700  017066  017130                          44$                     ;CARRIAGE RETURN DETECTED
 3701  017070  020042                          P8$                     ;CONTROL Z <^Z> DETECTED
 3702  017072  015762                          P0$                     ;CONTROL C <^C> DETECTED
 3703  017074  010346                          MOV     R3,-(SP)        ;STORE BUFFER ADDRESS
 3704  017076  004737  053452                  JSR     PC,DECBIN       ;CONVERT TO BINARY
 3705  017102  017112                          43$                     ;ERROR RETURN
 3706  017104  012665  000104                  MOV     (SP)+,P.SKET(R5) ;LOAD SEEK ERROR THRESHOLD
 3707  017110  100012                          BPL     46$             ;CHECK IF INHIBIT ERROR CORRECTION
 3708                                                                  ;  AND RETRY
 3709  017112                          43$:
 3710  017112  010337  017120                  MOV     R3,74$          ;LOAD BUFFER ADDRESS
 3711  017116  104401                          TYPE                    ;TYPE RECEIVED INPUT
 3712  017120  000000                  74$:    .WORD   0               ;BUFFER ADDRESS
 3713  017122  104401  001164                  TYPE    ,$QUES          ;TYPE QUESTION MARK
 3714  017126  000752                          BR      42$             ;TRY AGAIN
 3715
 3716  017130  012765  000005  000104  44$:    MOV     #D.SKET,P.SKET(R5) ;LOAD DEFAULT SEEK ERROR THRESHOLD
 3717
 3718  017136  104401  057110          46$:    TYPE    ,PAR010         ;TYPE "INHIBIT ERROR CORRECTION
 3719                                                                  ;  AND RETRY
 3720  017142  004037  020116                  JSR     R0,TSTDEF       ;CHECK FOR DEFAULT PARAMETERS
 3721  017146  017174                          47$                     ;COMMA DETECTED
 3722  017150  017212                          48$                     ;CARRIAGE RETURN DETECTED
 3723  017152  020050                          P9$                     ;CONTROL Z <^Z> DETECTED
 3724  017154  015762                          P0$                     ;CONTROL C <^C> DETECTED
 3725  017156  122713  000131                  CMPB    #'Y,(R3)        ;CHECK IF YES
 3726  017162  001013                          BNE     48$             ;LOAD DEFAULT
 3727  017164  112765  177777  000120          MOVB    #-1,P.IERC(R5)  ;SET INHIBIT ERROR CORRECTION
 3728  017172  000411                          BR      50$             ;GET COMMAND COUNT THRESHOLD
 3729
 3730  017174                          47$:
 3731  017174  010337  017202                  MOV     R3,75$          ;LOAD BUFFER ADDRESS
 3732  017200  104401                          TYPE                    ;TYPE RECEIVED INPUT
 3733  017202  000000                  75$:    .WORD   0               ;BUFFER ADDRESS
 3734  017204  104401  001164                  TYPE    ,$QUES          ;TYPE QUESTION MARK
 3735  017210  000752                          BR      46$             ;TRY AGAIN
 3736
 3737  017212  105065  000120          48$:    CLRB    P.IERC(R5)      ;CLEAR INHIBIT ERROR CORRECTION
 3738
 3739  017216  104401  057155          50$:    TYPE    ,PAR011         ;TYPE "OPERATION COUNT THRESHOLD*65K ="
 3740  017222  004037  020116                  JSR     R0,TSTDEF       ;CHECK FOR DEFAULT PARAMETERS
 3741  017226  017272                          51$                     ;COMMA DETECTED
 3742  017230  017310                          52$                     ;CARRIAGE RETURN DETECTED
 3743  017232  020054                          P10$                    ;CONTROL Z <^Z> DETECTED
 3744  017234  015762                          P0$                     ;CONTROL C <^C> DETECTED
 3745  017236  010346                          MOV     R3,-(SP)        ;STORE BUFFER ADDRESS
 3746  017240  004737  053452                  JSR     PC,DECBIN       ;CONVERT TO BINARY
 3747  017244  017277                          51$                     ;ERROR RETURN
 3748  017246  012665  000110                  MOV     (SP)+,P.MXCD+2(R5) ;STORE NUMBER OF 65K BLOCKS
 3749  017252  001407                          BEQ     51$             ;IF ZERO, TRY AGAIN
 3750  017254  100406                          BMI     51$             ;IF MINUS, TRY AGAIN
 3751  017256  005365  000110                  DEC     P.MXCD+2(R5)    ;DECREMENT BY 1
 3752  017262  012765  177777  000106          MOV     #-1,P.MXCD(R5)
```

```
3753  017270  000415                          BR      54$             ;GET WORD TRANSFERREC THRESHOLD
3754
3755  017272                          51$:
3756  017272  010337  017300                  MOV     R3,76$          ;LOAD BUFFER ADDRESS
3757  017276  104401                          TYPE                    ;TYPE RECEIVED INPUT
3758  017300  000000                  76$:    .WORD   0               ;BUFFER ADDRESS
3759  017302  104401  001164                  TYPE    ,$QUES          ;TYPE QUESTION MARK
3760  017306  000743                          BR      50$             ;TRY AGAIN
3761
3762  017310  012765  077777  000110  52$:    MOV     #D.CTWH,P.MXCD+2(R5) ;LOAD DEFAULT COMMAND THRESHOLD
3763  017316  012765  177770  000106          MOV     #D.CTPL,P.MXCD(R5)
3764
3765  017324  104401  057215          54$:    TYPE    ,PAR012         ;TYPE "WORD TRANSFERRED THRESHOLD*520K ="
3766  017330  004037  020116                  JSR     R0,TSTDEF       ;CHECK FOR DEFAULT PARAMETERS
3767  017334  017432                          55$                     ;COMMA DETECTED
3768  017336  017450                          56$                     ;CARRIAGE RETURN DETECTED
3769  017340  020070                          P11$                    ;CONTROL Z <^Z> DETECTED
3770  017342  015762                          P0$                     ;CONTROL C <^C> DETECTED
3771  017344  010346                          MOV     R3,-(SP)        ;STORE BUFFER ADDRESS
3772  017346  004737  053452                  JSR     PC,DECBIN       ;CONVERT TO BINARY
3773  017352  017432                          55$                     ;ERROR RETURN
3774  017354  012665  000112                  MOV     (SP)+,P.MXWT(R5) ;STORE NUMBER OF 520K BLOCKS
3775  017360  001424                          BEQ     55$             ;IF ZERO, TRY AGAIN
3776  017362  100423                          BMI     55$             ;IF NEGATIVE, TRY AGAIN
3777  017364  005065  000114                  CLR     P.MXWT+2(R5)    ;CLEAR HIGH ORDER BITS
3778  017370  006165  000112                  ROL     P.MXWT(R5)      ;SHIFT 4 BITS LEFT
3779  017374  006165  000114                  ROL     P.MXWT+2(R5)
3780  017400  006165  000112                  ROL     P.MXWT(R5)
3781  017404  006165  000114                  ROL     P.MXWT+2(R5)
3782  017410  006165  000112                  ROL     P.MXWT(R5)
3783  017414  006165  000114                  ROL     P.MXWT+2(R5)
3784  017420  006165  000112                  ROL     P.MXWT(R5)
3785  017424  006165  000114                  ROL     P.MXWT+2(R5)
3786  017430  000415                          BR      60$             ;CHECK FOR SAMPLED COMPARES
3787
3788  017432                          55$:
3789  017432  010337  017440                  MOV     R3,77$          ;LOAD BUFFER ADDRESS
3790  017436  104401                          TYPE                    ;TYPE RECEIVED INPUT
3791  017440  000000                  77$:    .WORD   0               ;BUFFER ADDRESS
3792  017442  104401  001164                  TYPE    ,$QUES          ;TYPE QUESTION MARK
3793  017446  000726                          BR      54$             ;TRY AGAIN
3794
3795  017450  012765  077777  000114  56$:    MOV     #D.WTHI,P.MXWT+2(R5) ;LOAD DEFAULT WORD TRANSFER
3796  017456  012765  177770  000112          MOV     #D.WTLO,P.MXWT(R5)      ;  THRESHOLD
3797
3798  017464  005737  001362          60$:    TST     SOFCMP          ;CHECK IF ANY SOFTWARE COMPARES ARE TO BE MADE
3799  017470  001430                          BEQ     PREXAR          ;NO, DETERMINE TRACK EXCLUSION
3800  017472  104401  057513                  TYPE    ,PAP021         ;TYPE "SAMPLED COMPARES ="
3801  017476  004037  020116                  JSR     R0,TSTDEF       ;CHECK FOR DEFAULT PARAMETERS
3802  017502  017530                          61$                     ;COMMA DETECTED
3803  017504  017546                          62$                     ;CARRIAGE RETURN DETECTED
3804  017506  020104                          P12$                    ;CONTROL Z <^Z> DETECTED
3805  017510  015762                          P0$                     ;CONTROL C <^C> DETECTED
3806  017512  122713  000116                  CMPB    #'N,(R3)        ;CHECK IF NO
3807  017516  001013                          BNE     62$             ;NO, MAKE SAMPLED COMPARES
3808  017520  112765  177777  000116          MOVB    #-1,P.SMPL(R5)  ;DO NOT MAKE SAMPLED COMPARES
```

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3809  017526  000411                    BR      PREXAP          ;DETERMINE TRACK EXCLUSION
3810
3811  017530                    61$:
3812  017530  010337  017536            MOV     R3,78$          ;LOAD BUFFER ADDRESS
3813  017534  104401                    TYPF                    ;TYPE RECEIVED INPUT
3814  017536  000000              78$:  .WORD   0               ;BUFFER ADDRESS
3815  017540  104401  001164            TYPF    ,$QUES          ;TYPE QUESTION MARK
3816  017544  000747                    BR      60$             ;TRY AGAIN
3817
3818  017546  105065  000116      62$:  CLRB    P.SMPL(R5)      ;MAKE SAMPLED COMPARES
3819
3820  017552  104401  057350      PREXAR: TYPE  ,PAR019         ;TYPE "CHANGE EXCODED PACK AREA ="
3821  017556  104401  057322            TYPF    ,PAR018
3822  017562  004037  020116            JSR     R0,TSTDEF       ;CHECK FOR DEFAULT PARAMETERS
3823  017566  017610                    1$                      ;COMMA DETECTED
3824  017570  017750                    50$                     ;CARRIAGE RETURN DETECTED
3825  017572  017750                    50$                     ;CONTROL Z <^Z> DETECTED
3826  017574  015762                    P0$                     ;CONTROL C <^C> DETECTED
3827  017576  122713  000131            CMPB    #'Y,(R3)        ;CHECK IF YES
3828  017602  001411                    BEQ     2$              ;YES, LOAD NEW TRACK EXCULSIONS
3829  017604  000137  017750            JMP     50$             ;NO, RETURN
3830
3831  017610                    1$:
3832  017610  010337  017616            MOV     R3,64$          ;LOAD BUFFER ADDRESS
3833  017614  104401                    TYPE                    ;TYPE RECEIVED INPUT
3834  017616  000000              64$:  .WORD   0               ;BUFFER ADDRESS
3835  017620  104401  001164            TYPE    ,$QUES          ;TYPE QUESTION MARK
3836  017624  000752                    BR      PREXAR          ;TRY AGAIN
3837
3838  017626  010146              2$:   MOV     R1,-(SP)        ;STORE R1 ON STACK
3839  017630  010501                    MOV     R5,R1           ;STORE PARMETER BLOCK ADDRESS
3840  017632  062701  000232            ADD     #P.EXAR,R1      ;CALCULATE EXCLUSION AREA
3841  017636  012704  000012            MOV     #10.,R4         ;LOAD COUNT
3842  017642  005021              5$:   CLR     (R1)+           ;CLEAR EXCLUSION AREA
3843  017644  005304                    DEC     R4              ;DECREMENT COUNT
3844  017646  001375                    BNE     5$              ;CHECK IF DONE
3845  017650  162701  000024            SUB     #20.,R1         ;REINITIALIZE POINTER
3846  017654  004037  020166            JSR     R0,LDEXAR       ;GET FIRST EXCLUDED AREA
3847  017660  057262                    PAR013
3848  017662  017746                    45$                     ;DEFAULT RETURN
3849  017664  017740                    40$                     ;CONTROL C <^C> RETURN
3850  017666  004037  020166            JSR     R0,LDEXAR       ;GET SECOND EXCLUDED AREA
3851  017672  057270                    PAR014
3852  017674  017746                    45$                     ;DEFAULT RETURN
3853  017676  017740                    40$                     ;CONTROL C <^C> RETURN
3854  017700  004037  020166            JSR     R0,LDEXAR       ;GET THIRD EXCLUDED AREA
3855  017704  057277                    PAR015
3856  017706  017746                    45$                     ;DEFAULT RETURN
3857  017710  017740                    40$                     ;CONTROL C <^C> RETURN
3858  017712  004037  020166            JSR     R0,LDEXAR       ;GET FOURTH EXCLUDED AREA
3859  017716  057305                    PAR016
3860  017720  017746                    45$                     ;DEFAULT RETURN
3861  017722  017740                    40$                     ;CONTROL C <^C> RETURN
3862  017724  004037  020166            JSR     R0,LDEXAR       ;GET FIFTH EXCLUDED AREA
3863  017730  057314                    PAR017
3864  017732  017746                    45$                     ;DEFAULT RETURN
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3865  017734  017740                          40$                     ;CONTROL C <^C> RETURN
3866  017736  000403                          BR      45$             ;RETURN
3867
3868  017740  012601                  40$:    MOV     (SP)+,R1        ;RESTORE R1
3869  017742  000137  015762                  JMP     P0$             ;START AGAIN
3870
3871  017746  012601                  45$:    MOV     (SP)+,R1        ;RESTORE R1
3872  017750  012603                  50$:    MOV     (SP)+,R3        ;RESTORE R3
3873  017752  012604                          MOV     (SP)+,R4        ;RESTORE R4
3874  017754  000207                          RTS     PC              ;RETURN
3875
3876  017756  012765  000632  000070  P1$:    MOV     #D.MXCL,P.MXCL(R5) ;LOAD DEFAULT MAXIMUM CYLINDER = 410
3877  017764  005065  000066                  CLR     P.MNCL(R5)      ;LOAD DEFAULT MINIMUM CYLINDER
3878  017770  112765  000002  000073  P2$:    MOVB    #D.MXTR,P.MXTR(R5) ;LOAD DEFAULT MAXIMUM TRACK = 2
3879  017776  105065  000072                  CLRB    P.MNTR(R5)      ;LOAD DEFAULT MINIMUM TRACK
3880  020002  112765  000025  000075  P3$:    MOVB    #D.MXSC,P.MXSC(R5) ;LOAD DEFAULT MAXIMUM SECTOR = 21
3881  020010  105065  000074                  CLRB    P.MNSC(R5)      ;LOAD DEFAULT MINIMUM SECTOR
3882  020014  112765  000003  000076  P4$:    MOVB    #D.RATE,P.RATE(R5) ;LOAD READ/WRITE RATIO
3883  020022  105065  000077          P5$:    CLRB    P.AWCK(R5)      ;LOAD WRITE CHECK AFTER WRITE
3884  020026  012765  000012  000100  P6$:    MOV     #D.CERT,P.CERT(R5) ;LOAD CORRECTABLE READ ERROR THRESHOLD
3885  020034  012765  000005  000102  P7$:    MOV     #D.UERT,P.UERT(R5) ;LOAD UNCORRECTABLE READ ERROR THRESHOLD
3886  020042  012765  000005  000104  P8$:    MOV     #D.SKET,P.SKET(R5) ;LOAD SEEK ERROR THRESHOLD
3887  020050  105065  000120          P9$:    CLRB    P.IERC(R5)      ;CLEAR INHIBIT ERROR CORRECTION
3888  020054  012765  077777  000110  P10$:   MOV     #D.CTRH,P.MXCD+2(R5) ;LOAD COMMAND THRESHOLD
3889  020062  012765  177770  000106          MOV     #D.CTRL,P.MXCD(R5)
3890  020070  012765  077777  000114  P11$:   MOV     #D.WTHI,P.MXWT+2(R5) ;LOAD WORD TRANSFERED THRESHOLD
3891  020076  012765  177770  000112          MOV     #D.WTLO,P.MXWT(R5)
3892  020104  105065  000116          P12$:   CLRB    P.SMPL(R5)      ;MAKE SAMPLED COMPARES
3893
3894  020110  012603                          MOV     (SP)+,R3        ;RESTORE R3
3895  020112  012604                          MOV     (SP)+,R4        ;RESTORE R4
3896  020114  000207                          RTS     PC              ;RETURN
```

```
                        .SBTTL  TEST DEFAULT PARAMETERS ROUTINE
                        ;;*****************************************************************
                        ;*
                        ;*      THIS ROUTINE WILL READ A LINE OF ASCII TEXT AND CHECK
                        ;*      IF PARAMETER OR REST OF PARAMETERS WILL BE DEFAULTED.
                        ;*      IT RETURNS WITH R3 POINTING TO THE ADDRESS OF THE BUFFER.
                        ;*
                        ;*CALL  JSR     R0,TSTDEF
                        ;*      <ADDRESS OF COMMA DETECTION RETURN>
                        ;*      <ADDRESS OF CARRIAGE RETURN DETECTION RETURN>
                        ;*      <ADDRESS OF CONTROL Z <^Z> DETECTION RETURN>
                        ;*      <ADDRESS OF CONTROL C <^C> DETECTION RETURN>
                        ;*      RETURN
                        ;*
                        ;;*****************************************************************

020116  104403          TSTDEF: RDLIN                   ;GET RESPONSE
020120  012603                  MOV     (SP)+,R3        ;STORE BUFFER ADDRESS
020122  121327  000054          CMPB    (R3),#',        ;CHECK IF COMMA
020126  001415                  BEQ     10$             ;YES, RETURN
020130  005720                  TST     (R0)+           ;ADJUST R0
020132  105713                  TSTB    (R3)            ;CHECK IF CARRIAGE RETURN
020134  001412                  BEQ     10$             ;YES, RETURN
020136  005720                  TST     (R0)+           ;ADJUST R0
020140  122713  000032          CMPB    #32,(R3)        ;CHECK IF CONTROL Z <^Z>
020144  001406                  BEQ     10$             ;YES, RETURN
020146  005720                  TST     (R0)+           ;ADJUST R0
020150  122713  000003          CMPB    #3,(R3)         ;CHECK IF CONTROL C <^C>
020154  001402                  BEQ     10$             ;YES, RETURN
020156  005720                  TST     (R0)+           ;ADJUST R0
020160  000200                  RTS     R0              ;RETURN

020162  011000          10$:    MOV     (R0),R0         ;STORE RETURN ADDRESS
020164  000200                  RTS     R0              ;RETURN
```

```
3932                            .SBTTL  LOAD DISK EXCLUDED AREAS
3933
3934                            ;;*****************************************************************
3935                            ;*
3936                            ;*      THIS ROUTINE WILL ACCEPT TTY INPUT FOR EXCLUDED AREAS AND
3937                            ;*      LOAD APPROPIATE IDENTIFICATION NUMBERS IN THE EXCLUDED AREAS OF
3938                            ;*      THE PARAMETER BLOCK.  THE FOLLOWING THREE FORMATS ARE
3939                            ;*      ACCEPTED BY THIS ROUTINE:
3940                            ;*
3941                            ;*              CYL
3942                            ;*              CYL,TRK
3943                            ;*              CYL1,TRK1,CYL2,TRK2
3944                            ;*
3945                            ;*      THE FOLLOWING FORMULA IS USED:
3946                            ;*
3947                            ;*              CYL1*66+TRK1*22+1 = BEGINNING OF EXCLUDED AREA
3948                            ;*              CYL2*66+TRK2*22+1 = END OF EXCLUDED AREA
3949                            ;*
3950                            ;*      REGISTER        USE
3951                            ;*      --------        ---
3952                            ;*
3953                            ;*      R1              ADDRESS IN EXCLUDED AREA
3954                            ;*      R3              ADDRESS OF INPUT STRING
3955                            ;*      R4              ADDRESS IN INPUT STRING
3956                            ;*      R5              PARAMETER BLOCK ADDRESS
3957                            ;*
3958                            ;*CALL  JSR     R0,LDEXAR
3959                            ;*      <ADDRESS OF MESSAGE TO PRINT>
3960                            ;*      <ADDDRESS FOR CARRIAGE RETURN OR CONTROL Z <^Z> DETECTION>
3961                            ;*      <ADDRESS FOR CONTROL C <^C> DETECTION>
3962                            ;*      RETURN
3963                            ;*
3964                            ;;*****************************************************************
3965
3966  020166  012037  020174    LDEXAR: MOV     (R0)+,2$        ;LOAD NUMBER OF EXCULSION AREA
3967
3968  020172  104401            1$:     TYPE                    ;TYPE "WITH EXCLUDED AREA ="
3969  020174  000000            2$:     .WORD   0
3970  020176  104401  057322            TYPE    ,PAR018
3971  020202  004037  020116            JSR     R0,TSTDEF       ;CHECK FOR DEFAULT PARAMETERS
3972  020206  020617                    30$                     ;COMMA DETECTED
3973  020210  020634                    45$                     ;CARRIAGE RETURN DETECTED
3974  020212  020634                    45$                     ;CONTROL Z <^Z> DETECTED
3975  020214  020632                    40$                     ;CONTROL C <^C> DETECTED
3976  020216  010346                    MOV     R3,-(SP)        ;STORE BUFFER ADDRESS
3977  020220  004737  053316            JSR     PC,OCTBIN       ;CONVERT TO BINARY
3978  020224  020612                    30$                     ;ERROR RETURN
3979  020226  022716  000632            CMP     #410.,(SP)      ;CHECK IF LEGAL CYLINDER
3980  020232  103566                    BLO     29$             ;NO, TRY AGAIN
3981  020234  011637  001612            MOV     (SP),EXAREA     ;MULTIPLY CYLINDER ADDRESS BY 3
3982  020240  006316                    ASL     (SP)
3983  020242  062637  001612            ADD     (SP)+,EXAREA
3984  020246  010304                    MOV     R3,R4           ;STORE BEGINNING OF COMMAND STRING
3985
3986  020250  105714            64$:    TSTB    (R4)            ;CHECK FOR CARRIAGE RETURN
3987  020252  001525                    BEQ     10$             ;YES, EXIT
```

```
3988  020254  122427  000054          CMPB    (R4)+,#',       ;CHECK FOR COMMA
3989  020260  001373                  BNE     64$             ;NO, GO TEST NEXT CHARACTER
3990  020262  105714                  TSTB    (R4)            ;CHECK IF CARRIAGE RETURN
3991  020264  001552                  BEQ     30$             ;YES, TRY AGAIN
3992  020266  121427  000054          CMPB    (R4),#',        ;CHECK IF COMMA
3993  020272  001547                  BEQ     30$             ;YES, TRY AGAIN
3994  020274  010446                  MOV     R4,-(SP)        ;STORE BUFFER ADDRESS
3995  020276  004737  053316          JSR     PC,OCTBIN       ;CONVERT TO BINARY
3996  020302  020617                  30$                     ;ERROR RETURN
3997  020304  022716  000002          CMP     #2,(SP)         ;CHECK IF LEGAL TRACK
3998  020310  103537                  BLO     29$             ;TRY AGAIN
3999  020312  063716  001612          ADD     EXAREA,(SP)     ;PUT MULTIPLIER ON STACK
4000  020316  012746  000026          MOV     #22.,-(SP)      ;PUT MULTIPLIER ON STACK
4001  020322  004737  054064          JSR     PC,$MULT        ;DO MULTIPLICATION
4002  020326  005216                  INC     (SP)            ;ADD 1
4003  020330  012637  001612          MOV     (SP)+,EXAREA    ;STORE VALUE
4004  020334  005726                  TST     (SP)+           ;THROW AWAY MOST SIGNIFICANT BITS
4005
4006  020336  105714          65$:    TSTB    (R4)            ;CHECK FOR CARRIAGE RETURN
4007  020340  001511                  BEQ     20$             ;YES, EXIT
4008  020342  122427  000054          CMPB    (R4)+,#',       ;CHECK FOR COMMA
4009  020346  001373                  BNE     65$             ;NO, GO TEST NEXT CHARACTER
4010  020350  105714                  TSTB    (R4)            ;CHECK IF CARRIAGE RETURN
4011  020352  001517                  BEQ     30$             ;YES, TRY AGAIN
4012  020354  121427  000054          CMPB    (R4),#',        ;CHECK IF COMMA
4013  020360  001514                  BEQ     30$             ;YES, TRY AGAIN
4014  020362  010446                  MOV     R4,-(SP)        ;STORE BUFFER ADDRESS
4015  020364  004737  053316          JSR     PC,OCTBIN       ;CONVERT TO BINARY
4016  020370  020617                  30$                     ;ERROR RETURN
4017  020372  022716  000632          CMP     #410.,(SP)      ;CHECK IF LEGAL CYLINDER
4018  020376  103504                  BLO     29$             ;NO, TRY AGAIN
4019  020400  011637  001614          MOV     (SP),EXAREA+2   ;MULTIPLY CYLINDER ADDRESS BY 3
4020  020404  006316                  ASL     (SP)
4021  020406  062637  001614          ADD     (SP)+,EXAREA+2
4022
4023  020412  105714          66$:    TSTB    (R4)            ;CHECK FOR CARRIAGE RETURN
4024  020414  001476                  BEQ     30$             ;YES, EXIT
4025  020416  122427  000054          CMPB    (R4)+,#',       ;CHECK FOR COMMA
4026  020422  001373                  BNE     66$             ;NO, GO TEST NEXT CHARACTER
4027  020424  105714                  TSTB    (R4)            ;CHECK IF CARRIAGE RETURN
4028  020426  001471                  BEQ     30$             ;YES, TRY AGAIN
4029  020430  121427  000054          CMPB    (R4),#',        ;CHECK IF COMMA
4030  020434  001466                  BEQ     30$             ;YES, TRY AGAIN
4031  020436  010446                  MOV     R4,-(SP)        ;STORE BUFFER ADDRESS
4032  020440  004737  053316          JSR     PC,OCTBIN       ;CONVERT TO BINARY
4033  020444  020612                  30$                     ;ERROR RETURN
4034  020446  022716  000002          CMP     #2,(SP)         ;CHECK IF LEGAL TRACK
4035  020452  103456                  BLO     29$             ;TRY AGAIN
4036  020454  063716  001614          ADD     EXAREA+2,(SP)   ;PUT MULTIPLIER ON STACK
4037  020460  012746  000026          MOV     #22.,-(SP)      ;PUT MULTIPLIER ON STACK
4038  020464  004737  054064          JSR     PC,$MULT        ;DO MULTIPLICATION
4039  020470  005216                  INC     (SP)            ;ADD 1
4040  020472  012637  001614          MOV     (SP)+,EXAREA+2  ;STORE VALUE
4041  020476  005726                  TST     (SP)+           ;THROW AWAY MOST SIGNIFICANT BITS
4042  020500  023737  001612  001614  CMP     EXAREA,EXAREA+2 ;CHECK IF LEGAL RANGE
4043  020506  103041                  BHIS    30$             ;NO, TRY AGAIN
```

```
4044  020510  013721  001612              MOV     EXAREA,(R1)+    ;LOAD EXCLUDED AREA
4045  020514  013721  001614              MOV     EXAREA+2,(R1)+
4046  020520  062700  000004              ADD     #4,R0           ;ADJUST R0
4047  020524  000200                      RTS     R0              ;RETURN
4048
4049  020526  013746  001612      10$:    MOV     EXAREA,-(SP)    ;LOAD MULTIPLIER
4050  020532  012746  000026              MOV     #22.,-(SP)      ;LOAD MULTICAND
4051  020536  004737  054064              JSR     PC,$MULT        ;CALCULATE VALUE
4052  020542  005216                      INC     (SP)            ;INCREMENT RESULTS
4053  020544  011621                      MOV     (SP),(R1)+      ;STORE EXCLUDED AREA
4054  020546  062716  000102              ADD     #66.,(SP)
4055  020552  012621                      MOV     (SP)+,(R1)+
4056  020554  005726                      TST     (SP)+           ;THROW AWAY MOST SIGNIFICANT BITS
4057  020556  062700  000004              ADD     #4,R0           ;ADJUST R0
4058  020562  000200                      RTS     R0              ;RETURN
4059
4060  020564  013721  001612      20$:    MOV     EXAREA,(R1)+    ;STORE EXCLUDEED AREA
4061  020570  062737  000026  001612      ADD     #22.,EXAREA
4062  020576  013721  001612              MOV     EXAREA,(R1)+
4063  020602  062700  000004              ADD     #4,R0           ;ADJUST R0
4064  020606  000200                      RTS     R0              ;RETURN
4065
4066  020610  005726              29$:    TST     (SP)+           ;ADJUST STACK
4067  020612  010337  020620      30$:    MOV     R3,31$          ;LOAD BUFFER ADDRESS
4068  020616  104401                      TYPE                    ;TYPE RECEIVED INPUT
4069  020620  000000              31$:    .WORD   0               ;BUFFER ADDRESS
4070  020622  104401  001164              TYPE    ,SQUES          ;TYPE QUESTION MARK
4071  020626  000137  020172              JMP     1$              ;TRY AGAIN
4072
4073  020632  005720              40$:    TST     (R0)+           ;ADJUST R0
4074  020634  011000              45$:    MOV     (R0),R0         ;STORE SPECIAL RETURN ADDRESS
4075  020636  000200                      RTS     R0              ;RETURN
```

```
                        .SBTTL  GENERATE NEW RANDOM COMMAND

                        ;;*****************************************************************
                        ;*
                        ;*      IF SWITCH 14 IS RESET, THIS ROUTINE WILL STORE THE PREVIOUS
                        ;*      COMMAND AND GENERATE A NEW RANDOM COMMAND.  A CHECK IS MADE
                        ;*      ON THE DISK ADDRESS AND THE DISK ADDRESS + THE NUMBER OF
                        ;*      SECTORS TO BE READ OR WRITTEN.  IF THE DATA TRANSFER WILL
                        ;*      CAUSE DATA TO BE READ OR WRITTEN BEYOND THE MAXIMUM PACK
                        ;*      ADDRESS OR USES ANY PART OF AN EXCLUDED AREA, A NEW DISK
                        ;*      ADDRESS WILL BE RANDOMLY GENERATED.
                        ;*
                        ;*      REGISTER        USE
                        ;*      --------        ---
                        ;*
                        ;*      R1              EXCLUSION AREA COUNT
                        ;*      R3              EXCLUSION AREA INDEX
                        ;*      R4              SECTOR POSITION
                        ;*      R5              PARAMETER BLOCK ADDRESS
                        ;*      (SP)            SECTORS TO BE TRANSFERRED
                        ;*
                        ;*
                        ;*      IF SWITCH 14 IS SET, THIS ROUTINE WILL SEEK TO THE PREVIOUS
                        ;*      DISK POSITION OR REISSUE THE LAST COMMAND DEPENDENT ON THE
                        ;*      P.SEEK FLAG IN THE PARAMETER BLOCK.
                        ;*
                        ;*
                        ;*      ROUTINES USED
                        ;*      -------------
                        ;*
                        ;*      Q.PUSH
                        ;*      $AND
                        ;*      $MULT
                        ;*
                        ;*CALL  JSR     PC,GENERT
                        ;*      RETURN
                        ;*
                        ;;*****************************************************************

020640  005065  000146          GENERT: CLR     P.ERCT(R5)      ;CLEAR ERROR FLAGS AND
020644  005065  000150                  CLR     P.DSTT(R5)      ;  RETRY COUNTS
020650  005065  000212                  CLR     P.EPR(R5)

020654  032777  040000  160256          BIT     #SW14,@SWR      ;CHECK IF NEW COMMAND
                                                                ;  SHOULD BE GENERATED
020662  001454                          BEQ     10$             ;YES, GENERATE NEW COMMAND
020664  105765  000211                  TSTB    P.SEEK(R5)      ;CHECK IF PREVIOUS CYLINDER ISSUED
020670  001020                          BNE     1$              ;YES, SET UP DATA TRANSFER
020672  112765  177777  000211          MOVB    #-1,P.SEEK(R5)  ;INDICATE SEEK HAS BEEN ISSUED
020700  112765  000117  000001          MOVB    #SEEK,P.CMND(R5)  ;LOAD SEEK PARAMETERS
020706  016565  000136  000002          MOV     P.LCYL(R5),P.CYLN(R5)  ;LOAD PRIOR CYLINDER
020714  016565  000140  000004          MOV     P.LSEC(R5),P.SECT(R5)  ;LOAD PRIOR SECTOR AND TRACK
020722  004037  050706                  JSR     R0,Q.PUSH       ;PUT PARAMETER BLOCK ON
020726  001324                          CINITQ                  ;  COMMAND INITIATION QUEUE
020730  000207                          RTS     PC              ;RETURN
```

```
4132  020732  105065  000211          1$:     CLRB    P.SEEK(R5)          ;INDICATE DATA TRANSFER ISSUED
4133  020736  116565  000122  000121          MOVB    P.RDPT(R5),P.DPAT(R5)  ;LOAD LAST DATA PATTERN
4134  020744  116565  000123  000001          MOVB    P.RCMD(R5),P.CMND(R5)  ;LOAD LAST COMMAND
4135  020752  016565  000124  000002          MOV     P.RCYL(R5),P.CYLN(R5)  ;LOAD LAST CYLINDER ADDRESS
4136  020760  122765  000131  000001          CMPB    #WRTCHK,P.CMND(R5)  ;CHECK IF WRITE CHECK
4137  020766  001003                          BNE     2$                  ;NO, DO NOT SET FLAG
4138  020770  052765  000200  000014          BIS     #W.WCK,P.PRST(R5)  ;SET ISSUE WRITE FOR WRITE CHECK
4139  020776  016565  000126  000004  2$:     MOV     P.RSEC(R5),P.SECT(R5)  ;LOAD LAST SECTOR AND TRACK
4140  021004  016565  000130  000012          MOV     P.RWC(R5),P.WC(R5)  ;LOAD LAST WORD COUNT
4141  021012  000207                          RTS     PC                  ;RETURN
4142
4143  021014  005077  160124          10$:    CLR     @$TKS               ;LOCK OUT TTY INTERRUPTS
4144  021020  010446                          MOV     R4,-(SP)            ;STORE R4 ON STACK
4145  021022  010346                          MOV     R3,-(SP)            ;STORE R3 ON STACK
4146  021024  010146                          MOV     R1,-(SP)            ;STORE R1 ON STACK
4147  021026  010046                          MOV     R0,-(SP)            ;STORE R0 ON STACK
4148  021030  116565  000123  000135          MOVB    P.RCMD(R5),P.LCMD(R5)  ;STORE LAST COMMAND
4149  021036  016565  000124  000136          MOV     P.RCYL(R5),P.LCYL(R5)  ;STORE LAST CYLINDER
4150  021044  016565  000126  000140          MOV     P.RSEC(R5),P.LSEC(R5)  ;STORE LAST SECTOR AND TRACK
4151  021052  016565  000130  000142          MOV     P.RWC(R5),P.LWC(R5)  ;STORE LAST WORD COUNT
4152  021060  116565  000122  000144          MOVB    P.RDPT(R5),P.LDPT(R5) ;STORE LAST PATTERN
4153  021066  004737  054200                  JSR     PC,$RAND            ;GENERATE RANDOM NUMBER
4154  021072  013746  054300                  MOV     $LONUM,-(SP)        ;LOAD MULTIPLIER
4155  021076  013746  001354                  MOV     MAXBUF,-(SP)        ;LOAD MULTIPLICAND
4156  021102  005216                          INC     (SP)                ;INCREMENT WORD COUNT MAX.
4157  021104  004737  054064                  JSR     PC,$MULT            ;CALCULATE WORD COUNT
4158  021110  005726                          TST     (SP)+               ;THROW AWAY LEAST SIGNIFICANT BITS
4159  021112  042716  100003                  BIC     #100003,(SP)        ;MAKE DIVISIBLE BY 4 AND < 32K
4160  021116  001002                          BNE     11$                 ;IF NOT ZERO USE WORD COUNT
4161  021120  012716  000004                  MOV     #4,(SP)             ;MAKE WORD COUNT 4
4162  021124  116604  000001          11$:    MOVB    1(SP),R4            ;CALCULATE NUMBER OF SECTORS TO
4163  021130  105716                          TSTB    (SP)                ;   TRANSFERRED
4164  021132  001401                          BEQ     12$                 ;IF EVEN SECTORS DO NOT MODIFY
4165  021134  005204                          INC     R4                  ;   SECTOR COUNT
4166  021136  011646                  12$:    MOV     (SP),-(SP)          ;SAVE WORD COUNT
4167  021140  005416                          NEG     (SP)                ;GENERATE NEGATIVE NUMBER
4168  021142  012665  000012                  MOV     (SP)+,P.WC(R5)      ;LOAD PRESENT WORD COUNT
4169  021146  062765  000001  000152          ADD     #1,P.NODR(R5)       ;INCREMENT NUMBER OF ORDERS
4170  021154  005565  000154                  ADC     P.NODR+2(R5)
4171  021160  113746  054276                  MOVB    $MINUM,-(SP)        ;RANDOM NUMBER FOR COMMAND
4172  021164  042716  177770                  BIC     #177770,(SP)        ;KEEP LOW 3 BITS
4173  021170  126526  000076                  CMPB    P.RATE(R5),(SP)+    ;DETERMINE IF READ OR WRITE
4174  021174  101462                          BLOS    15$                 ;ISSUE READ
4175  021176  113746  054277                  MOVB    $MINUM+1,-(SP)      ;RANDOM NUMBER FOR PATTERN
4176  021202  042716  177760                  BIC     #177760,(SP)        ;KEEP LOW 4 BITS
4177  021206  111665  000122                  MOVB    (SP),P.RDPT(R5)     ;STORE DATA PATTERN
4178  021212  112665  000121                  MOVB    (SP)+,P.DPAT(R5)
4179  021216  105765  000077                  TSTB    P.AWCK(R5)          ;CHECK IF AUTO WRITE CHECK
4180  021222  001017                          BNE     13$                 ;YES, ISSUE WRITE CHECK
4181  021224  113746  054276                  MOVB    $MINUM,-(SP)        ;RANDOM NUMBER FOR WRITE CHECK
4182  021230  042726  177707                  BIC     #177707,(SP)+       ;CHECK IF WRITE COMMAND
4183  021234  001412                          BEQ     13$                 ;YES, ISSUE WRITE CHECK
4184  021236  112765  000123  000123          MOVB    #WRDATA,P.RCMD(R5)  ;ISSUE WRITE DATA
4185  021244  062665  000156                  ADD     (SP)+,P.NWRT(R5) ;ADD NUMBER OF WORDS TO BE WRITTEN
4186  021250  005565  000160                  ADC     P.NWRT+2(R5)
4187  021254  005565  000162                  ADC     P.NWRT+4(R5)
```

```
4188  021260  000441                          BR      18$
4189
4190  021262  112765  000131  000123  17$:    MOVB    #WRTCHK,P.RCMD(R5)  ;ISSUE WRITE CHECK
4191  021270  052765  000200  000014          BIS     #W.WCK,P.PRST(R5)  ;SET NO WRITE FOR WRITE CHECK
4192  021276  062765  000001  000152          ADD     #1,P.NODR(R5)   ;INCREMENT NUMBER OF COMMAND ISSUED
4193  021304  005565  000154                  ADC     P.NODR+2(R5)
4194  021310  061665  000156                  ADD     (SP),P.NWRT(R5) ;ADD NUMBER OF WORDS TO BE WRITTEN
4195  021314  005565  000160                  ADC     P.NWRT+2(R5)
4196  021320  005565  000162                  ADC     P.NWRT+4(R5)
4197  021324  062665  000164                  ADD     (SP)+,P.NRD(R5) ;ADD NUMBER OF WORDS READ
4198  021330  005565  000166                  ADC     P.NRD+2(R5)
4199  021334  005565  000170                  ADC     P.NRD+4(R5)
4200  021340  000411                          BR      18$
4201
4202  021342  112765  000121  000123  15$:    MOVB    #RDDATA,P.RCMD(R5)  ;ISSUE READ DATA
4203  021350  062665  000164                  ADD     (SP)+,P.NRD(R5) ;ADD NUMBER OF WORDS READ
4204  021354  005565  000166                  ADC     P.NRD+2(R5)
4205  021360  005565  000170                  ADC     P.NRD+4(R5)
4206  021364  116565  000123  000001  18$:    MOVB    P.RCMD(R5),P.CMND(R5)  ;LOAD COMMAND
4207  021372  012700  000100                  MOV     #100,R0         ;LOAD REGENERATE COUNT
4208
4209  021376  010503                  20$:    MOV     R5,R3           ;LOAD INDEX
4210  021400  062703  000232                  ADD     #P.EXAR,R3      ;CALCULATE EXCLUDED AREA INDEX
4211  021404  012701  000005                  MOV     #5,R1           ;LOAD BAD TRACK COUNT
4212  021410  004737  054200                  JSR     PC,$RAND        ;GENERATE RANDOM NUMBER
4213  021414  016546  000070                  MOV     P.MXCL(R5),-(SP)  ;STORE MAXIMUM CYLINDER
4214  021420  166516  000066                  SUB     P.MNCL(R5),(SP) ;CALCULATE DIFFERENCE
4215  021424  001406                          BEQ     21$             ;IF 0, SKIP MULTIPLY
4216  021426  005216                          INC     (SP)            ;INCREMENT DIFFERENCE
4217  021430  013746  054300                  MOV     $LOWUM,-(SP)    ;PUT MULTICAND ON STACK
4218  021434  004737  054064                  JSR     PC,$MULT        ;CALCULATE CYLINDER ADDRESS
4219  021440  005726                          TST     (SP)+           ;THROW AWAY LEAST SIGNIFICANT BITS
4220
4221  021442  066516  000066          21$:    ADD     P.MNCL(R5),(SP) ;CALCULATE CYLINDER
4222  021446  011665  000124                  MOV     (SP),P.RCYL(R5) ;STORE CYLINDER
4223  021452  116537  000073  001566          MOVB    P.MXTR(R5),TMPTRK  ;STORE MAXIMUM TRACK
4224  021460  116537  000072  001570          MOVB    P.MNTR(R5),TMPTRK+2  ;STORE MINIMUM TRACK
4225  021466  163737  001570  001566          SUB     TMPTRK+2,TMPTRK ;CALCULATE DIFFERENCE
4226  021474  001415                          BEQ     22$             ;IF=0, SKIP MULTIPLY
4227  021476  005046                          CLR     -(SP)           ;MAKE ROOM ON STACK
4228  021500  113716  054277                  MOVB    $HINUM+1,(SP)   ;PUT IN MULTIPLIER ON STACK
4229  021504  013746  001566                  MOV     TMPTRK,-(SP)    ;PUT TRACK NUMBER ON STACK
4230  021510  005216                          INC     (SP)            ;INCREMENT DIFFERENCE
4231  021512  004737  054064                  JSR     PC,$MULT        ;CALCULATE TRACK
4232  021516  116637  000001  001566          MOVB    1(SP),TMPTRK    ;STORE TRACK
4233  021524  062706  000004                  ADD     #4,SP           ;ADJUST STACK
4234
4235  021530  063737  001570  001566  22$:    ADD     TMPTRK+2,TMPTRK ;CALCULATE TRACK
4236  021536  113765  001566  000127          MOVB    TMPTRK,P.RTRK(R5)  ;STORE TRACK NUMBER
4237  021544  116537  000075  001572          MOVB    P.MXSC(R5),TMPSEC  ;STORE MAXIMUM SECTOR
4238  021552  116537  000074  001574          MOVB    P.MNSC(R5),TMPSEC+2  ;STORE MINIMUM SECTOR
4239  021560  163737  001574  001572          SUB     TMPSEC+2,TMPSEC ;CALCULATE DIFFERENCE
4240  021566  001415                          BEQ     23$             ;IF=0, SKIP MULTIPLY
4241  021570  005046                          CLR     -(SP)           ;MAKE ROOM ON STACK
4242  021572  113716  054276                  MOVB    $HINUM,(SP)     ;PUT IN MULTIPLIER
4243  021576  013746  001572                  MOV     TMPSEC,-(SP)    ;PUT SECTOR NUMBER ON STACK
```

```
4244  021602  005216                        INC     (SP)            ;INCREMENT DIFFERENCE
4245  021604  004737  054064                JSR     PC,$MULT        ;CALCULATE SECTOR
4246  021610  116637  000001  001572        MOVB    1(SP),TMPSEC    ;STORE SECTOR
4247  021616  062706  000004                ADD     #4,SP           ;ADJUST STACK
4248
4249  021622  063737  001574  001572  23$:  ADD     TMPSEC+2,TMPSEC ;CALCULATE SECTOR
4250  021630  113765  001572  000126        MOVB    TMPSEC,P.RSEC(R5)  ;STORE SECTOR NUMBER
4251  021636  006316                        ASL     (SP)            ;MULTIPLY CYLINDER BY 3
4252  021640  066516  000124                ADD     P.RCYL(R5),(SP)
4253  021644  063716  001566                ADD     TMPTRK,(SP)     ;ADD TRACK
4254  021650  012746  000026                MOV     #22.,-(SP)      ;MULTIPLICAND - 22 SECTORS/TRACK
4255  021654  004737  054064                JSR     PC,$MULT
4256  021660  012616                        MOV     (SP)+,(SP)      ;THROW AWAY MOST SIGNIFICANT BITS
4257  021662  063716  001572                ADD     TMPSEC,(SP)     ;ADD SECTOR
4258  021666  005216                        INC     (SP)            ;CONSTANT FOR BAD TRACKS
4259  021670  061604                        ADD     (SP),R4         ;ADD NUMBER OF SECTORS
4260  021672  022704  064741                CMP     #<410.*2+.*3.>+<22.*2.>+1,R4 ;CHECK IF DATA TRANSFER EXCEEDS DISK
4261  021676  103421                        BLO     40$             ;CALCULATE NEW DISK ADDRESS
4262
4263  021700  005713                  25$:  TST     (R3)            ;CHECK IF BAD TRACK INTERVAL
4264                                                                ;  EXIST
4265  021702  001407                        BEQ     30$             ;NO, ISSUE COMMAND
4266  021704  021623                        CMP     (SP),(R3)+      ;CHECK IF IN BAD TRACK INTERVAL
4267  021706  103402                        BLO     26$             ;NO, CHECK NEXT BAD TRACK I
4268  021710  020413                        CMP     R4,(R3)
4269  021712  103413                        BLO     40$             ;YES, CALCULATE NEW DISK ADDRESS
4270  021714  005723                  26$:  TST     (R3)+           ;ADJUST R3
4271  021716  005301                        DEC     R1              ;DECREMENT BAD BLOCK COUNT
4272  021720  001367                        BNE     25$             ;IF NOT 0 GET NEXT BAD BLOCK
4273
4274  021722  005726                  30$:  TST     (SP)+           ;ADJUST STACK
4275  021724  016565  000124  000002        MOV     P.RCYL(R5),P.CYLN(R5)  ;LOAD CYLINDER
4276  021732  016565  000126  000004        MOV     P.RSEC(R5),P.SECT(R5)  ;LOAD TRACK AND SECTOR
4277  021740  000416                        BR      45$             ;RETURN
4278
4279  021742  162604                  40$:  SUB     (SP)+,R4        ;GET NUMBER OF SECTOR TRANSFERRED
4280  021744  005300                        DEC     R0              ;DECREMENT REGENERATE COUNT
4281  021746  001402                        BEQ     41$             ;DROP DRIVE CANNOT GENERATE
4282                                                                ;  RANDOM DISK ADDRESS
4283  021750  000137  021376                JMP     20$             ;GET ANOTHER DISK ADDRESS
4284
4285  021754  013737  001450  177776  41$:  MOV     RKPRI,PS        ;LOCK OUT RK06 AND TTY INTERRUPTS
4286  021762  104401  057357                TYPE    ,PAR020         ;TYPE "UNABLE TO GENERATE NEW COMMAND"
4287  021766  004737  012716                JSR     PC,DROP         ;DROP DRIVE
4288  021772  005037  177776                CLR     PS              ;ALLOW RK06 INTERRUPTS
4289
4290  021776  012600                  45$:  MOV     (SP)+,R0        ;RESTORE R0
4291  022000  012601                        MOV     (SP)+,R1        ;RESTORE R1
4292  022002  012603                        MOV     (SP)+,R3        ;RESTORE R3
4293  022004  012604                        MOV     (SP)+,R4        ;RESTORE R4
4294  022006  012777  000100  157130        MOV     #IE,@STKS       ;ALLOW TTY INTERRUPTS
4295  022014  000207                        RTS     PC              ;RETURN
```

```
                                .SBTTL  GET AVAILIBLE BUFFER ROUTINE

022016  013746  177776        GETBUF: MOV     PS,-(SP)        ;STORE PSW ON STACK
022022  013737  001450  177776        MOV     RKPRI,PS        ;LOCK OUT RK06 INTERRUPTS
022030  013705  001320                MOV     BWAITQ,R5       ;CHECK IF COMMAND WAITING FOR BUFFER
022034  001424                        BEQ     10$             ;RETURN IF QUEUE IS EMPTY
022036  004037  022114        1$:     JSR     R0,BUFFAL       ;ALLOCATE BUFFER
022042  022106                        10$                     ;NOT ENOUGH MEMORY RETURN
022044  004037  050766                JSR     R0,Q.POP        ;GET NEXT PARMETER BLOCK FROM
022050  001320                        BWAITQ                  ;  BUFFER WAIT QUEUE
022052  005726                        TST     (SP)+           ;ADJUST STACK
022054  005037  177776                CLR     PS              ;ALLOW RK06 INTERRUPTS
022060  004737  022532                JSR     PC,LDDATA       ;LOAD BUFFER
022064  004037  050706                JSR     R0,Q.PUSH       ;PUT PARAMETER BLOCK ON
022070  001324                        CINITQ                  ;  COMMAND INITIATION QUEUE
022072  013737  001450  177776        MOV     RKPRI,PS        ;LOCK OUT RK06 INTERRUPTS
022100  013705  001320                MOV     BWAITQ,R5       ;CHECK IF COMMAND WAITING FOR BUFFER
022104  001354                        BNE     1$              ;YES, TRY TO ALLOCATE BUFFER

022106  012637  177776        10$:    MOV     (SP)+,PS        ;RESTORE PSW
022112  000207                        RTS     PC              ;RETURN
```

```
                                .SBTTL  BUFFER ALLOCATION ROUTINE

                                ;;*****************************************************************
                                ;*
                                ;*      THIS ROUTINE WILL TRY TO ALLOCATE A MAIN MEMORY BUFFER
                                ;*      IF MEMORY IS AVAILABLE.  (CALLED BY PRIORITY 7)
                                ;*
                                ;*      REGISTER        USE
                                ;*      --------        ---
                                ;*
                                ;*      R1              WORD COUNT * 2
                                ;*      R3              FREE BLOCK TABLE INDEX
                                ;*      R4              FREE BLOCK TABLE COUNT
                                ;*      R5              PARAMETER BLOCK ADDRESS
                                ;*
                                ;*CALL  JSR     R0,BUFFAL
                                ;*      <ADDRESS OF BUFFER MEMORY NOT AVAILABLE ROUTINE>
                                ;*      RETURN  <BUFFER ALLOCATED>
                                ;*
                                ;;*****************************************************************

022114  010446          BUFFAL: MOV     R4,-(SP)        ;STORE R4 ON STACK
022116  010346                  MOV     R3,-(SP)        ;STORE R3 ON STACK
022120  010146                  MOV     R1,-(SP)        ;STORE R1 ON STACK
022122  016501  000012          MOV     P.WC(R5),R1     ;STORE WORD COUNT
022126  010165  000130          MOV     R1,P.PWC(R5)    ;STORE WORD COUNT
022132  005401                  NEG     R1              ;GET ACTUAL WORD COUNT
022134  006301                  ASL     R1              ;MULTIPLY WORD COUNT BY 2
022136  013704  001664          MOV     FBLKC,R4        ;STORE FREE BLOCK TABLE ADDRESS
022142  001420                  BEQ     2$              ;RETURN, IF NO BLOCKS AVAILABLE
022144  012703  001666          MOV     #FBLKT,R3       ;LOAD ADDRESS OF FREE BLOCK TABLE
022150  022704  000011          CMP     #9.,R4          ;HANG IF FREE BLOCK COUNT IS GREATER
022154  101001                  BHI     1$              ;  OR EQUAL TO 9
022156  000000                  HALT

022160  012346          1$:     MOV     (R3)+,-(SP)     ;STORE BEGINNING OF FREE BLOCK
022162  060116                  ADD     R1,(SP)         ;ADD WORD COUNT
022164  103411                  BCS     5$              ;CHECK IF ADDRESS OVERFLOW
022166  021316                  CMP     (R3),(SP)       ;CHECK IF ENOUGH ROOM
022170  001423                  BEQ     15$             ;YES, ELIMINATE BLOCK
022172  101010                  BHI     10$             ;YES, SHORTEN BLOCK
022174  005723                  TST     (R3)+           ;ADJUST R3
022176  005726                  TST     (SP)+           ;ADJUST STACK
022200  005304                  DEC     R4              ;DECREMENT FREE BLOCK COUNT
022202  001366                  BNE     1$              ;EXAMINE NEXT FREE BLOCK
022204  011000          2$:     MOV     (R0),R0         ;LOAD RETURN ADDRESS
022206  000437                  BR      25$             ;RETURN

022210  005726          5$:     TST     (SP)+           ;ADJUST STACK
022212  000774                  BR      2$              ;RETURN

022214  014365  000132  10$:     MOV     -(R3),P.BBAL(R5) ;LOAD BUS ADDRESS
022220  011365  000010          MOV     (R3),P.BALC(R5) ;LOAD BUS ADDRESS
022224  012613                  MOV     (SP)+,(R3)      ;LOAD NEW BASE
022226  005720                  TST     (R0)+           ;ADJUST RETURN
022230  112765  177777  000145  MOVB    #-1,P.BUFF(R5)  ;INDICATE THAT BUFFER HAS BEEN ASSIGNED
```

```
4373  022236  000423                          BR      25$             ;RETURN
4374
4375  022240  010301                  15$:    MOV     R3,R1           ;STORE WORD COUNT
4376  022242  014365  000137                  MOV     -(R3),P.RBAL(R5)
4377  022246  011365  000010                  MOV     (R3),P.BALO(R5) ;LOAD BUS ADDRESS
4378  022252  005726                          TST     (SP)+           ;ADJUST STACK
4379  022254  005721                          TST     (R1)+           ;ADJUST R1
4380  022256  005720                          TST     (R0)+           ;ADJUST RETURN
4381  022260  112765  177777  000145          MOVB    #-1,P.BUFF(R5)  ;INDICATE THAT BUFFER HAS BEEN ASSIGNED
4382  022266  005337  001664                  DEC     FRLKC           ;DECREMENT FREE BLOCK COUNT
4383  022272  005304                          DEC     R4              ;DECREMENT REPAIR BLOCK COUNT
4384  022274  001404                          BEQ     25$             ;IF 0, RETURN
4385
4386  022276  012123                  20$:    MOV     (R1)+,(R3)+     ;TRANSFER TWO WORDS
4387  022300  012123                          MOV     (R1)+,(R3)+
4388  022302  005304                          DEC     R4              ;DECREMENT REMAINING BLOCKS TO BE ADJUSTED
4389  022304  001374                          BNE     20$             ;IF NOT 0, TRANSFER NEXT TWO WORDS
4390  022306  012601                  25$:    MOV     (SP)+,R1        ;RESTORE R1
4391  022310  012603                          MOV     (SP)+,R3        ;RESTORE R3
4392  022312  012604                          MOV     (SP)+,R4        ;RESTORE R4
4393  022314  000200                          RTS     R0              ;RETURN
4394
```

```
                                .SBTTL  BUFFER RELEASE ROUTINE

                                ;;**************************************************************
                                ;*
                                ;*      THIS ROUTINE WILL RELEASE BUFFER USED.
                                ;*      (MUST BE CALLED IN PRIORITY 7)
                                ;*
                                ;*      REGISTER        USE
                                ;*      --------        ---
                                ;*
                                ;*      R0              NEW END OF FREE BLOCK TABLE
                                ;*      R1              LAST ADDRESS OF RELEASED BUFFER
                                ;*      R3              FREE BLOCK INDEX
                                ;*      R4              FREE BLOCK COUNT
                                ;*      R5              PARAMETER BLOCK ADDRESS
                                ;*      (SP)            BEGINNING ADDRESS OF RELEASED BLOCK
                                ;*
                                ;*CALL  JSR     PC,BUFREL
                                ;*      RETURN
                                ;*
                                ;;**************************************************************

022316  010446                  BUFREL: MOV     R4,-(SP)        ;STORE R4 ON STACK
022320  010346                          MOV     R3,-(SP)        ;STORE R3 ON STACK
022322  010146                          MOV     R1,-(SP)        ;STORE R1 ON STACK
022324  010046                          MOV     R0,-(SP)        ;STORE R0 ON STACK
022326  105765  000145                  TSTB    P.BUFF(R5)      ;CHECK IF BUFFER ASSIGNED
022332  001472                          BEQ     25$             ;NO, RETURN
022334  105065  000145                  CLRB    P.BUFF(R5)      ;CLEAR BUFFER ALLOCATED
022340  016501  000130                  MOV     P.RWC(R5),R1    ;STORE ALLOCATED WORD COUNT
022344  005401                          NEG     R1              ;GET ACTUAL WORD COUNT
022346  006301                          ASL     R1              ;MULTIPLY BY 2
022350  016546  000132                  MOV     P.RBAL(R5),-(SP)  ;STORE BUFFER ADDRESS
022354  061601                          ADD     (SP),R1         ;CALCULATE FINAL ADDRESS
022356  012703  001666                  MOV     #FBLKT,R3       ;LOAD FREE BLOCK TABLE ADDRESS
022362  013704  001664                  MOV     FBLKC,R4        ;STORE FREE BLOCK COUNT
022366  001424                          BEQ     8$              ;ADD FREE BLOCK

022370  022301                  1$:     CMP     (R3)+,R1        ;COMPARE END OF BUFFER AND FREE BLOCK
022372  001427                          BEQ     10$             ;EQUAL MERGE BLOCKS
022374  101005                          BHI     5$              ;LESS THEN ADD FREE BLOCK
022376  022316                          CMP     (R3)+,(SP)      ;COMPARE BEGINNING OF BUFFER
                                                                ;  AND END OF FREE BLOCK
022400  001426                          BEQ     15$             ;EQUAL MERGE
022402  005304                          DEC     R4              ;DECREMENT FREE BLOCK COUNT
022404  001371                          BNE     1$              ;GO TO NEXT FREE BLOCK
022406  000414                          BR      8$              ;GO ADD BLOCK

022410  010446                  5$:     MOV     R4,-(SP)        ;PUT REMAINING COUNT ON STACK
022412  006316                          ASL     (SP)            ;MULTIPLY BY 4
022414  006316                          ASL     (SP)
022416  005743                          TST     -(R3)           ;DECREMENT R3 BY 2
022420  062603                          ADD     (SP)+,R3        ;CALCULATE OLD END OF FREE BLOCK TABLE
022422  010300                          MOV     R3,R0
022424  062700  000004                  ADD     #4,R0           ;CALCULATE NEW END OF FREE BLOCK TABLE
022430  014340                  6$:     MOV     -(R3),-(R0)     ;MOVE TABLE
```

```
4451  022432  014340                  MOV     -(R3),-(R0)
4452  022434  005304                  DEC     R4              ;DECREMENT FREE BLOCK COUNT
4453  022436  001374                  BNE     6$              ;IF NOT ZERO, COUNT
4454
4455  022440  005237  001664  8$:     INC     FBLKC           ;INCREMENT FREE BLOCK COUNT
4456  022444  012623                  MOV     (SP)+,(R3)+     ;STORE BEGINNING OF FREE BLOCK
4457  022446  010123                  MOV     R1,(R3)+        ;STORE END OF FREE BLOCK
4458  022450  000423                  BR      25$             ;RETURN
4459
4460  022452  012643          10$:    MOV     (SP)+,-(R3)     ;LOAD BEGINNING OF FREE BLOCK
4461  022454  000421                  BR      25$             ;RETURN
4462
4463  022456  005726          15$:    TST     (SP)+           ;ADJUST STACK
4464  022460  005304                  DEC     R4              ;DECREMENT FREE BLOCKS LEFT
4465  022462  001402                  BEQ     16$             ;NO MORE FREE BLOCK ADJUST END
4466  022464  021301                  CMP     (R3),R1         ;CHECK IF RELEASED BLOCK END=
4467                                                          ;  FREE BLOCK BEGINNING
4468  022466  001402                  BEQ     20$             ;YES, MERGE BLOCKS
4469  022470  010143          16$:    MOV     R1,-(R3)        ;LOAD END OF FREE BLOCK
4470  022472  000412                  BR      25$             ;RETURN
4471
4472  022474  010300          20$:    MOV     R3,R0           ;STORE R3 FOR BUFFER MOVEMENT
4473  022476  005743                  TST     -(R3)           ;ADJUST R3
4474  022500  005720                  TST     (R0)+           ;ADJUST R0
4475  022502  006304                  ASL     R4              ;MULTIPLY COUNT BY TWO
4476  022504  005304                  DEC     R4              ;DECREMENT TRANSFER COUNT
4477  022506  012023          21$:    MOV     (R0)+,(R3)+     ;MOVE TABLE ENTRY
4478  022510  005304                  DEC     R4              ;DECREMENT COUNT
4479  022512  001375                  BNE     21$             ;IF NOT 0, CONTINUE MOVE
4480  022514  005337  001664          DEC     FBLKC           ;DECREMENT FREE BLOCK COUNT
4481
4482  022520  012600          25$:    MOV     (SP)+,R0        ;RESTORE R0
4483  022522  012601                  MOV     (SP)+,R1        ;RESTORE R1
4484  022524  012603                  MOV     (SP)+,R3        ;RESTORE R3
4485  022526  012604                  MOV     (SP)+,R4        ;RESTORE R4
4486  022530  000207                  RTS     PC              ;RETURN
4487
```

```
4488                            .SBTTL  LOAD DATA BUFFER
4489
4490                            ;;*****************************************************************
4491                            ;*
4492                            ;*      THE REGISTERS BE USED AS FOLLOWS:
4493                            ;*
4494                            ;*      REGISTER                USE
4495                            ;*      --------                ---
4496                            ;*
4497                            ;*         R5           ADDRESS OF PARAMETER BLOCK
4498                            ;*         R4           BUFFER ADDRESS
4499                            ;*         R3           PATTERN ADDRESS
4500                            ;*         R2           WORDS LEFT IN SECTOR
4501                            ;*         R1           WORD COUNT
4502                            ;*         R0           PATTERN COUNT
4503                            ;*
4504                            ;*CALL  JSR     PC,LDDATA
4505                            ;*      RETURN
4506                            ;*
4507                            ;*
4508                            ;*      THE DATA WILL LOOK AS FOLLOWS:
4509                            ;*
4510                            ;*      *----------------------*----------*----------*
4511                            ;*      !  CPU ID              !  PAT     !  PAT     ! WORD 0
4512                            ;*      ! NO. OF PAT. WORDS (N) ! NO. OF PAT. WORDS (N) ! WORD 1
4513                            ;*      !                RANDOM DATA                  ! WORDS 2
4514                            ;*      !                                             !  TO N+1
4515                            ;*      *---------------------------------------------*
4516                            ;*      !                  ZERO FILL                  ! WORDS N+2
4517                            ;*      !                                             !  TO 255
4518                            ;*      *---------------------------------------------*
4519                            ;*
4520                            ;;*****************************************************************
4521
4522  022532  010446            LDDATA: MOV     R4,-(SP)        ;STORE R4 ON STACK
4523  022534  010346                    MOV     R3,-(SP)        ;STORE R3 ON STACK
4524  022536  010246                    MOV     R2,-(SP)        ;STORE R2 ON STACK
4525  022540  010146                    MOV     R1,-(SP)        ;STORE R1 ON STACK
4526  022542  010046                    MOV     R0,-(SP)        ;STORE R0 ON STACK
4527  022544  016504  000132            MOV     P.BUFA(R5),R4   ;GET BUS ADDRESS
4528  022550  016501  000130            MOV     P.WWC(R5),R1    ;STORE WORD COUNT
4529  022554  005401                    NEG     R1              ;GET POSITIVE NUMBER FOR WORD COUNT
4530  022556  122765  000121  000001    CMPB    #RDDATA,P.CMND(R5) ;CHECK IF READ DATA
4531  022564  001005                    BNE     5$              ;NO, LOAD BUFFER
4532  022566  005024            3$:     CLR     (R4)+           ;CLEAR BUFFER BEFORE READ
4533  022570  005301                    DEC     R1              ;CHECK IF DONE
4534  022572  001375                    BNE     3$              ;NO, CONTINUE
4535  022574  000137  022744            JMP     25$             ;RESTORE REGISTERS
4536
4537  022600  116500  000121    5$:     MOVB    P.DPAT(R5),R0   ;STORE PATTERN COUNT
4538  022604  010046                    MOV     R0,-(SP)        ;STORE PATTERN FOR FIRST WORD
4539  022606  006316                    ASL     (SP)            ;MULTIPLY PATTERN BY 4 FOR
4540  022610  006316                    ASL     (SP)            ;  REDUNACY
4541  022612  006316                    ASL     (SP)
4542  022614  006316                    ASL     (SP)
4543  022616  050016                    BIS     R0,(SP)         ;STORE FIRST WORD OF SECTOR
```

