RK611

USER DEFINED TEST
CZR6RC0

AH-9149C-MC

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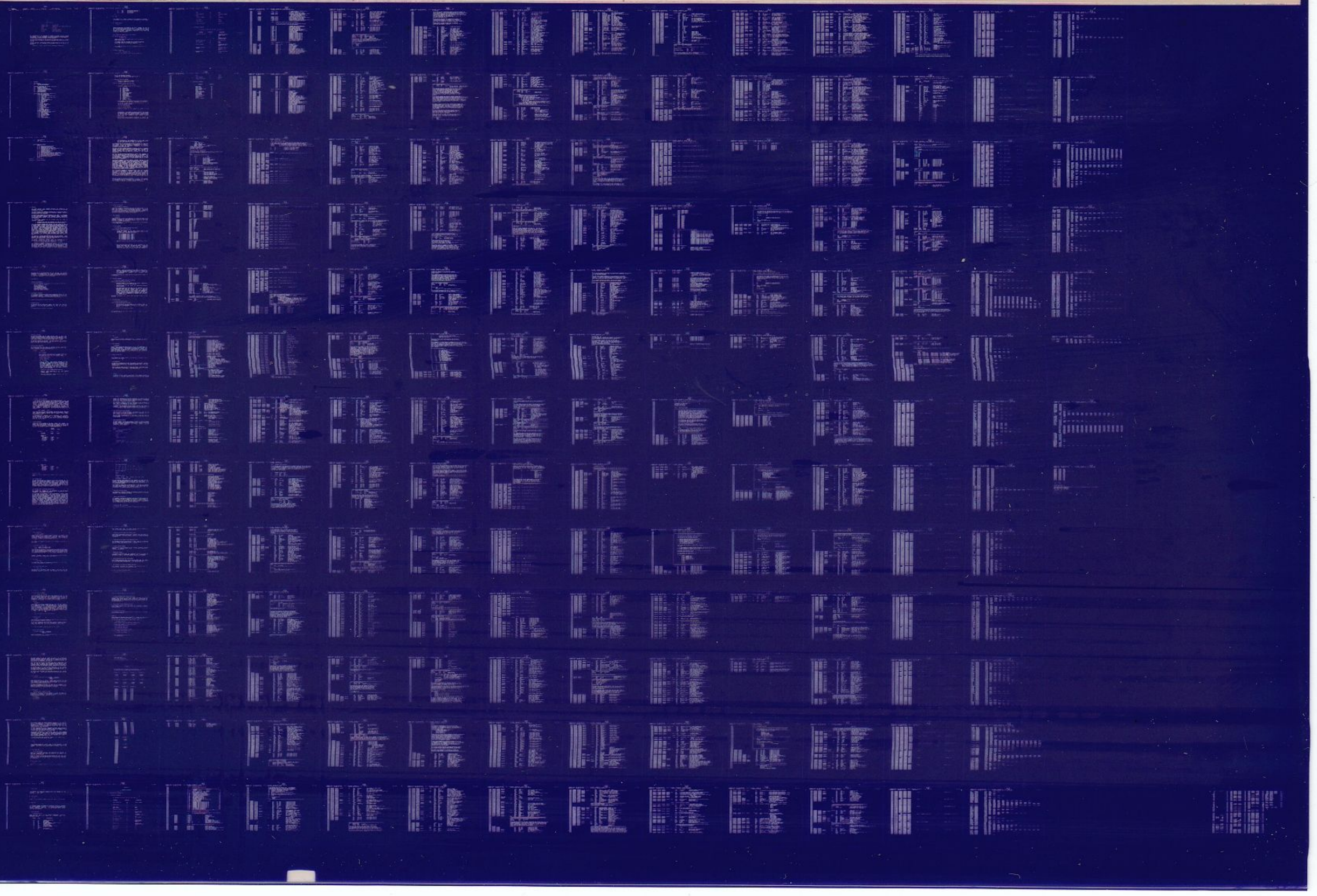
MADE IN USA



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IDENTIFICATION

PRODUCT CODE:	AC-9148C-MC
PRODUCT NAME:	CZR6RCO RK611/06 USER DEFINED TEST
DATE:	FEB 1978
MAINTAINER:	DIAGNOSTIC GROUP
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1.0 ABSTRACT

THE USER DEFINED TEST PROGRAM PROVIDES THE CAPABILITY OF ENTERING, EDITING, SAVING, RECALLING, AND EXECUTING TEST PROGRAMS DESIGNED BY THE USER.

THE USER DEFINED TEST OPERATES INTERACTIVELY TO ALLOW THE USER TO DEVELOP A SPECIFIC TEST MADE UP OF SUBSYSTEM COMMANDS, CHECKING, AND REPORTING IN ANY SEQUENCE.

AN INTERACTIVE COMMAND SET IS DEFINED TO BE USED IN ENTERING, STORING, RETRIEVING, EDITING, AND EXECUTING TESTS. THIS COMMAND SET INCLUDES OTHER COMMANDS THAT PERFORM COMPARE OPERATIONS, CHANGE TEST CONTROL VALUES, INITIALIZE THE BUFFER, AND INITIALIZE THE SUBSYSTEM.

THE INTERACTIVE COMMAND SET IS DIVIDED INTO TWO TYPES OF COMMANDS. THESE ARE:

* DEFERRED WHICH ARE THE COMMANDS THAT MAKE UP THE TESTS.
* IMMEDIATE WHICH ARE EXECUTED WHEN THEY ARE ENTERED.

WHEN THE DEFERRED COMMANDS ARE ENTERED THEY ARE STORED IN CORE IN A SOURCE AREA. EDITING CAN BE DONE ON THE STORED SOURCE TO ADD OR DELETE SPECIFIC LINES. AFTER THE SOURCE HAS BEEN ENTERED, IT IS "COMPILED" INTO OBJECT CODE, STORED IN CORE IN AN OBJECT AREA, AND EXECUTED. ONCE EXECUTION BEGINS, THE SOURCE CODE IS LOST. THE OBJECT CODE IS PRESERVED UNTIL ANOTHER COMPILE AND CAN BE REEXECUTED. EITHER THE SOURCE CODE BEFORE EXECUTION OR THE OBJECT CODE AFTER COMPILATION CAN BE PUNCHED OUT ON PAPER TAPE ALONG WITH ANY SPECIAL DATA PATTERNS ENTERED. CONVERSELY, EITHER TYPE OF CODE CAN BE READ FROM PAPER TAPE. SOURCE CODE IS PLACED IN THE SOURCE AREA AND OBJECT CODE IS PLACED IN THE OBJECT AREA AND EXECUTED. IF SPECIAL DATA PATTERNS WERE PUNCHED, THESE PATTERNS ARE PLACED IN THE APPROPRIATE BUFFER WHEN THE TAPE IS READ.

THE IMMEDIATE COMMANDS ARE EXECUTED WHEN THEY ARE ENTERED. THESE COMMANDS ARE NOT ENTERED INTO THE SOURCE AREA AND DO NOT BECOME PART OF THE COMPILED TEST. THEY CAN BE EXECUTED AT ANY TIME EXCEPT WHILE COMPILING OR EXECUTING A TEST.

THE GENERAL INTERACTIVE COMMAND (WITH THE EXCEPTION OF THE SPECIAL DATA PATTERN COMMAND, SEE PARAGRAPH 8.1.5) FORMAT IS:

    INTERACTIVE COMMAND,PARAMETER1,PARAMETER2,...(RETURN)

THE INTERACTIVE COMMAND IS TESTED FOR LEGALITY. IF IT IS NOT ONE THE DEFINED COMMANDS, THE COMMAND IS REJECTED AND AN ERROR MESSAGE IS PRINTED. THE COMMAND IN ERROR IS ECHOED BACK TO SHOW THE ERROR AND THE ENTIRE COMMAND MUST BE REENTERED. THE PARAMETERS ARE ACCEPTED WITHOUT CHECKING UNLESS SPECIFIC CHECKING IS DEFINED FOR THAT COMMAND IN THE FOLLOWING COMMAND

DESCRIPTIONS.

ANY ONE OR ALL OF THE PARAMETERS MAY BE OMITTED. AN OMITTED PARAMETER WILL DEFAULT TO THE VALUE LAST SPECIFIED FOR THAT PARAMETER. A CARRIAGE RETURN WILL CAUSE THE REMAINING PARAMETERS TO DEFAULT. IF A PARAMETER IS TO BE SPECIFIED AFTER ONE THAT IS OMITTED, THE SEPARATOR (,) MUST BE PROVIDED.

2.0 REQUIREMENTS

2.1 HARDWARE REQUIREMENTS

THE FOLLOWING HARDWARE IS REQUIRED TO RUN THE USER DEFINED TEST:

PDP-11 SYSTEM (16K MEMORY)
CONSOLE TERMINAL
RK06 UNIBUS CONTROLLER
1 TO 8 RK06/RK07 DRIVES
RK06-RK07 DISK CARTRIDGE.
PAPER TAPE READER (OPTIONAL)
PAPER TAPE PUNCH (OPTIONAL)

2.2 PRELIMINARY PROGRAMS

THE CONTROLLER DIAGNOSTIC AND/OR DRIVE DIAGNOSTIC SHOULD BE RUN TO DIAGNOSE FAULTS. HOWEVER, THIS PROGRAM DOES NOT RELY ON AN OPERATIONAL SUBSYSTEM. FEATURES ARE PROVIDED TO FACILITATE LOOPING ON A TEST OR ERROR FOR TROUBLESHOOTING PURPOSES.

3.0 OPERATING PROCEDURE AND CONTROL FUNCTIONS

3.1 PROGRAM LOADING

THE PROGRAM CAN BE LOADED FROM PAPER TAPE USING THE ABSOLUTE LOADER OR FROM ANY MEDIA SUPPORTED BY XXDP BUT IT IS NOT CHAINABLE. IT CAN ALSO BE LOADED BY ACT OR APT IN DUMP MODE ONLY.

THE PROGRAM DOES NOT DESTROY THE LOADER.

3.2 STARTING LOCATIONS

THE STARTING ADDRESS FOR THE USER DEFINED TEST IS 200. THE PROGRAM IDENTIFIES ITSELF, COMPUTES AND TYPES THE MAXIMUM NUMBER OF WORDS FOR DATA TRANSFER COMMANDS (BASED ON MEMORY SIZE), AND TYPES THE MESSAGE "TYPE HP TO PRINT HELP FILE". A STAR (*) IS THEN PRINTED TO SIGNIFY THE PROGRAM IS READY FOR A COMMAND.

THE RESTART ADDRESS IS ALSO 200. THE SAME MESSAGES ARE PRINTED EXCEPT FOR THE "HELP" MESSAGE. THE HELP FILE IS AVAILABLE ONLY WHEN THE PROGRAM IS INITIALLY LOADED.

3.3 CONSOLE SWITCH REGISTER

THE CONSOLE SWITCHES ARE USED TO PROVIDE CONTROL FUNCTIONS. THESE FUNCTIONS AND SWITCH ASSIGNMENTS GENERALLY CONFORM TO THE SYSMAC STANDARD WITH THE EXCEPTIONS NOTED:

SWITCH	FUNCTION
15	HALT ON ERROR
14	LOOP ON TEST. WHEN THE SWITCH IS RESET AFTER THE TEST HAS BEEN LOOPING THE PROGRAM WILL TYPE NNN=NUMBER OF LOOPS. NNN IS A DECIMAL NUMBER.
13	INHIBIT ERROR TYPEOUT
11	INHIBIT INERATION
10	BELL ON ERROR
9	LOOP ON ERROR. THIS SWITCH CONFORMS TO THE STANDARD IN THAT WHEN THE ERROR IS DETECTED, THE TEST PRESENTLY UNDER EXECUTION IS RESTARTED WITH THE FIRST COMMAND. IF THE TEST EVER COMPLETES WITHOUT AN ERROR THE TEST IS AGAIN STARTED FROM THE FIRST COMMAND AS LONG AS SWITCH 9 REMAINS SET. WHEN SWITCH 9 IS RESET THE LOOP WILL TERMINATE AFTER 1 MORE PASS AND TYPE THE NUMBER OF LOOPS AS WHEN SWITCH 9 WAS RESET.
2	INHIBIT ALL DATA COMPARE ERROR REPORTING.
1	WHEN SET FORCE REPORTING OF ALL DATA COMPARE ERRORS. WHEN RESET REPORT ONLY THE FIRST 10 COMPARE ERRORS.
0	WHEN SET FORCE SHORT ERROR REPORT. WHEN RESET FULL ERROR REPORT IS GIVEN.

3.4 'SOFTWARE' SWITCH REGISTER

IF THE PROGRAM IS BEING RUN ON A SWITCHLESS PROCESSOR (I.E. AN 11/04 OR 11/34), THE PROGRAM WILL DETERMINE THAT THE HARDWARE SWITCH REGISTER IS NOT PRESENT AND WILL USE A 'SOFTWARE' SWITCH REGISTER. THE 'SOFTWARE' SWITCH REGISTER IS LOCATED AT LOCATION 176(8). THE SETTINGS OF THE 'SOFTWARE' SWITCHES ARE CONTROLLED THROUGH A KEYBOARD ROUTINE WHICH IS CALLED BY TYPING A 'CONTROL G'. THE PROGRAM WILL RECOGNIZE THE 'CONTROL G' AT ANY TIME EXCEPT WHEN THE PROGRAM IS AT A HIGHER PRIORITY PROCESSING AN RK611 INTERRUPT. THE 'SOFTWARE' SWITCH VALUES ARE ENTERED AS AN OCTAL NUMBER IN RESPONSE TO THE PROMPT FROM THE SWITCH ENTRY ROUTINE:

SWR = NNNNNN NEW ='

EACH TIME SWITCH SETTING ARE ENTERED, THE ENTIRE SWITCH REGISTER IMAGE MUST BE ENTERED. LEADING ZEROS ARE NOT REQUIRED. 'RUBOUT' AND 'CONTROL U' FUNCTIONS MAY BE USED TO CORRECT TYPING ERRORS DURING SWITCH ENTRY.

ON PROCESSORS WITH HARDWARE SWITCH REGISTERS, THE 'SOFTWARE' SWITCH REGISTER MAY BE USED. IF THE PROGRAM FINDS ALL 16 SWITCHES IN THE 'UP' POSITION, ALL SWITCH REGISTER REFERENCES WILL BE TO THE 'SOFTWARE' REGISTER AND THE PROCEDURES DESCRIBED ABOVE MUST BE FOLLOWED.

3.5 UNIBUS ADDRESSES

UNIBUS AND VECTOR ADDRESS OF THE RK06, PAPER TAPE READER, AND PAPER TAPE PUNCH CAN BE CHANGED FROM THE DEFAULT AS PART OF THE PROGRAM STARTUP PROCEDURE. THE METHOD OF CHANGING THE PARAMETERS IS TO ALTER THE MEMORY LOCATIONS SPECIFIED BEFORE THE PROGRAM IS STARTED. THE DEFAULT VALUES OF THESE PARAMETERS ARE:

	UNIBUS ADDRESS	VECTOR
RK06-RK07	277400	210
TAG NAME	RKBAS	RKVEC
LOCATION	23342	23344
PAPER TAPE READER		
DATA BUFFER	177552	
TAG NAME	PTRDB	NOT
LOCATION	1730	USED
STATUS REG	177550	
TAG NAME	PTRSR	
LOCATION	1726	

```
                                        PAPER TAPE
                                        PUNCH
                                          DATA BUFFER     177556
                                          TAG NAME        PTPDB       NOT
                                          LOCATION        1734        USED
                                          STATUS REG      177554
                                          TAG NAME        PTPSR
                                          LOCATION        1732
```

3.6 EXECUTION TIME

EXECUTION TIME WILL DEPEND ON THE SPECIFIC TEST DEFINED BY THE USER.

3.7 TEST PROGRAM SIZE

THE TEST PROGRAM SIZE IS LIMITED BY THE STORAGE PROVIDED IN THE PROGRAM FOR SOURCE AND OBJECT CODE. IT IS NOT POSSIBLE TO SPECIFY THE EXACT MAXIMUM NUMBER OF SOURCE LINES POSSIBLE SINCE THE SOURCE LINES AND THE RESULTANT OBJECT CODE VARIES FROM COMMAND TO COMMAND. HOWEVER, THE APPROXIMATE MAXIMUM IS 200 SOURCE LINES. WHEN THE TEST IS ENTERED AND WHEN THE TEST IS COMPILED CHECKS ARE PERFORMED TO INSURE THAT NEITHER THE SOURCE OR OBJECT CODE WILL EXCEED ITS RESPECTIVE STORAGE.

4.0 USER DEFINED TEST FUNCTIONAL DESCRIPTION

THE INTERACTIVE COMMAND SET IS DESCRIBED IN THE FOLLOWING PARAGRAPHS. THE IMMEDIATE COMMAND SET IS DESCRIBED FIRST, FOLLOWED BY THE DEFERRED COMMAND SET.

THE FOLLOWING IS AN EXAMPLE OF WHAT IS CONSIDERED TYPICAL USAGE OF THE USER DEFINED TEST. THE USER WILL USE THE IMMEDIATE COMMANDS TO SET UP THE ITERATION COUNT AND TIMEOUT, SELECT THE DRIVE, INPUT DATA PATTERNS, ETC. THEN, CHOSING FROM THE DEFERRED COMMANDS, THE TEST IS ENTERED. AT ANY TIME WHILE ENTERING THE TEST THE PRINT AND EDIT COMMANDS MAY BE USED TO DISPLAY AND/OR CHANGE THE ENTERED DEFERRED COMMANDS. AFTER THE TEST HAS BEEN ENTERED AND EDITED, THE COMPILE COMMAND IS EXECUTED. IF THE COMPILE IS SUCCESSFUL (NO ERRORS REPORTED) THE OT,S COMMAND IS EXECUTED TO STORE THE SOURCE AND ALL ENTERED DATA PATTERNS ON PAPER TAPE. THE RUN COMMAND IS THEN USED TO HAVE THE TEST EXECUTED. IF A CHANGE TO THE PROGRAM IS DESIRED, THE SOURCE TYPE IS READ IN, THE EDITING PERFORMED, COMPILED AGAIN, PUNCHED AGAIN, ETC. AT ANY TIME THE OBJECT CODE MAY BE SAVED BY DOING AN OT,O COMMAND TO PUNCH A TAPE WITH THAT CODE.

4.1 IMMEDIATE COMMAND SET

4.1.1 DRIVE SELECTION

DN, DRIVE NUMBER

WHERE DRIVE NUMBER IS A SINGLE DIGIT 0 THROUGH 7 TO SPECIFY THE DRIVE TESTED. THIS DRIVE NUMBER WILL BE USED UNTIL EITHER ALTERED BY ANOTHER DN COMMAND OR A DIFFERENT DRIVE NUMBER IS SPECIFIED AS PART OF A SUBSYSTEM COMMAND (SF). WHEN THE PROGRAM IS INITIALLY LOADED THE DRIVE NUMBER IS SET TO 1.

DN,?

WILL CAUSE THE NUMBER OF THE DRIVE THAT IS PRESENTLY SELECTED TO BE TYPED.

4.1.2 OUTPUT TEST TO PAPER TAPE

OT,O WHERE O IS OBJECT CODE
OT,S WHERE S IS SOURCE CODE

THIS COMMAND IS PROVIDED TO ALLOW EITHER THE SOURCE OR THE OBJECT CODE TO BE PUNCHED. ONLY THE SOURCE CODE CAN BE PUNCHED BEFORE THE "COMPILE COMMAND HAS BEEN ISSUED, BOTH CAN BE PUNCHED AFTER THE "COMPILE" BUT BEFORE THE "RUN", AND ONLY THE OBJECT CODE CAN BE PUNCHED AFTER THE "RUN". ALL TEST SPECIFIC PARAMETERS (DRIVE NUMBER, CYLINDER, TRACK, ETC.), THE USER DEFINED DATA PATTERNS, AND THE RANDOM DATA PATTERN ARE ALSO PUNCHED.

4.1.3 COPY TAPE

CT (COPY TAPE)

THE PAPER TAPE LOADED IN THE READER IS REPRODUCED ON THE PUNCH. IT MAY BE EITHER SOURCE OR OBJECT CODE.

4.1.4 INPUT TEST FROM PAPER TAPE.

IT (INPUT TEST)

THE NEXT TEST ON THE PAPER TAPE IS READ. THE TEST WILL BE RECOGNIZED AS SOURCE OR OBJECT CODE AND THE CODE PLACED IN THE APPROPRIATE BUFFER. CONTROL WILL BE RETURNED TO THE CONSOLE

AFTER THE TEST IS LOADED.

IS (INPUT TEST STRING)

THIS COMMAND DIFFERS FROM THE INPUT TEST COMMAND IN THAT IF THE TEST IS OBJECT CODE, THAT TEST IS IMMEDIATELY EXECUTED AND THE NEXT TEST IS READ FROM TAPE. THIS CONTINUES UNTIL A TEST OF SOURCE CODE IS READ OR ALL TESTS HAVE BEEN EXECUTED (TAPE SUPPLY EXHAUSTED). WHEN A TEST OF SOURCE CODE IS READ CONTROL IS RETURNED TO THE CONSOLE AS FOR THE INPUT TEST COMMAND.

4.1.5 TIME OUT

TO,NNNNN

WHERE NNNNN IS A DECIMAL NUMBER THAT WILL VARY THE TIME DURATION OF A SUBSYSTEM TIMEOUT (SEE PARAGRAPH 4.4). THE VALUE HAS NO RELATIONSHIP TO TIME, IT IS SIMPLY THE NUMBER OF TIMES A SOFTWARE LOOP IS EXECUTED. IT IS PRESET TO 2000. EXPERMENTING WITH VALUES IS SUGGESTED AS THE BEST PROCEDURE TO FIND THE DESIRED VALUE FOR A GIVEN PROCESSOR AND MEMORY CONFIGURATION. THE TIMEOUT FALUE IS OUTPUTED WHEN A TEST IS PUNCHED, EITHER SOURCE OR OBJECT. WHEN THAT TEST IS READ, THE ASSOCIATED TIMEOUT VALUE IS STORED. NNNNN MUST BE 32767(10) OR LESS.

TO,?

WILL CAUSE THE TIME OUT VALUE TO BE PRINTED.

4.1.6 ITERATION COUNT

IC,NNNNN

WHERE NNNNN IS THE DECIMAL NUMBER OF TIMES THE NEXT TEST EXECUTED WILL BE ITERATED (32767(10) OR LESS).

IF THE TEST IS WRITTEN ONTO PAPER TAPE EITHER AS SOURCE OR OBJECT CODE, THE ITERATION COUNT IS ALSO WRITTEN. WHEN THE TEST IS LOADED FROM PAPER TAPE, THE WRITTEN ITERATION COUNT IS USED.

IC,?

WILL TYPE THE CURRENT ITERATION COUNT ON THE CONSOLE.

4.1.7 SPECIAL DATA PATTERNS

```
DP,BUFFER NAME,DDDD----D(RETURN)
               DDDD----D(RETURN)
               (RETURN)
```

WHERE PATTERN NAME IS X, Y, OR Z AND WHERE DDDD----D IS THE OCTAL DATA TO BE USED AS A DATA PATTERN.

THE TOTAL LENGTH OF D IS 32 WORDS OR LESS. TWO CONSECUTIVE CARRIAGE RETURNS TERMINATE DATA PATTERN ENTRY AND A SINGLE CARRIAGE RETURN RETURNS THE CARRIAGE BUT IS IGNORED AS FAR AS THE DATA PATTERN IS CONCERNED. IF LESS THAN 32 WORDS ARE ENTERED THE REMAINDER OF THE WORDS ARE ZERO FILLED.

EACH LINE MUST BE LIMITED TO 8 WORDS (48 ASCII CHARACTERS) PER LINE OR LESS AT WHICH TIME A CARRIAGE RETURN MUST BE TYPED. ALTHOUGH 6 ASCII CHARACTERS ARE REQUIRED TO FILL A SINGLE WORD, A CARRIAGE RETURN AT SOMETHING OTHER THAN MODULE 6 CAUSES LEFT JUSTIFYING OF THE PARTIAL WORD GIVEN AND USING IT AS A FULL WORD.

THE PATTERN NAME (X ,Y, OR Z) MAY BE SPECIFIED IN ANY COMMAND INVOLVING PATTERN SELECTION TO SELECT THE SPECIAL PATTERN. IF THE NAMED SPECIAL PATTERN HAS NOT BEEN DEFINED PRIOR TO ITS USE, A PATTERN OF ALL ZEROS WILL BE SUPPLIED.

THE SPECIAL DATA PATTERNS THAT HAVE BEEN DEFINED WILL BE PUNCHED WITH THE TEST. THESE DATA PATTERNS ARE RETRIEVED WHEN THE TEST IS LOADED.

4.1.8 EDIT BUFFER

```
EB,BUFFER NAME,WORD POSITION,DDDDD----D(RETURN)
                             DDDDD----D(RETURN)
                             (RETURN)
```

WHERE BUFFER NAME IS X, Y, OR Z; WHERE WORD POSITION IS THE FIRST WORD THAT IS TO BE EDITED; AND WHERE DDDD---D IS THE DATA TO BE ENTERED. WORD POSITION IS AN OCTAL NUMBER AND THE FIRST WORD IN THE BUFFER IS SPECIFIED AS 0.

THE ENTRY PROCEDURE IS THE SAME AS FOR THE DP COMMAND. THE SIGNIFICANT DIFFERENCE IS THAT THE BUFFER IS NOT CLEARED AND ANY WORDS NOT CHANGED BY THE EB COMMAND ARE UNCHANGED. AS BEFORE, PARTIAL WORDS ARE LEFT JUSTIFIED AND ZERO FILLED.

4.1.9 BUFFER DUMP

```
BD,BUFFER NAME, NUMBER OF WORDS
```

WHERE BUFFER NAME CAN BE SPECIAL BUFFER X, Y, OR Z, THE READ (R) OR WRITE (W) BUFFER, OR THE HEADER (H) BUFFER (SEE SUBSYSTEM COMMAND READ ALL HEADERS). THE PRINTOUT STARTS WITH WORD 0 AND PRINTS THE NUMBER OF WORDS SPECIFIED (OCTAL).

4.1.10 COMPILE

```
CO,NC,BII
```

THIS COMMAND CAUSES THE STORED DEFERRED COMMANDS TO BE COMPILED INTO A TEST SEQUENCE. THE OPTIONAL PARAMETER (NC) SPECIFIES IF THE TEST IS TO BE RUN IN A CHECK OR NO-CHECK MODE. IF THE PARAMETER IS OMITTED THE TEST WILL BE COMPILED TO BE RUN WITH NORMAL CHECKING. IF THE PARAMETER IS GIVEN THE TEST WILL BE COMPILED FOR NO-CHECK EXECUTION.

NO-CHECK PERTAINS ONLY TO ALL SUBSYSTEM COMMANDS (SEE DESCRIPTION OF THE SUBSYSTEM FUNCTION COMMAND AND THE COMMANDS LISTED IN APPENDIX B.2) WITH THE EXCEPTION OF THE READ ALL HEADER. THIS COMMAND CANNOT BE EXECUTED IN NO-CHECK MODE.

THE OPTIONAL PARAMETER (BII) SPECIFIES THAT ALL DATA TRANSFER OPERATIONS IN THE TEST ARE TO BE EXECUTED WITH "BUS ADDRESS INCREMENT INHIBIT". SPECIFYING BII CAUSES THE PROGRAM TO SUSPEND THE INTERNAL PROGRAM CHECK THAT LOOKS FOR WORD COUNTS THAT ARE GREATER THAN THE BUFFER SIZE, I.E., THE PROGRAM WILL ACCEPT A DATA TRANSFER WORD COUNT OF ANY SIZE.

IT SHOULD BE NOTED THAT AFTER THE COMPILE THE SOURCE CODE IS STILL VALID AND CAN BE EDITED OR SAVED.

4.1.11 RUN

RU

THIS COMMAND CAUSES THE OBJECT CODE TO BE EXECUTED. A RUN COMMAND GIVEN BEFORE A TEST IS COMPILED IS REJECTED WITH AN ERROR MESSAGE. EXECUTING A RUN COMMAND CAUSES THE SOURCE CODE TO BE LOST.

4.1.12 EDIT ADD LINE

EA,LN,NEW COMMAND

WHERE LN IS THE NUMBER (DECIMAL) THAT SPECIFIES THE POSITION OF THE LINE INSERTION AND WHERE NEW COMMAND IS THE COMMAND TO BE INSERTED INTO THE SOURCE.

AFTER THE COMMAND IS EXECUTED THE NEW COMMAND WILL HAVE THE LINE NUMBER LN AND THE LINE NUMBERS FROM THE ENTRY POINT (INCLUDING THE LINE THAT WAS AT THE ENTRY POINT) TO THE END OF THE TEST WILL BE INCREMENTED.

4.1.13 EDIT DELETE LINE

ED,LN

WHERE LN IS THE NUMBER IN DECIMAL OF THE LINE TO BE DELETED.

4.1.14 PRINT TEST

PT

THIS COMMAND WILL CAUSE THE STORED SOURCE TO BE PRINTED ON THE TELETYPE. LINE NUMBERS (DECIMAL) WILL BE PRINTED AT THE BEGINNING OF EACH LINE.

4.1.15 PRINT LINE

PL,LN

WHERE LN IS THE DECIMAL NUMBER OF THE LINE THAT IS TO BE PRINTED.

4.1.16 NEW TEST

NT

THIS COMMAND CAUSES THE PROGRAM TO INITIALIZE ITSELF BY CLEARING THE SOURCE COMMANDS, CLEARING THE COMPILED TEST, AND TERMINATING ANY TEST PRESENTLY EXECUTING. ALL STORED PARAMETERS (DRIVE NUMBER, ITERATION COUNT, STALL, CYLINDER NUMBER, TRACK, SECTOR, ETC.) ARE NOT CHANGED.

4.1.17 PRINT REGISTER

PR,REGISTER SELECT

WHERE REGISTER SELECT IS THE UNIBUS ADDRESSABLE REGISTER, SPECIFIED AS AN OCTAL NUMBER OR A NMEMONIC NAME. THE POSSIBILITIES ARE:

NUMBER	NAME	DESCRIPTION
00	CS1	COMMAND STATUS REG 1
01	WC	WORD COUNT
02	BA	BUS ADDRESS
03	DA	DESIRED ADDRESS - TRACK & SECTOR
04	CS2	COMMAND STATUS REG 2
05	DS	DRIVE STATUS
06	ER	ERROR REGISTER
07	ASOF	ATTENTION SUMMARY & OFFSET
10	DC	DESIRED CYLINDER
11	UNUSED	
12	DB	DATA BUFFER
13	MR1	MAINTENACE REGISTER 1

14	MR2	MAINTENANCE REGISTER 2
15	MR3	MAINTENANCE REGISTER 3
16	POS	ECC/POSITION
17	PAT	ECC/PATTERN

4.1.18 HELP

HP

THIS COMMAND WILL CAUSE A SUMMARY OF THE INTERACTIVE COMMANDS TO BE PRINTED. IT IS VALID ONLY AFTER THE PROGRAM IS FIRST LOADED.

4.1.19 FORMAT SELECT

FT,NN

WHERE NN SPECIFIES THE FORMAT AS AN OCTAL NUMBER (24 FOR 20 SECTOR/TRACK AND 26 FOR 22 SECTOR/TRACK). THE FORMAT DEFAULTS TO 26. THE SELECTED FORMAT APPLIES TO ALL COMMANDS AND WILL REMAIN AS SET UNTIL CHANGED. THIS VALUE IS ALSO OUTPUTTED TO PAPER TAPE AS PART OF THE TEST. CONSEQUENTLY, INPUTTING A TEST CAN ALSO CHANGE THE FORMAT SELECTED.

FT,?

WILL CAUSE THE FORMAT VALUE TO BE PRINTED.

4.1.20 DRIVE TYPE SELECTION

DT,DRIVE TYPE

WHERE DRIVE TYPE IS A SINGLE DIGIT 6 OR 7 TO SPECIFY RK06 OR RK07 RESP.

THIS DRIVE TYPE WILL BE USED UNTIL ALTERED BY ANOTHER DT COMMAND. WHEN THE PROGRAM IS INITIALLY LOADED, THE DRIVE TYPE IS SET TO 6 FOR RK06 OPERATION.

DT,?

WILL CAUSE THE DRIVE TYPE THAT IS PRESENTLY SELECTED TO BE TYPED.

4.2 DEFERRED COMMAND SET

**** IMPORTANT ***

THE DRIVE TYPE CANNOT BE SPECIFIED OR ALTERED BY

ANY OF THE DEFERRED COMMANDS.
IT MUST BE SPECIFIED OR ALTERED ONLY BY THE DT
COMMAND IN THE IMMEDIATE MODE. SEE 4.1.20

4.2.1 SUBSYSTEM FUNCTION COMMAND

SF,SUBSYSTEM COMMAND,DRIVE NUMBER,CCC,T,SS,
NUMBER OF WORDS,DATA PATTERN

WHERE ALL NUMERIC VALUES ARE OCTAL AND:

* SF IS SUBSYSTEM FUNCTION COMMAND.

* SUBSYSTEM COMMAND IS ONE OF THE FOLLOWING:

RD	READ DATA
WD	WRITE DATA
WC	WRITE CHECK
WH	WRITE HEADER
RH	READ HEADER
SK	SEEK
CC	CONTROLLER CLEAR
CS	CLEAR SUBSYSTEM
DC	DRIVE CLEAR
RC	RECALIBRATE
DS	DRIVE SELECT
PA	PACK ACKNOWLEDGE
UL	UNLOAD
SS	START SPINDLE
OF	OFFSET
AH	READ ALL HEADER

* DRIVE NUMBER IS THE NUMBER OF THE DRIVE TO BE ADDRESSED.
IF UNSPECIFIED THE LAST DRIVE ADDRESSED WILL BE USED.

* CCC IS THE CYLINDER ADDRESS OR THE OFFSET VALUE IF THE
SUBSYSTEM COMMAND IS OFFSET.

* T IS THE TRACK ADDRESS

* SS IS THE SECTOR ADDRESS

* NUMBER OF WORDS IS THE NUMBER OF WORDS TO BE

TRANSFERRED. THE NUMBER IS CHECKED AGAINST THE MAXIMUM
ALLOWED CONSISTANT WITH THE BUFFER SIZE. IF THE NUMBER
IS GREATER THAN THE MAXIMUM AN ERROR IS REPORTED WHEN
THE TEST IS COMPILED UNLESS THE COMPILE COMMAND IS GIVEN
WITH THE BII PARAMETER (SEE COMPILE COMMAND
DESCRIPTION).

* DATA PATTERN IS AN ALPHABETIC CHARACTER TO SELECT THE
DESIRED DATA PATTERN FROM THE VARIOUS PATTERNS AVAILABLE

(SEE APPENDIX A). THE CHARACTERS X, Y, OR Z ARE VALID TO USE A USER DEFINED PATTERN. IF THIS PATTERN HAS NOT BEEN DEFINED, DATA OF ALL ZEROS WILL BE USED.

ANY PARAMETER MAY BE OMITTED AND ALLOWED TO DEFAULT TO THE LAST VALUE GIVEN FOR THAT PARAMETER. A CARRIAGE RETURN ANYWHERE IN THE COMMAND ALLOWS THE REMAINING PARAMETERS TO DEFAULT. SEPARATORS (,) MUST BE SUPPLIED IF A PARAMETER IS OMITTED AND FOLLOWING PARAMETERS ARE GIVEN.

OMITTING THE DRIVE NUMBER PARAMETER IS USEFUL TO HAVE A GENERAL PURPOSE TEST THAT CAN BE RUN ON ANY DRIVE ADDRESS. THE IMMEDIATE COMMAND DN CAN BE USED TO SPECIFY THE DESIRED DRIVE BEFORE THE GENERAL PURPOSE TEST IS EXECUTED. NOTE THAT THIS IS NOT APPLICABLE IF MORE THAN ONE DRIVE IS TO BE USED IN THE GENERAL PURPOSE TEST.

OMITTING THE DATA PATTERN PARAMETER WILL CAUSE THIS COMMAND TO USE THE BUFFER AS IT WAS LAST INITIALIZED. IF THE PARAMETER IS GIVEN THE OUTPUT BUFFER IS INITIALIZED AS PART OF THE TEST. THIS IS ESPECIALLY IMPORTANT WHEN EXECUTION SPEED SHOULD BE FAST FOR SCOPING PURPOSES. THE BUFFER INITIALIZE COMMAND CAN BE ENTERED AND EXECUTED AS A SEPARATE TEST TO AVOID BUFFER LOADING IN A TEST WHERE SPEED IS REQUIRED.

THE NO-CHECK CAPABILITY OF THE COMPILE COMMAND APPLIES TO THE SUBSYSTEM COMMANDS THAT ARE LISTED ABOVE (WITH THE EXCEPTION OF THE READ SPECIFIC HEADER). WHEN THE NO-CHECK MODE OF OPERATION IS INVOKED THE CHECKING FUNCTIONS THAT DETECT THE OCCURRANCE OF OPERATION ERRORS OR FAILURES IN THE CONTROLLER OR DRIVE ARE INHIBITED. THE SUBSYSTEM COMMANDS ARE EXECUTED REGARDLESS OF ERROR CONDITIONS AT THE START OF THE COMMAND OR ERROR OCCURRANCE DURING THE COMMAND. THE ONLY REQUIREMENT FOR THE TEST TO PROCEED TO THE NEXT COMMAND IS THE CONTROLLER MUST INDICATE COMMAND COMPLETION BY SETTING "READY". THE IMPLICATION IS THAT WHEN THE NO-CHECK MODE IS USED THE TEST PROGRAM IS RESPONSIBLE FOR TESTING FOR ERRORS AND CLEARING ERROR CONDITIONS.

THE WRITE HEADER COMMAND IS IMPLEMENTED SUCH THAT THE CYLINDER AND TRACK PARAMETERS SPECIFY THE PHYSICAL LOCATION (CYLINDER & TRACK) THAT IS TO BE FORMATTED. THE SECTOR PARAMETER, IF SPECIFIED AS ZERO, CAUSED THE CORRECT HEADER FOR THAT PHYSICAL LOCATION TO BE GENERATED IN THE OUTPUT BUFFER AND WRITTEN. IF THE SECTOR PARAMETER IS NON-ZERO THE CONTENTS OF THE SPECIAL DATA PATTERN BUFFER X, Y, AND Z ARE USED AND WRITTEN AS THE HEADERS ON THAT CYLINDER AND TRACK. THE WRITE HEADER COMMAND

DOES NOT ALTER THE CONTENTS OF BUFFER X, Y, OR Z. THE CONTENTS OF THESE BUFFERS MUST BE SPECIFIED USING THE SPECIAL DATA PATTERN (DP) COMMAND TO LOAD ALL OF BUFFER X, ALL OF BUFFER Y, AND THE FIRST 2 WORDS OF BUFFER Z (66 WORDS REQUIRED FOR HEADERS).

4.2.2 BUFFER INITIALIZE

BI,ALPHABETIC CHARACTER

WHERE THE ALPHABETIC CHARACTER SPECIFIES THE DATA PATTERN TO BE USED (SEE APPENDIX A FOR THE AVAILABLE PATTERNS). THE OUTPUT BUFFER WILL BE INITIALIZED TO THE PATTERN SELECTED. CHARACTERS X, Y, OR Z ARE VALID TO SELECT THE USER DEFINED DATA PATTERN. IF THE SPECIAL DATA PATTERN HAS NOT BEEN USER DEFINED BEFORE IT IS SELECTED A PATTERN OF ALL ZEROS WILL BE USED.

4.2.3 DATA COMPARE

DC,NNNNNN

WHERE NNNNNN IS A OCTAL VALUE SPECIFING THE NUMBER OF WORDS TO BE COMPARED STARTING AT THE BEGINNING OF THE OUTPUT AND INPUT BUFFERS. IF NNNNNN IS OMITTED THE NUMBER OF WORDS IN THE LAST INPUT DATA TRANSFER ARE COMPARED.

A DATA MISCOMPARE WILL CAUSE THE GOOD AND BAD DATA TO BE REPORTED IN THE ERROR REPORT.

4.2.4 STATUS COMPARE

SC,STATUS WORD NUMBER,EXPECTED VALUE,MASK

WHERE ENTERED VALUES ARE OCTAL AND:

* STATUS WORD NUMBER IS THE DRIVE STATUS WORD TO BE COMPARED. STATUS WORDS ARE DESIGNATED 0 THROUGH 7 AND ARE ARBITRARILY ASSIGNED AS FOLLOWS:

  00 IS MESSAGE LINE A WORD 0
  01 IS MESSAGE LINE B WORD 0
  02 IS MESSAGE LINE A WORD 1
  03 IS MESSAGE LINE B WORD 1
  04 IS MESSAGE LINE A WORD 2
  05 IS MESSAGE LINE B WORD 2
  06 IS MESSAGE LINE A WORD 3
  07 IS MESSAGE LINE B WORD 3

* EXPECTED VALUE IS THE VALUE THE STATUS SPECIFIED SHOULD BE.

* MASK SPECIFIES WHICH BITS ARE TO BE COMPARED IN THE STATUS WORD READ AND THE EXPECTED VALUE. A ONE IN A SPECIFIC BIT POSITION ALLOWS THAT BIT POSITION COMPARISON TO OCCUR AND A ZERO INHIBITS COMPARISON. MASK IS INITIALLY SET TO 077777 WHEN THE PROGRAM IS

LOADED. (BIT 15 OF DRIVE STATUS WORDS IS ALWAYS ZERO.) ONCE MASK HAS BEEN SPECIFIED, THAT VALUE IS STORED AND USED FOR SUBSEQUENT SC COMMANDS UNTILL IT IS CHANGED BY A SUBSEQUENT SC COMMAND THAT INCLUDES MASK SPECIFICATION.

A STATUS MISCOMPARE WILL CAUSE THE GOOD AND BAD STATUS WORDS TO BE REPORTED.

4.2.5 REGISTER COMPARE

RC,REGISTER NUMBER,EXPECTED VALUE,MASK

WHERE ENTERED VALUES ARE OCTAL AND:

* REGISTER NUMBER IS THE NUMBER OF THE UNIBUS ADDRESSABLE REGISTER OF THE RK611 TO BE COMPARED.

* EXPECTED VALUE IS THE VALUE THE SPECIFIED REGISTER SHOULD CONTAIN.

* MASK SPECIFIES WHICH BITS ARE TO BE COMPARED IN THE REGISTER READ AND THE EXPECTED VALUE. A ONE IN A SPECIFIC BIT POSITION ALLOWS THAT BIT POSITION COMPARISON TO OCCUR AND A ZERO INHIBITS THAT COMPARISON. MASK IS INITIALLY SET TO 177777 WHEN THE PROGRAM IS LOADED. ONCE THE MASK HAS BEEN SPECIFIED, THAT VALUE IS STORED AND USED IN SUBSEQUENT RC COMMANDS UNTIL THE MASK IS CHANGED BY A SUBSEQUENT RC COMMAND THAT INCLUDES A MASK SPECIFICATION.

REGISTER MISCOMPARE WILL CAUSE GOOD AND BAD VALUES TO BE REPORTED.

4.2.6 REGISTER WRITE

RW,REGISTER SELECT,VALUE

WHERE ENTERED VALUES ARE OCTAL AND:

* REGISTER SELECT IS THE NUMBER OR THE MNEMONIC NAME OF THE UNIBUS ADDRESSABLE REGISTER OF THE RK611 TO BE WRITTEN. (SEE PARAGRAPH 4.1.14 FOR LIST OF NUMBERS AND NAMES.)

* VALUE IS THE VALUE TO BE LOADED.

ANY REGISTER AND ANY VALUE MAY BE SPECIFIED. NO CHECK IS MADE FOR READ ONLY BITS.

4.2.7 STALL

ST,NNNNN

WHERE NNNNN IS A DECIMAL NUMBER SPECIFING A CONSTANT TO DELAY BETWEEN SUBSYSTEM FUNCTION COMMANDS. NNNNN MUST BE 32767(10) OR LESS.

4.2.8 PRINT MESSAGE

PM,MESSAGE

WHERE MESSAGE CAN BE ANY ASCII STRING UP TO 70 CHARACTERS IN LENGTH. THAT MESSAGE IS PRINTED ON THE CONSOLE TERMINAL WHEN THE PM COMMAND IS EXECUTED. THE MESSAGE IS PRINTED ONLY DURING THE FIRST EXECUTION OF THE TEST AFTER A RUN COMMAND IS EXECUTED AND SUPPRESSED DURING SUBSEQUENT TEST ITERATIONS IF THE ITERATION COUNT IS GREATER THAN 1, IF LOOP ON TEST (SW14 SET) OR LOOP ON ERROR (SW9 SET AND ERROR).

4.2.9 UNIBUS INITIALIZE

UI

THIS COMMAND WILL CAUSE A RESET TO BE EXECUTED TO CLEAR ALL UNITS CONNECTED TO THE UNIBUS.

4.3 LINE NUMBERING

AS DEFERRED COMMANDS ARE ENTERED AND STORED, THE PROGRAM ASSIGNS DECIMAL LINE NUMBERS TO THE COMMANDS SEQUENTIALLY. THE LINE NUMBERS ARE USED IN THE EDIT COMMANDS (EA AND ED) AND FOR LINE PRINTING (PL).

WHEN A LINE IS ADDED OR DELETED FROM THE SOURCE, THE STORED LINES ARE RENUMBERED IMMEDIATELY. SUBSEQUENT LINE ORIENTED COMMANDS MUST TAKE THE NEW LINE NUMBERS INTO CONSIDERATION.

4.4 TIMEOUT

TO PREVENT "SILENT DEATH" SITUATIONS (THE PROGRAM STARTS AN OPERATION ON THE RK06 SUBSYSTEM AND THE SUBSYSTEM NEVER SIGNALS COMPLETION) A SOFTWARE TIMER IS EMPLOYED. EACH TIME THE PROGRAM

STARTS AN OPERATION ON THE RK06 SUBSYSTEM. THE TIMER IS USED TO INSURE THAT THE REQUESTED ACTIVITY COMPLETES WITHIN A REASONABLE PERIOD OF TIME. IF THE ACTIVITY DOES NOT COMPLETE, THE PROGRAM WILL DISPLAY A SUBSYSTEM TIMEOUT MESSAGE.

THE REASONABLE PERIOD OF TIME JUST MENTIONED IS NOT CALIBRATED TO REAL TIME. CALIBRATION IS NOT POSSIBLE BECAUSE OF VARIOUS CONFIGURATIONS OF MEMORIES AND PROCESSORS.

TO ENHANCE THE USEFULNESS OF THIS TIMEOUT FEATURE, THE TIMER IS VARIABLE. (SEE TIMEOUT COMMAND DESCRIPTION). THE DEFAULT VALUE OF THE VARIABLE IS LARGE ENOUGH TO INSURE COMMAND COMPLETION.

4.5 TEST LOOPING AND LOOP COUNTERS

USING THE SWITCH OPTIONS PROVIDED, THE PROGRAM WILL LOOP ON THE TEST (SWITCH 14) OR LOOP ON ERROR (SWITCH 9). WHENEVER A TEST IS BEING LOOPED, EACH LOOP IS COUNTED.

THE LOOP COUNT IS REPORTED IN TWO INSTANCES. THESE ARE WHEN AN ERROR OCCURS AND IS REPORTED (SWITCH 13 RESET) AND WHEN LOOPING IS TERMINATED.

5.0 ERROR REPORTING FORMATS

TWO BASIC REPORT FORMATS ARE DEFINED. FORMAT 1 IS FOR ALL ERRORS (EITHER PROGRAM OR HARDWARE DETECTED) WHERE COMMAND PARAMETERS AND RK611 REGISTER CONTENTS ARE APPLICABLE. FORMAT 2 IS FOR COMPARISON ERROR REPORTING, I.E., STATUS COMPARE, REGISTER COMPARE, AND DATA COMPARE.