A10

```
4544  022620  113766  001364  000001          MOVB    CPUID,1(SP)     ;  ON STACK
4545  022626  006300                          ASL     R0              ;MULTIPLY DATA PATTERN BY 2
4546  022630  016003  004576                  MOV     PATTAB(R0),R3   ;LOAD DATA PATTERN ADDRESS
4547  022634  012700  000040                  MOV     #32.,R0         ;LOAD PATTERN COUNT
4548  022640  011624                  11$:    MOV     (SP),(R4)+      ;STORE PATTERN AND CPU ID IN 1ST WORD
4549  022642  162701  000002                  SUB     #2,R1           ;DECREMENT WORD COUNT BY 2
4550  022646  022701  000376                  CMP     #254.,R1        ;CHECK IF REST OF SECTOR WILL BE
4551                                                                  ;  WRITTEN
4552  022652  101003                          BHI     12$             ;NO, USE R1 AS WORD COUNT
4553  022654  012746  000376                  MOV     #254.,-(SP)     ;STORE SECTOR COUNT = 254
4554  022660  000401                          BR      13$
4555
4556  022662  010146                  12$:    MOV     R1,-(SP)        ;STORE REMAINING WORD COUNT
4557  022664  111666  000001          13$:    MOVB    (SP),1(SP)      ;ADD REDUNDACY
4558  022670  012624                          MOV     (SP)+,(R4)+     ;STORE WORD COUNT IN 2ND WORD
4559  022672  012702  000376                  MOV     #254.,R2        ;LOAD SECTOR WORD COUNT
4560
4561  022676  012324                  15$:    MOV     (R3)+,(R4)+     ;STORE DATA PATTERN
4562  022700  005301                          DEC     R1              ;DECREMENT WORD COUNT
4563  022702  001417                          BEQ     20$             ;BRANCH IF FINISHED
4564  022704  005302                          DEC     R2              ;DECREMENT SECTOR COUNT
4565  022706  005300                          DEC     R0              ;DECREMENT PATTERN COUNT
4566  022710  001407                          BEQ     17$             ;IF ZERO, INITIALIZE PATTERN
4567  022712  005702                          TST     R2              ;ARE WE AT END OF SECTOR
4568  022714  001370                          BNE     15$             ;NO, CONTINUE TO LOAD DATA PATTERN
4569  022716  162703  000074                  SUB     #60.,R3         ;INITIALIZE PATTERN ADDRESS
4570  022722  012700  000040                  MOV     #32.,R0         ;INITIALIZE PATTERN COUNT
4571  022726  000744                          BR      11$             ;START NEXT SECTOR
4572
4573  022730  162703  000100          17$:    SUB     #64.,R3         ;INITIALIZE PATTERN ADDRESS
4574  022734  012700  000040                  MOV     #32.,R0         ;INITIALIZE PATTERN
4575  022740  000756                          BR      15$             ;REPEAT PATTERN
4576
4577  022742  005726                  20$:    TST     (SP)+           ;ADJUST STACK
4578  022744  012600                  2?$:    MOV     (SP)+,R0        ;RESTORE R0
4579  022746  012601                          MOV     (SP)+,R1        ;RESTORE R1
4580  022750  012602                          MOV     (SP)+,R2        ;RESTORE R2
4581  022752  012603                          MOV     (SP)+,R3        ;RESTORE R3
4582  022754  012604                          MOV     (SP)+,R4        ;RESTORE R4
4583  022756  000207                          RTS     PC              ;RETURN
```

```
                                        .SBTTL  FIND FIRST DATA ERROR

022760  032777  000002  156152  BUFER1: BIT     #SW1,@SWR       ;CHECK IF INHIBIT SOFTWARE DATA
                                                                ;  COMPARE
022766  001017                          BNE     5$              ;YES, RETURN
022770  013765  001362  000220          MOV     SOFCMP,P.CMLG(R5) ;LOAD COMPARISON LENGTH
022776  001413                          BEQ     5$              ;IF NO MORE COMPARISONS, RETURN
023000  016565  000010  000214          MOV     P.BALO(R5),P.FRMD(R5) ;LOAD ADDRESS OF START OF SECTOR
023006  016565  000012  000222          MOV     P.WC(R5),P.BFCP(R5) ;LOAD TRANSFER LENGTH
023014  005465  000222                  NEG     P.BFCP(R5)      ;MAKE IT POSITIVE IT POSITIVE
023020  004737  023036                  JSR     PC,CMPBUF       ;DO COMPARISON
023024  023032                          10$                     ;ERROR RETURN

023026  005720                  5$:     TST     (R0)+           ;ADJUST R0 FOR RETURN
023030  000200                          RTS     R0              ;RETURN

023032  011000                  10$:    MOV     (R0),R0         ;LOAD ERROR RETURN
023034  000200                          RTS     R0              ;RETURN
```

```
                                .SBTTL  COMPARE DATA BUFFER
                                ;;*****************************************************************
                                ;*
                                ;*      THE REGISTERS WILL BE USED AS FOLLOWS:
                                ;*
                                ;*      REGISTER                USE
                                ;*      --------                ---
                                ;*
                                ;*         R5           ADDRESS OF PARAMETER BLOCK
                                ;*         R4           BUFFER ADDRESS
                                ;*         R3           PATTERN ADDRESS
                                ;*         R2           SECTOR WORD COUNT
                                ;*         R1           WORDS OR SECTOR WRITTEN
                                ;*         R0           PATTERN COUNT
                                ;*
                                ;*CALL  JSR     PC,CMPBUF
                                ;*      <ADDRESS OF COMPARISON ERROR RETURN>
                                ;*      RETURN
                                ;*
                                ;*      (SP)    NUMBER OF SOFT DATA COMPARES
                                ;*      (SP+2)  WORD COUNT
                                ;*
                                ;;*****************************************************************

023036  010446          CMPBUF: MOV     R4,-(SP)        ;STORE R4
023040  010346                  MOV     R3,-(SP)        ;STORE R3
023042  010246                  MOV     R2,-(SP)        ;STORE R2
023044  010146                  MOV     R1,-(SP)        ;STORE R1
023046  010046                  MOV     R0,-(SP)        ;STORE R0
023050  016504  000214          MOV     P.ERMD(R5),R4   ;GET START ADDRESS
023054  016546  000222          MOV     P.BFCP(R5),-(SP) ;GET COMPARE COUNT
023060  016546  000220          MOV     P.CMLG(R5),-(SP) ;LOAD NUMBER OF COMPARISON
023064  001002                  BNE     10$             ;COMPARE IF COMPARE COUNT NOT ZERO
023066  000137  023322          JMP     40$             ;ELSE RETURN

023072  010465  000214  10$:    MOV     R4,P.ERMD(R5)   ;LOAD SECTOR READ IN CASE OF ERROR
023076  005002                  CLR     R2              ;CLEAR OFFSET ERROR READ
023100  012400                  MOV     (R4)+,R0        ;STORE 1ST WORD (PATTERN INDEX)
023102  010003                  MOV     R0,R3
023104  042700  177760          BIC     #177760,R0      ;KEEP LOW 4 BITS
023110  042703  177417          BIC     #177417,R3      ;MASK CPU ID
023114  006203                  ASR     R3              ;SHIFT 4 BITS RIGHT
023116  006203                  ASR     R3
023120  006203                  ASR     R3
023122  006203                  ASR     R3
023124  020003                  CMP     R0,R3           ;CHECK FOR PATTERN MATCH
023126  001066                  BNE     30$             ;NO, REPORT ERROR
023130  005202                  INC     R2              ;INCREMENT OFFSET
023132  005366  000002          DEC     2(SP)           ;DECREMENT COMPARISON COUNT

023136  006300          13$:    ASL     R0              ;MULTIPLY INDEX BY 2
023140  016003  00457?          MOV     PATTAB(R0),R3   ;STORE PATTERN ADDRESS
023144  126414  0000?1          CMPB    1(R4),(R4)      ;CHECK WORD COUNT
023150  001055                  BNE     30$             ;NO, REPORT ERROR
023152  012401                  MOV     (R4)+,R1        ;STORE WORDS IN SECTOR WRITTEN
```

```
4658  023154  042701  177400              BIC     #177400,R1      ;KEEP LOW BYTE
4659  023160  005202                      INC     R2              ;INCREMENT OFFSET VALUE
4660  023162  005366  000002              DEC     2(SP)           ;DECREMENT WORD COUNT
4661  023166  005765  000116              TST     P.SMPL(R5)      ;CHECK IF SAMPLED COMPARE
4662  023172  001467                      BEQ     50$             ;YES, START SAMPLED COMPARE SEQUENCE
4663  023174  005701                      TST     R1              ;CHECK IF SECTOR ALL ZEROES
4664  023176  001426                      BEQ     20$             ;YES GO TO ZERO FILL LOOP
4665  023200  012700  000040              MOV     #32.,R0         ;LOAD PATTERN COUNT
4666  023204  022324          15$:        CMP     (R3)+,(R4)+     ;CHECK PATTERN
4667  023206  001036                      BNE     30$             ;MISCOMPARE ERROR
4668  023210  005366  000002              DEC     2(SP)           ;DECREMENT WORD COUNT
4669  023214  001442                      BEQ     40$             ;NO MORE COMPARISONS
4670  023216  005316                      DEC     (SP)            ;DECREMENT NUMBER OF SOFT
4671                                                              ;  DATA COMPARE
4672  023220  001440                      BEQ     40$             ;NO MORE COMPARISONS
4673  023222  005202                      INC     R2              ;INCREMENT OFFSET
4674  023224  022702  000400              CMP     #256.,R2        ;CHECK IF COMPLETE SECTOR COMPARES
4675  023230  001720                      BEQ     10$             ;YES, START NEXT SECTOR
4676  023232  005301                      DEC     R1              ;DECREMENT NUMBER OF WORDS WRITTEN
4677  023234  001407                      BEQ     20$             ;IF ZERO, GO TO ZERO FILL LOOP
4678  023236  005300                      DEC     R0              ;DECREMENT PATTERN COUNT
4679  023240  001361                      BNE     15$             ;NEXT WORD
4680  023242  012700  000040              MOV     #32.,R0         ;REINITIALIZE PATTERN COUNT
4681  023246  162703  000100              SUB     #64.,R3         ;REINITIALIZE PATTERN ADDRESS
4682  023252  000754                      BR      15$             ;CHECK NEXT WORD
4683
4684  023254  005724          20$:        TST     (R4)+           ;CHECK ZERO FILL OF PATTERN
4685  023256  001012                      BNE     30$             ;MISCOMPARE ERROR
4686  023260  005366  000002              DEC     2(SP)           ;DECREMENT WORD COUNT
4687  023264  001416                      BEQ     40$             ;NO MORE COMPARISONS
4688  023266  005316                      DEC     (SP)            ;DECREMENT NUMBER OF SOFT
4689                                                              ;  DATA COMPARES
4690  023270  001414                      BEQ     40$             ;NO MORE COMPARISONS
4691  023272  005202                      INC     R2              ;INCREMENT OFFSET VALUE
4692  023274  022702  000400              CMP     #256.,R2        ;CHECK IF COMPLETE SECTOR COMPARED
4693  023300  001674                      BEQ     10$             ;YES, START NEXT SECTOR
4694  023302  000764                      BR      20$             ;COMPARE NEXT WORD CH
4695
4696  023304  110265  000217          30$:        MOVB    R2,P.FRAD(R5)   ;STORE OFFSET ADDRESS
4697  023310  022626                      CMP     (SP)+,(SP)+     ;ADJUST STACK
4698  023312  017666  000012  000012        MOV     @12(SP),12(SP)  ;LOAD ERROR RETURN
4699  023320  000404                      BR      45$             ;RETURN
4700
4701  023322  022626          40$:        CMP     (SP)+,(SP)+     ;ADJUST STACK
4702  023324  062766  000002  000012        ADD     #2,12(SP)       ;ADJUST RETURN
4703
4704  023332  105065  000117          45$:        CLRB    P.ECMP(R5)      ;CLEAR ECC COMPARE FLAG
4705  023336  012600                      MOV     (SP)+,R0        ;RESTORE R0
4706  023340  012601                      MOV     (SP)+,R1        ;RESTORE R1
4707  023342  012602                      MOV     (SP)+,R2        ;RESTORE R2
4708  023344  012603                      MOV     (SP)+,R3        ;RESTORE R3
4709  023346  012604                      MOV     (SP)+,R4        ;RESTORE R4
4710  023350  000207                      RTS     PC              ;RETURN
4711
4712  023352  005701          50$:        TST     R1              ;CHECK IF ALL ZEROES
4713  023354  001432                      BEQ     52$             ;YES, TEST FOR ZEROES
```

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4714  023356  021314                      CMP     (R3),(R4)       ;CHECK FIRST WORD OF PATERN
4715  023360  001351                      BNE     30$             ;MISCOMPARE, REPORT ERROR
4716  023362  026601  000002              CMP     2(SP),R1        ;CHECK IF ENOUGH WORDS READ FOR
4717                                                              ;  BOUNDARY COMPARISON
4718  023366  103443                      BLO     55$             ;NO, DO SAMPLE COMPARE
4719  023370  010146                      MOV     R1,-(SP)        ;SAVE SECTOR COUNT
4720  023372  005301                      DEC     R1              ;CALCULATE NUMBER OF WORDS FROM START
4721  023374  006301                      ASL     R1              ;CONVERT TO BYTES
4722  023376  060104                      ADD     R1,R4           ;CALCULATE MEMORY ADDRESS
4723  023400  042701  177700              BIC     #177700,R1      ;GET PATTERN ADDRESS OFFSET
4724  023404  060103                      ADD     R1,R3           ;CALCULATE PATTERN ADDRESS
4725  023406  021324                      CMP     (R3),(R4)+      ;CHECK IF DATA WORD IS CORRECT
4726  023410  001403                      BEQ     51$             ;YES, CHECK ZERO FILL
4727  023412  005216                      INC     (SP)            ;CALCULATE OFFSET
4728  023414  012602                      MOV     (SP)+,R2        ;STORE OFFSET
4729  023416  000732                      BR      30$             ;REPORT ERROR
4730
4731  023420  012602              51$:    MOV     (SP)+,R2        ;STORE OFFSET
4732  023422  062702  000002              ADD     #2,R2           ;CALCULATE OFFSET FOR START OF ZERO FILL
4733  023426  022702  000377              CMP     #377,R2         ;CHECK IF NO ZERO FILL
4734  023432  103421                      BLO     55$             ;YES, DO SAMPLE COMPARE
4735  023434  026602  000002              CMP     2(SP),R2        ;CHECK WORD WAS READ
4736  023440  103416                      BLO     55$             ;NO, DO SAMPLE COMPARE
4737  023442  005714              52$:    TST     (R4)            ;CHECK START OF ZERO FILL
4738  023444  001317                      BNE     30$             ;NO, REPORT ERROR
4739  023446  022766  000377  000002      CMP     #377,2(SP)      ;CHECK IF LAST WORD READ
4740  023454  101010                      BHI     55$             ;NO, DO SAMPLE COMPARE
4741  023456  012702  000377              MOV     #377,R2         ;LOAD OFFSET COUNT
4742  023462  016504  000214              MOV     P.ERHD(R5),R4   ;LOAD START OF SECTOR
4743  023466  062704  000776              ADD     #776,R4         ;CALCULATE END OF SECTOR
4744  023472  005714                      TST     (R4)            ;CHECK LAST WORD OF SECTOR
4745  023474  001303                      BNE     30$             ;REPORT ERROR
4746
4747  023476  016504  000214      55$:    MOV     P.ERHD(R5),R4   ;SET START OF SECTOR
4748  023502  012400                      MOV     (R4)+,R0        ;GET PATTERN INDEX
4749  023504  042700  177760              BIC     #177760,R0      ;MASK OFF UNNECESSARY BIT
4750  023510  006300                      ASL     R0              ;MULTIPLY BY 2
4751  023512  016003  004576              MOV     PATTAB(R0),R3   ;GET PATTERN ADDRESS
4752  023516  012401                      MOV     (R4)+,R1        ;GET SECTOR WORD COUNT
4753  023520  042701  177400              BIC     #177400,R1      ;MASK OFF UNNECESSARY BITS
4754  023524  012702  000002              MOV     #2,R2           ;INITIALIZE OFFSET
4755  023530  012700  000007              MOV     #7,R0           ;LOAD NUMBER OF SAMPLES
4756  023534  162701  000043      57$:    SUB     #35.,R1         ;SUBTRACT 35 FROM SECTOR WORD COUNT
4757  023540  101430                      BLOS    60$             ;CHECK IF ZERO FILL
4758  023542  162766  000043  000002      SUB     #35.,2(SP)      ;SUBTRACT 35 FROM WORD COUNT
4759  023550  101664                      BLOS    40$             ;CHECK IF FINISHED
4760  023552  062702  000043              ADD     #35.,R2         ;CALCULATE OFFSET
4761  023556  062704  000106              ADD     #106,R4         ;DETERMINE ADDRESS OF COMPARE
4762  023562  062703  000006              ADD     #6,R3           ;DETERMINE ADDRESS OF PATTERN
4763  023566  021413                      CMP     (R4),(R3)       ;CHECK IF DATA CORRECT
4764  023570  001245                      BNE     30$             ;NO, REPORT ERROR
4765  023572  005316                      DEC     (SP)            ;DECREMENT NUMBER OF COMPARES
4766  023574  001652                      BEQ     40$             ;CHECK IF FINISHED
4767  023576  005300                      DEC     R0              ;CHECK IF IF TIME FOR NEXT SECTOR
4768  023600  001355                      BNE     57$             ;NO, CHECK NEXT SAMPLE
4769  023602  162766  000011  000002      SUB     #11,2(SP)       ;ADJUST WORD COUNT
```

```
4770  023610  101644                    BLOS    40$             ;CHECK IF FINISHED
4771  023612  062704  000022            ADD     #22,R4          ;CALCULATE START OF NEXT SECTOR
4772  023616  000137  023072            JMP     10$             ;GO SERVICE NEXT SECTOR
4773
4774  023622  162766  000043  000002  60$:  SUB    #35.,2(SP)      ;SUBTRACT 35 FROM WORD COUNT
4775  023630  101634                    BLOS    40$             ;CHECK IF FINISHED
4776  023632  062702  000043            ADD     #35.,R2         ;DETERMINE OFFSET
4777  023636  062704  000106            ADD     #106,R4         ;DETERMINE ADDRESS OF COMPARE
4778  023642  005714                    TST     (R4)            ;CHECK IF DATA CORRECT
4779  023644  001217                    BNE     30$             ;NO, REPORT ERROR
4780  023646  005316                    DEC     (SP)            ;DECREMENT NUMBER OF COMPARES
4781  023650  001624                    BEQ     40$             ;BRANCH IF FINISHED
4782  023652  005300                    DEC     R0              ;CHECK IF SAMPLE COUNT EXHAUSTED
4783  023654  001362                    BNE     60$             ;NO, CHECK NEXT SAMPLE
4784  023656  162766  000011  000002    SUB     #11,2(SP)       ;ADJUST WORD COUNT
4785  023664  101616                    BLOS    40$             ;CHECK IF FINISHED
4786  023666  062704  000022            ADD     #22,R4          ;CALCULATE START OF NEXT SECTOR
4787  023672  000137  023072            JMP     10$             ;GO SERVICE NEXT SECTOR
```

```
                        .SBTTL  NORMAL COMMAND RETURN
                        ;;*****************************************************************
                        ;*
                        ;*      THIS ROUTINE WILL HANDLE ALL NORMAL COMMAND TERMINATIONS
                        ;*
                        ;*      CALLED ROUTINE          USE
                        ;*      --------------          ---
                        ;*
                        ;*      ASNORM                  ASSIGNMENT NORMAL TERMINATION
                        ;*      CNTRL1                  CONTROLLER ERROR
                        ;*      ABNORM                  DRIVE ERROR
                        ;*      EVCVY1                  NORMAL ERROR RECOVERY
                        ;*      DATERR                  INCORRECT DATA BUFFER
                        ;*
                        ;*      ASSUMED REGISTERS
                        ;*
                        ;*      REGISTER        CONTENTS
                        ;*      --------        --------
                        ;*
                        ;*      R5              ADDRESS OF PARMETER BLOCK
                        ;*      R2              ADDRESS OF RK06 REGISTERS
                        ;*
                        ;;*****************************************************************

023676  004737  046664        NORMAL: JSR     PC,I.CSTS       ;GATHER CONTROLLER STATUS
023702  032765  024000  000016        BIT     #SPARICTO,P.CS1(R5) ;CHECK IF DRIVE BUS PARITY OR CONTROLLER TIME OUT
023710  001010                      BNE     2$              ;YES, INDICATE CONTROLLER FAULT

                        ;       CHECK IF ANY OF THE FOLLOWING ERRORS ARE SET IN CS2
                        ;               UNIT FIELD ERROR
                        ;               MULTIPLE DRIVE SELECT
                        ;               PROGRAMMING ERROR
                        ;               NON-EXISTENT MEMORY
                        ;               NON-EXISTENT DRIVE
                        ;               UNIBUS PARITY ERROR
                        ;               WRITE CHECK ERROR
                        ;               DATA LATE
023712  032765  177400  000020        BIT     #UFE!MDS!IPGE!NEM!WED!UPE!WCF!DLT,P.CS2(R5)
023720  001004                      BNE     2$              ;YES, INIDICATE CONTROLLER ERROR

                        ;       CHECK IF ANY OF THE FOLLOWING ERRORS ARE SET IN ERER
                        ;               ILLEGAL FUNTION CODE
                        ;               FORMAT ERROR
                        ;               DRIVE TYPE ERROR
                        ;               ECC HARD
                        ;               BAD SECTOR ERROR
                        ;               HEADER VRC ERROR
                        ;               CYLINDER ADDRESS OVERFLOW
                        ;               DRIVE TIMING ERROR
                        ;               OPERATION INCOMPLETE
                        ;               DATA CHECK
023722  032765  131761  000034        BIT     #ILC!FMTE!DTYE!ECH!BSE!HVRC!CCE!DTE!OPI!DCK,P.ER(R5)
023730  001405                      BEQ     3$              ;NO, CHECK FOR UNREPORT DRIVE ERRORS
023732  052737  000001  001560  2$: BIS     #BIT0,ERCONT    ;SET CONTROLLER ERROR BIT FLAGGED
023740  000137  026426              JMP     CNTRL1          ;REPORT CONTROLLER ERROR
```

```
4844
4845                                    ;       CHECK THE FOLLOWING ERROR BITS IN RMER(UNREPORTED DRIVE ERROR)
4846                                    ;               SEEK INCOMPLETE
4847                                    ;               NON-EXECUTABLE DRIVE FUNCTION
4848                                    ;               DRIVE DETECTED DRIVE BUS PARITY ERROR
4849                                    ;               INVALID DISK ADDRESS
4850                                    ;               WRITE LOCK ERROR
4851                                    ;               UNSAFE
4852  023744  032765  046016  000034  3$:     BIT     #SKIINXFICRPARIIDAEIBLEIUNS,P.ER(R5)
4853  023752  001004                          BNE     4$              ;YES,SET UNREPORTED DRIVE ERROR
4854
4855                                    ;       CHECK THE FOLLOWING ERROR BITS IN RMDS
4856                                    ;               AC LOW
4857                                    ;               SPEED LOSS
4858                                    ;               DRIVE OFF TRACK
4859  023754  032765  000070  000036          BIT     #ACLOISPDLSSIDRDT,P.DS(R5)
4860  023762  001405                          BEQ     5$              ;NO, CHECK IF SPECIAL SEQUENCE
4861  023764  052765  000010  000212  4$:     BIS     #BIT3,P.ERR(R5) ;SET DRIVE ERROR NOT REPORTED
4862  023772  000137  024766                  JMP     ERNORM          ;PROCESS ERROR
4863
4864  023776  032765  000001  000014  5$:     BIT     #DRVUSE,P.PRST(R5) ;CHECK IF DRIVE IN USE
4865  024004  001005                          BNE     6$              ;YES, CHECK IF SPECIAL SEQUENCE
4866  024006  052765  000200  000212          BIS     #BIT7,P.ERR(R5) ;SET UNSOLICITATED ATTENTION
4867  024014  000137  024766                  JMP     ERNORM          ;PROCESS ERROR
4868
4869  024020  005737  001560          6$:     TST     ERCONT          ;CHECK IF CONTROLLER ERROR HAS OCCURRED
4870  024024  100017                          BPL     11$             ;NO, CONTINUE NORMAL PROCESSING
4871  024026  122765  000121  000001          CMPB    #RDDATA,P.CMND(R5) ;CHECK IF DATA TRANSFER COMMAND
4872  024034  101007                          BHI     7$              ;NO, REISSUE COMMAND
4873  024036  132765  000040  000001          BITB    #BIT5,P.CMND(R5) ;CHECK IF SPECIAL COMMAND
4874  024044  001003                          BNE     7$              ;YES, REISSUE COMMAND
4875  024046  004037  024506                  JSR     R0,CHKADD       ;CHECK BUS AND DISK ADDRESS
4876  024052  024062                          10$                     ;ERROR RETURN
4877  024054  004037  050706          7$:     JSR     R0,Q.PUSH       ;ENQUEUE PARAMETER BLOCK IN
4878  024060  001324                          CINITQ                  ;  COMMAND INITIATION QUEUE
4879  024062  000207                  10$:    RTS     PC              ;RETURN
4880
4881  024064  005765  000150          11$:    TST     P.DSTT(R5)      ;CHECK IF RETRY SEQUENCE
4882  024070  001417                          BEQ     32$             ;NO, CHECK IF DRIVE IS BEING ASSIGNED
4883  024072  004737  037464                  JSR     PC,ERCVY1       ;GO THROUGH ERROR RECOVERY
4884  024076  005737  001562          20$:    TST     ERRPRO          ;CHECK IF ERROR PROCESSING COMPLETE
4885  024102  001367                          BNE     10$             ;NO, RETURN
4886  024104  004037  050766                  JSR     R0,Q.POP        ;GET NEXT ERROR TO BE PROCESSED
4887  024110  001330                          ERRPRO
4888  024112  012605                          MOV     (SP)+,R5        ;LOAD ADDRESS OF PARAMETER BLOCK FOR
4889                                                                  ;  NEXT ERROR
4890  024114  001762                          BEQ     10$             ;IF NO MORE ERRORS, RETURN
4891  024116  010537  001562                  MOV     R5,ERRPRO       ;INDICATE THAT ERROR IS BEING PROCESSED
4892  024122  004737  031224                  JSR     PC,ERCVY        ;GO THROUGH ERROR RECOVERY
4893  024126  000763                          BR      20$             ;CHECK IF ERROR PROCESSING COMPLETE
4894
4895  024130  105765  000210          32$:    TSTB    P.ASSN(R5)      ;CHECK IF DRIVE IS BEING ASSIGNED
4896  024134  001402                          BEQ     33$             ;NO, CHECK IF SEEK OR RELEASE
4897  024136  000137  013270                  JMP     ASNORM          ;GO CONTINUE ASSIGNMENT
4898
4899  024142  122765  000117  000001  33$:    CMPB    #SEEK,P.CMND(R5) ;CHECK IF SEEK TO PREVIOUS POSITION
```

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4900                                                        ;  (SWITCH 14 OPTION)
4901  024150  001416                    BEQ     34$        ;YES, RELEASE DRIVE
4902  024152  122765  000140  000001    CMPB    #RELEAS,P.CMND(R5) ;CHECK IF RELEASE COMMAND
4903  024160  001021                    BNE     35$        ;NO, CHECK ADDRESS AND WORD COUNT
4904  024162  112737  177777  001502    MOVB    #-1,I.ISRL ;INDICATE THAT AN INTERRUPT HAS BEEN ISSUED
4905  024170  012762  000300  000000    MOV     #INTR,RKCS1(R2) ;FORCE AN INTERRUPT SCAN DRIVE ATTENTIONS
4906  024176  004037  050706            JSR     R0,Q.PUSH  ;PUT PARAMTER BLOCK ADDRESS ON
4907  024202  001314                    AVAILQ             ;  DRIVE AVAILIABLE QUEUE
4908  024204  000207                    RTS     PC         ;RETURN
4909
4910  024206  112765  000140  000001  34$:  MOVB    #RELEAS,P.CMND(R5) ;PUT RELEASE COMMAND IN PARAMETER BLOCK
4911  024214  004037  050706            JSR     R0,Q.PUSH  ;ENQUEUE PARAMETER BLOCK IN
4912  024220  001324                    CINITQ             ;  COMMAND INITIATION QUEUE
4913  024222  000207                    RTS     PC         ;RETURN
4914
4915  024224  004037  024506          35$:  JSR     R0,CHKADD  ;CHECK WORD COUNT, BUS ADDRESS,
4916                                                        ;  SECTOR, TRACK, AND CYLINDER
4917  024230  024062                    10$                ;SEARCH RETURN ADDRESS
4918  024232  112737  177777  001502    MOVB    #-1,I.ISRL ;INDICATE THAT AN INTERRUPT HAS BEEN ISSUED
4919  024240  012762  000300  000000    MOV     #INTR,RKCS1(R2) ;GO SCAN FOR DRIVE INTERRUPTS
4920  024246  005037  177776            CLR     PS         ;ALLOW RK06 INTERRUPTS
4921  024252  122765  000121  000001    CMPB    #RDDATA,P.CMND(R5) ;CHECK IF READ DATA
4922  024260  001004                    BNE     NORM1      ;NO, DO NOT COMPARE BUFFER
4923  024262  004037  022760            JSR     R0,BUFER1  ;CHECK DATA READ
4924  024266  025100                    DATERR             ;ERROR RETURN
4925  024270  000417                    BR      NORM2      ;RELEASE BUFFER
4926
4927  024272  122765  000131  000001  NORM1:  CMPB    #WRTCHK,P.CMND(R5) ;CHECK IF WRITE COMMAND
4928  024300  001013                    BNE     NORM2      ;NO, RELEASE BUFFER
4929  024302  032765  000200  000014    BIT     #W.WCK,P.PRST(R5) ;CHECK IF WRITE CHECK ISSUED
4930  024310  001407                    BEQ     NORM2      ;YES, RELEASE BUFFER
4931  024312  042765  000200  000014    BIC     #W.WCK,P.PRST(R5) ;CLEAR WRITE FLAG
4932  024320  004037  050706            JSR     R0,Q.PUSH  ;PUT PARAMETER BLOCK IN
4933  024324  001324                    CINITQ             ;  COMMAND INITIATION QUEUE
4934  024326  000207                    RTS     PC         ;RETURN
4935
4936  024330  013737  001450  177776  NORM2:  MOV     RKPRI,PS   ;LOCK OUT RK06 INTERRUPTS
4937  024336  004737  022316            JSR     PC,BUFREL  ;RELEASE BUFFER
4938  024342  005037  177776            CLR     PS         ;ALLOW RK06 INTERRUPTS
4939  024346  032777  040040  154564    BIT     #SW.SW14,@SWR  ;CHECK IF INHIBIT AUTOMATIC DESELECT
4940  024354  001043                    BNE     33$        ;YES, PUT PARAMETER BLOCK IN
4941                                                        ;  AVAILIABLE QUEUE
4942  024356  026565  000110  000154    CMP     P.MXCD+2(R5),P.NODR+2(R5) ;CHECK IF MAXIMUM NUMBER
4943                                                        ;  OF COMMAND HAVE BEEN ISSUED
4944  024364  101010                    BHI     29$        ;NO, CHECK IF MAXIMUM NUMBER OF
4945                                                        ;  OF WORDS HAVE BEEN TRANSFERRED
4946  024366  103404                    BLO     28$        ;YES, DROP DRIVE
4947  024370  026565  000106  000152    CMP     P.MXCD(R5),P.NCDR(R5) ;CHECK IF MAXIMUM NUMBER
4948                                                        ;  OF COMMANDS HAVE BEEN ISSUED
4949  024376  103003                    BHIS    29$        ;NO, CHECK IF MAXIMUM NUMBER OF
4950                                                        ;  HAVE BEEN TRANSFERRED
4951  024400  004737  012716          28$:  JSR     PC,DRCP    ;DROP DRIVE
4952  024404  000435                    BR      35$        ;ALLOCATE BUFFER
4953
4954
4955  024406  016546  000166          29$:  MOV     P.NRD+2(R5),-(SP) ;STORE NUMBER OF WORDS READ ON STACK
```

```
 4956  024412  016546  000170                MOV     P.NRD+4(R5),-(SP)
 4957  024416  066566  000160  000002        ADD     P.NWRT+2(R5),2(SP) ;ADD NUMBER OF WORDS WRITTEN
 4958  024424  005516                        ADC     (SP)
 4959  024426  066516  000162                ADD     P.NWRT+4(R5),(SP)
 4960  024432  103410                        BCS     30$             ;DROP DRIVE IF OVERFLOW
 4961  024434  026526  000114                CMP     P.MXWT+2(R5),(SP)+ ;CHECK IF MAXIMUM NUMBER OF WORDS
 4962                                                                ;  HAVE BEEN TRANSFERRED
 4963  024440  101010                        BHI     32$             ;NO, PUT PARAMETER BLOCK IN
 4964                                                                ;  AVAILIABLE QUEUE
 4965  024442  103405                        BLO     31$             ;YES, DROP DRIVE
 4966  024444  026526  000112                CMP     P.MXWT(R5),(SP)+ ;CHECK IF MAXIMUM NUMBER OF WORDS
 4967                                                                ;  HAVE BEEN TRANSFERRED
 4968  024450  103753                        BLO     28$             ;YES, DROP DRIVE
 4969  024452  000404                        BR      33$             ;NO, PUT PARAMETER BLOCK IN
 4970                                                                ;  AVAILABLE QUEUE
 4971
 4972  024454  005726                30$:    TST     (SP)+           ;ADJUST STACK
 4973  024456  005726                31$:    TST     (SP)+           ;ADJUST STACK
 4974  024460  000747                        BR      28$             ;DROP DRIVE
 4975
 4976  024462  005726                32$:    TST     (SP)+           ;ADJUST STACK
 4977  024464  112765  000140  000001  33$:    MOVB    #RELEAS,P.CMND(R5) ;PUT RELEASE COMMAND IN PARAMETER BLOCK
 4978  024472  004037  050706                JSR     R0,Q.PUSH       ;ENQUEUE PARAMETER BLOCK IN
 4979  024476  001324                        CINITQ                  ;  COMMAND INITIATION QUEUE
 4980
 4981  024500  004737  022016          35$:  JSR     PC,GETBUF       ;GET NEW BUFFER
 4982  024504  000207                        RTS     PC              ;RETURN
```

```
                                .SBTTL  CHECK BUS ADDRESS, WORD COUNT, SECTOR, TRACK, AND CYLINDER

024506  005765  000022         CHKADD: TST     P.WCR(R5)       ;CHECK IF WORD COUNT ZERO
024512  001404                         BEQ     6$              ;YES, CHECK BUS ADDRESS
024514  052737  000002  001560         BIS     #BIT1,ERRCNT    ;SET WORD COUNT NOT EQUAL ZERO
024522  000512                         BR      24$             ;REPORT ERROR

024524  032765  001400  000016  6$:    BIT     #BA16!BA17,P.CS1(R5) ;CHECK IF HIGH BUS ADDRESS BITS SET
024532  001011                         BNE     10$             ;YES, REPORT ERROR
024534  016546  000012                 MOV     P.WC(R5),-(SP)  ;STORE WORD COUNT
024540  005416                         NEG     (SP)            ;MAKE IT POSITIVE
024542  006316                         ASL     (SP)            ;DETERMINE NUMBER OF BITS
024544  066516  000010                 ADD     P.BALO(R5),(SP) ;DETERMINE EXPECTED BUS ADDRESS
024550  026526  000024                 CMP     P.BAR(R5),(SP)+ ;CHECK BUS ADDRESS
024554  001404                         BEQ     17$             ;BUS ADDRESS CORRECT--CHECK CYLINDER,
                                                               ;TRACK, AND SECTOR
024556  052737  000004  001560  10$:    BIS     #BIT2,ERRCNT    ;SET BUS ADDRESS INCORRECT
024564  000471                         BR      24$             ;REPORT ERROR

024566  016546  000012         17$:    MOV     P.WC(R5),-(SP)  ;STORE WORD COUNT
024572  005416                         NEG     (SP)            ;MAKE IT POSITIVE
024574  105716                         TSTB    (SP)            ;CHECK IF EVEN NUMBER OF SECTORS
024576  001402                         BEQ     18$             ;YES, DO COMPARISON
024600  105266  000001                 INCB    1(SP)           ;INCREMENT SECTOR COUNT
024604  005046                 18$:    CLR     -(SP)           ;MAKE ROOM ON STACK
024606  116616  000003                 MOVB    3(SP),(SP)      ;STORE NUMBER OF SECTORS TRANSFERRED
024612  005066  000002                 CLR     2(SP)           ;CLEAR LOCATION ON STACK
024616  116566  000004  000002         MOVB    P.SECT(R5),2(SP) ;STORE STARTING SECTOR
024624  066616  000002                 ADD     2(SP),(SP)      ;DETERMINE FINAL SECTOR ADDRESS
024630  005066  000002                 CLR     2(SP)           ;CLEAR NUMBER OF TRACKS TRANSFERRED

024634  022716  000026         19$:    CMP     #22.,(SP)       ;CHECK FOR SECTOR OVERFLOW
024640  101005                         BHI     20$             ;NO, CHECK IF SECTOR CORRECT
024642  162716  000026                 SUB     #22.,(SP)       ;DECREMENT SECTOR COUNT BY 22 AND
024646  005266  000002                 INC     2(SP)           ; INCREMENT TRACKS TRANSFERRED
024652  000770                         BR      19$             ;CHECK FOR SECTOR OVERFLOW

024654  176526  000026         20$:    CMPB    P.DTS(R5),(SP)+ ;CHECK IF FINAL SECTOR CORRECT
024660  001027                         BNE     23$             ;NO, REPORT ERROR
024662  005046                         CLR     -(SP)           ;MAKE ROOM FOR TRACKS TRANSFERRED
024664  116516  000005                 MOVB    P.TRCK(R5),(SP) ;STORE STARTING TRACK
024670  066616  000002                 ADD     2(SP),(SP)      ;DETERMINE FINAL TRACK ADDRESS
024674  005066  000002                 CLR     2(SP)           ;CLEAR FINAL CYLINDER

024700  122716  000003         21$:    CMPB    #3,(SP)         ;CHECK FOR TRACK OVERFLOW
024704  101005                         BHI     22$             ;NO, CHECK FINAL TRACK
024706  162716  000003                 SUB     #3,(SP)         ;DECREMENT TRACK COUNT BY 3 AND
024712  005266  000002                 INC     2(SP)           ;  INCREMENT CYLINDER COUNT
024716  000770                         BR      21$             ;CHECK FOR TRACK OVERFLOW

024720  126526  000027         22$:    CMPB    P.DTS+1(R5),(SP)+ ;CHECK IF FINAL TRACK CORRECT
024724  001005                         BNE     23$             ;TRACK INCORRECT ERROR
024726  066516  000002                 ADD     P.CYLN(R5),(SP) ;CALCULATE FINAL CYLINDER
024732  026516  000030                 CMP     P.DCYL(R5),(SP) ;CHECK IF CYLINDER CORRECT
024736  001410                         BEQ     25$             ;CORRECT GO TO NORMAL RETURN
024740  005726                 23$:    TST     (SP)+           ;ADJUST STACK
```

```
 5039  024742  052737  000010  001560          BIS     #BIT3,ERCONT    ;SET INCORRECT SECTOR, TRACK, OR CYLINDER
 5040  024750  004737  026426          24$:    JSR     PC,CNTRL1       ;REPORT ERROR
 5041  024754  011000                          MOV     (R0),R0         ;LOAD R0 FOR ERROR RETURN
 5042  024756  000200                          RTS     R0              ;RETURN
 5043
 5044  024760  005726                  25$:    TST     (SP)+           ;ADJUST STACK
 5045  024762  005720                          TST     (R0)+           ;ADJUST R0
 5046  024764  000200                          RTS     R0              ;NORMAL RETURN
```

```
5047                                    .SBTTL  ABNORMAL TERMINATION
5048
5049  024766  004737  051126            ABNORM: JSR     PC,C.RMCV       ;REMOVE PARAMETER BLOCK FROM COMMAND
5050                                                                    ;  INITIATION QUEUE
5051  024772  032765  000100  000014            BIT     #CMDTO,P.PRST(R5) ;CHECK IF COMMAND TIME OUT
5052  025000  001402                            BEQ     3$              ;NO, PROCESS ABNORMAL TERMINATION
5053  025002  000137  025172                    JMP     TIMOUT          ;JUMP TO TIME OUT ROUTINE
5054
5055  025006  005737  001560            3$:     TST     ERCONT          ;CHECK IF CONTROLLER ERROR WAS OCCURRED
5056  025012  100010                            BPL     10$             ;NO, CONTINUE ERROR PROCESSING
5057  025014  032765  000001  000014            BIT     #DRVUSE,P.PRST(R5) ;CHECK FOR UNSOLICATED INTERRUPT
5058  025022  001403                            BEQ     5$              ;YES, DO NOT ENQUEUE PARAMETER BLOCK
5059  025024  004037  050706                    JSR     R0,Q.PUSH       ;ENQUEUE PARAMETER BLOCK IN
5060  025030  001324                            CINITQ                  ;  COMMAND INITIATION QUEUE
5061  025032  000207                    5$:     RTS     PC              ;RETURN
5062
5063  025034  032765  000001  000014  10$:     BIT     #DRVUSE,P.PRST(R5) ;CHECK IF DRIVE IN USE
5064  025042  001004                            BNE     ABN000          ;YES, CHECK IF DRIVE BEING ASSIGNED
5065  025044  052765  000200  000212            BIS     #BIT7,P.EPR(R5) ;INDICATE UNSOLICATED INTERRUPT
5066  025052  000420                            BR      ABN001          ;CHECK IF ERROR IS BEING PROCESSED
5067
5068  025054  005765  000150            ABN000: TST     P.DSTT(R5)      ;CHECK IF CURRENTLY UNDERGOING
5069                                                                    ;  ERROR PROCESSING
5070  025060  001415                            BEQ     ABN001          ;NO, CHECK IF ERROR PRESENTLY BEING PROCESSED
5071  025062  100402                            BMI     13$             ;ERROR ENQUEUED
5072  025064  000137  042262                    JMP     ERCVY2          ;ERROR RECOVERY ROUTINE
5073
5074  025070  052765  000100  000212  13$:     BIS     #BIT6,P.ERR(R5) ;SET ERROR WHILE ENQUEUED IN ERROR QUEUE
5075  025076  000207                            RTS     PC              ;RETURN
5076
5077  025100  013737  001450  177776  DATERR: MOV     RKPPI,PS        ;LOCK RK06 INTERRUPTS
5078  025106  052765  000004  000212            BIS     #BIT2,P.ERR(R5) ;SET SOFTWARE DETECTED DATA ERROR
5079
5080  025114  012765  100200  000150  ABN001: MOV     #BIT15!BIT7,P.DSTT(R5) ;SET ERROR ENQUEUED AND FIRST ERROR
5081  025122  005737  001562                    TST     ERRPRO          ;CHECK IF ERROR IS BEING PROCESSED
5082  025126  001015                            BNE     5$              ;YES, GO ENQUEUE ERROR
5083  025130  010537  001562            2$:     MOV     R5,ERRPRO       ;LOAD ERROR BEING PROCESSED
5084  025134  004737  031224                    JSR     PC,ERCVY        ;START ERROR RECOVERY
5085  025140  005737  001562                    TST     EPRPRO          ;CHECK IF ERROR PROCESSING THROUGH
5086  025144  001005                            BNE     3$              ;NO, RETURN
5087  025146  004037  050766                    JSR     R0,Q.POP        ;GET NEXT ERROR ENQUEUED
5088  025152  001330                            ERRPRO
5089  025154  012605                            MOV     (SP)+,R5        ;LOAD R5 FOR ERROR PROCESSING
5090  025156  001364                            BNE     2$              ;IF NOT ZERO PROCESS NEXT ERROR
5091  025160  000207                    3$:     RTS     PC              ;RETURN
5092
5093  025162  004037  050706            5$:     JSR     R0,Q.PUSH       ;PUT PARAMETER BLOCK ON
5094  025166  001330                            ERRPRO                  ;  ERROR PROCESSING QUEUE
5095  025170  000207                            RTS     PC              ;RETURN
```

```
                                .SBTTL  COMMAND TIME OUT ROUTINE

025172  016246  000010        TIMOUT: MOV     RKCS2(R2),-(SP) ;GET CS2 FOR DRIVE NUMBER
025176  042716  177770                BIC     #^C<DRVMSK>,(SP) ;KEEP DRIVE NUMBER
025202  122665  000000                CMPB    (SP)+,P.DRVN(R5) ;CHECK IF TIME OUT IF FOR
                                                                ;  CURRENTLY SELECTED DRIVE
025206  001014                        BNE     5$              ;NO, TEST IF LOOPING ON CONTROLLER ERROR
025210  016237  000000  001406        MOV     RKCS1(R2),T.CS1 ;GET COMMAND AND STATUS REGISTER 1
025216  032737  000001  001406        BIT     #GO,T.CS1       ;CHECK IF GO IS STILL SET
025224  001405                        BEQ     5$              ;NO, TEST IF LOOPING ON CONTROLLER ERROR
025226  052737  040000  001460        BIS     #E.CMTO,E.CONT  ;SET CONTROLLER TIMED OUT ON COMMAND
025234  000137  026022                JMP     CONTRL          ;GO REPORT CONTROLLER ERROR

025240  005737  001560        5$:     TST     ERCONT          ;CHECK IF CYCLING ON CONTROLLER ERROR
025244  100004                        BPL     10$             ;NO, CHECK IF DRIVE IS CURRENTLY
                                                                ;  SEIZED BY OTHER PORT
025246  004037  050706                JSR     R0,Q.PUSH       ;REQUEUE COMMAND IN COMMAND
025252  001324                        CINITQ                  ;  INITIATION QUEUE
025254  000207                        RTS     PC              ;RETURN

025256  032765  010000  000014  10$:   BIT     #DRVSZD,P.PRST(R5) ;CHECK IF DRIVE WAS SEIZED
025264  001404                        BEQ     12$             ;NO, CONTINUE
025266  052765  000020  000212        BIS     #BIT4,P.ERR(R5) ;SET TIME OUT BECAUSE DRIVE SEIZED
025274  000667                        BR      ABN000          ;GO INITIATE ERROR PROCESSING

025276  032765  020000  000014  12$:   BIT     #E.UNLD,P.PRST(R5) ;CHECK IF WAITING FOR HEADS TO RELOAD
025304  001404                        BEQ     15$             ;NO, SET TIME OUT FOR POSITIONING
025306  052765  000400  000212        BIS     #BIT8,P.ERR(R5) ;SET TIME OUT IN RELOADING HEADS
025314  000657                        BR      ABN000          ;GO INITIATE ERROR PROCESSING

025316  052765  000040  000212  15$:   BIS     #BIT5,P.ERR(R5) ;SET TIME OUT DURING POSITIONING
025324  000653                        BR      ABN000          ;GO INITIATE ERROR PROCESSING
```

```
                        .SBTTL  PRINT RK06 UNIBUS REGISTERS

                        PRIREG: MOV     R3,-(SP)        ;STORE R3 ON STACK
                                MOV     R1,-(SP)        ;STORE R1 ON STACK
                                MOV     #T.CS1,R3       ;LOAD BEGINNING OF REGISTER STORAGE
                                MOV     #T.DS,R1        ;LOAD END OF REGISTER STORAGE
                                TYPE    ,ERR300         ;PRINT REGISTER NAMES
                                JSR     PC,PRSTAT       ;PRINT REGISTER CONTENTS
                                MOV     #T.DB,R1        ;LOAD END OF REGISTER STORAGE
                                TYPE    ,ERR301         ;PRINT REGISTER NAMES
                                JSR     PC,PRSTAT       ;PRINT REGISTER CONTENTS
                                MOV     (SP)+,R1        ;RESTORE R1
                                MOV     (SP)+,R3        ;RESTORE R3
                                RTS     PC              ;RETURN

                        .SBTTL  PRINT DRIVE STATUS

                        PRDSTT: MOV     R3,-(SP)        ;STORE R3 ON STACK
                                TYPE    ,ERR302         ;PRINT REGISTER NAMES
                                MOV     P.DS(R5),-(SP)  ;CONVERT DRIVE STATUS REG TO OCTAL
                                JSR     PC,BINOCT
                                TYPE    ,ERR303         ;PRINT HEADER
                                MOV     R5,R3           ;DETERMINE START OF PRINT OUT
                                ADD     #P.A00,R3
                                MOV     (R3)+,-(SP)     ;PRINT MESSAGE A
                                JSR     PC,BINOCT
                                TYPE    ,BLANKS
                                MOV     (R3)+,-(SP)     ;PRINT MESSAGE B
                                JSR     PC,BINOCT
                                TYPE    ,ERR304
                                MOV     (R3)+,-(SP)     ;PRINT MESSAGE A
                                JSR     PC,BINOCT
                                TYPE    ,BLANKS
                                MOV     (R3)+,-(SP)     ;PRINT MESSAGE B
                                JSR     PC,BINOCT
                                TYPE    ,ERR305
                                MOV     (R3)+,-(SP)     ;PRINT MESSAGE A
                                JSR     PC,BINOCT
                                TYPE    ,BLANKS
                                MOV     (R3)+,-(SP)     ;PRINT MESSAGE B
                                JSR     PC,BINOCT
                                TYPE    ,ERR306
                                MOV     (R3)+,-(SP)     ;PRINT MESSAGE A
                                JSR     PC,BINOCT
                                TYPE    ,BLANKS
                                MOV     (R3)+,-(SP)     ;PRINT MESSAGE B
                                JSR     PC,BINOCT
                                TYPE    ,CRLF
                                MOV     (SP)+,R3        ;RESTORE R3
                                RTS     PC              ;RETURN
```

```
5178                                    .SBTTL  PRINT CONTROLLER STATUS
5179
5180  025550  010346                    PRISTT: MOV     R3,-(SP)        ;STORE R3 ON STACK
5181  025552  010146                            MOV     R1,-(SP)        ;STORE R1 ON STACK
5182  025554  010503                            MOV     R5,R3           ;STORE PARAMETER BLOCK ADDRESS
5183  025556  010501                            MOV     R5,R1           ;  FOR INDEX CACULATIONS
5184  025560  062703  000016                    ADD     #P.CS1,R3       ;CALCULATE BEGINNING OF OUTPUT OCTAL
5185  025564  062701  000036                    ADD     #P.DS,R1        ;CALCULATE END OF OUTPUT OCTAL
5186  025570  104401  063401                    TYPE    ,ERP300         ;PRINT REGISTER NAMES
5187  025574  004737  025606                    JSR     PC,PRSTAT       ;PRINT REGISTER CONTENTS
5188  025600  012601                            MOV     (SP)+,R1        ;RESTORE R1
5189  025602  012603                            MOV     (SP)+,R3        ;RESTORE R3
5190  025604  000207                            RTS     PC              ;RETURN
5191
5192                                    .SBTTL  PRINT REGISTER CONTENTS
5193
5194  025606  012346                    PRSTAT: MOV     (R3)+,-(SP)     ;SAVE REGISTER VALUE FOR TYPE OUT
5195  025610  004737  052144                    JSR     PC,RINOCT       ;CONVERT TO OCTAL
5196  025614  020103                            CMP     R1,R3           ;CHECK IF FINISHED
5197  025616  001403                            BEQ     10$             ;YES, RETURN
5198  025620  104401  057551                    TYPE    ,BLANKS         ;TYPE 2 BLANKS
5199  025624  000770                            BR      PRSTAT          ;TYPE NEXT REGISTER
5200
5201  025626  104401  001165            10$:    TYPE    ,$CRLF          ;TYPE <CR><LF>
5202  025632  000207                            RTS     PC              ;RETURN
```

```
                        .SBTTL  ECC CORRECTION ROUTINE

ECCCOR: MOV     R4,-(SP)        ;STORE R4 ON STACK
        MOV     R3,-(SP)        ;STORE R3 ON STACK
        MOV     R1,-(SP)        ;STORE R1 ON STACK
        MOV     R0,-(SP)        ;STORE R0 ON STACK
        MOV     RTYBA,R3        ;LOAD BEGINNING OF SECTOR ADDRESS
        MOV     RTYWC,R4        ;LOAD WORDS READ FROM SECTOR
        ASL     R4              ;MAKE IT BYTES
        MOV     R3,-(SP)        ;STORE ADDRESS OF START OF SECTOR
        ADD     R4,(SP)         ;CALCULATE END OF SECTOR
        MOV     P.EPOS(R5),R1   ;SAVE POSITION INFORMATION
        DEC     R1              ;DECREMENT BIT COUNT BY ONE TO GET
                                ;  BIT ADDRESS
        MOV     R1,R0
        ASR     R1              ;DETERMINE WORDS THAT ARE BAD
        ASR     R1              ;  FOR DATA READ (SHIFT 3 BITS
        ASR     R1              ;  RIGHT)
        BIC     #1,R1           ;CLEAR BYTE INDICATOR
        CMP     R1,R4           ;CHECK IF ERROR WITHIN TRANSFER
        BHIS    10$             ;NO, RETURN
        ADD     R1,R3           ;DETERMINE ADDRESS OF ERROR
        MOV     P.EPAT(R5),ECCPAT ;LOAD PATTERN
        CLR     ECCPAT+2
        BIC     #177760,R0      ;DETERMINE BIT POSITION FOR START OF ECC
                                ;  CORRECTION
        BEQ     5$              ;CORRECTION STARTS ON
                                ;  WORD BOUNDARY

3$:     ASL     ECCPAT          ;SHIFT PATTERN 1 BIT LEFT
        ROL     ECCPAT+2
        DEC     R0              ;DECREMENT COUNT
        BNE     3$              ;CHECK IF IN POSITION

5$:     MOV     (R3),R0         ;CORRECT FIRST WORD WITH EXCLUSIVE
        MOV     ECCPAT,R1       ;  OF BITS IN ERROR
        BIC     ECCPAT,(R3)
        BIC     R0,R1
        BIS     R1,(R3)+
        CMP     (SP),R3         ;CHECK IF SECOND WORD IN TRANSFER
        BEQ     10$             ;NO, RETURN
        MOV     (R3),R0         ;CORRECT SECOND WORD WITH EXCLUSIVE
        MOV     ECCPAT+2,R1     ;  OF BITS IN ERROR
        BIC     ECCPAT+2,(R3)
        BIC     R0,R1
        BIS     R1,(R3)

10$:    TST     (SP)+           ;ADJUST STACK
        MOV     (SP)+,R0        ;RESTORE R0
        MOV     (SP)+,R1        ;RESTORE R1
        MOV     (SP)+,R3        ;RESTORE R3
        MOV     (SP)+,R4        ;RESTORE R4
        RTS     PC              ;RETURN
```

```
                                .SBTTL  CONTROLLER ERROR DETECTED BY RK06 DRIVER

026022  010446          CONTRL: MOV     R4,-(SP)        ;STORE R4 ON STACK
026024  004737  046536          JSR     PC,I.STOR       ;GET CONTROLLER STATUS
026030  032777  002000  153102  BIT     #SW10,@SWR      ;CHECK IF BELL ON ERROR
026036  001402                  BEQ     1$              ;NO, CONTINUE
026040  104401  001160          TYPE    ,$BELL          ;RING BELL
026044  013704  001460  1$:     MOV     E.CONT,R4       ;STORE CONTROLLER INDICATORS
026050  032704  100000          BIT     #E.MDS,R4       ;CHECK IF DUPLICATE DRIVE SELECT
026054  001403                  BEQ     2$              ;NO, CHECK FOR OTHER ERRORS
026056  104401  060023          TYPE    ,ERR006         ;TYPE "MULTIPLE DRIVE SELECT"
026062  000457                  BR      10$             ;DISPLAY REGISTERS

026064  032704  000001  2$:     BIT     #E.CCLR,R4      ;CHECK IF "CLEAR CONTROLLER DID NOT
                                                        ;  CLEAR ERROR"
026070  001403                  BEQ     3$              ;NO, CHECK OTHER CONTROLLER ERRORS
026072  104401  057601          TYPE    ,ERR001
026076  000451                  BR      10$             ;DISPLAY REGISTERS

026100  032704  000002  3$:     BIT     #E.NOAT,R4      ;CHECK IF "NO ATTENTION IN RKASOP"
026104  001403                  BEQ     4$              ;NO, CHECK THE OTHER CONTROLLER ERRORS
026106  104401  057646          TYPE    ,ERR002
026112  000443                  BR      10$             ;DISPLAY REGISTERS

026114  032704  000010  4$:     BIT     #E.UDAT,R4      ;CHECK IF "UNEXPECTED DATA TYPE ERROR"
026120  001403                  BEQ     5$              ;NO, CHECK OTHER CONTROLLER ERRORS
026122  104401  057675          TYPE    ,ERR003
026126  000435                  BR      10$             ;DISPLAY REGISTERS

026130  032704  000020  5$:     BIT     #E.CLAT,R4      ;CHECK IF "ATTENTION DID NOT RESET
                                                        ;  WITH DRIVE CLEAR"
026134  001403                  BEQ     6$              ;NO, CHECK OTHER CONTROLLER ERRORS
026136  104401  057730          TYPE    ,ERR004
026142  000427                  BR      10$             ;DISPLAY REGISTERS

026144  032704  000100  6$:     BIT     #E.ILLD,R4      ;CHECK IF "ILLEGAL DRIVER COMMAND"
026150  001403                  BEQ     7$              ;NO, CHECK IF DATA LATE WHEN UNLOADING HEADER
026152  104401  057774          TYPE    ,ERR005
026156  000421                  BR      10$             ;DISPLAY REGISTERS

026160  032704  000400  7$:     BIT     #E.DLT,R4       ;CHECK IF "DATA LATE WHEN UNLOADING HEADER"
026164  001403                  BEQ     8$              ;NO, CHECK IF "CONTROLLER ERROR WHILE GATHERING
                                                        ;  STATUS"
026166  104401  062602          TYPE    ,ERR200
026172  000413                  BR      10$             ;DISPLAY REGISTERS

026174  032704  001000  8$:     BIT     #E.CERR,R4      ;CHECK IF "CONTROLLER ERROR DURING
                                                        ;  DRIVE SERVICING"
026200  001403                  BEQ     9$              ;NO, CHECK IF CONTROLLER TIME OUT
026202  104401  062642          TYPE    ,ERR201
026206  000405                  BR      10$             ;DISPLAY REGISTERS

026210  032704  040000  9$:     BIT     #E.CMTO,R4      ;CHECK IF CONTROLLER TIME OUT
026214  001414                  BEQ     20$             ;NO, CHECK IF DRIVE DETECTED DRIVE BUS PARITY ERROR
026216  104401  063127          TYPE    ,ERR207
```

```
5312  026222  104401  001165          10$:    TYPE    ,$CRLF          ;TYPE <CR><LF>
5313  026226  004737  043072                  JSR     PC,PRTTIM       ;PRINT TIME
5314  026232  004737  025326                  JSR     PC,PRIREG       ;PRINT CONTROLLER REGISTERS
5315  026236  104401  057554                  TYPE    ,ERR000         ;TYPE FATAL ERROR
5316  026242  000000                          HALT                    ;HANG ON FATAL ERROR
5317  026244  000776                          BR      .-2
5318
5319  026246  032704  002000          20$:    BIT     #E.DPAR,R4      ;CHECK IF "DRIVE DETECTED DRIVE BUS PARITY ERROR"
5320  026252  001001                          BNE     30$             ;YES, SET DRPAR IN ERROR REGISTER
5321  026254  000000                          HALT
5322
5323  026256  012604                  30$:    MOV     (SP)+,R4        ;RESTORE R4
5324  026260  052765  000010  000034          BIS     #DRPAR,P.ER(R5) ;SET DRIVE DETECTED DRIVE BUSSOTT> PARITY
5325  026266  010346                          MOV     R3,-(SP)        ;STORE R3 ON THE STACK
5326  026270  005037  001462                  CLR     @.WAIT          ;CLEAR WAITING FOR COMMAND COMPLETION
5327  026274  116503  000000                  MOVB    P.DRVN(R5),R3   ;GET DRIVE NUMBER
5328  026300  005062  000026                  CLR     RKMR1(R2)       ;CLEAR MAINTENANCE REGISTER 1
5329  026304  010362  000010                  MOV     R3,RKCS2(R2)    ;LOAD DRIVE NUMBER
5330  026310  012762  000105  000000          MOV     #CLEAR,RKCS1(R2) ;LOAD DRIVE CLEAR
5331  026316  105762  000000          35$:    TSTB    RKCS1(R2)       ;WAIT FOR READY
5332  026322  001775                          BEQ     35$
5333  026324  004737  046536                  JSR     PC,T.STCR       ;STORE REGISTERS
5334  026330  032737  100000  001406          BIT     #CERR,T.CS1     ;CHECK IF CONTROLLER ERROR
5335  026336  001413                          BEQ     37$             ;NO, CHECK IF ATTENTION CLEARED
5336
5337                                  ;       CHECK FOR CONTROLLER TYPE ERROR
5338  026340  032737  137400  001410          BIT     #UFE!MDS!PGE!NEM!NED!OPF!DLT,T.CS2
5339  026346  001004                          BNE     36$
5340  026350  032737  130761  001424          BIT     #ILC!DTE!WPE!IFC!IPS!IAE!RCE!DTE!CPE!DCK,T.ER
5341  026356  001412                          BEQ     40$
5342
5343  026360  104401  062642          36$:    TYPE    ,ERR201         ;TYPE CONTROLLER ERROR DURING DRIVE SERVICING
5344  026364  000716                          BR      10$             ;GO REPORT ERROR
5345
5346  026366  136337  001510  001423  37$:    BITB    INTMSK(R3),T.ASOR+1 ;CHECK IF ATTENTION CLEARED
5347  026374  001403                          BEQ     40$             ;YES, REPORT ERROR
5348  026376  104401  057730                  TYPE    ,ERR004         ;TYPE "DRIVE CLEAR DID NOT RESET ATTENTION"
5349  026402  000707                          BR      10$             ;GO REPORT ERROR
5350
5351  026404  146337  001510  001506  40$:    BICB    INTMSK(R3),W.TIME ;CLEAR TIMING CURRENTLY ON THIS DRIVE
5352  026412  006303                          ASL     R3              ;MULTIPLY BY 2
5353  026414  005063  001540                  CLR     W.DRV(R3)       ;CLEAR WATCH DOG TIME
5354  026420  012603                          MOV     (SP)+,R3        ;RESTORE R3
5355  026422  000137  024766                  JMP     ABNORM          ;GO TO ABNORMAL RETURN
```

```
                                .SBTTL  CONTROLLER ERROR DUE TO REIGSTER INCONSISTANCIES

026426  004737  051126          CNTRL1: JSR     PC,Q.PMOV       ;REMOVE PARAMETER BLOCK FROM THE
                                        ;  COMMAND INITIATION QUEUE
026432  032777  002000  152500          BIT     #SW10,@SWR      ;CHECK IF BELL CR ERROR
026440  001402                          BEQ     1$              ;NO, CONTINUE
026442  104401  001160                  TYPE    ,$BELL          ;RING BELL
026446  032777  020000  152464  1$:     BIT     #SW13,@SWR      ;CHECK IF INHIBIT PRINT OUT
026454  001404                          BEQ     2$              ;NO PRINT ERROR MESSAGE
026456  032777  040000  152454          BIT     #SW14,@SWR      ;CHECK IF CYCLE OR OPERATION
026464  001050                          BNE     10$             ;YES, CHECK IF LOOP ON OPERATION
026466  032737  000001  001560  2$:     BIT     #BIT0,ERCONT    ;CHECK IF "CONTROLLER ERROR NOT FLAGGED"
026474  001402                          BEQ     3$
026476  104401  060332                  TYPE    ,ERR013
026502  032737  000002  001560  3$:     BIT     #BIT1,ERCONT    ;CHECK IF "WORD COUNT NOT 0"
026510  001402                          BEQ     4$
026512  104401  060371                  TYPE    ,ERR014
026516  032737  000004  001560  4$:     BIT     #BIT2,ERCONT    ;CHECK IF "BUS ADDRESS INCORRECT"
026524  001402                          BEQ     5$
026526  104401  060422                  TYPE    ,ERR015
026532  032737  000010  001560  5$:     BIT     #BIT3,ERCONT    ;CHECK IF "CYLINDER,TRACK,SECTOR
                                        ;  INCORRECT"
026540  001402                          BEQ     7$
026542  104401  060446                  TYPE    ,ERR016
026546  032777  020000  152364  7$:     BIT     #SW13,@SWR      ;CHECK IF INHIBIT PRINT OUT
026554  001014                          BNE     10$             ;YES, CHECK IF HALT ON ERROR
026556  004737  043072                  JSR     PC,PRITIM       ;PRINT TIME
026562  004737  025550                  JSR     PC,PRISTY       ;PRINT RK06 REGISTERS
026566  004737  027476                  JSR     PC,PRI002       ;PRINT CURRENT SUPPLIED COMMAND
026572  032737  000001  001560          BIT     #BIT0,ERCONT    ;CHECK IF CONTROLLER ERROR
                                        ;  NOT FLAGGED
026600  001402                          BEQ     10$             ;NO, DO NOT PRINT PREVOUS COMMAND
026602  004737  027320                  JSR     PC,PRI001       ;PRINT PREVIOUS COMMAND
026606  032777  100000  152324  10$:    BIT     #SW15,@SWR      ;CHECK IF HALT ON ERROR
026614  001010                          BNE     11$             ;YES, HALT
026616  032777  040000  152314          BIT     #SW14,@SWR      ;CHECK IF LOOP OPERATION
026624  001005                          BNE     15$             ;YES, CLEAR ERROR
026626  104401  057554                  TYPE    ,ERR000         ;PRINT "FATAL ERROR"
026632  104401  060051                  TYPE    ,ERR007         ;PRINT "SET SWITCH 14 TO CYCLE ON ERROR"
026636  000000                  11$:    HALT
026640  012737  100000  001560  15$:    MOV     #BIT15,ERCONT   ;SET CONTROLLER ERROR PRESENT
026646  012762  100000  000000          MOV     #CCLR,RKCS1(R2) ;CLEAR CONTROLLER
026654  005062  000026                  CLR     RKMR1(R2)       ;CLEAR MAINTANENCE REGISTER 1
026660  112737  000005  001406          MOVB    #DR.CLR,T.CS1   ;LOAD COMMAND INTO TEMPORARY CS1
026666  004037  046314                  JSR     R0,I.ISSU       ;GO ISSUE DRIVE CLEAR
026672  026702                          20$                     ;ERROR RETURN
026674  004037  050706                  JSR     R0,Q.PUSH       ;PUT PARAMETER BLOCK ON COMMAND
026700  001324                          CINITQ                  ;  INITIATION QUEUE
026702  000207                  20$:    RTS     PC              ;RETURN
```

```
                                .SBTTL  PRINT WHOLE DATA BUFFER

026704  122765  000121  000123  PRIBUF: CMPB    #RDDATA,P.RCMD(R5) ;CHECK IF READ DATA
026712  001017                          BNE     5$                 ;NO, RETURN
026714  032765  000010  000150          BIT     #BIT3,P.DSTT(R5) ;CHECK IF TIME TO PRINT BUFFER
026722  001013                          BNE     5$                 ;NO, RETURN
026724  052765  000010  000150          BIS     #BIT3,P.DSTT(R5) ;SET BUFFER ATTEMPTED TO BE PRINTED
026732  032777  020000  152200          BIT     #SW13,@SWR         ;CHECK IF INHIBIT PRINT OUT
026740  001004                          BNE     5$                 ;YES, RETURN
026742  032777  000010  152170          BIT     #SW3,@SWR          ;CHECK IF PRINT SECTOR BEFORE BEGINNING
                                                                   ;  ERROR RECOVERY
026750  001001                          BNE     10$                ;YES, PRINT SECTOR IN ERROR
026752  000207                  5$:     RTS     PC                 ;RETURN

026754  010146                  10$:    MOV     R1,-(SP)           ;STORE R1 ON THE STACK
026756  010346                          MOV     R3,-(SP)           ;STORE R3 ON THE STACK
026760  010446                          MOV     R4,-(SP)           ;STORE R4 ON THE STACK
026762  104401  063312                  TYPE    ,ERR213            ;TYPE ADDDRESS OF BEGINNING OF
                                                                   ;  SECTOR IN ERROR
026766  013703  001630                  MOV     RTYBA,R3           ;GET ADDRESS OF START OF SCTOR
026772  013704  001632                  MOV     RTYWC,R4           ;GET WORD COUNT
026776  010346                          MOV     R3,-(SP)           ;STORE STARTING ADDRESS FOR PRINT OUT
027000  004737  052144                  JSR     PC,BINOCT          ;CONVERT OF OCTAL
027004  104401  063363                  TYPE    ,ERR214            ;TYPE DATA READ
027010  012701  000010          15$:    MOV     #8.,R1             ;SET 8 COLUMNS ON PAGE
027014  104401  001165                  TYPE    ,$CRLF             ;TYPE <CR><LF>
027020  012346                  20$:    MOV     (R3)+,-(SP)        ;GET NEXT WORD OF SECTOR
027022  004737  052144                  JSR     PC,BINOCT          ;CONVERT TO OCTAL
027026  005304                          DEC     R4                 ;CHECK IF FINISHED
027030  001405                          BEQ     30$                ;YES, RESTORE REGISTERS
027032  005301                          DEC     R1                 ;CHECK IF END OF LINE
027034  001765                          BEQ     15$                ;YES, INITIALIZE COLUMN COUNT
027036  104401  057551                  TYPE    ,BLANKS            ;TYPE 2 BLANKS
027042  000766                          BR      20$                ;GET NEXT WORD

027044  104401  001165          30$:    TYPE    ,$CRLF             ;TYPE <CR><LF>
027050  012604                          MOV     (SP)+,R4           ;RESTORE R4
027052  012603                          MOV     (SP)+,R3           ;RESTORE R3
027054  012601                          MOV     (SP)+,R1           ;RESTORE R1
027056  000207                          RTS     PC                 ;RETURN
```

```
                        .SBTTL  PRINT DRIVE AND PACK SERIAL NUMBERS

027060  010146          PRISER: MOV     R1,-(SP)        ;STORE R1 ON STACK
027062  010346                  MOV     R3,-(SP)        ;STORE R3 ON STACK
027064  010446                  MOV     R4,-(SP)        ;STORE R4 ON STACK
027066  012701  055667          MOV     #STT100,R1      ;GET ADDRESS OF ASCII STRING
027072  016503  000224          MOV     P.SERL(R5),R3   ;GET DRIVE SERIAL NUMBER
027076  006103                  ROL     R3              ;SHIFT DRIVE SERIAL NUMBER 4 BITS LEFT
027100  006103                  ROL     R3
027102  006103                  ROL     R3
027104  006103                  ROL     R3
027106  012704  000003          MOV     #3,R4           ;LOAD NUMBER OF DIGITS OF SERIAL NUMBER
027112  105011          2$:     CLRB    (R1)            ;CLEAR NEXT BYTE FOR PRINT OUT
027114  006103                  ROL     R3              ;SHIFT IN NEXT 4 BITS
027116  106111                  ROLB    (R1)
027120  006103                  ROL     R3
027122  106111                  ROLB    (R1)
027124  006103                  ROL     R3
027126  106111                  ROLB    (R1)
027130  006103                  ROL     R3
027132  106111                  ROLB    (R1)
027134  152721  000060          BISB    #60,(R1)+       ;CHANGE BCD TO DECIMAL
027140  005304                  DEC     R4              ;CHECK IF FINISHED
027142  001363                  BNE     2$              ;CONVERT NEXT DIGIT
027144  104401  055644          TYPE    ,STT000         ;TYPE "DRIVE SERIAL NUMBER"
027150  016503  000226          MOV     P.PKSR(R5),R3   ;GET LEAST SIGNIFICANT BITS OF
                                                        ;  PACK SERIAL NUMBER
027154  016504  000230          MOV     P.PKSR+2(R5),R4 ;GET MOST SIGNIFICANT BITS OF
                                                        ;  PACK SERIAL NUMBER
027160  012701  056232          MOV     #STT012,R1      ;GET ADDRESS OF ASCII STRING
027164  105011                  CLRB    (R1)            ;CLEAR FIRST BYTE OF PRINT OUT
027166  000404                  BR      7$              ;START CONVERSION TO OCTAL

027170  105011          5$:     CLRB    (R1)            ;CLEAR NEXT BYTE OF PRINT OUT
027172  006103                  ROL     R3              ;SHIFT IN NEXT THREE BITS
027174  006104                  ROL     R4
027176  106111                  ROLB    (R1)
027200  006103          7$:     ROL     R3
027202  006104                  ROL     R4
027204  106111                  ROLB    (R1)
027206  006103                  ROL     R3
027210  006104                  ROL     R4
027212  106111                  ROLB    (R1)
027214  152721  000060          BISB    #60,(R1)+       ;MAKE IT ASCII
027220  022701  056245          CMP     #STT013,R1      ;CHECK IF FINISHED
027224  101361                  BHI     5$              ;NO, CONTINUE CONVERSION
027226  104401  056205          TYPE    ,STT011         ;TYPE PACK SERIAL NUMBER
027232  012604                  MOV     (SP)+,R4        ;RESTORE R4
027234  012603                  MOV     (SP)+,R3        ;RESTORE R3
027236  012601                  MOV     (SP)+,R1        ;RESTORE R1
027240  000207                  RTS     PC              ;RETURN
```

```
                                .SBTTL  PRINT BEGINNING OF ERROR HEADER

027242  032777  002000  151670  PRI000: BIT     #SW10,@SWR      ;CHECK IF BELL ON ERROR
027250  001402                          BEQ     1$              ;NO, CHECK IF INHIBIT PRINT OUT
027252  104401  001160                  TYPE    ,$BELL          ;RING BELL
027256  032777  020000  151654  1$:     BIT     #SW13,@SWR      ;CHECK IF INHIBIT PRINT OUT
027264  001014                          BNE     20$             ;YES, INCREMENT CONTROLLER ERROR
027266  116537  000000  055446          MOVB    P.DRVN(R5),OPR011 ;STORE DRIVE NUMBER
027274  152737  000060  055446          BISB    #60,OPR011      ;MAKE IT ASCII
027302  104401  055427                  TYPE    ,OPR010         ;TYPE "DRIVE NUMBER #"
027306  004737  027060                  JSR     PC,PRTSER       ;PRINT DRIVE AND PACK SERIAL NUMBERS
027312  004737  043072                  JSR     PC,PRTIM        ;PRINT TIME
027316  000207          20$:    RTS     PC                      ;RETURN
```