5.1 FORMAT 1

FORMAT 1 HAS THE FOLLOWING ENTRIES:

```
ERROR MESSAGE
   XXX = CMND LINE NUM
DRIVE=
CMND=
CURRENT OPERATIONS:

PARAMETERS GIVEN:
CYLNDR   SECTOR   TRACK   OFFSET   BAH   BAL   WDC
```

```
1081
1082                                    APPLICABLE REGISTERS:
1083
1084                                    CS1   CS2   WC   BA   DA   DC   ASOF
1085
1086                                    ER    DS    AD   BD
1087
1088                                    A1    B1    A2   B2   A3   B3   ECC/POS   ECC/PAT
1089
1090                                    PREVIOUS OPERATION:
1091
1092                                    DRIVE=
1093
1094                                    CMND=
1095
1096                                    PARAMETERS GIVEN:
1097
1098                                    CYLNDER   SECTOR   TRACK   OFFSET   BAH   BAL   WDC
1099
1100                                    XXXXXXXXXX = NUMBER OF LOOPS
1101
1102                                ALL THE ENTRIES LISTED ABOVE WILL NOT  APPEAR  IN  EVERY  REPORT.
1103                                ENTRIES THAT ARE NOT PERTINENT TO THE OPERATION ARE OMITTED.  FOR
1104                                EXAMPLE, THE PARAMETERS GIVEN ENTRIES ARE  NOT  APPLICABLE  TO  A
1105                                PACK ACKNOWLEDGE OPERATION SO ALL THESE ENTRIES ARE OMITTED IF PA
1106                                IS THE FAILING COMMAND.
1107
1108                                THE NUMBER OF LOOPS ENTRY IS PRINTED ONLY IF THE TEST IS  RUNNING
1109                                WITH  LOOP  ON  ERROR OR LOOP ON TEST SET.  WITH THE EXCEPTION OF
1110                                THE ERROR MESSAGE  ENTRY,  THE  ENTRIES  LISTED  ABOVE  ARE  SELF
1111                                EXPLANATORY.  ALL ERROR MESSAGES ARE LISTED BELOW.
1112
1113
1114
1115                        5.1.1  SUBSYSTEM DETECTED ERROR
1116
1117                            THIS MESSAGE IS PRINTED WHENEVER THE PROGRAM IS ALERTED THAT  THE
1118                            SUBSYSTEM  HAS  DETECTED  AN ERROR.  THIS INCLUDES ALL THE ERRORS
1119                            DETECTED IN THE CONTROLLER OR DRIVE.
1120
1121
1122
1123                        5.1.2  UNSOLICITED ATTENTION
1124
1125                            THIS MESSAGE INDICATES AN INTERRUPT WAS RECEIVED FROM A DRIVE BUT
1126                            NO  OPERATION  HAS BEEN STARTED ON THAT DRIVE.  THIS MESSAGE WILL
1127                            BE SEEN IF WRITE LOCK IS CHANGED OR A DRIVE IS STARTED  MANUALLY.
1128                            THE  MESSAGE IS NOT PRINTED WHEN THE CHANGE OCCURS IF THE PROGRAM
1129                            IS AT COMMAND LEVEL (INTERRUPTS ARE LOCKED OUT) BIT IS PRINTED AS
1130                            SOON AS CARRIAGE RETURN IS TYPED ON THE CONSOLE.
1131
1132
1133
1134                        5.1.3  UNEXPECTED DATA TYPE ERROR
1135
1136                            THIS MESSAGE INDICATES AN INTERRUPT OCCURRED THAT WAS  CAUSED  BY
```

DATA ERROR TYPE (DCK, OPI, HUNC, OR WCE) WHEN NO COMMAND OR A NON-DATA TRANSFER COMMAND WAS BEING EXECUTED.

5.1.4 ATTENTION DID NOT RESET WITH DRIVE CLEAR

THIS MESSAGE INDICATES A DRIVE CLEAR COMMAND WAS NOT ABLE TO RESET THE DRIVE ATTENTION SIGNAL. THIS IS A CATASTROPHIC ERROR FOR THE PROGRAM. THE HIGH ATTENTION SIGNAL WILL CAUSE CONTINUOUS INTERRUPTS.

5.1.5 ATTENTION DID NOT RESET WITH SUBSYSTEM CLEAR

THIS MESSAGE INDICATES AN ERROR OF THE SAME TYPE AS "ATTENTION DID NO RESET WITH DRIVE CLEAR". THE DIFFERENCE IS THAT THE SUBSYSTEM CLEAR GENERATES RESET TO ALL DRIVES.

5.1.6 ILLEGAL DRIVER COMMAND

THIS MESSAGE IS AN INDICATION OF AN INTERNAL PROGRAM INTERLAU PROBLEM. IT SHOULD NEVER APPEAR. IF IT DOES, PLEASE NOTIFY DIAGNOSTIC ENGINEERING.

5.1.7 SUBSYSTEM TIMEOUT

THIS MESSAGE INDICATES THAT THE SUBSYSTEM FAILED TO SEND AN INTERRUPT WITHIN A REASONABLE PERIOD OF TIME. "REASONABLE" IS SUFFICIENTLY LONG SO THAT THE INTERRUPT SHOULD HAVE OCCURRED.

5.1.8 CLEAR CONTROLLER DID NOT CLEAR ERROR

THIS MESSAGE INDICATES THAT THE CONTROLLER ERROR WAS NOT RESET WHEN A CONTROLLER CLEAR WAS DONE. THIS HAS THE SAME IMPLICATION AS "DRIVE HARD ERROR" MESSAGE BUT AT THE CONTROLLER LEVEL.

5.1.9 NO ATTENTION IN ATTENTION SUMMARY REGISTER

THIS MESSAGE INDICATES AN INTERRUPT WAS RECEIVED FROM THE CONTROLLER BUT NO DRIVE HAS RAISED ATTENTION.

5.1.10 DATA LATE WHEN UNLOADING HEADER

THIS MESSAGE IS PERTINENT TO THE READ ALL HEADER COMMAND AND

INDICATES PROBLEM REACHING THE DATA BUFFER.

5.1.11 CONTROLLER ERROR WHILE DRIVER SERVICING

THIS MESSAGE INDICATES A CONTROLLER ERROR OCCURRED WHILE THE PROGRAM WAS DOING SERVICE TYPE OPERATIONS. THESE SERVICE OPERATIONS ARE OF THE "DRIVE SELECT" OR "DRIVE CLEAR" NATURE AND ARE PERFORMED WHEN THE PROGRAM IS GATHERING STATUS FOR REPORTING, CLEARING ERRORS, ETC.

5.1.12 DRIVE PARITY WHILE GATHERING STATUS

THIS MESSAGE INDICATES THAT THE DRIVE HAS DETECTED A SERCON PARITY ERROR WHILE THE PROGRAM WAS DOING THE SERVICE OPERATION DESCRIBED ABOVE.

5.1.13 MULTIPLE DRIVE SELECT

THIS MESSAGE IS SELF-EXPLANATORY AND WILL APPEAR WITH A SUBSYSTEM DETECTED ERROR MESSAGE.

5.2 FORMAT 2

THREE ERRORS ARE REPORTED USING FORMAT 2. THESE ARE REGISTER COMPARE ERROR, STATUS COMPARE ERROR, AND DATA COMPARE ERROR.

THE REGISTER AND STATUS COMPARE ERROR REPORT FORMAT IS:

```
    XXX=CMND LINE NUM
ERROR MESSAGE (STATUS OR REGISTER COMPARE ERROR)
NN=REGISTER NUMBER OF STATUS WORD NUMBER
(VALUE EXPECTED)=GOOD DATA
(VALUE RECEIVED)=BAD DATA
(SPECIFIED MASK)=NUMBER OF LOOPS
```

THE DATA COMPARE ERROR REPORT FORMAT IS:

```
    XXX=CMND LINE NUMBER


DATA COMPARE ERR ON WORD NNNN
(DATA)=GOOD DATA
```

(DATA)=BAD DATA
XXXX=TOTAL MISCOMPARES

XXXXXXXXXX=NUMBER OF LOOPS

APPENDIX A

THE FOLLOWING DATA PATTERNS HAVE BEEN DEFINED. ADDITIONAL PATTERNS WILL BE INCLUDED WHEN THEY BECOME KNOWN.

PATTERN "A"	PATTERN "B"	PATTERN "C"	PATTERN "D"
177777	000000	125252	052525
000000	177777	125252	052525
.	.	.	.
.	.	.	.
.	.	.	.
(32 WORDS)	(32 WORDS)	(32 WORDS)	(32 WORDS)
.	.	.	.
.	.	.	.
000000	177777	125252	052525
177777	000000	125252	052525

PATTERN "E"	PATTERN "F"	PATTERN "G"
000001	177777	177776
000003	177776	177775
000007	177774	177773
000017	177770	177767
000037	177760	177757
000077	177740	177737
000177	177700	177677
000377	177600	177577
000777	177400	177377
001777	177000	176777
003777	176000	175777
007777	174000	173777
017777	170000	167777
037777	160000	157777
077777	140000	137777
177777	100000	077777

```
                                    077777      000000      137777
                                    037777      100000      157777
                                    017777      140000      167777
                                    007777      160000      173777
                                    003777      170000      175777
                                    001777      174000      176777
                                    000777      176000      177377
                                    000377      177000      177577
                                    000177      177400      177677
                                    000077      177600      177737
                                    000037      177700      177757
                                    000017      177740      177767
                                    000007      177760      177773
                                    000003      177770      177775
                                    000001      177774      177776
                                    000000      177776      177777


                                PATTERN "H"     PATTERN "I"
                                -----------     -----------

                                    000001      155555
                                    000002      155555
                                    000004          .
                                    000010          .
                                    000020          .
                                    000040
                                    000100      (32 WORDS)
                                    000200          .
                                    000400          .
                                    001000          .
                                    002000      155555
                                    004000      155555
                                    010000
                                    020000
                                    040000
                                    100000
                                    100000
                                    040000
                                    020000
                                    010000
                                    004000
                                    002000
                                    001000
                                    000400
                                    000200
                                    000100
                                    000040
                                    000020
                                    000010
                                    000004
                                    000002
                                    000001
```

APPENDIX B

COMMAND SUMMARIES

B.1 USER DEFINED COMMAND SET

B.1.1 IMMEDIATE COMMANDS

ALL DECIMAL VALUES MUST BE LESS THAN 32767(10).

COMMANDS	MNEMONIC	PARAMETERS
DRIVE SELECTION	DN	,DRIVE NUMBER
	DN	,?
OUTPUT TEST	OT	,O
		,S
INPUT TEST	IT	NONE
INPUT STRING	IS	NONE
ITERATION COUNT	IC	,NNNNN
	IC	,?
SPECIAL DATA BUFFER	DP	,PATTERN NAME
		,DDDD....D
COMPILE	CO	,NO CHECK
		,INCREMENT INHIBIT
EDIT ADD LINE	EA	,LN
		,NEW COMMAND
EDIT DELETE LINE	ED	,LN
EDIT BUFFER	EB	,BUFFER NAME
		,WORD POSITION
		,DDDD--D
BUFFER DUMP	BD	,BUFFER NAME
		,NUMBER OF WORDS
PRINT TEST	PT	NONE
PRINT LINE	PL	,LN
NEW TEST	NT	NONE

RUN	RU	NONE
PRINT REGISTER	PR	,REGISTER NUMBER
HELP	HP	NONE
TIME OUT CHANGE	TO TO	,CONSTANT ,?
COPY TAPE	CT	,NONE
FORMAT SELECT	FT	,FORMAT ,?
DRIVE TYPE SELECT	DT	,DRIVE TYPE ,?

B.1.2 DEFERRED COMMANDS

ALL DECIMAL VALUES MUST BE LESS THAN 32767(1).

COMMANDS	MNEMONIC	PARAMETERS
SUBSYSTEM FUNCTION	SF	,SUBSYSTEM COMMAND ,DRIVE NUMBER ,CCC ,T ,SS ,NUMBER OF WORDS ,DATA PATTERN
BUFFER INITIALIZE	BI	,PATTERN SELECT
DATA COMPARE	DC DC	NONE ,NNNNN
STATUS COMPARE	SC	,STATUS WORD SELECT ,EXPECTED VALUE ,MASK
REGISTER COMPARE NUMBER	RC	,REGISTER NAME OR ,EXPECTED VALUE ,MASK
REGISTER WRITE NUMBER	RW	,REGISTER NAME OR ,VALUE

STALL	ST	,NNNNN
PRINT MESSAGE	PM	,MESSAGE
UNIBUS INITIALIZE	UI	NONE

B.2 SUBSYSTEM COMMANDS

COMMAND	MNEMONIC
READ DATA	RD
WRITE DATA	WD
WRITE CHECK	WC
WRITE HEADER & DATA	WH
READ HEADER	RH
SEEK	SK
CLEAR SUBSYSTEM	CS
CONTROLLER CLEAR	CC
DRIVE CLEAR	DC
RECALIBRATE	RC
DRIVE SELECT	DS
PACK ACKNOWLEDGE	PA
UNLOAD	UL
START SPINDLE	SS
OFFSET	OF
READ ALL HEADER	AH

%

```
                                ;*** REV 005 ***
                                        .NLIST  MC,MD,CND
                                        .LIST   ME
                                        .ENABL  ABS,AMA
                                        :DEFINE SYSMAC MACROS
167000                          $SWR=   167000          ;DEFINE SWITCHES
                                .TITLE  CZR6RC0 RK611/06 USR DEFINED
                                ;*COPYRIGHT (C) 1976,1977
                                ;*DIGITAL EQUIPMENT CORP.
                                ;*MAYNARD, MASS. 01754
                                ;*
                                ;*PROGRAM BY MARV TEGROTENHUIS
                                ;*
                                ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                                ;*PACKAGE (MAINDEC-11-DZQAC-C3), JAN 19, 1977.
                                ;*
000001                          $TN=1
                                .SBTTL  OPERATIONAL SWITCH SETTINGS
                                ;*
                                ;*      SWITCH                  USE
                                ;*      ------          --------------------
                                ;*        15            HALT ON ERROR
                                ;*        14            LOOP ON TEST
                                ;*        13            INHIBIT ERROR TYPEOUTS
                                ;*        11            INHIBIT ITERATIONS
                                ;*        10            BELL ON ERROR
                                ;*         9            LOOP ON ERROR
                                ;*         2            INHIBIT MISCOMPARE PRINTING
                                ;*         1            REPORT ALL DATA MISCOMPARES
                                ;*         0            SHORT REPORT FORMAT

                                .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
```

```
1560  000004  R4=    %4              ;;GENERAL REGISTER
1561  000005  R5=    %5              ;;GENERAL REGISTER
1562  000006  R6=    %6              ;;GENERAL REGISTER
1563  000007  R7=    %7              ;;GENERAL REGISTER
1564  000006  SP=    %6              ;;STACK POINTER
1565  000007  PC=    %7              ;;PROGRAM COUNTER
1566
1567                  ;*PRIORITY LEVEL DEFINITIONS
1568  000000  PR0=    0               ;;PRIORITY LEVEL 0
1569  000040  PR1=    40              ;;PRIORITY LEVEL 1
1570  000100  PR2=    100             ;;PRIORITY LEVEL 2
1571  000140  PR3=    140             ;;PRIORITY LEVEL 3
1572  000200  PR4=    200             ;;PRIORITY LEVEL 4
1573  000240  PR5=    240             ;;PRIORITY LEVEL 5
1574  000300  PR6=    300             ;;PRIORITY LEVEL 6
1575  000340  PR7=    340             ;;PRIORITY LEVEL 7
1576
1577                  ;*"SWITCH REGISTER" SWITCH DEFINITIONS
1578  100000  SW15=   100000
1579  040000  SW14=   40000
1580  020000  SW13=   20000
1581  010000  SW12=   10000
1582  004000  SW11=   4000
1583  002000  SW10=   2000
1584  001000  SW09=   1000
1585  000400  SW08=   400
1586  000200  SW07=   200
1587  000100  SW06=   100
1588  000040  SW05=   40
1589  000020  SW04=   20
1590  000010  SW03=   10
1591  000004  SW02=   4
1592  000002  SW01=   2
1593  000001  SW00=   1
1594                  .EQUIV  SW09,SW9
1595                  .EQUIV  SW08,SW8
1596                  .EQUIV  SW07,SW7
1597                  .EQUIV  SW06,SW6
1598                  .EQUIV  SW05,SW5
1599                  .EQUIV  SW04,SW4
1600                  .EQUIV  SW03,SW3
1601                  .EQUIV  SW02,SW2
1602                  .EQUIV  SW01,SW1
1603                  .EQUIV  SW00,SW0
1604
1605                  ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
1606  100000  BIT15=   100000
1607  040000  BIT14=   40000
1608  020000  BIT13=   20000
1609  010000  BIT12=   10000
1610  004000  BIT11=   4000
1611  002000  BIT10=   2000
1612  001000  BIT09=   1000
1613  000400  BIT08=   400
1614  000200  BIT07=   200
1615  000100  BIT06=   100
```

```
                                ;BASIC DEFINITIONS
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
                        .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
000200                  .=200
000200  000137  004116          JMP     @#UDTSRT
```

```
                                .SBTTL  COMMON TAGS

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

                        001100                  .=1100
001100                  001100  $CMTAG:                 ;;START OF COMMON TAGS
001100  000000          001100  $PASS:   .WORD   0      ;;CONTAINS PASS COUNT
001102      000         001102  $TSTNM:  .BYTE   0      ;;CONTAINS THE TEST NUMBER
001103      000         001103  $ERFLG:  .BYTE   0      ;;CONTAINS ERROR FLAG
001104  000000          001104  $ICNT:   .WORD   0      ;;CONTAINS SUBTEST ITERATION COUNT
001106  000000          001106  $LPADR:  .WORD   0      ;;CONTAINS SCOPE LOOP ADDRESS
001110  000000          001110  $LPERR:  .WORD   0      ;;CONTAINS SCOPE RETURN FOR ERRORS
001112  000000          001112  $ERTTL:  .WORD   0      ;;CONTAINS TOTAL ERRORS DETECTED
001114      000         001114  $ITEMB:  .BYTE   0      ;;CONTAINS ITEM CONTROL BYTE
001115      001         001115  $ERMAX:  .BYTE   1      ;;CONTAINS MAX. ERRORS PER TEST
001116  000000          001116  $ERRPC:  .WORD   0      ;;CONTAINS PC OF LAST ERROR INSTRUCTION
001120  000000          001120  $GDADR:  .WORD   0      ;;CONTAINS ADDRESS OF 'GOOD' DATA
001122  000000          001122  $BDADR:  .WORD   0      ;;CONTAINS ADDRESS OF 'BAD' DATA
001124  000000          001124  $GDDAT:  .WORD   0      ;;CONTAINS 'GOOD' DATA
001126  000000          001126  $BDDAT:  .WORD   0      ;;CONTAINS 'BAD' DATA
001130  000000                  .WORD   0      ;;RESERVED--NOT TO BE USED
001132  000000                  .WORD   0
001134      000         001134  $AUTOB:  .BYTE   0      ;;AUTOMATIC MODE INDICATOR
001135      000         001135  $INTAG:  .BYTE   0      ;;INTERRUPT MODE INDICATOR
001136  000000                  .WORD   0
001140  177570          001140  SWR:     .WORD   DSWR   ;;ADDRESS OF SWITCH REGISTER
001142  177570          001142  DISPLAY: .WORD   DDISP  ;;ADDRESS OF DISPLAY REGISTER
001144  177560          001144  $TKS:    177560        ;;TTY KBD STATUS
001146  177562          001146  $TKB:    177562        ;;TTY KBD BUFFER
001150  177564          001150  $TPS:    177564        ;;TTY PRINTER STATUS REG. ADDRESS
001152  177566          001152  $TPB:    177566        ;;TTY PRINTER BUFFER REG. ADDRESS
001154      000         001154  $NULL:   .BYTE   0      ;;CONTAINS NULL CHARACTER FOR FILLS
001155      002         001155  $FILLS:  .BYTE   2      ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
001156      012         001156  $FILLC:  .BYTE   12     ;;INSERT FILL CHARS. AFTER A "LINE FEED"
001157      000         001157  $TPFLG:  .BYTE   0      ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
001160  000000          001160  $TIMES:  0             ;;MAX. NUMBER OF ITERATIONS
001162  000000          001162  $ESCAPE: 0             ;;ESCAPE ON ERROR ADDRESS
001164  177607  000377  001164  $BELL:   .ASCIZ  <207><377><377>  ;;CODE FOR BELL
001170      077         001170  $QUES:   .ASCII  /?/   ;;QUESTION MARK
001171      015         001171  $CRLF:   .ASCII  <15>  ;;CARRIAGE RETURN
001172  000012          001172  $LF:     .ASCIZ  <12>  ;;LINE FEED
                                ;;*****************************************************************
                                .SBTTL  STORED PARAMETERS
001174  000000          001174  PUCODE:  .WORD   0       ;PUNCH CODE (OBJECT OR SOURCE)
001176  000001          001176  DRIVE:   .WORD   1       ;LAST ADDRESSED DRIVE NUMBER
001200  000000          001200  CYLNUM:  .WORD          ;LAST GIVEN CYLINDER ADDRESS
001202  000000          001202  TRKNUM:  .WORD          ;LAST GIVEN TRACK ADDRESS
001204  000000          001204  SECNUM:  .WORD          ;LAST GIVEN SECTOR ADDRESS
001206  000400          001206  WDCNT:   .WORD   400   ;LAST GIVEN WORD COUNT
001210  000000                  .WORD   0       ;FILLER
001212  000026          001212  FORMAT:  .WORD   26    ;LAST FORMAT SELECTED
001214  000000          001214  SUBCMD:  .WORD          ;LAST ENTERED SUBSYSTEM COMMAND
001216  000000          001216  STATRD:  .WORD   0     ;LAST SELECTED STATUS MESSAGE
001220  000000          001220  STVAL:   .WORD         ;LAST VALUE READ FROM STATRD
```

```
1715  001222  177777          SMASK:   .WORD   177777          ;LAST GIVEN STATUS MASK
1716  001224  000000          REGNUM:  .WORD   0               ;LAST ADDRESSED RK611 REG.
1717  001226  000000          REGVAL:  .WORD                   ;LAST VALUE ENTERED OR READ FROM REGNUM
1718  001230  177777          RMASK:   .WORD   177777          ;LAST GIVEN REGISTER MASK
1719  001232  000001          ITCNT:   .WORD   1               ;ITERATION COUNT
1720  001234     001          SFEMP:   .BYTE   1       ;SOURCE FILE EMPTY(NO VALID SOURCE)
1721  001235     000          VLDOBJ:  .BYTE   0       ;VALID OBJECT CODE
1722  001236     101          PATSEL:  .BYTE   101     ;LAST PATTERN SELECTED
1723  001237     000          PATXDF:  .BYTE   0       ;USER HAS DEFINED PAT X
1724  00124C     000          PATYDF:  .BYTE   0       ;USER HAS DEFINED PAT Y
1725  001241     000          PATZDF:  .BYTE   0       ;USER HAS DEFINED PAT Z
1726  001242     000          PATRDF:  .BYTE   0       ;USER HAS DEFINED A RANDOM PAT
1727  001243     000          LNCNT:   .BYTE           ;NUMBER OF LINES IN BUFFER
1728  001244     000          DRVTYP:  .BYTE   0       ;LAST GIVEN DRIVE TYPE, 0=RK06, 4=RK07
1729                                                   ;LOADED IN DTRTE
1730  001245     000          OPFLGS:  .BYTE   0
1731          000002                   NOCK=    BIT1   ;BIT 1 - NO CHECK MODE SWITCH
1732          000004                   BAII=    BIT2   ;BIT 2 - BUS ADDRESS INCREMENT INHIBIT SWITCH
1733          000010                   SECT20=  BIT3   ;BIT 3 - 20 SECTOR FORMAT
1734                                   .EVEN
1735  001246  000000          SFPTR:   .WORD           ;SOURCE FILE POINTER
1736  001250  000000          PUFLSZ:  .WORD   0       ;PUNCH FILE SIZE. NUM OF BYTES IN
1737                                                   ;SOURCE OR OBJECT FILE.
1738  001252  000000          STALL:   .WORD           ;STALL DURATION
1739  001254  000000          COMSZE:  .WORD   0       ;DATA COMPARE SIZE PARAMETER
1740  001256  000000          LOFFST:  .WORD   0       ;LAST OFFSET
1741
1742  001260  003720          TOVAL:   .WORD   ↑D2000  ;TIMEOUT VALUE
1743  001262  000040          PATX:    .BLKW   40      ;USER DEFINED PATTERN X
1744
1745  001362  000040          PATY:    .BLKW   40      ;USER DEFINED PATTERN Y
1746
1747  001462  000040          PATZ:    .BLKW   40      ;USER DEFINED PATTERN Z
1748
1749  001562  000040          PATR:    .BLKW   40      ;RANDOM PATTERN STORAGE
1750                           .SBTTL   CONTROL PARAMETERS
1751
1752                                    .EQUIV  $ERRPC,LINNUM
1753  001662     000          PRINH:   .BYTE   0       ;PRINT INHIBIT SWITCH
1754  001663     000          CHNFLG:  .BYTE   0       ;CHAINING FLAG
1755  001664     000          C$ERR:   .BYTE   0       ;COMPILE ERROR FLAG
1756  001665     000          OFFLAG:  .BYTE   0       ;OFFSET FLAG
1757  001666     000          SAMDR:   .BYTE   0       ;SAME DRIVE SWITCH
1758  001667     000          DONE:    .BYTE   0       ;DONE FLAG
1759  001670     000          PBSW:    .BYTE   0       ;PARAMETER BLOCK SELECT SWITCH
1760  001671     000          RPSWIT:  .BYTE   0       ;REPORT PASS SWITCH
1761  001672     377          HPVLD:   .BYTE   377     ;HELP VALID SWITCH
1762          001674                   .EVEN
1763  001674  001750          OBJSZE:  .WORD   ↑D1000  ;OBJECT FILESIZE
1764  001676  000000          PATPTR:  .WORD           ;POINTER TO PATTERN BUFFER
1765
1766  001700  000400          MAXWDS:  .WORD   400     ;MAXIMUM WORD COUNT (SET BY PROGRAM)
1767  001702  000000          TEMP1:   .WORD   0       ;TEMPORARY STORAGE
1768  001704  000000          TEMP2:   .WORD   0       ;TEMPORARY STORAGE
1769  001706  000000          OBUFPT:  .WORD   0       ;OUTPUT BUFFER POINTER
1770  001710  000000          IBUFPT:  .WORD   0       ;INPUT BUFFER POINTER
```

```
1771  001712  000000                  OFPTR:  .WORD   0               ;OBJECT FILE POINTER
1772  001714  000000                  CNTSTR: .WORD   0               ;STORAGE FOR ITERATION COUNT
1773  001716  000207                  RTSPC:  .WORD   000207          ;RETURN CONSTANT
1774  001720  004437                  JSRR4:  .WORD   004437          ;JUMP CONSTANT
1775  001722  000000                  LPCNT1: .WORD   0               ;LOW ORDER LOOP COUNTER
1776  001724  000000                  LPCNT2: .WORD   0               ;HI ORDER LOOP COUNTER
1777  001726  177550                  PTRSR:  .WORD   177550          ;PAPER TAPE READER STATUS REGISTER
1778  001730  177552                  PTRDB:  .WORD   177552          ;PAPER TAPE READER DATA REGISTER
1779  001732  177554                  PTPSR:  .WORD   177554          ;PAPER TAPE PUNCH STATUS REGISTER
1780  001734  177556                  PTPDB:  .WORD   177556          ;PAPER TAPE PUNCH DATA REGISTER
1781  001736  000102                  HDBUFF: .BLKW   102             ;READ ALL HEADERS BUFFER
1782
1783
1784                                  .SBTTL  RK06 CONTROLLER REGISTER DEFINITION
1785
1786            000000                RKCS1=  0                       ;CONTROL AND STATUS REGISTER 1
1787            000002                RKWC=   2                       ;WORD COUNT REGISTER
1788            000004                RKBA=   4                       ;BUS ADDRESS REGISTER
1789            000006                RKDA=   6                       ;DESIRED TRACK SECTOR REGISTER
1790            000010                RKCS2=  10                      ;CONTROL AND STATUS REGISTER 2
1791            000012                RKDS=   12                      ;DRIVE STATUS REGISTER
1792            000014                RKER=   14                      ;ERROR REGISTER
1793            000016                RKASOF= 16                      ;ATTENTION SUMMARY AND OFFSET REGISTER
1794            000020                RKDC=   20                      ;DESIRED CYLINDER REGISTER
1795            000020                RKDCYL= 20                      ;DESIRED CYLINDER REGISTER
1796            000024                RKDB=   24                      ;DATA BUFFER
1797            000026                RKMR1=  26                      ;MAINTENANCE REGISTER 1
1798            000034                RKMR2=  34                      ;MAINTENANCE REGISTER 2
1799            000036                RKMR3=  36                      ;MAINTENANCE REGISTER 3
1800            000030                RKPOS=  30                      ;ECC POSITION INFORMATION
1801            000030                RKECPS= 30                      ;ECC POSITION INFORMATION
1802            000032                RKPAT=  32                      ;ECC PATTERN INFORMATION
1803            000032                RKECPT= 32                      ;ECC PATTERN INFORMATION
1804
1805                                  .SBTTL  DRIVE COMMANDS
1806
1807          000101                  SELDRV= 101                     ;SELECT DRIVE
1808          000103                  PACK=   103                     ;PACK ACKNOWLEDGE
1809          000105                  CLEAR=  105                     ;DRIVE CLEAR
1810          000107                  UNLOAD= 107                     ;UNLOAD
1811          000111                  SRTSPL= 111                     ;START SPINDLE
1812          000113                  RECAL=  113                     ;RECALIBRATE
1813          000115                  OFFSET= 115                     ;OFFSET
1814          000117                  SEEK=   117                     ;SEEK
1815          000121                  RDDATA= 121                     ;READ DATA
1816          000123                  WRDATA= 123                     ;WRITE DATA
1817          000125                  RDHEAD= 125                     ;READ HEADER
1818          000127                  WRHEAD= 127                     ;WRITE HEADER AND DATA
1819          000131                  WRTCHK= 131                     ;WRITE CHECK
1820
1821                                  ;       THE FOLLOWING ARE NOT DRIVE COMMANDS BUT ARE USED BY THE DRIVER
1822                                  ;       TO SIMULATE A SPECIFIC DESIRED OPERATION
1823
1824          000140                  RELEAS= 140                     ;RELEASE DRIVE
1825          000141                  RDSTAT= 141                     ;GET ALL STATUS FROM DRIVE
1826          000164                  RDALHD= 164                     ;READ ALL HEADERS
```

```
1827   000176          CONCLR= 176                     ;CONTROLLER CLEAR (BIT 15 OF CS1)
1828   000177          SUBCLR= 177                     ;SUBSYSTEM CLEAR (BIT 5 OF CS2)
1829   000300          INTR=   300                     ;GENERATE INTERRUPT TO CPU
1830
1831                   ;       DRIVER ISSUED SERVICE COMMANDS
1832
1833   000001          DR.SEL= 001                     ;DRIVE SELECT
1834   000005          DR.CLR= 005                     ;DRIVE CLEAR
1835
1836                   .SBTTL  CONTROL AND STATUS REGISTER 1 BITS
1837
1838   000001          GO=     BIT0                    ;GO BIT
1839   000100          IE=     BIT6                    ;INTERRUPT ENABLE
1840   000200          RDY=    BIT7                    ;CONTROLLER READY
1841   000400          BA16=   BIT8                    ;BUS ADDRESS BIT 16
1842   001000          BA17=   BIT9                    ;BUS ADDRESS BIT 17
1843   002000          CDT=    BIT10                   ;CONTROLLER DRIVE TYPE (0=RK06,1=RK07)
1844   004000          CTO=    BIT11                   ;CONTROLLER TIMED OUT WAITING FOR
1845                                                   ;  DRIVE RESPONSE
1846   010000          CFMT=   BIT12                   ;CONTROLLER DRIVE FORMAT (0=22 SECTOR, 1=20 SECTOR)
1847   020000          SPAR=   BIT13                   ;DRIVE BUS PARITY ERROR DETECTED BY CONTROLLER
1848   040000          DI=     BIT14                   ;DRIVE INTERRUPT
1849   100000          CERR=   BIT15                   ;CONTROLLER ERROR
1850   100000          CCLR=   BIT15                   ;CONTROLLER CLEAR
1851
1852                   ;       THESE BIT DEFINITIONS ARE USED FOR ADDRESS
1853                   ;       THE HIGH BYTE OF RKCS1
1854
1855   000001          B.BA16= BIT0                    ;BUS ADDRESS BIT 16
1856   000002          B.BA17= BIT1                    ;BUS ADDRESS BIT 17
1857   000004          B.CDT=  BIT2                    ;CONTROLLER DRIVE TYPE (0=RK06,1=RK07)
1858   000020          B.CFMT= BIT4                    ;CONTROLLER DRIVE FORMAT (0=22 SECTOR, 1=20 SECTOR)
1859
1860                   .SBTTL  CONTROL AND STATUS REGISTER 2 BITS
1861
1862   000007          DRVMSK= 7                       ;MASK FOR DRIVE SELECTION CODE
1863   000010          DESL=   BIT3                    ;DESELECT OR RELEASE DRIVE IN BITS 0-2
1864   000010          RLS=    BIT3                    ;DESELECT OR RELEASE DRIVE IN BITS 0-2
1865   000020          BAI=    BIT4                    ;BUS ADDRESS INCREMENT INHIBIT
1866   000040          CLR=    BIT5                    ;CLEAR CONTROLLER AND ALL DRIVES
1867   000040          SCLR=   BIT5                    ;CLEAR CONTROLLER AND ALL DRIVES
1868   000100          IR=     BIT6                    ;INPUT READY
1869   000200          OR=     BIT7                    ;OUTPUT READY
1870   000400          UFE=    BIT8                    ;UNIT FIELD ERROR
1871   001000          MDS=    BIT9                    ;MULTIPLE DRIVE SELECT
1872   002000          PGE=    BIT10                   ;PROGRAMMING ERROR
1873   004000          NEM=    BIT11                   ;NON-EXISTENT MEMORY
1874   010000          NED=    BIT12                   ;NON-EXISTENT DRIVE
1875   020000          UPE=    BIT13                   ;UNIBUS PARITY ERROR
1876   040000          WCE=    BIT14                   ;WRITE CHECK ERROR
1877   100000          DLT=    BIT15                   ;DATA LATE ERROR
1878
1879                   .SBTTL  ERROR REGISTER BIT DEFINITION
1880
1881   000001          ILC=    BIT0                    ;ILLEGAL FUNCTION CODE
1882                   ;*ILF=  BIT0                    ;ILLEGAL FUNCTION CODE
```

```
                        SKI=     BIT1                   ;SEEK INCOMPLETE
                        ILF=     BIT2                   ;ILLEGAL DRIVE FUNCTION
                        NXF=     BIT2                   ;ILLEGAL DRIVE FUNCTION
                        DRPAR=   BIT3                   ;DRIVE DETECTED DRIVE BUS PARITY ERROR
                        FMTE=    BIT4                   ;FORMAT ERROR
                        DTYE=    BIT5                   ;DRIVE TYPE ERROR
                        ECH=     BIT6                   ;ECC HARD
                        BSE=     BIT7                   ;BAD SECTOR ERROR
                        HCRC=    BIT8                   ;HEADER CRC ERRROR
                        HVRC=    BIT8                   ;HEADER VRC ERRROR
                        COE=     BIT9                   ;CYLINDER ADDRESS OVERFLOW ERROR
                        IDAE=    BIT10                  ;INVALID DISK ADDRESS ERROR
                        WLE=     BIT11                  ;WRITE LOCK ERROR
                        DTE=     BIT12                  ;DRIVE TIMING ERROR
                        OPI=     BIT13                  ;OPERATION (SEARCH) INCOMPLETE
                        UNS=     BIT14                  ;DRIVE UNSAFE
                        DCK=     BIT15                  ;DATA CHECK

                        .SBTTL   STATUS REGISTER BIT DEFINITION

                        DRA=     BIT0                   ;DRIVE AVAILABLE (CONTROLLER IS SET IF
                                                        ;  THIS BIT IS RESET)
                        OFST=    BIT2                   ;DRIVE OFFSET
                        ACLO=    BIT3                   ;AC LOW
                        SPDLSS=  BIT4                   ;SPEED LOSS
                        DCLO=    BIT4                   ;DC LOW
                        DROT=    BIT5                   ;DRIVE OFF TRACK
                        VV=      BIT6                   ;VOLUME VALID
                        DRY=     BIT7                   ;DRIVE READY
                        DRDY=    BIT7                   ;DRIVE READY
                        DDT=     BIT8                   ;DRIVE TYPE (0=RK06,1=RK07)
                        WRL=     BIT11                  ;WRITE LOCK
                        PIP=     BIT13                  ;POSITIONING IN PROGRESS
                        DSC=     BIT14                  ;DRIVE STATUS CHANGE
                        SVAL=    BIT15                  ;STATUS VALID

                        .SBTTL   MAINTENANCE REGISTER 1 BIT DEFINITION

                        MESMSK=  17                     ;MESSAGE MASK

                        PAT=     BIT4                   ;FORCE EVEN PARITY ON DRIVE BUS MESSAGE LINES
                        DMD=     BIT5                   ;DIAGNOSTIC MODE
                        MSP=     BIT6                   ;MAINTENANCE SECTOR PULSE
                        MIND=    BIT7                   ;MAINTENANCE INDEX
                        MCLK=    BIT8                   ;MAINTENANCE CLOCK
                        MERD=    BIT9                   ;MAINTENANCE ENCODED READ DATA
                        MEWD=    BIT10                  ;MAINTENACNE ENCODED WRITE DATA
                        PCA=     BIT11                  ;PRECOMPENSATION ADVANCE
                        PCD=     BIT12                  ;PRECOMPENSATION DELAY
                        ECCW=    BIT13                  ;ECC WORD IS BEING REA  OR WRITTEN
                        WRTGAT=  BIT14                  ;WRITE GATE
                        RDGATE=  BIT15                  ;READ GATE

                        .SBTTL   DEFINITION OF DRIVE STATUS BYTE 00 MESSAGE A

                        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
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.XERR= 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
```

```
1995    000003          M.ID=   3               ;BYTE ID
1996    017760          M.CDIF= 17760           ;CYLINDER DIFFERENCE/OFFSET
1997    017760          M.CADD= 17760           ;CYLINDER ADDRESS
1998    077770          M.SER=  77770           ;DRIVE SERIAL NUMBER
1999    000760          M.SECT= 760             ;SECTOR COUNT
2000    007000          M.HEAD= 7000            ;HEAD DECODE
```

```
                        .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/RK07 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
```

```
                                CMDTO=  BIT6                    ;NO TERMINATION TO COMMAND FOR AT
                                                                ;  LEAST 1 SECOND
                                W.WCK=  BIT7                    ;WRITE FOR WRITE WRITE CHECK
                                NOCHK=  BIT8                    ;NO CHECK, DO NOT SET INTERRUPT ENABLE
                                PBSVAL= BIT9                    ;PARAMETER STATUS WORDS VALID
                                                                ;  (SET WHEN ERROR TERMINATION OR
                                                                ;  READ STATUS COMMAND)
                                DRPDRV= BIT10                   ;DROP DRIVE FROM TEST SEQUENCE
                                NODSC=  BIT11                   ;ATTENTION SET BUT DCS AND FAULT RESET
                                DRVSZD= BIT12                   ;DRIVE SEIZED BY OTHER PORT
                                E.UNLD= BIT13                   ;DRIVE UNLOADED DUE TO ERROR
                                Q.INIT= BIT14                   ;PARAMETER BLOCK ENQUEUED IN INITIATION QUEUE
                                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

                                P.CS1=  16                      ;COMMAND AND STATUS REGISTER 1
                                P.CS2=  20                      ;COMMAND AND STATUS REGISTER 2
                                P.WCR=  22                      ;WORD COUNT REGISTER
                                P.BAR=  24                      ;BUS ADDRESS REGISTER
                                P.DTS=  26                      ;DESIRED TRACK SECTOR REGISTER
                                P.DCYL= 30                      ;DESIRED CYLINDER REGISTER
                                P.ASOF= 32                      ;ATTENTION SUMMARY/OFFSET REGISTER
                                P.ER=   34                      ;ERROR REGISTER
                                P.DS=   36                      ;STATUS REGISTER
                                P.A00=  40                      ;MESSAGE A STATUS BYTE 00
                                P.B00=  42                      ;MESSAGE B STATUS BYTE 00
                                P.A01=  44                      ;MESSAGE A STATUS BYTE 01
                                P.B01=  46                      ;MESSAGE B STATUS BYTE 01
                                P.A10=  50                      ;MESSGGE A STATUS BYTE 10
                                P.B10=  52                      ;MESSAGE B STATUS BYTE 10
                                P.A11=  54                      ;MESSAGE A STATUS BYTE 11
                                P.B11=  56                      ;MESSAGE B STATUS BYTE 11
                                P.EPOS= 60                      ;ECC POSITION INFORMATION
                                P.EPAT= 62                      ;ECC PATTERN INFORMATION
                                PRTCON=64                       ;PRINT CONTROL WORD

                                .SBTTL  PARAMETER BLOCK 0 FOR DRIVE

002142      000         PARM0:  .BYTE   0                       ;DRIVE NUMBER
002143      000                 .BYTE   0                       ;COMMAND
002144   000000                 .WORD   0                       ;CYLINDER ADDRESS
002146      000                 .BYTE   0                       ;SECTOR ADDRESS
002147      000                 .BYTE   0                       ;TRACK ADDRESS
002150      000                 .BYTE   0                       ;OFFSET VALUE
002151      000                 .BYTE   0                       ;BUS ADDRESS (BITS 16 AND 17)
002152   000000                 .WORD   0                       ;BUS ADDRESS (BITS 0 - 15)
002154   000000                 .WORD   0                       ;WORD COUNT (2'S COMPLEMENT)
002156   000000                 .WORD   0                       ;PROGRAM DRIVE STATUS INFORMATION
002160   000000                 .WORD   0                       ;COMMAND AND STATUS REGISTER 1
002162   000000                 .WORD   0                       ;COMMAND AND STATUS REGISTER 2
002164   000000                 .WORD   0                       ;WORD COUNT REGISTER
002166   000000                 .WORD   0                       ;BUS ADDRESS REGISTER
```

```
2113  002170  000000                    .WORD   0       ;DESIRED TRACK AND SECTOR REGISTER
2114  002172  000000                    .WORD   0       ;DESIRED CYLINDER REGISTER
2115  002174  000000                    .WORD   0       ;ATTENTION SUMMARY/OFFSET REGISTER
2116  002176  000000                    .WORD   0       ;ERROR REGISTER
2117  002200  000000                    .WORD   0       ;STATUS REGISTER
2118  002202  000000                    .WORD   0       ;MESSAGE LINE A STATUS BYTE 00
2119  002204  000000                    .WORD   0       ;MESSAGE LINE B STATUS BYTE 00
2120  002206  000000                    .WORD   0       ;MESSAGE LINE A STATUS BYTE 01
2121  002210  000000                    .WORD   0       ;MESSAGE LINE B STATUS BYTE 01
2122  002212  000000                    .WORD   0       ;MESSAGE LINE A STATUS BYTE 10
2123  002214  000000                    .WORD   0       ;MESSAGE LINE B STATUS BYTE 10
2124  002216  000000                    .WORD   0       ;MESSAGE LINE A STATUS BYTE 11
2125  002220  000000                    .WORD   0       ;MESSAGE LINE B STATUS BYTE 11
2126  002222  000000                    .WORD   0       ;ECC POSITION INFORMATION
2127  002224  000000                    .WORD   0       ;ECC PATTERN INFORMATION
2128  002226  000000                    .WORD   0       ;PRINT CONTROL WORD
2129
2130                          .SBTTL  PARAMETER BLOCK 1 FOR DRIVE
2131
2132  002230      000         PARM1:  .BYTE   0       ;DRIVE NUMBER
2133  002231      000                 .BYTE   0       ;COMMAND
2134  002232  000000                  .WORD   0       ;CYLINDER ADDRESS
2135  002234      000                 .BYTE   0       ;SECTOR ADDRESS
2136  002235      000                 .BYTE   0       ;TRACK ADDRESS
2137  002236      000                 .BYTE   0       ;OFFSET VALUE
2138  002237      000                 .BYTE   0       ;BUS ADDRESS (BITS 16 AND 17)
2139  002240  000000                  .WORD   0       ;BUS ADDRESS (BITS 0 - 15)
2140  002242  000000                  .WORD   0       ;WORD COUNT (2'S COMPLEMENT)
2141  002244  000000                  .WORD   0       ;PROGRAM DRIVE STATUS INFORMATION
2142  002246  000000                  .WORD   0       ;COMMAND AND STATUS REGISTER 1
2143  002250  000000                  .WORD   0       ;COMMAND AND STATUS REGISTER 2
2144  002252  000000                  .WORD   0       ;WORD COUNT REGISTER
2145  002254  000000                  .WORD   0       ;BUS ADDRESS REGISTER
2146  002256  000000                  .WORD   0       ;DESIRED TRACK AND SECTOR REGISTER
2147  002260  000000                  .WORD   0       ;DESIRED CYLINDER REGISTER
2148  002262  000000                  .WORD   0       ;ATTENTION SUMMARY/OFFSET REGISTER
2149  002264  000000                  .WORD   0       ;ERROR REGISTER
2150  002266  000000                  .WORD   0       ;STATUS REGISTER
2151  002270  000000                  .WORD   0       ;MESSAGE LINE A STATUS BYTE 00
2152  002272  000000                  .WORD   0       ;MESSAGE LINE B STATUS BYTE 00
2153  002274  000000                  .WORD   0       ;MESSAGE LINE A STATUS BYTE 01
2154  002276  000000                  .WORD   0       ;MESSAGE LINE B STATUS BYTE 01
2155  002300  000000                  .WORD   0       ;MESSAGE LINE A STATUS BYTE 10
2156  002302  000000                  .WORD   0       ;MESSAGE LINE B STATUS BYTE 10
2157  002304  000000                  .WORD   0       ;MESSAGE LINE A STATUS BYTE 11
2158  002306  000000                  .WORD   0       ;MESSAGE LINE B STATUS BYTE 11
2159  002310  000000                  .WORD   0       ;ECC POSITION INFORMATION
2160  002312  000000                  .WORD   0       ;ECC PATTERN INFORMATION
2161  002314  000000                  .WORD   0       ;PRINT CONTROL WORD
```

```
                                        .SBTTL  ERROR POINTER TABLE

                                        ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