. . .

```
                                .SBTTL  PRINT PREVIOUS COMMAND
                        
027320  104401  062453  PRI001: TYPE    ,ERR101         ;TYPE "PREVIOUS CMND CYL TRK SEC  WRD CT"
027324  122765  000121  000135  CMPB    #RDDATA,P.LCMD(R5) ;CHECK IF READ DATA
027332  001402          BEQ     5$              ;YES, DO NOT PRINT PATTERN NOW
027334  104401  062535  TYPE    ,ERR102         ;PRINT "PAT"
027340  104401  001165  5$:     TYPE    ,$CRLF          ;PRINT <CR><LF>
027344  005046          CLR     -(SP)           ;MAKE ROOM ON STACK
027346  116516  000135  MOVB    P.LCMD(R5),(SP) ;GET LAST COMMAND
027352  004737  052144  JSR     PC,BINOCT       ;CONVERT TO OCTAL
027356  104401  057551  TYPE    ,BLANKS         ;TYPE 2 BLANKS
027362  016546  000136  MOV     P.LCYL(R5),-(SP) ;GET LAST CYLINDER USED
027366  004737  052144  JSR     PC,BINOCT       ;CONVERT TO OCTAL
027372  104401  057551  TYPE    ,BLANKS         ;TYPE 2 BLANKS
027376  005046          CLR     -(SP)           ;MAKE ROOM ON STACK
027400  116516  000141  MOVB    P.LTRK(R5),(SP) ;GET LAST TRACK USED
027404  004737  052144  JSR     PC,BINOCT       ;CONVERT TO OCTAL
027410  104401  057551  TYPE    ,BLANKS         ;TYPE 2 BLANKS
027414  005046          CLR     -(SP)           ;MAKE ROOM ON STACK
027416  116516  000140  MOVB    P.LSEC(R5),(SP) ;GET LAST SECTOR USED
027422  004737  052144  JSR     PC,BINOCT       ;CONVERT TO OCTAL
027426  104401  057551  TYPE    ,BLANKS         ;TYPE 2 BLANKS
027432  016546  000142  MOV     P.LWC(R5),-(SP) ;STORE LAST WORD COUNT
027436  004737  052144  JSR     PC,BINOCT       ;CONVERT TO OCTAL
027442  122765  000121  000135  CMPB    #RDDATA,P.LCMD(R5) ;CHECK IF PAT # VALID
027450  001407          BEQ     10$             ;NO, DO NOT TYPE
027452  104401  057551  TYPE    ,BLANKS         ;TYPE 2 BLANKS
027456  005046          CLR     -(SP)           ;MAKE ROOM ON STACK
027460  116516  000144  MOVB    P.LDPT(R5),(SP) ;GET LAST DATA PATTERN
027464  004737  052144  JSR     PC,BINOCT       ;CONVERT TO OCTAL
027470  104401  001165  10$:    TYPE    ,$CRLF          ;TYPE <CR><LF>
027474  000207          RTS     PC              ;RETURN
```

```
                        .SBTTL  PRINT CURRENT GENERATED COMMAND

027476  104401  062342  PRI002: TYPE    ,ERR100         ;PRINT "CURRENT SUPPLIED COMMAND"
                                                        ;  CYL TRK SEC OFFSET
                                                        ;  BUS AD  WRD CT"
027502  122765  000121  000123        CMPB    #RDDATA,P.RCMD(R5) ;CHECK IF PAT # IS TO BE PRINTED
027510  001402                        BEQ     5$              ;NO, DO NOT PRINT HEADER
027512  104401  062535                TYPE    ,ERR102         ;PRINT "PAT"
027516  104401  001165          5$:   TYPE    ,$CRLF          ;PRINT <CR><LF>
027522  005046                        CLR     -(SP)           ;MAKE ROOM ON STACK
027524  116516  000001                MOVB    P.CMND(R5),(SP) ;STORE COMMAND FOR PRINT OUT
027530  004737  052144                JSR     PC,BINOCT       ;CONVERT TO OCTAL
027534  104401  057551                TYPE    ,BLANKS         ;TYPE 2 BLANKS
027540  016546  000002                MOV     P.CYLN(R5),-(SP) ;STORE CYLINDER
027544  004737  052144                JSR     PC,BINOCT       ;CONVERT TO OCTAL
027550  104401  057551                TYPE    ,BLANKS         ;TYPE 2 BLANKS
027554  005046                        CLR     -(SP)           ;MAKE ROOM ON STACK
027556  116516  000005                MOVB    P.TRCK(R5),(SP) ;STORE TRACK
027562  004737  052144                JSR     PC,BINOCT       ;CONVERT TO OCTAL
027566  104401  057551                TYPE    ,BLANKS         ;TYPE 2 BLANKS
027572  005046                        CLR     -(SP)           ;MAKE ROOM ON STACK
027574  116516  000004                MOVB    P.SECT(R5),(SP) ;STORE SECTOR
027600  004737  052144                JSR     PC,BINOCT       ;CONVERT TO OCTAL
027604  104401  057551                TYPE    ,BLANKS         ;TYPE 2 BLANKS
027610  005046                        CLR     -(SP)           ;MAKE ROOM ON THE STACK
027612  122765  000021  000147        CMPB    #21,P.RERD(R5)  ;CHECK IF OFFSET
027620  101002                        BHI     10$             ;NO, INDICATE ZERO OFFSET
027622  116516  000006                MOVB    P.OFST(R5),(SP) ;STORE OFFSET FOR PRINT OUT
027626  004737  052144          10$:  JSR     PC,BINOCT       ;CONVERT TO OCTAL
027632  104401  057551                TYPE    ,BLANKS         ;TYPE 2 BLANKS
027636  016546  000010                MOV     P.BALO(R5),-(SP) ;STORE BUS ADDRESS
027642  004737  052144                JSR     PC,BINOCT       ;COVERT TO OCTAL
027646  104401  057551                TYPE    ,BLANKS         ;TYPE 2 BLANKS
027652  016546  000012                MOV     P.WC(R5),-(SP)  ;STORE WORD COUNT
027656  004737  052144                JSR     PC,BINOCT       ;COVERT TO OCTAL
027662  122765  000121  000123        CMPB    #RDDATA,P.RCMD(R5) ;CHECK IF PAT # IS TO BE PRINTED
027670  001407                        BEQ     15$             ;NO, RETURN
027672  104401  057551                TYPE    ,BLANKS         ;TYPE 2 BLANKS
027676  005046                        CLR     -(SP)           ;MAKE ROOM ON THE STACK
027700  116516  000121                MOVB    P.DPAT(R5),(SP) ;STORE DATA PATTERN FOR PRINT OUT
027704  004737  052144                JSR     PC,BINOCT       ;CONVERT TO OCTAL
027710  104401  001165          15$:  TYPE    ,$CRLF          ;TYPE <CR><LF>
027714  000207                        RTS     PC              ;RETURN
```

```
5584                                    .SBTTL  PRINT ERROR MESSAGE AND DROP DRIVE
5585
5586                                    ;;**************************************************************
5587                                    ;*
5588                                    ;*      EXPECTED PRINT CODES
5589                                    ;*      --------------------
5590                                    ;*
5591                                    ;*      BIT 1   PRINT DRIVE STATUS
5592                                    ;*      BIT 2   PRINT PREVIOUS POSITION
5593                                    ;*      BIT 5   QUESTIONABLE DRIVE STATUS
5594                                    ;*      BIT 6   CURRENT GENERATED COMMAND
5595                                    ;*
5596                                    ;;**************************************** ***********************
5597
5598  027716  010446                    PRI100: MOV     R4,-(SP)        ;STORE R4 ON STACK
5599  027720  012004                            MOV     (R0)+,R4        ;STORE ADDRESS OF PRINT CODE
5600  027722  005204                            INC     R4              ;CALCULATE START OF MESSAGE
5601  027724  010437  027736                    MOV     R4,2$           ;STORE ERROR MESSAGE ADDRESS
5602  027730  004737  027242                    JSR     PC,PRI000       ;PRINT HEADER
5603  027734  104401                            TYPE                    ;TYPE ERROR MESSAGE
5604  027736  000000                    2$:     .WORD   0
5605  027740  104401  001165                    TYPE    ,$CRLF          ;TYPE <CR><LF>
5606  027744  032777  020000  151166            BIT     #SW13,@SWR      ;CHECK IF INHIBIT PRINTOUT
5607  027752  001033                            BNE     10$             ;YES, RETURN
5608  027754  105765  000150                    TSTB    P.DSTT(R5)      ;CHECK IF FIRST ERROR
5609  027760  100402                            BPI     3$              ;YES, GO PRINT CONTROLLER REGISTERS
5610  027762  104401  062712                    TYPE    ,ERR202         ;TYPE ERROR DURING ERROR RECOVERY
5611  027766  004737  025550            3$:     JSR     PC,PRISTI       ;PRINT CONTROLLER REGISTERS
5612  027772  132744  000002                    BITB    #BIT1,-(R4)     ;CHECK IF PRINT DRIVE STATUS
5613  027776  001407                            BEQ     5$              ;NO, CONTINUE
5614  030000  132714  000040                    BITB    #BIT5,(R4)      ;CHECK IF QUESTIONABLE STATUS
5615  030004  001402                            BEQ     4$              ;NO, DO NOT PRINT MESSAGE
5616  030006  104401  063073                    TYPE    ,ERR206         ;PRINT "QUESTIONABLE DRIVE STATUS"
5617  030012  004737  025374            4$:     JSR     PC,PRDSTT       ;PRINT DRIVE STATUS
5618  030016  132714  000100            5$:     BITB    #BIT6,(R4)      ;CHECK IF PRINT CURRENT GENERATED COMMAND
5619  030022  001402                            BEQ     8$              ;NO, DO NOT PRINT CURRENT COMMAND
5620  030024  004737  027476                    JSR     PC,PRI002       ;PRINT CURRENT GENERATED COMMAND
5621  030030  132714  000004            8$:     BITB    #BIT2,(R4)      ;CHECK IF PRINT PREVIOUS COMMAND
5622  030034  001402                            BEQ     10$             ;NO, CHECK IF HALT ON ERROR
5623  030036  004737  027320                    JSR     PC,PRI001       ;PRINT PREVIOUS COMMAND
5624  030042  004737  030472            10$:    JSR     PC,HLT000       ;TEST IF HALT ON ERROR
5625  030046  005265  000206                    INC     P.NER(R5)       ;INCREMENT OTHER ERROR COUNT
5626  030052  004737  022316                    JSR     PC,RUFREL       ;RELEASE BUFFER
5627  030056  004737  012716                    JSR     PC,DROP         ;DROP DRIVE FROM TEST SEQUENCE
5628  030062  004737  022016                    JSR     PC,GETBUF       ;GET NEW DRIVE, COMMAND, AND BUFFER
5629  030066  005037  001562                    CLR     ERRPRO          ;CLEAR ERROR CURRENTLY BEING PROCESSED
5630  030072  012604                            MOV     (SP)+,R4        ;RESTORE R4
5631  030074  000200                            RTS     R0              ;RETURN
```

```
                        .SBTTL  PRINT ERROR MESSAGE

                        ;;*****************************************************************
                        ;*
                        ;*      EXPECTED PRINT CODES
                        ;*      --------------------
                        ;*
                        ;*      BIT 0   DATA TYPE ERROR = 1
                        ;*              NON-DATA TYPE ERROR = 0
                        ;*      BIT 1   PRINT DRIVE STATUS
                        ;*      BIT 2   PRINT PREVIOUS POSITION
                        ;*      BIT 3   PRINT SECTOR IN ERROR
                        ;*      BIT 4   PRINT HEADER
                        ;*      BIT 5   QUESTIONABLE DRIVE STATUS
                        ;*      BIT 6   CURRENT GENERATED COMMAND
                        ;*
                        ;;*****************************************************************

030076  010446          PRI200: MOV     R4,-(SP)        ;STORE R4 ON STACK
030100  012004                  MOV     (R0)+,R4        ;GET PRINT CODE ERROR FLAGS
030102  132724  000001          BITB    #BIT0,(R4)+     ;CHECK IF DATA TYPE ERROR
030106  001416                  BEQ     5$              ;NO, NON-DATA TYPE ERROR
030110  032765  000002  000150  BIT     #BIT1,P.DSTT(R5) ;CHECK IF DATA TYPE ERROR
                                                        ;  BEING PROCESSED
030116  001402                  BEQ     1$              ;NO, PRINT MESSAGE
030120  012604                  MOV     (SP)+,R4        ;RESTORE R4
030122  000200                  RTS     R0              ;RETURN

030124  052765  000002  000150  1$:     BIS     #BIT1,P.DSTT(R5) ;SET DATA TRANSFER ERROR OCCURRED
030132  100015                  BPL     10$             ;CHECK IF START OF ERROR RECOVERY
030134  052765  000001  000150          BIS     #BIT0,P.DSTT(R5) ;YES, SET SERVICING DATA ERROR
030142  000411                  BR      10$             ;GO REPORT ERROR

030144  032765  000004  000150  5$:     BIT     #BIT2,P.DSTT(R5) ;CHECK IF NON-DATA TYPE ERROR OCCURRED
030152  001402                  BEQ     6$              ;NO, REPORT ERROR
030154  012604                  MOV     (SP)+,R4        ;RESTORE R4
030156  000200                  RTS     R0              ;RETURN

030160  052765  000004  000150  6$:     BIS     #BIT2,P.DSTT(R5) ;SET NON-DATA ERROR OCCURRED
030166  004737  027242          10$:    JSR     PC,PRI000       ;TYPE ERROR HEADER
030172  032777  020000  150740          BIT     #SW13,@SWR      ;CHECK IF INHIBIT PRINT OUT
030200  001115                  BNE     30$             ;YES, INHIBIT PRINT OUT
030202  010437  030222          MOV     R4,12$          ;STORE ERROR MESSAGE
030206  105765  000150          TSTB    P.DSTT(R5)      ;CHECK IF ERROR DURING RECOVERY
030212  100402                  BMI     11$             ;NO, PRINT ERROR
030214  104401  062717          TYPE    ,ERR202         ;PRINT "ERROR DURING ERROR RECOVERY"
030220  104401                  11$:    TYPE            ;PRINT ERROR MESSAGE
030222  000000                  12$:    .WORD   0
030224  104401  001165          TYPE    ,SCRLF          ;TYPE <CR><LF>
030230  004737  025550          JSR     PC,PRISTT       ;PRINT CONTROLLER REGISTERS
030234  132744  000002          BITB    #BIT1,-(R4)     ;CHECK IF PRINT DRIVE STATUS
030240  001407                  BEQ     22$             ;NO, CONTINUE
030242  132714  000040          BITB    #BIT5,(R4)      ;CHECK IF QUESTIONABLE DRIVE STATUS
030246  001402                  BEQ     20$             ;NO, DO NOT PRINT MESSAGE
030250  104401  063073          TYPE    ,ERR206         ;TYPE "QUESTIONABLE DRIVE STATUS"
030254  004737  025374          20$:    JSR     PC,PRDSTT       ;PRINT DRIVE STATUS
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5688  030260  132714  000100          22$:    BITB    #BIT6,(R4)      ;CHECK IF PRINT CURRENT COMMAND
5689  030264  001402                          BEQ     23$             ;NO, CONTINUE
5690  030266  004737  027476                  JSR     PC,PRI002       ;PRINT CURRENTLY ISSUED COMMAND
5691  030272  132714  000004          23$:    BITB    #BIT2,(R4)      ;CHECK IF PRINT PREVIOUS COMMAND
5692  030276  001402                          BEQ     25$             ;NO, CHECK IF PRINT HEADER
5693  030300  004737  027320                  JSR     PC,PRI001       ;PRINT PREVIOUS COMMAND
5694  030304  132714  000001          25$:    BITB    #BIT0,(R4)      ;CHECK IF DATA TYPE ERROR
5695  030310  001422                          BEQ     27$             ;NO, DO NOT PRINT ECC
5696  030312  032765  100000  000034          BIT     #DCK,P.ER(R5)   ;CHECK IF DATA CHECK
5697  030320  001416                          BEQ     27$             ;NO, DO NOT PRINT ECC
5698  030322  104401  062141                  TYPE    ,ERR067         ;TYPE ECC PAT, ECC POS
5699  030326  016546  000062                  MOV     P.EPAT(R5),-(SP) ;GET PATTERN
5700  030332  004737  052144                  JSR     PC,BINOCT       ;CONVERT TO OCTAL
5701  030336  104401  057551                  TYPE    ,BLANKS
5702  030342  016546  000060                  MOV     P.EPOS(R5),-(SP) ;GET POSITION
5703  030346  004737  052144                  JSR     PC,BINOCT       ;CONVERT TO OCTAL
5704  030352  104401  001165                  TYPE    ,$CRLF
5705  030356  132724  000020          27$:    BITB    #BIT4,(R4)+     ;CHECK IF PRINT HEADER
5706  030362  001424                          BEQ     30$             ;NO, CHECK IF HALT ON ERROR
5707  030364  104401  062554                  TYPE    ,ERR111         ;TYPE HEADER DESCRIPTOR
5708  030370  013746  001642                  MOV     HEAD1,-(SP)     ;STORE FIRST WORD OF THE HEADER
5709  030374  004737  052144                  JSR     PC,BINOCT       ;CONVERT TO OCTAL
5710  030400  104401  057551                  TYPE    ,BLANKS         ;TYPE 2 BLANKS
5711  030404  013746  001644                  MOV     HEAD2,-(SP)     ;STORE SECOND WORD OF THE HEADER
5712  030410  004737  052144                  JSR     PC,BINOCT       ;CONVERT TO OCTAL
5713  030414  104401  057551                  TYPE    ,BLANKS         ;TYPE 2 BLANKS
5714  030420  013746  001646                  MOV     HEAD3,-(SP)     ;STORE THIRD WORD OF THE HEADER
5715  030424  004737  052144                  JSR     PC,BINOCT       ;CONVERT TO OCTAL
5716  030430  104401  001165                  TYPE    ,$CRLF          ;TYPE <CR><LF>
5717  030434  132744  000010          30$:    BITB    #BIT3,-(R4)     ;CHECK IF PRINT ANCLE SECTOR
5718  030440  001402                          BEQ     40$             ;NO, CHECK IF HALT ON ERROR
5719  030442  004737  026704                  JSR     PC,PRIBUF       ;GO PRINT BUFFER
5720  030446  132714  000001          40$:    BITB    #BIT0,(R4)      ;CHECK IF DATA TYPE ERROR
5721  030452  001403                          BEQ     45$             ;NO, CHECK IF HALT ON ERROR
5722  030454  042765  100200  000150          BIC     #BIT15!BIT7,P.DSTT(P5) ;CLEAR FIRST ERROR AND ERROR
5723                                                                  ;  ENQUEUED
5724  030462  004737  030472          45$:    JSR     PC,HLT000       ;CHECK IF HALT ON ERROR
5725  030466  012604                          MOV     (SP)+,R4        ;RESTORE R4
5726  030470  000200                          RTS     R0              ;RETURN
```

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                                .SBTTL  HALT ON ERROR CHECK

030472  032777  100000  150440  HLT000: BIT     #SW15,@SWR      ;CHECK IF HALT ON ERROR
030500  001407                          BEQ     10$             ;NO, RETURN
030502  005737  001462                  TST     @.WAIT          ;CHECK IF WAITING FOR COMMAND
                                                                ;  COMPLETION
030506  001403                          BEQ     5$              ;NO, HALT
030510  105762  000000          1$:     TSTB    RKCS1(R2)       ;WAIT FOR READY
030514  001775                          BEQ     1$
030516  000000          5$:     HALT
030520  000207          10$:    RTS     PC              ;RETURN
```

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                                        .SBTTL  OTHER EPROR STATISTICS GATHERING
                                
030522  105765  000150         MERSTT: TSTB    P.DSTT(R5)      ;CHECK IF FIRST ERROR
030526  100057                         BPL     STT5$           ;NO, CONTINUE ERROR RECOVERY
030530  042765  100200  000150        BIC     #BIT15!BIT7,P.DSTT(R5) ;RESET FIRST ERROR AND ERROR ENQUEUED
030536  005265  000206                INC     P.MER(R5)       ;INCREMENT OTHER ERRORS COUNT
030542  022765  000020  000206        CMP     #T.MER,P.MER(R5) ;CHECK IF ERROR THRESHOLD EXCEEDED
030550  103426                         BLO     STT2$           ;YES, CHECK IF DROP DRIVE
030552  000445                         BR      STT5$           ;NO, START ERROR RECOVERY SEQUENCE
                                
                                        .SBTTL  SEEK INCOMPLETE STATISTICS GATHERING
                                
030554  105765  000150         SKISTT: TSTB    P.DSTT(R5)      ;CHECK IF FIRST ERROR
030560  100042                         BPL     STT5$           ;NO, CONTINUE ERROR RECOVERY
030562  005265  000202                INC     P.NSKI(R5)      ;INCREMENT NUMBER OF SEEK INCOMPLETES
030566  000405                         BR      STT1$           ;GO CHECK IF ERROR THRESHOLD EXCEEDED
                                
                                        .SBTTL  OPERATION INCOMPLETE STATISTICS GATHERING
                                
030570  105765  000150         OPISTT: TSTB    P.DSTT(R5)      ;CHECK IF FIRST ERROR
030574  100034                         BPL     STT5$           ;NO, CONTINUE ERROR PROCESSING
030576  005265  000204                INC     P.NOPI(R5)      ;INCREMENT NUMBER OF OPERATION INCOMPLETES
030602  042765  100200  000150  STT1$: BIC     #BIT15!BIT7,P.DSTT(R5) ;RESET FIRST ERROR AND ERROR ENQUEUED
030610  016546  000204                MOV     P.NOPI(R5),-(SP) ;STORE NUMBER OF OPERATION INCOMPLETES
030614  066516  000202                ADD     P.NSKI(R5),(SP) ;ADD SEEK INCOMPLETES
030620  026526  000104                CMP     P.SKET(R5),(SP)+ ;CHECK IF ERROR THRESHOLD EXCEEDED
030624  103020                         BHIS    STT5$           ;NO, START ERROR RECOVERY
030626  032777  040020  150304  STT2$: BIT     #SW4!SW14,@SWR  ;CHECK IF INHIBIT DRIVE DESELECTION
030634  001014                         BNE     STT5$           ;YES, START RECOVERY SEQUENCE
030636  104401  063040                TYPF    ,ERR205         ;PRINT "ERROR THRESHOLD EXCEEDED"
030642  004737  022316                JSR     PC,BUFREL       ;RELEASE BUFFER
030646  004737  012716                JSR     PC,DROP         ;DROP DRIVE
030652  004737  022016                JSR     PC,GETBUF       ;GET NEW COMMAND, DRIVE, AND BUFFER
030656  005037  001562                CLR     ERRPRO          ;CLEAR ERROP CURRENT BEING PROCESSED
030662  011000                         MOV     (R0),R0         ;INDICATE NO RECOVERY SEQUENCE IS PROGRESS
030664  000200                         RTS     R0              ;RETURN
                                
030666  105765  000120         STT5$: TSTB    P.IERC(R5)      ;CHECK IF INHIBIT ERROR RECOVERY
030672  001010                         BNE     5$              ;YES, INDICATE UNRECOVERABLE RETURN
030674  105265  000146                INCB    P.RECT(R5)      ;INCREMENT RETRY COUNT
030700  122765  000010  000146        CMPB    #8.,P.RECT(R5)  ;CHECK IF RETRY FINISHED
030706  103402                         BLO     5$              ;YES, CLEAN UP AFTER UNSUCCESSFUL RETRY
030710  005720                         TST     (R0)+           ;INDICATE RECOVERY SEQUENCE IN PROGRESS
030712  000200                         RTS     R0              ;RETURN
                                
030714  004737  030724         5$:    JSR     PC,UNRECV       ;CLEAN UP FOR UNSUCCESSFUL RECOVERY
030720  011000                         MOV     (R0),R0         ;INDICATE NO RECOVERY SEQUENCE IS PROGRESS
030722  000200                         RTS     R0              ;RETURN
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5786                                    .SBTTL  UNSUCCESSFUL RECOVERY CLEANUP
5787
5788  030724  105037  001640            UNRECV: CLRB    RTYSCN          ;CLEAR RETRY SECTOR COUNT
5789  030730  004737  022316                    JSR     PC,BUFREL       ;RELEASE BUFFER
5790  030734  032765  000001  000150            BIT     #BIT0,P.DSTT(R5) ;CHECK IF DATA HARD ERROR
5791  030742  001415                            BEQ     1$              ;NO, CHECK IF DRIVE IS BEING ASSIGNED
5792  030744  005265  000200                    INC     P.HARD(R5)      ;INCREMENT HARD ERROR COUNT
5793  030750  026565  000102  000200            CMP     P.VERT(R5),P.HARD(R5) ;CHECK IF HARD ERROR THRESHOLD EXCEEDED
5794  030756  103007                            BHIS    1$              ;NO, CHECK IF DRIVE IS BEING ASSIGNED
5795  030760  032777  040020  150152            BIT     #SW14!SW11,@SWR ;INHIBIT DRIVE DESELECTION
5796  030766  001003                            BNE     1$              ;YES, CHECK IF DRIVE IS BEING ASSIGNED
5797  030770  104401  063040                    TYPE    ,ERR205         ;PRINT "ERROR THRESHOLD EXCEEDED
5798  030774  000413                            BR      2$              ;GO DROP DRIVE
5799
5800  030776  105765  000210            1$:     TSTB    P.ASSN(R5)      ;CHECK IF DRIVE IS BEING ASSIGNED
5801  031002  001421                            BEQ     5$              ;NO, CLEAR OF ERROR
5802  031004  132765  000010  000210            BITB    #BIT3,P.ASSN(R5) ;CHECK IF READ PACK SERIAL NUMBER
5803  031012  001404                            BEQ     2$              ;NO, DROP DRIVE
5804  031014  132765  000200  000210            BITB    #BIT7,P.ASSN(R5) ;CHECK IF RECAL FOR READ OF
5805                                                                    ;  PACK SERIAL NUMBER
5806  031022  001441                            BEQ     10$             ;NO, ISSUE RECALIBRATE AND TRY AGAIN
5807  031024  104401  063003            2$:     TYPE    ,ERR204         ;TYPE "ERROR RECOVERY UNSUCCESSFUL"
5808  031030  004737  012716                    JSR     PC,DROP         ;DROP DRIVE FROM TEST SEQUENCE
5809  031034  004737  022016                    JSR     PC,GETBUF       ;GET NEW DRIVE, COMMAND, AND BUFFER
5810  031040  005037  001562                    CLR     ERRPRO          ;CLEAR ERROR CURRENT BEING PROCESSED
5811  031044  000207                            RTS     PC              ;RETURN
5812
5813  031046  105765  000120            5$:     TSTB    P.IERC(R5)      ;CHECK IF INHIBIT RETRY
5814  031052  001006                            BNE     6$              ;YES, DO NOT PRINT MESSAGE
5815  031054  032777  020000  150056            BIT     #SW13,@SWR      ;CHECK IF INHIBIT PRINT OUT
5816  031062  001002                            BNE     6$              ;YES, CONTINUE
5817  031064  104401  063003                    TYPE    ,ERR204         ;TYPE "ERROR RECOVERY UNSUCCESSFUL"
5818  031070  010446                    6$:     MOV     R4,-(SP)        ;STORE R4 ON STACK
5819  031072  116504  000000                    MOVB    P.DRVN(R5),R4   ;GET DRIVE NUMBER
5820  031076  156437  001510  001507            BISB    INTMSK(R4),Q.CVER ;INDICATE IMPLIED SEEKS ARE ALLOWED
5821  031104  012604                            MOV     (SP)+,R4        ;RESTORE R4
5822  031106  004037  050706                    JSR     R0,Q.PUSH       ;PUT PARAMETER BLOCK IN DRIVE
5823  031112  001314                            AVATLQ                  ;  AVAILIABLE QUEUE
5824  031114  004737  022016                    JSR     PC,GETBUF       ;GET NEW DRIVE, COMMAND, AND BUFFER
5825  031120  005037  001562                    CLR     ERRPRO          ;CLEAR ERROR CURRENT BEING PROCESSED
5826  031124  000207                            RTS     PC              ;RETURN
5827
5828  031126  122765  000010  000126  10$:     CMPB    #8.,P.RSEC(R5)  ;CHECK IF ALL 16-BIT MODE SECTORS HAVE BEEN TRIED
5829  031134  101733                            BLOS    2$              ;YES, DROP DRIVE
5830  031136  010446                            MOV     R4,-(SP)        ;STORE R4 ON STACK
5831  031140  116504  000000                    MOVB    P.DRVN(R5),R4   ;GET DRIVE NUMBER FOR INDEX
5832  031144  156437  001510  001507            BISB    INTMSK(R4),Q.CVER ;INDICATE THAT IMPLIED SEEKS ARE ALLOWED
5833  031152  012604                            MOV     (SP)+,R4        ;RESTORE R4
5834  031154  152765  000200  000210            BISB    #BIT7,P.ASSN(R5) ;INDICATE THAT RECALIBRATE HAS BEEN ISSUED
5835  031162  005065  000146                    CLR     P.RECT(R5)      ;CLEAR ERROR FLAGS
5836  031166  005065  000150                    CLR     P.DSTT(R5)
5837  031172  005065  000212                    CLR     P.EPR(R5)
5838  031176  112765  000113  000001            MOVB    #RECAL,P.CMND(R5) ;LOAD RECALIBRATE COMMAND
5839  031204  004037  050706                    JSR     R0,Q.PUSH       ;PUT PARAMETER BLOCK IN COMMAND
5840  031210  001324                            CTNITQ                  ;  INITIATION QUEUE
5841  031212  004737  022016                    JSR     PC,GETBUF       ;GO ALLOCATE MEMORY BUFFER
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 5842  031216  005037  001562                  CLR     ERRPRC          ;CLEAR ERROR PROCESSING IN PROGRESS
 5843  031222  000207                          RTS     PC              ;RETURN
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5844                                    .SBTTL  ERROR RECOVERY SEQUENCE
5845
5846  031224  032765  000200  000212  ERCVY:  BIT     #BIT7,P.ERR(R5) ;CHECK IF UNSOLICITATED INTERRUPT
5847  031232  001441                          BEQ     3$              ;NO, CHECK IF ERROR INFORMATION STILL VALID
5848  031234  032777  002000  147676          BIT     #SW10,@SWR      ;CHECK IF BELL ON ERROR
5849  031242  001402                          BEQ     1$              ;NO, CONTINUE PROCESSING
5850  031244  104401  001160                  TYPE    ,$BELL          ;RING BELL
5851  031250  032777  020000  147662  1$:     BIT     #SW13,@SWR      ;CHECK IF INHIBIT PRINT OUT
5852  031256  001020                          BNE     2$              ;YES, CHECK IF HALT ON ERROR
5853  031260  116537  000000  055446          MOVB    P.DRVN(R5),OPR011 ;LOAD DRIVE NUMBER FOR PRINT OUT
5854  031266  152737  000060  055446          BISB    #60,OPR011      ;MAKE IT ASCII
5855  031274  104401  055427                  TYPE    ,OPR010         ;TYPE "DRIVE N"
5856  031300  004737  043072                  JSR     PC,PRTTIM       ;PRINT TIME
5857  031304  104401  060704                  TYPE    ,ERR026         ;TYPE "INT FORM DRV NOT UNDER TEST"
5858  031310  004737  025550                  JSR     PC,PRISTT       ;PRINT CONTROLLER REGISTERS
5859  031314  004737  025774                  JSR     PC,PRDSTT       ;PRINT DRIVE STATUS
5860  031320  004737  030472          2$:     JSR     PC,HLT000       ;CHECK IF HALT ON ERROR
5861  031324  005065  000212                  CLR     P.ERR(R5)       ;CLEAR ERROR FLAGS
5862  031330  005037  001562                  CLR     ERRPRO          ;CLEAR ERROR BEING PROCESSED
5863  031334  000207                          RTS     PC              ;RETURN
5864
5865  031336  032765  000020  000212  3$:     BIT     #BIT4,P.ERR(R5) ;CHECK IF SERVICING DRIVE SEIZED TIME OUT
5866  031344  001427                          BEQ     5$              ;NO, CONTINUE
5867  031346  004737  027242                  JSR     PC,PRI000       ;PRINT HEADER
5868  031352  104401  061744                  TYPE    ,ERR059         ;PRINT "TIME OUT BECAUSE DRIVE SEIZED"
5869  031356  032777  020000  147554          BIT     #SW13,@SWR      ;CHECK IF INHIBIT PRINT OUT
5870  031364  001002                          BNE     4$              ;YES, DO NOT PRINT CURRENT GENERATED COMMAND
5871  031366  004737  027476                  JSR     PC,PRI002       ;PRINT CURRENT GENERATED COMMAND
5872  031372  005265  000206          4$:     INC     P.NER(R5)       ;INCREMENT OTHER ERRORS
5873  031376  004737  030472                  JSR     PC,HLT000       ;CHECK IF HALT ON ERROR
5874  031402  004737  022316                  JSR     PC,PUTBFL       ;RELEASE BUFFER
5875  031406  004737  012716                  JSR     PC,DROP         ;DROP DRIVE
5876  031412  004737  022016                  JSR     PC,GETBUF       ;GET NEW DRIVE, COMMAND, AND BUFFER
5877  031416  005037  001562                  CLR     ERRPRO          ;CLEAR ERROR BEING PROCESSED
5878  031422  000207                          RTS     PC              ;RETURN
5879
5880  031424  032765  000400  000212  5$:     BIT     #BIT8,P.ERR(R5) ;CHECK IF TIME OUT BECAUSE HEADS DID NOT RELOAD
5881  031432  001404                          BEQ     6$              ;NO, CONTINUE
5882  031434  004037  027716                  JSR     R0,PRI100       ;PRINT TIME OUT BECAUSE HEADS DID NOT RELOAD
5883  031440  062277                          ERR074
5884  031442  000207                          RTS     PC              ;RETURN
5885
5886  031444  032765  000040  000212  6$:     BIT     #BIT5,P.ERR(R5) ;CHECK IF TIME OUT DURING DRIVE POSITIONING
5887  031452  001425                          BEQ     7$              ;NO, CONTINUE
5888  031454  042765  100000  000150          BIC     #BIT15,P.DSTT(R5) ;RESET ERROR ENCOUNTERED
5889  031462  052765  000100  000150          BIS     #BIT6,P.DSTT(R5) ;SET READ STATUS ISSUED
5890  031470  116537  000001  001662          MOVB    P.CMND(R5),POSCMD ;STORE COMMAND IN ERROR
5891  031476  042765  000002  000014          BIC     #DRVPOS,P.PRST(R5) ;RESET DRIVE POSITIONING
5892  031504  004737  036150                  JSR     PC,GETCOR       ;STORE PRESENT STATUS FOR PRINT OUT
5893  031510  112765  000141  000001          MOVB    #RDSTAT,P.CMND(R5) ;GET DRIVE STATUS
5894  031516  004037  050706                  JSR     R0,Q.PUSH       ;ENQUEUE COMMAND IN COMMAND
5895  031522  001324                          CINITQ                  ;  INITIATION QUEUE
5896  031524  000207                          RTS     PC              ;RETURN
5897
5898  031526  032765  000100  000212  7$:     BIT     #BIT6,P.ERR(R5) ;CHECK IF ERROR WHILE ENQUEUED
5899  031534  001404                          BEQ     8$              ;NO, CONTINUE
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 5900  031536  004037  027716                JSR     R0,PRI100       ;PRINT HEADER
 5901  031542  060564                        ERR022                  ;TYPE "ERROR WHILE WAITING TO
 5902                                                                ;  REPORT ERROR"
 5903  031544  000207                        RTS     PC              ;RETURN
 5904
 5905  031546  032765  004000  000016  8$:   BIT     #CTO,P.CS1(R5) ;CHECK IF CONTROLLER TIME OUT
 5906  031554  001404                        BEQ     9$              ;NO, CONTINUE
 5907  031556  004037  036524                JSR     R0,CONERR       ;GO REPORT ERROR
 5908  031562  060476                        ERR017
 5909  031564  000207                        RTS     PC              ;RETURN
 5910
 5911  031566  032765  002000  000020  9$:   BIT     #PGE,P.CS2(R5)  ;CHECK IF PROGRAMMING ERROR
 5912  031574  001404                        BEQ     10$             ;NO, CONTINUE
 5913  031576  004037  036524                JSR     R0,CONEPR       ;PRINT HEADER
 5914  031602  060532                        ERR020                  ;TYPE "PROG ERROR"
 5915  031604  000207                        RTS     PC              ;RETURN
 5916
 5917  031606  032765  000001  000034  10$:  BIT     #ILC,P.ER(R5)   ;CHECK IF ILLEGAL FUNCTION CODE
 5918  031614  001404                        BEQ     11$             ;NO, CONTINUE
 5919  031616  004037  036524                JSR     R0,CONEPR       ;PRINT HEADER
 5920  031622  060545                        ERR021                  ;TYPE "ILLEGAL FUNCTION CODE"
 5921  031624  000207                        RTS     PC              ;RETURN
 5922
 5923  031626  032765  010000  000020  11$:  BIT     #NED,P.CS2(R5)  ;CHECK FOR NON-EXISTENT DRIVE
 5924  031634  001404                        BEQ     15$             ;NO, CONTINUE
 5925  031636  004037  027716                JSR     R0,PRI100       ;PRINT HEADER
 5926  031642  060631                        ERR023                  ;TYPE "NON-EXISTENT DRIVE"
 5927  031644  000207                        RTS     PC              ;RETURN
 5928
 5929  031646  032765  000400  000020  15$:  BIT     #UFE,P.CS2(R5)  ;CHECK IF UNIT FIELD ERROR
 5930  031654  001404                        BEQ     18$             ;NO, CONTINUE
 5931  031656  004037  027716                JSR     R0,PRI100       ;PRINT HEADER
 5932  031662  060664                        ERR025                  ;TYPE "UNIT FIELD ERROR"
 5933  031664  000207                        RTS     PC              ;RETURN
 5934
 5935  031666  032765  020000  000016  18$:  BIT     #SPAR,P.CS1(R5) ;CHECK IF CONTROLLER DETECTED BAD PARITY
 5936  031674  001004                        BNE     19$             ;YES, PRINT MESSAGE
 5937  031676  032765  000010  000034        BIT     #DRPAR,P.ER(R5) ;CHECK IF DRIVE DETECTED BAD PARITY
 5938  031704  001437                        BEQ     25$             ;NO, CONTINUE
 5939  031706  004037  030076          19$:  JSR     R0,PRI200       ;PRINT HEADER
 5940  031712  060650                        ERR024                  ;PRINT "SERCON PARITY"
 5941  031714  004037  030522                JSR     R0,NERSTT       ;TAKE STATISTICS FOR OTHER ERRORS
 5942  031720  032166                        60$                     ;ERROR RECOVERY SEQUENCE FINISHED RETURN
 5943  031722  032765  020000  000016        BIT     #SPAR,P.CS1(R5) ;CHECK IF CONTROLLER DETECTD SERCON PARITY ERROR
 5944  031730  001021                        BNE     22$             ;YES, GO RETRY COMMAND
 5945  031732  032765  003400  000150        BIT     #BIT8!BIT9!BIT10,P.DSTT(R5) ;CHECK IF NO POSITIONING
 5946  031740  001015                        BNE     22$             ;YES, RETRY COMMAND
 5947  031742  132765  000007  000210        BITB    #BIT0!BIT1!BIT2,P.ASSN(R5) ;CHECK IF NO POSITION
 5948                                                                ;  DURING DRIVE ASSIGNMENT
 5949  031750  001011                        BNE     22$             ;YES, RETRY COMMAND
 5950  031752  042765  030000  000150        BIC     #BIT12!BIT13,P.DSTT(R5) ;RESET RE-SEEK AND RE-OFFSET
 5951  031760  052765  004000  000150        BIS     #BIT11,P.DSTT(R5) ;SET RECALIBRATE DRIVE
 5952  031766  112765  000113  000001        MOVB    #RECAL,P.CMND(R5) ;LOAD RECALIBRATE COMMAND
 5953  031774  004037  050706          22$:  JSR     R0,Q.PUSH       ;PUT PARAMETER BLOCK IN COMMAND
 5954  032000  001324                        CINITQ                  ;  INITIATION QUEUE
 5955  032002  000207                        RTS     PC              ;RETURN
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5956
5957  032004  032765  004000  000020  25$:    BIT     #NEM,P.CS2(R5)  ;CHECK IF NON-EXISTENT MEMORY
5958  032012  001404                          BEQ     30$             ;NO,CONTINUE
5959  032014  004037  036524                  JSR     R0,CONERR       ;PRINT HEADER
5960  032020  061270                          ERR044                  ;PRINT "NON-EXISTENT MEMORY"
5961  032022  000207                          RTS     PC              ;RETURN
5962
5963  032024  032765  020000  000020  30$:    BIT     #UPE,P.CS2(R5)  ;CHECK IF UNIBUS PARITY
5964  032032  001404                          BEQ     35$             ;NO, CONTINUE
5965  032034  004037  036524                  JSR     R0,CONERR       ;PRINT HEADER
5966  032040  061306                          ERR045                  ;PRINT "UNIBUS PARITY"
5967  032042  000207                          RTS     PC              ;RETURN
5968
5969  032044  004037  036714          35$:    JSR     R0,TSTDRP       ;CHECK IF DPCP DRIVE ERROR
5970  032050  032166                          60$                     ;YES, ERROR RETURN
5971  032052  032765  000002  000034          BIT     #SKI,P.ER(R5)   ;CHECK IF SEEK INCOMPLETE
5972  032060  001407                          BEQ     45$             ;NO, CONTINUE
5973  032062  004037  030076                  JSR     R0,PRI200       ;PRINT HEADER
5974  032066  061172                          ERR038                  ;PRINT "SEEK INCOMPLETE"
5975  032070  004037  030554                  JSR     R0,SKISTT       ;TAKE SEEK INCOMPLETE STATISTICS
5976  032074  032166                          60$                     ;ERROR RECOVERY FINISHED RETURN
5977  032076  000412                          BR      48$             ;GO ISSUE RECALIBRATE
5978
5979  032100  032765  000040  000036  45$:    BIT     #DROT,P.DS(R5)  ;CHECK IF DRIVE OFF TRACK
5980  032106  001420                          BEQ     50$             ;NO, CONTINUE
5981  032110  004037  030076                  JSR     R0,PRI200       ;PRINT HEADER
5982  032114  061207                          ERR039                  ;PRINT "DRIVE OFF TRACK"
5983  032116  004037  030522                  JSR     R0,NERSTT       ;TAKE STATISTICS ON OTHER ERRORS
5984  032122  032166                          60$                     ;END OF ERROR RECOVERY RETURN
5985  032124  042765  034000  000150  48$:    BIC     #PIT11!PIT12!PIT13,P.DSTT(R5) ;RESET STATUS
5986  032132  052765  004000  000150          BIS     #BIT11,P.DSTT(R5) ;SET RECALIBRATE ISSUED
5987  032140  112765  000113  000001          MOVB    #RECAL,P.CMND(R5) ;LOAD RECALIBRATE
5988  032146  000712                          BR      22$             ;ENQUEUE COMMAND
5989
5990  032150  032765  001000  000034  50$:    BIT     #COE,P.ER(R5)   ;CHECK IF CYLINDER ADDRESS OVERFLOW
5991  032156  001404                          BEQ     60$             ;NO, CONTINUE
5992  032160  004037  036524                  JSR     R0,CONERR       ;PRINTER HEADER
5993  032164  061406                          ERR051                  ;PRINT "CYLINDER ADDRESS OVERFLOW"
5994  032166  000207                  60$:    RTS     PC              ;RETURN
5995
5996  032170  005765  000022          60$:    TST     P.WCR(R5)       ;CHECK IF FINAL WORD COUNT IS ZERO
5997  032174  001410                          BEQ     5$              ;YES, CONTINUE
5998  032176  026565  000022  000012          CMP     P.WCR(R5),P.WC(R5) ;CHECK THAT FINAL WORD COUNT IS LESS
5999                                                                  ;  THAN OR EQUAL TO INITIAL WORD COUNT
6000  032204  103004                          BHIS    5$              ;YES, CONTINUE
6001  032206  004037  036524                  JSR     R0,CONERR       ;TYPE "WORD COUNT INVALID"
6002  032212  062162                          ERR070
6003  032214  000207                          RTS     PC              ;RETURN
6004
6005  032216  032765  001400  000016  5$:     BIT     #BA16!BA17,P.CS1(R5) ;CHECK IF BUS ADDRESS BITS 16 OR 17 SET
6006  032224  001015                          BNE     8$              ;YES, REPORT ERROR
6007  032226  026565  000024  000010          CMP     P.BAR(R5),P.BALO(R5) ;CHECK THAT FINAL BUS ADDRESS IS GREATER
6008                                                                  ;  THAN OR EQUAL TO INITIAL BUS ADDRESS
6009  032234  103411                          BLO     8$              ;NO, REPORT ERROR
6010  032236  016546  000012                  MOV     P.WC(R5),-(SP)  ;PUT INITIAL WORD COUNT ON STACK
6011  032242  005416                          NEG     (SP)            ;MAKE IT POSITIVE
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6012  032244  006316                          ASL     (SP)              ;MULTIPLY BY 2
6013  032246  066516  000010                  ADD     P.BALO(R5),(SP) ;CALCULATE MAXIMUM FINAL ADDRESS
6014  032252  026526  000024                  CMP     P.BAR(R5),(SP)+ ;MAKE SURE IT IS NOT TO LARGE
6015  032256  101404                          BLOS    10$               ;GOOD ADDRESS CONTINUE
6016  032260  004037  036524          8$:     JSR     R0,CONERR         ;TYPE "BUS ADDRESS INVALID"
6017  032264  062205                          ERR071
6018  032266  000207                          RTS     PC                ;RETURN
6019
6020  032270  026565  000030  000002  10$:    CMP     P.DCYL(R5),P.CYLN(R5) ;CHECK THAT FINAL CYLINDER IS GREATER
6021                                                                    ;  THAN OR EQUAL TO INITIAL CYLINDER
6022  032276  001405                          BEQ     15$               ;IF EQUAL CHECK TRACK/SECTOR
6023  032300  101014                          BHI     E1$               ;IF GREATER THAN, DETERMINE ERROR
6024  032302  004037  036524                  JSR     R0,CONERR         ;TYPE "CYLIN ADDRESS INVALID"
6025  032306  062231                          ERR072
6026  032310  000207                          RTS     PC                ;RETURN
6027
6028  032312  026565  000026  000004  15$:    CMP     P.DTS(R5),P.SECT(R5) ;CHECK TRACK/SECTOR GREATER THAN OR
6029                                                                    ;  EQUAL TO INITIAL VALUES
6030  032320  103004                          BHIS    E1$               ;YES, GO INTO ERROR RECOVERY
6031  032322  004037  036524                  JSR     R0,CONERR         ;TYPE "SECTOR/TRACK INVALID"
6032  032326  062252                          ERR073
6033  032330  000207                          RTS     PC
6034
6035  032332  032765  010000  000034  E1$:    BIT     #DTE,P.ER(R5)   ;CHECK FOR DRIVE TIMING ERROR
6036  032340  001002                          BNE     2$                ;YES, PROCESS DRIVE TIMING ERROR
6037  032342  000137  033034                  JMP     E2$               ;NO, CONTINUE
6038
6039  032346  105765  000147          2$:     TSTB    P.RERD(R5)        ;CHECK IF FIRST DATA ERROR IN
6040                                                                    ;  RETRY SEQUENCE
6041  032352  001117                          BNE     30$               ;NO, REPORT ERROR
6042  032354  016537  000010  001630          MOV     P.BALO(R5),RTYBA ;STORE SUPPLIED POS ADDRESS
6043  032362  016537  000012  001632          MOV     P.WC(R5),RTYWC ;STORE SUPPLIED WORD COUNT
6044  032370  005437  001632                  NEG     RTYWC             ;MAKE IT POSITIVE
6045  032374  022737  000400  001632          CMP     #256.,RTYWC       ;CHECK IF LESS THAT OR EQUAL TO A SECTOR
6046  032402  103013                          BHIS    21$               ;YES, WORK WITH ONE SECTOR
6047  032404  026565  000026  000004          CMP     P.DTS(R5),P.SECT(R5) ;CHECK IF STARTING TRACK AND SECTOR
6048  032412  001021                          BNE     25$               ;NOT RETRY 2 SECTORS
6049  032414  026565  000030  000002          CMP     P.DCYL(R5),P.CYLN(R5) ;CHECK IF STARTING CYLINDER
6050  032422  001015                          BNE     25$               ;NO, RETRY 2 SECTORS
6051  032424  012737  000400  001632          MOV     #256.,RTYWC       ;SET WORD COUNT = 1 SECTOR
6052  032432  112737  000001  001640  21$:    MOVB    #1,RTYSCN         ;SET SECTOR COUNT = 1
6053  032440  016537  000004  001634          MOV     P.SECT(R5),RTYSEC ;LOAD SECTOR AND TRACK
6054  032446  016537  000002  001636          MOV     P.CYLN(R5),RTYCYL ;LOAD CYLINDER
6055  032454  000456                          BR      30$               ;GO REPORT ERROR
6056
6057  032456  016537  000026  001634  25$:    MOV     P.DTS(R5),RTYSEC ;SET SECTOR AND TRACK
6058  032464  016537  000030  001636          MOV     P.DCYL(R5),RTYCYL ;GET CYLINDER
6059  032472  105737  001634                  TSTB    RTYSEC            ;CHECK IF SECTOR = 0
6060  032476  001403                          BEQ     26$               ;YES, GO DECREMENT TRACK
6061  032500  105337  001634                  DECB    RTYSEC            ;DECREMENT SECTOR
6062  032504  000416                          BR      28$               ;DETERMINE WORD COUNT
6063
6064  032506  112737  000025  001634  26$:    MOVB    #21.,RTYSEC       ;LOAD SECTOR = 21
6065  032514  105737  001635                  TSTB    RTYTRK            ;CHECK IF TRACK 0
6066  032520  001403                          BEQ     27$               ;YES, GO DECREMENT CYLINDER
6067  032522  105337  001635                  DECB    RTYTRK            ;DECREMENT TRACK
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6068  032526  000405                          BR      28$             ;DETERMINE WORD COUNT
6069
6070  032530  112737  000002  001635  27$:    MOVB    #2,RTYTRK       ;LOAD TRACK = 2
6071  032536  005337  001636                  DEC     RTYCYL          ;DECREMENT CYLINDER
6072  032542  004737  036412          28$:    JSR     PC,CALWC        ;CALCULATE RETRY WORD COUNT
6073  032546  112737  000002  001640          MOVB    #2,RTYSCN       ;LOAD SECTOR COUNT = 2
6074  032554  022737  001000  001632          CMP     #512.,RTYWC     ;CHECK IF LESS THAN OR EQUAL
6075  032562  101004                          BMI     29$             ;  TWO SECTORS
6076  032564  012737  001000  001632          MOV     #512.,RTYWC     ;MAKE IT 512
6077  032572  000407                          BR      30$             ;GO REPORT ERROR
6078
6079  032574  022737  000400  001632  29$:    CMP     #256.,RTYWC     ;CHECK IF ONLY ONE SECTOR
6080  032602  103403                          BLO     30$             ;NO, GO REPORT ERROR
6081  032604  112737  000001  001640          MOVB    #1,RTYSCN       ;LOAD SECTOR COUNT = 1
6082
6083  032612  004037  030076          30$:    JSR     R0,PRI200       ;PRINT HEADER
6084  032616  061321                          ERR046                  ;PRINT DRIVE TIMING ERROR
6085  032620  105765  000120                  TSTB    P.IERC(R5)      ;CHECK IF INHIBIT ERROR RECOVERY
6086  032624  001016                          BNE     35$             ;YES, GO CLEAN UP FOR NEXT COMMAND
6087  032626  105265  000147                  INCB    P.RERD(R5)      ;INCREMENT REREAD COUNT
6088  032632  122765  000043  000147          CMPB    #43,P.RERD(R5)  ;CHECK IF RETRY UNSUCCESSFUL
6089  032640  101410                          BLOS    35$             ;YES, GO INDICATE UNSUCCESSFUL
6090                                                                  ;  RECOVERY
6091  032642  122765  000121  000123          CMPB    #RDDATA,P.RCMD(R5) ;CHECK IF READ DATA
6092  032650  001407                          BEQ     37$             ;YES, GO TO RECOVERY SEQUENCE
6093  032652  122765  000021  000147          CMPB    #21,P.RERD(R5)  ;CHECK IF RETRY UNSUCCESSFUL
6094  032660  101026                          BHI     40$             ;NO, GO TO RETRY SEQUENCE
6095  032662  004737  030724          35$:    JSR     PC,UNRECV       ;CLEAN UP FOR UNSUCCESSFUL RECOVERY
6096  032666  000207                          RTS     PC              ;RETURN
6097
6098  032670  122765  000021  000147  37$:    CMPB    #21,P.RERD(R5)  ;CHECK IF OFFSET +400 MICRO-INCHES
6099  032676  001017                          BNE     40$             ;NO, CONTINUE RECOVERY
6100  032700  122737  000001  001640          CMPB    #1,RTYSCN       ;CHECK IF NUMBER OF SECTORS = 1
6101  032706  001404                          BEQ     38$             ;YES, DO OFFSET
6102  032710  122737  000025  001634          CMPB    #21.,RTYSEC     ;CHECK IF MID-TRANSFER SEEK
6103                                                                  ;  IS REQUIRED
6104  032716  001761                          BEQ     35$             ;YES, INDICATE UNSUCCESSFUL RETRY
6105  032720  010446                  38$:    MOV     R4,-(SP)        ;STORE R4 ON THE STACK
6106  032722  116504  000000                  MOVB    P.DRVN(R5),R4   ;GET DRIVE NUMBER FOR INDEX
6107  032726  146437  001510  001507          BICB    INTMSK(R4),O.OVER ;DO NOT SEEK BEFORE DATA
6108                                                                  ;  TRANSFER (RESETTING OFFSET)
6109  032734  012604                          MOV     (SP)+,R4        ;RESTORE R4
6110
6111  032736  004037  036230          40$:    JSR     R0,DETOFF       ;DETERMINE IF OFFSET INSTRUCTION
6112  032742  033032                          50$                     ;OFFSET ISSUED RETURN
6113  032744  116565  000123  000001          MOVB    P.RCMD(R5),P.CMND(R5) ;LOAD COMMAND
6114  032752  013765  001634  000004          MOV     RTYSEC,P.SECT(R5) ;LOAD SECTOR AND TRACK
6115  032760  013765  001636  000002          MOV     RTYCYL,P.CYLN(R5) ;LOAD CYLINDER
6116  032766  013765  001630  000010          MOV     RTYPA,P.BALO(R5) ;LOAD BUS ADDRESS
6117  032774  013765  001632  000012          MOV     RTYWC,P.WC(R5)  ;LOAD WORD COUNT
6118  033002  005465  000012                  NEG     P.WC(R5)        ;MAKE IT NEGATIVE
6119  033006  122765  000131  000001          CMPB    #WRTCHK,P.CMND(R5) ;CHECK IF WRITE CHECK
6120  033014  001003                          BNE     45$             ;NO, ISSUE COMMAND
6121  033016  052765  000200  000014          BIS     #W.WCK,P.PRST(R5) ;YES, SET ISSUE WRITE COMMAND
6122  033024  004037  050706          45$:    JSR     R0,Q.PUSH       ;ENQUEUE PARAMETER BLOCK IN
6123  033030  001324                          CINITQ                  ;  COMMAND INITIATION QUEUE
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6124  033032  000207                    50$:    RTS     PC              ;RETURN
6125
6126  033034  032765  020400  000034    E2$:    BIT     #OPIIHVRC,P.ER(R5) ;CHECK IF HEADER TYPE ERROR
6127  033042  001002                            BNE     2$              ;YES, PROCESS ERROR
6128  033044  000137  033372                    JMP     E3$             ;NO, CONTINUE
6129
6130  033050  004737  036150            2$:     JSR     PC,GETCUR       ;GET CURRENT REGISTER STATUS
6131  033054  112737  000001  001640            MOVB    #1,RTYSCN       ;LOAD RETRY SECTOR COUNT TO 1
6132  033062  016537  000026  001634            MOV     P.DTS(R5),RTYSEC ;STORE CURRENT SECTOR AND TRACK
6133  033070  016537  000030  001636            MOV     P.DCYL(R5),RTYCYL ;STORE CURRENT SECTOR
6134  033076  016537  000010  001630            MOV     P.BALO(R5),RTYBA ;GET INITIAL BUS ADDRESS
6135  033104  016537  000012  001632            MOV     P.WC(R5),RTYWC  ;GET INITIAL WORD COUNT
6136  033112  005437  001632                    NEG     RTYWC           ;MAKE IT POSITIVE
6137  033116  022737  000400  001632            CMP     #256.,RTYWC     ;CHECK IF LESS THEN OR EQUAL TO ONE SECTOR
6138  033124  103021                            BHIS    20$             ;RETRY COMMAND
6139  033126  026565  000026  000004            CMP     P.DTS(R5),P.SECT(R5) ;CHECK IF CURRENT SECTOR AND TRACK EQUALS
6140                                                                    ;  INITIAL TRACK AND SECTOR
6141  033134  001004                            BNE     15$             ;NO, CALCULATE DESIRED SECTOR
6142  033136  026565  000030  000002            CMP     P.DCYL(R5),P.CYLN(R5) ;CHECK IF CURRENT CYLINDER EQUALS
6143                                                                    ;  INITIAL CYLINDER
6144  033144  001406                            BEQ     18$             ;YES, USE INITIAL CYLINDER, TRACK, AND SECTOR
6145  033146  004737  036412            15$:    JSR     PC,CALWC        ;CALCULATE WORD COUNT
6146  033152  022737  000400  001632            CMP     #256.,RTYWC     ;CHECK IF WORD COUNT LESS THAN OR EQUAL
6147                                                                    ;  TO ONE SECTOR
6148  033160  103003                            BHIS    20$             ;YES, USE CALCULATED WORD COUNT
6149  033162  012737  000400  001632    18$:    MOV     #256.,RTYWC     ;USE 256 WORDS
6150  033170  016546  000052            20$:    MOV     P.B10(R5),-(SP) ;STORE DRIVE CYLINDER ADDRESS
6151  033174  042716  160017                    BIC     #^C<M.CADD>,(SP) ;THROW AWAY PARITY AND MESSAGE TYPE
6152  033200  006216                            ASR     (SP)            ;SHIFT 4 BITS RIGHT
6153  033202  006216                            ASR     (SP)
6154  033204  006216                            ASR     (SP)
6155  033206  006216                            ASR     (SP)
6156  033210  022637  001636                    CMP     (SP)+,RTYCYL    ;CHECK IF CYLINDER IS CORRECT
6157  033214  001420                            BEQ     30$             ;YES, ISSUE READ HEADER
6158  033216  004037  030076                    JSR     R0,PRI200       ;REPORT ERROR
6159  033222  061224                            ERR040                  ;TYPE "MISPOS"
6160  033224  004037  030570                    JSR     R0,OPISTT       ;GET OPI/MISPOSITIONING STATISTICS
6161  033230  033370                            60$                     ;ERROR THRESHOLD EXCEEDED RETURN
6162  033232  052765  004000  000150            BIS     #BIT11,P.DSTT(R5) ;SET RECALIBRATE ISSUED
6163  033240  112765  000113  000001            MOVB    #RECAL,P.CMND(R5) ;LOAD RECALIBRATE IN PARAMETER BLOCK
6164  033246  004037  050706                    JSR     R0,Q.PUSH       ;PUT PARAMETER BLOCK IN COMMAND
6165  033252  001324                            CINITQ                  ;  INITIATION QUEUE
6166  033254  000207                            RTS     PC              ;RETURN
6167
6168  033256  010446                    30$:    MOV     R4,-(SP)        ;STORE R4 ON THE STACK
6169  033260  113704  001635                    MOVB    RTYTRK,R4       ;GET TRACK FOR INDEX
6170  033264  136465  001503  000057            BITB    H.HEAD(R4),P.P11+1(R5) ;CHECK IF CORRECT HEAD IS SELECTED
6171  033272  001013                            BNE     35$             ;YES, CONTINUE
6172  033274  012604                            MOV     (SP)+,R4        ;RESTORE R4
6173  033276  004037  030076                    JSR     R0,PRI200       ;PRINT HEAD SELECT ERROR
6174  033302  062076                            ERR065
6175  033304  004037  030570                    JSR     R0,OPISTT       ;RECORD AS AN OPI
6176  033310  033370                            60$                     ;ERROR THRESHOLD EXCEEDED RETURN
6177  033312  004037  050706                    JSR     R0,Q.PUSH       ;REISSUE COMMAND
6178  033316  001324                            CINITQ
6179  033320  000207                            RTS     PC              ;RETURN
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6180
6181  033322  012604                    35$:  MOV     (SP)+,R4          ;RESTORE R4
6182  033324  052765  000020  000150          BIS     #BIT4,P.DST*(R5) ;SET READ ALL HEADERS ISSUED
6183  033332  013765  001634  000004          MOV     RTYSEC,P.SECT(R5) ;LOAD SECTOR AND TRACK
6184  033340  013765  001636  000002          MOV     RTYCYL,P.CYLN(R5) ;LOAD CYLINDER
6185  033346  012765  064776  000010          MOV     #HDRBUF,P.BALC(R5) ;LOAD ADDRESS OF HEADER BUFFER
6186  033354  112765  000164  000001          MOVB    #RDALHD,P.CMND(R5) ;LOAD COMMAND
6187  033362  004037  050706                  JSR     R0,Q.PUSH         ;PUT PARAMETER BLOCK IN COMMAND
6188  033366  001324                          CINITQ                    ;  INITIATION QUEUE
6189  033370  000207                    60$:  RTS     PC                ;RETURN
6190
6191  033372  032765  000200  000034  E3$:  BIT     #BSE,P.ER(R5)     ;CHECK FOR BAD SECTOR ERROR
6192  033400  001403                          BEQ     5$                ;NO, CONTINUE
6193  033402  004737  041560                  JSR     PC,RDSECT         ;SERVICE BAD SECTOR
6194  033406  000207                          RTS     PC                ;RETURN
6195
6196  033410  032765  100000  000020  5$:   BIT     #DLT,P.CS2(R5)    ;CHECK IF DATA LATE
6197  033416  001444                          BEQ     E4$               ;NO, CONTINUE
6198  033420  004737  027242                  JSR     PC,PRTOOO         ;TYPE HEADER
6199  033424  032777  020000  145506          BIT     #SW13,@SWR        ;CHECK IF INHIBIT PRINT OUT
6200  033432  001004                          BNE     10$               ;YES, CHECK IF HALT ON ERROR
6201  033434  104401  061741                  TYPE    ,ERR047           ;TYPE "DATA LATE"
6202  033440  004737  025550                  JSR     PC,PRISTT         ;PRINT CONTROLLER STATUS
6203  033444  004737  030472          10$:    JSR     PC,HLTOOO         ;CHECK IF HALT ON ERROR
6204  033450  005237  001622                  INC     DLTCNT            ;INCREMENT DATA LATE COUNT
6205  033454  022737  001000  001627          CMP     #T.DLT,DLTCNT     ;CHECK IF THRESHOLD EXCEEDED
6206  033462  103006                          BHIS    15$               ;NO, RETSUE COMMAND
6207  033464  104401  057554                  TYPE    ,ERP000           ;TYPE FATAL ERROR
6208  033470  104401  060157                  TYPE    ,FRR009           ;TYPE DATA LATE THRESHOLD EXCEEDED
6209  033474  000000                          HALT                      ;HANG
6210  033476  000776                          BR      .-2
6211
6212  033500  105765  000150          15$:    TSTB    P.DSTT(R5)        ;CHECK IF FIRST ERROR
6213  033504  100005                          BPL     20$               ;NO, RETSSUE COMMAND
6214  033506  042765  100200  000150          BIC     #BIT15!BIT7,P.DSTT(R5) ;CLEAR ERROR ENQUEUED AND FIRST ERROR
6215  033514  005037  001562                  CLR     ERPPRO            ;CLEAR ERROR RECOVERY IN PROGRESS
6216  033520  004037  050706          20$:    JSR     R0,Q.PUSH         ;ENQUEUE PARAMETER BLOCK IN COMMAND
6217  033524  001324                          CINITQ                    ;  INITIATION QUEUE
6218  033526  000207                          RTS     PC                ;RETURN
6219
6220  033530  032765  100000  000034  E4$:  BIT     #DCK,P.ER(R5)     ;CHECK IF DATA CHECK
6221  033536  001002                          BNE     2$                ;YES, START RECOVERY
6222  033540  000137  034340                  JMP     E5$               ;NO, CONTINUE
6223
6224  033544  112737  000001  001640  2$:   MOVB    #1,RTYSCN         ;SET SECTOR COUNT = 1
6225  033552  016537  000004  001634          MOV     P.SECT(R5),RTYSEC ;STORE RETRY SECTOR AND TRACK
6226  033560  016537  000002  001636          MOV     P.CYLN(R5),RTYCYL ;STORE RETRY CYLINDER
6227  033566  016537  000010  001630          MOV     P.BALO(R5),RTYBA ;STORE RETRY BUS ADDRESS
6228  033574  016537  000012  001632          MOV     P.WC(R5),RTYWC ;STORE RETRY WORD COUNT
6229  033602  005437  001632                  NEG     RTYWC             ;MAKE IT POSITIVE
6230  033606  022737  000400  001632          CMP     #256.,RTYWC       ;CHECK IF LESS THAN OR EQUAL TO A SECTOR
6231  033614  103043                          BHIS    15$               ;YES, CHECK IF ECC CORRECTION
6232  033616  016537  000026  001634          MOV     P.DTS(R5),RTYSEC ;STORE PRESENT TRACK AND SECTOR
6233  033624  016537  000030  001636          MOV     P.DCYL(R5),RTYCYL ;STORE PRESENT CYLINDER
6234  033632  105737  001634                  TSTB    RTYSEC            ;CHECK IF SECTOR = 0
6235  033636  001403                          BEQ     11$               ;YES, DECREMENT TRACK
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6236  033640  105337  001634              DECB    RTYSEC          ;DECREMENT SECTOR
6237  033644  000416                      BR      13$             ;GO CALCULATE WORD COUNT
6238
6239  033646  112737  000025  001634  11$:  MOVB    #21.,RTYSEC     ;SET SECTOR = 21
6240  033654  105737  001635              TSTB    RTYTRK          ;CHECK IF TRACK = 0
6241  033660  001403                      BEQ     12$             ;YES, DECREMENT CYLINDER
6242  033662  105337  001635              DECB    RTYTRK          ;DECREMENT TRACK
6243  033666  000405                      BR      13$             ;GO CALCULATE WORD COUNT
6244
6245  033670  112737  000002  001635  12$:  MOVB    #2,RTYTRK       ;SET TRACK = 2
6246  033676  005337  001636              DEC     RTYCYL          ;DECREMENT CYLINDER
6247  033702  004737  036412          13$:  JSR     PC,CALWC        ;CALCULATE WORD COUNT
6248  033706  022737  000400  001632      CMP     #256.,RTYWC     ;CHECK IF LESS THAN OR EQUAL TO ONE SECTOR
6249  033714  103003                      BHIS    15$             ;YES, PERFORM ECC CORRECTION
6250  033716  012737  000400  001632      MOV     #256.,RTYWC     ;MAKE IT ONE SECTOR
6251  033724  004037  030076          15$:  JSR     R0,PRI200       ;PRINT HEADER
6252  033730  061355                      ERR04B                  ;PRINT DATA CHECK
6253  033732  105765  000120              TSTB    P.IERC(R5)      ;CHECK IF INHIBIT ERROR RECOVERY
6254  033736  001123                      BNE     40$             ;YES, INDICATE UNSUCESSFUL RECOVERY
6255  033740  122765  000121  000123      CMPB    #RDDATA,P.RCMD(R5) ;CHECK IF READ DATA
6256  033746  001101                      BNE     30$             ;NO, DO NOT DO ECC CORRECTION
6257  033750  032765  000100  000034      BIT     #ECH,P.ER(R5)   ;CHECK IF CORRECTABLE
6258  033756  001075                      BNE     30$             ;NO, DO NOT DO ECC CORRECTION
6259  033760  022765  010040  000060      CMP     #10040,P.EPOS(R5) ;CHECK IF ECC POSITION TOO LARGE
6260  033766  101406                      BLOS    16$             ;YES, REPORT ERROR
6261  033770  005765  000060              TST     P.EPOS(R5)      ;CHECK IF ECC POSITION = 0
6262  033774  001403                      BEQ     16$             ;YES, REPORT ERROR
6263  033776  005765  000062              TST     P.EPAT(R5)      ;CHECK IF ECC PATTERN = 0
6264  034002  001004                      BNE     17$             ;NO, DO ECC CORRECTION
6265  034004  004037  036524          16$:  JSR     R0,CONERR       ;TYPE "ECC LOGIC ERROR"
6266  034010  062121                      ERR066
6267  034012  000207                      RTS     PC              ;RETURN
6268
6269  034014  004737  025634          17$:  JSR     PC,ECCCOR       ;DO ECC CORRECTION
6270  034020  105765  000210              TSTB    P.ASSN(R5)      ;CHECK IF IN ASSIGNMENT SEQUENCE
6271  034024  001017                      BNE     18$             ;YES, DO NOT CHECK ECC CORRECTION
6272  034026  013765  001630  000214      MOV     RTYBA,P.ERHD(R5) ;LOAD START OF SECTOR FOR
6273                                                              ;  DATA COMPARISON
6274  034034  013765  001632  000222      MOV     RTYWC,P.BFCP(R5) ;LOAD NUMBER OF WORDS OF
6275  034042  013765  001632  000220      MOV     RTYWC,P.CMLG(R5) ;  SECTOR PRESENT
6276  034050  112765  177777  000117      MOVB    #-1,P.ECMP(R5)  ;SET ECC COMPARE FLAG
6277  034056  004737  023036              JSR     PC,CMPBUF       ;CHECK ECC CORRECTION
6278  034062  034072                      20$                     ;INDICATE ECC MISCORRECTION
6279  034064  004737  035500          18$:  JSR     PC,SUPECV       ;INDICATE SUCCESSFUL RECOVERY
6280  034070  000207                      RTS     PC              ;RETURN
6281
6282  034072  032777  020000  145040  20$:  BIT     #SW13,@SWR      ;CHECK IF INHIBIT ERROR PRINT OUT
6283  034100  001024                      BNE     30$             ;YES, GO TO RECOVERY SEQUENCE
6284  034102  104401  062015              TYPE    ,ERR060         ;TYPE "ECC MISCORRECTION"
6285  034106  104401  063274              TYPE    ,ERR211         ;TYPE "RKPOS"
6286  034112  016546  000060              MOV     P.EPOS(R5),-(SP) ;STORE RKPOS FOR PRINT OUT
6287  034116  004737  052144              JSR     PC,BINOCT       ;CONVERT TO OCTAL
6288  034122  104401  001165              TYPE    ,$CRLF          ;TYPE <CR><LF>
6289  034126  104401  063303              TYPE    ,ERR212         ;TYPE "RKPAT"
6290  034132  016546  000062              MOV     P.EPAT(R5),-(SP) ;STORE RKPAT FOR PRINT OUT
6291  034136  004737  052144              JSR     PC,BINOCT       ;COVERT TO OCTAL
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 6292  034142  104401  001165                  TYPE    ,SCRLF          ;TYPE <CR><LF>
 6293  034146  004737  035226                  JSR     PC,PRERWD       ;PRINT WORD IN ERROR
 6294  034152  105265  000147          30$:    INCB    P.RERD(R5)      ;INCREMENT RETRY COUNT
 6295  034156  122765  000043  000147          CMPB    #43,P.RERD(R5)  ;CHECK IF UNSUCCESSFUL RETRY
 6296  034164  101410                          BLOS    40$             ;YES, INDICATE UNSUCESSFUL RETRY
 6297  034166  122765  000121  000123          CMPB    #RDDATA,P.RCMD(R5) ;CHECK IF READ DATA
 6298  034174  001407                          BEQ     45$             ;YES, CHECK FOR OFFSET
 6299  034176  122765  000021  000147          CMPB    #21,P.RERD(R5)  ;CHECK IF ABOUT TO ENTER OFFSET OPERATATIONS
 6300  034204  101021                          BHI     50$             ;NO, DO REREAD
 6301  034206  004737  030724          40$:    JSR     PC,UNRECV       ;INDICATE UNSUCCESSFUL RECOVERY
 6302  034212  000207                          RTS     PC              ;RETURN
 6303
 6304  034214  122765  000021  000147  45$:    CMPB    #21,P.RERD(R5)  ;CHECK IF OFFSET +400 MICRO-INCHES
 6305  034222  001007                          BNE     48$             ;NO, GO DETERMINE IF OFFSET IS TO
 6306                                                                  ;  BE ISSUED
 6307  034224  010446                          MOV     R4,-(SP)        ;STORE R4 ON STACK
 6308  034226  116504  000000                  MOVB    P.DRVN(R5),R4   ;GET DRIVE NUMBER AS INDEX
 6309  034232  146437  001510  001507          BICB    INTMSK(R4),@#ATTN ;RESET ISSUE IMPLIED SEEK
 6310  034240  012604                          MOV     (SP)+,R4        ;RESTORE R4
 6311  034242  004037  036230          48$:    JSR     R0,DETOFF       ;DETERMINE IF OFFSET IS TO BE ISSUED
 6312  034246  034336                          60$                     ;OFFSET ISSUED RETURN
 6313  034250  116565  000123  000001  50$:    MOVB    P.RCMD(R5),P.CMND(R5) ;REISSUE LAST COMMAND
 6314  034256  013765  001634  000004          MOV     RTYSEC,P.SECT(R5) ;LOAD SECTOR AND TRACK
 6315  034264  013765  001636  000002          MOV     RTYCYL,P.CYLN(R5) ;LOAD CYLINDER
 6316  034272  013765  001630  000010          MOV     RTYBA,P.BALO(R5) ;LOAD BUS ADDRESS
 6317  034300  013765  001632  000012          MOV     RTYWC,P.WC(R5)  ;LOAD WORD COUNT
 6318  034306  005465  000012                  NEG     P.WC(R5)        ;MAKE IT NEGATIVE
 6319  034312  122765  000131  000001          CMPB    #WRTCHK,P.CMND(R5) ;CHECK IF WRITE CHECK
 6320  034320  001003                          BNE     55$             ;NO, GO ISSUE COMMAND
 6321  034322  052765  000200  000014          BIS     #W.WCK,P.PRST(R5) ;ISSUE WRITE BEFORE WRITE CHECK
 6322  034330  004037  050706          55$:    JSR     R0,Q.PUSH       ;PUT PARAMETER BLOCK ON COMMAND
 6323  034334  001324                          CINITQ                  ;COMMAND INITIATION QUEUE
 6324  034336  000207                  60$:    RTS     PC              ;RETURN
 6325
 6326  034340  032765  040000  000020  E5$:    BIT     #WCE,P.CS2(R5)  ;CHECK IF WRITE CHECK ERROR
 6327  034346  001002                          BNE     1$              ;YES, PROCESS WRITE CHECK ERROR
 6328  034350  000137  034512                  JMP     E10$            ;NO, CONTINUE
 6329
 6330  034354  004037  030076          1$:     JSR     R0,PRI200       ;PRINT WRITE CHECK ERROR
 6331  034360  061367                          ERR050
 6332  034362  105765  000120                  TSTB    P.IFRC(R5)      ;CHECK IF INHIBIT ERROR CORRECTION AND RETRY
 6333  034366  001006                          BNE     5$              ;YES, INITIATE NEXT COMMAND
 6334  034370  105265  000147                  INCB    P.RERD(R5)      ;INCREMENT RETRY COUNT
 6335  034374  122765  000021  000147          CMPB    #21,P.RERD(R5)  ;CHECK IF 16 REREADS OCCURRED
 6336  034402  101003                          BHI     10$             ;NO, START RECOVERY SEQUENCE
 6337  034404  004737  030724          5$:     JSR     PC,UNRECV       ;INDICATE UNSUCCESSFUL RECOVERY
 6338  034410  000207                          RTS     PC              ;RETURN
 6339
 6340  034412  016537  000024  001630  10$:    MOV     P.BAR(R5),RTYBA ;GET ADDRESS OF WORD IN ERROR
 6341  034420  162737  000002  001630          SUB     #2,RTYBA        ;ADJUST ADDRESS
 6342  034426  004737  035014                  JSR     PC,CALSEC       ;CALCULATE SECTOR, TRACK AND CYLINDER
 6343  034432  116565  000123  000001          MOVB    P.RCMD(R5),P.CMND(R5) ;GET PREVIOUS COMMAND
 6344  034440  013765  001634  000004          MOV     RTYSEC,P.SECT(R5) ;GET SECTOR AND TRACK
 6345  034446  013765  001636  000002          MOV     RTYCYL,P.CYLN(R5) ;GET CYLINDER
 6346  034454  013765  001630  000010          MOV     RTYBA,P.BALO(R5) ;GET BUS ADDRESS
 6347  034462  013765  001632  000012          MOV     RTYWC,P.WC(R5)  ;GET WORD COUNT
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6348  034470  005465  000012                  NEG     P.WC(R5)          ;MAKE IT NEGATIVE
6349  034474  052765  000200  000014          BIS     #W.WCF,P.PRST(R5) ;SET ISSUP WRITE BEFORE WRITE CHECK
6350  034502  004037  050706                  JSR     R0,Q.PUSH         ;ENQUEUE PARAMETER IN
6351  034506  001324                          CINITQ                    ;  COMMAND INITIATION QUEUE
6352  034510  000207                          RTS     PC                ;RETURN
6353
6354
6355  034512  032765  000004  000212  E10$:   BIT     #BIT2,P.ERR(R5) ;CHECK IF DATA COMPARE ERROR
6356  034520  001001                          BNE     2$              ;YES, CONTINUE PROCESSING ERROR
6357  034522  000000                          HALT                    ;  *** UNKNOWN ENTRY
6358  034524  005046                  2$:     CLR     -(SP)           ;MAKE ROOM ON STACK
6359  034526  116516  000217                  MOVB    P.ERAD(R5),(SP) ;GET WORD IN ERROR
6360  034532  006316                          ASL     (SP)            ;MULTIPLY BY 2
6361  034534  066516  000214                  ADD     P.EPHD(R5),(SP) ;CALCULATE ADDRESS OF MISCOMPARED WORD
6362  034540  012637  001630                  MOV     (SP)+,RTYBA     ;LOAD ADDRESS OF BAD WORD
6363  034544  004737  035014                  JSR     PC,CALSPC       ;CALCULATE CYLINDER, TRACK, AND SECTOR
6364  034550  032765  000002  000150          BIT     #BIT1,P.DSTT(R5) ;CHECK IF DATA TYPE ERROR HAS ALREADY OCCURRED
6365  034556  001037                          BNE     10$             ;YES, GO TO RETRY SEQUENCE
6366  034560  052765  000002  000150          BIS     #BIT1,P.DSTT(R5) ;SET DATA TYPE ERROR OCCURRED
6367  034566  100003                          BPL     3$              ;CHECK IF FIRST ERROR
6368  034570  052765  000001  000150          BIS     #BIT0,P.DSTT(R5) ;SET INITIAL DATA ERROR
6369  034576  004737  027242          3$:     JSR     PC,PRI000       ;PRINT HEADER
6370  034602  032777  020000  144330          BIT     #SW13,@SWR      ;CHECK IF INHIBIT PRINT OUT
6371  034610  001013                          BNE     5$              ;YES, CHECK IF HALT ON ERROR
6372  034612  104401  062041                  TYPE    ,ERR062         ;TYPE DATA COMPARE ERROR
6373  034616  005765  000150                  TST     P.DSTT(R5)      ;CHECK IF FIRST ERROR
6374  034622  100402                          BMI     4$              ;YES, GO PRINT ERROR WORD
6375  034624  104401  062712                  TYPE    ,ERR202         ;TYPE ERROR DURING ERROR RECOVERY
6376  034630  004737  035226          4$:     JSR     PC,PRERWD       ;PRINT WORD IN ERROR
6377  034634  004737  027476                  JSR     PC,PRI002       ;PRINT CORRECTLY SUPPLIED COMMAND
6378  034640  042765  100200  000150  5$:     BIC     #PIT15!PIT7,P.DSTT(R5) ;CLEAR FIRST ERROR AND ERROR ENQUEUED
6379  034646  004737  026704                  JSR     PC,PRIBUF       ;GO PRINT BUFFER
6380  034652  004737  030472                  JSR     PC,HLT000       ;CHECK IF HALT ON ERROR
6381  034656  105765  000120          10$:    TSTB    P.IERC(R5)      ;CHECK IF INHIBIT ERROR CORRECTION AND RECOVERY
6382  034662  001006                          BNE     15$             ;YES, INDICATE UNSUCCESSFUL RECOVERY
6383  034664  105265  000147                  INCB    P.RERD(R5)      ;INCREMENT RETRY COUNT
6384  034670  122765  000043  000147          CMPB    #43,P.RERD(R5)  ;CHECK IF ERROR RECOVERY UNSUCCESSFUL
6385  034676  101003                          BHI     20$             ;NO, GO TO RECOVERY SEQUENCE
6386  034700  004737  030724          15$:    JSR     PC,UNRECV       ;INDICATE UNSUCCESSFUL RECOVERY
6387  034704  000207                          RTS     PC              ;RETURN
6388
6389  034706  122765  000021  000147  20$:    CMPB    #21,P.RERD(R5)  ;CHECK IF ENTERING OFFSET
6390  034714  001007                          BNE     25$             ;NO, DETERMINE IF TIME TO CHANGE OFFSET
6391  034716  010446                          MOV     R4,-(SP)        ;STORE R4 ON STACK
6392  034720  116504  000000                  MOVB    P.DRVN(R5),R4   ;GET DRIVE NUMBER FOR INDEX
6393  034724  146437  001510  001507          BICB    INTMSK(R4),Q.OVER ;RESET SEEK BEFORE DATA TRANSFER
6394  034732  012604                          MOV     (SP)+,R4        ;RESTORE R4
6395  034734  004037  036230          25$:    JSR     R0,DETOFF       ;DETERMINE IF OFFSET TO BE ISSUED
6396  034740  035012                          50$                     ;OFFSET HAS BEEN ISSUED
6397  034742  116565  000123  000001          MOVB    P.RCMD(R5),P.CMND(R5) ;GET LAST ISSUED COMMAND
6398  034750  013765  001634  000004          MOV     RTYSEC,P.SECT(R5) ;LOAD SECTOR AND TRACK ADDRESS
6399  034756  013765  001636  000002          MOV     RTYCYL,P.CYLN(R5) ;LOAD CYLINDER ADDRESS
6400  034764  013765  001630  000010          MOV     RTYBA,P.BALO(R5) ;LOAD BUS ADDRESS
6401  034772  013765  001632  000012          MOV     RTYWC,P.WC(R5)  ;GET WORD COUNT
6402  035000  005465  000012                  NEG     P.WC(R5)        ;MAKE IT NEGATIVE
6403  035004  004037  050706                  JSR     R0,Q.PUSH       ;ENQUEUE PARAMETER BLOCK TO COMMAND
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 6404  035010  001324                      CINITQ                  ;  INITIATION QUEUE
 6405  035012  000207              50$:    RTS     PC              ;RETURN
```

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                        .SBTTL  CALCULATE CYLINDER, TRACK, AND SECTOR FOR RETRY

035014  010146          CALSEC: MOV     R1,-(SP)        ;STORE R1 ON STACK
035016  010346                  MOV     R3,-(SP)        ;STORE R3 ON STACK
035020  013703  001630          MOV     RTYBA,R3        ;GET ADDRESS OF ERROR WORD
035024  166503  000010          SUB     P.BALO(R5),R3   ;CALCULATE BYTES CORRECTLY TRANSFERRED
035030  042703  000777          BIC     #777,R3         ;MAKE IT ON SECTOR BOUNDARY
035034  010337  001630          MOV     R3,RTYBA        ;STORE CALCULATED BUS ADDRESS
035040  066537  000010  001630  ADD     P.BALO(R5),RTYBA ;CALCULATE START OF SECTOR WITH ERROR
035046  016501  000012          MOV     P.WC(R5),R1     ;GET INITIAL WORD COUNT
035052  005401                  NEG     R1              ;MAKE IT POSITIVE
035054  006203                  ASR     R3              ;DETERMINE WORDS BEFORE ERROR
035056  160301                  SUB     R3,R1           ;CALCULATE NUMBER OF WORDS LEFT
035060  022701  000400          CMP     #256.,R1        ;CHECK IF LESS THAN OR EQUAL TO ONE SECTOR
035064  103002                  BHIS    5$              ;LOAD RETRY WORD COUNT
035066  012701  000400          MOV     #256.,R1        ;NO, MAKE IT ONE SECTOR
035072  010137  001632  5$:     MOV     R1,RTYWC        ;LOAD RETY WORD COUNT
035076  116537  000005  001635  MOVB    P.TPCK(R5),RTYTRK ;STORE RETRY TRACK
035104  016537  000002  001636  MOV     P.CYLN(R5),RTYCYL ;STORE RETRY CYLINDER
035112  010346                  MOV     R3,-(SP)        ;STORE WORDS TRANSFERRED
035114  116616  000001          MOVB    1(SP),(SP)      ;STORE NUMBER OF SECTORS
035120  105066  000001          CLRB    1(SP)           ;CLEAR HIGH ORDER BYTE
035124  005046                  CLR     -(SP)           ;MAKE ROOM ON STACK
035126  116516  000004          MOVB    P.SPCT(R5),(SP) ;GET INITIAL SECTOR
035132  062616                  ADD     (SP)+,(SP)      ;ADD SECTORS TRANSFERRED
035134  022716  000025  10$:     CMP     #21.,(SP)       ;CHECK IF SECTOR COUNT GREATER THAN 21
035140  103005                  BHIS    15$             ;NO, CHECK TRACK
035142  162716  000026          SUB     #22.,(SP)       ;SUBTRACT 22 SECTORS/TRACK
035146  105237  001635          INCB    RTYTRK          ;INCREMENT TRACK
035152  000770                  BR      10$             ;CHECK SECTOR COUNT

035154  112637  001634  15$:     MOVB    (SP)+,RTYSEC    ;STORE RETRY SECTOR
035160  005046                  CLR     -(SP)           ;MAKE ROOM ON THE STACK
035162  113716  001635          MOVB    RTYTRK,(SP)     ;STORE RETRY TRACK
035166  122716  000002  17$:     CMPB    #2,(SP)         ;CHECK TRACK GREATER THAN 2
035172  103005                  BHIS    20$             ;NO, RETURN
035174  162716  000003          SUB     #3,(SP)         ;SUBTRACT 3 TRACKS/CYLINDER
035200  005237  001636          INC     RTYCYL          ;INCREMENT CYLINDER
035204  000770                  BR      17$             ;CHECK TRACK COUNT

035206  112637  00163?  20$:     MOVB    (SP)+,RTYTRK    ;LOAD RETRY COUNT
035212  112737  000001  001640  MOVB    #1,RTYSCN       ;INDICATE ONE SECTOR IN RETRY COUNT
035220  012603                  MOV     (SP)+,R3        ;RESTORE R3
035222  012601                  MOV     (SP)+,R1        ;RESTORE R1
035224  000207                  RTS     PC              ;RETURN
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                                .SBTTL  PRINT FIRST ERROR WORD IN BUFFER
                        
035226  010046          PRERWD: MOV     R0,-(SP)        ;STORE R0 ON STACK
035230  010146                  MOV     R1,-(SP)        ;STORE R1 ON STACK
035232  010346                  MOV     R3,-(SP)        ;STORE R3 ON STACK
035234  010446                  MOV     R4,-(SP)        ;STORE R4 ON STACK
035236  104401  060214          TYPE    ,ERR012         ;TYPE ERROR HEADER
035242  016503  000214          MOV     P.ERHD(R5),R3   ;GET ADDRESS OF START OF SECTOR
035246  005046                  CLR     -(SP)           ;MAKE ROOM ON STACK
035250  116516  000217          MOVB    P.ERAD(R5),(SP) ;GET WORD IN ERROR OF SECTOR
035254  006316                  ASL     (SP)            ;MULTIPLY IT BY 2
035256  011601                  MOV     (SP),R1         ;STORE IT IN R1
035260  062603                  ADD     (SP)+,R3        ;GET ADDRESS OF BAD WORD
035262  010346                  MOV     R3,-(SP)        ;STORE ADDRESS FOR PRINT OUT
035264  004737  052144          JSR     PC,BINOCT       ;CONVERT TO OCTAL
035270  122765  000001  000217  CMPB    #1,P.ERAD(R5)   ;CHECK IF IN DESCRIPTOR AREA
035276  103403                  BLO     5$              ;NO, CALCULATE WORD
035300  104401  057536          TYPE    ,QUFSMK         ;TYPE QUESTION MARKS
035304  000436                  BR      10$             ;GO TYPE WORD READ
                        
035306  016504  000214  5$:     MOV     P.ERHD(R5),R4   ;GET HEADER FOR PATTERN INDEX
035312  016400  000002          MOV     2(R4),R0        ;GET NUMBER OF WORDS WRITTEN IN SECTOR
035316  042700  177400          BIC     #177400,R0      ;KEEP LOW BYTE
035322  005200                  INC     R0              ;INCREMENT R0 TO MAKE OFFSET FROM START
                                                        ;  OF SECTOR
035324  126500  000217          CMPB    P.ERAD(R5),R0   ;CHECK IF IN ZERO FILL AREA
035330  101402                  BLOS    7$              ;NO, CALCULATE ADDRESS OF
                                                        ;  WORD IN DATA PATTERN
035332  005046                  CLR     -(SP)           ;LOAD ZERO FOR PRINT OUT
035334  000414                  BR      9$              ;GO PRINT EXPECTED CONTENTS
                        
035336  011404          7$:     MOV     (R4),R4         ;GET DATA PATTERN NUMBER FOR INDEX
035340  042704  177760          BIC     #177760,R4      ;MASK OFF INSIGNIFICANT BITS
035344  006304                  ASL     R4              ;MULTIPLY BY 2
035346  016404  004576          MOV     PATTAB(R4),R4   ;GET PATTERN BASE
035352  162701  000004          SUB     #4,R1           ;SUBTRACT 4 FROM SECTOR OFFSET
035356  042701  177700          BIC     #177700,R1      ;MAKE IT MOD 32 WORDS
035362  060104                  ADD     R1,R4           ;CALCULATE PATTERN ADDRESS
035364  011446                  MOV     (R4),-(SP)      ;STORE EXPECTED CONTENTS FOR PRINT OUT
035366  104401  057551          TYPE    ,BLANKS         ;TYPE BLANKS
035372  004737  052144  9$:     JSR     PC,BINOCT       ;CONVERT TO OCTAL
035376  104401  057551          TYPE    ,BLANKS         ;TYPE BLANKS
035402  011346          10$:    MOV     (R3),-(SP)      ;STORE WORD READ
035404  004737  052144          JSR     PC,BINOCT       ;CONVERT TO OCTAL
035410  104401  057551          TYPE    ,BLANKS         ;TYPE BLANKS
035414  005046                  CLR     -(SP)           ;MAKE ROOM ON STACK
035416  116516  000217          MOVB    P.ERAD(R5),(SP) ;STORE SECTOR WORD NUMBER FOR PRINT OUT
035422  004737  052144          JSR     PC,BINOCT       ;CONVERT TO OCTAL
035426  105765  000217          TSTB    P.ERAD(R5)      ;CHECK IF ERROR IS IN PATTERN WORD
035432  001003                  BNE     15$             ;NO, PRINT PATTERN NUMBER
035434  104401  057536          TYPE    ,QUFSMK         ;TYPE QUESTION MARKS
035440  000410                  BR      20$             ;GO RESTORE REGISTERS
                        
035442  104401  057551  15$:    TYPE    ,BLANKS         ;TYPE BLANKS
035446  017546  000214          MOV     @P.FRMD(R5),-(SP) ;GET FIRST WORD OF SECTOR READ
035452  042716  177760          BIC     #177760,(SP)    ;CLEAR INSIGNIFICANT BITS
```

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```
 6507  035456  004737  052144                 JSR     PC,PINOCT       ;CONVERT TO OCTAL
 6508  035462  104401  001165         20$:    TYPE    ,$CRLF          ;TYPE <CR><LF>
 6509  035466  012604                         MOV     (SP)+,R4        ;RESTORE R4
 6510  035470  012603                         MOV     (SP)+,R3        ;RESTORE R3
 6511  035472  012601                         MOV     (SP)+,R1        ;RESTORE R1
 6512  035474  012600                         MOV     (SP)+,R0        ;RESTORE R0
 6513  035476  000207                         RTS     PC              ;RETURN
```

```
                                .SBTTL  SUCCESSFUL RECOVERY CLEAN UP
                        
035500  032765  000001  000150  SURECV: BIT     #BIT0,P.DSTT(R5) ;CHECK IF DATA TYPE ERROR
035506  001466                          BEQ     10$              ;NO, CLEAN UP FOR NEXT COMMAND
035510  105765  000147                  TSTB    P.RERD(R5)       ;CHECK IF FIRST ERROR
035514  001003                          BNE     5$               ;NO, CHECK IF OFFSET
035516  005265  000176                  INC     P.SECC(R5)       ;INCREMENT NO. OF ECC RECOVERABLE ERRORS
035522  000426                          BR      9$               ;GO CLEAN UP FOR NEXT COMMAND
                        
035524  122765  000020  000147  5$:     CMPB    #20,P.RERD(R5) ;CHECK IF OFFSET
035532  103403                          BLO     8$               ;YES, INCREMENT OFFSET RECOVERABLE
035534  005265  000172                  INC     P.SRRD(R5)       ;INCREMENT REREAD RECOVERABLE
035540  000417                          BR      9$               ;GO CLEAN UP FOR NEXT COMMAND
                        
035542  005265  000174          8$:     INC     P.SOFF(R5)       ;INCREMENT OFFSET RECOVERABLE
035546  032777  020000  143364          BIT     #SW13,@SWR       ;CHECK IF INHIBIT PRINT OUT
035554  001011                          BNE     9$               ;YES, CLEAN UP FOR NEXT COMMAND
035556  104401  062543                  TYPE    ,ERR108          ;TYPE "OFFSET"
035562  005046                          CLR     -(SP)            ;MAKE ROOM ON STACK
035564  116516  000006                  MOVB    P.CFST(R5),(SP) ;STORE CFFST FOR PRINT OUT
035570  004737  052144                  JSR     PC,BINOCT        ;CONVERT TO OCTAL
035574  104401  001165                  TYPE    ,$CRLF           ;TYPE <CR><LF>
035600  105037  001640          9$:     CLRB    RTYSCN           ;CLEAR SECTOR RETRY FLAG
035604  016546  000176                  MOV     P.SECC(R5),-(SP) ;STORE NUMBER OF ECC RECOVERABLE ERRORS
035610  066516  000172                  ADD     P.SRRD(R5),(SP) ;ADD NUMBER OF REREAD RECOVERABLE ERRORS
035614  066516  000174                  ADD     P.SOFF(R5),(SP) ;ADD NUMBER OF OFFSET RECOVERABLE ERRORS
035620  022665  000100                  CMP     (SP)+,P.CFRT(R5) ;CHECK IF SOFT ERROR RATE EXCEEDED
035624  101417                          BLOS    10$              ;NO, GO ISSUE NEXT COMMAND
035626  032777  040020  143304          BIT     #SW14!SW14,@SWR  ;CHECK IF INHIBIT AUTOMATIC DRIVE DROPPING
035634  001013                          BNE     10$              ;YES, GO ISSUE NEXT COMMAND
035636  004737  022316                  JSR     PC,BUFREL        ;GO RELEASE BUFFER
035642  104401  063040                  TYPE    ,ERR205          ;TYPE "ERROR THRESHOLD EXCEEDED"
035646  004737  012716                  JSR     PC,DROP          ;GO DROP DRIVE
035652  005037  001562                  CLR     ERRPRO           ;CLEAR ERROR CURRENTLY BEING PROCESSED
035656  004737  022016                  JSR     PC,GETBUF        ;GET BUFFER FOR NEXT COMMAND
035662  000207                          RTS     PC               ;RETURN
                        
035664  032777  020000  143246  10$:     BIT     #SW13,@SWR       ;CHECK IF INHIBIT PRINT OUT
035672  001002                          BNE     15$              ;YES, CHECK IF READ PACK SERIAL NUMBER
035674  104401  062750                  TYPE    ,ERR203          ;TYPE RECOVERABLE ERROR
035700  105037  001640          15$:     CLRB    RTYSCN           ;CLEAR SECTOR RETRY COUNT
035704  005065  000146                  CLR     P.RFCT(R5)       ;CLEAR ERROR FLAGS AND RETRY COUNTS
035710  005065  000150                  CLR     P.DSTT(R5)
035714  005065  000212                  CLR     P.ERR(R5)
035720  005037  001562                  CLR     ERRPRO           ;CLEAR ERROR CURRENTLY BEING PROCESSED
035724  010446                          MOV     R4,-(SP)         ;STORE R4 ON STACK
035726  116504  000000                  MOVB    P.DRVN(R5),R4    ;STORE DRIVE NUMBER FOR INDEX
035732  156437  001510  001507          BISB    INTMSK(R4),Q.CVER ;ALLOW OVERLAPPED OPERATIONS ON THIS DRIVE
035740  012604                          MOV     (SP)+,R4         ;RESTORE R4
035742  105765  000210                  TSTB    P.ASSI(R5)       ;CHECK IF IN ASSIGNMENT SEQUENCE
035746  001025                          BNE     20$              ;YES, TERMINATE SEQUENCE
035750  122765  000117  000001          CMPB    #SEEK,P.CMND(R5) ;CHECK IF SEEK TO PREVIOUS CYLINDER
035756  001410                          BEQ     16$              ;YES, GO ISSUE RELEASE
035760  122765  000140  000001          CMPB    #RELEAS,P.CMND(R5) ;CHECK IF RELEASE
035766  001013                          BNE     17$              ;NO, CARRY OUT NORMAL RECOVERY
035770  004037  050706                  JSR     R0,Q.PUSH        ;ENQUEUE PARAMETER BLOCK IN DRIVE
```

```
6570  035774  001314                          AVAILQ                  ;  AVAILIABLE QUEUE
6571  035776  000207                          RTS     PC              ;RETURN
6572
6573  036000  112765  000140  000001  16$:    MOVB    #RELEAS,P.CMND(R5) ;ISSUE RELEASE COMMAND
6574  036006  004037  050706                  JSR     R0,Q.PUSH       ;ENQUEUE PARAMETER BLOCK IN COMMAND
6575  036012  001324                          CINITQ                  ;  INITIATION QUEUE
6576  036014  000207                          RTS     PC              ;RETURN
6577
6578  036016  000137  024272          17$:    JMP     NORM1           ;CARRY OUT NORMAL DATA TRANSFER TERMINATION
6579
6580                                  ;       CHECK IF ANY OF THE FOLLOWING ASSIGNMENT STAGES
6581                                  ;               READ DRIVE STATUS
6582                                  ;               START SPINDLE
6583                                  ;               SET VOLUME VALID
6584                                  ;               RECAL
6585                                  ;               READ PACK SERIAL NUMBER
6586  036022  132765  000117  000210  20$:    BITB    #BIT0!BIT1!BIT2!BIT3!BIT6,P.ASSN(R5)
6587  036030  001402                          BEQ     25$             ;NO, PROCESS WRITE PACK
6588  036032  000137  013370                  JMP     ASNORM          ;PROCESS NORMAL TERMINATION
6589
6590  036036  032765  002000  000014  25$:    BIT     #DRPDRV,P.PRST(R5) ;CHECK IF DROP DRIVE
6591  036044  001030                          BNE     30$             ;YES, GO DROP DRIVE
6592  036046  105065  000211                  CLRB    P.SEEK(R5)      ;CLEAR SEEK TO PREVIOUS LOCATION
6593  036052  116565  000123  000001          MOVB    P.RCMD(R5),P.CMND(R5) ;REISSUE LAST WRITE/WRITE CHECK COMMAND
6594  036060  052765  000200  000014          BIS     #W.WCK,P.PRST(R5) ;SET ISSUE WRITE BEFORE WRITE CHECK
6595  036066  016565  000126  000004          MOV     P.RSEC(R5),P.SECT(R5) ;LOAD PREVIOUS TRACK AND SECTOR
6596  036074  016565  000124  000002          MOV     P.RCYL(R5),P.CYLN(R5) ;LOAD PREVIOUS CYLINDER
6597  036102  016565  000132  000010          MOV     P.RBAL(R5),P.BALO(R5) ;LOAD PREVIOUS BUS ADDRESS
6598  036110  016565  000130  000012          MOV     P.RWC(R5),P.WC(R5) ;LOAD PREVIOUS WORD COUNT
6599  036116  004037  050706                  JSR     R0,Q.PUSH       ;ENQUEUE PARAMETER BLOCK IN COMMAND
6600  036122  001324                          CINITQ                  ;  INITIATION QUEUE
6601  036124  000207                          RTS     PC              ;RETURN
6602
6603  036126  004737  022316          30$:    JSR     PC,BUFREL       ;GO RELEASE BUFFER
6604  036132  104401  055347                  TYPE    ,OPR008         ;TYPE "OPERATOR INITIATED DROP DRIVE
6605                                                                  ;  DURING PACK WRITING"
6606  036136  004737  012716                  JSR     PC,DROP         ;GO DROP DRIVE
6607  036142  004737  022016                  JSR     PC,GETBUF       ;GET BUFFER FOR NEXT COMMAND
6608  036146  000207                          RTS     PC              ;RETURN
```

```
6609                                    .SBTTL  GET CURRENT STATUS INFORMATION
6610
6611  036150  010446                    GETCUR: MOV     R4,-(SP)        ;STORE R4 ON STACK
6612  036152  010346                            MOV     R3,-(SP)        ;STORE R3 ON STACK
6613  036154  010504                            MOV     R5,R4           ;LOAD START OF CURRENT PARRAMETER BLOCK
6614  036156  012703  004512                    MOV     #PARM10,R3      ;LOAD START OF RETRY PARAMETER BLOCK
6615
6616  036162  012423                    5$:     MOV     (R4)+,(R3)+     ;COPY PARAMTER BLOCK
6617  036164  022703  004576                    CMP     #PARM10+P.EPAT+2,R3 ;CHECK IF FINISHED
6618  036170  001374                            BNE     5$              ;NO, GET NEXT WORD
6619  036172  012603                            MOV     (SP)+,R3        ;RESTORE R3
6620  036174  012604                            MOV     (SP)+,R4        ;RESTORE R4
6621  036176  000207                            RTS     PC              ;RETURN
6622
6623                                    .SBTTL  RESTORE STATUS
6624
6625  036200  010446                    RSTAT:  MOV     R4,-(SP)        ;STORE R4 ON STACK
6626  036202  010346                            MOV     R3,-(SP)        ;STORE R3 ON STACK
6627  036204  010504                            MOV     R5,R4           ;LOAD START OF CURRENT PARRAMETER BLOCK
6628  036206  012703  004512                    MOV     #PARM10,R3      ;LOAD START OF RETRY PARAMETER BLOCK
6629
6630  036212  012324                    5$:     MOV     (R3)+,(R4)+     ;COPY PARAMTER BLOCK
6631  036214  022703  004576                    CMP     #PARM10+P.EPAT+2,R3 ;CHECK IF FINISHED
6632  036220  001374                            BNE     5$              ;NO, GET NEXT WORD
6633  036222  012603                            MOV     (SP)+,R3        ;RESTORE R3
6634  036224  012604                            MOV     (SP)+,R4        ;RESTORE R4
6635  036226  000207                            RTS     PC              ;RETURN
```

```
                                .SBTTL  DETERMINE OFFSET FOR RETRY
                        
036230  122765  000021  000147  DETOFF: CMPB    #21,P.READ(R5)  ;CHECK IF OFFSET = +400 MICRO-INCHES
036236  001004                          BNE     10$             ;NO, CONTINUE
036240  112765  000020  000006          MOVB    #OFFP4,P.OFST(R5) ;LOAD OFFSET VALUE = +400 MICRO-INCHES
036246  000447                          BR      15$             ;ISSUE OFFSET
                        
036250  122765  000024  000147  10$:    CMPB    #24,P.READ(R5)  ;CHECK IF OFFSET = -400 MICRO-INCHES
036256  001004                          BNE     11$             ;NO, CONTINUE
036260  112765  000220  000006          MOVB    #OFFM4,P.OFST(R5) ;LOAD OFFSET VALUE = -400 MICRO-INCHES
036266  000437                          BR      15$             ;ISSUE OFFSET
                        
036270  122765  000027  000147  11$:    CMPB    #27,P.READ(R5)  ;CHECK IF OFFSET = +800 MICRO-INCHES
036276  001004                          BNE     12$             ;NO, CONTINUE
036300  112765  000040  000006          MOVB    #OFFP8,P.OFST(R5) ;LOAD OFFSET VALUE = +800 MICRO-INCHES
036306  000427                          BR      15$             ;ISSUE OFFSET
                        
036310  122765  000032  000147  12$:    CMPB    #32,P.READ(R5)  ;CHECK IF OFFSET = -800 MICRO-INCHES
036316  001004                          BNE     13$             ;NO, CONTINUE
036320  112765  000240  000006          MOVB    #OFFM8,P.OFST(R5) ;LOAD OFFSET VALUE = -800 MICRO-INCHES
036326  000417                          BR      15$             ;ISSUE OFFSET
                        
036330  122765  000035  000147  13$:    CMPB    #35,P.READ(R5)  ;CHECK IF OFFSET = +1200 MICRO-INCHES
036336  001004                          BNE     14$             ;NO, CONTINUE
036340  112765  000060  000006          MOVB    #OFFP12,P.OFST(R5) ;LOAD OFFSET VALUE = +1200 MICRO-INCHES
036346  000407                          BR      15$             ;ISSUE OFFSET
                        
036350  122765  000040  000147  14$:    CMPB    #40,P.READ(R5)  ;CHECK IF OFFSET = -1200 MICRO-INCHES
036356  001013                          BNE     30$             ;NO, DO REREAD
036360  112765  000260  000006          MOVB    #OFFM12,P.OFST(R5) ;LOAD OFFSET VALUE = -1200 MICRO-INCHES
036366  112765  000115  000001  15$:    MOVB    #OFFSET,P.CMND(R5) ;LOAD OFFSET COMMAND
036374  004037  050706                  JSR     R0,Q.PUSH       ;ENQUEUE PARAMETER BLOCK IN COMMAND
036400  001324                          CINITQ                  ;  INITIATION QUEUE
036402  011000                          MOV     (R0),R0         ;LOAD OFFSET ISSUED RETURN
036404  000200                          RTS     R0              ;RETURN
                        
036406  005720                  30$:    TST     (R0)+           ;ADJUST RETURN FOR NO OFFSET
036410  000200                          RTS     R0              ;RETURN
```

```
                        .SBTTL  CALCULATE RETRY WORD COUNT
                        
036412  013746  001636 CALWC:  MOV     RTYCYL,-(SP)     ;STORE RETRY CYLINDER
036416  166516  000002         SUB     P.CYLN(R5),(SP)  ;SUBTRACT INITIAL CYLINDER
036422  011646                 MOV     (SP),-(SP)       ;STORE CYLINDER DIFFERENCE
036424  006316                 ASL     (SP)             ;MULTIPLY DIFFERENCE BY 2
036426  062616                 ADD     (SP)+,(SP)       ;MULTIPLY DIFFERENCE BY 3
036430  005046                 CLR     -(SP)            ;MAKE ROOM ON STACK
036432  113716  001635         MOVB    RTYTRK,(SP)      ;GET RETRY TRACK
036436  062616                 ADD     (SP)+,(SP)       ;ADD RETRY TRACK
036440  005046                 CLR     -(SP)            ;MAKE ROOM ON THE STACK
036442  116516  000005         MOVB    P.TRCK(R5),(SP)  ;GET INITIAL TRACK
036446  162616                 SUB     (SP)+,(SP)       ;SUBTRACT INITIAL TRACK
036450  012746  000026         MOV     #22.,-(SP)       ;MULTIPLY TRACK BY 22
036454  004737  054064         JSR     PC,$MULT
036460  012616                 MOV     (SP)+,(SP)       ;THROW AWAY MOST SIGNIFICANT BITS
036462  005046                 CLR     -(SP)            ;MAKE ROOM ON THE STACK
036464  113716  001634         MOVB    RTYSEC,(SP)      ;GET RETRY SECTOR
036470  062616                 ADD     (SP)+,(SP)       ;ADD PRESENT SECTOR
036472  005046                 CLR     -(SP)            ;MAKE ROOM ON STACK
036474  116516  000004         MOVB    P.SECT(R5),(SP)  ;GET INITIAL SECTOR
036500  162616                 SUB     (SP)+,(SP)       ;CALCULATE NUMBER OF SECTORS UNTIL ERROR
036502  111666  000001         MOVB    (SP),1(SP)       ;MULTIPLY BY 256 WORDS/SECTOR
036506  105016                 CLRB    (SP)
036510  161637  001632         SUB     (SP),RTYWC       ;SUBTRACT FROM INITIAL WORD COUNT
036514  006316                 ASL     (SP)             ;DETERMINE NUMBER OF BYTES
036516  062637  001630         ADD     (SP)+,RTYBA      ;CALCULATE STARTING BUFFER ADDRESS
036522  000207                 RTS     PC               ;RETURN
```

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6702                                    .SBTTL  RECOVERABLE CONTROLLER ERROR TERMINATION
6703
6704  036524  012037  036546            CONERR: MOV     (R0)+,2$        ;STORE ERROR MESSAGE ADDRESS
6705  036530  004737  027242                    JSR     PC,PRT000       ;PRINTER HANDLER
6706  036534  032777  020000  142376            BIT     #SW13,@SWR      ;CHECK IF INHIBIT PRINT OUT
6707  036542  001032                            BNE     10$             ;YES, CHECK IF HALT ON ERROR
6708  036544  104401                            TYPE                    ;TYPE ERROR MESSAGE
6709  036546  000000                    2$:     .WORD   0
6710  036550  104401  001165                    TYPE    ,SCRLF          ;TYPE <CR><LF>
6711  036554  004737  025550                    JSR     PC,PRTSTT       ;PRINT CONTROLLER REGISTERS
6712  036560  004737  027476                    JSR     PC,PRT002       ;PRINT CURRENT EXECUTED COMMAND
6713  036564  022737  062121  036546            CMP     #ERR066,2$      ;CHECK IF ECC LOGIC ERROR
6714  036572  001016                            BNE     10$             ;NO, CHECK IF HALT ON ERROR
6715  036574  104401  062141                    TYPE    ,ERR067         ;TYPE "RRECPI WRECPS"
6716  036600  016546  000062                    MOV     P.EPAT(R5),-(SP) ;STORE ECC PATTERN FOR PRINT OUT
6717  036604  004737  052144                    JSR     PC,BINOCT       ;CONVERT TO OCTAL
6718  036610  104401  057551                    TYPE    ,SLANKS         ;TYPE 2 SPACES
6719  036614  016546  000060                    MOV     P.EPOS(R5),-(SP) ;STORE ECC POSITION FOR PRINT OUT
6720  036620  004737  052144                    JSR     PC,BINOCT       ;CONVERT TO OCTAL
6721  036624  104401  001165                    TYPE    ,SCRLF          ;TYPE <CR><LF>
6722  036630  004737  030472            10$:    JSR     PC,HLT000       ;CHECK IF HALT ON ERROR
6723  036634  005237  001624                    INC     CNTCNT          ;INCREMENT CONTROLLER ERROR COUNT
6724  036640  022737  000012  001624            CMP     #T.CONT,CNTCNT  ;CHECK IF THRESHOLD EXCEEDED
6725  036646  103006                            BHIS    15$             ;NO, CONTINUE
6726  036650  104401  057554                    TYPE    ,ERR000         ;TYPE "FATAL ERROR"
6727  036654  104401  060113                    TYPE    ,ERR008         ;TYPE "CONTROLLER ERROR THRESHOLD EXCEEDED"
6728  036660  000000                            HALT
6729  036662  000776                            BR      .-2
6730
6731  036664  105765  000150            15$:    TSTB    P.DSTT(R5)      ;CHECK IF FIRST ERROR
6732  036670  100005                            BPL     20$             ;NO, REQUEUE COMMAND
6733  036672  042765  100200  000150            BIC     #BIT15!BIT7,P.DSTT(R5) ;CLEAR ERROR ENQUEUED AND FIRST ERROR
6734  036700  005037  001562                    CLR     ERRPRO          ;CLEAR ERROR BEING PROCESSED
6735  036704  004037  050706            20$:    JSR     R0,Q.PUSH       ;REQUEUE COMMAND IN COMMAND
6736  036710  001324                            CINITQ                  ;  INITIATION QUEUE
6737  036712  000200                            RTS     R0              ;RETURN
```

```
                                .SBTTL  TEST FOR DROP DRIVE ERRORS
                        
036714  032765  000030  000036  TSTDRP: BIT     #ACLO!SPDLSS,P.DS(R5) ;CHECK IF AC LOW OR SPEED LOSS
036722  001016                          BNE     10$             ;YES REPORT ERROR
                                ;       CHECK IF ANY OF THE FOLLOWING ERRORS ARE SET
                                ;               UNSAFE
                                ;               ILLEGAL DISK ADDRESS
                                ;               WRITE LOCK ERROR
                                ;               DRIVE TYPE ERROR
                                ;               FORMAT ERROR
                                ;               NON-EXECUTABLE DRIVE FUNCTION
036724  032765  046064  000034          BIT     #UNS!IDAE!WLE!DTYE!FMTE!NXF,P.ER(R5)
                        
036732  001026                          BNE     12$             ;YES, REPORT ERROR
                                ;       CHECK IF ANY OF THE FOLLOWING FLAGS ARE SET
                                ;               DRIVE ERROR NOT REPORTED
                                ;               DRIVE READY NOT SET AFTER START SPINDLE
                                ;               VOLUME VALID NOT SET AFTER PACK ACKNOWLEDGE
036734  032765  006010  000212          BIT     #BIT3!BIT10!BIT11,P.ERR(R5)
                        
036742  001072                          BNE     18$             ;YES, GO REPORT ERROR
                        
                                ;       CHECK IF ANY OF THE FOLLOWING FLAGS ARE SET
                                ;               DRIVE HARD ERROR
                                ;               DRIVE STATUS CHANGE DID NOT CLEAR
                                ;               UNEXPECTED ATTN FROM DRIVE COMMAND
                                ;               ATTENTION SET BUT DSC AND FAULT RESET
036744  032765  004070  000014          BIT     #DRVHRD!DRVDSC!UEXATT!NODSC,F.FRST(R5)
                        
036752  001116                          BNE     32$             ;YES REPORT ERROR
036754  005720                          TST     (R0)+           ;GET NORMAL RETURN ADDRESS
036756  000200                          RTS     R0              ;RETURN
                        
036760  004737  027242          10$:    JSR     PC,PRI000       ;PRINT ERROR HEADER
036764  032765  000010  000036          BIT     #ACLO,P.DS(R5)  ;CHECK IF AC LOW
036772  001403                          BEQ     11$             ;NO, CONTINUE
036774  104401  061074                  TYPE    ,ERR033         ;TYPE "AC LOW"
037000  000472                          BR      30$             ;GO GET ERROR QUALIFICATION
                        
037002  104401  061103          11$:    TYPE    ,ERR034         ;TYPE "SPEED LOSS"
037006  000467                          BR      30$             ;GET ERROR QUALIFICATION
                        
037010  004737  027242          12$:    JSR     PC,PRI000       ;PRINT ERROR HEADER
037014  032765  040000  000034          BIT     #UNS,P.ER(R5)   ;CHECK IF DRIVE UNSAFE
037022  001403                          BEQ     13$             ;NO, CONTINUE
037024  104401  061613                  TYPE    ,ERR056         ;TYPE "DRIVE UNSAFE"
037030  000456                          BR      30$             ;GET ERROR QUALIFICATION
                        
037032  032765  000040  000034  13$:    BIT     #DTYE,P.ER(R5)  ;CHECK IF DRIVE TYPE ERROR
037040  001403                          BEQ     14$             ;NO, CONTINUE
037042  104401  061116                  TYPE    ,ERR035         ;TYPE "DRIVE TYPE ERROR"
037046  000447                          BR      30$             ;GET ERROR QUALIFIER BITS
                        
037050  032765  000020  000034  14$:    BIT     #FMTE,P.ER(R5)  ;CHECK IF FORMAT ERROR
037056  001403                          BEQ     15$             ;NO, CONTINUE
037060  104401  061133                  TYPE    ,ERR036         ;TYPE FORMAT ERROR
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6794  037064  000440                          BR      30$             ;GET ERROR QUALIFIER BITS
6795
6796  037066  032765  000004  000034  15$:    BIT     #NXF,P.ER(R5)   ;CHECK IF NON-EXECUTABLE DRIVE FUNCTION
6797  037074  001403                          BEQ     16$             ;NO, CONTINUE
6798  037076  104401  061146                  TYPE    ,ERR037         ;TYPE ILLEGAL DRIVE FUNCTION
6799  037102  000431                          BR      30$             ;GET ERROR QUALIFIER BITS
6800
6801  037104  032765  002000  000034  16$:    BIT     #IDAE,P.ER(R5)  ;CHECK IF ILLEGAL DISK ADDRESS
6802  037112  001403                          BEQ     17$             ;NO, CONTINUE
6803  037114  104401  061043                  TYPE    ,ERR031         ;TYPE "ILLEGAL DISK ADDRESS"
6804  037120  000422                          BR      30$             ;GET ERROR QUALIFER BITS
6805
6806  037122  104401  061057          17$:    TYPE    ,ERR032         ;TYPE "WRITE LOCK ERROR"
6807  037126  000417                          BR      30$             ;GET ERROR QUALIFIER BITS
6808
6809  037130  004737  027242          18$:    JSR     PC,PRI00G       ;PRINT ERROR HEADER
6810  037134  032765  002000  000212          BIT     #BIT10,P.ERR(R5) ;CHECK IF DRIVE NOT READY AFTER START SPINDLE
6811  037142  001403                          BEQ     19$             ;NO, CONTINUE
6812  037144  104401  061505                  TYPE    ,ERR053+1       ;PRINT "DRIVE NOT READY AFTER START SPINDLE"
6813  037150  000406                          BR      30$             ;GET ERROR QUALIFIER BITS
6814
6815  037152  032765  004000  000212  19$:    BIT     #BIT11,P.ERR(R5) ;CHECK IF VOLUME VALID DID NOT SET
6816                                                                  ;  AFTER PACK ACKNOWLEDGE
6817  037160  001404                          BEQ     31$             ;NO, CONTINUE
6818  037162  104401  061546                  TYPE    ,ERR054+1       ;PRINT "VOLUME VAID NOT SET AFTER
6819                                                                  ;  PACK ACKNOWLEDGE INDSTRUCTION"
6820  037166  104401  001165          30$:    TYPE    ,$CRLF          ;TYPE <CR><LF>
6821  037172  032765  000010  000212  31$:    BIT     #BIT3,P.ERR(R5) ;CHECK IF ERROR NOT INDICATED BY FAULT
6822  037200  001405                          BEQ     42$             ;NO, CHECK OTHER QUALIFIER BITS
6823  037202  104401  061626                  TYPE    ,ERR057         ;TYPE "ERROR NOT INDICATED BY FAULT"
6824  037206  000402                          BR      42$             ;CHECK OTHER QUALIFIER BITS
6825
6826  037210  004737  027242          32$:    JSR     PC,PRI000       ;PRINT ERROR HEADER
6827  037214  032765  000020  000014  42$:    BIT     #DRVHRD,P.PRST(R5) ;CHECK IF HARD DRIVE ERROR
6828  037222  001402                          BEQ     43$             ;NO, CHECK OTHER QUALIFIER BITS
6829  037224  104401  060744                  TYPE    ,ERR027         ;TYPE "DRIVE HARD ERROR"
6830  037230  032765  004000  000014  43$:    BIT     #NODSC,P.PRST(R5) ;CHECK IF ATTENTION BUT
6831                                                                  ;  NO DRIVE STATUS CHANGE OR FAULT
6832  037236  001402                          BEQ     44$             ;NO, CHECK OTHER QUALIFIER BITS
6833  037240  104401  061667                  TYPE    ,ERR058         ;TYPE "ATTN BUT NO DSC OR FAULT"
6834  037244  032765  000040  000014  44$:    BIT     #DRVDSC,P.PRST(R5) ;CHECK IF DRIVE STATUS CHANGE DID
6835                                                                  ;  NOT CLEAR
6836  037252  001402                          BEQ     45$             ;NO, CHECK OTHER ERROR QUALIFIER BITS
6837  037254  104401  060763                  TYPE    ,ERR028         ;TYPE "DRIVE STATUS CHANGE DID NOT CLEAR"
6838  037260  032765  000010  000014  45$:    BIT     #UEXATT,P.PRST(R5) ;CHECK IF UNEXPECTED ATTENTION FROM
6839                                                                  ;  DRIVE COMMAND
6840  037266  001402                          BEQ     46$             ;NO, CHECK OTHER QUALIFIER BITS
6841  037270  104401  061023                  TYPE    ,ERR030         ;TYPE "UNEXPECTED ATTN FROM DRIVE COMMAND"
6842  037274  005265  000206          46$:    INC     P.NER(R5)       ;INCREMENT OTHER ERROR COUNT
6843  037300  032777  020000  141632          BIT     #SW13,@SWR      ;CHECK IF INHIBIT PRINT OUT
6844  037306  001015                          BNE     60$             ;YES, CHECK IF HALT ON ERROR
6845  037310  005765  000150                  TST     P.DSTT(R5)      ;CHECK IF ERROR DURING ERROR RECOVERY
6846  037314  100402                          BMI     51$             ;NO, PRINT STATUS
6847  037316  104401  062712                  TYPE    ,ERR202         ;TYPE "ERROR DURING ERROR RECOVERY"
6848  037322  004737  025550          51$:    JSR     PC,PRISTT       ;PRINT CONTROLLER REGISTERS
6849  037326  004737  025374                  JSR     PC,PRDSTT       ;PRINT DRIVE STATUS
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6850  037332  004737  027476              JSR     PC,PRT002       ;PRINT CURRENT COMMAND
6851  037336  004737  027320              JSR     PC,PRT001       ;PRINT PREVIOUS COMMAND
6852  037342  004737  030472      60$:    JSR     PC,HLT000       ;CHECK IF HALT ON ERROR
6853  037346  032777  000100  141564      BIT     #SW6,@SWR       ;CHECK FOR SWITCH 6
6854  037354  001431                      BEQ     63$             ;NO DROP DRIVE
6855  037356  032765  000030  000036      BIT     #ACLO!SPDLSS,P.DS(R5) ;CHECK IF UNSAFE, ACLOW AND SPEED LOSS
6856  037364  001004                      BNE     61$
6857  037366  032765  040000  000034      BIT     #DMS,P.FR(R5)
6858  037374  001421                      BEQ     63$
6859  037376  105765  000120      61$:    TSTB    P.IERC(R5)      ;CHECK IF INHIBIT ERROR RECOVERY
6860  037402  001012                      BNE     62$
6861  037404  105265  000146              INCB    P.RECT(R5)      ;INCREMENT ERROR RETRY COUNT
6862  037410  122765  000010  000146      CMPB    #8.,P.RECT(R5)  ;CHECK IF RETRY THRESHOLD EXCEEDED
6863  037416  103404                      BLO     62$             ;YES, INDICATE UNSUCCESSFUL RECOVERY
6864  037420  004037  050706              JSR     R0,Q.PUSH       ;ENQUEUE PARAMETER BLOCK IN COMMAND
6865  037424  001324                      CTRITQ                  ;  INITIATION QUEUE
6866  037426  000402                      BR      57$             ;RETURN
6867
6868  037430  004737  030724      62$:    JSR     PC,UNRECV       ;INDICATE UNSUCCESSFUL RECOVERY
6869  037434  011000      57$:    MOV     (R0),R0
6870  037436  000200                      RTS     R0
6871
6872  037440  004737  022316      63$:    JSR     PC,RUFRFL       ;RELEASE BUFFER
6873  037444  004737  012716              JSR     PC,DROP         ;DROP DRIVE
6874  037450  004737  022016              JSR     PC,GETBUF       ;GET NEW BUFFER
6875  037454  005037  001562              CLR     ERRPRO          ;CLEAR ERROR BEING PROCESSED
6876  037460  011000                      MOV     (R0),R0         ;LOAD ERROR RETURN
6877  037462  000200                      RTS     R0              ;RETURN
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                                .SBTTL  ERROR RECOVERY SEQUENCE NORMAL RETURN
                        
037464  032765  004000  000150  ERCVY1: BIT     #BIT11,P.DSTT(R5) ;CHECK IF RECALIBRATE ISSUED
037472  001415                          BEQ     EC3$              ;NO, CONTINUE
037474  042765  004000  000150          BIC     #BIT11,P.DSTT(R5) ;CLEAR RECALIBRATE ISSUED
037502  052765  010000  000150  15$:     BIS     #BIT12,P.DSTT(R5) ;SET SEEK ISSUED
037510  112765  000117  000001          MOVB    #SEEK,P.CMND(R5) ;ISSUE SEEK INSTRUCTION
037516  004037  050706                  JSR     R0,Q.PUSH         ;PUT PARAMETER BLOCK IN COMMAND
037522  001324                          CINITQ                    ;  INITIATION QUEUE
037524  000207                          RTS     PC                ;RETURN
                        
037526  032765  010000  000150  EC3$:   BIT     #BIT12,P.DSTT(R5) ;CHECK IF SEEK ISSUED
037534  001427                          BEQ     10$               ;NO, CONTINUE
037536  042765  010000  000150          BIC     #BIT12,P.DSTT(R5) ;CLEAR SEEK ISSUED
037544  105765  000211                  TSTB    P.SPER(R5)        ;CHECK IF SEEK TO PREVIOUS POSITION
037550  001403                          BEQ     5$                ;NO, PROCESS DATA TRANSFER
037552  004737  035500                  JSR     PC,SUHECV         ;INDICATE SUCCESSFUL RECOVERY
037556  000207                          RTS     PC                ;RETURN
                        
037560  122765  000021  000147  5$:     CMPB    #21,P.RFHD(R5)  ;CHECK IF OFFSET
037566  101053                          BHI     20$               ;NO, REISSUE COMMAND
037570  052765  020000  000150          BIS     #BIT13,P.DSTT(R5) ;SET OFFSET ISSUED
037576  112765  000115  000001          MOVB    #OFFSET,P.CMND(R5) ;ISSUE OFFSET
037604  004037  050706                  JSR     R0,Q.PUSH         ;PUT PARAMETER BLOCK IN COMMAND
037610  001324                          CINITQ                    ;  INITIATION QUEUE
037612  000207                          RTS     PC                ;RETURN
                        
037614  032765  020000  000150  10$:    BIT     #BIT13,P.DSTT(R5) ;CHECK IF DO PREVIOUS OFFSET
037622  001453                          BEQ     EC4$              ;NO, CONTINUE
037624  042765  020000  000150          BIC     #BIT13,P.DSTT(R5) ;CLEAR OFFSET ISSUED
037632  122765  000021  000147          CMPB    #21,P.RFRD(R5)  ;CHECK IF OFFSET +400 MICRO-INCHES
037640  001424                          BEQ     15$               ;YES, GO ISSUE READ
037642  122765  000024  000147          CMPB    #24,P.RFRD(R5)  ;CHECK IF OFFSET -400 MICRO-INCHES
037650  001420                          BEQ     15$               ;YES, GO ISSUE READ
037652  122765  000027  000147          CMPB    #27,P.RFRD(R5)  ;CHECK IF OFFSET +800 MICRO-INCHES
037660  001414                          BEQ     15$               ;YES, GO ISSUE READ
037662  122765  000032  000147          CMPB    #32,P.RFRD(R5)  ;CHECK IF OFFSET -800 MICRO-INCHES
037670  001410                          BEQ     15$               ;YES, GO ISSUE READ
037672  122765  000035  000147          CMPB    #35,P.RFRD(R5)  ;CHECK IF OFFSET +1200 MICRO-INCHES
037700  001404                          BEQ     15$               ;YES, GO ISSUE READ
037702  122765  000040  000147          CMPB    #40,P.RFRD(R5)  ;CHECK IF OFFSET -1200 MICRO-INCHES
037710  001002                          BNE     20$               ;NO, DO NOT INCREMENT REREAD COUNT
037712  105265  000147          15$:    INCB    P.RFRD(R5)        ;INCREMENT REREAD COUNT
037716  116565  000123  000001  20$:    MOVB    P.RCMD(R5),P.CMND(R5) ;LOAD COMMAND
037724  122765  000131  000001          CMPB    #WRTCHK,P.CMND(R5) ;CHECK IF WRITE CHECK
037732  001003                          BNE     25$               ;NO, ISSUE COMMAND
037734  052765  000200  000014          BIS     #W.WCK,P.PRST(R5) ;YES, ISSUE WRITE BEFOR WRITE CHECK
037742  004037  050706          25$:    JSR     R0,Q.PUSH         ;REQUEUE PARAMETER BLOCK IN COMMAND
037746  001324                          CINITQ                    ;  INITIATION QUEUE
037750  000207                          RTS     PC                ;RETURN
                        