                                        ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
                                        ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
                                        ;*NOTE1:        IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
                                        ;*NOTE2:        EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:

                                        ;*      EM              ;;POINTS TO THE ERROR MESSAGE
                                        ;*      DH              ;;POINTS TO THE DATA HEADER
                                        ;*      DI              ;;POINTS TO THE DATA
                                        ;*      DF              ;;POINTS TO THE DATA FORMAT


002316                                  $ERRTB:
002316  025012  051040  033113          PROGID: .ASCII  <12>@* RK611/RK06-RK07 USER DEFINED TEST *@<15><12>
002324  030461  051057  030113
002332  026466  045522  033460
002340  052440  042523  020122
002346  042504  044506  042516
002354  020104  042524  052123
002362  025040  005015
002366  055103  033122  041522              .ASCIZ  /CZR6RC0/<15><12>
002374  006460  000012
002400  054524  042520  044040          HELPQ:  .ASCIZ  /TYPE HP TO PRINT HELP FILE/<15><12>
002406  020120  047524  050040
002414  044522  052116  044040
002422  046105  020120  044506
002430  042514  005015      000
002435      052     000                 STAR:   .ASCIZ  /*/
002437      124  051505  020124          SCTOBG: .ASCIZ  /TEST PROGRAM TO BIG/<15><12>
002444  051120  043517  040522
002452  020115  047524  041040
002460  043511  005015      000
002465      123  052517  041522          NOROOM: .ASCIZ  /SOURCE FILE FULL/<15><12>
002472  020105  044506  042514
002500  043040  046125  006514
002506  000012
002510  000075                          EQSGN:  .ASCIZ  /=/
002512  047111  046126  020104          BADDEC: .ASCIZ  /INVLD DECIMAL/<15><12>
002520  042504  044503  040515
002526  006514  000012
002532  047111  046126  020104          IVDEDT: .ASCIZ  /INVLD EDIT CMND/<15><12>
002540  042105  052111  041440
002546  047115  006504  000012
002554  047111  046126  020104          IVDADD: .ASCIZ  /INVLD NEW CMND/<15><12>
002562  042516  020127  046503
002570  042116  005015      000
002575      111  053116  042114          IVDLN:  .ASCIZ  /INVLD LINE NUM/<15><12>
002602  046040  047111  020105
002610  052516  006515  000012
002616  047111  046126  020104          IVDPAR: .ASCIZ  /INVLD PARAMETER/<15><12>
002624  040520  040522  042515
002632  042524  006522  000012
002640  047111  046126  020104          BADOCT: .ASCIZ  /INVLD OCTAL/<15><12>
002646  041517  040524  006514
```

```
2218  002654  000012
2219  002656  042510  050114  043040  HPFILE: .ASCIZ  /HELP FILE AVAILABLE ONLY AS FIRST COMMAND AFTER PROGRAM LOAD./<15><12>
2220  002664  046111  020105  053101
2221  002672  044501  040514  046102
2222  002700  020105  047117  054514
2223  002706  040440  020123  044506
2224  002714  051522  020124  047503
2225  002722  046515  047101  020104
2226  002730  043101  042524  020122
2227  002736  051120  043517  040522
2228  002744  020115  047514  042101
2229  002752  006456  000012
2230  002756  047516  047440  045102  IVDRUN: .ASCIZ  /NO OBJECT/<15><12>
2231  002764  041505  006524  000012
2232  002772  047503  050115  046111  COMPOK: .ASCIZ  /COMPILE OK/<15><12>
2233  003000  020105  045517  005015
2234  003006     000
2235  003007     116  020117  047523  NOSRC:  .ASCIZ  /NO SOURCE/<15><12>
2236  003014  051125  042503  005015
2237  003022     000
2238  003023     111  052116  051105  INTERR: .ASCIZ  /INTERNAL COMPILER ERR/<15><12>
2239  003030  040516  020114  047503
2240  003036  050115  046111  051105
2241  003044  042440  051122  005015
2242  003052     000
2243  003053     111  053116  042114  BADCOM: .ASCIZ  /INVLD OR UNDEF CMND/<15><12>
2244  003060  047440  020122  047125
2245  003066  042504  020106  046503
2246  003074  042116  005015     000
2247  003101     127  051117  020104  IVDWCT: .ASCIZ  /WORD CT TOO BIG/<15><12>
2248  003106  052103  052040  047517
2249  003114  041040  043511  005015
2250  003122     000
2251  003123     111  053116  042114  IVDNC:  .ASCIZ  /INVLD CMND IN NC/<15><12>
2252  003130  041440  047115  020104
2253  003136  047111  047040  006503
2254  003144  000012
2255  003146  047111  046126  020104  BADDRV: .ASCIZ  /INVLD DRV NUM/<15><12>
2256  003154  051104  020126  052516
2257  003162  006515  000012
2258  003166  047111  046126  020104  BADTYP: .ASCIZ  /INVLD DRV TYPE/<15><12>
2259  003174  051104  020126  054524
2260  003202  042520  005015     000
2261  003207     120  047125  044103  PUERR:  .ASCIZ  /PUNCH ERR/<15><12>
2262  003214  042440  051122  005015
2263  003222     000
2264  003223     122  040505  042504  PRERR:  .ASCIZ  /READER ERR/<15><12>
2265  003230  020122  051105  006522
2266  003236  000012
2267  003240  042012  044522  042526  STNTVD: .ASCIZ  <12>/DRIVE STATUS NOT VALID/<15><12><12>
2268  003246  051440  040524  052524
2269  003254  020123  047516  020124
2270  003262  040526  044514  006504
2271  003270  005012     000
2272  003273     075  047524  040524  TOTMSC: .ASCIZ  /=TOTAL MISCOMPARES/<15><12><12>
2273  003300  020114  044515  041523
```

```
2274  003306  046517  040520  042522
2275  003314  006523  005012  000
2276  003321  075  040515  020130  IOBFSZ: .ASCIZ  /=MAX WORD COUNT FOR DATA TRANSFER/<15><12>
2277  003326  047527  042122  041440
2278  003334  052517  052116  043040
2279  003342  051117  042040  052101
2280  003350  020101  051124  047101
2281  003356  043123  051105  005015
2282  003364  000
2283  003365  111  046114  043505  BADSEL: .ASCIZ  /ILLEGAL REG SEL'D/<15><12>
2284  003372  046101  051040  043505
2285  003400  051440  046105  042047
2286  003406  005015  000
2287  003411  075  021440  047440  LPLABL: .ASCIZ  /= # OF LOOPS/<15><12><12>
2288  003416  020106  047514  050117
2289  003424  006523  005012  000
2290  003431  052  046040  047517  LCNTOF: .ASCIZ  /* LOOP COUNTER OVERFLOW */<15><12>
2291  003436  020120  047503  047125
2292  003444  042524  020122  053117
2293  003452  051105  046106  053517
2294  003460  025040  005015  000
2295  003465  127  051117  020104  DMPHDR: .ASCIZ  /WORD #          CONTENTS/<15><12>
2296  003472  020043  020040  020040
2297  003500  020040  020040  020040
2298  003506  047503  052116  047105
2299  003514  051524  005015  000
2300  003521  040  020040  020040  SPACE6: .ASCIZ  /      /
2301  003526  000040
2302  003530  020040  000  SPACE2: .ASCIZ  /  /
2303
2304                    ;;*****************************************************************
2305                    .SBTTL  TABLE OF INTERACTIVE COMMANDS
2306                    ;*THIS TABLE CONTAINS ALL THE INTERACTIVE COMMANDS.
2307                    ;*THERE ARE 4 WORDS PER ENTRY:
2308                    ;*WORD 1        COMMAND MNEUMONIC
2309                    ;*WORD 2        IF IMMEDIATE, ADDRESS OF INTERACTIVE COMMAND PROCESSOR
2310                    ;*              ROUTINE FOR THIS COMMAND. IF DEFERRED, THE
2311                    ;*              ADDRESS OF THE COMPILATION ROUTINE FOR THIS COMMAND.
2312                    ;*WORD 3        IF DEFERRED, NUMBER OF PARAMETERS ASSOCIATED WITH
2313                    ;*              THIS COMMAND. IF IMMEDIATE, -1.
2314                    ;*WORD 4                IF DEFERRED, ADDRESS OF EXECUTE ROUTINE
2315                    ;*              FOR THIS COMMAND. IF IMMEDIATE, ALL 0'S
2316                    ;*THIS TABLE IS USED IN COMMAND ENTRY AND TEST
2317                    ;*COMPILATION
2318                    ;*****************************************************************
2319  003534                    .EVEN
2320  003534  047524            ICTBL:  .ASCII  /TO/            ;TIMEOUT
2321  003536  006062  177777  000000    .WORD   TORTE,-1,0
2322  003544  047104            .ASCII  /DN/            ;DRIVE SELECT
2323  003546  006144  177777  000000    .WORD   DNRTE,-1,0
2324  003554  052104            .ASCII  /DT/            ;DRIVE TYPE
2325  003556  022450  177777  000000    .WORD   DTRTE,-1,0
2326  003564  052117            .ASCII  /OT/            ;OUTPUT TEST
2327  003566  012426  177777  000000    .WORD   OTRTE,-1,0
2328  003574  052111            .ASCII  /IT/            ;INPUT TEST
2329  003576  013026  177777  000000    .WORD   ITRTE,-1,0
```

```
2330  003604  052103                        .ASCII  /CT/          ;COPY TAPE
2331  003606  022154  177777  000000        .WORD   CTRTE,-1,0
2332  003614  051511                        .ASCII  /IS/          ;INPUT STRING
2333  003616  013020  177777  000000        .WORD   ISRTE,-1,0
2334  003624  041511                        .ASCII  /IC/          ;ITERATION COUNT
2335  003626  006254  177777  000000        .WORD   ICRTE,-1,0
2336  003634  052106                        .ASCII  /FT/          ;FORMAT SELECT
2337  003636  006000  177777  000000        .WORD   FTRTE,-1,0
2338  003644  041105                        .ASCII  /EB/          ;EDIT SPECIAL BUFFERS
2339  003646  006346  177777  000000        .WORD   EBRTE,-1,0
2340  003654  050104                        .ASCII  /DP/          ;SPECIAL DATA PATTERN
2341  003656  006356  177777  000000        .WORD   DPRTE,-1,0
2342  003664  047503                        .ASCII  /CO/          ;COMPILE
2343  003666  010310  177777  000000        .WORD   CORTE,-1,0
2344  003674  040505                        .ASCII  /EA/          ;EDIT ADD LINE
2345  003676  004764  177777  000000        .WORD   EARTE,-1,0
2346  003704  042105                        .ASCII  /ED/          ;EDIT DELETE LINE
2347  003706  005266  177777  000000        .WORD   EDRTE,-1,0
2348  003714  052120                        .ASCII  /PT/          ;PRINT TEST
2349  003716  005700  177777  000000        .WORD   PTRTE,-1,0
2350  003724  046120                        .ASCII  /PL/          ;PRINT LINE
2351  003726  005500  177777  000000        .WORD   PLRTE,-1,0
2352  003734  052116                        .ASCII  /NT/          ;NEW TEST
2353  003736  007416  177777  000000        .WORD   NTRTE,-1,0
2354  003744  052522                        .ASCII  /RU/          ;RUN
2355  003746  010036  177777  000000        .WORD   RURTE,-1,0
2356  003754  051120                        .ASCII  /PR/          ;PRINT REGISTER
2357  003756  006742  177777  000000        .WORD   PRRTE,-1,0
2358  003764  050110                        .ASCII  /HP/          ;HELP
2359  003766  007366  177777  000000        .WORD   HPRTE,-1,0
2360  003774  042102                        .ASCII  /BD/          ;BUFFER DUMP
2361  003776  007530  177777  000000        .WORD   BDRTE,-1,0
2362  004004  043123                        .ASCII  /SF/          ;SUBSYSTEM FUNCTION
2363  004006  011576  000010  000000        .WORD   C$SF,10,0
2364  004014  044502                        .ASCII  /BI/          ;BUFFER INITIALIZE
2365  004016  011162  000001  020536  C$CBIS: .WORD   C$BI,1,E$BI      ;SPECIAL TAG FOR BUFFER INIT
2366  004024  041504                        .ASCII  /DC/          ;DATA COMPARE
2367  004026  011272  000001  020204        .WORD   C$DC,1,E$DATC
2368  004034  041523                        .ASCII  /SC/          ;STATUS COMPARE
2369  004036  010770  000003  017610        .WORD   C$SC,3,E$SC
2370  004044  041522                        .ASCII  /RC/          ;REGISTER COMPARE
2371  004046  010752  000003  020026        .WORD   C$RC,3,E$REGC
2372  004054  053522                        .ASCII  /RW/          ;REGISTER WRITE
2373  004056  010734  000002  020426        .WORD   C$RW,2,E$RW
2374  004064  052123                        .ASCII  /ST/          ;STALL
2375  004066  011350  000001  020446        .WORD   C$ST,1,E$ST
2376  004074  046520                        .ASCII  /PM/          ;PRINT MESSAGE
2377  004076  010674  000001  013516        .WORD   C$PM,1,E$PM
2378  004104  044525                        .ASCII  /UI/          ;UNIBUS INITIALIZE
2379  004106  011422  000000  021464        .WORD   C$UI,0,E$UI
2380  004114  025052                        .ASCII  /**/          ;END OF TABLE
2381                                ;;*****************************************************************
2382
2383  004116                      UDTSRT:
2384                              .SBTTL  INITIALIZE THE COMMON TAGS
2385                              ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
```

```
2386  004116  012706  001100            MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
2387  004122  005026                    CLR     (R6)+           ;;CLEAR MEMORY LOCATION
2388  004124  022706  001140            CMP     #SWR,R6 ;;DONE?
2389  004130  001374                    BNE     .-6             ;;LOOP BACK IF NO
2390  004132  012706  001100            MOV     #STACK,SP       ;;SETUP THE STACK POINTER
2391                          ;;INITIALIZE A FEW VECTORS
2392  004136  012737  034546  000034    MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
2393  004144  012737  000340  000036    MOV     #340,@#TRAPVEC+2;LEVEL 7
2394  004152  012737  034370  000024    MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
2395  004160  012737  000340  000026    MOV     #340,@#PWRVEC+2 ;;LEVEL 7
2396                          ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
2397                          ;;EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.
2398  004166  013746  000004            MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
2399  004172  012737  004226  000004    MOV     #64$,@#ERRVEC   ;;SET UP ERROR VECTOR
2400  004200  012737  177570  001140    MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
2401  004206  012737  177570  001142    MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
2402  004214  022777  177777  174716    CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
2403  004222  001012                    BNE     66$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
2404                                                            ;;AND  THE HARDWARE SWR IS NOT = -1
2405  004224  000403                    BR      65$             ;;BRANCH IF NO TIMEOUT
2406  004226  012716  004234    64$:    MOV     #65$,(SP)       ;;SET UP FOR TRAP RETURN
2407  004232  000002                    RTI
2408  004234  012737  000176  001140  65$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
2409  004242  012737  000174  001142          MOV     #DISPREG,DISPLAY
2410  004250  012637  000004    66$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR
2411
2412  004254  013701  023556            MOV     RKVEC,R1        ;GET VECTOR STORAGE ADDRESS
2413  004260  012721  023764            MOV     #I.INTR,(R1)+   ;LOAD IT WITH INTERRUPT HNDLR ADDR
2414  004264  012711  000340            MOV     #PR7,(R1)       ;SET PSW TO PRIORITY 7
2415  004270  004737  034272            JSR     PC,$SIZE
2416  004274  013700  034366            MOV     SLSTAD,R0       ;GET LAST ADDRESS VALUE
2417  004300  012737  041616  001706    MOV     #ENDLOC,OBUFPT  ;SET OUTPUT BUFFER POINTER
2418  004306  162700  006000            SUB     #6000,R0        ;ALLOW FOR XXDP LOADER
2419  004312  162700  041616            SUB     #ENDLOC,R0      ;SUBTRACT FOR PROGRAM CODE
2420  004316  000241                    CLC                     ;CLEAR CARRY
2421  004320  006000                    ROR     R0              ;DIVIDE BY TWO FOR TWO BUFFERS
2422  004322  042700  000001            BIC     #BIT0,R0        ;MAKE SURE ITS EVEN
2423  004326  012737  041616  001710    MOV     #ENDLOC,IBUFPT  ;SET THE INPUT BUFFER POINTER
2424  004334  060037  001710            ADD     R0,IBUFPT       ;AT THE MIDDLE OF BUFFER AREA
2425  004340  000241                    CLC                     ;CLEAR CARRY
2426  004342  006000                    ROR     R0              ;DIVIDE BY TWO FOR MAXIMUM WORDS
2427  004344  162700  000002            SUB     #2,R0           ;MAKE IT TWO LESS
2428  004350  010037  001700            MOV     R0,MAXWDS       ;SET MAX WORD VALUE
2429  004354  004737  032370            JSR     PC,$TKINT       ;INITIALIZE KEYBOARD
2430  004360  104401  002316            TYPE    ,PROGID         ;TYPE PROGRAM NAME
2431  004364  010046                    MOV     R0,-(SP)
2432  004366  104402                    TYPOC                   ;TYPE MAX WORDS
2433  004370  104401  003321            TYPE    ,IOBFSZ         ;LABEL IT
2434  004374  005046                    CLR     -(SP)           ;;PUT NEW PS ON STACK
2435  004376  012746  004404            MOV     #67$,-(SP)      ;;PUT NEW PC ON  STACK
2436  004402  000002                    RTI                     ;;POP NEW PC AND PS
2437  004404                    67$:
2438  004404  105737  001672            TSTB    HPVLD           ;TEST IF HELP FILE VALID
2439  004410  001402                    BEQ     COMLEV          ;NO - DON'T PRINT HELP QUESTION
2440  004412  104401  002400            TYPE    ,HELPQ          ;TYPE HELP QUESTION
2441                    ;;*****************************************************************
```

```
                                .SBTTL  COMMAND LEVEL ROUTINE

                                ;*THIS ROUTINE WAITS FOR AND ACCEPTS A COMMAND FROM THE COSOLE AND DECODES
                                ;*IT TO DETERMINE IF THE COMMAND IS IMMEDIATE, DEFERRED, OR AN UNDEFINED.
                                ;*IF THE COMMAND IS DEFERRED IT CALLS THE DEFERRED COMMAND PROCESSOR IT
                                ;*(DCMDPR).  IF THE COMMAND IS IMMEDIATE THE 2ND WORD OF THE
                                ;*INTERACTIVE COMMAND TABLE (ICTBL) IS THE ADDRESS OF A SPECIAL
                                ;*ROUTINE FOR THAT COMMAND.


                                ;*      RETURN TO COMLEV IS
                                ;*      NORMAL - TST    (R4)+
                                ;*               RTS    R4
                                ;*      ERROR - MOV     (R4),R4
                                ;*               RTS    R4
                                ;;*****************************************************************

004416  104401  002435  COMLEV: TYPE   ,STAR           ;TYPE COMMAND LEVEL DESIGNATOR
004422  104411                  RDLIN                  ;READ COMMAND LINE
004424  012601                  MOV    (SP)+,R1        ;MOVE ADDR OF COMMAND R1
004426  004437  004704          JSR    R4,ICDEC        ;CALL INTERACTIVE COMMAND DECODE
004432  004470                  2$                     ;ERROR RETURN, GO TO ERROR
004434  005722                  TST    (R2)+           ;BUMP TO PARAM WORD
004436  005712                  TST    (R2)            ;TEST PARAM WORD
004440  100005                  BPL    1$              ;IF DEFERRED, BRANCH. ELSE
004442  005742                  TST    -(R2)           ;DEC TO ADDRESS WORD
004444  004472  000000          JSR    R4,@(R2)                ;BR IMMEDIATE COMMAND
                                                       ;ROUTINE WHOSE ADDRESS WAS
                                                       ;PLACED IN R2 BY ICDEC.
004450  004476                  3$                     ;ERROR RETURN
004452  000403                  BR     4$              ;RETURN TO COMMAND LEVEL
004454  004437  004510  1$:     JSR    R4,DCMDPR       ;JUMP TO DEFERRED CMD PROCESSOR
004460  004476                  3$                     ;ERROR RETURN
004462  105037  001672  4$:     CLRB   HPVLD           ;CLEAR HELP VALID SWITCH
004466  000753                  BR     COMLEV          ;RETURN TO COMMAND LEVEL
004470  104401  003053  2$:     TYPE   ,BADCOM         ;TYPE BAD COMMAND MESSAGE
004474  000400                  BR     3$
004476  104401  033544  3$:     TYPE   ,$TTYIN         ;TYPE LINE IN ERROR
004502  104401  001170          TYPE   ,$QUES          ;FOLLOWED BY QUESTION MARK
004506  000743                  BR     COMLEV          ;RETURN TO COMMAND LEVEL

                                ;;*****************************************************************
                                .SBTTL  DEFERRED COMMANDS INPUT PROCESSER
                                ;*ENTRY:        JSR     PC,DCMDPR
                                ;*WITH R1 POINTING TO INPUT CMND.
                                ;*RETURN:       NORMAL  TST     (R4)+
                                ;*                      RTS     R4
                                ;*              ERROR   MOV     (R4),R4
                                ;*                      RTS     R4
                                ;*THIS ROUTINE WILL PLACE THE DEFERRED COMMAND
                                ;*INTO THE SOURCE FILE. THE SOURCE FILE EMPTY
                                ;*(SFEMP) FLAG IS CHECKED AND IF SET THE SOURCE
                                ;*FILE IS CLEARED AND COUNTERS & POINTER INITIALIZED.
                                ;*A LINE NUMBER IS PREFIXED TO THE DEFERRED
                                ;*COMMAND AND STORED WITH THE COMMAND. THE
```

```
2498                                    ;*LINE TERMINATOR (NULL) IS KEPT WITH THE COMMAND.
2499                                    ;*1000 WORDS ARE ALLOCATED FOR SOURCE FILE AND
2500                                    ;*IS NOT ALLOWED TO OVERFLOW. WHEN THIS ROUTINE IS
2501                                    ;*CALLED R1 MUST BE POINTING TO THE INPUT DEFERRED
2502                                    ;*COMMAND.
2503                                    ;;*****************************************************************
2504
2505  004510  010346                   DCMDPR: MOV     R3,-(SP)        ;STORE R3
2506  004512  010546                           MOV     R5,-(SP)        ;STORE R5
2507  004514  105737  001234                   TSTB    SFEMP           ;TEST SOURCE FILE EMPTY
2508  004520  001420                           BEQ     2$              ;BR IF NOT EMPTY, APPEND TO SOURCE
2509  004522  105037  001243                   CLRB    LNCNT           ;CLEAR LINE COUNTER
2510  004526  013703  001700                   MOV     MAXWDS,R3       ;SET BUFFERSIZE
2511  004532  013737  001710  001246           MOV     IBUFPT,SFPTR    ;SETUP SOURCE FILE POINTER
2512  004540  013705  001710                   MOV     IBUFPT,R5       ;SET UP TO CLEAR SOURCE FILE.
2513  004544  162705  000002                   SUB     #2,R5           ;START CLEAR 1 WORD EARLY
2514  004550  005025                   1$:     CLR     (R5)+           ;CLEAR TO ZEROS
2515  004552  005303                           DEC     R3              ;AND
2516  004554  001375                           BNE     1$              ;LOOP UNTIL INPUT BUFFER CLEARED
2517  004556  105037  001234                   CLRB    SFEMP           ;CLEAR SOURCE FILE EMPTY
2518
2519  004562  013705  001246           2$:     MOV     SFPTR,R5        ;SET UP R5 AS SOURCE FILE PTR
2520  004566  013737  001700  001702           MOV     MAXWDS,TEMP1    ;STORE SF SIZE
2521  004574  162737  000016  001702           SUB     #16,TEMP1       ;ALLOW FOR THIS LINE
2522  004602  063737  001710  001702           ADD     IBUFPT,TEMP1    ;COMPUTE LAST ADDR OF SF
2523  004610  020537  001702                   CMP     R5,TEMP1        ;TEST FOR SUFFICIENT ROOM FOR
2524  004614  101406                           BLOS    3$              ;THIS LINE. BR IF YES
2525  004616  104401  002465                   TYPE    ,NOROOM         ;TYPE NO ROOM MESSAGE
2526  004622  012605                           MOV     (SP)+,R5        ;RESTORE R5
2527  004624  012603                           MOV     (SP)+,R3        ;RESTORE R3
2528  004626  011404                           MOV     (R4),R4         ;SET UP ERROR RETURN
2529  004630  000414                           BR      5$              ;GO TO EXIT
2530  004632  105237  001243           3$:     INCB    LNCNT           ;BUMP LINE COUNT
2531  004636  113725  001243                   MOVB    LNCNT,(R5)+     ;PUT LINE COUNT IN SOURCE
2532  004642  112115                   4$:     MOVB    (R1)+,(R5)      ;MOVE INPUT CHR TO SOURCE
2533  004644  105725                           TSTB    (R5)+           ;TEST IF LAST CHAR MOVED IS NULL
2534  004646  001375                           BNE     4$              ;BR IF NOT YET NULL
2535  004650  010537  001246                   MOV     R5,SFPTR        ;STORE OFF NEW SOURCE FILE PTR
2536  004654  012605                           MOV     (SP)+,R5        ;RESTORE R5
2537  004656  012603                           MOV     (SP)+,R3        ;RESTORE R3
2538  004660  005724                           TST     (R4)+           ;SET UP NORMAL RETURN
2539  004662  000204                   5$:     RTS     R4              ;RETURN TO CALLER
2540
2541                                    ;;*****************************************************************
2542                                    ;.SBTTL  SEARCH BYTE STRING FOR COMMA OR NULL
2543                                    ;*ENTRY
2544                                    ;*      JSR     PC,SBSCN
2545                                    ;*      R1 POINTS TO FIRST CHAR OF STRING
2546                                    ;*
2547                                    ;*RETURN
2548                                    ;*      RTS     PC
2549                                    ;*      WITH R1 NOW POINTING TO FIRST CHARACTER
2550                                    ;*      AFTER A COMMA OR TO THE NULL
2551                                    ;*
2552                                    ;;*****************************************************************
2553  004664       000                  NULL:   .BYTE   0
```

```
                        ;SEARCH BYTE STRING FOR COMMA OR NULL

004665  054             COMMA:  .ASCII  /,/
004666                  SBSCN:
004666  121137  004664  1$:     CMPB    (R1),NULL       ;TEST FOR NULL
004672  001403          BEQ     2$              ;BR IF YES
004674  122137  004665  CMPB    (R1)+,COMMA     ;TEST OF COMMA
004700  001372          BNE     1$              ;LOOP IF NOT
004702  000207          2$:     RTS     PC              ;RETURN

                        ;;*****************************************************************
                        .SBTTL  INTERACTIVE COMMAND DECODE ROUTINE
                        ;*ENTRY:
                        ;*      JSR     R4,ICDEC
                        ;*              WITH R1 CONTAINING THE ADDRESS OF THE COMMAND LINE
                        ;*RETURN:       MOV     (R4),R4
                        ;*              RTS     R4      ERROR RETURN
                        ;*              TST     (R4)+
                        ;*              RTS     R4      NORMAL RETURN
                        ;*
                        ;*WHEN RETURNED R2 WILL POINT TO THE SECOND WORD OF
                        ;*THE MATCHING TABLE ENTRY.
                        ;*
                        ;*
                        ;*THIS ROUTINE SEARCHES THE TABLE OF INTERACTIVE
                        ;*COMMANDS, LOOKING FOR A MATCH FOR THE COMMAND
                        ;*POINTED TO BY R1. IF NO MATCH THE ROUTINE RETURNS
                        ;*BACK TO RETURN 1. IF MATCH OCCURS RETURN IS TO RETURN 2.
                        ;*R2 POINTS TO SECOND WORD OF TABLE ENTRY WHICH IS
                        ;*ADDRESS OF INTERACTIVE COMMAND PROCESSOR
                        ;*SUBROUTINE. THE CALLING ROUTINE MUST
                        ;*STORE R2 BEFORE CALLING ICDEC$
                        ;;*****************************************************************

004704  010346  ICDEC:  MOV     R3,-(SP)        ;STORE R3
004706  112137  001702  MOVB    (R1)+,TEMP1     ;MOVE COMMAND INTO R3
004712  111137  001703  MOVB    (R1),TEMP1+1    ;TO INSURE WORD
004716  013703  001702  MOV     TEMP1,R3        ;ALIGNMENT FOR EASE OF COMPARE
004722  005301          DEC     R1              ;RESTORE R1 TO BEGINNING OF CMD
004724  012702  003534  MOV     #ICTBL,R2       ;ADDRESS OF TABLE INTO R2
004730  020312  1$:     CMP     R3,(R2)         ;TEST TABLE ENTRY AGAINST
004732  001410          BEQ     3$              ;ENTERED COMMAND. BR IF HIT
004734  121237  002435  CMPB    (R2),STAR       ;TEST IF END OF TABLE.
004740  001403          BEQ     2$              ;IF YES DO ERROR RETURN
004742  062702  000010  ADD     #10,R2          ;BUMP R2 TO NEXT TABLE ENTRY
004746  000770          BR      1$              ;LOOP - TEST NEXT ENTRY
004750  011404  2$:     MOV     (R4),R4         ;SET UP ERROR RETURN
004752  000402          BR      4$              ;JUMP TO EXIT
004754  005724  3$:     TST     (R4)+           ;SET UP FOR NO ERROR RETURN
004756  005722          TST     (R2)+           ;BUMP R2 TO SECOND WORD
                                                ;OF TABLE
004760  012603  4$:     MOV     (SP)+,R3        ;RESTORE R3
004762  000204          RTS     R4              ;RETURN TO CALLER

                        ;;*****************************************************************
                        .SBTTL  EDIT ADD LINE ROUTINE
                        ;*ENTRY:
                        ;*      JSR     R4,EARTE
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                                ;*      R1 POINTS TO COMMAND LINE R2 POINTS TO 2ND WORD
                                ;*      IN ICTBL
                                ;*RETURN
                                ;*      RTS     R4      IF ERROR
                                ;*      RTS     R4+2    IF NO ERROR
                                ;*ROUTINES CALLED
                                ;*      ICDEC
                                ;*      DECBIN
                                ;*
                                ;*THIS ROUTINE IS USED TO INSERT A NEW LINE INTO THE
                                ;*SOURCE FILE. THE LINES BELOW THE ENTERED COMMAND
                                ;*ARE SHIFTED DOWN, THE NEW LINE IS ENTERED, AND
                                ;*THE COMMAND LINE NUMBERS ARE RESEQUENCED.
                                ;*THE LINE ADDED IS CHECKED TO INSURE IT IS A
                                ;*DEFERRED COMMAND. IF IT IS NOT, THE COMMAND IS
                                ;*NOT ADDED AND AN ERROR IS REPORTED. THE SOURCE
                                ;*FILE LENGTH IS CHECKED FOR SUFFICIENT ROOM.

004764                          EARTE:
004764  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
004766  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
004770  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
004772  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
004774  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
004776  013705  001246                  MOV     SFPTR,R5        ;LOAD SOURCE FILE PTR INTO R5
005002  013700  001710                  MOV     IBUFPT,R0       ;GET START OF INPUT BUFFER
005006  063700  001700                  ADD     MAXWDS,R0       ;ADD THE MAX WORDS
005012  162700  000020                  SUB     #20,R0          ;ALLOW FOR THIS COMMAND
005016  020500                          CMP     R5,R0           ;CHECK IF ROOM FOR THIS CMD
005020  101403                          BLOS    1$              ;BR IF YES
005022  104401  002465                  TYPE    ,NOROOM         ;TYPE NO ROOM MESSAGE
005026  000506                          BR      25$             ;GO TO EXIT
005030  004737  004666          1$:     JSR     PC,SBSCN        ;BUMP R1 TO NEXT PARAM (LN)
005034  121137  004664                  CMPB    (R1),NULL       ;CHECK IF NULL
005040  001471                          BEQ     21$             ;BR IF YES (ERROR)
005042  010146                          MOV     R1,-(SP)        ;ADDRESS OF ASCII LINE NUMBER
005044  004737  031314                  JSR     PC,DECBIN       ;CONVERT IT TO BINARY
005050  005216                          20$
005052  012603                          MOV     (SP)+,R3        ;STORE DECODED LINE NUMBER
005054  113700  001243                  MOVB    LNCNT,R0        ;GET NUMBER OF LAST LINE
005060  042700  177400                  BIC     #177400,R0      ;CLEAR ANY PROPAGATED BITS IN R0
005064  020300                          CMP     R3,R0           ;REQUESTED ADD IN PRESENT SOURCE
005066  101064                          BHI     23$             ;BR IF NO
005070  004737  004666                  JSR     PC,SBSCN        ;BUMP R1 TO NEXT PARAM (NEW CMND)
005074  121137  004664                  CMPB    (R1),NULL       ;CHECK IF NULL
005100  001451                          BEQ     21$             ;BRANCH IF YES (ERROR)
005102  004437  004704                  JSR     R4,ICDEC        ;DECODE & CHECK NEW COMMAND
005106  005232                          22$                     ;ERROR RETURN
005110  005722                          TST     (R2)+           ;BUMP R2 TO 3RD WORD OF ICTBL
005112  005712                          TST     (R2)            ;TEST IF WORD PLUS
005114  100446                          BMI     22$             ;BR IF MINUS, NOT DEFERRED CMND
005116  005742                          TST     -(R2)           ;DEC BACK TO 2ND WORD
005120  010146                          MOV     R1,-(SP)        ;STORE R1 FOR REFERENCE
005122  005200                          INC     R0              ;ADD 1 TO OLD LINE TOTAL
005124  110037  001243                  MOVB    R0,LNCNT        ;STORE IT OFF
005130  010500                          MOV     R5,R0           ;STORE R4 FOR REFERENCE
```