037752  032765  000100  000150  EC4$:   BIT     #BIT6,P.DSTT(R5) ;CHECK IF WAITING FOR READ STATUS
                                                                  ; FOR POSITIONING TIME OUT
037760  001436                          BEQ     EC5$              ;NO, CONTINUE
037762  042765  000100  000150          BIC     #BIT6,P.DSTT(R5) ;CLEAR WAITING FOR READ STATUS
037770  113765  001662  000001          MOVB    POSCMD,P.CMND(R5) ;RESTORE COMMAND OF ERROR
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6934  037776  032765  000200  000036          BIT     #DRDY,P.DS(R5)  ;CHECK IF DRIVE READY
6935  040004  001004                          BNE     10$             ;YES, REISSUE COMMAND
6936  040006  004037  027716                  JSR     R0,PRT100       ;PRINT DRIVE TIME OUT DURING POSITIONING
6937  040012  061426                          ERR052                  ;  AND DROP DRIVE
6938  040014  000207                  5$:     RTS     PC              ;RETURN
6939
6940  040016  004037  030076          10$:    JSR     R0,PRT200       ;PRINT DRIVE TIME OUT DURING
6941  040022  061426                          ERR052                  ;  POSITIONING
6942  040024  004037  030522                  JSR     R0,MERSTT       ;TAKE OTHER ERROR STATICS
6943  040030  040014                          5$                      ;NO RECOVERY RETURN
6944  040032  052765  004000  000150          BIS     #BIT11,P.DSTT(R5) ;SET RECALIBRATE ISSUED
6945  040040  112765  000113  000001          MOVB    #RECAL,P.CMND(R5) ;ISSUE RECALIBRATE
6946  040046  004037  050706                  JSR     R0,Q.PUSH       ;ENQUEUE PARAMETER BLOCK IN COMMAND
6947  040052  001324                          CINITQ                  ;  INITIATION QUEUE
6948  040054  000207                          RTS     PC              ;RETURN
6949
6950  040056  032765  000020  000150  EC5$:   BIT     #BIT4,P.DSTT(R5) ;CHECK IF HEADER ERROR
6951  040064  001002                          BNE     1$              ;YES, GO PROCESS ERROR
6952  040066  000137  040602                  JMP     EC6$            ;NO, CONTINUE
6953
6954  040072  042765  000020  000150  1$:     BIC     #BIT4,P.DSTT(R5) ;CLEAR READ ALL HEADERS ISSUED
6955  040100  010346                          MOV     R3,-(SP)        ;STORE R3 ON THE STACK
6956  040102  016546  000056                  MOV     P.B11(R5),-(SP) ;STORE SECTOR READ
6957  040106  042716  177017                  BIC     #^C<M.SECT>,(SP) ;KEEP ONLY SECTOR COUNT
6958  040112  006216                          ASR     (SP)            ;SHIFT 4 BITS RIGHT
6959  040114  006216                          ASR     (SP)
6960  040116  006216                          ASR     (SP)
6961  040120  006216                          ASR     (SP)            ;GET SECTOR COUNT
6962  040122  005046                          CLR     -(SP)           ;MAKE ROOM ON THE STACK
6963  040124  116516  000004                  MOVB    P.SECT(R5),(SP) ;GET DESIRED SECTOR
6964  040130  162616                          SUB     (SP)+,(SP)      ;CALCULATE DIFFERENCE
6965  040132  100410                          BMI     2$              ;BRANCH IF IN LOWER PART OF BUFFER
6966  040134  012703  065174                  MOV     #BUFADD-6,R3    ;LOAD BASE OF HIGHER PART OF BUFFER
6967  040140  006316                          ASL     (SP)            ;MULTIPLY SECTOR COUNT BY 6
6968  040142  011646                          MOV     (SP),-(SP)
6969  040144  006316                          ASL     (SP)
6970  040146  062616                          ADD     (SP)+,(SP)
6971  040150  162603                          SUB     (SP)+,R3        ;CALCULATE HEADER ADDRESS
6972  040152  000407                          BR      3$              ;CHECK HEADER
6973
6974  040154  005416                  2$:     NEG     (SP)            ;MAKE COUNT POSITIVE
6975  040156  006316                          ASL     (SP)            ;MULTIPLY DIFFERENCE BY 6
6976  040160  011603                          MOV     (SP),R3
6977  040162  006316                          ASL     (SP)
6978  040164  062603                          ADD     (SP)+,R3
6979  040166  062703  064770                  ADD     #HDRBUFF-6,R3   ;CALCULATE HEADER ADDRESS
6980  040172  012337  001642          3$:     MOV     (R3)+,HEAD1     ;GET FIRST WORD OF HEADER
6981  040176  012337  001644                  MOV     (R3)+,HEAD2     ;GET SECOND WORD OF HEADER
6982  040202  011337  001646                  MOV     (R3),HEAD3      ;GET THIRD WORD OF HEADER
6983  040206  012603                          MOV     (SP)+,R3        ;RESTORE R3
6984  040210  004737  036200                  JSR     PC,RSTAT        ;RESTORE STATUS
6985  040214  013746  001642                  MOV     HEAD1,-(SP)     ;STORE FIRST WORD OF THE HEADER
6986  040220  043716  001644                  BIC     HEAD2,(SP)      ;HD1 & ^HD2
6987  040224  013746  001644                  MOV     HEAD2,-(SP)     ;STORE SECOND WORD OF HEADER
6988  040230  043716  001642                  BIC     HEAD1,(SP)      ;^HD1 & HD2
6989  040234  052616                          BIS     (SP)+,(SP)      ;GENERATE EXPECTED HEADER CRC
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 6990  040236  023726  001646              CMP     HEAD3,(SP)+     ;CHECK IF HEADER VRC IS CORRECT
 6991  040242  001501                      BEQ     15$             ;NO, CONTINUE
 6992  040244  004037  030076              JSR     R0,PRT200       ;PRINT HEADER VRC ERROR
 6993  040250  061253                      EPR043
 6994  040252  105765  000120              TSTB    P.IERC(R5)      ;CHECK IF INHIBIT ERROR RECOVERY
 6995  040256  001016                      BNE     5$              ;YES, INDICATE UNSUCCESSFUL RECOVERY
 6996  040260  105265  000147        4$:   INCB    P.RERD(R5)      ;INCREMENT REREAD COUNT
 6997  040264  122765  000043  000147      CMPB    #43,P.RERD(R5)  ;CHECK IF UNRECOVERABLE
 6998  040272  101410                      BLOS    5$              ;YES, INDICATE UNRECOVERABLE ERROR
 6999  040274  122765  000121  000123      CMPB    #RDDATA,P.RCMD(R5) ;CHECK IF READ DATA COMMAND
 7000  040302  001407                      BEQ     6$              ;YES, START ERROR RECOVERY
 7001  040304  122765  000021  000147      CMPB    #21,P.RERD(R5)  ;CHECK IF UNRECOVERABLE WRITE
 7002  040312  101021                      BHI     8$              ;NO, START ERROR RECOVERY
 7003  040314  004737  030724        5$:   JSR     PC,UNRECV       ;INDICATE UNRECOVERABLE ERROR
 7004  040320  000207                      RTS     PC              ;RETURN
 7005
 7006  040322  122765  000021  000147  6$: CMPB    #21,P.RERD(R5)  ;CHECK IF BEGINNING OFFSETTING OPERATION
 7007  040330  001007                      BNE     7$              ;NO, DETERMINE PROPER OFFSET
 7008  040332  010446                      MOV     R4,-(SP)        ;STORE R4 ON THE STACK
 7009  040334  116504  000000              MOVB    P.DRVN(R5),R4   ;GET DRIVE NUMBER FOR INDEX
 7010  040340  146437  001510  001507      BICB    INTMSK(R4),D.OVER ;DO NOT DO IMPLIED SEEKS
 7011  040346  012604                      MOV     (SP)+,R4        ;RESTORE R4
 7012  040350  004037  036230        7$:   JSR     R0,DETOFF       ;DETERMINE OFFSET VALUE
 7013  040354  040444                      12$                     ;OFFSET ISSUED RETURN
 7014  040356  116565  000123  000001  8$: MOVB    P.RCMD(R5),P.CMND(R5) ;STORE COMMAND
 7015  040364  013765  001636  000002      MOV     RTYCYL,P.CYLN(R5) ;GET CYLINDER
 7016  040372  013765  001634  000004      MOV     RTYSEC,P.SECT(R5) ;GET TRACK AND SECTOR
 7017  040400  013765  001630  000010      MOV     RTYBA,P.BALO(R5) ;GET BUS ADDRESS
 7018  040406  013765  001632  000012      MOV     RTYWC,P.WC(R5) ;GET WORD COUNT
 7019  040414  005465  000012              NEG     P.WC(R5)        ;MAKE IT POSITIVE
 7020  040420  122765  000131  000001      CMPB    #WRTCHK,P.CMND(R5) ;CHECK IF WRITE CHECK COMMAND
 7021  040426  001003                      BNE     10$             ;NO, GO ISSUE COMMAND
 7022  040430  052765  000200  000014      BIS     #M.WCK,P.PRST(R5) ;ISSUE WRITE BEFORE WRITE CHECK
 7023  040436  004037  050706        10$:  JSR     R0,Q.PUSH       ;ENQUEUE PARAMETER BLOCK ON COMMAND
 7024  040442  001324                      CINITQ                  ;  INITIATION QUEUE
 7025  040444  000207                12$:  RTS     PC              ;RETURN
 7026
 7027  040446  023765  001642  000030  15$: CMP     HEAD1,P.DCYL(R5) ;CHECK IF CYLINDER CORRECT
 7028  040454  001420                      BEQ     20$             ;YES, CHECK SECTOR TRACK AND FORMAT
 7029  040456  004037  030076              JSR     R0,PRT200       ;PRINT MISPOSITIONING
 7030  040462  062066                      EPR064
 7031  040464  004037  030570              JSR     R0,OPTSTT       ;GO TAKE STATISTICS
 7032  040470  040514                      17$                     ;UNRECOVERABLE ERROR RETURN
 7033  040472  052765  004000  000150      BIS     #BIT11,P.DSTT(R5) ;SET RECALIBRATE ISSUED
 7034  040500  112765  000113  000001      MOVB    #RECAL,P.CMND(R5) ;ISSUE RECALIBRATE
 7035  040506  004037  050706              JSR     R0,Q.PUSH       ;ENQUEUE PARAMETER BLOCK IN
 7036  040512  001324                      CINITQ                  ;  COMMAND INITIATION QUEUE
 7037  040514  000207                17$:  RTS     PC              ;RETURN
 7038
 7039  040516  005046                20$:  CLR     -(SP)           ;MAKE ROOM ON STACK
 7040  040520  113766  001635  000001      MOVB    RTYTRK,1(SP)    ;GET TRACK
 7041  040526  006216                      ASR     (SP)            ;SHIFT RIGHT 3 BITS
 7042  040530  006216                      ASR     (SP)
 7043  040532  006216                      ASR     (SP)
 7044  040534  153716  001634              BISB    RTYSEC,(SP)     ;GENERATE EXPECTED SECOND WORD
 7045  040540  052716  140000              BIS     #140000,(SP)    ;PUT IN GO TRACK BITS
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7046  040544  022637  001644              CMP     (SP)+,HEAD2     ;CHECK IF SECOND WORD IS CORRECT
7047  040550  001407                      BEQ     25$             ;CHECK FOR BAD SECTOR
7048  040552  004037  030076              JSR     R0,PRI200       ;INDICATE OPERATION INCOMPLETE
7049  040556  061234                      EPR042
7050  040560  004037  030570              JSR     R0,OPISTT       ;GO TAKE STATISTICS
7051  040564  040514                      17$                     ;UNRECOVERABLE RETURN
7052  040566  000673                      BR      8$              ;GO ISSUE LAST COMMAND
7053
7054  040570  004037  030076      25$:    JSR     R0,PRI200       ;TYPE HEADER ERROR
7055  040574  063223                      EPR209
7056  040576  000137  040260              JMP     4$              ;GO TRY TO RETRY COMMAND
7057
7058  040602  122765  000021  000147  EC6$:   CMPB    #21,P.RERD(R5)  ;CHECK IF REISSUE DATA TRANSFER
7059  040610  101036                      BHI     10$             ;YES, INDICATE SUCESSFUL RECOVERY
7060  040612  001424                      BEQ     5$              ;NO, OFFSET = +400 MICRO-INCHES
7061                                                              ;  ISSUE DATA TRANSFER
7062  040614  122765  000024  000147          CMPB    #24,P.RERD(R5)  ;CHECK IF OFFSET -400 MICRO-INCHES
7063  040622  001420                      BEQ     5$              ;YES, ISSUE DATA TRANSFER
7064  040624  122765  000027  000147          CMPB    #27,P.RERD(R5)  ;CHECK IF OFFSET +800 MICRO-INCHES
7065  040632  001414                      BEQ     5$              ;YES, ISSUE DATA TRANSFER
7066  040634  122765  000032  000147          CMPB    #32,P.RERD(R5)  ;CHECK IF OFFSET -800 MICRO-INCHES
7067  040642  001410                      BEQ     5$              ;YES, ISSUE DATA TRANSFER
7068  040644  122765  000035  000147          CMPB    #35,P.RERD(R5)  ;CHECK IF OFFSET +1200 MICRO-INCHES
7069  040652  001404                      BEQ     5$              ;YES, ISSUE DATA TRANSFER
7070  040654  122765  000040  000147          CMPB    #40,P.RERD(R5)  ;CHECK IF OFFSET -1200 MICRO-INCHES
7071  040662  001011                      BNE     10$             ;NO, INDICATE SUCESSFUL RECOVERY
7072  040664  105265  000147          5$:     INCB    P.RERD(R5)      ;INCREMENT REREAD COUNT
7073  040670  116565  000123  000001          MOVB    P.RCMD(R5),P.CMND(R5) ;REISSUE COMMAND
7074  040676  004037  050706              JSR     R0,Q.PUSH       ;ENQUEUE PARAMETER BLOCK IN COMPARE
7075  040702  001324                      CINITQ                  ;  INITIATION QUEUE
7076  040704  000207                      RTS     PC              ;RETURN
7077
7078  040706  032765  040000  000150  10$:     BIT     #BIT14,P.DSTT(R5) ;CHECK IF SERVICING BAD SECTOR
7079  040714  001403                      BEQ     11$             ;NO, CONTINUE
7080  040716  005765  000146              TST     P.RFCT(R5)      ;CHECK IF IN RETRY SEQUENCE
7081  040722  001472                      BEQ     EC7$            ;NO, GO TO BAD SECTOR SERVICE ROUTINE
7082  040724  105765  000210          11$:    TSTB    P.ASSN(R5)      ;CHECK IF DRIVE IS BEING ASSIGNED
7083  040730  001403                      BEQ     12$             ;NO, CHECK IF SEEK TO PREVIOUS CYLINDER
7084  040732  004737  035500              JSR     PC,SURECV       ;INDICATE SUCCESSFUL RECOVERY
7085  040736  000207                      RTS     PC              ;RETURN
7086
7087  040740  122765  000117  000001  12$:     CMPB    #SEEK,P.CMND(R5) ;CHECK IF SEEK TO PREVIOUS CYLINDER
7088  040746  001404                      BEQ     14$             ;YES, INDICATE SUCCESSFUL RECOVERY
7089  040750  122765  000140  000001          CMPB    #RELEAS,P.CMND(R5) ;CHECK IF RELEASE
7090  040756  001003                      BNE     16$             ;NO, PROCESS DATA TRANSFER
7091  040760  004737  035500          14$:    JSR     PC,SURECV       ;INDICATE SUCCESSFUL RECOVERY
7092  040764  000207                      RTS     PC              ;RETURN
7093
7094  040766  004037  024506          16$:    JSR     R0,CHKADD       ;CHECK SECTOR, TRACK, CYLINDER, BUS ADDRESS
7095                                                              ;  AND WORD COUNT
7096  040772  041030                      20$                     ;ERROR RETURN
7097  040774  005037  177776              CLR     PS              ;ALLOW RK06 INTERRUPTS
7098  041000  122765  000121  000001          CMPB    #RDDATA,P.CMND(R5) ;CHECK IF READ DATA
7099  041006  001021                      BNE     30$             ;NO, CHECK IF ;WRITE CHECK
7100  041010  004037  022760              JSR     R0,BUFFR1       ;FIND FIRST DATA ERROR
7101  041014  041032                      25$                     ;ERROR RETURN
```

```
7102  041016  013737  001450  177776  10$:    MOV     RKPRI,PS        ;LOCK OUT RK06 INTERRUPTS
7103  041024  004737  035500                  JSR     PC,SURECV       ;INDICATE SUCCESSFUL RECOVERY
7104  041030  000207                  20$:    RTS     PC              ;RETURN
7105
7106  041032  013737  001450  177776  25$:    MOV     RKPRI,PS        ;LOCK OUT RK06 INTERRUPTS
7107  041040  052765  000004  000212          BIS     #BIT2,P.ERR(R5) ;INDICATE DATA COMPARE ERROR
7108  041046  000137  034512                  JMP     E10$            ;PROCESS DATA COMPARE ERROR
7109
7110  041052  122765  000131  000001  30$:    CMPB    #WRTCHK,P.CMND(R5) ;CHECK IF WRITE CHECK
7111  041060  001356                          BNE     10$             ;NO, INDICATE SUCCESSFUL RECOVERY
7112  041062  032765  000200  000014          BIT     #W.WCK,P.PRST(R5) ;CHECK IF WRITE CHECK ISSUED
7113  041070  001752                          BEQ     10$             ;YES, INDICATE SUCCESSFUL RECOVERY
7114  041072  042765  000200  000014          BIC     #W.WCK,P.PRST(R5) ;CLEAR WRITE BEFORE WRITE CHECK
7115  041100  004037  050706                  JSR     R0,Q.PUSH       ;ENQUEUE COMMAND IN COMMAND INITIATION QUEUE
7116  041104  001324                          CINITQ
7117  041106  000207                          RTS     PC              ;RETURN
7118
7119  041110  004037  024506          EC7$:   JSR     R0,CHKADD       ;CHECK IF BUS ADD, WORD COUNT, SECTOR,
7120                                                                  ;  TRACK AND CYLINDER ARE CORRECT
7121  041114  041202                          9$                      ;ERROR RETURN
7122  041116  042765  040000  000150          BIC     #BIT14,P.DSTT(R5) ;CLEAR SERVICING BAD SECTOR
7123  041124  004737  041344                  JSR     PC,BSTRAN       ;CALCULATE NUMBER OF WORDS TRANSFERRED
7124  041130  013765  001654  000012          MOV     BSWC,P.WC(R5)   ;LOAD BUS ADDRESS FOR NEXT DATA TRANSFER
7125  041136  100022                          BPL     10$             ;CHECK IF DATA TRANSFER FINISHED
7126  041140  013765  001650  000004          MOV     BSSECT,P.SECT(R5) ;LOAD SECTOR AND TRACK FOR NEXT COMPARE
7127  041146  013765  001652  000002          MOV     BSCYLN,P.CYLN(R5) ;LOAD CYLINDER FOR NEXT COMPARE
7128  041154  013765  001656  000010          MOV     BSBA,P.BALO(R5) ;LOAD BUS ADDRESS FOR NEXT DATA TRANSFER
7129  041162  052765  000200  000014          BIS     #W.WCK,P.PRST(R5) ;GO ISSUE WRITE
7130  041170  004037  050706          5$:     JSR     R0,Q.PUSH       ;ENQUEUE COMMAND IN COMMAND INITIATION
7131  041174  001324                          CINITQ                  ;  QUEUE
7132  041176  005037  001562                  CLR     ERRPRO          ;CLEAR ERROR PROCESSING FLAG
7133  041202  000207                  9$:     RTS     PC              ;RETURN
7134
7135  041204  105765  000210          10$:    TSTB    P.ASSN(R5)      ;CHECK IF PACK IS BEING WRITTEN
7136  041210  001012                          BNE     13$             ;YES, CHECK IF SEEK TO NEXT CYLINDER
7137  041212  004737  022316                  JSR     PC,BUFREL       ;RELEASE BUFFER
7138  041216  004037  050706                  JSR     R0,Q.PUSH       ;ENQUEUE PARMETER BLOCK IN DRIVE
7139  041222  001314                          AVAILQ                  ;  AVAILIABLE QUEUE
7140  041224  004737  022016                  JSR     PC,GETBUF       ;GET NEXT BUFFER FOR DAT TRANSFER
7141  041230  005037  001562                  CLR     ERRPRO          ;CLEAR ERROR RETRY PROCESSING
7142  041234  000207                          RTS     PC              ;RETURN
7143
7144  041236  005037  001562          13$:    CLR     ERRPRO          ;CLEAR ERROR BEING PROCESSED
7145  041242  013765  001650  000026          MOV     BSSECT,P.DTS(R5) ;LOAD NEXT SECTOR AND TRACK
7146  041250  013765  001652  000030          MOV     BSCYLN,P.DCYL(R5) ;LOAD NEXT CYLINDER
7147  041256  032777  040000  137654          BIT     #SW14,@SWR      ;CHECK IF LOOP ON CURRENT OPERATION
7148  041264  001002                          BNE     14$             ;YES, ISSUE SEEK TO PREVIOUS CYLINDER
7149  041266  000137  015140                  JMP     WV0$            ;NO, CONTINUE TO WRITE PACK
7150
7151  041272  004737  022316          14$:    JSR     PC,BUFREL       ;RELEASE BUFFER
7152  041276  032765  002000  000014          BIT     #DRPDRV,P.PRST(R5) ;CHECK IF DROP DRIVE
7153  041304  001402                          BEQ     15$             ;NO ISSUE SEEK TO PREVIOUS CYLINDER
7154  041306  000137  015626                  JMP     WV1$            ;DROP DRIVE
7155
7156  041312  112765  177777  000211  15$:    MOVB    #-1,P.SEEK(R5) ;SET SEEK TO PREVIOUS CYLINDER
7157  041320  016565  000136  000002          MOV     P.LCYL(R5),P.CYLN(R5) ;GET LAST CYLINDER
```

```
 7158  041326  016565  000140  000004          MOV     P.LSEC(R5),P.SECT(R5) ;GET LAST TRACK AND SECTOR
 7159  041334  112765  000117  000001          MOVB    #SEEK,P.CMND(R5) ;LOAD COMMAND
 7160  041342  000712                          BR      5$              ;GO ISSUE SEEK COMMAND
```

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                                .SBTTL  CALCULATE WORDS TRANSFERRED UNTIL BAD SECTOR

041344  016537  000026  001650  BSTRAN: MOV     P.DTS(R5),BSSECT ;STORE ADDRESS OF BAD SECTOR
041352  016537  000030  001657          MOV     P.DCYL(R5),BSCYLN
041360  105237  001650                  INCB    BSSECT          ;ADVANCE TO NEXT SECTOR ON PACK
041364  122737  000025  001650          CMPB    #21.,BSSECT     ;CHECK FOR SECTOR OVERFLOW
041372  103014                          BHIS    5$              ;NO, CONTINUE
041374  105037  001650                  CLRB    BSSECT          ;CLEAR SECTOR
041400  105237  001651                  INCB    BSTRCK          ;INCREMENT TRACK
041404  122737  000002  001651          CMPB    #2,BSTRCK       ;CHECK FOR TRACK OVERFLOW
041412  103004                          BHIS    5$              ;NO, CONTINUE
041414  105037  001651                  CLRB    BSTRCK          ;CLEAR TRACK
041420  005237  001652                  INC     BSCYLN          ;INCREMENT CYLINDER
041424  013746  001652          5$:     MOV     BSCYLN,-(SP)    ;STORE CYLINDER ON STACK
041430  166516  000002                  SUB     P.CYLN(R5),(SP) ;SUBTRACT STARTING CYLINDER
041434  011646                          MOV     (SP),-(SP)      ;SAVE DIFFERENCE
041436  006316                          ASL     (SP)            ;MULTIPLY CYLINDER BY 3
041440  062616                          ADD     (SP)+,(SP)
041442  005046                          CLR     -(SP)           ;MAKE ROOM ON STACK
041444  113716  001651                  MOVB    BSTRCK,(SP)     ;PLACE TRACK ON STACK
041450  062616                          ADD     (SP)+,(SP)      ;ADD TRACK
041452  005046                          CLR     -(SP)           ;MAKE ROOM ON THE STACK
041454  116516  000005                  MOVB    P.TRCK(R5),(SP) ;STORE TRACK
041460  162616                          SUB     (SP)+,(SP)      ;SUBTRACT INITIAL TRACK
041462  012746  000026                  MOV     #22.,-(SP)      ;STORE 22 ON STACK FOR MULTIPLICATION
041466  004737  054064                  JSR     PC,$MULT        ;MULTIPLY BY 22
041472  005046                          CLR     -(SP)           ;MAKE ROOM ON THE STACK
041474  113716  001650                  MOVB    BSSECT,(SP)     ;STORE BAD SECTOR
041500  062616                          ADD     (SP)+,(SP)      ;ADD BAD SECTOR ADDRESS
041502  005046                          CLR     -(SP)           ;MAKE ROOM ON THE STACK
041504  116516  000004                  MOVB    P.SECT(R5),(SP) ;STORE ORGINAL SECTOR ADDRESS
041510  162616                          SUB     (SP)+,(SP)      ;SUBTRACT ORGINAL SECTOR ADDRESS
041512  111666  000001                  MOVB    (SP),1(SP)      ;KEEP NUMBER OF SECTORS TRANSFERRED
041516  105016                          CLRB    (SP)
041520  011637  001660                  MOV     (SP),BSWORD     ;LOAD WORD COUNT
041524  006316                          ASL     (SP)            ;MULTIPLY BY 2
041526  066516  000010                  ADD     P.BALO(R5),(SP) ;GET STARTING ADDRESS FOR NEW DATA
041532  011637  001656                  MOV     (SP),BSBA       ;GET NEW BUS ADDRESS
041536  166516  000132                  SUB     P.BRAL(R5),(SP) ;GET NUMBER OF BYTES TRANSFERRED
041542  006216                          ASR     (SP)            ;CONVERT TO WORDS (DIVIDE BY 2)
041544  066516  000130                  ADD     P.RWC(R5),(SP)  ;DETERMINE REMAINING WORD COUNT
041550  012637  001654                  MOV     (SP)+,BSWC      ;STORE CALCULATED WORD COUNT
041554  005726                          TST     (SP)+           ;THROW AWAY MOST SIGNIFICANT BITS
041556  000207                          RTS     PC              ;RETURN
```

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                                .SBTTL  BAD SECTOR HANDLING

041560  032765  040000  000150  BDSECT: BIT     #BIT14,P.DSTT(R5) ;CHECK IF PRESENTLY SERVICING BAD SECTOR
041566  001401                          BEQ     5$                ;NO, CONTINUE
041570  000000                          HALT
041572  132765  000010  000210  5$:     BITB    #BIT3,P.ASSN(R5) ;CHECK IF READING PACK SERIAL NUMBER
041600  001157                          BNE     40$               ;YES, DETERMINE NEXT SECTOR
041602  004737  041344                  JSR     PC,RSTRAN         ;CALCULATE WORDS TRANSFERRED
041606  122765  000121  000001          CMPB    #RDDATA,P.CMND(R5) ;CHECK IF READ COMMAND
041614  001076                          BNE     25$               ;NO, DO NO CHECK BUS ADDRESS AND WORD COUNT
041616  013746  001656                  MOV     BSBA,-(SP)        ;STORE BUS ADDRESS
041622  162716  001000                  SUB     #256.*2,(SP)      ;SUBTRACT ADDITIONAL SECTOR
041626  026526  000024                  CMP     P.BAR(R5),(SP)+   ;CHECK IF BUS ADDRESS CORRECT
041632  001404                          BEQ     10$               ;YES, CONTINUE
041634  004037  036524                  JSR     R0,CONERR         ;PRINT "BUS ADDRESS INVALID"
041640  062705                          ERR071
041642  000207                          RTS     PC                ;RETURN

041644  016546  000022          10$:    MOV     P.WCR(R5),-(SP) ;STORE WORD COUNT FOR COMPARISON
041650  062716  000400                  ADD     #256.,(SP)        ;SUBTRACT OFF BAD SECTOR
041654  023726  001654                  CMP     BSWC,(SP)+        ;CHECK IF WORD COUNT CORRECT
041660  001404                          BEQ     15$               ;YES, CONTINUE
041662  004037  036524                  JSR     R0,CONERR         ;PRINT "WORD COUNT INVALID"
041666  062162                          ERR070
041670  000207                          RTS     PC                ;RETURN

041672  042765  100200  000150  15$:    BIC     #BIT15!BIT7,P.DSTT(R5) ;CLEAR FIRST ERROR AND ERROR ENQUEUED
041700  022737  000400  001660          CMP     #256.,BSWORD      ;CHECK IF NO WORDS TRANSFERRED
041706  001413                          BEQ     20$               ;YES, DO NOT CHECK DATA
041710  004037  022760                  JSR     R0,RUFER1         ;CHECK DATA READ
041714  042250                          50$                       ;ERROR RETURN
041716  063765  001660  000012          ADD     BSWORD,P.WC(R5) ;CALCULATE NEW WORD COUNT
041724  100410                          BMI     22$               ;CHECK IF DATA TRANSFER NOT COMPLETE
041726  000464                          BR      30$               ;DATA TRANSFER COMPLETE

041730  052765  000200  000014  19$:    BIS     #M.WCF,P.PHST(R5) ;ISSUE WRITE BEFORE WRITE CHECK
041736  013765  001654  000012  20$:    MOV     BSWC,P.WC(R5)     ;GET NUMBER OF WORDS TO BE TRANSFERRED
041744  100055                          BPL     30$               ;CHECK IF DATA TRANSFER COMPLETE
041746  013765  001652  000002  22$:    MOV     BSCYLN,P.CYLN(R5) ;GET NEW CYLINDER
041754  013765  001650  000004          MOV     BSSECT,P.SECT(R5) ;GET NEW SECTOR
041762  013765  001656  000010          MOV     BSBA,P.BALC(R5) ;GET NEW BUS ADDRESS
041770  004037  050706                  JSR     R0,Q.PUSH         ;PUT PARAMETER IN COMMAND
041774  001324                          CINITQ                    ;  INITIATION QUEUE
041776  005765  000146                  TST     P.RECT(R5)        ;CHECK IF ERROR RECOVERY IN PROGRESS
042002  001002                          BNE     23$               ;YES, DO NOT RESET ERROR PROCESSING IN PROGRESS
042004  005037  001562                  CLR     ERRPRO            ;RESET ERROR PROCESSING IN PROGRESS
042010  000207                  23$:    RTS     PC                ;RETURN

042012  042765  100200  000150  25$:    BIC     #BIT15!BIT7,P.DSTT(R5) ;CLEAR FIRST ERROR AND ERROR ENQUEUED
042020  122765  000131  000001          CMPB    #WRTCHK,P.CMND(R5) ;CHECK IF WRITE CHECK COMMAND
042026  001343                          BNE     20$               ;NO, CONTINUE
042030  022737  000400  001660          CMP     #256.,BSWORD      ;CHECK IF NO WORDS TRANSFERRED
042036  001734                          BEQ     19$               ;YES, ISSUE NEXT DATA TRANSFER
042040  012746  000400                  MOV     #256.,-(SP)       ;STORE EXCESS WORD COUNT ON STACK
042044  163716  001660                  SUB     BSWORD,(SP)       ;CALCULATE NEW WORD COUNT
042050  012665  000012                  MOV     (SP)+,P.WC(R5)    ;STORE NEW WORD COUNT
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 7261  042054  052765  040000  000150          BIS     #BIT14,P.DSTT(R5) ;INDICATE THAT BAD
 7262                                                                    ;  SECTOR IS BEING PROCESSED
 7263  042062  042765  000200  000014          BIC     #W.WCR,P.PRST(R5) ;DO WRITE CHECK PART OF COMMAND
 7264  042070  004037  050706                  JSR     R0,Q.PUSH         ;PUT PARAMETER BLOCK IN COMMAND
 7265  042074  001324                          CINITQ                    ;  INITIATION QUEUE
 7266  042076  000207                          RTS     PC                ;RETURN
 7267
 7268  042100  004737  022316          30$:    JSR     PC,BUFREL         ;RELEASE BUFFER
 7269  042104  005765  000146                  TST     P.RECT(R5)        ;DETERMINE IF CURRENTLY UNDERGOING ERROR
 7270                                                                    ;  RECOVERY
 7271  042110  001403                          BEQ     35$               ;YES, PUT IN AVAILIABLE QUEUE
 7272  042112  004737  035500                  JSR     PC,SURECV         ;INDICATE SUCCESSFUL RECOVERY
 7273  042116  000207                          RTS     PC                ;RETURN
 7274
 7275  042120  004037  050706          35$:    JSR     R0,Q.PUSH         ;ENQUEUE PARAMETER BLOCK IN
 7276  042124  001314                          AVAILQ                    ;  AVAILIABLE QUEUE
 7277  042126  004737  022016                  JSR     PC,GETBUF         ;GET NEXT BUFFER
 7278  042132  005037  001562                  CLR     ERRPRO            ;CLEAR ERROR BEING PROCESSED
 7279  042136  000207                          RTS     PC                ;RETURN
 7280
 7281  042140  042765  100200  000150  40$:    BIC     #BIT15!BIT7,P.DSTT(R5) ;CLEAR FIRST ERROR AND ERROR ENQUEUED
 7282  042146  122737  000010  000126          CMPB    #R.,P.RSEC        ;CHECK IF ALL SECTORS HAVE BEEN READ
 7283  042154  101422                          BLOS    45$               ;YES, DROP DRIVE FROM TEST SEQUENCE
 7284  042156  116565  000123  000135          MOVB    P.RCMD(R5),P.LCMD(R5) ;STORE PREVIOUS COMMAND
 7285  042164  016565  000124  000136          MOV     P.RCYL(R5),P.LCYL(R5)
 7286  042172  016565  000126  000140          MOV     P.RSEC(R5),P.LSEC(R5)
 7287  042200  016537  000130  000142          MOV     P.RWC(R5),P.LWC
 7288  042206  004037  050706                  JSR     R0,Q.PUSH         ;ENQUEUE PARAMETER BLOCK IN COMMAND
 7289  042212  001324                          CINITQ                    ;  INITIATION QUEUE
 7290  042214  005037  001562                  CLR     ERRPRO            ;CLEAR ERROR RECOVERY IN PROGRESS
 7291  042220  000207                          RTS     PC                ;RETURN
 7292
 7293  042222  004737  022316          45$:    JSR     PC,BUFREL         ;GO RELEASE BUFFER
 7294  042226  104401  063003                  TYPE    ,ERR204
 7295  042232  004737  012716                  JSR     PC,DROP           ;DROP DRIVE FROM TEST SEQUENCE
 7296  042236  004737  022016                  JSR     PC,GETBUF         ;GET NEW BUFFER
 7297  042242  005037  001562                  CLR     ERRPRC            ;CLEAR ERROR RECOVERY IN PROGRESS
 7298  042246  000207                          RTS     PC                ;RETURN
 7299
 7300  042250  052765  000004  000212  50$:    BTS     #BIT2,P.ERR(R5)   ;SET DATA TYPE ERROR
 7301  042256  000137  034512                  JMP     E10$              ;GO PROCESS DATA ERROR
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7302                                    .SBTTL  ERROR RECOVERY SEQUENCE ABNORMAL RETURN
7303
7304  042262  032765  000120  000150  ERCVY2: BIT     #BIT4!BIT6,P.DSTT(R5) ;CHECK IF DIAGNOSING SEQUENCE
7305  042270  001524                          BEQ     35$             ;NO, GO TO ERROR RECOVERY SEQUENCE
7306  042272  004737  027247                  JSR     PC,PRIOCO       ;PRINT HEADER
7307  042276  104401  063172                  TYPE    ,ERR208         ;TYPE "ERROR WHILE DIAGNOSING ---"
7308  042302  032765  000020  000150          BIT     #BIT4,P.DSTT(R5) ;CHECK IF HEADER TYPE ERROR
7309  042310  001005                          BNE     2$              ;YES, PRINT MESSAGE
7310  042312  104401  061427                  TYPE    ,ERR052+1       ;TYPE "TIME OUT WHILE DRIVE POSITION"
7311  042316  104401  001165                  TYPE    ,$CRLF          ;TYPE <CR><LF>
7312  042322  000402                          BR      3$              ;GO PRINT STATUS
7313
7314  042324  104401  063224          2$:     TYPE    ,ERR209+1       ;PRINT HEADER TYPE ERROR
7315  042330  032777  020000  136602  3$:     BIT     #SW13,@SWR      ;CHECK IF INHIBIT PRINT OUT
7316  042336  001066                          BNE     30$             ;YES, DO NOT PRINT STATUS
7317  042340  032765  000020  000217          BIT     #BIT4,P.ERR(R5) ;CHECK IF DRIVE SEIZED TIME OUT
7318  042346  001402                          BEQ     4$
7319  042350  104401  061744                  TYPE    ,ERR059
7320  042354  032765  000040  000212  4$:     BIT     #BIT5,P.ERR(R5) ;CHECK IF TIME OUT WHILE DRIVE POSITIONING
7321  042362  001407                          BEQ     5$
7322  042364  104401  061427                  TYPE    ,ERR052+1
7323  042370  032765  000010  000214  5$:     BIT     #UETATT,P.PRST(R5) ;CHECK IF UNEXPECTED ATTENTION
7324  042376  001402                          BEQ     6$
7325  042400  104401  061027                  TYPE    ,ERR050
7326  042404  032765  000020  000014  6$:     BIT     #DRVHRD,P.PRST(R5) ;CHECK IF DRIVE HARD ERROR
7327  042412  001402                          BEQ     7$
7328  042414  104401  060744                  TYPE    ,ERR027
7329  042420  032765  000040  000014  7$:     BIT     #DRVDSC,P.PRST(R5) ;CHECK IF DSC DID NOT CLEAR
7330  042426  001402                          BEQ     8$
7331  042430  104401  060763                  TYPE    ,ERR028
7332  042434  032765  004000  000014  8$:     BIT     #NODSC,P.PRST(R5) ;CHECK IF ATTN BUT NO DSC OR FAULT
7333  042442  001402                          BEQ     11$
7334  042444  104401  061667                  TYPE    ,ERR058
7335  042450  004737  025550          11$:    JSR     PC,PRISTT       ;PRINT CONTROLLER STATUS
7336  042454  004737  025374                  JSR     PC,PRDSTT       ;PRINT DRIVE STATUS
7337  042460  004737  027476                  JSR     PC,PRIOO2       ;PRINT RETRY COMMAND
7338  042464  010546                          MOV     R5,-(SP)        ;STORE R5 ON STACK
7339  042466  012705  004512                  MOV     #PAPM10,R5      ;LOAD R5 FOR PREVIOUS STATUS
7340  042472  104401  063243                  TYPE    ,ERR210         ;TYPE "FIRST ERROR INFO"
7341  042476  004737  025550                  JSR     PC,PRISTT       ;PRINT CONTROLLER STATUS
7342  042502  004737  025374                  JSR     PC,PRDSTT       ;PRINT DRIVE STATUS
7343  042506  004737  027476                  JSR     PC,PRIOO2       ;PRINT INITIAL COMMAND
7344  042512  012605                          MOV     (SP)+,R5        ;RESTORE R5
7345  042514  005765  000206          30$:    INC     P.NER(R5)       ;INCREMENT OTHER ERRORS
7346  042520  004737  030472                  JSR     PC,HLTOOO       ;CHECK IF HALT OR ERROR
7347  042524  004737  022316                  JSR     PC,BUFREL       ;RELEASE BUFFER
7348  042530  004737  012716                  JSR     PC,DROP         ;DROP DRIVE
7349  042534  004737  022016                  JSR     PC,GETBUF       ;GO ALLOCATE BUFFERS
7350  042540  000405                          BR      40$             ;CHECK IF ERROR QUEUE EMPTY
7351
7352  042542  004737  031224          35$:    JSR     PC,ERCVY        ;GO DO ERROR RECOVERY
7353  042546  005737  001562                  TST     ERRPRO          ;CHECK IF ERROR RECOVERY ON LAST DRIVE
7354                                                                  ;  IS FINISHED
7355  042552  001007                          BNE     45$             ;NO, RETURN
7356  042554  004037  050766          40$:    JSR     R0,Q.POP        ;GET NEXT ELEMENT FROM
7357  042560  001330                          ERRPRQ                  ;  ERROR PROCESSING QUEUE
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 7358  042562  012605                        MOV     (SP)+,R5        ;LOAD PARAMETER BLOCK
 7359  042564  010537  001562                MOV     R5,ERPPPC       ;LOAD CURRENT PROCESSING ERPOP
 7360  042570  001364                        BNE     35$             ;IF ERROR PROCESSING QUFUE NOT EMPTY GO
 7361                                                                ;  PROCESS NEXT ERROR
 7362  042572  000207                45$:    RTS     PC              ;RETURN
```

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                                .SBTTL  DETERMINE IF CLOCK IS PRESENT

042574  012737  042624  000004  CHKCLK: MOV     #5$,ERRVEC      ;SET UP ERROR VECTOR FOR NON-EXISTENT MEMORY
042602  012737  000340  000006          MOV     #PR7,ERRVEC+2   ;LOCK ALL INTERRUPTS
042610  005777  136522                  TST     @SLRCSB         ;CHECK FOR P CLOCK
042614  112737  177777  001374          MOVB    #-1,CLKFLG      ;INDICATE KW11-P PRESENT
042622  000413                          BR      20$             ;LOAD COMMON CLOCK PARAMETERS

042624  022626                  5$:     CMP     (SP)+,(SP)+     ;ADJUST STACK
042626  012737  042650  000004          MOV     #15$,ERRVEC     ;SET UP ERROR VECTOR FOR NON-EXISTENT MEMORY
042634  005777  136502                  TST     @SLRS           ;CHECK FOR L CLOCK
042640  112737  000001  001374          MOVB    #1,CLKFLG       ;SET KW11-L PRESENT
042646  000401                          BR      20$             ;REINSTATE TRAP CATCHER

042650  022626                  15$:    CMP     (SP)+,(SP)+     ;ADJUST STACK
042652  012737  000006  000004  20$:    MOV     #ERRVEC+2,ERRVEC ;REINSTATE TRAP CATCHER
042660  005037  000006                  CLR     ERRVEC+2
042664  000207                          RTS     PC              ;RETURN
```

```
7381                                    .SBTTL  SET UP CLOCK INTERRUPT
7382
7383  042666  105737  001374            CLKINT: TSTB    CLKFLG          ;CHECK IF A CLOCK IS ON SYSTEM
7384  042672  001431                            BEQ     20$             ;NO, RETURN
7385  042674  100011                            BPL     5$              ;CHECK IF KW11-L
7386  042676  013701  001340                    MOV     $LPVEC,R1       ;LOAD VECTOR ADDRESS
7387  042702  012777  177777  136426            MOV     #-1,@$LKCSB     ;LOAD COUNT BUFFER WITH 1'S
7388  042710  012777  000135  136416            MOV     #135,@$LKCSR    ;SET COUNT UP, 16 MS, CONT
7389  042716  000405                            BR      10$             ;LOAD COMMON CLOCK PARAMETERS
7390
7391  042720  013701  001344            5$:     MOV     $LLVEC,R1       ;LOAD VECTOR ADDRESS
7392  042724  012777  000100  136410            MOV     #100,@$LKS      ;SET UP L CLOCK FOR INTERRUPT MODE
7393  042732  012721  042760            10$:    MOV     #CLOCK,(R1)+    ;LOAD ADDRESS OF INTERRUPT ROUTINE
7394  042736  012711  000300                    MOV     #PR6,(R1)       ;SET UP FOR PRIORITY 6
7395  042742  113737  001352  001359            MOVB    HZ,CLKFRQ       ;SET UP CLOCK FREQUENCY
7396  042750  113737  001360  001375            MOVB    PERINT,PERICD   ;SET UP COUNTER FOR INITIAL STATISTIC SUMMARY
7397  042756  000207            20$:    RTS     PC              ;RETURN
```

```
                                .SBTTL  KW11-L AND FW11-P INTERRUPT HANDLER

042760  105337  001353  CLOCK:  DECR    CLKFRQ          ;CHECK IF ONE SECOND PASSED
042764  001041                  BNE     10$             ;NO, RETURN
042766  113737  001352  001353          MOVB    #7,CLKFRQ       ;REINITIALIZE SYSTEM CLOCK
042774  005237  001372          INC     SECOND          ;INCREMENT SECOND COUNT
043000  022737  000074  001372          CMP     #60.,SECOND     ;CHECK IF MINUTE WAS OCCURRED
043006  001030                  BNE     10$             ;NO, RETURN
043010  005037  001372          CLR     SECOND          ;CLEAR SECOND
043014  105737  001360          TSTB    PERINV          ;CHECK IF INTERVAL STATISTICS
043020  001411                  BEQ     5$              ;NO, UPDATE MINUTE COUNT
043022  105337  001375          DECB    PERIOD          ;DECREMENT PERIOD COUNT
043026  001006                  BNE     5$              ;CHECK IF END OF PERIOD, IF NOT UPDATE MINUTE COUNT
043030  113737  001360  001375          MOVB    PERINV,PERIOD   ;INITIALIZE PERIOD
043036  112737  177777  001627          MOVB    #-1,STATIS      ;INDICATE TIME FOR STATISTIC TYPE OUT
043044  005237  001370  5$:     INC     MINUTE          ;INCREMENT MINUTE COUNTER
043050  022737  000074  001370          CMP     #60.,MINUTE     ;CHECK IF HOUR WAS OCCURED
043056  001004                  BNE     10$             ;NO, RETURN
043060  005037  001370          CLR     MINUTE          ;CLEAR MINUTE COUNT
043064  005237  001366          INC     HOUR            ;INCREMENT HOUR COUNT
043070  000002          10$:    RTI                     ;RETURN
```

```
                                .SBTTL  PRINT TIME ROUTINE

043072  105737  001374        PRITIM: TSTB    CLKFLG          ;CHECK IF CLOCK ON SYSTEM
043076  001455                        BEQ     50$             ;NO, RETURN
043100  010046                        MOV     R0,-(SP)        ;SAVE R0
043102  013746  177776                MOV     PS,-(SP)        ;SAVE PSW
043106  012737  000340  177776        MOV     #PR7,PS         ;LOCK OUT CLOCK
043114  013737  001366  001376        MOV     HOUR,TIMHR      ;SAVE TIME FOR PRINT OUT
043122  013737  001370  001400        MOV     MINUTE,TIMMIN
043130  013737  001372  001402        MOV     SECOND,TIMSEC
043136  012637  177776                MOV     (SP)+,PS        ;RESTORE PSW
043142  012700  063734                MOV     #TIM001,R0      ;LOAD R0 FOR INDEX
043146  105010                        CLRB    (R0)            ;DETERMINE HUNDREDS OF HOURS
043150  013746  001376                MOV     TIMHR,-(SP)     ;STORE HOURS FOR CONVERSION
043154  162716  000144        1$:     SUB     #100.,(SP)      ;CONVERT HUNDRECS
043160  100402                        BMI     2$              ;CHECK IF TOO SMALL
043162  105210                        INCB    (R0)
043164  000773                        BR      1$

043166  062716  000144        2$:     ADD     #100.,(SP)
043172  152720  000060                BISB    #60,(R0)+       ;MAKE DIGIT ASCII
043176  004737  043234                JSR     PC,CONHUN
043202  013716  001400                MOV     TIMMIN,(SP)     ;LOAD STACK FOR MINUTES
043206  004737  043234                JSR     PC,CONHUN
043212  013716  001402                MOV     TIMSEC,(SP)     ;LOAD STACK FOR SECONDS
043216  004737  043234                JSR     PC,CONHUN
043222  005726                        TST     (SP)+           ;ADJUST STACK
043224  104401  063727                TYPE    ,TIM000         ;TYPE TIME:
043230  012600                        MOV     (SP)+,R0        ;RESTORE R0
043232  000207                50$:    RTS     PC              ;RETURN

                                .SBTTL  CONVERT DECIMAL  LESS THAN 100

043234  105010                CONHUN: CLRB    (R0)            ;ZERO DIGIT
043236  162766  000012  000002  1$:     SUB     #10.,2(SP)      ;CONVERT TENS
043244  100402                        BMI     5$
043246  105210                        INCB    (R0)
043250  000772                        BR      1$

043252  062766  000012  000002  5$:     ADD     #10.,2(SP)
043260  152720  000060                BISB    #60,(R0)+       ;MAKE ASCII
043264  105010                        CLRB    (R0)            ;ZERO DIGIT
043266  005766  000002                TST     2(SP)
043272  001404                        BEQ     7$
043274  105210                6$:     INCB    (R0)            ;CONVERT ONES
043276  005366  000002                DEC     2(SP)
043302  001374                        BNE     6$
043304  152720  000060        7$:     BISB    #60,(R0)+       ;MAKE ASCII
043310  105720                        TSTB    (R0)+           ;SKIP OVER COLON
043312  000207                        RTS     PC
```

```
                        .SBTTL  RK611/RK06 UNIBUS DRIVER FOR QUEUED OPERATIONS (REV. 0.08)

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                        ;*MAYNARD, MA. 01754
                        ;*AUTHOR: ROY SPITZER

                        .SBTTL   *WATCH-DOG TIMER

                        ;;*****************************************************************
                        ;*
                        ;*      THE WATCH-DOG TIMER DOES A PSEUDO-TIMING OF RK06 UNIBUS
                        ;*      SUBSYSTEM COMMAND. SINCE ONE CAN NOT GUARANTEE THAT A
                        ;*      REAL-TIME CLOCK (KW11-P OR KW11-L) IS ON THE SYSTEM
                        ;*      THE RK06 DRIVER WILL USE THE LOCATION W.MTIM FOR
                        ;*      MILLI-SECOND TIMING. WHEN W.MTIM REACHES ZERO THE
                        ;*      WATCH-DOG TIMER WILL SCAN THE DRIVES IN USE AS
                        ;*      DETERMINED BY THE LOCATION W.TIME. THE TIMER COUNTS
                        ;*      (ONE FOR EACH DRIVE) ARE KEPT IN THE TABLE W.DRV.
                        ;*      IF ANY COUNT IN THE TABLE W.DRV REACHES ZERO A COMMAND
                        ;*      TIME-OUT WILL BE DESIGNATED IN THE PROGRAM DEVICE STATUS
                        ;*      REGISTER OF THAT DRIVE'S PARAMETER BLOCK.
                        ;*
                        ;*      THE DRIVER WILL USE THE LOCATION W.MIN AS THE NUMBER
                        ;*      OF MILLISECONDS FOR AN UNLOAD OR START SPINDLE COMMAND.
                        ;*      THE DRIVER WILL USE THE LOCATION W.SEC AS THE TIME
                        ;*      LIMIT FOR ALL OTHER COMMANDS.
                        ;*
                        ;*      FOR QUEUED OPERATIONS THE WATCH-DOG TIMER WILL
                        ;*      WATCH UP TO 8 OPERATIONS SIMULATEOUSLY. FOR SEQUENTIAL
                        ;*      OPERATIONS ONLY ONE OPERATION WILL BE WATCHED.
                        ;*
                        ;*CALL  JSR     PC,W.WTCH
                        ;*      RETURN          IF NO DRIVE TIMER EXCEEDED ITS TIME LIMIT
                        ;*
                        ;*      OTHERWISE AN ABNORMAL RETURN TO THE ROUTINE ADDRESS
                        ;*      BY LOCATION A.ABNL WILL OCCUR AND THE CNCTO FLAG
                        ;*      IN THE PROGRAM DEVICE STATUS REGISTER OF THE
                        ;*      APPROPRIATE PARAMETER BLOCK WILL BE SET.
                        ;*
                        ;;*****************************************************************

043314  010546          W.WTCH: MOV     R5,-(SP)        ;SAVE R5 ON THE STACK
043316  010446                  MOV     R4,-(SP)        ;SAVE R4 ON THE STACK
043320  010346                  MOV     R3,-(SP)        ;SAVE R3 ON THE STACK
043322  010246                  MOV     R2,-(SP)        ;SAVE R2 ON STACK
043324  013746  177776          MOV     PS,-(SP)        ;SAVE PROGRAM STATUS WORD ON STACK
043330  005337  001464          DEC     W.MTIM          ;DECREMENT MILLISECOND TIMER
043334  001046                  BNE     20$             ;IF NOT ZERO RETURN
043336  013737  001466  001464  MOV     W.MILI,W.MTIM   ;REINITIALIZE MILLISECOND TIMER
043344  013737  001450  177776  MOV     #PRI,PS         ;LOCK OUT RK06 INTERRUPTS
043352  013702  001444          MOV     #BAS,R2         ;LOAD BASE OF RK06 REGISTERS
043356  005004                  CLR     R4              ;CLEAR INDEX OF DRIVE MASKS
043360  005003                  CLR     R3              ;CLEAR INDEX OF DRIVE TIMES
                                                        ;  AND PARAMETER BLOCK ADDRESSES
043362  136437  001510  001506  1$:     BITB    INTPSR(R4),W.TIME ;CHECK IF DRIVE IS BEING TIMED
```

```
7525  043370  001422                          BEQ     6$              ;NO, GO TO NEXT DRIVE
7526  043372  005363  001540                  DEC     W.DPV(R3)       ;DECREMENT DRIVE COUNT
7527  043376  001017                          BNE     6$              ;IF NOT TIME OUT, GO TO
7528                                                                  ;  NEXT DRIVE
7529  043400  016305  001520                  MOV     PRLST(R3),R5    ;LOAD ADDRESS OF PARAMETER
7530                                                                  ;  BLOCK TABLE FOR INDEXING
7531  043404  146437  001510  001506          BICB    INTFSF(R4),W.TIME ;RESET TIMING INDICATOR FOR DRIVE
7532  043412  052765  000100  000014          BIS     #CMDTO,P.PRST(R5) ;SET COMMAND TIME OUT
7533  043420  020537  001467                  CMP     R5,O.WAIT       ;CHECK IF DRIVER IS WAITING FOR
7534                                                                  ;  COMMAND COMPLETION
7535  043424  001002                          BNE     5$              ;NO, DO NOT ALTER WAITING FOR
7536                                                                  ;  COMMAND COMPLETION
7537  043426  005037  001462                  CLR     O.WAIT          ;CLEAR WAIT FOR COMMAND COMPLETION
7538  043432  004777  136016          5$:     JSR     PC,@A.ARML      ;BRANCH TO ERROR ROUTINE
7539  043436  062703  000002          6$:     ADD     #2,R3           ;ADD 2 TO INDEX OF DRIVE TIMES
7540                                                                  ;  AND PARAMETER BLOCK ADDRESSES
7541  043442  005204                          INC     R4              ;INCREMENT INDEX OF DRIVE MASK
7542  043444  022704  000010                  CMP     #10,R4          ;CHECK IF ALL DRIVES ARE TESTED
7543  043450  001344                          BNE     1$              ;NO, CHECK NEXT DRIVE
7544  043452  012637  177776          20$:    MOV     (SP)+,PS        ;RESTORE PSW
7545  043456  012602                          MOV     (SP)+,R2        ;RESTORE R2
7546  043460  012603                          MOV     (SP)+,R3        ;RESTORE R3
7547  043462  012604                          MOV     (SP)+,R4        ;RESTORE R4
7548  043464  012605                          MOV     (SP)+,R5        ;RESTORE R5
7549  043466  000207                          RTS     PC              ;RETURN
```

```
                        .SBTTL   *RK06 INTERRUPT SERVICE ROUTINE

                        ;;*****************************************************************
                        ;*
                        ;*      THIS ROUTINE WILL SERVICE ALL RK06 INTERRUPTS.
                        ;*
                        ;*      UPON RECEIVING AN INTERRUPT, THIS ROUTINE WILL
                        ;*      PERFORM ONE OF THE FOLLOWING SERVICES:
                        ;*
                        ;*      1.) SERVICE PORT WAS SEIZED BY OTHER PORT
                        ;*      2.) SERVICE DRIVER IS WAIT FOR COMMAND COMPLETION
                        ;*      3.) SERVICE POSITIONING COMPLETION
                        ;*      4.) REQUEUE COMMAND IF DRIVE WAS RELEASED
                        ;*          FOR THE QUEUED RK06 DRIVER.
                        ;*      5.) IF NO SERVICE IS REQUIRED, THE COMMAND WILL BE ISSUED
                        ;*          FOR THE QUEUED RK06 DRIVER.
                        ;*
                        ;*      THREE LINKS ARE PROVIDED TO THE DRIVING PROGRAM.
                        ;*      THEY ARE:
                        ;*
                        ;*      1.) A.NORM ADDRESS OF NORMAL RETURN (SUCESSFUL COMPLETION OF COMMAND)
                        ;*      2.) A.ABNL ADDRESS OF ABNORMAL RETURN (UNSUCESSFUL COMPLETION OF COMMAND)
                        ;*      3.) A.CONT ADDRESS OF CONTROL ERROR RETURN
                        ;*
                        ;*      FOR NORMAL AND ABNORMAL RETURNS, THE ADDRESS OF THE APPROPRIATE
                        ;*      PARAMETER BLOCK WILL BE IN R5.
                        ;*
                        ;*      FOR THE CONTROLLER ERROR RETURN, THE LOCATION E.CONT CONTAINS
                        ;*      THE REASON FOR THE CONTROLLER ERROR.
                        ;*
                        ;*      ROUTINES USED:
                        ;*              C.OPT  (QUEUED ONLY)
                        ;*              Q.PUSH (QUEUED ONLY)
                        ;*              Q.RMOV (QUEUED ONLY)
                        ;*              R.CONT (SEQUENTIAL ONLY)
                        ;*              R.NORM (SEQUENTIAL ONLY)
                        ;*              R.ABNL (SEQUENTIAL ONLY)
                        ;*              I.CSTS
                        ;*              I.STAT
                        ;*              I.ISSU
                        ;*              I.CCLR
                        ;*
                        ;;*****************************************************************

043470  010546          I.INTR: MOV     R5,-(SP)        ;STORE R5 ON THE STACK
043472  010446                  MOV     R4,-(SP)        ;STORE R4 ON THE STACK
043474  010346                  MOV     R3,-(SP)        ;STORE R3 ON THE STACK
043476  010246                  MOV     R2,-(SP)        ;STORE R2 ON THE STACK
043500  010146                  MOV     R1,-(SP)        ;STORE R1 ON THE STACK
043502  010046                  MOV     R0,-(SP)        ;STORE R0 ON THE STACK
043504  013702  001444          MOV     RKBAS,R2        ;LOAD R2 TO ADDRESS RK06 REGISTER
043510  016737  000010  001410  MOV     RKCS2(R7),T.CS2 ;STORE CS2
043516  032737  001000  001410  BIT     #MDS,T.CS2      ;CHECK IF MULTIPLE DRIVE SELECT
043524  001407                  BEQ     1$              ;NO, CONTINUE PROCESSING
043526  052737  100000  001460  BIS     #E.MDS,E.CONT   ;SET MULTIPLE DRIVE SELECT
043534  004777  135716          JSR     PC,@A.CONT      ;REPORT ERROR
```

I15

```
                        ;RETURN
                        ;CHECK IF INTERRUPT OR RELEASE
                        ;NO, CHECK IF DRIVE AVAILABLE
                        ;CHECK IF RELEASE COMMAND
                        ;YES,CLEAR FLAG
                        ;CONTINUE PROCESSING INTERRUPT

                        ;CLEAR FLAG
                        ;GO PROCESS DRIVE ATTENTIONS

                        ;CHECK FOR NON-EXISTENT DRIVE OR
                        ;  UNIT FIELD ERROR
                        ;NO, WAIT FOR DUAL ACCESS INTERRUPT
                        ;LOAD R4 FOR DRIVE NUMBER
                        ;KEEP DRIVE BITS
                        ;STORE DRIVE NUMBER FOR INDEX
                        ;MULTIPLY BY 2
                        ;STORE PARAMETER BLOCK ADDRESS
                        ;LOAD TEMPORARY CS1 FOR STATUS REPORT
                        ;REPORT ERROR

                        ;STORE STATUS REGISTER FOR COMPARISON
                        ;CHECK IF DRIVE SEIZED BY OTHER
                        ;  PORT
                        ;NO, CONTINUE PROCESSING INTERRUPT

                        ;CHECK IF ANY DATA TRANSFER ERROR EXISTS
                        BIT     #DLTINCE!OPE!NEM,T.CS2
                        BNE     10$             ;INDICATE ERROR
                        MOV     RKER(R2),T.ER   ;STORE ERROR REGISTER

                ;       CHECK FOR DATA TRANSFER ERROR TYPE ERROR
                        BIT     #DCK!OPI!WLE!COE!PGMRC!BSE!ECH,T.ER

                        BEQ     11$             ;NO, WAIT FOR RELEASE OF RK06 DRIVE

                10$:    BIS     #E.UDAT,E.CONT  ;SET UNEXPECTED DATA TYPE ERROR
                        JSR     PC,@A.CONT      ;REPORT ERROR
                        JMP     I.RTRN          ;RESTORE REGISTERS

                11$:    MOV     T.CS2,R3        ;STORE RKCS2 FOR DRIVE NUMBER
                        BIC     #^C<DRVMSK>,R3  ;STRIP OFF JUNK
                        ASL     R3              ;MULTIPLY INDEX BY 2
                        MOV     W.MIN,W.DRV(R3) ;WAIT ONE MINUTE FOR RELEASE
                        MOV     PBLKT(R3),R5    ;LOAD R5 WITH PARAMETER
                                                ;  BLOCK ADDRESS
                        JSR     PC,Q.RMOV       ;REMOVE PARAMETER BLOCK FROM
                                                ;  COMMAND INITIATION QUEUE
                        BIS     #DRVS7D,P.PRST(R5) ;SET DRIVE SEIZED IN THE
                                                ;  PROGRAM DRIVE STATUS REGISTER
                        CLR     Q.WAIT          ;CLEAR WAIT FOR COMMAND COMPLETION
                        JSR     R0,I.CCLR       ;CLEAR CONTROLLER
                        I.RTRN                  ;ERROR RETURN
                        JMP     I.RTRN          ;GO RESTORE REGISTERS
```

```
7662
7663  043772  013705  001462          I.IOO:  MOV     O.WAIT,R5       ;LOAD PARAMETER BLOCK ADDRESS INTO R5
7664  043776  001002                          BNE     2$              ;IS COMMAND WAITING PROCESSING
7665                                                                  ;  YES, DO PROCESSING
7666  044000  000137  044740                  JMP     I.ATTN          ;NO, PROCESS ATTENTION
7667
7668  044004  013704  001410          2$:     MOV     T.CS2,R4        ;STORE RKCS2 FOR DRIVE NUMBER
7669  044010  042704  177770                  BIC     #^C<DRVMSK>,R4  ;MASK OUT UNNECESSARY BITS
7670
7671
7672  044014  010403                          MOV     R4,R3           ;STORE DRIVE NUMBER FOR INDEX
7673  044016  006303                          ASL     R3              ;MULTIPLY BY 2 FOR INDEX
7674
7675  044020  126504  000000                  CMPB    P.DRVN(R5),R4   ;CHECK IF DRIVE NUMBER IS EXPECTED
7676  044024  001401                          BEQ     3$              ;YES, CONTINUE
7677  044026  000000                          HALT                    ;NO, DRIVER ERROR
7678  044030  122765  000164  000001  3$:     CMPB    #RDALHD,P.CMND(R5) ;CHECK IF READ ALL HEADERS
7679  044036  001002                          BNE     10$             ;NO, EXECUTE NORMAL DATA TRANSFER
7680  044040  000137  044400                  JMP     I.HDAL          ;GO EXECUTE SPECIAL HEADER SEQUENCE
7681
7682  044044  005037  001462          10$:    CLR     O.WAIT          ;CLEAR WAIT FOR COMMAND COMPLETION
7683  044050  005063  001540                  CLR     W.DRV(R3)       ;CLEAR WATCH-DOG TIME
7684  044054  146437  001510  001506          BICB    INTMSK(R4),W.TIME ;RESET TIMING ON THIS DRIVE
7685  044062  016237  000000  001406          MOV     RKCS1(R2),T.CS1 ;STORE COMMAND AND STATUS REGISTER 1
7686  044070  032737  100000  001406          BIT     #CERR,T.CS1     ;CHECK IF CONTROLLER ERROR
7687  044076  001021                          BNE     I.ERRC          ;YES, PROCESS ERROR
7688  044100  016237  000016  001422          MOV     RKASOF(R2),T.ASOF ;STORE ATTENTION SUMMARY
7689  044106  136437  001510  001423          BITB    INTMSK(R4),T.ASOF+1 ;CHECK IF DRIVE ATTENTION SET
7690  044114  001004                          BNE     15$             ;YES, REPORT ERROR
7691  044116  004777  135330                  JSR     PC,@A.NORM      ;INDICATE NORMAL RETURN
7692  044122  000137  046214                  JMP     I.RTRN          ;RESTORE REGISTERS
7693
7694  044126  052765  000010  000014  15$:    BIS     #UEXATT,P.ERST(R5) ;SET UNEXPECTED ATTENTION
7695
7696  044134  004737  046664          I.ERRA: JSR     PC,I.CSTS       ;STORE CONTROLLER STATUS
7697  044140  000405                          BR      I.ERR           ;STORE PATTERN AND POSITION INFORMATION
7698
7699  044142  013765  001406  000016  I.ERRC: MOV     T.CS1,P.CS1(R5) ;GET ERROR RKCS1
7700  044150  004737  046706                  JSR     PC,I.CST1       ;GET REST OF CONTROLLER STATUS
7701  044154  016765  000032  000062  I.ERR:  MOV     RKECPT(R2),P.EPAT(R5) ;STORE ECC PATTERN
7702  044162  016265  000030  000060          MOV     RKECPS(R2),P.EPOS(R5) ;STORE ECC POSITION
7703  044170  004037  046232                  JSR     R0,I.CCLR       ;CLEAR CONTROLLER
7704  044174  046214                          I.RTRN                  ;ERROR RETURN
7705  044176  032765  010400  000020          BIT     #NEDIOFF,P.CS2(R5) ;CHECK IF IT WAS NON-EXISTENT DRIVE OR
7706                                                                  ;  UNIT FIELD ERROR
7707  044204  001046                          BNE     5$              ;YES, REPORT ERROR
7708  044206  004037  046770                  JSR     R0,I.STAT       ;GATHER DRIVE STATUS
7709  044212  046214                          I.RTRN                  ;ERROR RETURN
7710  044214  112737  000005  001406          MOVB    #DR.CLR,T.CS1   ;LOAD COMMAND
7711  044222  004037  046314                  JSR     R0,I.ISSU       ;ISSUE DRIVE CLEAR
7712  044226  046214                          I.RTRN                  ;ERROR RETURN
7713  044230  136437  001510  001423          BITB    INTMSK(R4),T.ASOF+1 ;CHECK IF ATTENTION RESET
7714  044236  001407                          BEQ     2$              ;NO, INDICATE DRIVE ERROR
7715  044240  052737  000020  001460          BIS     #E.CLAT,E.CONT  ;SET ATTENTION DID NOT RESET
7716                                                                  ;  WITH CLEAR
7717  044246  004777  135204                  JSR     PC,@A.CONT      ;REPORT CONTROLLER ERROR
```

K15

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 7718  044252  000137  046214                    JMP     I.RTRN          ;GO RESTORE REGISTERS
 7719
 7720  044256  032737  040000  001432  2$:       BIT     #S.DSC,T.MR2    ;CHECK IF DRIVE STATUS CHANGE CLEARED
 7721  044264  001403                            BEQ     3$              ;YES, CHECK FAULT
 7722  044266  052765  000040  000014            BIS     #DRVDSC,P.PRST(R5) ;SET DSC DID NOT CLEAR
 7723  044274  032737  001000  001434  3$:       BIT     #S.PAR,T.MR3    ;CHECK IF DRIVE PARITY ERROR
 7724  044302  001407                            BEQ     5$              ;NO, INDICATE ABNORMAL TERMINATION
 7725  044304  052737  002000  001460            BIS     #E.DPAR,E.CONT  ;SET DRIVE PARITY ERROR
 7726  044312  004777  135140                    JSR     PC,@A.CONT      ;INDICATE CONTROLLER ERROR
 7727  044316  000137  046214                    JMP     I.RTRN          ;RETURN
 7728
 7729  044322  032765  000020  000014  5$:       BIT     #DRVHWD,P.PRST(R5) ;CHECK IF HARD DRIVE ERROR
 7730  044330  001017                            BNE     10$             ;YES, GO REPORT ERROR
 7731  044332  032737  020000  001432            BIT     #S.PIP,T.MR2    ;CHECK IF DRIVE IS CYCLING DOWN
 7732  044340  001413                            BEQ     10$             ;NO, REPORT ERROR
 7733  044342  052765  020000  000014            BIS     #E.UNLD,P.PRST(R5) ;SET DRIVE UNLOADING
 7734  044350  156437  001510  001506            BISB    INTMSK(R4),W.TIME ;SET UP 8 SECONDS FOR
 7735  044356  013763  001472  001540            MOV     W.8SEC,W.DRV(R3) ;  DRIVE TO CYCLE UP
 7736  044364  000137  046214                    JMP     I.RTRN          ;GO RESTORE REGISTERS
 7737
 7738  044370  004777  135060          10$:      JSR     PC,@A.ABNL      ;GO REPORT ERROR
 7739  044374  000137  046214                    JMP     I.RTRN          ;GO RESTORE REGISTERS
 7740
 7741                                  .SBTTL   *READ ALL HEADERS INTERRUPT SEQUENCE
 7742
 7743  044400  016237  000000  001406  I.HDAL: MOV     RKCS1(R2),T.CS1 ;STORE CS1 TO CHECK CONTROLLER
 7744                                                                  ;  ERROR
 7745  044406  032737  100000  001406            BIT     #CERR,T.CS1     ;CHECK IF CONTROLLER ERROR
 7746  044414  001423                            BEQ     5$              ;NO, CHECK FOR ATTENTION
 7747
 7748  044416  005037  001462                    CLR     O.WAIT          ;CLEAR WAITING FOR COMMAND COMPLETE
 7749  044422  146437  001510  001506            BICB    INTMSK(R4),W.TIME ;RESET TIMING ON DRIVE
 7750  044430  005063  001540                    CLR     W.DRV(R3)       ;CLEAR TIME OUT COUNT
 7751  044434  013765  001406  000016            MOV     T.CS1,P.CS1(R5) ;STORE ERROR RKCS1
 7752  044442  004737  046706                    JSR     PC,I.CST1       ;STORE CONTROLLER REGISTERS
 7753  044446  004037  046232                    JSR     R0,I.CCLR       ;CLEAR CONTROLLER
 7754  044452  046214                            I.RTRN                  ;ERROR RETURN
 7755  044454  004777  134774                    JSR     PC,@A.ABNL      ;INDICATE ERROR RETURN
 7756  044460  000137  046214                    JMP     I.RTRN          ;RESTORE REGISTERS
 7757
 7758  044464  016537  000016  001422  5$:       MOV     RKASOP(R5),T.ASOP ;STORE ATTENTION SUMMARY
 7759  044472  136437  001510  001423            BITB    INTMSK(R4),T.ASOP+1 ;CHECK IF DRIVE ATTENTION IS SET
 7760  044500  001411                            BEQ     7$              ;NO, CHECK IF READ ALL HEADERS
 7761  044502  005037  001462                    CLR     O.WAIT          ;CLEAR WAITING FOR COMMAND COMPLETION
 7762  044506  146437  001510  001506            BICB    INTMSK(R4),W.TIME ;RESET TIMING ON DRIVE
 7763  044514  005063  001540                    CLR     W.DRV(R3)       ;CLEAR TIME OUT COUNT
 7764  044520  000137  044134                    JMP     I.ERRA          ;GO REPORT ERROR
 7765
 7766  044524  013701  001476          7$:       MOV     HDR.AD,R1       ;GET MAIN MEMORY ADDRESS
 7767  044530  016221  000024                    MOV     RKDB(R2),(R1)+  ;GET FIRST WORD OF HEADER
 7768  044534  016221  000024                    MOV     RKDB(R2),(R1)+  ;GET SECOND WORD OF HEADER
 7769  044540  016221  000024                    MOV     RKDB(R2),(R1)+  ;GET THIRD WORD OF HEADER
 7770  044544  010137  001476                    MOV     R1,HDR.AD       ;STORE ADDRESS FOR NEXT HEADER
 7771  044550  016237  000010  001410            MOV     RKCS2(R2),T.CS2 ;STORE CS2 TO CHECK FOR DATA LATE
 7772  044556  032737  100000  001410            BIT     #DLT,T.CS2      ;CHECK FOR DATA LATE
 7773  044564  001056                            BNE     35$             ;YES, REPORT ERROR
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L15

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 7774  044566  005337  001500            DEC     HDR.CT          ;DECREMENT NUMBER OF HEADER YET TO READ
 7775  044572  001027                    BNE     25$             ;IF NON-ZERO, GO ISSUE NEXT READ HEADER
 7776  044574  005037  001462            CLR     O.WAIT          ;CLEAR DRIVER WAITING FOR COMMAND COMPLETION
 7777  044600  005063  001540            CLR     W.DRV(R3)       ;CLEAR TIME OUT COUNT FOR THIS DRIVE
 7778  044604  146437  001510  001506    BICB    INTMSK(R4),W.TIME ;CLEAR WATCH DOG TIME ON THIS DRIVE
 7779  044612  012762  000003  000026    MOV     #3,RKWR1(R2)    ;LOAD MAINTENANCE REGISTER FOR SECTOR COUNT
 7780  044620  112737  000001  001406    MOVB    #DR.SEL,T.CS1   ;LOAD SELECT COMMAND
 7781  044626  004037  046314            JSR     R0,I.ISSU       ;GET SECTOR COUNT
 7782  044632  046214                    I.RTRN                  ;ERROR RETURN
 7783  044634  013765  001434  000056    MOV     T.MR3,P.B11(R5) ;LOAD SECTOR COUNT
 7784  044642  004777  134604            JSR     PC,@A.NORM      ;INDICATE NORMAL TERMINATION
 7785  044646  000137  046214            JMP     I.RTRN          ;RESTORE REGISTERS
 7786
 7787  044652  016567  000002  000020  25$:    MOV     P.CYLN(R5),RKDCYL(R2) ;LOAD CYLINDER ADDRESS REGISTER
 7788  044660  016567  000004  000006        MOV     P.SECT(R5),RKDA(R2) ;LOAD SECTOR AND TRACK
 7789  044666  116567  000007  000017        MOVB    P.CS1H(R5),P.CS1+1(R5) ;STORE BITS 8-15 OF CS1
 7790  044674  042765  165777  000016        BIC     #^C<CDTICFMT>,P.CS1(R5) ;CLEAR ALL BITS EXCEPT FORMAT AND
 7791                                                                ;  DRIVE TYPE
 7792  044702  112765  000125  000016        MOVB    #RDHEAD,P.CS1(R5)  ;STORE COMMAND ISSUED
 7793  044710  016562  000016  000000        MOV     P.CS1(R5),RKCS1(R2)  ;ISSUE READ HEADER
 7794  044716  000137  046214                JMP     I.RTRN          ;RESTORE REGISTERS
 7795
 7796  044722  052737  000400  001460  35$:    BIS     #E.DLT,E.CONT   ;SET DATA LATE WHILE UNLOADING HEADER
 7797  044730  004777  134522                JSR     PC,@A.CONT      ;REPORT ERROR
 7798  044734  000137  046214                JMP     I.RTRN          ;RESTORE REGISTERS
 7799
 7800                                  .SBTTL   *DRIVE ATTENTION SCANNER
 7801
 7802  044740  016237  000000  001406  I.ATTN: MOV     RKCS1(R2),T.CS1 ;STORE COMMAND AND STATUS
 7803                                                                ;  REGISTER 1 FOR COMPARISON
 7804  044746  032737  100000  001406        BIT     #CERR,T.CS1     ;CHECK IF CONTROLLER ERROR OCCURRED
 7805  044754  001444                        BEQ     5$              ;NO, CHECK IF ATTENTION
 7806
 7807                                  ;CHECK IF ANY DATA TRANSFER TYPE ERROR EXISTS
 7808  044756  032737  164000  001410        BIT     #DLTIWCEIOPEINEM,T.CS2
 7809
 7810  044764  001007                        BNE     1$              ;INDICATE ERROR
 7811  044766  016237  000014  001424        MOV     RKER(R2),T.ER   ;STORE ERROR REGISTER
 7812
 7813                                  ;       CHECK FOR DATA TRANSFER ERROR TYPE
 7814  044774  032737  125700  001424        BIT     #DCKIOPTIMLEICOFIHVRCIBSETECH,T.ER
 7815
 7816  045002  001407                        BEQ     2$              ;NO DATA TRANSFER ERROR
 7817
 7818  045004  052737  000010  001460  1$:     BIS     #E.UDAT,E.CONT  ;SET UNEXPECTED DATA TYPE ERROR
 7819  045012  004777  134440                JSR     PC,@A.CONT      ;REPORT ERROR
 7820  045016  000137  046214                JMP     I.RTRN          ;RESTORE REGISTERS
 7821
 7822  045022  013704  001410          2$:   MOV     T.CS2,R4        ;SAVE CS2 FOR REGISTER NUMBER
 7823  045026  042704  177770                BIC     #^C<DRVMSK>,R4  ;STRIP OFF JUNK
 7824  045032  010403                        MOV     R4,R3           ;STORE DRIVE NUMBER IN R3
 7825  045034  006303                        ASL     R3              ;MULTIPLY DRIVE NUMBER BY 2
 7826  045036  146437  001510  001506        BICB    INTMSK(R4),W.TIME ;CLEAR WATCH-DOG TIMER FOR DRIVE
 7827  045044  005063  001540                CLR     W.DRV(R3)       ;RESET WATCH DOG TIME
 7828  045050  016305  001520                MOV     PKLPT(R3),R5    ;STORE PARAMETER BLOCK ADDRESS IN R5
 7829
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N15

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7830                                    ;       CLEAR DRIVE POSITIONING AND DRIVE POSITIONED FOR DATA TRANSFER
7831                                    ;         IN PROGRAM DEVICE STATUS REGISTER
7832  045054  042765  000006  000014            BIC     #DRVPOSIGNPDT,P.PRST(R5)
7833
7834  045062  000137  044142                    JMP     I.ERRC          ;GO REPORT ERROR
7835
7836  045066  032737  040000  001406  5$:       BIT     #DI,T.CSR       ;CHECK IF ANY DRIVE ATTENTION
7837  045074  001004                            BNE     6$              ;YES, PROCESS INTERRUPT
7838  045076  004737  051240                    JSR     PC,C.OPT        ;CALL COMMAND OPTIMIZER
7839  045102  000137  046214                    JMP     I.RTRN          ;RESTORE REGISTERS
7840
7841  045106  016237  000016  001422  6$:       MOV     ERASOF(R2),T.ASOF ;STORE ATTENTION SUMMARY
7842  045114  105737  001423                    TSTB    T.ASOF+1        ;CHECK IF ANY ATTENTIONS SET
7843  045120  001007                            BNE     7$              ;YES GO PROCESS INTERRUPT
7844  045122  052737  000002  001460            BIS     #F.NOAT,E.CONT  ;SET NO ATTENTION IN ATTENTION SUMMARY
7845  045130  004777  134522                    JSR     PC,@A.CONT      ;GO REPORT ERROR
7846  045134  000137  046214                    JMP     I.RTRN          ;GO RESTORE REGISTERS
7847
7848  045140  005004                    7$:     CLR     R4              ;CLEAR DRIVE NUMBER
7849  045142  136437  001510  001423  8$:       BITB    INTMSF(R4),T.ASOF+1 ;CHECK IF ATTENTION OF THIS DRIVE
7850  045150  001002                            BNE     9$              ;YES, PROCESS INTERRUPT
7851  045152  005204                            INC     R4              ;INCREMENT DRIVE NUMBER
7852  045154  000772                            BR      8$              ;CHECK ATTENTION ON NEXT DRIVE
7853
7854  045156  010403                    9$:     MOV     R4,R3           ;STORE DRIVE NUMBER
7855  045160  006303                            ASL     R3              ;MULTIPLY DRIVE NUMBER BY 2
7856  045162  016305  001520                    MOV     PRLST(R3),R5    ;STORE PARAMETER BLOCK ADDRESS
7857  045166  032765  010000  000014            BIT     #DRVSZD,P.PRST(R5) ;CHECK IF DRIVE WAS SIZED
7858  045174  001402                            BEQ     10$             ;NO, PROCESS NORMAL ATTENTION
7859  045176  000137  046026                    JMP     I.DUAL          ;PROCESS THE RELEASE OF DRIVE
7860
7861  045202                            10$:
7862  045202  032765  020000  000014            BIT     #F.UNLD,P.PRST(R5)  ;CHECK IF DRIVE UNLOADING
7863  045210  001402                            BEQ     11$             ;NO, CONTINUE
7864  045212  000137  045727                    JMP     I.UNLD          ;SERVICE DRIVE TO POSITION AFTER ERROR
7865
7866  045216  042765  000002  000014  11$:       BIC     #DRVPOS,P.PRST(R5)  ;RESET DRIVE POSITIONING
7867  045224  005062  000026                    CLR     MFMR1(R2)       ;CLEAR MAINTENANCE REGISTER 1
7868  045230  112737  000001  001406            MOVB    #DR.SFL,T.CSR   ;LOAD COMMAND
7869  045236  004037  046314                    JSR     R0,I.ISSU       ;SELECT DRIVE WITH ATTENTION HIGH
7870  045242  046214                            I.RTRN                  ;ERROR RETURN
7871  045244  013765  001434  000042            MOV     T.MP3,P.R00(R5) ;STORE STATUS BYTE 00 MPSS B
7872  045252  032765  000200  000042            BIT     #S.FLT,P.R00(R5) ;CHECK IF DRIVE FAULT
7873  045260  001401                            BEQ     12$             ;NO, CHECK FOR DRIVE STATUS CHANGE
7874  045262  000473                            BR      I.AERR          ;PROCESS ERROR
7875
7876  045264  013765  001432  000040  12$:     MOV     T.MP2,P.A00(R5) ;STORE MAINTENANCE REGISTER 2
7877  045272  032765  040000  000040            BIT     #S.DSC,P.A00(R5) ;CHECK FOR DRIVE STATUS CHANGE
7878  045300  001004                            BNE     13$             ;YES, PROCESS DRIVE STATUS CHANGE
7879  045302  052765  004000  000014            BIS     #NODSC,P.PRST(R5) ;SET NO DRIVE STATUS CHANGE
7880  045310  000460                            BR      I.AERR          ;PROCESS ERROR
7881
7882  045312  112737  000005  001406  13$:     MOVB    #DR.CLR,T.CSR   ;LOAD COMMAND
7883  045320  004037  046314                    JSR     R0,I.ISSU       ;CLEAR DRIVE STATUS CHANGE
7884  045324  046214                            I.RTRN                  ;ERROR RETURN
7885  045326  013765  001422  000032            MOV     T.ASOF,P.ASOF(R5) ;STORE ATTENTION SUMMARY
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A10

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7886  045334  136465  001510  000033          BITB    INTMSK(R4),P.ASCP+1(R5) ;CHECK IF ATTENTION RESET
7887  045342  001407                          BEQ     15$             ;YES, CONTINUE INTERRUPT PROCESSING
7888  045344  052737  000020  001460          BIS     #F.CLAT,E.CONT  ;SET ATTENTION DID NOT RESET
7889                                                                  ;  WITH DRIVE CLEAR
7890  045352  004777  134100                  JSR     PC,@A.CONT      ;FLAG ERROR
7891  045356  000137  046214                  JMP     I.RTRN          ;RESTORE REGISTERS
7892
7893  045362  013765  001432  000040  15$:    MOV     T.MR2,P.AOO(R5) ;STORE MAINTENANCE REGISTER 2
7894  045370  032765  040000  000040          BIT     #S.DSC,P.AOO(R5) ;CHECK IF DRIVE STATUS CHANGE
7895                                                                  ;  RESET
7896  045376  001404                          BEQ     16$             ;YES, CONTINUE INTERRUPT PROCESSING
7897  045400  052765  000040  000014          BIS     #DRVDSC,P.PRST(R5) ;SET DRIVE STATUS CHANGE DID NOT CLEAR
7898  045406  000421                          BR      I.AERR          ;GO PROCESS ERROR
7899
7900  045410  146437  001510  001506  16$:    BICB    INTMSK(R4),W.TIME ;RESET TIMING ON THIS DRIVE
7901  045416  005063  001540                  CLR     W.DRV(R3)       ;CLEAR DRIVE TIMING COUNT
7902  045422  032765  000004  000014          BIT     #DRVPDT,P.PRST(R5) ;CHECK IF DRIVE IS POSITIONING
7903                                                                  ;  FOR DATA TRANSFER
7904  045430  001004                          BNE     17$             ;YES, CALL COMMAND OPTIMIZER
7905  045432  004777  134014                  JSR     PC,@A.MCHK      ;REPORT SUCCESSFUL COMMAND
7906                                                                  ;  COMPLETION
7907  045436  000137  046214                  JMP     I.RTRN          ;RESTORE REGISTERS
7908
7909  045442  004737  051240          17$:    JSR     PC,C.OPT        ;CALL COMMAND OPTIMIZER
7910  045446  000137  046214                  JMP     I.RTRN          ;RESTORE REGISTERS
7911
7912                                  .SBTTL  *ATTENTION ERROR HANDLER
7913
7914  045452  042765  000004  000014  I.AERR: BIC     #DRVPDT,P.PRST(R5) ;RESET POSITIONING IN PROGRESS BECAUSE
7915                                                                  ;  OF DATA TRANSFER
7916  045460  146437  001510  001506          BICB    INTMSK(R4),W.TIME ;CLEAR TIMING FOR THIS DRIVE
7917  045466  005063  001540                  CLR     W.DRV(R3)       ;RESET WATCH-DOG TIME
7918  045472  042765  177741  000016          BIC     #177741,P.CS1(R5) ;KEEP COMMAND ISSUED
7919  045500  042737  000036  001406          BIC     #36,T.CS1       ;KEEP CURRENT CONTROLLER STATUS
7920  045506  053765  001406  000016          BIS     T.CS1,P.CS1(R5) ;MAKE GOOD MESSAGE
7921  045514  013765  001410  000020          MOV     T.CS2,P.CS2(R5) ;STORE CONTROLLER REGISTERS
7922  045522  013765  001412  000022          MOV     T.WCR,P.WCR(R5)
7923  045530  013765  001414  000024          MOV     T.BA,P.BAR(R5)
7924  045536  013765  001416  000026          MOV     T.DA,P.DTS(R5)
7925  045544  013765  001420  000030          MOV     T.DC,P.DCYL(R5)
7926  045552  013765  001422  000032          MOV     T.ASOF,P.ASOF(R5)
7927  045560  013765  001424  000034          MOV     T.ER,P.ER(R5)
7928  045566  013765  001426  000036          MOV     T.DS,P.DS(R5)
7929  045574  004037  046770                  JSR     R0,I.STAT       ;GATHER DRIVE STATUS
7930  045600  046214                          I.RTRN                  ;ERROR RETURN
7931  045602  112737  000005  001406          MOVB    #DR.CLR,T.CS1   ;LOAD COMMAND
7932  045610  004037  046314                  JSR     R0,I.ISSU       ;CLEAR DRIVE ERRORS
7933  045614  046214                          I.RTRN                  ;ERROR RETURN
7934  045616  136437  001510  001423          BITB    INTMSK(R4),T.ASOF+1 ;CHECK IF ATTENTION RESET
7935  045624  001407                          BEQ     2$              ;YES, FLAG DRIVE ERROR
7936  045626  052737  000020  001460          BIS     #F.CLAT,E.CONT  ;SET ATTENTION DID NOT RESET
7937  045634  004777  133616                  JSR     PC,@A.CONT      ;REPORT ERROR
7938  045640  000137  046214                  JMP     I.RTRN          ;RESTORE REGISTERS
7939
7940  045644  032765  000020  000014  2$:     BIT     #DRVHRD,P.PRST(R5) ;CHECK IF HARD DRIVE ERROR
7941  045652  001017                          BNE     10$             ;YES, REPORT ERROR
```

B16

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7942  045654  032737  020000  001432          BIT     #S.PIP,T.MR2    ;CHECK IF DRIVE IS UNLOADING
7943  045662  001413                          BEQ     10$             ;NO, REPORT ERROR
7944  045664  052765  020000  000014          BIS     #E.UNLD,P.PRST(R5) ;SET DRIVE UNLOADING DUE TO FATAL
7945  045672  156437  001510  001506          BISB    INTMSK(R4),M.TIME ;SET TIMING ON THIS DRIVE
7946  045700  013763  001472  001540          MOV     M.BSEC,M.DRV(R3) ;LOAD # SECONDS FOR CYCLE UP
7947  045706  000137  046214                  JMP     I.RTRN          ;RESTORE REGISTERS
7948
7949  045712  004777  133536          10$:    JSR     PC,@A.ABNL      ;REPORT ERROR
7950  045716  000137  046214                  JMP     I.RTRN          ;RESTORE REGISTERS
7951
7952                                  .SBTTL   *ERROR CAUSING DRIVE TO UNLOAD
7953
7954  045722  052765  020000  000014  I.UNLD: BIS     #F.UNLD,P.PRST(R5) ;CLEAR DRIVE UNLOADING BECAUSE OF ERROR
7955  045730  112737  000005  001406          MOVB    #DR.CLR,T.CS1   ;LOAD IN DRIVE CLEAR
7956  045736  004037  046314                  JSR     R0,I.ISSU       ;GO ISSUE DRIVE CLEAR
7957  045742  046214                          I.RTRN                  ;ERROR RETURN
7958  045744  136437  001510  001423          BITB    INTMSK(R4),T.ASOF+1 ;CHECK IF ATTENTION CLEARED
7959  045752  001406                          BEQ     15$             ;YES, CONTINUE
7960  045754  012737  000020  001460          MOV     #F.CLAT,E.CONT  ;SET ATTENTION DID NOT RESET
7961  045762  004777  133470                  JSR     PC,@A.CONT      ;REPORT ERROR
7962  045766  000512                          BR      I.RTRN          ;RESTORE REGISTERS
7963
7964  045770  032737  040000  001432  15$:    BIT     #S.DSC,T.MR2    ;CHECK IF DRIVE STATUS CHANGE RESET
7965  045776  001403                          BEQ     20$             ;YES, CONTINUE
7966  046000  052765  000040  000014          BIS     #DRVDSC,P.PRST(R5) ;SET DRIVE STATUS CHANGE DID NOT CLEAR
7967  046006  146437  001510  001506  20$:    BICB    INTMSK(R4),M.TIME ;RESET TIMING ON THIS DRIVE
7968  046014  005063  001540                  CLR     M.DRV(R3)       ;CLEAR TIME COUNT
7969  046020  004777  133430                  JSR     PC,@A.ABNL      ;REPORT ERROR
7970  046024  000473                          BR      I.RTRN          ;RESTORE REGISTERS
7971
7972                                  .SBTTL   *DUAL ACCESS INTERRUPT HANDLER
7973
7974  046026  112737  000001  001406  I.DUAL: MOVB    #DR.SEL,T.CS1   ;LOAD COMMAND
7975  046034  004037  046314                  JSR     R0,I.ISSU       ;SELECT DRIVE
7976  046040  046214                          I.RTRN                  ;ERROR RETURN
7977  046042  032737  000200  001434          BIT     #S.FLT,T.MR3    ;CHECK IF DRIVE FAULT
7978  046050  001402                          BEQ     10$             ;NO, PROCESS INTERRUPT
7979  046052  000137  045457                  JMP     I.AERR          ;PROCESS ATTENTION ERROR
7980
7981  046056  032737  040000  001432  10$:    BIT     #S.DSC,T.MR2    ;CHECK IF DRIVE STATUS CHANGE SET
7982  046064  001005                          BNE     11$             ;YES, PROCESS INTERRUPT
7983  046066  052765  004000  000014          BIS     #NODSC,P.PRST(R5) ;SET NO DRIVE STATUS CHANGE
7984  046074  000137  045452                  JMP     I.AERR          ;PROCESS ATTENTION ERROR
7985
7986  046100  042765  010000  000014  11$:    BIC     #DRVSZD,P.PRST(R5) ;RESET DRIVE SEIZED
7987  046106  112737  000005  001406          MOVB    #DR.CLR,T.CS1   ;LOAD COMMAND
7988  046114  004037  046314                  JSR     R0,I.ISSU       ;CLEAR DRIVE DSC
7989  046120  046214                          I.RTRN                  ;ERROR RETURN
7990  046122  136437  001510  001423          BITB    INTMSK(R4),T.ASOF+1 ;CHECK IF ATTENTION RESET
7991  046130  001406                          BEQ     15$             ;YES, CONTINUE
7992  046132  052737  000020  001460          BIS     #F.CLAT,E.CONT  ;SET ATTENTION DID NOT RESET
7993  046140  004777  133312                  JSR     PC,@A.CONT      ;INDICATE CONTROLLER ERROR
7994  046144  000423                          BR      I.RTRN          ;RESTORE REGISTERS
7995
7996  046146  032737  040000  001432  15$:    BIT     #S.DSC,T.MR2    ;CHECK IF DRIVE STATUS CHANGE IS STILL SET
7997  046154  001405                          BEQ     20$             ;NO, GO ENQUEUE COMMAND
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7998  046156  052765  000040  000014          BIS     #DRVDSC,P.PRST(R5) ;SET DRIVE STATUS CHANGE DID NOT CLEAR
7999  046164  000137  045452                  JMP     I.AERR             ;REPORT ATTENTION ERROR
8000
8001  046170  146437  001510  001506  20$:    BICB    #MTPSR(R4),W.TIME ;STOP TIMING ON THIS DRIVE
8002  046176  005063  001540                  CLR     W.DRV(R3)          ;CLEAR WATCH DOG TIME OF THIS DRIVE
8003  046202  004037  050706                  JSR     R0,Q.PUSH          ;PUT PARAMETER BLOCK ADDRESS ON
8004  046206  001324                          CINITQ                     ;  COMMAND INITIATION QUEUE
8005  046210  004737  051240                  JSR     PC,C.OPT           ;CALL COMMAND OPTIMIZER
8006
8007  046214  012600                  I.RTRN: MOV     (SP)+,R0           ;RESTORE R0
8008  046216  012601                          MOV     (SP)+,R1           ;RESTORE R1
8009  046220  012602                          MOV     (SP)+,R2           ;RESTORE R2
8010  046222  012603                          MOV     (SP)+,R3           ;RESTORE R3
8011  046224  012604                          MOV     (SP)+,R4           ;RESTORE R4
8012  046226  012605                          MOV     (SP)+,R5           ;RESTORE R5
8013  046230  000007                          RTI                        ;RETURN
8014
```

```
                                .SBTTL   *CONTROLLER CLEAR ROUTINE

                                ;;*****************************************************************
                                ;*
                                ;*      THIS ROUTINE WILL BE USED BY THE DRIVER TO CLEAR THE CONTROLLER
                                ;*      AND CHECK IF THE CONTROLLER ERRORS ARE RESET.  IF THE ERROR IS NOT
                                ;*      CLEARED, THE ROUTINE AS SPECIFIED IN A.CONT WILL BE CALLED WITH
                                ;*      E.CCLR SET IN E.CONT.
                                ;*
                                ;*      REGISTER        USE
                                ;*      --------        ---
                                ;*
                                ;*      R2              ADDRESS OF RK06 REGISTERS
                                ;*      R5              ADDRESS OF PARAMETER BLOCK
                                ;*
                                ;*CALL  JSR     R0,I.CCLR
                                ;*      <ADDRESS OF ERROR RETURN>
                                ;*      RETURN
                                ;*
                                ;;*****************************************************************

046232  012762  100000  000000  I.CCLR: MOV     #CCLR,RKCS1(R2) ;CLEAR CONTROLLER
046240  016237  000000  001406          MOV     RKCS1(R2),T.CS1 ;STORE COMMAND AND STATUS REGISTER 1
046246  032737  100000  001406          BIT     #CERR,T.CS1     ;CHECK IF CONTROLLER CLEAR DID
                                                                ;  CLEAR ERROR
046254  001407                          BEQ     5$              ;YES, RETURN TO DRIVER PROCESSING
046256  052737  000001  001460          BIS     #F.CCLR,E.CONT  ;SET CLEAR CONTROLLER DID NOT CLEAR ERROR
046264  004777  133166                  JSR     PC,@A.CONT      ;REPORT CONTROLLER ERROR
046270  011000                          MOV     (R0),R0         ;SET UP ERROR RETURN
046272  000200                          RTS     R0              ;RETURN

046274  012762  000100  000000  5$:     MOV     #IE,RKCS1(R2)   ;SET INTERRUPT ENABLE
046302  112737  177777  001502          MOVB    #-1,I.ISRL      ;SET INTERRUPT ENABLE ISSUED
046310  005720                          TST     (PC)+           ;ADJUST FOR NORMAL RETURN
046312  000200                          RTS     R0              ;RETURN
```

```
                        .SBTTL   *COMMAND ISSUED BY DRIVER SERVICE ROUTINE
                        ;;*****************************************************************
                        ;*
                        ;*      THIS ROUTINE WILL ISSUE THE COMMAND AS SPECIFIED IN T.CS1
                        ;*      AND CHECK IF A CONTROLLER ERROR OCCURRED.  IF A CONTROLLER
                        ;*      ERROR OCCURRED, E.CERR WILL BE SET IN E.CONT AND
                        ;*      CONTROL WILL BE TURN OVER TO THE ROUTINE SPECIFIED BY THE
                        ;*      ADDRESS IN A.CONT.
                        ;*
                        ;*      REGISTER        USE
                        ;*      --------        ---
                        ;*
                        ;*      R2              ADDDRESS OF RK06 REGISTERS
                        ;*      R5              ADDRESS OF PARAMETER BLOCK
                        ;*
                        ;*CALL  JSR     R0,T.ISSU
                        ;*      <ADDRESS OF ERROR RETURN>
                        ;*      RETURN
                        ;*
                        ;*      ROUTINES USED:
                        ;*      --------------
                        ;*
                        ;*              I.CCLR
                        ;*              I.STOP
                        ;*
                        ;;*****************************************************************

046714  013746  001406          I.ISSU: MOV     T.CS1,-(SP)     ;STORE COMMAND ISSUED
046320  005037  001410                  CLR     T.CS2           ;CLEAR TEMPORARY CS2
046324  116537  000000  001410          MOVB    P.DRVN(R5),T.CS2 ;LOAD IN DRIVE NUMBER
046332  013762  001410  000010          MOV     T.CS2,RKCS2(R2) ;LOAD DRIVE NUMBER FOR COMMAND
046340  116537  000007  001407          MOVB    P.CS1H(R5),T.CS1+1 ;STORE BITS 8-15 OF CS1
046346  142737  177753  001407          BICB    #^C<B.CDT!B.CFMT>,T.CS1+1 ;CLEAR ALL BITS EXCEPT
                                                ;  FORMAT AND DRIVE TYPE
046354  013762  001406  000000          MOV     T.CS1,RKCS1(R2) ;ISSUE COMMAND
046362  105762  000000          1$:     TSTB    RKCS1(R2)       ;WAIT FOR READY
046366  100375                          BPL     1$
046370  004737  046536                  JSR     PC,T.STOR       ;GO STORE REGISTERS
046374  032737  100000  001406          BIT     #CERR,T.CS1     ;CHECK IF CONTROLLER ERROR OCCURRED
046402  001437                          BEQ     5$              ;NO, RETURN
046404  032737  001000  001410          BIT     #MDS,T.CS2      ;CHECK IF MULTIPLE DRIVE SELECT
046412  001406                          BEQ     2$              ;NO, CHECK FOR OTHER CONTROLLER ERRORS
046414  052737  100000  001460          BIS     #F.MDS,F.CONT   ;SET MULTIPLE DRIVE SELECT FLAG
046422  004777  133030                  JSR     PC,@A.CONT      ;REPORT CONTROLLER ERROR
046426  000440                          BR      10$             ;RETURN

                                        ;CHECK IF ANY CONTROLLER ERROR IS SET
046430  032737  024000  001406  2$:     BIT     #CTO!SPAR,T.CS1
046436  001027                          BNE     7$
046440  032737  176400  001410          BIT     #UFF!PGE!NEM!NED!UPE!WCE!DLT,T.CS2
046446  001023                          BNE     7$
046450  032737  131761  001424          BIT     #ILC!DTYE!FMTE!ECH!IAE!IVRC!CDE!DTE!OPI!DCK,T.ER
046456  001017                          BNE     7$

046460  122716  000005                  CMPB    #DR.CLR,(SP)    ;CHECK IF CLEAR DRIVE
```

F16

```
 8106  046464  001003                        BNE     3$              ;NO, DO NOT SET DRIVE HARD ERROR
 8107  046466  052765  000020  000014        BIS     #DRVHRD,P.PRST(R5) ;SET HARD DRIVE ERROR
 8108  046474  004037  046232          3$:   JSR     R0,I.CCLR       ;GO ISSUE A CONTROLLER CLEAR
 8109  046500  046530                        10$                     ;ERROR RETURN
 8110  046502  012762  000100  000000  5$:   MOV     #IE,RKCS1(R2)   ;SET INTERRUPT ENABLE
 8111  046510  005726                        TST     (SP)+           ;ADJUST STACK
 8112  046512  005720                        TST     (R0)+           ;ADJUST R0 FOR NORMAL RETURN
 8113  046514  000200                        RTS     R0              ;RETURN
 8114
 8115  046516  052737  001000  001460  7$:   BIS     #E.CERR,E.CONT  ;SET CONTROLLER ERROR DURING
 8116                                                                ;  DRIVER SERVICING
 8117  046524  004777  132726                JSR     PC,@A.CONT      ;REPORT ERROR
 8118  046530  005726                  10$:  TST     (SP)+           ;ADJUST STACK
 8119  046532  011000                        MOV     (R0),R0         ;ADJUST R0 FOR ERROR RETURN
 8120  046534  000200                        RTS     R0              ;RETURN
```

```
                                .SBTTL   *STORE RK611 UNIBUS REGISTERS

                                ;;*****************************************************************
                                ;*
                                ;*      THIS SUBROUTINE IS CALLED BY THE RK06 DRIVER TO STORE ALL
                                ;*      RK611 REGISTER IN TEMPORARY LOCATIONS.
                                ;*
                                ;*CALL  JSR     PC,I.STOR
                                ;*      RETURN
                                ;*
                                ;*      REGISTER        USE
                                ;*      --------        ---
                                ;*
                                ;*      R2              ADDRESS OF RK611 REGISTERS
                                ;*
                                ;;*****************************************************************

 046536  016737  000000  001406  I.STOR: MOV     RKCS1(R2),T.CS1 ;STORE ALL CONTROLLER REGISTERS
 046544  016237  000010  001410          MOV     RKCS2(R2),T.CS2 ;  EXCEPT DATA BUFFER
 046552  016237  000002  001412          MOV     RKWC(R2),T.WCR
 046560  016237  000004  001414          MOV     RKBA(R2),T.BA
 046566  016237  000006  001416          MOV     RKDA(R2),T.DA
 046574  016237  000012  001426          MOV     RKDS(R2),T.DS
 046602  016237  000014  001424          MOV     RKER(R2),T.ER
 046610  016237  000016  001422          MOV     RKASOF(R2),T.ASOF
 046616  016237  000020  001420          MOV     RKDCYL(R2),T.DC
 046624  016237  000026  001430          MOV     RKMR1(R2),T.MR1
 046632  016237  000034  001432          MOV     RKMR2(R2),T.MR2
 046640  016237  000036  001434          MOV     RKMR3(R2),T.MR3
 046646  016237  000030  001436          MOV     RKECPS(R2),T.POS
 046654  016237  000032  001440          MOV     RKECPT(R2),T.PAT
 046662  000207                          RTS     PC                      ;RETURN
```

```
                        .SBTTL  *STORE CONTROLLER STATUS

                        ;;*****************************************************************
                        ;*
                        ;*      THIS SUBROUTINE IS CALLED BY THE RK06 DRIVER AT PRIORITY 7.
                        ;*      THE FOLLOWING REGISTERS WILL BE STORED:
                        ;*
                        ;*              COMMAND AND STATUS REGISTER 2
                        ;*              WORD COUNT REGISTER
                        ;*              BUS ADDRESS REGISTER
                        ;*              DESIRED TRACK AND SECTOR
                        ;*              STATUS REGISTER
                        ;*              ERROR REGISTER
                        ;*              ATTENTION SUMMARY/OFFSET REGISTER
                        ;*              CYLINDER ADDRESS REGISTER
                        ;*
                        ;*CALL  JSR     PC,I.CSTS
                        ;*      RETURN
                        ;*
                        ;*      THIS ROUTINE ASSUMES THE FOLLOWING REGISTERS CONTAIN:
                        ;*
                        ;*
                        ;*              REGISTER                CONTENTS
                        ;*              --------                --------
                        ;*
                        ;*              R2                      RK06 BASE ADDRESS
                        ;*              R5                      ADDRESS OF PARAMETER BLOCK
                        ;*
                        ;;*****************************************************************

046664  042765  177741  000016  I.CSTS: BIC     #177741,P.CS1(R5)       ;CLEAR ALL BITS EXCEPT FUNCTION
                                                                        ;OF LAST COMMAND ISSUED
046672  042737  000036  001406          BIC     #36,T.CS1               ;CLEAR FUNCTION OF CS1 STATUS
046700  053765  001406  000016          BIS     T.CS1,P.CS1(R5)         ;GENERATE CS1 STATUS INFORMATION
046706  016265  000010  000020  I.CST1: MOV     RKCS2(R2),P.CS2(R5)     ;STORE COMMAND AND STATUS REGISTER 2
046714  016265  000002  000022          MOV     RKWC(R2),P.WCR(R5)      ;STORE WORD COUNT REGISTER
046722  016265  000004  000024          MOV     RKBA(R2),P.BAR(R5)      ;STORE BUS ADDRESS REGISTER
046730  016265  000006  000026          MOV     RKDA(R2),P.DTS(R5)      ;STORE DESIRED TRACK AND SECTOR
046736  016265  000012  000036          MOV     RKDS(R2),P.DS(R5)       ;STORE DRIVE STATUS REGISTER
046744  016265  000014  000034          MOV     RKER(R2),P.ER(R5)       ;STORE ERROR REGISTER
046752  016265  000016  000032          MOV     RKASOF(R2),P.ASOF(R5)   ;STORE ATTENTION SUMMARY AND
                                                                        ;  OFFSET
046760  016265  000020  000030          MOV     RKDCYL(R2),P.DCYL(R5)   ;STORE CYLINDER ADDRESS
046766  000207                          RTS     PC                      ;RETURN
```

```
8199                            .SBTTL   *GATHER DRIVE STATUS
8199
8200                            ;;*****************************************************************
8201                            ;*
8202                            ;*      THIS SUBROUTINE WILL BE USED TO GATHER DRIVE STATUS
8203                            ;*      BYTE 01, 10, AND 11. IT IS ASSUMED THAT THE DRIVE
8204                            ;*      HAS PREVIOUSLY BEEN SEIZED.  IT RUNS AT PRIORITY 7.
8205                            ;*
8206                            ;*CALL  JSR     R0,I.STAT
8207                            ;*      <ADDRESS OF ERROR RETURN>
8208                            ;*      RETURN
8209                            ;*
8210                            ;*      THIS ROUTINE ASSUMES THE FOLLOWING REGISTERS CONTAIN:
8211                            ;*
8212                            ;*
8213                            ;*              REGISTER                CONTENTS
8214                            ;*              --------                --------
8215                            ;*
8216                            ;*              R2                      RK06 BASE ADDRESS
8217                            ;*              R5                      ADDRESS OF PARAMETER BLOCK
8218                            ;*
8219                            ;*      ROUTINES USED:
8220                            ;*              I.ISSU
8221                            ;*
8222                            ;;*****************************************************************
8223
8224  046770  012762  000001  000026  I.STAT: MOV     #1,RKMR1(R2)            ;LOAD MAINTENANCE REGISTER 1
8225                                                                          ;  FOR STATUS BYTE 01
8226  046776  112737  000001  001406          MOVB    #DR.SEL,T.CS1           ;LOAD COMMAND
8227  047004  004037  046314                  JSR     R0,I.ISSU               ;GET STATUS BYTES 01
8228  047010  047200                          3$                              ;ERROR RETURN
8229  047012  013765  001432  000044          MOV     T.MR2,P.A01(R5)         ;STORE STATUS BYTE 01 MESS A
8230  047020  013765  001434  000046          MOV     T.MR3,P.B01(R5)         ;STORE STATUS BYTE 01 MESS B
8231  047026  012762  000002  000026          MOV     #2,RKMR1(R2)            ;LOAD MAINTENANCE REGISTER 1
8232                                                                          ;  FOR STATUS BYTE 10
8233  047034  112737  000001  001406          MOVB    #DR.SEL,T.CS1           ;LOAD COMMAND
8234  047042  004037  046314                  JSR     R0,I.ISSU               ;GET STATUS BYTES 10
8235  047046  047200                          3$                              ;ERROR RETURN
8236  047050  013765  001432  000050          MOV     T.MR2,P.A10(R5)         ;STORE STATUS BYTE 10 MESS A
8237  047056  013765  001434  000052          MOV     T.MR3,P.B10(R5)         ;STORE STATUS BYTE 10 MESS B
8238  047064  012762  000003  000026          MOV     #3,RKMR1(R2)            ;LOAD MAINTENANCE REGISTER
8239                                                                          ;  FOR STATUS BYTE 11
8240  047072  112737  000001  001406          MOVB    #DR.SEL,T.CS1           ;LOAD COMMAND
8241  047100  004037  046314                  JSR     R0,I.ISSU               ;GET STATUS BYTES 11
8242  047104  047200                          3$                              ;ERROR RETURN
8243  047106  013765  001432  000054          MOV     T.MR2,P.A11(R5)         ;STORE STATUS BYTE 11 MESS A
8244  047114  013765  001434  000056          MOV     T.MR3,P.B11(R5)         ;STORE STATUS BYTE 11 MESS B
8245  047122  005062  000026                  CLR     RKMR1(R2)               ;LOAD MAINTENANCE REGISTER 1
8246                                                                          ;  FOR STATUS BYTE 00
8247  047126  112737  000001  001406          MOVB    #DR.SEL,T.CS1           ;LOAD COMMAND
8248  047134  004037  046314                  JSR     R0,I.ISSU               ;GET STATUS BYTES 00
8249  047140  047200                          3$                              ;ERROR RETURN
8250  047142  013765  001432  000040          MOV     T.MR2,P.A00(R5)         ;STORE STATUS BYTE 00 MESS A
8251  047150  013765  001434  000042          MOV     T.MR3,P.B00(R5)         ;STORE STATUS BYTE 00 MESS B
8252  047156  032737  001000  001434          BIT     #S.PAR,T.MR3            ;CHECK IF BAD PARITY DETECTED BY DRIVE
8253  047164  001407                          BEQ     5$                      ;NO, RETURN NORMALLY
```

```
 8254  047166  052737  002000  001460          BIS     #E.DPAR,E.CONT          ;INDICATE BAD PARITY DETECTED BY DRIVE
 8255  047174  004777  132256                  JSR     PC,@A.CONT              ;REPORT ERROR
 8256  047200  011000                  3$:     MOV     (R0),R0                 ;LOAD R0 FOR ERROR RETURN
 8257  047202  000200                          RTS     R0                      ;RETURN
 8258
 8259  047204  052765  001000  000014  5$:     BIS     #PBSVAL,P.PRST(R5)      ;SET PARAMETER BLOCK STATUS VALID
 8260  047212  005720                          TST     (R0)+                   ;ADJUST R0 FOR NORMAL RETURN
 8261  047214  000200                          RTS     R0                      ;RETURN
 8262
```

```
                        .SBTTL   *COMMAND INITATOR
                        ;;*****************************************************************
                        ;*
                        ;*      THIS SUBROUTINE WILL INITIATE ALL COMMANDS AS SPECIFIED
                        ;*      BY THE COMMAND FIELD OF THE PARAMETER BLOCK. THE FOLLOWING
                        ;*      SPECIAL COMMAND ARE ALSO EXECUTED:
                        ;*
                        ;*              RELEASE
                        ;*              CONROLLER CLEAR
                        ;*              SUBSYSTEM CLEAR
                        ;*              READ ALL DRIVE STATUS
                        ;*              READ SPECIFIED HEADER
                        ;*
                        ;*      THE ABOVE COMMANDS ARE TRANSLATED INTO A SEQUENCE OF COMMANDS
                        ;*
                        ;*CALL  JSR     PC,C.INIT
                        ;*      <ADDRESS OF PARAMETER BLOCK>
                        ;*      RETURN
                        ;*
                        ;*      FOR THE SEQUENTIAL OPERATIONS, THE DRIVES WILL LOAD THE
                        ;*      LOCATIONS, PBLKT AND INTMSK.
                        ;*
                        ;*      ROUTINES USED:
                        ;*              M.MTCH
                        ;*              I.CSTS
                        ;*              I.STAT
                        ;*              I.CCLR
                        ;*
                        ;;*****************************************************************

047216  010546          C.INIT: MOV     R5,-(SP)        ;STORE R5 ON STACK
047220  010446                  MOV     R4,-(SP)        ;STORE R4 ON STACK
047222  010346                  MOV     R3,-(SP)        ;STORE R3 ON STACK
047224  010246                  MOV     R2,-(SP)        ;STORE R2 ON STACK
047226  010146                  MOV     R1,-(SP)        ;STORE R1 ON STACK
047230  010046                  MOV     R0,-(SP)        ;STORE R0 ON STACK
047232  013746  177776          MOV     PS,-(SP)        ;STORE PSW ON STACK
047236  013737  001450  177776  MOV     RKPRI,PS        ;LOCK OUT RK06 INTERRUPTS
047244  017605  000016          MOV     @16(SP),R5      ;STORE PARAMETER BLOCK ADDRESS
047250  062766  000002  000016  ADD     #2,16(SP)       ;ADJUST RETURN
047256  016504  000000          MOV     P.DRVN(R5),R4   ;STORE DRIVE NUMBER
047262  042704  177770          BIC     #^C<DRVMSK>,R4  ;MASK OUT JUNK
047266  156437  001510  001506  BISB    INTMSK(R4),M.TIME ;SET WATCH DOG TIME
047274  010403                  MOV     R4,R3           ;STORE DRIVE NUMBER
047276  006303                  ASL     R3              ;MULTIPLY DRIVE NUMBER BY 2
047300  013763  001470  001540  MOV     M.SEC,M.DRV(R3) ;LOAD WATCH-DOG TIME

047306  013702  001444          MOV     RKBAS,R2        ;LOAD R2 WITH RK06 ADDRESS BASE

                        ;       RESET ALL BITS IN PROGRAM DEVICE STATUS REGISTER EXCEPT
                        ;               DRIVE IN USE
                        ;               WRITE FOR WRITE CHECK
                        ;               NO CHECK
                        ;               DROP DRIVE FROM TEST SEQUENCE
                        ;               INHIBIT BUS ADDRESS INCREMENT
```

```
8319  047312  042765  075176  000014          BIC     #^C<DRVUSE!W.WCK!NOCHK!DRPDRV!DTBAII>,P.PRST(P5)
8320
8321  047320  010500                          MOV     R5,R0           ;STORE PARAMETER BLOCK ADDRESS
8322  047322  062700  000016                  ADD     #P.CS1,R0       ;CALCULATE FIRST LOCATION TO BE CLEARED
8323  047326  010501                          MOV     R5,R1           ;STORE PARAMETER BLOCK ADDRESS
8324  047330  062701  000062                  ADD     #P.EPAT,R1      ;CALCULATE LAST LOCATION TO BE CLEARED
8325
8326  047334  005020                  1$:     CLR     (R0)+           ;CLEAR RETURN PARAMETER
8327  047336  020001                          CMP     R0,R1           ;CHECK IF FINISHED
8328  047340  101775                          BLOS    1$              ;NO, CLEAR NEXT RETURN PARAMETER
8329  047342  105037  001502                  CLRB    I.ISRL          ;CLEAR RELEASE OR INTERRUPT ISSUED
8330  047346  010465  000020                  MOV     R4,P.CS2(P5)    ;STORE DRIVE NUMBER
8331  047352  005062  000026                  CLR     RKMR1(R2)       ;CLEAR RK06 MAINTENANCE REGISTER 1
8332  047356  132765  000040  000001          BITB    #BIT5,P.CMND(R5) ;CHECK IF SPECIAL COMMAND
8333  047364  001402                          BEQ     3$              ;NO, PROCESS
8334  047366  000137  047746                  JMP     C.SPEC          ;JUMP TO SPECIAL COMMAND PROCESSOR
8335
8336  047372  122765  000107  000001  3$:     CMPB    #UNLOAD,P.CMND(R5) ;CHECK IF POSITIONING COMMAND
8337                                                                  ;  START SPINDLE
8338                                                                  ;  RECALIBRATE
8339                                                                  ;  OFFSET
8340                                                                  ;  SEEK
8341                                                                  ;  UNLOAD
8342
8343  047400  101125                          BHI     25$             ;NO, DRIVE COMMAND
8344                                                                  ;  SELECT DRIVE
8345                                                                  ;  PACK ACKNOWLEDGE
8346                                                                  ;  CLEAR
8347
8348  047402  122765  000117  000001          CMPB    #SEEK,P.CMND(R5) ;CHECK IF DATA TRANSFER
8349  047410  103471                          BLO     20$             ;YES, DATA TRANSFER COMMAND
8350                                                                  ;  READ DATA
8351                                                                  ;  WRITE DATA
8352                                                                  ;  READ HEADER
8353                                                                  ;  WRITE HEADER
8354                                                                  ;  WRITE CHECK
8355  047412  016562  000020  000010          MOV     P.CS2(R5),RKCS2(R2) ;LOAD DRIVE NUMBER
8356  047420  052765  000002  000014          BIS     #DRVPOS,P.PRST(R5) ;SET DRIVE POSITIONING
8357  047426  005037  001462                  CLR     @.WAIT          ;CLEAR WAIT FOR COMMAND
8358  047432  122765  000117  000001          CMPB    #SEEK,P.CMND(R5) ;CHECK IF SEEK
8359  047440  001007                          BNE     5$              ;NO, CHECK FOR OFFSET
8360  047442  016562  000002  000020          MOV     P.CYLN(R5),RKDCYL(R2) ;LOAD CYLINDER ADDRESS
8361  047450  016562  000004  000006          MOV     P.SECT(R5),RKDA(R2) ;LOAD SECTOR AND TRACK
8362  047456  000431                          BR      8$              ;GO ISSUE COMMAND
8363
8364  047460  122765  000115  000001  5$:     CMPB    #OFFSET,P.CMND(R5) ;CHECK IF OFFSET
8365  047466  001007                          BNE     6$              ;NO, CHECK FOR UNLOAD
8366  047470  116565  000006  000032          MOVB    P.OFST(R5),P.ASOF(R5) ;STORE OFFSET
8367  047476  016562  000032  000016          MOV     P.ASOF(R5),RKASOF(R2) ;LOAD OFFSET REGISTER
8368  047504  000416                          BR      8$              ;GO ISSUE COMMAND
8369
8370  047506  122765  000111  000001  6$:     CMPB    #SRTSPL,P.CMND(R5) ;CHECK IF START SPINDLE
8371  047514  001003                          BNE     7$              ;NO, CHECK IF RECAL
8372  047516  013763  001474  001540          MOV     @.MIN,@.DRV(R3) ;LOAD WATCH DOG TIME FOR 1 MINUTE
8373  047524  122765  000113  000001  7$:     CMPB    #RECAL,P.CMND(R5) ;CHECK IF RECAL
8374  047532  001003                          BNE     8$              ;NO, CONTINUE
```

M16

```
8375  047534  013763  001472  001540          MOV     W.8SEC,W.DRV(R3) ;LOAD RECAL TIME TO 8 SECONDS
8376  047542  116565  000007  000017  8$:     MOVP    P.CS1H(R5),P.CS1+1(R5) ;STORE BITS 8-15 OF CS1
8377  047550  042765  165777  000016          BIC     #^C<CFMT!CDT>,P.CS1(R5) ;CLEAR ALL BITS EXCEPT FORMAT
8378                                                  ;  AND DRIVE TYPE
8379  047556  116565  000001  000016          MOVP    P.CMND(R5),P.CS1(R5) ;MOVE COMMAND INTO CS1
8380  047564  042765  006200  000014          BIC     #W.WCF,P.PRST(R5) ;RESET WRITE FOR WRITE CHECK
8381  047572  000460                          BR      30$             ;GO, ISSUE COMMAND
8382
8383  047574  016562  000010  000004  20$:    MOV     P.BALO(R5),PKBA(R2) ;LOAD BUS ADDRESS REGISTER
8384  047602  016562  000012  000002          MOV     P.WC(R5),PKWC(R2) ;LOAD WORD COUNT REGISTER
8385  047610  016562  000002  000020          MOV     P.CYLN(R5),PKDCYL(R2) ;LOAD CYLINDER ADDRESS REGISTER
8386  047616  016562  000004  000006          MOV     P.SECT(R5),PKDA(R2) ;LOAD SECTOR AND TRACK NUMBER
8387  047624  122765  000131  000001          CMPB    #WRTCHK,P.CMND(R5)  ;CHECK IF WRITE CHECK COMMAND
8388  047632  001010                          BNE     25$             ;NO, GO ISSUE THE COMMAND
8389  047634  032765  000200  000014          BIT     #W.WCF,P.PRST(R5)  ;CHECK IF WRITE COMMAND SHOULD BE ISSUED
8390  047642  001404                          BEQ     25$             ;NO, GO ISSUE THE COMMAND
8391  047644  012765  000123  000016          MOV     #WRDATA,P.CS1(R5)  ;ISSUE WRITE COMMAND
8392  047652  000406                          BR      26$             ;GO ISSUE COMMAND
8393
8394  047654  116565  000001  000016  25$:    MOVP    P.CMND(R5),P.CS1(R5) ;MOVE COMMAND INTO CS1
8395  047662  042765  000200  000014          BIC     #W.WCF,P.PRST(R5) ;RESET WRITE FOR WRITE CHECK
8396  047670  116565  000007  000017  26$:    MOVB    P.CS1H(R5),P.CS1+1(R5) ;STORE BITS 8-15 OF CS1
8397  047676  142765  177750  000017          BICB    #^C<B.CFMTIP.CDTIP.BA16!B.BA17>,P.CS1+1(R5) ;CLEAR ALL BITS EXCEPT
8398                                                  ;  FORMAT, DRIVE TYPE, AND BUS ADDRESS
8399                                                  ;  BITS 16-17
8400  047704  010537  001462 -                MOV     R5,@.WAIT       ;LOAD WAITING FOR COMMAND
8401  047710  032765  100000  000014          BIT     #DTRAII,P.PRST(R5) ;CHECK IF INHIBIT BUS ADDRESS INCREMENT
8402  047716  001403                          BEQ     27$             ;NO, LOAD CS2
8403  047720  052765  000020  000020          BIS     #BAI,P.CS2(R5)  ;SET INHIBIT BUS ADDRESS INCREMENT
8404  047726  016562  000020  000010  27$:    MOV     P.CS2(R5),RKCS2(R2) ;LOAD CS2
8405  047734  016562  000016  000000  30$:    MOV     P.CS1(R5),RKCS1(R2) ;ISSUE COMMAND
8406  047742  000137  050664                  JMP     C.RTRN          ;RESTORE REGISTERS
8407
8408                                  .SBTTL  *SPECIAL COMMAND PROCESSING
8409
8410  047746  122765  000141  000001  C.SPEC: CMPB    #RDSTAT,P.CMND(R5) ;CHECK IF READ DRIVE STATUS
8411  047754  001132                          BNE     10$             ;NO, PROCESS OTHER COMMANDS
8412  047756  016562  000020  000010          MOV     P.CS2(R5),RKCS2(R2) ;LOAD CS2 FOR COMMAND
8413  047764  116565  000007  000017          MOVB    P.CS1H(R5),P.CS1+1(R5) ;STORE BITS 8-15 OF CS1
8414  047772  042765  165777  000016          BIC     #^C<CFMT!CDT>,P.CS1(R5) ;CLEAR ALL BITS EXCEPT FORMAT
8415                                                  ;  AND DRIVE TYPE
8416  050000  112765  000001  000016          MOVB    #DR.SFL,P.CS1(R5) ;STORE COMMAND
8417  050006  016562  000016  000000          MOV     P.CS1(R5),RKCS1(R2) ;ISSUE COMMAND
8418  050014  004737  043314                  JSR     PC,W.WTCH       ;CALL WATCH-DOG TIMER
8419  050020  016265  000000  000016          MOV     RKCS1(R2),P.CS1(R5) ;STORE COMMAND AND STATUS REG. 1
8420  050026  032765  000200  000016          BIT     #RDY,P.CS1(R5)  ;WAIT FOR READY
8421  050034  001767                          BEQ     2$
8422  050036  004737  046706                  JSR     PC,I.CST1       ;STORE CONTROLLER REGISTERS
8423  050042  016265  000034  000040          MOV     RKMP2(R2),P.A00(R5) ;STORE STATUS BYTE 00 MESSAGE A
8424  050050  016265  000036  000042          MOV     RKMP3(R2),P.B00(R5) ;STORE STATUS BYTE 00 MESSAGE B
8425  050056  032765  100000  000016          BIT     #CERR,P.CS1(R5) ;CHECK IF CONTROLLER ERROR
8426  050064  001443                          BEQ     6$              ;NO, GATHER DRIVE STATUS
8427  050066  146437  001510  001506          BICB    INTVSR(R4),W.TIME ;RESET WATCH DOG TIMING ON THIS DRIVE
8428  050074  005063  001540                  CLR     W.DRV(R3)       ;CLEAR WATCH DOG COUNT
8429  050100  032765  001000  000020          BIT     #MDS,P.CS2(R5)  ;CHECK IF MULTIPLE DRIVE SELECT
8430  050106  001046                          BNE     9$              ;YES, INDICATE CONTROLLER ERROR
```

A1

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8431  050110  004037  046732              JSR     R0,I.CCLR       ;CLEAR ERROR
8432  050114  050664                      C.RTRN                  ;ERROR RETURN
8433  050116  032765  010400  000020      BIT     #NEDIOF,P.CS2(R5) ;CHECK IF NON-EXISTENT DRIVE OR UNIT FIELD ERROR
8434  050124  001017                      BNE     5$              ;REPORT ERROR
8435  050126  032765  000001  000036      BIT     #DRA,P.DS(R5)   ;CHECK IF DRIVE AVAILIABLE
8436  050134  001013                      BNE     5$              ;YES, REPORT ERROR
8437  050136  156437  001510  001506      BISB    INTMSK(R4),W.TIME ;SET TIMING FOR THIS DRIVE
8438  050144  013763  001474  001540      MOV     W.MIN,W.DRV(R3) ;WAIT 1 MINUTE FOR RELEASE
8439  050152  052765  010000  000014      BIS     #DRVSZD,P.PRST(R5) ;SET DRIVE SEIZED
8440  050160  000137  050664              JMP     C.RTRN          ;RESTORE REGISTERS
8441
8442  050164  004777  131264      5$:     JSR     PC,RA.ABNL      ;REPORT ERROR
8443  050170  000137  050664              JMP     C.RTRN          ;RESTORE REGISTERS
8444
8445  050174  004037  046770      6$:     JSR     R0,I.STAT       ;GATHER DRIVE STATUS
8446  050200  050664                      C.RTRN                  ;ERROR RETURN
8447  050202  146437  001510  001506      BICB    INTMSK(R4),W.TIME ;STOP WATCH-DOG TIMING ON DRIVE
8448  050210  005063  001540              CLR     W.DRV(R3)       ;RESET WATCH-DOG TIME
8449  050214  004777  131232              JSR     PC,RA.NORM      ;REPORT COMMAND COMPLETE
8450  050220  000137  050664              JMP     C.RTRN          ;RESTORE REGISTERS
8451
8452  050224  052737  100000  001[illegible]  9$:     BIS     #E.MDS,F.CONT   ;SET MULTIPLE DRIVE SELECT
8453  050232  004777  131220              JSR     PC,RA.CONT      ;INDICATE CONTROLLER ERROR
8454  050236  000137  050664              JMP     C.RTRN
8455
8456  050242  122765  000140  000001  10$:    CMPB    #RELEAS,P.CMND(R5) ;CHECK IF RELEASE COMMAND
8457  050250  001031                      BNE     13$             ;NO, CHECK IF READ ALL HEADERS
8458  050252  010537  001462              MOV     R5,O.WAIT       ;STORE PARAMETER BLOCK ADDRESS IN
8459                                                              ;  WAIT FOR COMMAND
8460  050256  052765  000010  000020      BIS     #RLS,P.CS2(R5)  ;SET RELEASE BIT
8461  050264  016562  000020  000010      MOV     P.CS2(R5),RKCS2(R2) ;LOAD CS2 FOR DESELECT
8462  050272  112737  000001  001507      MOVB    #1,I.ISPL       ;SET FLAG FOR RELEASE COMMAND
8463  050300  116565  000007  000017      MOVB    P.CS1H(R5),P.CS1+1(R5);STORE BITS 8-15 OF CS1
8464  050306  042765  165777  000016      BIC     #^C<CPMTICDT>,P.CS1(R5) ;CLEAR ALL BITS EXCEPT FORMAT
8465                                                              ;  AND DRIVE TYPE
8466  050314  112765  000101  000016      MOVB    #SELDRV,P.CS1(R5) ;STORE COMMAND
8467  050322  016562  000016  000000  11$:     MOV     P.CS1(R5),RKCS1(R2) ;ISSUE COMMAND
8468  050330  000137  050664              JMP     C.RTRN          ;RESTORE REGISTERS
8469
8470  050334  122765  000164  000001  13$:    CMPB    #RDALHD,P.CMND(R5) ;CHECK IF READ ALL HEADERS
8471  050342  001047                      BNE     30$             ;NO, CHECK IF CONTROLLER CLEAR
8472  050344  010537  001462              MOV     R5,O.WAIT       ;SET WAITING FOR COMMAND COMPLETION
8473  050350  016537  000010  001476      MOV     P.BALO(R5),HDR.AD ;LOAD HEADER ADDRESS
8474  050356  132765  000020  000007      BITB    #B.CFMT,P.CS1H(R5) ;CHECK IF 22 SECTOR FORMANT
8475  050364  001404                      BEQ     14$             ;YES, LOAD 22 IN HEADER COUNT
8476  050366  012737  000024  001500      MOV     #20.,HDR.CT     ;LOAD 20 IN SECTOR COUNT
8477  050374  000403                      BR      22$             ;GO ISSUE READ HEADER COMMAND
8478
8479  050376  012737  000026  001500  14$:    MOV     #22.,HDR.CT     ;LOAD 22 IN SECTOR COUNT
8480  050404  016562  000002  000020  22$:    MOV     P.CYLN(R5),RKDCYL(R2) ;LOAD CYLINDER ADDRESS
8481  050412  016562  000004  000006      MOV     P.SECT(R5),RKDA(R2) ;LOAD TRACK NUMBER
8482  050420  016562  000020  000010      MOV     P.CS2(R5),RKCS2(R2) ;LOAD DRIVE NUMBER
8483  050426  116565  000007  000017      MOVB    P.CS1H(R5),P.CS1+1(R5) ;STORE BITS 8-15 OF CS1
8484  050434  042765  165777  000016      BIC     #^C<CPMTICDT>,P.CS1(R5) ;CLEAR ALL BITS EXCEPT DRIVE TYPE
8485                                                              ;  AND FORMAT
8486  050442  112765  000125  000016      MOVB    #RDHEAD,P.CS1(R5) ;STORE READ HEADER COMMAND
```

```
 8487  050450  016567  000016  000000          MOV     P.CS1(R5),RKCS1(R2) ;ISSUE READ HEADER
 8488  050456  000137  050664                  JMP     C.RTRN              ;RESTORE REGISTERS
 8489
 8490  050462  122765  000176  000001  30$:    CMPB    #CONCLR,P.CMND(R5) ;CHECK IF CONTROLLER CLEAR
 8491  050470  001004                          BNE     32$                 ;NO, CHECK IF SUBSYSTEM CLEAR
 8492  050472  004037  046232                  JSR     R0,I.CCLR           ;CLEAR CONTROLLER
 8493  050476  050664                          C.RTRN                      ;ERROR RETURN
 8494  050500  000467                          BR      40$                 ;INDICATE NORMAL RETURN
 8495
 8496  050502  122765  000177  000001  32$:    CMPB    #SUBCLR,P.CMND(R5) ;CHECK IF SUBSYSTEM CLEAR
 8497  050510  001406                          BEQ     36$                 ;YES, CLEAR SUBSYSTEM
 8498  050512  052737  000100  001460  34$:    BIS     #F.ILLD,E.CONT      ;SET ILLEGAL DRIVER COMMAND
 8499  050520  004777  130737                  JSR     PC,@A.CONT          ;REPORT ERROR
 8500  050524  000457                          BR      C.RTRN              ;RESTORE REGISTERS
 8501
 8502  050526  012762  000040  000010  36$:    MOV     #SCLR,RKCS2(R2) ;ISSUE SUBSYSTEM CLEAR
 8503  050534  016765  000000  000016          MOV     RKCS1(R2),P.CS1(R5) ;STORE COMMAND AND STATUS REGISTER 1
 8504  050542  032765  100000  000016          BIT     #CERR,P.CS1(R5) ;CLEAR IF CONTROLLER ERROR RESET
 8505  050550  001406                          BEQ     37$                 ;NO, FINISH COMMAND
 8506  050552  052737  000001  001460          BIS     #BIT0,E.CONT        ;SET CLEAR SUBSYSTEM DID NOT CLEAR
 8507                                                                      ;  CONTROLLER ERROR
 8508  050560  004777  130672                  JSR     PC,@A.CONT          ;REPORT ERROR
 8509  050564  000437                          BR      C.RTRN              ;RESTORE REGISTERS
 8510
 8511  050566  013746  001466          37$:    MOV     W.MILI,-(SP)        ;LOAD 16 MILI-SECOND COUNT FOR ATTENTION
 8512                                                                      ;  TO DISAPPEAR
 8513  050572  016765  000000  000016  38$:    MOV     RKCS1(R2),P.CS1(R5) ;STORE CS1
 8514  050600  032765  040000  000016          BIT     #DI,P.CS1(R5)       ;CHECK IF ATTENTIONS CLEARED
 8515  050606  001411                          BEQ     39$                 ;YES, FINISH COMMAND
 8516  050610  005316                          DEC     (SP)                ;DECREMENT 16 MILISECOND COUNT
 8517  050612  001367                          BNE     38$                 ;CHECK DRIVE INTERRUPT AGAIN
 8518  050614  005726                          TST     (SP)+               ;ADJUST STACK
 8519  050616  052737  000040  001460          BIS     #F.SCLR,E.CONT      ;SET SUBSYSTEM CLEAR DID NOT CLEAR
 8520                                                                      ;  DRIVE ATTENTIONS
 8521  050624  004777  130626                  JSR     PC,@A.CONT          ;REPORT ERROR
 8522  050630  000415                          BR      C.RTRN              ;RESTORE REGISTER
 8523
 8524  050632  005726                  39$:    TST     (SP)+               ;ADJUST STACK
 8525  050634  032765  000400  000014          BIT     #NOCHF,P.PRST(R5) ;CHECK IF AC CHECK MODE
 8526  050642  001010                          BNE     C.RTRN              ;YES, RESTORE REGISTERS
 8527  050644  112737  177777  001502          MOVB    #-1,I.ISRL          ;SET INTERRUPT ENABLE SET
 8528  050652  012762  000100  000000          MOV     #IE,RKCS1(R2)       ;SET INTERRUPT ENABLE
 8529  050660  004777  130566          40$:    JSR     PC,@A.NORM          ;INDICATE NORMAL TERMINATION
 8530
 8531  050664  012637  177776          C.RTRN: MOV     (SP)+,PS            ;RESTORE PSW
 8532  050670  012600                          MOV     (SP)+,R0            ;RESTORE R0
 8533  050672  012601                          MOV     (SP)+,R1            ;RESTORE R1
 8534  050674  012602                          MOV     (SP)+,R2            ;RESTORE R2
 8535  050676  012603                          MOV     (SP)+,R3            ;RESTORE R3
 8536  050700  012604                          MOV     (SP)+,R4            ;RESTORE R4
 8537  050702  012605                          MOV     (SP)+,R5            ;RESTORE R5
 8538  050704  000207                          RTS     PC                  ;RETURN
```

C1

```
8539                                    .SBTTL   *ENQUEUE ROUTINE
8540
8541                                    ;;*****************************************************************
8542                                    ;*
8543                                    ;*      THIS ROUTINE WILL PUT THE ADDRESS OF THE PARAMETER IN THE
8544                                    ;*      QUEUE SPECIFIED BY THE LOCATION FOLLOWING THE CALL.
8545                                    ;*
8546                                    ;*CALL  JSR     R0,Q.PUSH
8547                                    ;*      <ADDRESS OF QUEUE>
8548                                    ;*      RETURN
8549                                    ;*
8550                                    ;;*****************************************************************
8551
8552  050706  010446                    Q.PUSH: MOV     R4,-(SP)        ;STORE R4 ON STACK
8553  050710  010346                            MOV     R3,-(SP)        ;STORE R3 ON STACK
8554  050712  013746  177776                    MOV     PS,-(SP)        ;STORE PSW ON STACK
8555  050716  013737  001450  177776            MOV     #PRI,PS         ;LOCK OUT RK06 INTERRUPTS
8556  050724  012004                            MOV     (R0)+,R4        ;STORE QUEUE ADDRESS
8557  050726  005065  000064                    CLR     P.QLNK(R5)      ;CLEAR QUEUE LINK
8558  050732  005724                            TST     (R4)+           ;CHECK IF QUEUE IS EMPTY
8559  050734  001405                            BEQ     1$              ;YES, PUT PARAMETER BLOCK ADDRESS
8560                                                                    ;  AT HEAD AND TAIL OF THE QUEUE
8561  050736  011403                            MOV     (R4),R3         ;STORE TAIL OF QUEUE
8562  050740  010563  000064                    MOV     R5,P.QLNK(R3)   ;UPDATE QUEUE LINK
8563  050744  010514                            MOV     R5,(R4)         ;UPDATE QUEUE TAIL
8564  050746  000402                            BR      2$
8565
8566  050750  010514                    1$:     MOV     R5,(R4)         ;LOAD TAIL OF QUEUE
8567  050752  010544                            MOV     R5,-(R4)        ;LOAD HEAD OF QUEUE
8568
8569  050754  012637  177776            2$:     MOV     (SP)+,PS        ;RESTORE PSW
8570  050760  012603                            MOV     (SP)+,R3        ;RESTORE R3
8571  050762  012604                            MOV     (SP)+,R4        ;RESTORE R4
8572  050764  000200                            RTS     R0              ;RETURN
```

D1

```
8573                            .SBTTL   *POP QUEUE ROUTINE*
8574
8575                            ;;*****************************************************************
8576                            ;*
8577                            ;*      THIS ROUTINE WILL PUT THE ADDRESS OF THE FIRST PARAMTER
8578                            ;*      BLOCK ADDRESS OF THIS QUEUE ON THE STACK AND REMOVE IT
8579                            ;*      FROM THE QUEUE DESIGNATED BY THE CALL.  A RETURN OF ZERO
8580                            ;*      ON THE STACK INDICATES THAT THE QUEUE WAS EMPTY.  OTHERWISE,
8581                            ;*      THE STACK WILL CONTAIN THE ADDRESS OF THE FIRST
8582                            ;*      PARAMETER BLOCK ON THE QUEUE.
8583                            ;*
8584                            ;*CALL  JSR     R0,Q.POP
8585                            ;*      <ADDRESS OF QUEUE>
8586                            ;*      RETURN
8587                            ;*
8588                            ;;*****************************************************************
8589
8590  050766  011646            Q.POP:  MOV     (SP),-(SP)      ;CREATE SPACE ON THE STACK
8591  050770  010546                    MOV     R5,-(SP)        ;STORE R5 ON THE STACK
8592  050772  010446                    MOV     R4,-(SP)        ;STORE R4 ON THE STACK
8593  050774  013746  177776            MOV     PS,-(SP)        ;STORE PSW ON THE STACK
8594  051000  013737  001450  177776    MOV     RKPRI,PS        ;LOCK OUT RK06 INTERRUPTS
8595  051006  012004                    MOV     (R0)+,R4        ;STORE QUEUE ADDRESS
8596  051010  011405                    MOV     (R4),R5         ;STORE PARAMETER BLOCK ADDRESS
8597  051012  010566  000010            MOV     R5,10(SP)       ;LOAD ADDRESS ON STACK
8598  051016  001404                    BEQ     1$              ;IF QUEUE IS EMPTY, RETURN
8599  051020  016524  000064            MOV     P.BLNK(R5),(R4)+ ;READJUST HEAD OF THE QUEUE
8600  051024  001001                    BNE     1$              ;IF NOT LAST ELEMENT OF THE QUEUE, RETURN
8601  051026  005014                    CLR     (R4)            ;CLEAR TAIL POINTER IF LAST ELEMENT OF QUEUE
8602
8603  051030  012637  177776    1$:     MOV     (SP)+,PS        ;RESTORE PSW
8604  051034  012604                    MOV     (SP)+,R4        ;RESTORE R4
8605  051036  012605                    MOV     (SP)+,R5        ;RESTORE R5
8606  051040  000200                    RTS     R0              ;RETURN
```

```
 8607                                   .SBTTL   *SEARCH QUEUE FOR DRIVE NOT POSITIONING
 8608
 8609                                   ;;*****************************************************************
 8610                                   ;*
 8611                                   ;*      THIS ROUTINE WILL SEARCH THROUGH THE COMMAND INITIATION
 8612                                   ;*      QUEUE FOR THE FIRST PARAMETER BLOCK WHOSE DRIVE IS
 8613                                   ;*      NOT POSITIONING.  IF THE QUEUE IS EMPTY OR ALL DRIVES
 8614                                   ;*      ARE POSITIONING ZERO IS PLACED IN R5.  OTHERWISE,
 8615                                   ;*      THE ADDRESS OF THE PARAMETER BLOCK IS PLACED IN R5.
 8616                                   ;*
 8617                                   ;*CALL  JSR     PC,Q.SRCH
 8618                                   ;*      RETURN
 8619                                   ;*
 8620                                   ;*NOTE: THIS ROUTINE DESTROYS R4.
 8621                                   ;*
 8622                                   ;;*****************************************************************
 8623
 8624  051042  012704  001324          Q.SRCH: MOV     #CINITQ,R4      ;LOAD ADDRESS OF COMMAND INITIATION
 8625                                                                  ;  QUEUE IN R4
 8626  051046  011405                  1$:     MOV     (R4),R5         ;GET NEXT QUEUE ELEMENT
 8627  051050  001425                          BEQ     5$              ;IF END OF QUEUE, RETURN
 8628  051052  032765  000002  000014          BIT     #DRVPOS,P.PPST(R5) ;CHECK IF DRIVE IS POSITIONING
 8629  051060  001404                          BEQ     2$              ;NO, RETURN PARAMETER BLOCK ADDRESS
 8630  051062  010504                          MOV     R5,R4           ;UPDATE LINK ADDRESS POINTER
 8631  051064  062704  000064                  ADD     #P.QLNK,R4      ;CALCULATE LINK ADDRESS
 8632  051070  000766                          BR      1$              ;GET NEXT ELEMENT OF QUEUE
 8633
 8634  051072  016514  000064          2$:     MOV     P.QLNK(R5),(R4) ;UPDATE QUEUE LINK
 8635  051076  001012                          BNE     5$              ;CHECK IF LAST ELEMENT OF QUEUE
 8636                                                                  ;  IF NOT, DO NOT UPDATE QUEUE TAIL
 8637  051100  022704  001324                  CMP     #CINITQ,R4      ;CHECK IF ONLY ELEMENT IN QUEUE
 8638  051104  001405                          BEQ     4$              ;YES, CLEAR HEAD AND TAIL
 8639  051106  162704  000064                  SUB     #P.QLNK,R4      ;ADJUST R4 FOR TAIL POINTER
 8640  051112  010437  001326                  MOV     R4,CINITQ+2     ;LOAD TAIL
 8641  051116  000207                          RTS     PC              ;RETURN
 8642
 8643  051120  005024          4$:     CLR     (R4)+           ;CLEAR HEAD OF QUEUE
 8644  051122  005014                  CLR     (R4)            ;CLEAR TAIL OF QUEUE
 8645  051124  000207          5$:     RTS     PC              ;RETURN
```

```
                                .SBTTL   *REMOVE PARAMETER BLOCK FROM COMMAND INITIATION QUEUE
                                ;;*****************************************************************
                                ;*
                                ;*      THIS ROUTINE WILL CHECK IF THE CURRENT PARAMETER BLOCK
                                ;*      IS IN THE COMMAND INITIATION QUEUE.  IF IT IS, THIS
                                ;*      ROUTINE WILL REMOVE IT FROM THE COMMAND INITIATION QUEUE.
                                ;*
                                ;*CALL  JSR     PC,Q.RMOV
                                ;*      RETURN
                                ;*
                                ;*NOTE: R5 CONTAINS ADDRESS OF CURRENT PARAMETER BLOCK.
                                ;*
                                ;;*****************************************************************

051126  032765  040000  000014  Q.RMOV: BIT     #Q.INIT,P.PPST(R5) ;CHECK IF PARAMETER BLOCK ENQUEUED IN
                                                                   ;  INITIATION QUEUE
051134  001001                          BNE     5$                 ;YES, REMOVE PARAMETER BLOCK
                                                                   ;  FROM COMMAND INITIATION QUEUE
051136  000207                          RTS     PC                 ;RETURN