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2666
2667                                    ;ROUTINE TO DETERMINE HOW FAR TO MOVE SFPTR TO ACCOMMODATE
2668                                    ;NEW LINE & MOVE OLD SOURCE TO MAKE ROOM
2669
2670  005132  005205            10$:    INC     R5              ;SCAN INPUT COMMAND, LOOK FOR
2671  005134  105721                    TSTB    (R1)+           ;NULL. ADD 1 TO R5 FOR LINE
2672  005136  001375                    BNE     10$             ;NUMBER, EACH NON-NULL CHAR,
2673  005140  005205                    INC     R5              ;AND ONE FOR NULL.
2674  005142  010537  001246            MOV     R5,SFPTR        ;STORE NEW SF LINE POINTER
2675  005146  012601                    MOV     (SP)+,R1        ;RECOVER R1 (COMMAND LINE PTR)
2676  005150  114045            11$:    MOVB    -(R0),-(R5)     ;MOVE LAST CHAR OF OLD SF TO
2677                                                            ;NEW LAST CHAR LOC.
2678  005152  001376                    BNE     11$             ;IF NOT NULL, LOOP
2679  005154  126003  000001            CMPB    1(R0),R3        ;TEST IF NEXT TO LAST CHAR MOVED IS
2680                                                            ;LINE NUMBER TO BE REPLACED
2681  005160  001373                    BNE     11$             ;MOVE NOT DONE, LOOP
2682  005162  062700  000002            ADD     #2,R0           ;GET R0 OFF NULL PAST LINE NUM
2683  005166  010005                    MOV     R0,R5           ;STORE R0 FOR REFERENCE
2684  005170  111120            12$:    MOVB    (R1),(R0)+      ;MOVE NEW COMMAND INTO SF
2685  005172  105721                    TSTB    (R1)+           ;TEST IF CHAR MOVED IS NULL
2686  005174  001375                    BNE     12$             ;NOT DONE STORING CMND, LOOP
2687  005176  005203            13$:    INC     R3              ;ADD ONE TO LINE NUMBER
2688  005200  105725            14$:    TSTB    (R5)+           ;TEST IF NULL
2689  005202  001376                    BNE     14$             ;GO UNTIL NULL
2690  005204  020537  001246            CMP     R5,SFPTR        ;SF RESEQUENCED, EXIT TEST
2691  005210  001417                    BEQ     30$             ;BR IF YES, EXIT
2692  005212  110325                    MOVB    R3,(R5)+        ;MOVE IN NEW LINE NUMBER
2693  005214  000770                    BR      13$             ;BRANCH TO NEXT LINE
2694  005216  104401  002512    20$:    TYPE    ,BADDEC         ;TYPE BAD NUMBER ENTERED
2695  005222  000410                    BR      25$
2696  005224  104401  002532    21$:    TYPE    ,IVDEDT         ;TYPE INVALID EDIT
2697  005230  000405                    BR      25$
2698  005232  104401  002554    22$:    TYPE    ,IVDADD         ;TYPE INVALID NEW COMMAND
2699  005236  000402                    BR      25$
2700  005240  104401  002575    23$:    TYPE    ,IVDLN          ;TYPE INVALID LINE NUMBER
2701  005244  011404    25$:    MOV     (R4),R4         ;ERROR RETURN
2702  005246  000401                    BR      35$
2703  005250  005724            30$:    TST     (R4)+
2704  005252                    35$:
2705  005252  012605                    MOV     (SP)+,R5        ;;POP STACK INTO R5
2706  005254  012603                    MOV     (SP)+,R3        ;;POP STACK INTO R3
2707  005256  012602                    MOV     (SP)+,R2        ;;POP STACK INTO R2
2708  005260  012601                    MOV     (SP)+,R1        ;;POP STACK INTO R1
2709  005262  012600                    MOV     (SP)+,R0        ;;POP STACK INTO R0
2710  005264  000204                    RTS     R4
2711
2712
2713                            ;:*****************************************************************
2714                            .SBTTL  EDIT DELETE LINE ROUTINE
2715                            ;*ENTRY:    JSR     R4,EDRTE
2716                            ;*      WITH R1 POINTING TO INPUT COMMAND LINE (THE EDIT
2717                            ;*      DELETE COMMAND) AND R2 POINTING TO THE SECOND
2718                            ;*      WORD OF THE TABLE (IC TBC)
2719                            ;*      RETURN: RTS     R4      ERROR RETURN
2720                            ;*              RTS     R4+2    NO ERROR RETURN
2721                            ;*THIS ROUTINE WILL REMOVE THE COMMAND DESIGNATED BY THE
```

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                                        ;*LINE NUMBER FROM THE SOURCE FILE.  THE REMAINING
                                        ;*COMMANDS ARE MOVED UP IN THE SF AND RENUMBERED.
                                        ;*THE FOLLOWING SEQUENCE OF OPERATIONS IS PERFORMED:
                                        ;*1.  RETRIEVE LINE NUMBER FROM INPUT COMMAND
                                        ;*2.  CONVERT LN FROM ASCII TO BINARY
                                        ;*3.  CHECK IF LN EXISTS IN SF
                                        ;*4.  DELETE COMMAND FROM SF BY MOVING REST OF
                                        ;*    SF.
                                        ;*5.  DECREMENT LINE NUMBERS WHILE MOVING COMMANDS.
                                        ;*6.  ADJUST AND STORE POINTERS AN NEW LINE
                                        ;*    COUNT.
                                        ;*
                                        ;*    ROUTINES CALLED
                                        ;*      DECBIN
                                        ;*      SBSCN
                                        ;*****************************************************************

005266                                  EDRTE:
005266 010046                           MOV     R0,-(SP)        ;;PUSH R0 ON STACK
005270 010146                           MOV     R1,-(SP)        ;;PUSH R1 ON STACK
005272 010246                           MOV     R2,-(SP)        ;;PUSH R2 ON STACK
005274 010346                           MOV     R3,-(SP)        ;;PUSH R3 ON STACK
005276 010546                           MOV     R5,-(SP)        ;;PUSH R5 ON STACK
005300 004737 004666                    JSR     PC,SBSCN        ;BUMP R1 TO NEXT PARAM (LN)
005304 105711                           TSTB    (R1)            ;CHECK IF NULL
005306 001455                           BEQ     20$             ;BR IF YES (ERROR)
005310 010146                           MOV     R1,-(SP)        ;ADDRESS OF LN ON STACK
005312 004737 031314                    JSR     PC,DECBIN       ;DECODE LN TO BINARY
005316 005450                           21$
005320 012603                           MOV     (SP)+,R3        ;STORE DECODED LINE NUMBER
005322 113702 001243                    MOVB    LNCNT,R2        ;GET NUMBER OF LAST LINE
005326 042702 177400                    BIC     #177400,R2      ;CLEAR UPPER BITS
005332 120203                           CMPB    R2,R3           ;TEST IF VALID LINE NUMBER
005334 103450                           BLO     22$             ;NO - GO PRINT ERROR
005336 013700 001710                    MOV     IBUFPT,R0       ;GET ADDRESS OF START OF SF
005342 121003                   I$:     CMPB    (R0),R3         ;TEST IF THIS IS LINE TO BE
005344 001406                           BEQ     3$              ;DELETED.  BR IF YES
005346 020037 001246                    CMP     R0,SFPTR                ;CHECK IF STILL IN SF
005352 101041                           BHI     22$             ;BR IF NO (ERROR)
005354 105720                   2$:     TSTB    (R0)+           ;TEST FOR NULL
005356 001376                           BNE     2$              ;BR IF NOT NULL, CHECK NEXT
005360 000770                           BR      1$              ;FOUND NULL, BR TO TEST FOR LN
                                        ;LINE TO BE DELETED HAS
                                        ;BEEN FOUND.  NOW FIND THE
                                        ;START OF NEXT LINE.  DEC
                                        ;THAT LINE NUMBER AND
                                        ;MOVE IT TO OVERLAY OLD CMD.

005362 010005                   3$:     MOV     R0,R5           ;STORE R0 FOR REFERENCE
005364 105720                   4$:     TSTB    (R0)+           ;LOOK FOR NEXT NULL
005366 001376                           BNE     4$              ;BR IF NOT, CHECK NEXT CHAR
005370 013702 001246                    MOV     SFPTR,R2        ;GET SOURCE FILE PTR
005374 020002                   5$:     CMP     R0,R2           ;TEST IF END OF SF
005376 001404                           BEQ     7$              ;BR IF YES, END OF MOVE
005400 105310                           DECB    (R0)            ;DEC THAT LN
005402 112025                   6$:     MOVB    (R0)+,(R5)+     ;MOVE BYTE TO OVERLAY LINE
```

```
2778  005404  001773                        BEQ     5$              ;TEST IF BYTE MOVED WAS MOVE
2779                                                                  ;END OF THAT LINE, CHECK IF MORE
2780  005406  000775                        BR      6$              ;MOVE NEXT CHAR OF THIS LINE
2781  005410  010537  001246          7$:   MOV     R5,SFPTR        ;STORE NEW SF POINTER
2782  005414  105337  001243          8$:   DECB    LNCNT           ;DEC TOTAL LINE COUNT
2783  005420  001003                        BNE     8$              ;SKIP IF NOT ZERO
2784  005422  152737  000001  001234        BISB    #1,SFEMP        ;ELSE SET SOURCE EMPTY FLAG
2785  005430  105025                        CLRB    (R5)+           ;CLEAR REST OF SOURCE FILE
2786  005432  020500                        CMP     R5,R0           ;CHECK IF FINISHED
2787  005434  001375                        BNE     8$              ;LOOP IF NOT DONE
2788
2789  005436  005724                        TST     (R4)+           ;SET UP NORMAL RETURN
2790  005440  000411                        BR      30$             ;GO TO NORMAL EXIT
2791  005442  104401  002532          20$:  TYPE    ,IVDEDT         ;TYPE INVALID EDIT MESSAGE
2792  005446  000405                        BR      25$
2793  005450  104401  002512          21$:  TYPE    ,BADDEC         ;TYPE BAD DECIMAL MESSAGE
2794  005454  000402                        BR      25$
2795  005456  104401  002575          22$:  TYPE    ,IVDLN          ;TYPE INVALID LINE NUMBER MESSAGE
2796  005462  011404                  25$:  MOV     @(R4),R4        ;SET UP ERROR RETURN
2797  005464                          30$:
2798  005464  012605                        MOV     (SP)+,R5        ;;POP STACK INTO R5
2799  005466  012603                        MOV     (SP)+,R3        ;;POP STACK INTO R3
2800  005470  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
2801  005472  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
2802  005474  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
2803  005476  000204                        RTS     R4              ;RETURN TO CALLER
2804
2805
2806
2807                                  ;;*****************************************************************
2808                                  .SBTTL  PRINT LINE ROUTINE
2809                                  ;*ENTRY:        JSR     R4,PTRTE ON PLRTE
2810                                  ;*WITH R1 POINTING TO COMMAND (PRINT LINE)
2811                                  ;*RETURN:       RTS     R4      NORMAL
2812                                  ;*              RTS     R4+2    ERROR RETURN
2813                                  ;*THIS ROUTINE WILL PRINT A SINGLE LINE FROM THE
2814                                  ;*SOURCE FILE.  IF A LINE NUMBER IS GIVEN WITH THE PRINT
2815                                  ;*LINE (PL) REQUEST THE ROUTINE PRINTS THE SPECIFIED
2816                                  ;*LN.  IF LN IS NOT SUPPLIED THE LAST COMMAND
2817                                  ;*ENTERED IS PRINTED.
2818                                  ;*
2819                                  ;*ROUTINES CALLED
2820                                  ;*      TYPDS
2821                                  ;*      TYPE
2822                                  ;*      DECBIN
2823                                  ;*
2824                                  ;;*****************************************************************
2825
2826  005500                          PLRTE:
2827  005500  010046                        MOV     R0,-(SP)        ;;PUSH R0 ON STACK
2828  005502  010146                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
2829  005504  010346                        MOV     R3,-(SP)        ;;PUSH R3 ON STACK
2830  005506  010546                        MOV     R5,-(SP)        ;;PUSH R5 ON STACK
2831  005510  105737  001234                TSTB    SFEMP           ;TEST IF ANY SOURCE CODE
2832  005514  001061                        BNE     22$             ;BRANCH IF NO SOURCE
2833  005516  004737  004666                JSR     PC,SBSCN        ;BUMP R1 TO NEXT PARAM
```

```
2834  005522  105711                TSTB    (R1)            ;TEST IF NULL
2835  005524  001424                BEQ     4$              ;NO LN PRINT LAST CMND
2836  005526  010146                MOV     R1,-(SP)        ;CONVERT ASCII LINE
2837  005530  004737  031314        JSR     PC,DECBIN       ;NUMBER TO BINARY
2838  005534  005644                20$                     ;ERROR RETURN
2839  005536  012603                MOV     (SP)+,R3                ;STORE CONVERTED LN
2840  005540  113705  001243        MOVB    LNCNT,R5        ;GET STORED LINE COUNT
2841  005544  042705  177400        BIC     #177400,R5      ;CLEAR UPPER BITS
2842  005550  020305                CMP     R3,R5           ;TEST IF VALID LINE NUMBER
2843  005552  101037                BHI     21$             ;NO - GO PRINT ERROR
2844  005554  013700  001710        MOV     IBUFPT,R0       ;GET ADDRESS OF START OF SF
2845  005560  121003        1$:     CMPB    (R0),R3         ;TEST IF THIS IS LINE TO BE
2846  005562  001413                BEQ     3$              ;PRINTED. BR IF YES FOUND LN
2847  005564  121005                CMPB    (R0),R5         ;CHECK IF STILL IN SF
2848  005566  101031                BHI     21$             ;BR IF NO (ERROR-INVALID LN)
2849  005570  105720        2$:     TSTB    (R0)+           ;TEST FOR NULL
2850  005572  001376                BNE     2$              ;BR IF NOT NULL, TEST NEXT CHAR
2851  005574  000771                BR      1$              ;FOUND NULL, CHECK IF THIS IS LN
2852  005576  013700  001246        MOV     SFPTR,R0        ;GET SF POINTER
2853  005602  124040                CMPB    -(R0),-(R0)     ;DEC R0 PAST NULL
2854  005604  105740        5$:     TSTB    -(R0)           ;TEST FOR NULL
2855  005606  001376                BNE     5$              ;BR IF NO, LOOP TO FIND NULL
2856  005610  105720                TSTB    (R0)+           ;BUMP R0 PAST NULL
2857
2858  005612  005046        3$:     CLR     -(SP)           ;CLEAR NEXT STACK WORD
2859  005614  112016                MOVB    (R0)+,(SP)      ;PUT LINE NUMBER ON STACK
2860  005616  104405                TYPDS                   ;TYPE LINE NUMBER
2861  005620  104401  002510        TYPE    ,EQSGN          ;TYPE EQUAL SIGN
2862  005624  010037  005632        MOV     R0,6$           ;SET UP PRINT ADDRESS
2863  005630  104401                TYPE                    ;TYPE LINE
2864  005632  000000        6$:     .WORD
2865  005634  104401  001171        TYPE    $CRLF           ;TYPE CARIAGE RETURN
2866  005640  005724                TST     (R4)+           ;SET UP NO ERROR RETURN
2867  005642  000411                BR      30$
2868  005644  104401  002512  20$:  TYPE    ,BADDEC         ;TYPE BAD DECIMAL MESSAGE
2869  005650  000405                BR      25$
2870  005652  104401  002575  21$:  TYPE    ,IVDLN          ;TYPE INVALID LINE NUMBER
2871  005656  000402                BR      25$
2872  005660  104401  003007  22$:  TYPE    ,NOSRC          ;TYPE SO SOURCE MESSAGE
2873  005664  011404  25$:  MOV     (R4),R4         ;SET UP ERROR RETURN
2874  005666        30$:
2875  005666  012605                MOV     (SP)+,R5        ;;POP STACK INTO R5
2876  005670  012603                MOV     (SP)+,R3        ;;POP STACK INTO R3
2877  005672  012601                MOV     (SP)+,R1        ;;POP STACK INTO R1
2878  005674  012600                MOV     (SP)+,R0        ;;POP STACK INTO R0
2879  005676  000204                RTS     R4              ;RETURN
2880
2881
2882                  ;;*****************************************************************
2883                  .SBTTL  PRINT TEST ROUTINE
2884                  ;*ENTRY:        JSR     R4,PTRTE
2885                  ;*WITH R1 POINTING TO COMMAND (PRINT TEST)
2886                  ;*RETURN:       RTS     R4      ERROR RETURN
2887                  ;*              RTS     R4+2    NORMAL RETURN
2888                  ;*THIS ROUTINE WILL PRINT THE ENTIRE CONTENTS
2889                  ;*OF THE SOURCE FILE.
```

```
2890                                    ;#ROUTINES CALLED
2891                                    ;*      TYPE
2892                                    ;*      TYPOS
2893                                    ;;*****************************************************************
2894
2895  005700                            PTRTE:
2896  005700  010046                           MOV     R0,-(SP)        ;;PUSH R0 ON STACK
2897  005702  010346                           MOV     R3,-(SP)        ;;PUSH R3 ON STACK
2898  005704  105737  001234                   TSTB    $FEMP           ;TEST IF ANY SOURCE
2899  005710  001025                           BNE     20$             ;IF NONE, BRANCH EXIT
2900  005712  013700  001710                   MOV     IBUFPT,R0       ;GET START OF SF
2901  005716  013703  001246                   MOV     $FPTR,R3        ;GET SOURCE FILE PTR
2902  005722  005046                    3$:    CLR     -(SP)           ;CLEAR NEXT STACK WORD
2903  005724  112016                           MOVB    (R0)+,(SP)      ;PUT LINE NUM ON STACK
2904  005726  104405                           TYPOS                   ;PRINT IT
2905  005730  104401  002510                   TYPE    ,EQSGN          ;TYPE EQUAL SIGN
2906  005734  010037  005742                   MOV     R0,1$           ;SET UP TYPE ADDRESS
2907  005740  104401                           TYPE                    ;TYPE COMMAND
2908  005742  000000                    1$:    .WORD
2909  005744  104401  001171                   TYPE    ,$CRLF          ;TYPE CARRIAGE RETURN
2910  005750  105720                    2$:    TSTB    (R0)+           ;TEST FOR NULL
2911  005752  001376                           BNE     2$              ;IF NOT LOOP UNTIL NULL
2912  005754  020003                           CMP     R0,R3           ;TEST IF LAST LINE PRINTED
2913  005756  001361                           BNE     3$              ;NOT DONE, LOOP
2914  005760  005724                           TST     (R4)+           ;SET NORMAL RETURN
2915  005762  000403                           BR      25$             ;GO TO NORMAL EXIT
2916  005764  104401  003007            20$:   TYPE    ,NOSRC          ;TYPE NO SOURCE
2917  005770  011404                           MOV     (R4),R4         ;SET ERROR RETURN
2918  005772                            25$:
2919  005772  012603                           MOV     (SP)+,R3        ;;POP STACK INTO R3
2920  005774  012600                           MOV     (SP)+,R0        ;;POP STACK INTO R0
2921  005776  000204                           RTS     R4              ;RETURN
2922
2923
2924
2925                                    ;;*****************************************************************
2926                                    .SBTTL  FORMAT SELECT ROUTINE
2927                                    ;*ENTRY:        JSR     R4,FTRTE
2928                                    ;*                              WITH R1 POINTING TO COMMAND
2929                                    ;*
2930                                    ;*RETURN:       RTS     R4      ERROR RETURN
2931                                    ;*              RTS     R4+2    NO ERROR RETURN
2932                                    ;*
2933                                    ;*THIS ROUTINE WILL SELECT THE FORMAT (24 OR 26,OCTAL) THAT IS TO
2934                                    ;*BE USED FOR THE SUBSYSTEM COMMANDS. ALL COMMANDS WILL BE EXECUTED
2935                                    ;*WITH THIS FORMAT UNTIL IT IS CHANGED.
2936                                    ;*****************************************************************
2937  006000  004737  004666   FTRTE:  JSR     PC,SBSCN        ;BUMP TO NEXT PARAMETER
2938  006004  105711                   TSTB    (R1)            ;TEST IF NULL
2939  006006  001417                   BEQ     2$              ;NO CHANGE - EXIT
2940  006010  121127  000077           CMPB    (R1),#'?        ;TEST IF QUESTION
2941  006014  001006                   BNE     1$              ;NO - SKIP PRINT
2942  006016  013746  001212           MOV     FORMAT,-(SP)    ;ELSE GET FORMAT STORED
2943  006022  104402                   TYPOC                   ;PRINT IT
2944  006024  104401  001171           TYPE    ,$CRLF
2945  006030  000406                   BR      2$              ;GO TO EXIT
```

```
2946  006032  010146          1$:     MOV     R1,-(SP)        ;PUT VALUE FOR CONVERSION ON STACK
2947  006034  004737  031160          JSR     PC,OCTBIN
2948  006040  006052                  20$                     ;ERROR RETURN
2949  006042  012637  001212          MOV     (SP)+,FORMAT    ;STORE NEW FORMAT
2950  006046  005724          2$:     TST     (R4)+           ;GOOD RETURN
2951  006050  000403                  BR      30$
2952  006052  011404          20$:    MOV     (R4),R4         ;SET ERROR RETURN
2953  006054  104401  002640          TYPE    ,BADOCT         ;PRINT ERROR MESSAGE
2954  006060  000204          30$:    RTS     R4              ;RETURN
2955
2956                          ;:*****************************************************************
2957                          .SBTTL  TIMEOUT CHANGE ROUTINE
2958                          ;*ENTRY:        JSR     R4,TORTE
2959                          ;*                      WITH R1 POINTING TO COMMAND
2960                          ;*
2961                          ;*RETURN        RTS     R4      ERROR RETURN
2962                          ;*              RTS     R4+2    NO ERROR RETURN
2963                          ;*
2964                          ;*THIS ROUTINE WILL CHANGE THE TIME OUT DELAY FOR SUBSYSTEM OPERATIONS.
2965                          ;:*****************************************************************
2966  006062  004737  004666  TORTE:  JSR     PC,SBSCN                ;BUMP TO PARAMETER
2967  006066  105711          TSTB    (R1)                    ;TEST IF 0
2968  006070  001417          BEQ     1$                      ;EXIT - NO TIME OUT CHANGE
2969  006072  121127  000077  CMPB    (R1),#'?                ;TEST IF QUESTION
2970  006076  001006          BNE     2$                      ;NO - SKIP TYPE
2971  006100  013746  001260  MOV     TOVAL,-(SP)             ;GET TOVAL TO STACK
2972  006104  104405          TYPDS                           ;TYPE IT
2973  006106  104401  001171  TYPE    $CRLF
2974  006112  000406          BR      1$
2975  006114  010146  2$:     MOV     R1,-(SP)                ;GET VALUE FOR CONVERSION
2976  006116  004737  031314  JSR     PC,DECBIN               ;CONVERT VALUE TO BINARY
2977  006122  006134          20$                             ;ERROR RETURN
2978  006124  012637  001260  MOV     (SP)+,TOVAL             ;STORE VALUE
2979  006130  005724  1$:     TST     (R4)+                   ;SET GOOD RETURN
2980  006132  000403          BR      30$
2981  006134  011404  20$:    MOV     (R4),R4                 ;SET ERROR RETURN
2982  006136  104401  002512  TYPE    ,BADDEC                 ;TYPE MESSAGE
2983  006142  000204  30$:    RTS     R4                      ;RETURN
2984                          ;:*****************************************************************