051140  010446                  5$:     MOV     R4,-(SP)           ;STORE R4 ON STACK
051142  010346                          MOV     R3,-(SP)           ;STORE R3 ON THE STACK
051144  012704  001324                  MOV     #CINITQ,R4         ;LOAD ADDRESS OF COMMAND INITIATION
                                                                   ;  QUEUE TO R4
051150  011403                  10$:    MOV     (P4),P3            ;GET NEXT QUEUE ELEMENT
051152  001001                          BNE     11$                ;CHECK IF NO MORE ELEMENTS
051154  000000                          HALT                       ;  *** FLAGS DO NOT AGREE WITH
                                                                   ;  COMMAND INITIATION QUEUE
051156  020305                  11$:    CMP     R3,P5              ;CHECK IF CORRECT PARAMETER BLOCK
051160  001404                          BEQ     12$                ;YES, ADJUST QUEUE
051162  010304                          MOV     R3,R4              ;UPDATE LINK ADDRESS POINTER
051164  062704  000064                  ADD     #P.QLNK,R4         ;CALCULATE LINK ADDRESS
051170  000767                          BR      10$                ;GET NEXT ELEMENT OF QUEUE

051172  016314  000064          12$:    MOV     P.QLNK(R3),(R4)    ;UPDATE QUEUE LINK
051176  001012                          BNE     15$                ;CHECK IF LAST ELEMENT OF QUEUE
                                                                   ;  IF NOT, DO NOT UPDATE QUEUE TAIL
051200  022704  001324                  CMP     #CINITQ,R4         ;CHECK IF ONLY ELEMENT IN QUEUE
051204  001405                          BEQ     14$                ;YES, CLEAR HEAD AND TAIL
051206  162704  000064                  SUB     #P.QLNK,R4         ;ADJUST R4 FOR TAIL POINTER
051212  010437  001326                  MOV     R4,CINITQ+2        ;LOAD TAIL
051216  000402                          BR      15$                ;RETURN

051220  005024                  14$:    CLR     (R4)+              ;CLEAR HEAD OF QUEUE
051222  005014                          CLR     (P4)               ;CLEAR TAIL OF QUEUE
051224  042765  040006  000014  15$:    BIC     #DRVPDT!DRVPCS!Q.INIT,P.PRST(R5) ;CLEAR DRIVE POSITIONING,
                                                                   ;  DRIVE POSITIONING FOR DATA TRANSFER, AND
                                                                   ;  PARAMETER BLOCK ENQUEUED IN INITIATION QUEUE

051232  012603                          MOV     (SP)+,R3           ;RESTORE R3
051234  012604                          MOV     (SP)+,R4           ;RESTORE R4
051236  000207                          RTS     PC                 ;RETURN
```

```
8699                                .SBTTL   *COMMAND OPTIMIZER
8700
8701                                ;;*****************************************************************
8702                                ;*
8703                                ;*      THIS ROUTINE WILL INITIATE THE COMMAND AS SPECIFIED IN THE
8704                                ;*      PARAMETER BLOCK OF THE FIRST DRIVE WHICH IS NOT POSITIONING
8705                                ;*      IN THE COMMAND INITIATION QUEUE.
8706                                ;*
8707                                ;*CALL  JSR     PC,C.OPT
8708                                ;*      RETURN
8709                                ;*
8710                                ;*      ROUTINES USED:
8711                                ;*              C.INIT
8712                                ;*              Q.PUSH
8713                                ;*              G.SPCH
8714                                ;*
8715                                ;;*****************************************************************
8716
8717  051240  010546                C.OPT:  MOV     R5,-(SP)        ;STORE R5 ON STACK
8718  051242  010446                        MOV     R4,-(SP)        ;STORE R4 ON STACK
8719  051244  010346                        MOV     R3,-(SP)        ;STORE R3 ON STACK
8720  051246  010246                        MOV     R2,-(SP)        ;STORE R2 ON STACK
8721  051250  010146                        MOV     R1,-(SP)        ;STORE R1 ON STACK
8722  051252  010046                        MOV     R0,-(SP)        ;STORE R0 ON STACK
8723  051254  013746  177776                MOV     PS,-(SP)        ;STORE PSW ON STACK
8724  051260  013737  001450  177776        MOV     RKPRI,PS        ;LOCK OUT RF06 INTERRUPTS
8725  051266  005737  001462                TST     Q.WAIT          ;CHECK IF WAITING FOR COMMAND COMPLETION
8726  051272  001152                        BNE     Q.RTRN          ;YES, RESTORE REGISTERS
8727  051274  013702  001444                MOV     RKBAS,R2        ;LOAD R2 WITH BASE ADDRESS OF THE RK06
8728                                                                ;  REGISTERS
8729  051300  016737  000000  001406        MOV     RKCS1(R2),T.CS1 ;STORE COMMAND AND STATUS REGISTER 1
8730  051306  032737  000200  001406        BIT     #RDY,T.CS1      ;CHECK IF READY SET
8731  051314  001541                        BEQ     Q.RTRN          ;NO, WAIT FOR COMMAND COMPLETION
8732  051316  004737  051042                JSR     PC,Q.SRCH       ;SEARCH FOR PARAMETER BLOCK ADDRESS
8733  051322  005705                        TST     R5              ;CHECK IF NO COMMAND CAN BE ISSUED
8734  051324  001013                        BNE     1$              ;YES, ISSUE COMMAND
8735  051326  032737  040000  001406        BIT     #D1,T.CS1       ;CHECK IF DRIVE INTERRUPT WAITING
8736  051334  001531                        BEQ     Q.RTRN          ;NO, RETURN
8737  051336  112737  177777  001507        MOVB    #-1,I.ISRL      ;SET FLAG THAT INTERRUPT WAS FORCED
8738  051344  012762  000300  000000        MOV     #INTR,RKCS1(R2) ;FORCE INTERRUPT TO SCAN DRIVE ATTENTIONS
8739  051352  000522                        BR      Q.RTRN          ;RESTORE REGISTERS
8740
8741  051354  005065  000212        1$:     CLR     P.ERR(R5)       ;CLEAR ERROR STATUS INFORMATION
8742  051360  122765  000164  000001        CMPB    #RDALHD,P.CMND(R5) ;CHECK IF READ ALL HEADERS
8743  051366  001410                        BEQ     2$              ;YES, CHECK IF IMPLIED SEEK
8744  051370  122765  000121  000001        CMPB    #PDDATA,P.CMND(R5) ;CHECK IF DATA TRANSFER
8745  051376  101021                        BHI     3$              ;NO, GO TO THE COMMAND INITIATOR
8746  051400  122765  000131  000001        CMPB    #WRTCHK,P.CMND(R5) ;CHECK IF SPECIAL COMMAND
8747  051406  103415                        BLO     3$              ;YES, GO TO THE COMMAND INITIATOR
8748  051410  116504  000000        2$:     MOVB    P.DRVN(R5),R4   ;STORE DRIVE NUMBER
8749  051414  136437  001510  001507        BITB    INTPSF(R4),C.CVER ;CHECK IF OVERLAPPED OPERATIONS FOR THIS DRIVE
8750  051422  001407                        BEQ     3$              ;NO, GO TO THE COMMAND INITIATOR
8751  051424  032765  000004  000014        BIT     #DRVPDT,P.PRST(R5) ;CHECK IF POSITIONING FOR
8752                                                                ;  DATA TRANSFER OCCURED
8753  051432  001411                        BEQ     5$              ;NO, ISSUE SEEK
8754  051434  042765  040004  000014        BIC     #DRVPDTIQ.INIT,P.PRST(R5) ;CLEAR POSITIONING IN PROGRESS FOR
```

H1

```
                                                        ;  DATA TRANSFER AND PARAMETER BLOCK ENQUEUED
                                                        ;  IN INITIATION QUEUE
                                                        ;
051442  010537  051452          3$:     MOV     R5,4$           ;LOAD PARAMETER BLOCK ADDRESS
051446  004737  047216                  JSR     PC,C.INIT       ;ISSUE COMMAND
051452  000000                  4$:     .WORD   0               ;ADDRESS OF PARAMETER BLOCK
                                                        ;  PLACED HERE
051454  000461                          BR      C.RTRN          ;RESTORE REGISTERS
                                                        ;
051456  156437  001510  001506  5$:     BISB    INTPSK(R4),W.TIME ;SET WATCH DCC TIMING
051464  010403                          MOV     R4,R3           ;STORE DRIVE NUMBER
051466  006303                          ASL     R3              ;MULTIPLY DRIVE NUMBER BY 2
051470  013763  001470  001540          MOV     W.SEC,W.DRV(R3) ;LOAD WATCH-DCC TIME
051476  005037  001462                  CLR     C.WAIT          ;CLEAR WAIT FOR COMMAND
051502  105037  001502                  CLRB    I.ISRL          ;CLEAR RELEASE OF INTERRUPT ISSUED
                                                        ;
                                        ;       RESET ALL THE BITS IN THE PROGRAM STATUS REGISTER EXCEPT
                                        ;               DRIVE IN USE
                                        ;               WRITE FOR WRITE CHECK
                                        ;               NO CHECK
                                        ;               DROP DRIVE FROM TEST SEQUENCE
                                        ;               INHIBIT BUS ADDRESS INCREMENT
051506  042765  075176  000014          BIC     #^C<DRVUSE!W.WCK!NOCHK!DRPDRV!DTBAII>,P.PRST(R5)
                                                        ;
                                        ;       SET DRIVE POSITIONING, DRIVE POSITIONING BECAUSE OF DATA TRANSFER,
                                        ;         AND PARAMETER BLOCK ENQUEUED IN INITIATION QUEUE
051514  052765  040006  000014          BIS     #DRVPOS!DRVPDTIQ.INIT,P.PRST(R5)
                                                        ;
051522  010500                          MOV     R5,R0           ;STORE PARAMTER BLOCK ADDRESS
051524  062700  000016                  ADD     #P.CS1,R0       ;CALCULATE FIRST LOCATION TO BE CLEARED
051530  010501                          MOV     R5,R1           ;STORE PARAMETER BLOCK ADDRESS
051532  062701  000062                  ADD     #P.EPAT,R1      ;CALCULATE LAST LOCATION TO BE CLEARED
                                                        ;
051536  005020                  6$:     CLR     (R0)+           ;CLEAR RETURN PARAMETERS
051540  020001                          CMP     R0,R1           ;CHECK IF FINISHED
051542  101775                          BLOS    6$              ;NO, CLEAR NEXT RETURN PARAMETER
051544  005067  000026                  CLR     RKMR1(R7)       ;CLEAR MAINTENANCE REGISTER 1
051550  016562  000002  000020          MOV     P.CYLN(R5),RKDCYL(R2) ;LOAD CYLINDER ADDRESS
051556  010462  000010                  MOV     R4,RKCS2(R2)    ;LOAD DEVICE NUMBER
051562  116565  000007  000017          MOVB    P.CS1H(R5),P.CS1+1(R5) ;STORE BITS 8-15 OF CS1
051570  042765  165777  000016          BIC     #^C<CFMT!CDT>,P.CS1(R5) ;CLEAR BITS EXCEPT FORMAT AND
                                                        ;  DRIVE TYPE
051576  112765  000117  000016          MOVB    #SEEK,P.CS1(R5) ;STORE COMMAND
051604  016562  000016  000000          MOV     P.CS1(R5),RKCS1(R7) ;ISSUE SEEK
051612  004037  050706                  JSR     R0,Q.PUSH       ;REQUEUE COMMAND IN COMMAND
051616  001324                          CINITQ                  ;  INITIATIATION QUEUE
                                                        ;
051620  012637  177776          C.RTRN: MOV     (SP)+,PS        ;RESTORE PSW
051624  012600                          MOV     (SP)+,R0        ;RESTORE R0
051626  012601                          MOV     (SP)+,R1        ;RESTORE R1
051630  012602                          MOV     (SP)+,R2        ;RESTORE R2
051632  012603                          MOV     (SP)+,R3        ;RESTORE R3
051634  012604                          MOV     (SP)+,R4        ;RESTORE R4
051636  012605                          MOV     (SP)+,R5        ;RESTORE R5
051640  000207                          RTS     PC              ;RETURN
```

```
                        .SBTTL  MEMORY CHECK ENABLE TEST
                        
051642  104401  063671  MEMERR: TYPE    ,ERR400         ;TYPE UNEXPECTED MEMORY PARITY TRAP
051646  011646                  MOV     (SP),-(SP)      ;TYPE PC VALUE
051650  004737  052144          JSR     PC,RINOCT
051654  104401  001165          TYPE    ,SCRLF
051660  000007                  RTI                     ;RETURN
```

```
                                .SBTTL  TYPE ROUTINE
                                ;;*****************************************************************
                                ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
                                ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
                                ;*NOTE1:         $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
                                ;*NOTE2:         $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
                                ;*NOTE3:         $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
                                ;*
                                ;*CALL:
                                ;*1) USING A TRAP INSTRUCTION
                                ;*      TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
                                ;*OR
                                ;*      TYPE
                                ;*      MESADR
                                ;*

051662  105737  001157          $TYPE:  TSTB    $TTFLG          ;;IS THERE A TERMINAL?
051666  100002                          BPL     1$              ;;BR IF YES
051670  000000                          HALT                    ;;HALT HERE IF NO TERMINAL
051672  000430                          BR      3$              ;;LEAVE
051674  010046                  1$:     MOV     R0,-(SP)        ;;SAVE R0
051676  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
051702  122737  000001  001210          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
051710  001011                          BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
051712  132737  000100  001211          BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
051720  001405                          BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
051722  010037  051732                  MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
051726  004737  054574                  JSR     PC,$ATY?        ;;SPOOL MESSAGE TO APT
051732  000000                  61$:    .WORD   0               ;;MESSAGE ADDRESS
051734  132737  000040  001211  62$:    BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
051742  001003                          BNE     60$             ;;YES,SKIP TYPE OUT
051744  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
051746  001005                          BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
051750  005726                          TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
051752  012600                  60$:    MOV     (SP)+,R0        ;;RESTORE R0
051754  062716  000002          3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
051760  000002                          RTI                     ;;RETURN
051762  122716  000011          4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
051766  001430                          BEQ     8$
051770  122716  000200                  CMPB    #CRLF,(SP)      ;;BRANCH IF ACT <CRLF>
051774  001006                          BNE     5$
051776  005726                          TST     (SP)+           ;;POP  <CR><LF> EQUIV
052000  104401                          TYPE                    ;;TYPE A CR AND LF
052002  001165                          $CRLF
052004  105037  052140                  CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
052010  000755                          BR      2$              ;;GET NEXT CHARACTER
052012  004737  052074          5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
052016  123726  001156          6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
052022  001350                          BNE     2$              ;;IF NO GO GET NEXT CHAR.
052024  013746  001154                  MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
                                                                ;;AND THE NULL CHAR.
052030  105366  000001          7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
052034  002770                          BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
052036  004737  052074                  JSR     PC,$TYPEC       ;;GO TYPE A NULL
052042  105337  052140                  DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
```

K1

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8873  052046  000770                    BR      7$              ;;LOOP
8874
8875                                    ;HORIZONTAL TAB PROCESSOR
8876
8877  052050  112716  000040            8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
8878  052054  004737  052074            9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
8879  052060  132737  000007  052140            BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
8880  052066  001372                            BNE     9$              ;;TAB STOP
8881  052070  005726                            TST     (SP)+           ;;POP SPACE OFF STACK
8882  052072  000724                            BR      2$              ;;GET NEXT CHARACTER
8883  052074  105777  127050            $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
8884  052100  100375                            BPL     $TYPEC
8885  052102  116677  000002  127042            MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
8886  052110  122766  000015  000002            CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
8887  052116  001003                            BNE     1$              ;;BRANCH IF NO
8888  052120  105037  052140                    CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
8889  052124  000406                            BR      $TYPEX          ;;EXIT
8890  052126  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
8891  052134  001402                            BEQ     $TYPEX          ;;BRANCH IF YES
8892  052136  105227                            INCB    (PC)+           ;;COUNT THE CHARACTER
8893  052140  000000            $CHARCNT:.WORD  0               ;;CHARACTER COUNT STORAGE
8894  052142  000207            $TYPEX: RTS     PC
8895
8896
8897                                    .SBTTL  BINARY TO OCTAL (ASCII) CONVERSION
8898
8899                                    ;;**************************************************************
8900                                    ;*
8901                                    ;*      THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A
8902                                    ;*      6-DIGIT OCTAL (ASCII) NUMBER.
8903                                    ;*
8904                                    ;*CALL  MOV     NUM,-(SP)
8905                                    ;*      JSR     PC,BINOCT
8906                                    ;*      RETURN                  ;NUMBER IN OCTSTG
8907                                    ;*
8908                                    ;;**************************************************************
8909
8910  052144                    BINOCT:
8911  052144  010346                            MOV     R3,-(SP)        ;;PUSH R3 ON STACK
8912  052146  010446                            MOV     R4,-(SP)        ;;PUSH R4 ON STACK
8913  052150  010546                            MOV     R5,-(SP)        ;;PUSH R5 ON STACK
8914  052152  012704  000006                    MOV     #6,R4           ;STORE COUNT
8915  052156  016605  000010                    MOV     10(SP),R5       ;PICKUP INPUT NUMBER
8916  052162  012703  052240                    MOV     #OCTSTG,R3      ;LOAD ADDRESS OF CONVERTTED STRING
8917  052166  005013                            CLR     (R3)            ;CLEAR OUTPUT BYTE
8918  052170  006105                            ROL     R5              ;ROTATE MSB INTO "C"
8919  052172  000404                            BR      3$              ;GO DO MSR
8920
8921  052174  006105            2$:     ROL     R5              ;ROTP THIS DIGIT
8922  052176  006105                            ROL     R5
8923  052200  006105                            ROL     R5
8924  052202  110513                            MOVB    R5,(R3)
8925  052204  106113            3$:     RCLB    (R3)            ;GET LSB OF THIS DIGIT
8926  052206  142713  177770                    BICB    #177770,(R3)    ;GET RID OF JUNK
8927  052212  152723  000060                    BISB    #'0,(R3)+       ;MAKE IT ASCII
8928  052216  005304                            DEC     R4              ;CHECK IF DONE
```

```
 8929  052220  001365                    BNE     2$              ;;NO CONVERT NEXT DIGIT
 8930  052222  012605                    MOV     (SP)+,R5        ;;POP STACK INTO R5
 8931  052224  012604                    MOV     (SP)+,R4        ;;POP STACK INTO R4
 8932  052226  012603                    MOV     (SP)+,R3        ;;POP STACK INTO R3
 8933  052230  012616                    MOV     (SP)+,(SP)      ;SETUP STACK FOR RETURN
 8934  052232  104401  052240            TYPF    ,OCTSTG         ;TYPE NUMBER
 8935  052236  000207                    RTS     PC              ;RETURN
 8936
 8937  052240  000006            OCTSTG: .BLKB   6
 8938  052246     000     000            .BYTE   0,0
 8939
 8940                              .SBTTL  TTY INPUT ROUTINE
 8941
 8942                              ;;**************************************************************
 8943                              .ENABL  LSB
 8944
 8945                              .DSABL  LSB
 8946
 8947
 8948                              ;;**************************************************************
 8949                              ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
 8950                              ;*CALL:
 8951                              ;*      RDCHR                   ;;INPUT A SINGLE CHARACTER FROM THE TTY
 8952                              ;*      RETURN HERE             ;;CHARACTER IS ON THE STACK
 8953                              ;*                              ;;WITH PARITY BIT STRIPPED OFF
 8954                              ;
 8955
 8956  052250  011646            $RDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC
 8957  052252  016666  000004  000002    MOV     4(SP),2(SP)     ;;SAVE THE PS
 8958  052260  105777  126660      1$:   TSTB    @$TKS           ;;WAIT FOR
 8959  052264  100375                    BPL     1$              ;;A CHARACTER
 8960  052266  117766  126654  000004    MOVB    @$TKB,4(SP)     ;;READ THE TTY
 8961  052274  042766  177600  000004    BIC     #^C<177>,4(SP)  ;;GET RID OF JUNK IF ANY
 8962  052302  026627  000004  000023    CMP     4(SP),#23       ;;IS IT A CONTROL-S?
 8963  052310  001013                    BNE     3$              ;;BRANCH IF NO
 8964  052312  105777  126626      2$:   TSTB    @$TKS           ;;WAIT FOR A CHARACTER
 8965  052316  100375                    BPL     2$              ;;LOOP UNTIL ITS THERE
 8966  052320  117746  126622            MOVB    @$TKB,-(SP)     ;;GET CHARACTER
 8967  052324  042716  177600            BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
 8968  052330  022627  000021            CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
 8969  052334  001366                    BNE     2$              ;;IF NOT DISCARD IT
 8970  052336  000750                    BR      1$              ;;YES, RESUME
 8971  052340  026627  000004  000140  3$:   CMP     4(SP),#140      ;;IS IT UPPER CASE?
 8972  052346  002407                    BLT     4$              ;;BRANCH IF YES
 8973  052350  026627  000004  000175        CMP     4(SP),#175      ;;IS IT A SPECIAL CHAR?
 8974  052356  003003                    BGT     4$              ;;BRANCH IF YES
 8975  052360  042766  000040  000004        BIC     #40,4(SP)       ;;MAKE IT UPPER CASE
 8976  052366  000002            4$:   RTI                     ;;GO BACK TO USER
 8977                              ;;**************************************************************
 8978                              ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
 8979                              ;*CALL:
 8980                              ;*      RDLIN                   ;;INPUT A STRING FROM THE TTY
 8981                              ;*      RETURN HERE             ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
 8982                              ;*                              ;;TERMINATOR WILL BE A BYTE OF ALL 0'S
 8983
 8984  052370  010346            $RDLIN: MOV     R3,-(SP)        ;;SAVE R3
```

M1

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 8985  052372  005046                        CLR     -(SP)           ;;CLEAR THE RUBOUT KEY
 8986  052374  012703  052624          1$:   MOV     #STTYIN,R3      ;;GET ADDRESS
 8987  052400  022703  052655          2$:   CMP     #STTYIN+25.,R3  ;;BUFFER FULL?
 8988  052404  101456                        BLOS    4$              ;;BR IF YES
 8989  052406  104402                        RDCHR                   ;;GO READ ONE CHARACTER FROM THE TTY
 8990  052410  112613                        MOVB    (SP)+,(R3)      ;;GET CHARACTER
 8991  052412  122713  000177          10$:  CMPB    #177,(R3)       ;;IS IT A RUBOUT
 8992  052416  001022                        BNE     5$              ;;BR IF NO
 8993  052420  005716                        TST     (SP)            ;;IS THIS THE FIRST RUBOUT?
 8994  052422  001007                        BNE     6$              ;;BR IF NO
 8995  052424  112737  000134  052623        MOVB    #'\,9$          ;;TYPE A BACK SLASH
 8996  052432  104401  052622                TYPE    ,9$
 8997  052436  012716  177777                MOV     #-1,(SP)        ;;SET THE RUBOUT KEY
 8998  052442  005303                  6$:   DEC     R3              ;;BACKUP BY ONE
 8999  052444  020327  052624                CMP     R3,#STTYIN      ;;STACK EMPTY?
 9000  052450  103434                        BLO     4$              ;;BR IF YES
 9001  052452  111337  052622                MOVB    (R3),9$         ;;SETUP TO TYPEOUT THE DELETED CHAR.
 9002  052456  104401  052622                TYPE    ,9$             ;;GO TYPE
 9003  052462  000746                        BR      2$              ;;GO READ ANOTHER CHAR.
 9004  052464  005716                  5$:   TST     (SP)            ;;RUBOUT KEY SET?
 9005  052466  001406                        BEQ     7$              ;;BR IF NO
 9006  052470  112737  000134  052622        MOVB    #'\,9$          ;;TYPE A BACK SLASH
 9007  052476  104401  052622                TYPE    ,9$
 9008  052502  005016                        CLR     (SP)            ;;CLEAR THE RUBOUT KEY
 9009  052504  122713  000025          7$:   CMPB    #25,(R3)        ;;IS CHARACTER A CTRL U?
 9010  052510  001003                        BNE     8$              ;;BR IF NO
 9011  052512  104401  052655                TYPE    ,$CNTLU         ;;TYPE A CONTROL "U"
 9012  052516  000726                        BR      1$              ;;GO START OVER
 9013  052520  122713  000022          8$:   CMPB    #22,(R3)        ;;IS CHARACTER A "R"?
 9014  052524  001011                        BNE     3$              ;;BRANCH IF NO
 9015  052526  105013                        CLRB    (R3)            ;;CLEAR THE CHARACTER
 9016  052530  104401  001165                TYPE    ,$CRLF          ;;TYPE A "CR" & "LF"
 9017  052534  104401  052624                TYPE    ,#TTYIN         ;;TYPE THE INPUT STRING
 9018  052540  000717                        BR      2$              ;;GO PICKUP ANOTHER CHACTER
 9019  052542  104401  001164          4$:   TYPE    ,$QUES          ;;TYPE A "?"
 9020  052546  000712                        BR      1$              ;;CLEAR THE BUFFER AND LOOP
 9021  052550  111337  052622          3$:   MOVB    (R3),9$         ;;ECHO THE CHARACTER
 9022  052554  104401  052622                TYPE    ,9$
 9023  052560  122723  000015                CMPB    #15,(R3)+       ;;CHECK FOR RETURN
 9024  052564  001305                        BNE     2$              ;;LOOP IF NOT RETURN
 9025  052566  105063  177777                CLRB    -1(R3)          ;;CLEAR RETURN (TPE 15)
 9026  052572  104401  001166                TYPE    ,$LF            ;;TYPE A LINE FEED
 9027  052576  005726                        TST     (SP)+           ;;CLEAR RUBOUT KEY FROM THE STACK
 9028  052600  012603                        MOV     (SP)+,R3        ;;RESTORE R3
 9029  052602  011646                        MOV     (SP),-(SP)      ;;ADJUST THE STACK AND PUT ADDRESS OF THE
 9030  052604  016666  000004  000002        MOV     4(SP),2(SP)     ;;       FIRST ASCII CHARACTER ON IT
 9031  052612  012766  052624  000004        MOV     #STTYIN,4(SP)
 9032  052620  000002                        RTI                     ;;RETURN
 9033  052622     000                  9$:   .BYTE   0               ;;STORAGE FOR ASCII CHAR. TO TYPE
 9034  052623     000                        .BYTE   0               ;;TERMINATOR
 9035  052624  000031          $TTYIN: .BLKB  25.              ;;RESERVE 25. BYTES FOR TTY INPUT
 9036  052655     136  006525  000012  $CNTLU: .ASCIZ  /^U/<15><12>    ;;CONTROL "U"
 9037  052662  043536  005015     000  $CNTLG: .ASCIZ  /^G/<15><12>    ;;CONTROL "G"
 9038  052667     015  051412  051127  $MSWR:  .ASCIZ  <15><12>/SWR = /
 9039  052674  036440  000040
 9040  052700  020040  042516  020127  $MNEW:  .ASCIZ  /  NEW = /
```

A2

```
 9041  052706  020075  000
 9042          052712                  .EVEN
 9043
 9044                                  .SBTTL  TK INITIALIZE ROUTINE
 9045
 9046                                  ;;*****************************************************************
 9047                                  ;*
 9048                                  ;*      THIS ROUTINE WILL INITIALIZE THE TTY KEYBOARD TO ALL THE
 9049                                  ;*        OPERATOR TO COMMUNICATE WITH THE PROGRAM.
 9050                                  ;*
 9051                                  ;*CALL
 9052                                  ;*      JSR     PC,$TKINT
 9053                                  ;*      RETURN
 9054                                  ;*
 9055                                  ;;*****************************************************************
 9056
 9057  052712  012737  052742  000060  $TKINT: MOV     #$TKSRV,TKVEC   ;INITIALIZE THE KEY BOARD VECTOR
 9058  052720  013737  001450  000062          MOV     RKPRI,TKVEC+2   ;LOCK RK06 AND TTY INTERUPTS
 9059  052726  005777  126214                TST     @$TKB           ;CLEAR DONE FLAG
 9060  052732  012777  000100  126204        MOV     #IE,@$TKS       ;ENABLE INTERRUPT
 9061  052740  000207                        RTS     PC              ;RETURN
 9062
 9063                                  .SBTTL  TK SERVICE ROUTINE (ONLY CONTROL C IS REGNIZED)
 9064
 9065  052742  117737  126200  053304  $TKSRV: MOVB    @$TKB,2$        ;PICK UP CHARACTER AND STORE FOR
 9066                                                                  ;  PRINT OUT
 9067  052750  142737  000200  053304          BICB    #BIT7,2$        ;STRIP THE JUNK
 9068  052756  122737  000003  053304          CMPB    #3,2$           ;IS IT A CONTROL-C
 9069  052764  001022                        BNE     1$              ;NO, PRINT <CHAR>?<15><12>
 9070  052766  104401  053311                TYPE    ,$CNTLC         ;TYPE A CONTROL-C
 9071  052772  005077  126146                CLR     @$TKS           ;CLEAR INTERRUPT ENABLE
 9072  052776  016637  000002  177776        MOV     2(SP),PS        ;REINSTATE PREVIOUS PSW
 9073  053004  004737  011526                JSR     PC,OPRCMD       ;PROCESS OPERATOR COMMAND
 9074  053010  013737  001450  177776        MOV     RKPRI,PS        ;LOAD PSW TO LOCK OUT TTY AND RKCS
 9075  053016  005777  126124                TST     @$TKB           ;CLEAR DONE FLAG
 9076  053022  012777  000100  126114        MOV     #IE,@$TKS       ;ENABLE INTERRUPTS
 9077  053030  000002                        RTI                     ;RETURN
 9078
 9079  053032  122737  000007  053304  1$:     CMPB    #7,2$           ;CHECK IF CONTROL G
 9080  053040  001403                        BEQ     5$              ;YES, GET NEW SWITCH REGISTER VALUE
 9081  053042  104401  053304                TYPE    ,2$             ;PRINT CHARACTER ?<15><12>
 9082  053046  000002                3$:     RTI                     ;RETURN
 9083
 9084  053050  022737  000176  001140  5$:     CMP     #SWREG,SWP      ;CHECK IF SOFTWARE SWITCH REG
 9085  053056  001373                        BNE     3$              ;NO, RETURN
 9086  053060  122737  000001  001134        CMPB    #1,$AUTCB       ;CHECK IF IN AUTO ACCEPT MODE
 9087  053066  001767                        BEQ     3$              ;YES, RETURN
 9088  053070  104401  052662                TYPE    ,$CNTLG         ;TYPE CONTROL G
 9089  053074  104401  052667                TYPE    ,$NSWP          ;TYPE OLD SWITCH REGISTER
 9090  053100  013746  000176                MOV     SWREG,-(SP)
 9091  053104  004737  052144                JSR     PC,$INOCT
 9092  053110  104401  052700                TYPE    ,$NNEW
 9093  053114  005077  126024                CLR     @$TKS           ;GO INTO FLAG MODE
 9094  053120  005046                10$:     CLR     -(SP)           ;;CLEAR COUNTER
 9095  053122  005046                        CLR     -(SP)           ;;THE NEW SWR
 9096  053124  105777  126014          7$:     TSTB    @$TKS           ;;CHAR THERE?
```

```
 9097  053130  100375                    BPL     7$              ;;IF NOT TRY AGAIN
 9098
 9099  053132  117746  126010            MOVB    @$TKB,-(SP)     ;;PICK UP CHAR
 9100  053136  042716  177600            BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
 9101
 9102  053142  021627  000025    9$:     CMP     (SP),#25        ;;IS IT A CONTROL-U?
 9103  053146  001005                    BNE     10$             ;;BRANCH IF NOT
 9104  053150  104401  052655            TYPE    ,$CNTLU         ;;YES, ECHO CONTROL-U (^U)
 9105  053154  062706  000006    20$:    ADD     #6,SP           ;;IGNORE PREVIOUS INPUT
 9106  053160  000757                    BR      19$             ;;LET'S TRY IT AGAIN
 9107
 9108
 9109  053162  021627  000015    10$:    CMP     (SP),#15        ;;IS IT A <CR>?
 9110  053166  001016                    BNE     16$             ;;BRANCH IF NO
 9111  053170  005766  000004            TST     4(SP)           ;;YES, IS IT THE FIRST CHAR?
 9112  053174  001403                    BEQ     11$             ;;BRANCH IF YES
 9113  053176  016677  000002  175734    MOV     2(SP),@SWR      ;;SAVE NEW SWR
 9114  053204  062706  000006    11$:    ADD     #6,SP           ;;CLEAR UP STACK
 9115  053210  104401  001165    14$:    TYPE    ,$CRLF          ;;ECHO <CR> AND <LF>
 9116  053214  012777  000100  175722    MOV     #100,@$TKS      ;;RE-ENABLE TTY KBD INTERRUPTS
 9117  053222  000002            15$:    RTI                     ;;RETURN
 9118  053224  004737  052074    16$:    JSR     PC,$TYPEC       ;;ECHO CHAR
 9119  053230  021627  000060            CMP     (SP),#60        ;;CHAR < 0?
 9120  053234  002420                    BLT     18$             ;;BRANCH IF YES
 9121  053236  021627  000067            CMP     (SP),#67        ;;CHAR > 7?
 9122  053242  003015                    BGT     18$             ;;BRANCH IF YES
 9123  053244  042726  000060            BIC     #60,(SP)+       ;;STRIP-OFF ASCII
 9124  053250  005766  000002            TST     2(SP)           ;;IS THIS THE FIRST CHAR
 9125  053254  001403                    BEQ     17$             ;;BRANCH IF YES
 9126  053256  006316                    ASL     (SP)            ;;NO, SHIFT PRESENT
 9127  053260  006316                    ASL     (SP)            ;;    CHAR OVER TO MAKE
 9128  053262  006316                    ASL     (SP)            ;;    ROOM FOR NEW ONE.
 9129  053264  005266  000002    17$:    INC     2(SP)           ;;KEEP COUNT OF CHAR
 9130  053270  056616  177776            BIS     -2(SP),(SP)     ;;SET IN NEW CHAR
 9131  053274  000713                    BR      7$              ;;GET THE NEXT ONE
 9132  053276  104401  001164    18$:    TYPE    ,$QUES          ;;TYPE ?<CR><LF>
 9133  053302  000724                    BR      20$             ;;SIMULATE CONTROL-U
 9134
 9135  053304     000    2$:     .BYTE   0                       ;STORAGE FOR QUESTIONABLE INPUT
 9136  053305     077  005015     000    .ASCIZ  /?/<15><12>
 9137  053311     136  006503  000012  $CNTLC: .ASCIZ  /^C/<15><12>    ;CONTROL-C
 9138
 9139                                    .SBTTL  OCTAL TO BINARY CONVERSION ROUTINE
 9140
 9141                                    ;;**************************************************************
 9142                                    ;*
 9143                                    ;*      THIS ROUTINE WILL CHECK A STRING OF ASCII CHARACTERS TERMINATED
 9144                                    ;*      WITH A NULL <000> OR COMMA.  IF THE CHARACTERS ARE LEGAL
 9145                                    ;*      IT  WILL GENERATE TWO BINARY WORDS PLACING THE LOW 16 BITS
 9146                                    ;*      ON THE STACK AND THE HIGH 16 BITS IN LOCATION $RIOCT.
 9147                                    ;*
 9148                                    ;*CALL
 9149                                    ;*      MOV     <ADDRESS OF ASCII STRING>,-(SP)
 9150                                    ;*      JSR     PC,OCTBIN
 9151                                    ;*      <ADDRESS OF ERROR RETURN>
 9152                                    ;*      RETURN
```

```
                        ;*
                        ;;*****************************************************************
                        
053316  010046          OCTBIN: MOV     R0,-(SP)        ;SAVE R0
053320  010146                  MOV     R1,-(SP)        ;SAVE R1
053322  010246                  MOV     R2,-(SP)        ;SAVE R2
053324  016600  000010          MOV     10(SP),R0       ;GET ADDRESS OF ASCII STRING
053330  005001                  CLR     R1              ;CLEAR DATA WORDS
053332  005002                  CLR     R2
053334  112046          2$:     MOVB    (R0)+,-(SP)     ;PICK THIS CHARACTER
053336  001423                  BEQ     3$              ;IF ZERO GET OUT
053340  121627  000054          CMPB    (SP),#',        ;CHECK IF COMMA
053344  001420                  BEQ     3$              ;IF COMMA GET OUT
053346  122716  000060          CMPB    #'0,(SP)        ;MAKE SURE THIS CHARACTER IS
053352  003030                  BGT     4$              ;  AN OCTAL DIGIT
053354  122716  000067          CMPB    #'7,(SP)
053360  002425                  BLT     4$
053362  006301                  ASL     R1              ; *2
053364  006102                  ROL     R2
053366  006301                  ASL     R1              ; *4
053370  006102                  ROL     R2
053372  006301                  ASL     R1              ; *8
053374  006102                  ROL     R2
053376  042716  177770          BIC     #^C7,(SP)       ;STRIP THE ASCII JUNK
053402  062601                  ADD     (SP)+,R1        ;ADD THIS DIGIT
053404  000752                  BR      2$              ;LOOP
053406  005726          3$:     TST     (SP)+           ;CLEAN PARTIAL FROM STACK
053410  010166  000010          MOV     R1,10(SP)       ;SAVE RESULT
053414  010237  053450          MOV     R2,$HIOCT
053420  012602                  MOV     (SP)+,R2        ;RESTORE R2
053422  012601                  MOV     (SP)+,R1        ;RESTORE R1
053424  012600                  MOV     (SP)+,R0        ;RESTORE R0
053426  062716  000002          ADD     #2,(SP)         ;ADJUST RETURN
053432  000207                  RTS     PC              ;RETURN

053434  005726          4$:     TST     (SP)+           ;CLEAN UP PARTIAL FROM STACK
053436  012602                  MOV     (SP)+,R2        ;RESTORE R2
053440  012601                  MOV     (SP)+,R1        ;RESTORE R1
053442  012600                  MOV     (SP)+,R0        ;RESTORE R0
053444  013616                  MOV     @(SP)+,(SP)     ;PUT ADDRESS OF ERROR ROUTINE ON STACK
053446  000207                  RTS     PC              ;GO PROCESS ERROR
053450  000000          $HIOCT: .WORD   0               ;HIGH ORDER BITS GO HERE
                        .SBTTL  DECIMAL TO BINARY CONVERSION ROUTINE

                        ;;*****************************************************************
                        ;*
                        ;*      THIS ROUTINE WILL CHECK A STRING OF ASCII CHARACTERS TERMINATED
                        ;*      WITH A NULL <000> OR COMMA.  IF THE CHARACTERS ARE LEGAL,
                        ;*      IT WILL GENERATE A  BINARY WORD PLACING IT ON THE STACK.
                        ;*
                        ;*CALL
                        ;*      MOV     <ADDRESS OF ASCII STRING>,-(SP)
                        ;*      JSR     PC,DECBIN
                        ;*      <ADDRESS OF ERROR RETURN>
                        ;*      RETURN
                        ;*
```

D2

```
 9209                                   ;;*****************************************************************
 9210
 9211  053452  010046                   DECBIN: MOV     R0,-(SP)        ;SAVE R0
 9212  053454  010146                           MOV     R1,-(SP)        ;SAVE R1
 9213  053456  010246                           MOV     R2,-(SP)        ;SAVE R2
 9214  053460  016600  000010                   MOV     10(SP),R0       ;GET ADDRESS OF ASCII STRING
 9215  053464  005046                           CLR     -(SP)           ;CLEAR DATA WORD
 9216  053466  005002                           CLR     R2              ;SIGN SET POSITIVE
 9217  053470  122710  000055                   CMPB    #'-,(R0)        ;SEE IF A MINUS SIGN
 9218  053474  001001                           BNE     2$              ;BRANCH IF NO MINUS SIGN
 9219  053476  112002                           MOVB    (R0)+,R2        ;SAVE FOR LATER USE
 9220  053500  112001                   2$:     MOVB    (R0)+,R1        ;PICKUP THIS CHARACTER
 9221  053502  001427                           BEQ     3$              ;GET OUT IF ZERO
 9222  053504  120127  000054                   CMPB    R1,#',          ;CHECK IF COMMA
 9223  053510  001424                           BEQ     3$              ;GET OUT IF COMMA
 9224  053512  122701  000060                   CMPB    #'0,R1          ;MAKE SURE THIS CHARACTER IS
 9225  053516  003034                           BGT     5$              ;  A DIGIT BETWEEN 0 & 9
 9226  053520  122701  000071                   CMPB    #'9,R1
 9227  053524  002431                           BLT     5$
 9228  053526  032716  170000                   BIT     #170000,(SP)    ;DON'T LET NUMBER GET TO BIG
 9229  053532  001026                           BNE     5$              ;BRANCH IF NUMBER WOULD OVERFLOW
 9230  053534  006316                           ASL     (SP)            ; *2
 9231  053536  011646                           MOV     (SP),-(SP)      ;SAVE FOR LATER
 9232  053540  006316                           ASL     (SP)            ; *4
 9233  053542  006316                           ASL     (SP)            ; *8
 9234  053544  062616                           ADD     (SP)+,(SP)      ; *10
 9235  053546  102420                           BVS     5$              ;OVERFLOW ISN'T ALLOWED
 9236  053550  162701  000060                   SUB     #'0,R1          ;STRIP AWAY THE ASCII JUNK
 9237  053554  060116                           ADD     R1,(SP)         ;ADD IN THIS DIGIT
 9238  053556  102414                           BVS     5$              ;OVERFLOW ISN'T ALLOWED
 9239  053560  000747                           BR      2$              ;LOOP
 9240  053562  005702                   3$:     TST     R2              ;CHECK IF NUMBER IS NEGATIVE
 9241  053564  001401                           BEQ     4$              ;BRANCH IF NO
 9242  053566  005416                           NEG     (SP)            ;YES--NEGATE THE NUMBER
 9243  053570  012666  000010           4$:     MOV     (SP)+,10(SP)    ;SAVE RESULT
 9244  053574  012602                           MOV     (SP)+,R2        ;RESTORE R2
 9245  053576  012601                           MOV     (SP)+,R1        ;RESTORE R1
 9246  053600  012600                           MOV     (SP)+,R0        ;RESTORE R0
 9247  053602  062716  000002                   ADD     #2,(SP)         ;ADJUST RETURN
 9248  053606  000207                           RTS     PC              ;RETURN
 9249
 9250  053610  005726                   5$:     TST     (SP)+           ;CLEAN PARTIAL NUMBER FROM STACK
 9251  053612  012602                           MOV     (SP)+,R2        ;RESTORE R2
 9252  053614  012601                           MOV     (SP)+,R1        ;RESTORE R1
 9253  053616  012600                           MOV     (SP)+,R0        ;RESTORE R0
 9254  053620  013616                           MOV     @(SP)+,(SP)     ;PUT ADDRESS OF ERROR ON STACK
 9255  053622  000207                           RTS     PC              ;TO PROCESS ERROR
 9256                                   .SBTTL  ROUTINE TO SIZE MEMORY
 9257
 9258                                   ;;*****************************************************************
 9259                                   ;*CALL:
 9260                                   ;*      JSR     PC,$SIZE
 9261                                   ;*      RETURN
 9262                                   ;*$LSTAD WILL CONTAIN THE LAST AVAILABLE MEMORY LOCATION
 9263
 9264  053624  010046                   $SIZE:  MOV     R0,-(SP)        ;;SAVE R0 ON THE STACK
```

```
 9265  053626  010146                        MOV     R1,-(SP)        ;;SAVE R1 ON THE STACK
 9266  053630  013746  000004                MOV     @#ERRVEC,-(SP)  ;;SAVE PRESENT ERROR VECTOR PS & PC
 9267  053634  013746  000006                MOV     @#ERRVEC+2,-(SP)
 9268  053640  010600                        MOV     SP,R0           ;;SAVE THE STACK POINTER
 9269                                  ;;SET THE ERRVEC PS TO THE PRESENT PS
 9270  053642  104400                        TRAP                    ;;PUSH OLD PSW AND PC ON STACK
 9271  053644  012637  000006                MOV     (SP)+,@#ERRVEC+2        ;;SAVE THE PSW IN @#ERRVEC+2
 9272  053650  012737  053670  000004        MOV     #7$,@#ERRVEC    ;;SET FOR TIMEOUT
 9273  053656  012701  020000                MOV     #20000,R1       ;;FIRST ADDRESS
 9274  053662  005711                1$:     TST     (R1)            ;;TEST THIS ADDRESS
 9275  053664  005721                        TST     (R1)+           ;;STEP TO NEXT ADDRESS
 9276  053666  000775                        BR      1$              ;;TRY ANOTHER
 9277  053670  162701  000002        2$:     SUB     #2,R1           ;;DROP BACK
 9278  053674  010006                        MOV     R0,SP           ;;RESTORE THE STACK
 9279  053676  012637  000006                MOV     (SP)+,@#ERRVEC+2 ;;RESTORE ERROR VECTOR
 9280  053702  012637  000004                MOV     (SP)+,@#ERRVEC
 9281  053706  010137  053720                MOV     R1,$LSTAD       ;;LAST ADDRESS
 9282  053712  012601                        MOV     (SP)+,R1        ;;RESTORE R1
 9283  053714  012600                        MOV     (SP)+,R0        ;;RESTORE R0
 9284  053716  000207                        RTS     PC
 9285  053720  000000                $LSTAD: .WORD   0               ;;CONTAINS THE LAST ADDRESS
 9286                                  ;;*****************************************************************
 9287
 9288                                  .SBTTL  POWER DOWN AND UP ROUTINES
 9289
 9290                                  ;POWER DOWN ROUTINE
 9291  053722  017737  125212  001404  $PWRDN: MOV     @SWR,SAVSWR     ;SAVE SWITCH REGISTER
 9292  053730  012737  053742  000024        MOV     #$PWRUP,PWRVEC  ;SET UP VECTOR
 9293  053736  000000                        HALT
 9294  053740  000776                        BR      .-2             ;HANG UP
 9295
 9296                                  ;POWER UP ROUTINE
 9297  053742  005037  054046        $PWRUP: CLR     $PWRCT          ;WAIT LOOP FOR THE TTY
 9298  053746  012737  000144  054050        MOV     #100.,$PWRCT+2
 9299  053754  005237  054046        1$:     INC     $PWRCT          ;WAIT FOR THE INCREMENT
 9300  053760  001375                        BNE     1$              ;  OF WORD
 9301  053762  005337  054050                DEC     $PWRCT+2
 9302  053766  001372                        BNE     1$
 9303  053770  012737  053722  000024        MOV     #$PWRDN,PWRVEC  ;SET POWER DOWN VECTOR
 9304  053776  012737  000340  000026        MOV     #PR7,PWRVEC+2   ;PRIORITY 7
 9305  054004  012737  000340  000036        MOV     #PR7,TRAPVEC+2  ;LOCK OUT ALL INTERRUPTS FOR TRAPS
 9306  054012  012706  001100                MOV     #STACK,SP       ;INITIALIZE STACK
 9307  054016  104401  054052                TYPE    ,$POWER         ;REPORT POWER FAIL
 9308  054022  004737  043072                JSR     PC,PRITIM       ;PRINT TIME
 9309  054026  112737  177777  001361        MOVB    #-1,FLAG        ;SET FLAG FOR RESTART SEQUENCE
 9310  054034  013777  001404  125076        MOV     SAVSWR,@SWR     ;RESTORE SWITCH REGISTER
 9311  054042  000137  007150                JMP     PWRSRT          ;RESTART PROGRAM
 9312
 9313  054046  000000  000000        $PWRCT: .WORD   0,0             ;WAIT COUNT FOR TTY
 9314  054052  005015  047520  042527 $POWER: .ASCIZ  <15><12>/POWER/<15><12>
 9315  054060  006522  000012
 9316                                  .EVEN
 9317
 9318                                  .SBTTL  INTEGER MULTIPLY ROUTINE
 9319
 9320                                  ;;*****************************************************************
```

F2

```
                        ;*
                        ;*CALL
                        ;*      MOV     MULTIPLER,-(SP)
                        ;*      MOV     MULTIPLICAND,-(SP)
                        ;*      JSR     PC,$MULT
                        ;*      RETURN                          ;;PRODUCT IS ON THE STACK
                        ;*
                        ;*      STACK   PRODUCT
                        ;*      -----   -------
                        ;*
                        ;*      TOP     LSB'S
                        ;*      +2      MSB'S
                        ;*
                        ;;*****************************************************************

054064                  $MULT:
054064  010046                 MOV     R0,-(SP)        ;;PUSH R0 ON STACK
054066  010146                 MOV     R1,-(SP)        ;;PUSH R1 ON STACK
054070  010246                 MOV     R2,-(SP)        ;;PUSH R2 ON STACK
054072  010346                 MOV     R3,-(SP)        ;;PUSH R3 ON STACK
054074  010446                 MOV     R4,-(SP)        ;;PUSH R4 ON STACK
054076  010546                 MOV     R5,-(SP)        ;;PUSH R5 ON STACK
054100  016605  000016         MOV     16(SP),R5       ;STORE MULTIPLICAND
054104  016603  000020         MOV     20(SP),R3       ;STORE MULTIPLIER
054110  005000                 CLR     R0              ;CLEAR HIGH ORDER WORDS
054112  005001                 CLR     R1
054114  005002                 CLR     R2
054116  005004                 CLR     R4
054120  012746  000041         MOV     #41,-(SP)       ;MOVE 33 DEC TO COUNTER
054124  006000         1$:     ROR     R0
054126  006001                 ROR     R1
054130  006002                 ROR     R2              ;SHIFT TO ADD
054132  006003                 ROR     R3
054134  103003                 BCC     2$              ;NO CARRY NO ADD
054136  060501                 ADD     R5,R1
054140  005500                 ADC     R0              ;ADD DOUBLE PRECISION TO OBTAIN NEW PARTIAL
054142  060400                 ADD     R4,R0           ;PRODUCT
054144  005316         2$:     DEC     (SP)            ;DECREMENT COUNTER
054146  001366                 BNE     1$
054150  005726                 TST     (SP)+           ;REMOVE COUNTER
054152  010266  000020         MOV     R2,20(SP)       ;GET LEAST SIGNIFICANT BITS
054156  010366  000016         MOV     R3,16(SP)       ;GET MOST SIGNIFICANT BITS
054162  012605                 MOV     (SP)+,R5        ;;POP STACK INTO R5
054164  012604                 MOV     (SP)+,R4        ;;POP STACK INTO R4
054166  012603                 MOV     (SP)+,R3        ;;POP STACK INTO R3
054170  012602                 MOV     (SP)+,R2        ;;POP STACK INTO R2
054172  012601                 MOV     (SP)+,R1        ;;POP STACK INTO R1
054174  012600                 MOV     (SP)+,R0        ;;POP STACK INTO R0
054176  000207                 RTS     PC              ;RETURN


                        .SBTTL  RANDOM NUMBER GENERATOR ROUTINE

                        ;;*****************************************************************
                        ;*THIS ROUTINE IS A DOUBLE PRECISION PSEUDO RANDOM NUMBER GENERATOR
                        ;*WITH A RANGE OF 0 TO 2(+33)-1.
```

G2

```
                                ;*CALL:
                                ;*      JSR     PC,$RAND        ;;CALL THE ROUTINE
                                ;*      RETURN                  ;;RETURN HERE THE RANDOM
                                ;*                              ;;NUMBER WILL BE IN
                                ;*                              ;;$HINUM,$LONUM

054200                          $RAND:
054200  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
054202  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
054204  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
054206  013700  054300                  MOV     $LONUM,R0       ;;SET R0 WITH LOW
054212  013701  054276                  MOV     $HINUM,R1       ;;SET R1 WITH HIGH
054216  012702  177771                  MOV     #-7,R2          ;;SET SHIFT COUNT
054222  006300                  1$:     ASL     R0              ;;SHIFT R0 LEFT AND
054224  006101                          ROL     R1              ;;ROTATE CARRY INTO R1 AND
054226  005202                          INC     R2              ;;CHECK FOR DONE
054230  001374                          BNE     1$              ;;CONTINUE SHIFT LOOP
054232  063700  054300                  ADD     $LONUM,R0       ;;ADD NUMBER TO MAKE X 129
054236  005501                          ADC     R1              ;;PROPOGATE CARRY
054240  063701  054276                  ADD     $HINUM,R1       ;;ADD NUMBER TO MAKE X 129
054244  062700  001057                  ADD     #1057,R0        ;;ADD LOW CONSTANT
054250  005501                          ADC     R1              ;;PROPOGATE CARRY
054252  062701  047401                  ADD     #47401,R1       ;;ADD HIGH CONSTANT
054256  010037  054300                  MOV     R0,$LONUM       ;;SAVE R0
054262  010137  054276                  MOV     R1,$HINUM       ;;SAVE R1
054266  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
054270  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
054272  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
054274  000207                          RTS     PC              ;;RETURN
054276  176543          $HINUM: .WORD   176543
054300  123456          $LONUM: .WORD   123456

                                .SBTTL  SINGLE/DOUBLE LENGTH BINARY TO DECIMAL ASCII CONVERT ROUTINES

                                ;;**************************************************************
                                ;*
                                ;*      THESE ROUTINE WIL CONVERT A 16-BIT OR 32-BIT BINARY NUMBER
                                ;*      TO AN UNSIGNED DECIMAL (ASCII) NUMBER.
                                ;*
                                ;*CALL  MOV     #PNTR,-(SP)     ;POINTER TO LOW WORD OF BINARY NUMBER
                                ;*      JSR     PC,$DR2D
                                ;*      RETURN                  ;DECIMAL NUMBER IN $DECVL
                                ;*
                                ;*CALL  MOV     NUM,-(SP)
                                ;*      JSR     PC,$SR2D
                                ;*      RETURN                  ;DECMAL NUMBER IN $DECVL
                                ;*
                                ;;**************************************************************

054302                          $SB2D:
054302  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
054304  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
054306  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
054310  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
054312  010446                          MOV     R4,-(SP)        ;;PUSH R4 ON STACK
054314  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
```

H2

```
 9433  054316  016601  000016                MOV     16(SP),R1       ;STORE NUMBER IN R1
 9434  054322  005002                        CLR     R2              ;CLEAR MOST SIGNIFICANT BITS
 9435  054324  012737  000005  054450        MOV     #5,$DECNT       ;SET UP FOR 5 CONVERSIONS
 9436  054332  012704  054526                MOV     #$TNPW,R4       ;ADDRESS FOR 5 POWER
 9437  054336  012705  054530                MOV     #$TNPW+2,R5
 9438  054342  000421                        BR      $P2D            ;START CONVERSION
 9439
 9440  054344                        $DB2D:
 9441  054344  010046                        MOV     R0,-(SP)        ;;PUSH R0 ON STACK
 9442  054346  010146                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
 9443  054350  010246                        MOV     R2,-(SP)        ;;PUSH R2 ON STACK
 9444  054352  010346                        MOV     R3,-(SP)        ;;PUSH R3 ON STACK
 9445  054354  010446                        MOV     R4,-(SP)        ;;PUSH R4 ON STACK
 9446  054356  010546                        MOV     R5,-(SP)        ;;PUSH R5 ON STACK
 9447  054360  016602  000016                MOV     16(SP),R2       ;PICKUP DATA POINTER
 9448  054364  012201                        MOV     (R2)+,R1        ;PICKUP BINARY NUMBER
 9449  054366  011202                        MOV     (R2),R2
 9450  054370  012737  000012  054450        MOV     #10.,$DECNT     ;SET UP TO DO 10 CONVERSIONS
 9451  054376  012704  054502                MOV     #$TNPWR,R4      ;ADDRESS OF TEN POWER
 9452  054402  012705  054504                MOV     #$TNPWR+2,R5
 9453
 9454  054406  012700  054552        $P2D:   MOV     #$DECVL,R0      ;GET ADDRESS OF "$DECVL" STRING
 9455  054412  005003                $2DEC:  CLR     R3              ;CLEAR PARTIAL
 9456  054414  161401                2$:     SUB     (R4),R1         ;SUBTRACT TEN POWER
 9457  054416  005602                        SBC     R2
 9458  054420  161502                        SUB     (R5),R2
 9459  054422  002402                        BLT     3$              ;BRANCH IF TEN POWER TOO LARGE
 9460  054424  005203                        INC     R3              ;ADD 1 TO PARTIAL
 9461  054426  000772                        BR      2$              ;LOOP
 9462
 9463  054430  062401                3$:     ADD     (R4)+,R1        ;RESTORE SUBTRACTED VALUE
 9464  054432  005502                        ADC     R2
 9465  054434  062402                        ADD     (R4)+,R2
 9466  054436  022525                        CMP     (R5)+,(R5)+     ;MOVE TO NEXT TEN POWER
 9467  054440  052703  000060                BIS     #'0,R3          ;CHANGE IT TO ASCII
 9468  054444  110320                        MOVB    R3,(R0)+        ;SAVE IT
 9469  054446  005327                        DEC     (PC)+           ;DONE?
 9470  054450  000000                $DECNT: .WORD   0
 9471  054452  001357                        BNE     $2DEC           ;BRANCH IF NO
 9472  054454  105020                        CLRB    (R0)+           ;TERMINATOR
 9473  054456  012605                        MOV     (SP)+,R5        ;;POP STACK INTO R5
 9474  054460  012604                        MOV     (SP)+,R4        ;;POP STACK INTO R4
 9475  054462  012603                        MOV     (SP)+,R3        ;;POP STACK INTO R3
 9476  054464  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
 9477  054466  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
 9478  054470  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
 9479  054472  012616                        MOV     (SP)+,(SP)      ;SETUP STACK FOR RETURN
 9480  054474  104401  054552                TYPE    ,$DECVL
 9481  054500  000207                        RTS     PC              ;RETURN
 9482
 9483  054502  145000                $TNPWR: 145000                  ;1.0E09
 9484  054504  035632                        35632
 9485  054506  160400                        160400                  ;1.0E08
 9486  054510  002765                        2765
 9487  054512  113200                        113200                  ;1.0E07
 9488  054514  000230                        230
```

I2

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 9489  054516  041100                          041100                  ;1.0E06
 9490  054520  000017                          17
 9491  054522  103240                          103240                  ;1.0E05
 9492  054524  000001                          1
 9493  054526  023420                  $TNPW:  23420                   ;1.0E04
 9494  054530  000000                          0
 9495  054532  001750                          1750                    ;1.0E03
 9496  054534  000000                          0
 9497  054536  000144                          144                     ;1.0E02
 9498  054540  000000                          0
 9499  054542  000012                          12                      ;1.0E01
 9500  054544  000000                          0
 9501  054546  000001                          1                       ;1.0E00
 9502  054550  000000                          0
 9503  054552  000014                  $DECVL: .BLKB   12.             ;RESERVE STORAGE FOR ASCIZ STRING
 9504                                  .SBTTL  APT COMMUNICATIONS ROUTINE
 9505
 9506                                  ;;**************************************************************
 9507  054566  112737  000001  055032  $ATY1:  MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
 9508  054574  112737  000001  055030  $ATY3:  MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
 9509  054602  000403                          BR      $ATYC
 9510  054604  112737  000001  055032  $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
 9511  054612                          $ATYC:
 9512  054612  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
 9513  054614  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
 9514  054616  105737  055030                  TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
 9515  054622  001450                          BEQ     5$              ;;IF NOT:  BR
 9516  054624  122737  000001  001210          CMPB    #APTENV,$ENV    ;;OPERATING UNDER APT?
 9517  054632  001031                          BNE     3$              ;;IF NOT:  BR
 9518  054634  132737  000100  001211          BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
 9519  054642  001425                          BEQ     3$              ;;IF NOT:  BR
 9520  054644  017600  000004                  MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
 9521  054650  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
 9522  054656  005737  001170          1$:     TST     $MSGTYPE        ;;SEE IF DONE W/ LAST XMISSION?
 9523  054662  001375                          BNE     1$              ;;IF NOT:  WAIT
 9524  054664  010037  001204                  MOV     R0,$MSGAD       ;;PUT ADDR IN MAILBOX
 9525  054670  105720                  2$:     TSTB    (R0)+           ;;FIND END OF MESSAGE
 9526  054672  001376                          BNE     2$
 9527  054674  163700  001204                  SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
 9528  054700  006200                          ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
 9529  054702  010037  001206                  MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
 9530  054706  012737  000004  001170          MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
 9531  054714  000413                          BR      5$
 9532  054716  017637  000004  054742  3$:     MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
 9533  054724  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
 9534  054732  013746  177776                  MOV     177776,-(SP)    ;;PUSH 177776 ON STACK
 9535  054736  004737  051662                  JSR     PC,$TYPE        ;;CALL TYPE MACRO
 9536  054742  000000                  4$:     .WORD   0
 9537  054744                          5$:
 9538  054744  105737  055032          10$:    TSTB    $FFLG           ;;SHOULD REPORT FATAL ERROR?
 9539  054750  001416                          BEQ     12$             ;;IF NOT:  BR
 9540  054752  005737  001210                  TST     $ENV            ;;RUNNING UNDER APT?
 9541  054756  001413                          BEQ     12$             ;;IF NOT:  BR
 9542  054760  005737  001170          11$:    TST     $MSGTYPE        ;;FINISHED LAST MESSAGE?
 9543  054764  001375                          BNE     11$             ;;IF NOT:  WAIT
 9544  054766  017637  000004  001172          MOV     @4(SP),$FATAL   ;;GET ERROR #
```

```
 9545  054774  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
 9546  055002  005237  001170                  INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
 9547  055006  105037  055032          12$:    CLRB    $FFLG           ;;CLEAR FATAL FLAG
 9548  055012  105037  055031                  CLRB    $LFLG           ;;CLEAR LOG FLAG
 9549  055016  105037  055030                  CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
 9550  055022  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
 9551  055024  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
 9552  055026  000207                          RTS     PC              ;;RETURN
 9553  055030     000          $MFLG:  .BYTE   0               ;;MESSG. FLAG
 9554  055031     000          $LFLG:  .BYTE   0               ;;LOG FLAG
 9555  055032     000          $FFLG:  .BYTE   0               ;;FATAL FLAG
 9556          055034                  .EVEN
 9557          000200          APTSIZE=200
 9558          000001          APTENV=001
 9559          000100          APTSPOOL=100
 9560          000040          APTCSUP=040
 9561                          .SBTTL  TRAP DECODER
 9562
 9563                          ;;*************************************************************
 9564                          ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
 9565                          ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
 9566                          ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
 9567                          ;*GO TO THAT ROUTINE.
 9568
 9569  055034  010046          $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
 9570  055036  016600  000002          MOV     2(SP),R0        ;;GET TRAP ADDRESS
 9571  055042  005740                  TST     -(R0)           ;;BACKUP BY 2
 9572  055044  111000                  MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
 9573  055046  006300                  ASL     R0              ;;POSITION FOR INDEXING
 9574  055050  016000  055070          MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
 9575  055054  000200                  RTS     R0              ;;GO TO ROUTINE
 9576
 9577
 9578                          ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO
 9579
 9580  055056  011646          $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
 9581  055060  016666  000004  000002          MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
 9582  055066  000002                  RTI                     ;;RESTORE THE PSW
 9583
 9584                          .SBTTL  TRAP TABLE
 9585
 9586                          ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
 9587                          ;*BY THE "TRAP" INSTRUCTION.
 9588
 9589                          ;       ROUTINE
 9590                          ;       -------
 9591  055070  055056          $TRPAD: .WORD   $TRAP2
 9592  055072  051662                  $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
 9593
 9594
 9595  055074  052750                  $RDCHR  ;;CALL=RDCHR    TRAP+2(104402)  TTY TYPEIN CHARACTER ROUTINE
 9596  055076  052370                  $RDLIN  ;;CALL=RDLIN    TRAP+3(104403)  TTY TYPEIN STRING ROUTINE
```

K2

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 9597                                   .SBTTL  ASCII MESSAGES
 9598
 9599  055100  046111  042514  040507  ILLCOM: .ASCII  /ILLEGAL OPERATOR COMMAND /
 9600  055106  020114  050117  051105
 9601  055114  052101  051117  041440
 9602  055122  046517  040515  042116
 9603  055130     040
 9604  055131     040  037440  005015  ILLCMD: .ASCIZ  /  ?/<15><12>
 9605  055136     000
 9606  055137     104  044522  042526  OPR000: .ASCII  /DRIVE NUMBER /
 9607  055144  047040  046525  042502
 9608  055152  020122
 9609  055154  020060     000          OPR001: .ASCIZ  /0 /
 9610  055157     111  046114  043505  OPR002: .ASCIZ  /ILLEGAL?/<15><12>
 9611  055164  046101  006477  000012
 9612  055172  047125  042504  020122  OPR003: .ASCIZ  /UNDER TEST/
 9613  055200  042524  052123     000
 9614  055205     101  051114  040505  OPR004: .ASCIZ  /ALREADY ASSIGNED?/<15><12>
 9615  055212  054504  040440  051523
 9616  055220  043511  042516  037504
 9617  055226  005015     000
 9618  055231     116  052117  040440  OPR005: .ASCIZ  /NOT ASSIGNED?/<15><12>
 9619  055236  051523  043511  042516
 9620  055244  037504  005015     000
 9621  055251     110  051501  041040  OPR006: .ASCIZ  /HAS BEEN DROPPED FROM TEST SEQUENCE/<15><12>
 9622  055256  042505  020116  051104
 9623  055264  050117  042520  020104
 9624  055272  051106  046517  052040
 9625  055300  051505  020124  042523
 9626  055306  052521  047105  042503
 9627  055314  005015     000
 9628  055317     120  042514  051501  OPR007: .ASCIZ  /PLEASE ENTER COMMAND/<15><12>/*/
 9629  055324  020105  047105  042524
 9630  055332  020122  047503  046515
 9631  055340  047101  006504  025012
 9632  055346     000
 9633  055347     117  042520  040522  OPR008: .ASCIZ  /OPERATOR INITIATED DROP DRIVE DURING WRITE PACK/
 9634  055354  047524  020122  047111
 9635  055362  052111  040511  042524
 9636  055370  020104  051104  050117
 9637  055376  042040  044522  042526
 9638  055404  042040  051125  047111
 9639  055412  020107  051127  052111
 9640  055420  020105  040520  045503
 9641  055426     000
 9642  055427     015  042012  044527  OPR010: .ASCII  <15><12>/DRIVE NUMBER /
 9643  055434  042526  047040  046525
 9644  055442  042502  020122
 9645  055446  020060     000          OPR011: .ASCIZ  /0 /
 9646  055451     104  044522  042526  OPR012: .ASCIZ  /DRIVE WRITE LOCKED/<15><12>
 9647  055456  053440  044522  042524
 9648  055464  046040  041517  042513
 9649  055472  006504  000012
 9650  055476  046101  020114  051104  OPR013: .ASCIZ  /ALL DRIVES CURRENTLY UNDER TEST/<15><12>
 9651  055504  053111  051505  041440
 9652  055512  051125  042522  052116
```

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 9653  055520  054514  052440  042116
 9654  055526  051105  052040  051505
 9655  055534  006524  000012
 9656  055540  047516  042040  044522  OPR014: .ASCIZ  /NO DRIVE IN USE/<15><12>
 9657  055546  042526  044440  020116
 9658  055554  051525  006505  000012
 9659  055562  046101  044514  047107  OPR015: .ASCIZ  /ALLIGNMENT PACK IN DRIVE/<15><12>
 9660  055570  042515  052116  050040
 9661  055576  041501  020113  047111
 9662  055604  042040  044522  042526
 9663  055612  005015     000
 9664  055615     052  042052  044522  DRVSTT: .ASCIZ  /**DRIVE STATISTICS**/<15><12>
 9665  055622  042526  051440  040524
 9666  055630  044524  052123  041511
 9667  055636  025123  006452  000012
 9668  055644  005015  051104  053111  STT000: .ASCII  <15><12>/DRIVE SERIAL NO. /
 9669  055652  020105  042523  044522
 9670  055660  046101  047040  027117
 9671  055666     040
 9672  055667  000003                  STT100: .BLKB   3
 9673  055672     000                          .BYTE   0
 9674  055673     117  042122  051105  STT001: .ASCIZ  /ORDERS PERFORMED /
 9675  055700  020123  042520  043122
 9676  055706  051117  042515  020104
 9677  055714     000
 9678  055715     015  053412  051117  STT002: .ASCIZ  <15><12>/WORDS WRITTEN*65K /
 9679  055722  051504  053440  044522
 9680  055730  052124  047105  033052
 9681  055736  045465  000040
 9682  055747  005015  047527  042122  STT003: .ASCIZ  <15><12>/WORDS READ*65K /
 9683  055750  020123  042522  042101
 9684  055756  033052  045465  000040
 9685  055764  005015  047523  052106  STT004: .ASCIZ  <15><12>/SOFT DATA ERRORS/<15><12>/  FCC /
 9686  055772  042040  052101  020101
 9687  056000  051105  047522  051522
 9688  056006  005015  020040  041505
 9689  056014  020103     000
 9690  056017     015  020012  051040  STT005: .ASCIZ  <15><12>/  REREAD /
 9691  056024  051105  040505  020104
 9692  056032     000
 9693  056033     015  020012  047440  STT006: .ASCIZ  <15><12>/  OFFSET /
 9694  056040  043106  042523  020124
 9695  056046     000
 9696  056047     015  044012  051101  STT007: .ASCIZ  <15><12>/HARD DATA ERRORS /
 9697  056054  020104  040504  040524
 9698  056062  042440  051122  051117
 9699  056070  020123     000
 9700  056073     015  051412  042505  STT008: .ASCIZ  <15><12>/SEEK INCOMPLETES /
 9701  056100  020113  047111  047503
 9702  056106  050115  042514  042524
 9703  056114  020123     000
 9704  056117     015  047412  042520  STT009: .ASCIZ  <15><12>"OPERATION INCOMPLETES/MISPOSITIONS "
 9705  056124  040522  044524  047117
 9706  056132  044440  041516  046517
 9707  056140  046120  052105  051505
 9708  056146  046457  051511  047520
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M2

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 9709  056154  044523  044524  047117
 9710  056162  020123     000
 9711  056165     015  047412  044124  STT010: .ASCIZ  <15><12>/CTHER ERRORS /
 9712  056172  051105  042440  051122
 9713  056200  051117  020123     000
 9714  056205     015  050017  041501  STT011: .ASCIZ  <15><12>/PACK SERIAL NUMBER /
 9715  056212  020113  042523  044522
 9716  056220  046101  047040  046525
 9717  056226  042502  020122
 9718  056237  000013                  STT012: .BLKB   11.
 9719  056245     015  000012          STT013: .ASCIZ  <15><12>
 9720  056250  050103  020125  042111  SYS000: .ASCIZ  /CPU ID=/
 9721  056256  000075
 9722  056260  053117  051105  040514  SYS001: .ASCIZ  /OVERLAY LOADER=/
 9723  056266  020131  047514  042101
 9724  056274  051105  000075
 9725  056300  040515  020130  051124  SYS002: .ASCIZ  /MAX TRANSFER SIZE ( MAX: /
 9726  056306  047101  043123  051105
 9727  056314  051440  055111  020105
 9728  056322  020050  040515  035130
 9729  056330  000040
 9730  056332  024440  000075          SYS003: .ASCIZ  / )=/
 9731  056336  047516  020056  043117  SYS004: .ASCIZ  /NO. OF SOFTWARE COMPARES=/
 9732  056344  051440  043117  053524
 9733  056352  051101  020105  047503
 9734  056360  050115  051101  051505
 9735  056366  000075
 9736  056370  045522  033060  041040  SYS005: .ASCIZ  /RK06 BPS ADD=/
 9737  056376  051525  040440  042104
 9738  056404  000075
 9739  056406  045522  033060  053040  SYS006: .ASCIZ  /RK06 VEC ADD=/
 9740  056414  041505  040440  042104
 9741  056422  000075
 9742  056424  047516  042516  044530  SYS007: .ASCIZ  /NONEXISTENT MEMORY/<15><12>
 9743  056432  052123  047105  020124
 9744  056440  042515  047515  054522
 9745  056446  005015     000
 9746  056451     127  040505  054504  SYS008: .ASCIZ  /READY TO BEGIN PERFORMANCE TESTING/<15><12><12>
 9747  056456  052040  020117  042502
 9748  056464  044507  020116  042520
 9749  056472  043122  051117  040515
 9750  056500  041516  020105  042524
 9751  056506  052123  047111  006507
 9752  056514  005012     000
 9753  056517     123  040524  044524  SYS009: .ASCIZ  /STATISTIC INTERVAL=/
 9754  056524  052123  041511  044440
 9755  056532  052116  051105  040526
 9756  056540  036514     000
 9757  056543     122  030113  020066  SYS010: .ASCIZ  /RK06 PPICK=/
 9758  056550  051120  047511  036527
 9759  056556     000
 9760  056557     120  051101  042515  PAR000: .ASCII  /PARMETERS FOR DRIVE /
 9761  056564  042524  051522  043040
 9762  056572  051117  042040  044527
 9763  056600  042526     040
 9764  056603     060  005015  000012  PAR001: .ASCIZ  /0/<15><12><12>
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 9765  056610  054503  044514  042116  PAR002: .ASCIZ  /CYLINDER MAX,MIN =/
 9766  056616  051105  046440  054101
 9767  056624  046454  047111  036440
 9768  056632     000
 9769  056633     124  040522  045503  PAR003: .ASCIZ  /TRACK MAX,MIN =/
 9770  056640  046440  054101  046454
 9771  056646  047111  036440     000
 9772  056653     123  041505  047524  PAR004: .ASCIZ  /SECTOR MAX,MIN =/
 9773  056660  020122  040515  026130
 9774  056666  044515  020116  000075
 9775  056674  042522  042101  053457  PAR005: .ASCIZ  "READ/WRITE RATIO ="
 9776  056702  044522  042524  051040
 9777  056710  052101  047511  036440
 9778  056716     000
 9779  056717     127  044522  042524  PAR006: .ASCIZ  /WRITE CHECK AFTER WRITE =/
 9780  056724  041440  042510  045503
 9781  056732  040440  052106  051105
 9782  056740  053440  044522  042524
 9783  056746  036440     000
 9784  056751     103  051117  042522  PAR007: .ASCIZ  /CORRECTABLE READ ERROR THRESHOLD =/
 9785  056756  052103  041101  042514
 9786  056764  051040  040505  020104
 9787  056772  051105  047522  020122
 9788  057000  044124  042522  044123
 9789  057006  046117  020104  000075
 9790  057014  047125  047503  051122  PAR008: .ASCIZ  /UNCORRECTABLE READ ERROR THRESHOLD =/
 9791  057022  041505  040524  046102
 9792  057030  020105  042522  042101
 9793  057036  042440  051122  051117
 9794  057044  052040  051110  051505
 9795  057052  047510  042114  036440
 9796  057060     000
 9797  057061     123  042505  020113  PAR009: .ASCIZ  /SEEK ERROR THRESHOLD =/
 9798  057066  051105  047522  020122
 9799  057074  044124  042522  044123
 9800  057102  046117  020104  000075
 9801  057110  047111  044510  044502  PAR010: .ASCIZ  /INHIBIT ERROR CORRECTION AND RETRY =/
 9802  057116  020124  051105  047522
 9803  057124  020122  047503  051122
 9804  057132  041505  044524  047117
 9805  057140  040440  042116  051040
 9806  057146  052105  054522  036440
 9807  057154     000
 9808  057155     117  042520  040522  PAR011: .ASCIZ  /OPERATION COUNT THRESHOLD*65K =/
 9809  057162  044524  047117  041440
 9810  057170  052517  052116  052040
 9811  057176  051110  051505  047510
 9812  057204  042114  033052  045465
 9813  057212  036440     000
 9814  057215     127  051117  051504  PAR012: .ASCIZ  /WORDS TRANSFERRED THRESHOLD*1,049K =/
 9815  057222  052040  040522  051516
 9816  057230  042506  051122  042105
 9817  057236  052040  051110  051505
 9818  057244  047510  042114  030452
 9819  057252  030054  034464  020113
 9820  057260  000075
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 9821  057262  044506  051522  000124  PAR013: .ASCIZ  /FIRST/
 9822  057270  042523  047503  042116  PAR014: .ASCIZ  /SECOND/
 9823  057276     000
 9824  057277     124  044510  042122  PAR015: .ASCIZ  /THIRD/
 9825  057304     000
 9826  057305     106  052517  052122  PAR016: .ASCIZ  /FOURTH/
 9827  057312  000110
 9828  057314  044506  052106  000110  PAR017: .ASCIZ  /FIFTH/
 9829  057322  042440  041530  052514  PAR018: .ASCIZ  / EXCLUDED PACK AREA =/
 9830  057330  042504  020104  040520
 9831  057336  045503  040440  042522
 9832  057344  020101  000075
 9833  057350  044103  047101  042507  PAR019: .ASCIZ  /CHANGE/
 9834  057356     000
 9835  057357     125  040516  046102  PAR020: .ASCIZ  /UNABLE TO GENERATE NEW COMMAND CODE TO/<15><12>
 9836  057364  020105  047524  043440
 9837  057372  047105  051105  052101
 9838  057400  020105  042516  020127
 9839  057406  047503  046515  047101
 9840  057414  020104  052504  020105
 9841  057422  047524  005015
 9842  057426  054105  046103  042125          .ASCIZ  /EXCLUDED PACK AREAS AND MAX TRANSFER SIZE CONFLICT/<15><12>
 9843  057434  042105  050040  041501
 9844  057442  020113  051101  040505
 9845  057450  020123  047101  020104
 9846  057456  040515  020130  051124
 9847  057464  047101  043123  051105
 9848  057472  051440  055111  020105
 9849  057500  047503  043116  044514
 9850  057506  052103  005015     000
 9851  057513     123  046501  046120  PAR021: .ASCIZ  /SAMPLED COMPARES =/
 9852  057520  042105  041440  046517
 9853  057526  040520  042522  020123
 9854  057534  000075
 9855  057536  020040  037477  037477  QUESMK: .ASCIZ  /  ??????  /
 9856  057544  037477  020040     000
 9857  057551     040  000040          BLANKS: .ASCIZ  /  /
 9858  057554  025057  043052  052101  ERR000: .ASCIZ  /***FATAL ERROR***/<15><12><12>
 9859  057562  046101  042440  051122
 9860  057570  051117  025052  006452
 9861  057576  005012     000
 9862  057601     103  047117  051124  ERR001: .ASCIZ  /CONTROLLER CLEAR DID NOT CLEAR ERROR/
 9863  057606  046117  042514  020122
 9864  057614  046103  040505  020122
 9865  057622  044504  020104  047516
 9866  057630  020124  046103  040505
 9867  057636  020122  051105  047522
 9868  057644  000122
 9869  057646  047516  040440  052124  ERR002: .ASCIZ  /NO ATTENTION IN RKASOF/
 9870  057654  047105  044524  047117
 9871  057662  044440  020116  045522
 9872  057670  051501  043117     000
 9873  057675     125  042516  050130  ERR003: .ASCIZ  /UNEXPECTED DATA TYPE ERROR/
 9874  057702  041505  042524  020104
 9875  057710  040504  040524  052040
 9876  057716  050131  020105  051105
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 9877  057724  047522  000122
 9878  057730  051104  053111  020105  ERR004: .ASCIZ  /DRIVE CLEAR DID NOT RESET ATTENTION/
 9879  057736  046103  040505  020122
 9880  057744  044504  020104  047516
 9881  057752  020124  042522  042523
 9882  057760  020124  052101  042524
 9883  057766  052116  047511  000116
 9884  057774  046111  042514  040507  ERR005: .ASCIZ  /ILLEGAL DRIVER COMMAND/
 9885  060002  020114  051104  053111
 9886  060010  051105  041440  046517
 9887  060016  040515  042116     000
 9888  060023     115  046125  044524  ERR006: .ASCIZ  /MULTIPLE DRIVE SELECT/
 9889  060030  046120  020105  051104
 9890  060036  053111  020105  042523
 9891  060044  042514  052103     000
 9892  060051     123  052105  051440  ERR007: .ASCIZ  /SET SWITCH 14 TO CYCLE ON ERROR/<15><12>
 9893  060056  044527  041524  020110
 9894  060064  032061  052040  020117
 9895  060072  054503  046103  020105
 9896  060100  047117  042440  051122
 9897  060106  051117  005015     000
 9898  060113     103  047117  051124  ERR008: .ASCIZ  /CONTROLLER ERROR THRESHOLD EXCEEDED/
 9899  060120  046060  042514  020122
 9900  060126  051105  047522  020122
 9901  060134  044124  042522  044123
 9902  060142  046117  020104  054105
 9903  060150  042503  042105  042105
 9904  060156     000
 9905  060157     104  052101  020101  ERR009: .ASCIZ  /DATA LATE THRESHOLD EXCEEDED/
 9906  060164  040514  042524  052040
 9907  060172  051110  051505  047510
 9908  060200  042114  042440  041530
 9909  060206  042505  042504  000104
 9910  060214  042101  051104  051505  ERR012: .ASCIZ  /ADDRESS CCOD    BAD     SECTOR  DATA/<15><12>
 9911  060222  020123  047507  042117
 9912  060230  020040  020040  040502
 9913  060236  020104  020040  020040
 9914  060244  042523  052103  051117
 9915  060252  020040  040504  040524
 9916  060260  005015
 9917  060267  020040  020040  020040          .ASCIZ  /        DATA    DATA    POS     PAT #/<15><17>
 9918  060276  020040  040504  040524
 9919  060304  040524  020040  020040
 9920  060312  047520  020123  020040
 9921  060320  020040  040520  020124
 9922  060326  006443  000012
 9923  060332  047503  052116  047522  ERR013: .ASCIZ  /CONTROLLER ERROR NOT FLAGGED/<15><12>
 9924  060340  046114  051105  042440
 9925  060346  051122  051117  047040
 9926  060354  052117  043040  040514
 9927  060362  043507  042105  005015
 9928  060370     000
 9929  060371     127  051117  020104  ERR014: .ASCIZ  /WORD COUNT NOT EQUAL 0/<15><12>
 9930  060376  047503  047125  020124
 9931  060404  047516  020124  050505
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 9933  060412  040525  020114  006460
 9934  060420  000012
 9935  060422  052502  020123  042101  ERR015: .ASCIZ  /BUS ADD INCORRECT/<15><12>
 9936  060430  020104  047111  047503
 9937  060436  051122  041505  006524
 9938  060444  000012
 9939  060446  054503  026114  051124  ERR016: .ASCIZ  /CYL,TRK,SEC INCORRECT/<15><12>
 9940  060454  026113  042523  020103
 9941  060462  047111  047503  051122
 9942  060470  041505  006524  000012
 9943  060476  047503  052116  047522  ERR017: .ASCIZ  /CONTROLLER COMMAND TIME OUT/
 9944  060504  046114  051105  041440
 9945  060512  046517  040515  042116
 9946  060520  052040  046511  020105
 9947  060526  052517  000124
 9948  060532  051120  043517  042440  ERR020: .ASCIZ  /PROG ERROR/
 9949  060540  051122  051117     000
 9950  060545     111  046114  043040  ERR021: .ASCIZ  /ILL FUNCT CODE/
 9951  060552  047125  052103  041440
 9952  060560  042117  000105
 9953  060564     106                  ERR022: .BYTE   106
 9954  060565     105  051122  051117          .ASCIZ  /ERROR WHILE WAITING TO REPORT ERROR/
 9955  060572  053440  044510  042514
 9956  060600  053440  044501  044524
 9957  060606  043516  052040  020117
 9958  060614  042522  047520  052122
 9959  060622  042440  051122  051117
 9960  060630     000
 9961  060631     106                  ERR023: .BYTE   106
 9962  060632  047516  026516  054105          .ASCIZ  /NON-EXIST DRV/
 9963  060640  051511  020124  051104
 9964  060646  000126
 9965  060650     106                  ERR024: .BYTE   106
 9966  060651     123  051105  047503          .ASCIZ  /SERCOM PAR/
 9967  060656  020116  040520  000122
 9968  060664     106                  ERR025: .BYTE   106
 9969  060665     125  044516  020124          .ASCIZ  /UNIT FIELD ERR/
 9970  060672  044506  046105  020104
 9971  060700  051105  000122
 9972  060704  005015  047111  020124  ERR026: .ASCIZ  <15><12>/INT FROM DRV NOT UNDER TEST/<15><12>
 9973  060712  051106  046517  042040
 9974  060720  053122  047040  052117
 9975  060726  052440  042116  051105
 9976  060734  052040  051505  006524
 9977  060742  000012
 9978  060744  040510  042122  042040  ERR027: .ASCIZ  /HARD DRV ERR/<15><12>
 9979  060752  053122  042440  051122
 9980  060760  005015     000
 9981  060763     104  053122  051440  ERR028: .ASCIZ  /DRV STATUS CHANGE DID NOT CLR/<15><12>
 9982  060770  040524  052524  020123
 9983  060776  044103  047101  042507
 9984  061004  042040  042111  047040
 9985  061012  052117  041440  051114
 9986  061020  005015     000
 9987  061023     125  042516  050130  ERR030: .ASCIZ  /UNEXPECT ATTN/<15><12>
 9988  061030  041505  020124  052101
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 9989  061036  047124  005015     000
 9990  061043     111  046114  042040  ERR031: .ASCIZ  /ILL DSK ADD/
 9991  061050  045523  040440  042104
 9992  061056     000
 9993  061057     127  052122  046040  ERR032: .ASCIZ  /WRT LOCK ERR/
 9994  061064  041517  020113  051105
 9995  061072  000122
 9996  061074  041501  046040  053517  ERR033: .ASCIZ  /AC LOW/
 9997  061102     000
 9998  061103     123  042520  042105  ERR034: .ASCIZ  /SPEED LOSS/
 9999  061110  046040  051517  000123
10000  061116  051104  020126  054524  ERR035: .ASCIZ  /DRV TYPE ERR/
10001  061124  042520  042440  051122
10002  061132     000
10003  061133     106  051117  040515  ERR036: .ASCIZ  /FORMAT ERR/
10004  061140  020124  051105  000122
10005  061146  047516  026516  054105  ERR037: .ASCIZ  /NON-EXIST DRV FUNCT/
10006  061154  051511  020124  051104
10007  061162  020126  052506  041516
10008  061170  000124
10009  061172     106                  ERR038: .BYTE   106
10010  061173     123  042505  020113          .ASCIZ  /SEEK INCOMP/
10011  061200  047111  047503  051115
10012  061206     000
10013  061207     106                  ERR039: .BYTE   106
10014  061210  051104  020126  043117          .ASCIZ  /DRV OFF TRK/
10015  061216  020106  051124  000113
10016  061224     106                  ERR040: .BYTE   106
10017  061225     115  051511  047520          .ASCIZ  /MISPOS/
10018  061232  000123
10019  061234     126                  ERR042: .BYTE   126
10020  061235     117  042520  040522          .ASCIZ  /OPERAT INCOMP/
10021  061242  020124  047111  047503
10022  061250  050115     000
10023  061253     127                  ERR043: .BYTE   127
10024  061254  042110  020122  051126          .ASCIZ  /HDR VRC ERR/
10025  061262  020103  051105  000122
10026  061270  047516  026516  054105  ERR044: .ASCIZ  /NON-EXIST MEM/
10027  061276  051511  020124  042515
10028  061304  000115
10029  061306  047125  041111  051525  ERR045: .ASCIZ  /UNIBUS PAR/
10030  061314  050040  051101     000
10031  061321     117                  ERR046: .BYTE   117
10032  061322  051104  020126  044524          .ASCIZ  /DRV TIMING ERR/
10033  061330  044515  043516  042440
10034  061336  051122     000
10035  061341     104  052101  020101  ERR047: .ASCIZ  /DATA LATE/<15><12>
10036  061346  040514  042524  005015
10037  061354     000
10038  061355     117                  ERR048: .BYTE   117
10039  061356  040504  040524  041440          .ASCIZ  /DATA CHK/
10040  061364  045510     000
10041  061367     107                  ERR050: .BYTE   107
10042  061370  051127  052111  020105          .ASCIZ  /WRITE CHK ERR/
10043  061376  044103  020113  051105
10044  061404  000122
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10045  061406  054503  020114  042101  ERR051: .ASCI7  /CYL ADDR OVRFLW/
10046  061414  051104  047440  051126
10047  061422  046106  000127
10048  061426     106                  ERR052: .BYTE   106
10049  061427     103  047115  020104          .ASCIZ  /CMND TIME OUT DURING POSITIONING OPERATION/<15><12>
10050  061434  044524  042515  047440
10051  061442  052125  042040  051125
10052  061450  047111  020107  047520
10053  061456  044523  044524  047117
10054  061464  047111  020107  050117
10055  061472  051105  052101  047511
10056  061500  006516  000012
10057  061504     106                  ERR053: .BYTE   106
10058  061505     104  053122  047040          .ASCIZ  /DRV NOT RDY AFTER START SPINDLE/
10059  061512  052117  051040  054504
10060  061520  040440  052106  051105
10061  061526  051440  040524  052122
10062  061534  051440  044520  042116
10063  061542  042514     000
10064  061545     106                  ERR054: .BYTE   106
10065  061546  047526  020114  040526          .ASCIZ  /VOL VALID DID NOT SET AFTER PACK ACK/
10066  061554  044514  020104  044504
10067  061562  020104  047516  020124
10068  061570  042523  020124  043101
10069  061576  042524  020122  040520
10070  061604  045503  040440  045503
10071  061612     000
10072  061613     104  053122  052440  ERR056: .ASCI7  /DRV UNSAFE/
10073  061620  051516  043101  000105
10074  061626  051104  020126  051105  ERR057: .ASCIZ  /DRV ERR NOT INDICATED BY FAULT/<15><12>
10075  061634  020122  047516  020124
10076  061642  047111  044504  040503
10077  061650  042524  020104  054502
10078  061656  043040  052501  052114
10079  061664  005015     000
10080  061667     104  053122  040440  ERR058: .ASCIZ  /DRV ATTN BUT NO FAULT OR DRV STATUS CHANGE/<15><12>
10081  061674  052124  020116  052502
10082  061707  020124  047516  043040
10083  061710  052501  052114  047440
10084  061716  020122  051104  020126
10085  061724  052123  052101  051525
10086  061732  041440  040510  043516
10087  061740  006505  000012
10088  061744  046503  042116  052040  ERR059: .ASCI7  /CMND TIME OUT DRV SEIZED BY OTHER PORT/<15><12>
10089  061752  046511  020105  052517
10090  061760  020124  051104  020126
10091  061766  042523  055111  042105
10092  061774  041040  020131  052117
10093  062002  042510  020122  047520
10094  062010  052122  005015     000
10095  062015     105  041503  046440  ERR060: .ASCI7  /FCC MISCORRECTION/<15><12>
10096  062022  051511  047503  051122
10097  062030  041505  044524  047117
10098  062036  005015     000
10099  062041     104  052101  020101  ERR062: .ASCI7  /DATA COMPARE ERROR/<15><12>
10100  062046  047503  050115  051101
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10101  062054  020105  051105  047522
10102  062062  006527  000012
10103  062066     126                  ERR064: .BYTE   126
10104  062067     115  051511  047520          .ASCIZ  /MISPOS/
10105  062074  000123
10106  062076     106                  ERR065: .BYTE   106
10107  062077     110  040505  020104          .ASCIZ  /HEAD SELECT ERROR/
10108  062104  042523  042514  052103
10109  062112  042440  051122  051117
10110  062120     000
10111  062121     105  041503  046040  ERR066: .ASCIZ  /ECC LOGIC ERROR/
10112  062126  043517  041511  042440
10113  062134  051122  051117     000
10114  062141     122  042513  050103  ERR067: .ASCIZ  /RECPT  RECPS/<15><12>
10115  062146  020124  051040  042513
10116  062154  050103  006523  000012
10117  062162  047527  042122  041440  ERR070: .ASCIZ  /WORD COUNT INVALID/
10118  062170  052517  052116  044440
10119  062176  053116  046101  042111
10120  062204     000
10121  062205     102  051525  040440  ERR071: .ASCIZ  /BUS ADDRESS INVALID/
10122  062213  042104  042522  051523
10123  062220  044440  053116  046101
10124  062226  042111     000
10125  062231     103  046131  047111  ERR072: .ASCIZ  /CYLINDER INVALID/
10126  062236  042504  020122  047111
10127  062244  040526  044514  000104
10128  062252  051124  041501  027513  ERR073: .ASCIZ  "TRACK/SECTOR INVALID"
10129  062260  042523  052103  051117
10130  062266  044440  053116  046101
10131  062274  042111     000
10132  062277     106                  ERR074: .BYTE   106
10133  062300  051105  047522  020122          .ASCIZ  /ERROR IN DRV DID NOT RELOAD HEADS/
10134  062306  047111  042040  053122
10135  062314  042040  042111  047040
10136  062322  052117  051040  046105
10137  062330  040517  020104  042510
10138  062336  042101  000123
10139  062342  052503  051122  047105  ERR100: .ASCII  /CURRENT SUPPLIED/<15><12>
10140  062350  020124  052523  050120
10141  062356  044514  042105  005015
10142  062364  046503  042116  020040          .ASCIZ  /CMND    CYL     TRK     SEC     OFFSET  BUS AD  WRD CT/
10143  062372  020040  054503  020114
10144  062400  020040  020040  051124
10145  062406  020113  020040  020040
10146  062414  042523  020103  020040
10147  062422  020040  043117  051506
10148  062430  052105  020040  052502
10149  062436  020123  042101  020040
10150  062444  051127  020104  052103
10151  062452     000
10152  062453     120  042522  044526  ERR101: .ASCII  /PREVIOUS /<15><12>
10153  062460  052517  020123  005015
10154  062466  046503  042116  020040          .ASCIZ  /CMND    CYL     TRK     SEC     WRD CT/
10155  062474  020040  054503  020114
10156  062502  020040  020040  051124
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10157  062510  020113  020040  020040
10158  062516  042523  020103  020040
10159  062524  020040  051127  020104
10160  062532  052103     000
10161  062535     040  050040  052101  ERR102: .ASCIZ  /  PAT/
10162  062542     000
10163  062543     117  043106  042523  ERR108: .ASCIZ  /OFFSET =/
10164  062550  020124  000075
10165  062554  042110  020061  020040  ERR111: .ASCIZ  /MD1     MD2     MD3/<15><12>
10166  062562  020040  042110  020062
10167  062570  020040  020040  042110
10168  062576  006463  000012
10169  062602  040504  040524  046040  ERR200: .ASCIZ  /DATA LATE WHEN UNLOADING HEADER/
10170  062610  052101  020105  044127
10171  062616  047105  052440  046116
10172  062624  040517  044504  043516
10173  062632  044040  040505  042504
10174  062640  000122
10175  062642  047503  052116  047522  ERR201: .ASCIZ  /CONTROLLER ERROR DURING DRIVE SERVICING/
10176  062650  046114  051105  042440
10177  062656  051122  051117  042040
10178  062664  051125  047111  020107
10179  062672  051104  053111  020105
10180  062700  042523  053122  041511
10181  062706  047111  000107
10182  062712  051105  047522  020122  ERR202: .ASCIZ  /ERROR DURING ERROR RECOVERY/<15><12>
10183  062720  052504  044522  043516
10184  062726  042440  051122  051117
10185  062734  051040  041505  053117
10186  062742  051105  006531  000012
10187  062750  051105  047522  020122  ERR203: .ASCIZ  /ERROR RECOVERY SUCESSFUL/<15><12>
10188  062756  042522  047503  042526
10189  062764  054522  051440  041525
10190  062772  051505  043123  046125
10191  063000  005015     000
10192  063003     105  051122  051117  ERR204: .ASCIZ  /ERROR RECOVERY UNSUCESSFUL/<15><12>
10193  063010  051040  041505  053117
10194  063016  051105  020131  047125
10195  063024  052523  042503  051523
10196  063032  052506  006514  000012
10197  063040  051105  047522  020122  ERR205: .ASCIZ  /ERROR THRESHOLD EXCEEDED/<15><12>
10198  063046  044124  042522  044123
10199  063054  046117  020104  054105
10200  063062  042503  042105  042105
10201  063070  005015     000
10202  063073     121  042525  052123  ERR206: .ASCIZ  /QUESTIONABLE DRIVE STATUS/<15><12>
10203  063100  047511  040516  046102
10204  063106  020105  051104  053111
10205  063114  020105  052123  052101
10206  063122  051525  005015     000
10207  063127     103  047117  051124  ERR207: .ASCIZ  /CONTROLLER TIMED OUT WITH CC SET/<15><12>
10208  063134  046117  042514  020122
10209  063142  044524  042515  020104
10210  063150  052517  020124  044527
10211  063156  044124  043440  020117
10212  063164  042523  006524  000012
```

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10213  063172  051105  047522  020122  ERR208: .ASCIZ  /ERROR WHILE DIAGNOSING/<15><12>
10214  063200  044127  046111  020105
10215  063206  044504  043501  047516
10216  063214  044523  043516  005015
10217  063222     000
10218  063223     127                  ERR209: .BYTE   127
10219  063224  042510  042101  051105          .ASCIZ  /HEADER ERROR/<15><12>
10220  063232  042440  051122  051117
10221  063240  005015     000
10227  063243     052  025052  044506  ERR210: .ASCIZ  /***FIRST ERROR INFO***/<15><12>
10223  063250  051522  020124  051105
10224  063256  047522  020122  047111
10225  063264  047506  025052  006452
10226  063272  000012
10227  063274  045522  047520  020123  ERR211: .ASCIZ  /RKPOS /
10228  063302     000
10229  063303     122  050113  052101  ERR212: .ASCIZ  /RKPAT /
10230  063310  000040
10231  063312  042101  051104  051505  ERR213: .ASCIZ  /ADDRESS OF BEGINNING OF SECTOR IN ERROR /
10232  063320  020123  043117  041040
10233  063326  043505  047111  044516
10234  063334  043516  047440  020106
10235  063342  042523  052103  051117
10236  063350  044440  020116  051105
10237  063356  047522  020122     000
10238  063363     015  042012  052101  ERR214: .ASCIZ  <15><12>/DATA READ/<15><12>
10239  063370  020101  042522  042101
10240  063376  005015     000
10241  063401     122  041513  030523  ERR300: .ASCIZ  /RKCS1   RKCS2   RKWCR   RKBA    RKDA    RKDC    RKASOF  RKER/<15><12>
10242  063406  020040  051040  041513
10243  063414  031123  020040  051040
10244  063422  053513  051103  020040
10245  063430  051040  041113  020101
10246  063436  020040  051040  042113
10247  063444  020101  020040  051040
10248  063452  042113  020103  020040
10249  063460  051040  040513  047523
10250  063466  020106  051040  042513
10251  063474  006522  000012
10252  063500  045522  051504  020040  ERR301: .ASCIZ  /RKDS    RKMR1   RKMR2   RKMR3   RKFOS   RKPAT/<15><12>
10253  063506  020040  045522  051115
10254  063514  020061  020040  045522
10255  063522  051115  020062  020040
10256  063530  045522  051115  020063
10257  063536  020040  045522  047520
10258  063544  020123  020040  045522
10259  063552  040520  006524  000012
10260  063560  045522  051504  005015  ERR302: .ASCIZ  /RKDS/<15><12>
10261  063566     000
10262  063567     015  046412  051505  ERR303: .ASCIZ  <15><12>/ESS       A       B/<15><12>/ 00     /
10263  063574  020123  020040  020040
10264  063602  020040  020101  020040
10265  063610  020040  020040  006502
10266  063616  020012  030060  020040
10267  063624  020040  000040
10268  063630  005015  030040  020061  ERR304: .ASCIZ  <15><12>/ 01     /
```

```
10269  063636  020040  020040     000
10270  063643     015  020012  030061  ERR305: .ASCIZ  <15><12>/ 10     /
10271  063650  020040  020040  000040
10272  063656  005015  030440  020061  ERR306: .ASCIZ  <15><12>/ 11     /
10273  063664  020040  020040     000
10274  063671     125  042516  050130  ERR400: .ASCIZ  /UNEXPECTED MEMORY PARITY TRAP/
10275  063676  041505  042524  020104
10276  063704  042515  047515  054522
10277  063712  050040  051101  052111
10278  063720  020131  051124  050101
10279  063726     000
10280  063727     124  046511  035105  TIM000: .ASCII  /TIME:/
10281  063734  020040  035040  020040  TIM001: .ASCIZ  /   :  :  /<15><17>
10282  063747  020072  006440  000012
10283                                  .EVEN
```

```
10284                                   .SBTTL  *** DUMP MEMORY ***
10285
10286                                   .EVEN
10287  063750  000040                             .BLKW   40              ;RESERVE SPACE FOR STACK
10288  064050  000000                   ..STCK: .WORD   0               ;STORED STACK POINTER
10289
10290  064052  012737  000340  177776  ..DUMP: MOV     #PR7,PS         ;LOCK OUT ALL INTERRUPTS
10291  064060  010637  064050                   MOV     SP,..STCK       ;STORE STACK POINTER
10292  064064  012706  064050                   MOV     #..STCK,SP      ;LOAD STACK POINTER
10293  064070  010546                           MOV     R5,-(SP)        ;;PUSH R5 ON STACK
10294  064072  010446                           MOV     R4,-(SP)        ;;PUSH R4 ON STACK
10295  064074  010346                           MOV     R3,-(SP)        ;;PUSH R3 ON STACK
10296  064076  010246                           MOV     R2,-(SP)        ;;PUSH R2 ON STACK
10297  064100  010146                           MOV     R1,-(SP)        ;;PUSH R1 ON STACK
10298  064102  010046                           MOV     R0,-(SP)        ;;PUSH R0 ON STACK
10299  064104  013705  000224                   MOV     ..LOW,R5        ;STORE FIRST ADDRESS
10300  064110  004737  064442                   JSR     PC,..CR         ;TYPE <CR><LF>
10301  064114  004037  064522                   JSR     R0,..ASCI       ;TYPE R0 =
10302  064120  064630                           ..R0
10303  064122  011646                           MOV     (SP),-(SP)
10304  064124  004737  064546                   JSR     PC,..OCT
10305  064130  004737  064442                   JSR     PC,..CR
10306  064134  004037  064522                   JSR     R0,..ASCI       ;TYPE R1 =
10307  064140  064643                           ..R1
10308  064142  016646  000002                   MOV     2(SP),-(SP)
10309  064146  004737  064546                   JSR     PC,..OCT
10310  064152  004737  064442                   JSR     PC,..CR
10311  064156  004037  064522                   JSR     R0,..ASCI       ;TYPE R2 =
10312  064162  064656                           ..R2
10313  064164  016646  000004                   MOV     4(SP),-(SP)
10314  064170  004737  064546                   JSR     PC,..OCT
10315  064174  004737  064442                   JSR     PC,..CR
10316  064200  004037  064522                   JSR     R0,..ASCI       ;TYPE R3 =
10317  064204  064671                           ..R3
10318  064206  016646  000006                   MOV     6(SP),-(SP)
10319  064212  004737  064546                   JSR     PC,..OCT
10320  064216  004737  064442                   JSR     PC,..CR
10321  064222  004037  064522                   JSR     R0,..ASCI       ;TYPE R4 =
10322  064226  064704                           ..R4
10323  064230  016646  000010                   MOV     10(SP),-(SP)
10324  064234  004737  064546                   JSR     PC,..OCT
10325  064240  004737  064442                   JSR     PC,..CR
10326  064244  004037  064522                   JSR     R0,..ASCI       ;TYPE R5 =
10327  064250  064717                           ..R5
10328  064252  016646  000012                   MOV     12(SP),-(SP)
10329  064256  004737  064546                   JSR     PC,..OCT
10330  064262  004737  064442                   JSR     PC,..CR
10331  064266  004037  064522                   JSR     R0,..ASCI       ;TYPE SP =
10332  064272  064732                           ..SP
10333  064274  013746  064050                   MOV     ..STCK,-(SP)
10334  064300  004737  064546                   JSR     PC,..OCT
10335  064304  004737  064442                   JSR     PC,..CR
10336  064310  004737  064442                   JSR     PC,..CR
10337  064314  004037  064522                   JSR     R0,..ASCI       ;TYPE HEADER
10338  064320  064745                           ..ADD
10339  064322  004737  064442                   JSR     PC,..CR
```

```
10340  064326  004737  064442                  JSR     PC,..CR
10341
10342  064332  010546                  10$:    MOV     R5,-(SP)        ;TYPE ADDRESS
10343  064334  004737  064546                  JSR     PC,..OCT
10344  064340  012703  000004                  MOV     #4,R3           ;TYPE 4 LOCATIONS PER LINE
10345  064344  004037  064522          12$:    JSR     R0,..ASCI
10346  064350  064770                          ..BLNK
10347  064352  012546                          MOV     (R5)+,-(SP)     ;TYPE CONTENTS
10348  064354  004737  064546                  JSR     PC,..OCT
10349  064360  005303                          DEC     R3              ;CHECK IF START OF NEXT LINE
10350  064362  001370                          BNE     12$
10351  064364  004737  064442                  JSR     PC,..CR
10352  064370  005777  114544                  TST     @SWR            ;CHECK IF STOP POINT OUT
10353  064374  100001                          BPL     15$
10354  064376  000000                          HALT
10355  064400  023705  000226          15$:    CMP     ..HIGH,R5       ;CHECK IF FINISHED
10356  064404  103352                          BHIS    10$
10357  064406  004737  064442                  JSR     PC,..CR
10358  064412  004737  064442                  JSR     PC,..CR
10359  064416  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
10360  064420  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
10361  064422  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
10362  064424  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
10363  064426  012604                          MOV     (SP)+,R4        ;;POP STACK INTO R4
10364  064430  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
10365  064432  013706  064050                  MOV     ..STCK,SP       ;RESTORE STACK POINTER
10366  064436  000000                          HALT
10367  064440  000776                          BR      .-2
10368
10369  064442  105777  114502          ..CR:   TSTB    @STPS           ;WAIT FOR READY
10370  064446  100375                          BPL     ..CR
10371  064450  112777  000015  114474          MOVB    #15,@STPB       ;LOAD <CR>
10372  064456  105777  114466          5$:     TSTB    @STPS           ;WAIT FOR READY
10373  064462  100375                          BPL     5$
10374  064464  112777  000012  114460          MOVB    #12,@STPB       ;LOAD <LF>
10375  064472  113701  001155                  MOVB    $FILLS,R1       ;LOAD FILL COUNT
10376  064476  001410                          BEQ     20$             ;RETURN IF NO FILLS
10377  064500  105777  114444          10$:    TSTB    @STPS           ;WAIT FOR READY
10378  064504  100375                          BPL     10$
10379  064506  113777  001154  114436          MOVB    $NULL,@STPB     ;LOAD FILL CHARACTER
10380  064514  005301                          DEC     R1              ;CHECK IF FILL COMPLETE
10381  064516  001370                          BNE     10$
10382  064520  000207                  20$:    RTS     PC              ;RETURN
10383
10384  064522  012001                  ..ASCI: MOV     (R0)+,R1        ;STORE ADDRESS OF ASCII
10385
10386  064524  105711                  1$:     TSTB    (R1)            ;CHECK IF FINISHED
10387  064526  001406                          BEQ     20$
10388  064530  105777  114414          2$:     TSTB    @STPS           ;WAIT FOR READY
10389  064534  100375                          BPL     2$
10390  064536  112177  114410                  MOVB    (R1)+,@STPB     ;TYPE CHARACTER
10391  064542  000770                          BR      1$
10392
10393  064544  000200                  20$:    RTS     R0              ;RETURN
10394
10395  064546  012701  000006          ..OCT:  MOV     #6,R1           ;LOAD DIGIT COUNT INTO R1
```

M3

```
10396  064552  005002                          CLR     R2              ;CLEAR R2 FOR OUTPUT
10397  064554  000407                          BR      10$             ;GET LEADING DIGIT
10398
10399  064556  005002                  5$:     CLR     R2              ;GET OCTAL DIGIT
10400  064560  006366  000002                  ASL     2(SP)
10401  064564  006102                          ROL     R2
10402  064566  006366  000002                  ASL     2(SP)
10403  064572  006102                          ROL     R2
10404  064574  006366  000002          10$:    ASL     2(SP)
10405  064600  006102                          ROL     R2
10406  064602  052702  000060                  BIS     #60,R2          ;MAKE IT ASCII
10407  064606  105777  114336          15$:    TSTB    @$TPS           ;WAIT FOR READY
10408  064612  100375                          BPL     15$
10409  064614  110277  114332                  MOVB    R2,@$TPB        ;TYPE OCTAL DIGIT
10410  064620  005301                          DEC     R1              ;CHECK IF WHOLE WORD PRINTED
10411  064622  001355                          BNE     5$
10412  064624  012616                          MOV     (SP)+,(SP)      ;ADJUST RETURN
10413  064626  000207                          RTS     PC              ;RETURN
10414
10415  064630  030122  036440  020040  ..R0:   .ASCIZ  /P0 =      /
10416  064636  020040  020040     000
10417  064643     122  020061  020075  ..R1:   .ASCIZ  /R1 =      /
10418  064650  020040  020040  000040
10419  064656  031122  036440  020040  ..R2:   .ASCIZ  /R2 =      /
10420  064664  020040  020040     000
10421  064671     122  020063  020075  ..R3:   .ASCIZ  /P3 =      /
10422  064676  020040  020040  000040
10423  064704  032122  036440  020040  ..R4:   .ASCIZ  /P4 =      /
10424  064712  020040  020040     000
10425  064717     122  020065  020075  ..R5:   .ASCIZ  /R5 =      /
10426  064724  020040  020040  000040
10427  064732  050123  036440  020040  ..SP:   .ASCIZ  /SP =      /
10428  064740  020040  020040     000
10429  064745     101  042104  042527  ..ADD:  .ASCIZ  /ADDRESS   CONTENTS/
10430  064752  051523  020040  041440
10431  064760  047117  042524  052116
10432  064766  000123
10433  064770  020040  020040     000  ..BLNK: .ASCIZ  /    /
10434          064776                  .EVEN
10435          064776                  HDBUFF=.
10436          065202                  BUFADD=.+132.
10437  064776  044124  020105  045522  HELP:   .ASCII  /THE RK06-K MUST BE PROPERLY FORMATED 22 SECTORS PER TRACK/<15><12>
10438  065004  033060  045455  046440
10439  065012  051525  020124  042502
10440  065020  050040  047522  042520
10441  065026  046122  020131  047506
10442  065034  046522  052101  042105
10443  065042  031040  020062  042523
10444  065050  052103  051117  020123
10445  065056  042520  020122  051124
10446  065064  041501  006513     012
10447  065071     124  020117  042502          .ASCII  /TO BEGIN PERFORMANCE TESTING TYPE CONTROL-C <^C>/<15><12>
10448  065076  044507  020116  042520
10449  065104  043122  051117  040515
10450  065112  041516  020105  042524
10451  065120  052123  047111  020107
```

A4

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10457  065126  054524  042520  041440
10453  065134  047117  051124  046117
10454  065142  041455  036040  041536
10455  065150  006476     012
10456  065153     114  043505  046101          .ASCII  /LEGAL COMMANDS ARE:/<15><12><12>
10457  065160  041440  046517  040515
10458  065166  042116  020123  051101
10459  065174  035105  005015     012
10460  065201     124  020116  020055          .ASCII  /TN -  TEST DRIVE N/<15><12>
10461  065206  052040  051505  020124
10462  065214  051104  053111  020105
10463  065222  006516     012
10464  065225     127  020116  020055          .ASCII  /WN -  WRITE PACK,VERFY PACK, AND TEST DRIVE N/<15><12>
10465  065232  053440  044522  042524
10466  065240  050040  041501  026113
10467  065246  042526  043122  020131
10468  065254  040520  045503  020054
10469  065262  047101  020104  042524
10470  065270  052123  042040  044522
10471  065276  042526  047040  005015
10472  065304  047123  026440  020040          .ASCII  /SN -  GET STATISTICS ON DRIVE N/<15><12>
10473  065312  042507  020124  052123
10474  065320  052101  051511  044524
10475  065326  051503  047440  020116
10476  065334  051104  053111  020105
10477  065342  006516     012
10478  065345     104  020116  020055          .ASCII  /DN -  DROP DRIVE N AND GET STATISTICS/<15><12><12>
10479  065352  042040  047522  020120
10480  065360  051104  053111  020105
10481  065366  020116  047101  020104
10482  065374  042507  020124  052123
10483  065402  052101  051511  044524
10484  065410  051503  005015     012
10485  065415     116  041440  047101          .ASCII  /N CAN BE 0-7 OR A/<15><12><12>
10486  065422  041040  020105  026460
10487  065430  020067  051117  040440
10488  065436  005015     012
10489  065441     104  052101  020101          .ASCII  /DATA PATTERNS MUST BE WRITTEN BY THE EXERCISER/<15><12>
10490  065446  040520  052124  051105
10491  065454  051516  046440  051525
10492  065462  020124  042502  053440
10493  065470  044522  052124  047105
10494  065476  041040  020131  044124
10495  065504  020105  054105  051105
10496  065512  044503  042523  006527
10497  065520     012
10498  065521     102  043105  051117          .ASCII  /BEFORE PERFORMANCE TESTING/<15><12><12>
10499  065526  020105  042520  043122
10500  065534  051117  040515  041516
10501  065542  020105  042524  052123
10502  065550  047111  006507  005012
10503  065556  025052  053452  051101          .ASCII  /***WARNING*** IF PROCESSOR HALT DURING DATA TRANSFER/<15><12>
10504  065564  044516  043516  025052
10505  065572  020052  043111  050040
10506  065600  047522  042503  051523
10507  065606  051117  044040  046101
```

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10508  065614  020124  052504  044522
10509  065622  043516  042040  052101
10510  065630  020101  051124  047101
10511  065636  043123  051105  005015
10517  065644  020040  020040  052040          .ASCII  /     TO DRIVE, BAD ECC MAY BE WRITTEN ON PACK./<15><12>
10513  065652  020117  051104  053111
10514  065660  026105  041040  042101
10515  065666  042440  041503  046440
10516  065674  054501  041040  020105
10517  065702  051127  052111  042524
10518  065710  020116  047117  050040
10519  065716  041501  027113  005015
10520  065724  020040  020040  042040          .ASCIZ  /     DRIVES MUST BE DROPPED BY PROGRAM OR WITH DROP COMMAND/<15><12><12
10521  065732  044522  042526  020123
10522  065740  052515  052123  041040
10523  065746  020105  051104  050117
10524  065754  042520  020104  054502
10525  065762  050040  047522  051107
10526  065770  046501  047440  020122
10527  065776  044527  044124  042040
10528  066004  047522  020120  047503
10529  066012  046515  047101  006504
10530  066020  005012     000
10531          000001                  .END
```

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ABASE = 177440          ASN3$   013530          BUFADD= 065202          DLTCNT  001622          ERCVY1  037464
ARNORM  024766          ASN4$   013540          BUFER1  022760          DMD   = 000040          ERCVY2  042262
ABN000  025054          ASNREG= 000000          BUFFAL  022114          DRA   = 000001          ERRPRC  001562
APN001  025114          ATESTN= 000000          BUFREL  022316          DRDY  = 000200          ERRPRO  001330
ACDW1 = 000000          AUNIT = 000000          BWAITQ  001320          DROP    012716          ERRVEC= 000004
ACDW2 = 000000          AUSWR = 000000          B.BA16= 000001          DPCPDV  012172          ESS000  057554
ACLO  = 000010          AVAILQ  001314          B.BA17= 000002          DPDT  = 000040          ESR001  057601
ACPUOP= 000000          AVECT1= 120210          B.CDT = 000004          DRPAR = 000010          ESR002  057646
ADDW0 = 000000          AVECT2= 000000          B.CPMT= 000020          DRPDRV= 002000          ESS003  057675
ADDW1 = 000000          A.ABHL  001454          CALSEC  035014          DRVCNT  001626          ESS004  057730
ADDW10= 000000          A.CONT  001456          CALWC   036412          DRVDSC= 000040          ESR005  057774
ADDW11= 000000          A.WORM  001452          CCLR  = 100000          DRVHRD= 000020          ESS006  060023
ADDW12= 000000          BAI   = 000020          CDT   = 002000          DRVMSK= 000007          ESR007  060051
ADDW13= 000000          BA16  = 000400          CERR  = 100000          DRVPDT= 000004          ESR00P  060113
ADDW14= 000000          BA17  = 001000          CPMT  = 010000          DRVPCS= 000002          ESS009  060157
ADDW15= 000000          BDSECT  041560          CMKADD  024506          DRVSTT  055615          ESR012  060214
ADDW2 = 000000          BINOCT  052144          CMKCLK  042574          DRVSZD= 010000          ESR013  060337
ADDW3 = 000000          BIT0  = 000001          CINITQ  001324          DRVUSE= 000001          ESS014  060371
ADDW4 = 000000          BIT00 = 000001          CLEAR = 000105          DRY   = 000200          ESR015  060422
ADDW5 = 000000          BIT01 = 000002          CLKFLG  001374          DR.CLR= 000005          ESR016  060446
ADDW6 = 000000          BIT02 = 000004          CLKFRQ  001353          DR.SEL= 000001          ESR017  060476
ADDW7 = 000000          BIT03 = 000010          CLKINT  042666          DSC   = 040000          ESR020  060532
ADDW8 = 000000          BIT04 = 000020          CLOCK   042760          DSWR  = 177570          ESR021  060545
ADDW9 = 000000          BIT05 = 000040          CLR   = 000040          DTBAIT= 100000          ESR022  060564
ADEVCT= 000000          BIT06 = 000100          CMDTQ = 000100          DTE   = 010000          ESR023  060631
ADEVM = 000000          BIT07 = 000200          CPPBUF  023036          DTYE  = 000040          ESR024  060650
AENV  = 000000          BIT08 = 000400          CNTCNT  001624          D.AWCK= 000000          ESR025  060664
AENVM = 000000          BIT09 = 001000          CNTRL1  026426          D.CERT= 000012          ESS026  060764
APATAL= 000000          BIT1  = 000002          COE   = 001000          D.CTRN= 077777          ESR027  060744
AMADR1= 000000          BIT10 = 002000          CONCLR= 000176          D.CTRL= 177770          ESR02P  060763
AMADR2= 000000          BIT11 = 004000          CONERR  036524          D.MNCL= 000000          ESS030  061023
AMADR3= 000000          BIT12 = 010000          CONMUM  043234          D.MNSC= 000000          ESS031  061043
AMADR4= 000000          BIT13 = 020000          CONTRL  026022          D.MNTR= 000000          ESR032  061057
AMAMS1= 000000          BIT14 = 040000          CPUID   001364          D.MXCL= 000632          ESS033  061074
AMAMS2= 000000          BIT15 = 100000          CR    = 000015          D.MXSC= 000025          ESR034  061103
AMAMS3= 000000          BIT2  = 000004          CRLF  = 000200          D.MXTR= 000007          ESR035  061116
AMAMS4= 000000          BIT3  = 000010          CTO   = 004000          D.RATE= 000003          ESS036  061133
AMSGAD= 000000          BIT4  = 000020          C.INIT  047216          D.SRET= 000005          ESR037  061146
AMSGLG= 000000          BIT5  = 000040          C.OPT   051240          D.UERT= 000005          ESR03P  061177
AMSGTY= 000000          BIT6  = 000100          C.RTRN  050664          D.WTHI= 077777          ESS039  061267
AMTYP1= 000000          BIT7  = 000200          C.SPEC  047746          D.WTLO= 177770          ESS040  061224
AMTYP2= 000000          BIT8  = 000400          DATERR  025100          ECCCOR  025634          ESR042  061234
AMTYP3= 000000          BIT9  = 001000          DCK   = 100000          ECCPAT  001616          ESS043  061253
AMTYP4= 000000          BLANKS  057551          DCLO  = 000020          ECCW  = 020000          ESR044  061270
APASS = 000000          BPTVEC= 000014          DDISP = 177570          ECH   = 000100          ESR045  061306
APRIOR= 000240          BSBA    001656          DDT   = 000400          EC3$    037526          ESR046  061321
APTCSR= 000040          BSCYLN  001652          DECRIN  053452          EC4$    037752          ESS047  061341
APTENV= 000001          BSE   = 000200          DESL  = 000010          EC5$    040056          ESS04R  061355
APTSIZ= 000200          BSSECT  001650          DETOFF  036730          EC6$    040607          ESR050  061367
APTSPD= 000100          BSTRAN  041344          DI    = 040000          EC7$    041110          ESS051  061406
ASNORM  013370          BSTRCK  001651          DISPLA  001142          EMTVEC= 000030          ESR052  061426
ASN1$   013446          BSWC    001654          DISPRE  000174          ERCONT  001560          ESR053  061564
ASN2$   013500          BSWORD  001660          DLT   = 100000          ERCVY   031224          ESS054  061545
```

```
ERR056  061613    E.NOAT= 000002    I.HDAL  044400    OPISTT  030570    PAR014  057270
ERR057  061626    E.SCLR= 000040    I.INTR  043470    OPRCMD  011526    PAR015  057277
ERR058  061667    E.UATT= 000004    I.ISRL  001502    OPR000  055137    PAR016  057305
ERR059  061744    E.UDAT= 000010    I.ISSU  046314    OPR001  055154    PAR017  057314
ERR060  062015    E.UNLD= 020000    I.IOO   043777    OPR002  055157    PAR018  057322
ERR062  062041    E0$     032170    I.RTRN  046214    OPR003  055172    PAR019  057350
ERR064  062066    E1$     032332    I.STAT  046770    OPR004  055205    PAR020  057357
ERR065  062076    E10$    034512    I.STOR  046536    OPR005  055231    PAR021  057513
ERR066  062121    E2$     033034    I.UNLD  045722    OPR006  055251    PASCNT  001356
ERR067  062141    E3$     033372    LDDATA  022532    OPR007  055317    PAT   = 000020
ERR070  062162    E4$     033530    LDEXAR  020166    OPR008  055347    PATTAB  004576
ERR071  062205    E5$     034340    LF    = 000012    OPR010  055427    PAT0    004636
ERR072  062231    FBLKC   001664    MAIN    011270    OPR011  055446    PAT1    004736
ERR073  062252    FBLKT   001666    MAXBUF  001354    OPR012  055451    PAT10   005636
EPR074  062277    FLAG    001361    MCLK  = 000400    OPR013  055476    PAT11   005736
ERR100  062342    FMTE  = 000020    MDS   = 001000    OPR014  055540    PAT12   006036
ERR101  062453    GENERT  020640    MEMBAS= 172100    OPR015  055562    PAT13   006136
ERR102  062535    GETBUF  022016    MEMERR  051642    OP    = 000200    PAT14   006236
ERR103  062543    GETCUR  036150    MEMVEC= 000114    OVLVLD  001365    PAT15   006336
ERR111  062554    GO    = 000001    MERD  = 001000    O.OVER  001507    PAT16   006436
ERR200  062602    HCRC  = 000400    MESMSK= 000017    O.RTRN  051620    PAT17   006536
ERR201  062642    HDBUFF= 064776    MEMD  = 002000    O.WAIT  001462    PAT2    005036
ERR202  062712    HDR.AD  001476    MIND  = 000200    PACK  = 000103    PAT3    005136
ERR203  062750    HDR.CT  001500    MINUTE  001370    PARCYL  001576    PAT4    005236
ERR204  063003    HEAD1   001642    MSP   = 000100    PARM    015756    PAT5    005336
ERR205  063040    HEAD2   001644    M.CADD= 017760    PARMDV  012062    PAT6    005436
ERR206  063073    HEAD3   001646    M.CDIF= 017760    PARM0   001732    PAT7    005536
ERR207  063127    HELP    064776    M.DRV = 000007    PARM1   002210    PPLRT   001520
ERR208  063172    HLT000  030472    M.HEAD= 007000    PARM10  004512    PPSVAL= 001000
ERR209  063223    HOUR    001366    M.ID  = 000003    PARM2   002466    PCA   = 004000
ERR210  063243    HT    = 000011    M.PAR = 100000    PARM3   002744    PCB   = 010000
ERR211  063274    HVRC  = 000400    M.SECT= 000760    PARM4   003222    PERINT  001360
ERR212  063303    HZ      001352    M.SER = 077770    PARM5   003500    PERIOD  001375
ERR213  063312    H.HEAD  001503    MPD   = 010000    PARM6   003756    PCE   = 002000
ERR214  063363    IDAE  = 002000    MEM   = 004000    PARM7   004234    PIP   = 020000
ERR300  063401    IE    = 000100    MERSTT  000522    PARSEC  001606    PIRQ  = 177777
ERR301  063500    ILC   = 000001    MOCHK = 000400    PASSRT  006636    PISCVE= 000240
ERR302  063560    ILF   = 000004    MODSC = 004000    PARTRK  001602    PCSCNT  001662
ERR303  063567    ILLCMD  055131    MORPAL  023676    PAR.EN= 000001    PRDSTT  025774
ERR304  063630    ILLCOM  055100    MORM1   024272    PAR000  056557    PRERMC  035226
ERR305  063643    INTMSK  001510    MORM2   024330    PAR001  056603    PRERAB  017552
EPR306  063656    INTR  = 000300    MXF   = 000004    PAR002  056610    PRCSRT  006667
ERR400  063671    IOTVEC= 000020    OCTBIN  053316    PAR003  056633    PRIBUF  026764
EXAREA  001612    IR    = 000100    OCTSTG  052240    PAR004  056653    PRIREG  025326
E.CCLR= 000001    I.AERR  045452    OFFM12= 000260    PAR005  056674    PRISER  027060
E.CERR= 001000    I.ATTN  044740    OFFM4 = 000220    PAR006  056717    PRISTT  025550
E.CLAT= 000020    I.CCLR  046232    OFFM8 = 000240    PAR007  056751    PRITIM  043072
E.CMTO= 040000    I.CSTS  046664    OFFP12= 000060    PAR008  057014    PRI000  027242
E.CONT  001460    I.CST1  046706    OFFP4 = 000020    PAR009  057061    PRI001  027326
E.DLT = 000400    I.DUAL  046026    OFFP8 = 000040    PAR010  057110    PRI002  027476
E.DPAR= 002000    I.ERR   044154    OFFSET= 000115    PAR011  057155    PRI100  027716
E.ILLD= 000100    I.ERRA  044134    OFST  = 000004    PAR012  057215    PRI200  030076
E.MDS = 100000    I.ERRC  044142    OPI   = 020000    PAR013  057262    PRSTAT  025666
```

```
PR0    = 000000   P.LDPT= 000144   P5$     020022   RTYSCN  001640   SW04  = 000020
PR1    = 000040   P.LSEC= 000140   P6$     020026   RTYSEC  001634   SW05  = 000040
PR2    = 000100   P.LTRK= 000141   P7$     020034   RTYTKR  001635   SW06  = 000100
PR3    = 000140   P.LWC = 000142   P8$     020042   RTYWC   001632   SW07  = 000200
PR4    = 000200   P.MNCL= 000066   P9$     020050   R6     =000006   SW08  = 000400
PR5    = 000240   P.MNSC= 000074   QNEWSW= 000000   R7     =000007   SW09  = 001000
PR6    = 000300   P.MNTR= 000072   QUESNR  057536   SAVSWR  001404   SW1   = 000002
PR7    = 000340   P.MXCD= 000106   Q.INIT= 040000   SCLR   = 000040   SW10  = 002000
PS     = 177776   P.MXCL= 000070   Q.POP   050766   SECOND  001372   SW11  = 004000
PSW    = 177776   P.MXSC= 000075   Q.PUSH  050706   SEEK   = 000117   SW12  = 010000
PWRSRT  007150    P.MXTR= 000073   Q.RMOV  051126   SELDRV= 000101   SW13  = 020000
PWRVEC= 000024   P.MXWT= 000112   Q.SRCH  051042   SRI    = 000002   SW14  = 040000
P.ASOF= 000032   P.NER  = 000206   RDALHD= 000164   SRISTT  030554   SW15  = 100000
P.ASSN= 000210   P.NODR= 000152   RDCHR  = 104402   SOFCMP  001362   SW2   = 000004
P.AWCK= 000077   P.NOPI= 000204   RDDATA= 000121   SPAR   = 020000   SW3   = 000010
P.A00  = 000040   P.NRD  = 000164   RDGATE= 100000   SPDLSS= 000020   SW4   = 000020
P.A01  = 000044   P.NSKI= 000202   RDHEAD= 000125   SRTSPL= 000111   SW5   = 000040
P.A10  = 000050   P.NWRT= 000156   RDLIM  = 104403   STACK  = 001100   SW6   = 000100
P.A11  = 000054   P.OFST= 000006   RDSTAT= 000141   START   C06656   SW7   = 000200
P.BAHI= 000007   P.PKSP= 000226   RDY    = 000200   START$  007240   SW8   = 000400
P.BALO= 000010   P.PRST= 000014   RFCAL  = 000113   STAT    012777   SW9   = 001000
P.BAR  = 000024   P.QLNK= 000064   RFLEAS= 000140   STATDV  012352   SYS000  056250
P.BFCP= 000222   P.RATE= 000076   RESTRT  006646   STATIS  001627   SYS001  056260
P.BUFF= 000145   P.RBAH= 000134   RESTO   007614   STATOO  013004   SYS002  056300
P.B00  = 000042   P.RBAL= 000132   REST1   011214   STELNT= 177774   SYS003  056332
P.B01  = 000046   P.RCMD= 000123   REST2   011230   STT000  055644   SYS004  056336
P.B10  = 000052   P.RCYL= 000124   RESVEC= 000010   STT001  055672   SYS005  056370
P.B11  = 000056   P.RDPT= 000122   RKASOF= 000016   STT002  055715   SYS006  056406
P.CERT= 000100   P.RECT= 000146   RKBA   = 000004   STT003  055742   SYS007  056424
P.CMLG= 000220   P.RERD= 000147   RKBAS   001444   STT004  055764   SYS008  056451
P.CMND= 000001   P.RSEC= 000126   RKCS1  = 000000   STT005  056017   SYS009  056517
P.CS1  = 000016   P.RTRK= 000127   RKCS2  = 000010   STT006  056033   SYS010  056543
P.CS1H= 000007   P.RWC  = 000130   RKDA   = 000006   STT007  056047   S.ACLC= 000100
P.CS2  = 000020   P.SECC= 000176   RKDB   = 000024   STT008  056073   S.BRHW= 000100
P.CYLN= 000002   P.SFCT= 000004   RKDC   = 000020   STT009  056117   S.BRKP= 040000
P.DCYL= 000030   P.SEEK= 000211   RKDCYL= 000020   STT010  056165   S.CART= 000400
P.DPAT= 000121   P.SERL= 000224   RKDS   = 000012   STT011  056205   S.DCLC= 010000
P.DRVN= 000000   P.SRET= 000104   RKECPS= 000030   STT012  056232   S.EIB  = 002000
P.DS   = 000036   P.SMPL= 000116   RKECPT= 000032   STT013  056245   S.DOOR= 000200
P.DSTT= 000150   P.SOFF= 000174   RKER   = 000014   STT1$   030607   S.DRA  = 000040
P.DTS  = 000026   P.SRRD= 000172   RKMP1  = 000026   STT100  055667   S.ERCT= 020000
P.ECMP= 000117   P.TPCK= 000005   RKMR2  = 000034   STT2$   030626   S.DRV  = 000200
P.EPAT= 000062   P.UERT= 000102   RKMR3  = 000036   STT5$   030666   S.ESC  = 040000
P.EPOS= 000060   P.WC   = 000012   RKPAT  = 000032   SUBCLR= 000177   S.FLT  = 000200
P.ER   = 000034   P.WCR  = 000022   RKPOS  = 000030   SURECV  035400   S.FCRW= 001000
P.ERAD= 000217   P0$      015762   RKPRI   001450   SVAL   = 100000   S.FWD  = 002000
P.ERHD= 000214   P1$      017756   RKVEC   001446   SWR     001140   S.HDFL= 000200
P.ERR  = 000212   P10$     020054   RKWC   = 000002   SWREG   000176   S.HDHW= 000040
P.EXAR= 000232   P11$     020070   RLS    = 000010   SW0    = 000001   S.ICYL= 000040
P.HARD= 000200   P12$     020104   RSTAT   036200   SW00   = 000001   S.ILF  = 000400
P.IERC= 000120   P2$      017770   RTYBA   001630   SW01   = 000002   S.LIMD= 020000
P.LCMD= 000135   P3$      020002   RTYCMD  001641   SW02   = 000004   S.LOAD= 010000
P.LCYL= 000136   P4$      020014   RTYCYL  001636   SW03   = 000010   S.MMD  = 000400
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F4

```
S.NMOV= 010000   T.CONT= 000012   $BASE  001244   $HIPTS  001000   $S82D  054362
S.OFF = 002000   T.CS1  001406   $BDADR 001122   $HINUP  054276   $SETUP= 000014
S.PAR = 001000   T.CS2  001410   $BDDAT 001126   $HIOCT  053450   $SIZE  053624
S.PIP = 020000   T.DA   001416   $BELL  001160   $ICNT   001104   $SIUP = 177777
S.PLO = 004000   T.DB   001442   $B2D   054406   $INTAG  001135   $SMP  = 162060
S.REV = 004000   T.DC   001420   $CDW1  001250   $ITEMB  001114   $SWREG 001212
S.RTZ = 020000   T.DLT = 001000   $CDW2  001252   $LF     001166   $TESTN  001174
S.SECT= 000020   T.DS   001426   $CHARC 052140   $LFLG   055031   $TKR    001146
S.SKI = 002000   T.ER   001424   $CNTAG 001100   $LKCSB  001336   $TKINT  052712
S.SPIN= 010000   T.MR1  001430   $CM3  = 000000   $LKCSR  001334   $TKS    001144
S.SPLS= 010000   T.MR2  001432   $CNTLC 053311   $LKS    001342   $TKSRV  052742
S.SPOF= 001000   T.MR3  001434   $CNTLG 052662   $LLVEC  001344   $TN   = 000001
S.TYPE= 000400   T.NER = 000020   $CNTLU 052655   $LOWUP  054300   $TNPM   054526
S.UNLD= 040000   T.PAT  001440   $CPOOP 001216   $LPADR  001106   $TNPMR  054562
S.UNS = 040000   T.POS  001436   $CRLF  001165   $LPERR  001110   $TPB    001152
S.VV  = 000100   T.WCR  001412   $DB2D  054344   $LPVEC  001340   $TPFLG  001157
S.WCLK= 000040   UBXATT= 000010   $DDW0  001254   $LSCS   001346   $TPS    001150
S.WGAT= 000100   UPE   = 000400   $DDW1  001256   $LSDB   001350   $TRAP   055034
S.WLE = 004000   UNLOAD= 000107   $DDW10 001300   $LSTAD  053720   $TRAP2  055056
S.WPL = 004000   UNRECV  030724   $DDW11 001302   $MADR1  001222   $TRP  = 000004
S.XDOK= 000020   UNS   - 040000   $DDW12 001304   $MADR2  001226   $TRPAD  055070
S.XERR= 001000   UPE   = 070000   $DDW13 001306   $MADR3  001232   $TSTN   001004
S1$     011060   VV    = 000100   $DDW14 001310   $MADR4  001236   $TSTNP  001102
S2$     011072   WCE   = 040000   $DDW15 001312   $MAIL   001170   $TTYIN  052024
S3$     011122   WLE   = 004000   $DDW2  001260   $MAPS1  001220   $TYPE   051667
S4$     011160   WRDATA= 000123   $DDW3  001262   $MAPS2  001224   $TYPEC  052074
S5$     011166   WRHEAD= 000127   $DDW4  001264   $MAPS3  001230   $TYPEX  052142
S6$     011172   WRL   = 004000   $DDW5  001266   $MAPS4  001234   $UBIT   001202
S7$     011200   WPTCHK= 000131   $DDW6  001270   $MBADF  001002   $UBITP  001010
S8$     011206   WRTEPK  012526   $DDW7  001272   $MFLG   055030   $USWR   001214
TMITVF= 000014   WRTGAT= 040000   $DDW8  001274   $MMEM   052700   $VECT1  001240
TEST    013250   WRTVER  015076   $DDW9  001276   $MSGAD  001204   $VECT2  001242
TESTDV  011706   WV0$    015140   $DECNT 054450   $MSGLG  001206   $ZDEC   054412
TEST1   013324   WV1$    015626   $DECVL 054552   $MSGTY  001170   .     = 066023
TIMHR   001376   WV2$    015640   $DEVCT 001200   $MSWR   052667   .$X   = 001000
TIMMIN  001400   WV5$    015750   $DEVM  001246   $MTYP1  001221   ..ADD   064745
TIMOUT  025172   WV9$    015754   $ENV   001210   $MTYP2  001225   ..ASCI  064522
TIMSEC  001402   W.DRV   001540   $ENVM  001211   $MTYP3  001231   ..BLNK  064770
TIM000  063727   W.MILI  001466   $ERFLG 001103   $MTYP4  001235   ..CR    064442
TIM001  063734   W.MIN   001474   $ERMAX 001115   $MULT   054064   ..DUMP  064052
TKVEC = 000060   W.MTIM  001464   $ERPPC 001116   $NULL   001154   ..HIGH  000226
TMPCNT  001564   W.SEC   001470   $ERRTB 001314   $PASS   001176   ..LOW   000224
TMPSEC  001572   W.TIME  001506   $ERTTL 001112   $PASTP  001006   ..OCT   064546
TMPTRP  001566   W.WCK = 000200   $ETABL 001210   $PCMEP  054052   ..RO    064630
TPVEC = 000064   W.WTCH  043314   $ETEND 001314   $PERCT  054046   ..R1    064643
TPAPVF= 000034   W.8SEC  001472   $FATAL 001172   $PWRDN  053722   ..R2    064656
TRTVEC= 000014   $APTHD  001000   $FFLG  055032   $PWRUP  053742   ..R3    064671
TSTDEF  020116   $ATVC   054612   $FILLC 001156   $QUES   001164   ..R4    064764
TSTDRP  036714   $ATV1   054566   $FILLS 001155   $RAND   054200   ..R5    064717
TYPE  = 104401   $ATV3   054574   $GDADR 001120   $RDCHP  052250   ..SP    064737
T.ASOF  001422   $ATV4   054604   $GDDAT 001124   $RDLIN  052370   ..STCK  064650
T.BA    001414   $AUTOB  001134   $HD   = 000000   $RDSZ = 000031

. ABS.  066023      000
```

ERROPS DETECTED: 0

,DZR6PB/SOL/EQ:QNEWSW=DRIVE8,DUMP,DZR6P8
RUN-TIME: 30 29 1 SECONDS
RUN-TIME RATIO: 1457/61=23.6
CORE USED: 42K (83 PAGES)