2985                          .SBTTL  DRIVE NUMBER CHANGE ROUTINE
2986                          ;*ENTRY:        JSR     R4,DNRTE
2987                          ;*      WITH R1 POINTING TO THE COMMAND FIELD IF DN
2988                          ;*      COMMAND OR SUBSYSTEM COMMAND PARAMETER IF
2989                          ;*      SYBSYSTEM FUNCTION COMMAND
2990                          ;*ERROR RETURN:          MOV     (R4),R4
2991                          ;*                      RTS     R4
2992                          ;*NO ERROR RETURN:       TST     (R4)+
2993                          ;*                      RTS     R4
2994                          ;*
2995                          ;*THIS ROUTINE CHANGES THE "DRIVE" PARAMETER BY STORING
2996                          ;*IN IT THE VALUE SPECIFIED BY THE "DN" OR "SF"
2997                          ;*COMMANDS NOTE R1 MUST POINT TO THE COMMAND
2998                          ;*FIELD (DN) OR THE SUBSYSTEM COMMAND PARAMETER (SF).
2999                          ;*
3000                          ;*ROUTINES CALLED
3001                          ;*OCTBIN
```

```
3002                                    ;*
3003                                    ;*SBSCN
3004
3005  006144                            DNRTE:
3006  006144  010146                            MOV     R1,-(SP)        ;;PUSH R1 ON STACK
3007  006146  004737  004666                    JSR     PC,SBSCN        ;BUMP R1 TO NEXT PARAM
3008  006152  105711                            TSTB    (R1)            ;TEST IF PARAM NULL
3009  006154  001425                            BEQ     1$              ;NO DRIVE CHANGE EXIT
3010  006156  121127  000077                    CMPB    (R1),#'?        ;TEST IF QUESTION
3011  006162  001006                            BNE     4$              ;NO - SKIP TYPE
3012  006164  013746  001176                    MOV     DRIVE,-(SP)     ;GET DRIVE NUM TO STACK
3013  006170  104402                            TYPOC                   ;TYPE IT
3014  006172  104401  001171                    TYPE    ,$CRLF
3015  006176  000414                            BR      1$
3016  006200  121127  000054            4$:     CMPB    (R1),#',        ;TEST IF NULL ENTRY
3017  006204  001411                            BEQ     1$              ;IF YES NO DRIVE CHANGE EXIT
3018  006206  010146                            MOV     R1,-(SP)        ;ADDRESS OF ASCII CHAR
3019  006210  004737  031160                    JSR     PC,OCTBIN       ;CONVERT TO BINARY
3020  006214  006234                            2$                      ;ERROR RETURN
3021  006216  011637  001176                    MOV     (SP),DRIVE      ;STORE NEW DRIVE NUMBER
3022  006222  022627  000007                    CMP     (SP)+,#7                ;TEST IF VALID DRIVE
3023  006226  101005                            BHI     3$              ;YES - TYPE BAD DRIVE NUM
3024  006230  005724                    1$:     TST     (R4)+           ;SET NORMAL RETURN
3025  006232  000406                            BR      30$
3026  006234  104401  002640            2$:     TYPE    ,BADOCT         ;TYPE INVALID OCTAL NUMBER
3027  006240  000402                            BR      29$
3028  006242  104401  003146            3$:     TYPE    ,BADDRV         ;PRINT MESSAGE
3029  006246  011404                    29$:    MOV     (R4),R4         ;SET ERROR RETURN
3030  006250                            30$:
3031  006250  012601                            MOV     (SP)+,R1        ;;POP STACK INTO R1
3032  006252  000204                            RTS     R4              ;RETURN
3033
3034                                    ;;*****************************************************************
3035                                    .SBTTL  ITERATION COUNT CHANGE ROUTINE
3036                                    ;*ENTRY:        JSR     R4,ICRTE
3037                                    ;*                      WITH R1 POINTING TO INPUT COMMAND
3038                                    ;*RETURN:       RTS     R4      ERROR RETURN
3039                                    ;*              RTS     R4+2    NO ERROR RETURN
3040                                    ;*
3041                                    ;*      ROUTINES CALLED:
3042                                    ;*      DECBIN
3043                                    ;*      SBSCN
3044                                    ;;*****************************************************************
3045
3046  006254  004737  004666            ICRTE:  JSR     PC,SBSCN        ;BUMP R1 TO NEXT PARAM (IC)
3047  006260  105711                            TSTB    (R1)            ;TEST FOR NULL
3048  006262  001417                            BEQ     1$              ;IF NULL, EXIT. NO CHANGE IC
3049  006264  121127  000077                    CMPB    (R1),#'?        ;TEST IF QUESTION
3050  006270  001006                            BNE     2$              ;NO - SKIP TYPE
3051  006272  013746  001232                    MOV     ITCNT,-(SP)     ;GET ITERATION CNT TO STACK
3052  006276  104405                            TYPDS                   ;TYPE IT
3053  006300  104401  001171                    TYPE    ,$CRLF
3054  006304  000406                            BR      1$
3055  006306  010146                    2$:     MOV     R1,-(SP)        ;ADDRESS OF PARAM ON STACK
3056  006310  004737  031314                    JSR     PC,DECBIN       ;CONVERT IT TO BINARY
3057  006314  006326                            20$                     ;ERROR RETURN
```

```
3058  006316  012637  001232            MOV     (SP)+,ITCNT     ;STORE ITERATION COUNT
3059  006322  005724                1$: TST     (R4)+           ;SET UP NORMAL RETURN
3060  006324  000403                    BR      30$
3061  006326  011404                20$: MOV     (R4),R4         ;SET UP ERROR RETURN
3062  006330  104401  002512            TYPE    ,BADDEC         ;TYPE BAD DECIMAL MESSAGE
3063  006334  000204                30$: RTS     R4              ;RETURN
3064
3065                                    ;;*****************************************************************
3066                                    .SBTTL  SPECIAL DATA PATTERN ROUTINE
3067                                    ;*ENTRY:        JSR     R4,DPRTE
3068                                    ;*              WITH R1 POINTING TO THE INPUT COMMAND
3069                                    ;*RETURN:       RTS     R4      ERROR RETURN
3070                                    ;*              RTS     R4+2    NO ERROR ROUTINE
3071                                    ;*
3072                                    ;*THIS ROUTINE WILL ACCEPT 32 WORDS OR LESS AND STORE
3073                                    ;*THEM WITH THE IDENTIFIER X,Y, OR Z AS CHOSEN BY
3074                                    ;*PARAMETER 1.  INPUT DATA MUST BE IN OCTAL AND IN
3075                                    ;*WORD FORMAT (6 OCTAL CHARACTERS WITH THE UPPER BIT A 0).
3076                                    ;*CARRIAGE RETURNS MAY BE USED TO TERMINATE A LINE
3077                                    ;*WITHOUT AFFECTING THE INPUT DATA BUT IT MUST OCCUR
3078                                    ;*ON A WORD BOUNDARY.  (IF NOT ON WORD BOUNDARY THE
3079                                    ;*REMAINDER OF THE WORD IS ZERO FILLED.) THE
3080                                    ;*INPUT DATA IS TERMINATED WITH A CARRIAGE RETURN
3081                                    ;*AT THE BEGINNING OF A LINE.  IF LESS THAN 32
3082                                    ;*WORDS ARE ENTERED THE REMAINDER WORDS ARE
3083                                    ;*ZERO FILLED.
3084                                    ;*      ROUTINES CALLED:
3085                                    ;*              OCTBIN
3086                                    ;*              SBSCN
3087                                    ;;*****************************************************************
3088  006336  000000  000000  000000  CVTBUF: .WORD   0,0,0,0
3089  006344  000000
3090  006346  052737  100000  001702  EBRTE:  BIS     #BIT15,TEMP1            ;SET FLAG FOR EDIT BUFFER
3091  006354  000402                    BR      DPRTE1          ;SKIP
3092  006356  005037  001702            DPRTE:  CLR     TEMP1           ;CLEAR EDIT BUFFER FLAG
3093  006362                            DPRTE1:
3094  006362  010046                    MOV     R0,-(SP)        ;;PUSH R0 ON STACK
3095  006364  010146                    MOV     R1,-(SP)        ;;PUSH R1 ON STACK
3096  006366  010246                    MOV     R2,-(SP)        ;;PUSH R2 ON STACK
3097  006370  010346                    MOV     R3,-(SP)        ;;PUSH R3 ON STACK
3098  006372  010546                    MOV     R5,-(SP)        ;;PUSH R5 ON STACK
3099  006374  010446                    MOV     R4,-(SP)        ;;PUSH R4 ON STACK
3100  006376  004737  004666            JSR     PC,SBSCN        ;BUMP R1 TO NEXT PARAM (PAT NAME)
3101  006402  105711                    TSTB    (R1)            ;TEST PARAM NULL
3102  006404  001541                    BEQ     20$             ;CANNOT ACCEPT NULL, BRANCH TO ERROR
3103
3104  006406  121127  000130            CMPB    (R1),#'X        ;TEST PATTERN NAME FOR
3105  006412  001006                    BNE     1$              ;X, Y, OR Z. SET UP R3
3106  006414  012703  001262            MOV     #PATX,R3        ;WITH ADDRESS OF AREA
3107  006420  152737  000377  001237    BISB    #377,PATXDF     ;SET PAT X DEFINED SWITCH
3108  006426  000421                    BR      3$              ;TO STORE DATA PATTERN
3109  006430  121127  000131        1$: CMPB    (R1),#'Y
3110  006434  001006                    BNE     2$
3111  006436  012703  001362            MOV     #PATY,R3
3112  006442  152737  000377  001240    BISB    #377,PATYDF     ;SET PAT Y DEFINED SWITCH
3113  006450  000410                    BR      3$
```

```
3114  006452  121127  000132          2$:   CMPB    (R1),#'Z
3115  006456  001114                        BNE     20$             ;INVALID PATTERN NAME, ERROR
3116  006460  012703  001462                MOV     #PATZ,R3
3117  006464  152737  000377  001241        BISB    #377,PATZDF     ;SET PAT Z DEFINED SWITCH
3118  006472  010300                  3$:   MOV     R3,R0           ;STORE R3 (BUFFER AREA)
3119  006474  005737  001702                TST     TEMP1           ;TEST EDIT FLAG
3120  006500  100016                        BPL     39$             ;IF SET - SKIP
3121  006502  004737  004666                JSR     PC,SBSCN        ;ELSE BUMP TO NEXT PARAM, WORD NUM
3122  006506  010146                        MOV     R1,-(SP)        ;GET ADDRESS OF PARAM
3123  006510  004737  031160                JSR     PC,OCTBIN       ;CONVERT IT TO OCTAL
3124  006514  006710                        20$                     ;ERROR RETURN
3125  006516  011602                        MOV     (SP),R2         ;GET WORD NUMBER FOR START OF EDIT
3126  006520  006302                        ASL     R2              ;NOW ITS WORD ADDRESS
3127  006522  060200                        ADD     R2,R0           ;SET TO INDEX INTO BUFFER
3128  006524  012702  000040                MOV     #^D32,R2        ;SET MAX OF EDIT
3129  006530  162602                        SUB     (SP)+,R2        ;NOW SET TO REMAINDER OF BUFFER LENGTH
3130  006532  100466                        BMI     20$             ;ERROR, EDIT IS OUT OF BOUNDS
3131  006534  000410                        BR      45$
3132  006536  012704  000040          39$:  MOV     #^D32,R4        ;SET R4 FOR COUNT
3133  006542  012723  177777          44$:  MOV     #-1,(R3)+       ;SET PATTERN STORAGE
3134  006546  005304                        DEC     R4              ;AREA, 32 WORDS
3135  006550  001374                        BNE     44$             ;LOOP
3136
3137  006552  012702  000040                MOV     #^D32,R2        ;SET TOTAL WORD COUNT
3138                                        ;THE REGISTERS USAGE FOR THE REMAINDER IS AS FOLLOWS:
3139                                        ;  R0    POINTS TO THE PATTERN STORAGE AREA
3140                                        ;  R1    POINTS TO THE ASCII INPUT DATA
3141                                        ;  R3    USED AS A SWITCH, SET WHEN NULL (CARRIAGE
3142                                        ;        RETURN IS DETECTED.
3143                                        ;  R4    COUNTER FOR TICKING OFF 6 ASCII INPUT
3144                                        ;        CHARACTERS (ONE WORD)
3145                                        ;  R5    POINTS TO THE TEMPORARY CONVERSION BUFFER (CVTBUF)
3146                                        ;  R2    COUNTER TO LIMIT INPUT TO 32 WORDS. ALSO
3147                                        ;        USED TO FORCE EXIT IF TWO CONSECUTIVE
3148                                        ;        CARRIAGE RETURNS ARE TYPED.
3149
3150
3151  006556  005003          45$:  CLR     R3              ;RESET CR SWITCH
3152  006560  004737  004666                JSR     PC,SBSCN        ;BUMP R1 TO NEXT PARAM (DATA)
3153  006564  012705  006336          4$:   MOV     #CVTBUF,R5      ;SET UP CVTBUF POINTER
3154  006570  012704  000006                MOV     #6,R4           ;SET UP CONVERSION COUNT
3155  006574  112125          5$:   MOVB    (R1)+,(R5)+     ;MOVE ASCII CHAR TO CVTBUF. IF
3156  006576  001404                        BEQ     6$              ;0 (NULL) EXIT LOOP CLEAR CR SWITCH IF
3157  006600  005003                        CLR     R3              ;SET (NON-NULL CHAR TYPED). DEC CONVERT
3158  006602  005304                        DEC     R4              ;COUNT AND
3159  006604  001373                        BNE     5$              ;LOOP. IF ONE WORD READY,
3160  006606  000415                        BR      10$             ;BRANCH TO CONVERSION
3161  006610  005703          6$:   TST     R3              ;TEST IF CR SWITCH SET. IF NOT
3162  006612  001402                        BEQ     7$              ;SET CR SWITCH. IF SET, CLEAR R2
3163  006614  005002                        CLR     R2              ;(TOTAL WORD COUNT) TO PREPARE FOR
3164  006616  000401                        BR      8$              ;EXIT
3165  006620  005103          7$:   COM     R3              ;SETTING CR SWITCH FOR ABOVE
3166  006622  020427  000006          8$:   CMP     R4,#6           ;TEST IF PARTIAL WORD TYPED. IF
3167  006626  001414                        BEQ     11$             ;YES, 0 FILL REST OF WORD. GO TO CONVERT
3168  006630  005305                        DEC     R5              ;AND PLACE IN PAT STORE. IF NOT, GO TO
3169  006632  112725  000060          9$:   MOVB    #'0,(R5)+       ;CHECK IF DONE.
```

```
3170  006636  005304                        DEC     R4
3171  006640  001374                        BNE     9$
3172  006642  012746  006336          10$:  MOV     #CVTBUF,-(SP)   ;START OF CONVERT. RESET CVTBUF PTR
3173  006646  004737  031160                JSR     PC,OCTBIN       ;CALL CONVERSION
3174  006652  006716                        21$                     ;CONVERSION ERROR ROUTINE
3175  006654  012620                        MOV     (SP)+,(R0)+     ;STORE CONVERTED VALUE IN PAT STORE
3176  006656  005302                        DEC     R2              ;DEC TOTAL WORD COUNTER
3177  006660  005702                  11$:  TST     R2              ;TEST IF WORD CNTR 0.
3178  006662  001407                        BEQ     12$             ;EXIT IF YES
3179  006664  005703                        TST     R3              ;TEST CARRIAGE RETURN SWITCH
3180  006666  001736                        BEQ     4$              ;IF NOT SET, GET NEXT 6 CHAR. ELSE
3181  006670  104401  003521                TYPE    ,SPACE6         ;TYPE 6 SPACES TO ALIGN DATA INPUT
3182  006674  104411                        RDLIN                   ;READ NEXT INPUT LINE
3183  006676  012601                        MOV     (SP)+,R1        ;GET ADDRESS OF INPUT
3184  006700  000731                        BR      4$              ;LOOP TO PROCESS NEW LINE
3185  006702  012604                  12$:  MOV     (SP)+,R4        ;RESTORE R4 FOR RETURN
3186  006704  005724                        TST     (R4)+           ;NO ERROR RETURN
3187  006706  000407                        BR      30$
3188  006710  104401  002616          20$:  TYPE    ,IVDPAR         ;TYPE INVALID PARAMETER
3189  006714  000402                        BR      25$
3190  006716  104401  002640          21$:  TYPE    ,BADOCT         ;TYPE BAD OCTAL CHARACTERS
3191  006722  012604                  25$:  MOV     (SP)+,R4        ;RESTORE R4 FOR RETURN
3192  006724  011404                        MOV     (R4),R4         ;ERROR RETURN
3193  006726                          30$:
3194  006726  012605                        MOV     (SP)+,R5        ;;POP STACK INTO R5
3195  006730  012603                        MOV     (SP)+,R3        ;;POP STACK INTO R3
3196  006732  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
3197  006734  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
3198  006736  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
3199  006740  000204                        RTS     R4              ;RETURN
3200
3201                          ;;*****************************************************************
3202                          .SBTTL  PRINT REGISTER ROUTINE
3203                          ;*      ENTRY:  JSR     R4,PRRTE
3204                          ;*                      WITH R1 POINTING TO INPUT COMMAND
3205                          ;*      RETURN: RTS     R4      ERROR RETURN
3206                          ;*              RTS     R4+2    NO ERROR RETURN
3207                          ;*
3208                          ;*THIS ROUTINE WILL READ THE RK611 UNIBUS VISIBLE
3209                          ;*REGISTER AND PRINT THE VALUE (OCTAL) ON THE
3210                          ;*TERMINAL. THE REGISTER MAY BE SPECIFIED IN OCTAL
3211                          ;*FROM 00 TO 17 (NUMBER 13 RESERVED FOR FUTURE USE)
3212                          ;*OR NMEMONICALLY AS:
3213                          ;*      NUMBER  NAME    DESCRIPTION
3214                          ;*       0      CS1     COMMAND STATUS REGISTER 1
3215                          ;*       01     WC      WORD COUNT
3216                          ;*       02     BA      BUFFER ADDRESS
3217                          ;*       03     DA      DESIRED ADDRESS - TRACK AND SECTOR
3218                          ;*       04     CS2     COMMAND STATUS REGISTER 2
3219                          ;*       05     DS      DRIVE STATUS
3220                          ;*       06     ER      ERROR REGISTER
3221                          ;*       07     ASOF    ATTENTION SUMMARY AND OFFSET REGISTER
3222                          ;*       10     DC      DESIRED CYLINDER
3223                          ;*       12     DB      DATA BUFFER
3224                          ;*       13     MR1     MAINTENANCE REGISTER 1
3225                          ;*       14     POS     ECC POSITION REGISTER
```

```
                                ;*      15      PAT     ECC PATTERN REGISTER
                                ;*      16      MR2     MAINTENANCE REGISTER 2
                                ;*      17      MR3     MAINTENANCE REGISTER 3
                                ;*ROUTINES CALLED
                                ;*      TYPOC
                                ;*      SBSCN
                                ;;*****************************************************************
006742                          PRRTE:
006742  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
006744  004737  004666                  JSR     PC,SBSCN        ;BUMP R1 TO NEXT PARAM (RN)
006750  105711                          TSTB    (R1)            ;TEST IF PARAM NULL
006752  001416                          BEQ     1$              ;NO REG SPECIFIED, USED LAST REG SELECTED
006754  121127  000067                  CMPB    (R1),#67        ;TEST IF NUMERIC PARAMETER
006760  101404                          BLOS    4$              ;YES - SKIP
006762  004737  007056                  JSR     PC,RGDCDE       ;GO DECODE REGISTER
006766  007044                          21$                     ;ERROR RETURN
006770  000405                          BR      3$
006772  010146                  4$:     MOV     R1,-(SP)        ;GET ADDRESS OF STRING FOR CNVERSION
006774  004737  031160                  JSR     PC,OCTBIN       ;CONVERT IT
007000  007036                          20$                     ;ERROR RETURN
007002  012603                          MOV     (SP)+,R3        ;GET CONVERTED NUMBER
007004  010337  001224          3$:     MOV     R3,REGNUM       ;STORE INTEGER
007010  013703  001224          1$:     MOV     REGNUM,R3       ;
007014                          2$:
007014  006303                          ASL     R3              ;SHIFT R3, MULTIPLY INDEX BY 2
007016  063703  023554                  ADD     RKBAS,R3        ;COMPUTE RK611 ADDRESS
007022  011346                          MOV     (R3),-(SP)      ;PUT SELECTED REGISTER CONTENTS ON STACK
007024  104402                          TYPOC                   ;TYPE REGISTER CONTENTS
007026  104401  001171                  TYPE    ,$CRLF          ;TYPE CARRIAGE RETURN & LINE FEED
007032  005724                          TST     (R4)+           ;SET UP NO ERROR RETURN
007034  000406                          BR      30$
007036  104401  002640          20$:    TYPE    ,BADOCT         ;TYPE BAD OCTAL MESSAGE
007042  000402                          BR      25$             ;GO TO EXIT
007044  104401  003365          21$:    TYPE    ,BADSEL         ;TYPE BAD REGISTER SELECTION
007050  011404                  25$:    MOV     (R4),R4         ;SET UP ERROR RETURN
007052                          30$:
007052  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
007054  000204                          RTS     R4              ;RETURN

                                ;;*****************************************************************
                                ;.SBTTL  CONVERT REGISTER NAME (ASCII) TO REGISTER NUMBER (OCTAL)
                                ;*ENTRY:        JSR     PC,RGDCDE
                                ;*                      WITH R1 POINTING TO THE REG NAME
                                ;*RETURN:       RTS     PC      NORMAL RETURN
                                ;*              RTS     PC+2    ERROR RETURN
                                ;*                      WITH R3 CONTAINING THE REG NUMBER
                                ;*
                                ;*THE ASCII NAME OF THE REGISTER IS DECODED INTO AN OCTAL VALUE
                                ;*REQUIRED TO SELECT THE REGISTER. THIS OCTAL VALUE IS PLACED
                                ;*IN R3.
                                ;;*****************************************************************
007056  121127  000101          RGDCDE: CMPB    (R1),#'A        ;TEST IF FIRST CHAR IS A
007062  001003                          BNE     1$              ;NO - SKIP
007064  012703  000007                  MOV     #7,R3           ;SET FOR ASOF
007070  000533                          BR      40$             ;GO TO EXIT
```

```
3282  007072  121127  000102          1$:     CMPB    (R1),#'B        ;TEST IF B
3283  007076  001003                          BNE     2$
3284  007100  012703  000002                  MOV     #2,R3           ;SET FOR BA
3285  007104  000525                          BR      40$             ;GO TO EXIT
3286  007106  121127  000103          2$:     CMPB    (R1),#'C        ;TEST IF C
3287  007112  001012                          BNE     5$
3288  007114  062701  000002                  ADD     #2,R1           ;BUMP R1 TO 3RD CHAR
3289  007120  121127  000061                  CMPB    (R1),#'1                ;TEST IF THIRD CHAR IS 1
3290  007124  001002                          BNE     3$              ;NO - BRANCH
3291  007126  005003                          CLR     R3              ;SET FOR CS1
3292  007130  000513                          BR      40$
3293  007132  012703  000004          3$:     MOV     #4,R3           ;SET FOR CS2
3294  007136  000510                          BR      40$
3295  007140  121127  000104          5$:     CMPB    (R1),#'D        ;TEST IF D
3296  007144  001026                          BNE     9$              ;NO - SKIP
3297  007146  005201                          INC     R1              ;BUMP TO 2ND CHAR
3298  007150  121127  000101                  CMPB    (R1),#'A        ;TEST 2ND CHAR A
3299  007154  001003                          BNE     6$
3300  007156  012703  000003                  MOV     #3,R3           ;SET FOR DA
3301  007162  000476                          BR      40$             ;EXIT
3302  007164  121127  000123          6$:     CMPB    (R1),#'S        ;TEST IF 2ND CHAR S
3303  007170  001003                          BNE     7$
3304  007172  012703  000005                  MOV     #5,R3           ;SET FOR DS
3305  007176  000470                          BR      40$
3306  007200  121127  000102          7$:     CMPB    (R1),#'B        ;TEST IF 2ND CHAR B
3307  007204  001003                          BNE     8$
3308  007206  012703  000012                  MOV     #12,R3          ;SET FOR DB
3309  007212  000462                          BR      40$
3310  007214  012703  000010          8$:     MOV     #10,R3          ;SET FOR DC
3311  007220  000457                          BR      40$
3312  007222  121127  000105          9$:     CMPB    (R1),#'E        ;TEST IF E
3313  007226  001003                          BNE     10$
3314  007230  012703  000006                  MOV     #6,R3           ;SET FOR ER
3315  007234  000451                          BR      40$
3316  007236  121127  000115          10$:    CMPB    (R1),#'M        ;TEST IF M
3317  007242  001021                          BNE     13$
3318  007244  062701  000002                  ADD     #2,R1           ;BUMP R1 TO 3RD CHAR
3319  007250  121127  000061                  CMPB    (R1),#'1                ;TEST IF 3RD CHAR 1
3320  007254  001003                          BNE     11$
3321  007256  012703  000013                  MOV     #13,R3          ;SET FOR MR1
3322  007262  000436                          BR      40$
3323  007264  121127  000062          11$:    CMPB    (R1),#'2                ;TEST IF 3RD CHAR 2
3324  007270  001003                          BNE     12$
3325  007272  012703  000016                  MOV     #16,R3          ;SET FOR MR2
3326  007276  000430                          BR      40$
3327  007300  012703  000017          12$:    MOV     #17,R3          ;SET FOR MR3
3328  007304  000425                          BR      40$
3329  007306  121127  000120          13$:    CMPB    (R1),#'P        ;TEST IF P
3330  007312  001012                          BNE     15$
3331  007314  005201                          INC     R1              ;BUMP R1 TO 2ND CHAR
3332  007316  121127  000117                  CMPB    (R1),#'O        ;TEST 2ND CHAR O
3333  007322  001003                          BNE     14$
3334  007324  012703  000014                  MOV     #14,R3          ;SET FOR POS
3335  007330  000413                          BR      40$
3336  007332  012703  000015          14$:    MOV     #15,R3          ;SET FOR PAT
3337  007336  000410                          BR      40$
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3338  007340  121127  000127          15$:    CMPB    (R1),#'W                ;TEST IF W
3339  007344  001003                          BNE     20$                     ;BR TO ERROR EXIT
3340  007346  012703  000001                  MOV     #1,R3                   ;SET FOR WC
3341  007352  000402                          BR      40$
3342  007354  013616                  20$:    MOV     @(SP)+,(SP)             ;SET ERROR RETURN
3343  007356  000207                          RTS     PC
3344  007360  062716  000002          40$:    ADD     #2,(SP)                 ;SET FOR GOOD RETURN
3345  007364  000207                          RTS     PC
3346                                  ;;*****************************************************************
3347                                  .SBTTL  HELP PRINTOUT ROUTINE
3348                                  ;*      ENTRY:  JSR     R4,HPRTE
3349                                  ;*      RETURN: RTS     R4
3350                                  ;*
3351                                  ;*THIS ROUTINE PRINTS A SUMMARY OF THE COMMANDS
3352                                  ;*AND PARAMETERS AVAILABLE TO THE USER.
3353                                  ;* ROUTINES CALLED:
3354                                  ;*      TYPE
3355                                  ;*
3356                                  ;;*****************************************************************
3357
3358  007366  105737  001672          HPRTE:  TSTB    HPVLD                   ;TEST IF HELP FILE VALID
3359  007372  001006                          BNE     1$
3360  007374  104401  002656                  TYPE    ,HPFILE
3361  007400  104401  041616                  TYPE    ,ENDLOC
3362  007404  005724                  2$:     TST     (R4)+                   ;GOOD RETURN
3363  007406  000204                          RTS     R4                      ;RETURN
3364  007410  104401  034636          1$:     TYPE    ,HPDATA                 ;TYPE HELP FILE
3365  007414  000773                          BR      2$
3366
3367                                  ;;*****************************************************************
3368                                  .SBTTL  NEW TEST ROUTINE
3369                                  ;*      ENTRY   JSR     R4,NTRTE
3370                                  ;*      RETURN: JMP     COMLEV  (RETURN TO COMMAND LEVEL.)
3371                                  ;*
3372                                  ;*THIS ROUTINE CLEARS THE SOURCE AND OBJECT FILES
3373                                  ;*AND TERMINATES ANY TEST PRESENTLY EXECUTING. ALL
3374                                  ;*STORED TEST PARAMETERS AND THE OUTPUT BUFFER
3375                                  ;*ARE LEFT UNCHANGED. SINCE THE INPUT BUFFER
3376                                  ;*AND THE SOURCE FILE IS THE SAME MEMORY, THE
3377                                  ;*INPUT BUFFER IS LOST AND MUST BE REINITIALIZED.
3378                                  ;*
3379                                  ;* ROUTINES CALLED
3380                                  ;*      NONE
3381                                  ;;*****************************************************************
3382
3383  007416                          NTRTE:
3384  007416  010346                          MOV     R3,-(SP)                ;;PUSH R3 ON STACK
3385  007420  010546                          MOV     R5,-(SP)                ;;PUSH R5 ON STACK
3386  007422  152737  000377  001234          BISB    #377,SFEMP              ;SET SOURCE FILE EMPTY
3387  007430  105037  001235                  CLRB    VLDOBJ                  ;CLEAR OBJECT VALID
3388  007434  012737  034634  001712          MOV     #OFILE,OFPTR            ;RESET OBJECT FILE POINTER
3389  007442  013737  001710  001246          MOV     IBUFPT,SFPTR            ;RESET SOURCR FILE POINTER
3390  007450  105037  001116                  CLRB    LINNUM                  ;CLEAR LINE NUMBER
3391  007454  105037  001243                  CLRB    LNCNT                   ;CLEAR LINE COUNT
3392  007460  013703  001246                  MOV     SFPTR,R3
3393
```

```
3394  007464  013705  001700          MOV     MAXWDS,R5
3395  007470  005023          1$:     CLR     (R3)+           ;SET UP REGISTERS
3396  007472  005305                  DEC     R5              ;AND CLEAR SOURCE
3397  007474  001375                  BNE     1$              ;FILE
3398  007476  013705  001674          MOV     OBJSZE,R5
3399  007502  013703  001712          MOV     OFPTR,R3
3400  007506  005023          2$:     CLR     (R3)+           ;SET UP REGISTERS AND
3401  007510  005305                  DEC     R5              ;CLEAR OBJECT FILE
3402  007512  001375                  BNE     2$
3403  007514  012605                  MOV     (SP)+,R5        ;;POP STACK INTO R5
3404  007516  012603                  MOV     (SP)+,R3        ;;POP STACK INTO R3
3405  007520  012706  001100          MOV     #1100,SP        ;CLEAN OFF STACK
3406  007524  000137  004416          JMP     COMLEV          ;GO TO COMMAND LEVEL
3407                                ;;*************************************************************
3408                                .SBTTL  BUFFER DUMP ROUTINE
3409                                ;*      ENTRY:  JSR     R4,BDRTE
3410                                ;*      RETURN: RTS     R4
3411                                ;*THIS ROUTINE WILL DUMP THE READ, WRITE, HEADER, OR SPECIAL BUFFER. THE
3412                                ;*NUMBER OF WORDS DUMPED IS GIVEN AS A PARAMETER. IF THE NUMBER OF
3413                                ;*WORDS IS NOT GIVEN THE LAST SPECIFIED WORD COUNT IS USED IN THE CASE
3414                                ;*OF THE READ OR WRITE BUFFER OR 32 IN THE CASE OF A SPECIAL DATA BUFFER.
3415                                ;;*************************************************************
3416  007530                        BDRTE:
3417  007530  010046                  MOV     R0,-(SP)        ;;PUSH R0 ON STACK
3418  007532  010146                  MOV     R1,-(SP)        ;;PUSH R1 ON STACK
3419  007534  010246                  MOV     R2,-(SP)        ;;PUSH R2 ON STACK
3420  007536  010346                  MOV     R3,-(SP)        ;;PUSH R3 ON STACK
3421  007540  005002                  CLR     R2              ;CLEAR FOR POSSIBLE WORD COUNT
3422  007542  004737  004666          JSR     PC,SBSCN                ;GET BUFFER PARAMETER
3423  007546  105711                  TSTB    (R1)                    ;TEST IF IT IS NULL
3424  007550  001522                  BEQ     21$                     ;YES - SKIP TO ERROR EXIT
3425  007552  121127  000122          CMPB    (R1),#'R        ;TEST IF READ BUFFER
3426  007556  001003                  BNE     1$              ;NO - SKIP
3427  007560  013703  001710          MOV     IBUFPT,R3       ;ELSE GET ADDRESS OF READ BUFFER
3428  007564  000441                  BR      5$              ;GO DO IT
3429  007566  121127  000127  1$:     CMPB    (R1),#'W        ;TEST IF WRITE BUFFER
3430  007572  001003                  BNE     2$              ;NO - SKIP
3431  007574  013703  001706          MOV     OBUFPT,R3       ;ELSE GET ADDRESS OF WRITE BUFFER
3432  007600  000433                  BR      5$              ;GO DO IT
3433  007602  012702  000040  2$:     MOV     #40,R2          ;SET WORD COUNT FOR SPEC BUFF
3434  007606  121127  000130          CMPB    (R1),#'X        ;TEST IF SPECIAL BUFFER X
3435  007612  001003                  BNE     3$              ;NO - SKIP
3436  007614  012703  001262          MOV     #PATX,R3        ;ELSE GET ADDRESS OF BUFFER X
3437  007620  000423                  BR      5$              ;GO DO IT
3438  007622  121127  000131  3$:     CMPB    (R1),#'Y        ;TEST IF BUFFER Y
3439  007626  001003                  BNE     4$              ;NO - SKIP
3440  007630  012703  001362          MOV     #PATY,R3        ;ELSE GET ADDRESS OF BUFFER Y
3441  007634  000415                  BR      5$              ;GO DO IT
3442  007636  121127  000132  4$:     CMPB    (R1),#'Z        ;TEST IF BUFFER Z
3443  007642  001003                  BNE     44$             ;NO - SKIP
3444  007644  012703  001462          MOV     #PATZ,R3        ;GET ADDRESS OF BUFFER Z
3445  007650  000407                  BR      5$
3446  007652  121127  000110  44$:    CMPB    (R1),#'H        ;TEST IF HEADER BUFF DUMP
3447  007656  001057                  BNE     21$             ;NO - SKIP TO ERROR EXIT
3448  007660  012703  001736          MOV     #HDBUFF,R3      ;SET ADDRESS FOR HEADER BUFF
3449  007664  012702  000102          MOV     #102,R2         ;SET SPECIAL BUFF LENGTH IF WRD CNT NULL
```

```
3450  007670  004737  004666          5$:     JSR     PC,SBSCN        ;GET NUMBER OF WORDS PARAM
3451  007674  105711                          TSTB    (R1)            ;TEST IF NULL
3452  007676  001007                          BNE     7$              ;NO - SKIP TO USE GIVEN VALUE
3453  007700  005702                          TST     R2              ;ELSE USE DEFAULT WORD NUMBER
3454  007702  001402                          BEQ     6$              ;IF NO WRD CNT IN R2, GO USE WORD COUNT
3455  007704  010201                          MOV     R2,R1           ;ELSE SET TO R2 COUNT
3456  007706  000410                          BR      8$
3457  007710  013701  001206          6$:     MOV     WDCNT,R1        ;GET WORD COUNT
3458  007714  000405                          BR      8$
3459  007716  010146                  7$:     MOV     R1,-(SP)        ;SET UP TO CONVERT PARAMETER
3460  007720  004737  031160                  JSR     PC,OCTBIN       ;GO CONVERT
3461  007724  010010                          20$                     ;ERROR RETURN
3462  007726  012601                          MOV     (SP)+,R1        ;STORE WORD COUNT GIVEN
3463  007730  005002                  8$:     CLR     R2              ;CLEAR COUNTERS
3464  007732  005000                          CLR     R0
3465  007734  104401  003465                  TYPE    ,DMPHDR         ;TYPE DUMP HEADERS
3466  007740  012700  000004          9$:     MOV     #4,R0           ;SET NUMBER OF COLUMNS COUNTER
3467  007744  010246                          MOV     R2,-(SP)        ;SET TO PRINT WORD NUMBER
3468  007746  104402                          TYPOC                   ;TYPE IT
3469  007750  104401  003530          10$:    TYPE    ,SPACE2         ;TYPE FORMAT SPACES
3470  007754  012346                          MOV     @(R3)+,-(SP)    ;GET WORD TO TYPE
3471  007756  104402                          TYPOC
3472  007760  005202                          INC     R2              ;BUMP WORD COUNTER
3473  007762  005301                          DEC     R1              ;DEC NUMBER OF WORDS TO TYPE COUNT
3474  007764  001405                          BEQ     11$             ;IF 0, EXIT
3475  007766  005300                          DEC     R0              ;DEC NUMBER OF COL COUNT
3476  007770  001367                          BNE     10$             ;IF NOT 0, GO TYPE FORMAT SPACES AND NEXT COL
3477  007772  104401  001171                  TYPE    ,$CRLF          ;ELSE LF-CR AND START NEW LINE
3478  007776  000760                          BR      9$              ;LOOP
3479  010000  104401  001171          11$:    TYPE    ,$CRLF          ;RETURN CARRIAGE
3480  010004  005724                          TST     @(R4)+          ;SET UP NO ERROR RETURN
3481  010006  000406                          BR      25$
3482  010010  104401  002640          20$:    TYPE    ,BADOCT         ;REPORT NON-OCTAL PARAMETER
3483  010014  000402                          BR      24$
3484  010016  104401  002616          21$:    TYPE    ,IVDPAR         ;REPORT INVALID PARAM
3485  010022  011404                  24$:    MOV     @(R4),R4        ;ERROR RETURN
3486  010024                          25$:
3487  010024  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
3488  010026  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
3489  010030  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
3490  010032  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
3491  010034  000204                          RTS     R4
3492
3493
3494                  ;;*****************************************************************
3495                  .SBTTL  RUN ROUTINE
3496                  ;*      ENTRY:  JSR     R4,RURTE
3497                  ;*      RETURN: RESET   STACK, JUMP TO COMMAND LEVEL
3498                  ;*
3499                  ;*THIS ROUTINE CHECKS TO BE SURE OBJECT CODE EXISTS.
3500                  ;*IT THEN CHECKS THE NOCK SWITCH TO SEE IF THE OBJECT
3501                  ;*WAS COMPILED WITH THE NOCK OPTION. IF IT WAS THE ROUTINE
3502                  ;*PROCEEDS TO CLEAN OFF THE STACK AND EXECUTE THE OBJECT CODE.
3503                  ;*
3504                  ;*IF THE NOCK SWITCH IS OFF THE ROUTINE CHECKS THE CONTROLLER
3505                  ;*ERROR BIT AND THE DRIVE INTERRUPT BIT (BIT 15 & 14 OF CS1).
```

```
                                        ;*IF EITHER IS SET A SUBSYSTEM CLEAR IS EXECUTED BEFORE THE
                                        ;*TEST IS STARTED. THIS IS NECESSARY BECAUSE IF EITHER OF THESE
                                        ;*BITS ARE SET WHEN THE TEST IS STARTED (WITHOUT NO CHECK)
                                        ;*CONTINUOUS INTERRUPTS WILL BE GENERATED. THIS CASE CAN ONLY
                                        ;*OCCUR IF THE PREVIOUS TEST WAS A NO CHECK TEST AND AN ERROR
                                        ;*WAS LEFT UNCLEARED IN THE SUBSYSTEM.
                                        ;*IT THEN CLEANS OFF THE STACK AND DOES A JSR TO THE
                                        ;*START OF THE OBJECT FILE.
                                        ;*
                                        ;*THIS ROUTINE ALSO ACTS AS A MONITOR TO CONTROL THE
                                        ;*LOOPING ON THE OBJECT. IT HANDLES THE ITERATION
                                        ;*COUNTING AND RESTARTING THE OBJECT FILE, MAKING SURE
                                        ;*THE STACK IS CLEANED UP TO PREVENT ACCIDENTAL OVERFLOW.
                                        ;*
                                        ;*WHEN LOOPING IS DONE OR WHEN TEST IS ABORTED
                                        ;*(ABORTING IS PRESENTLY UNDEFINED) THE ROUTINE RESETS
                                        ;*THE STACK AND JUMPS TO COM LEV.
                                        ;*
010036 005037 001722            RURTE:  CLR     LPCNT1          ;CLEAR LOOP COUNTER
010042 005037 001724                    CLR     LPCNT2
010046 013737 001260 023600             MOV     TOVAL,W.SEC     ;SET TIMEOUT VALUE
010054 105737 001235                    TSTB    VLDOBJ          ;TEST OBJECT VALID
010060 001510                           BEQ     RUEXIT          ;NO OBJECT CODE
010062 152737 000377 001234             BISB    #377,$FEMP      ;SET SOURCE FILE EMPTY
010070 013702 023554                    MOV     RKBA$,R2        ;GET UNIBUS BASE ADDRESS
010074 105037 001103                    CLRB    $ERFLG          ;CLEAR ERROR FLAG
010100 032762 140000 000000             BIT     #CERR!DI,RKCS1(R2)  ;TEST FOR CONT ERR OR DEV INTERRUPT
010106 001403                           BEQ     1$              ;BOTH OFF, SKIP CLEAR
010110 052762 000040 000010             BIS     #$CLR,RKCS2(R2) ;SET CLEAR SUBSYSTEM, BIT 5 CS2
010116 013737 001232 001714     1$:     MOV     ITCNT,CNTSTR    ;STORE OFF ITERATION COUNT
010124 012737 010152 001110             MOV     #LOC2$,$LPERR   ;SET UP ERROR LOOP VALUE
010132 012706 001100            LPRET:  MOV     #STACK,SP       ;CLEAN STACK
010136 005037 001116                    CLR     LINNUM          ;INITIALIZE PSUEDO LINE COUNTER
010142 004737 034634                    JSR     PC,OFILE        ;GO TO OBJECT CODE
010146 000401                           BR      LOC2$           ;GOOD RETURN
010150 000454                           BR      RUEXIT          ;ABORT RETURN
010152 032777 040000 170760     LOC2$:  BIT     #SW14,@SWR      ;LOOP ON TEST?
010160 001012                           BNE     1$
010162 105737 001103                    TSTB    $ERFLG          ;TEST IF ERROR FLAG SET
010166 001420                           BEQ     3$
010170 032777 001000 170742             BIT     #SW9,@SWR       ;TEST IF LOOP ON ERROR SWITCH
010176 001003                           BNE     1$
010200 105037 001103                    CLRB    $ERFLG          ;NO LOOP ON ERROR, CLEAR FLAG
010204 000411                           BR      3$
010206 062737 000001 001722     1$:     ADD     #1,LPCNT1       ;ADD ONE TO COUNTER
010214 005537 001724                    ADC     LPCNT2          ;PROPAGATE CARRY
010220 103002                           BCC     2$              ;TEST IF COUNTER OVERFLOWED
010222 104401 003431                    TYPE    ,LCNTOF         ;TYPE OVERFLOW WARNING
010226 000741                   2$:     BR      LPRET           ;RETURN TO LOOP
010230 032777 004000 170702     3$:     BIT     #SW11,@SWR      ;INHIBIT ITERATIONS?
010236 001003                           BNE     LOC3$           ;BACK TO MONITOR
010240 005337 001714                    DEC     CNTSTR          ;DEC IT COUNT
010244 001332                           BNE     LPRET           ;BACK TO TEST
010246 004737 016670            LOC3$:  JSR     PC,PRLPCT       ;GO PRINT LOOP COUNTER
010252 012706 001100            5$:     MOV     #STACK,SP       ;CLEAN STACK
```

```
3562  010256  005037  001116            CLR     LINNUM          ;SET LINE NUMBER TO ZERO
3563  010262  105737  001663            TSTB    CHNFLG          ;TEST IF CHAINING
3564  010266  001403                     BEQ     RURETN          ;BRANCH IF NOT, ELSE
3565  010270  004437  013026            JSR     R4,ITRTE        ;JUMP TO INPUT TEST
3566  010274  010302                     RUEXIT
3567  010276  000137  004416    RURETN: JMP     COMLEV          ;JUMP TO COMMAND LEVEL
3568  010302  104401  002756    RUEXIT: TYPE    ,IVDRUN         ;TYPE NO OBJECT CODE
3569  010306  000757                     BR      LOC3$
3570
3571                             ;*****************************************************************
3572                             .SBTTL  COMPILE ROUTINE
3573                             ;*      ENTRY   JSR     R4,CORTE
3574                             ;*      RETURN  RTS     R4+2    FOR ALL RETURNS.  ERROR AND ERROR
3575                             ;*                              MESSAGES ARE ALL HANDLED LOCALLY
3576                             ;*
3577                             ;*THIS ROUTINE ACTS AS A MONITOR FOR THE COMPILE PROCESS.
3578                             ;*THE DEFERRED COMMANDS ARE EXTRACTED FROM THE SOURCE
3579                             ;*FILE.  THE INTERACTIVE COMMAND TABLE IS SCANNED TO
3580                             ;*LOCATE THE ENTRY FOR THIS COMMAND. R2 IS SET
3581                             ;*TO POINT TO THE 2ND WORD WHICH IS THE ADDRESS OF
3582                             ;*THE SPECIFIC COMMAND PROCESSOR ROUTINE. CONTROL
3583                             ;*IS THEN GIVEN TO THAT ROUTINE TO GENERATE THE OBJECT
3584                             ;*CODE. R5 POINTS TO WHERE THE OBJECT CODE IS TO BE
3585                             ;*PLACED.
3586                             ;*
3587                             ;*THIS ROUTINE CHECKS THE COMPILE COMMAND PARAMETERS. IF
3588                             ;*THE FIRST PARAMETER SPECIFIES NO CHECK AND THE SECOND SPECIFIES
3589                             ;*BUS ADDRESS INCREMENT INHIBIT FOR DATA TRANSFERS. IF THE FIRST IS
3590                             ;*NULL, THE NO CHECK (NOCK) SWITCH IS RESET. IF NOT NULL
3591                             ;*THE NO CHECK SWITCH IS SET. THIS SWITCH IS USED TO DETERMINE
3592                             ;*IF NO CHECKING IS TO BE DONE IN TEST EXECUTION. IF THE SECOND
3593                             ;*IS NULL THE BUS ADDRESS INCREMENT INHIBIT SWITCH IS RESET,
3594                             ;*ELSE IT IS SET.
3595
3596                             ;*
3597                             ;*A CHECK IS MADE TO INSURE THE COMMAND LINE NUMBERS ARE
3598                             ;*RETRIEVED SEQUENTIALLY. IF NOT, AN "INTERNAL ERROR" MESSAGE
3599                             ;*IS PRINTED OUT. THIS LINE COUNT IS TESTED AGAINST THE
3600                             ;*STORED LINE NUMBERS.  WHEN EQUAL, AN RTS PC IS INSERTED
3601                             ;*IN THE OBJECT FILE AND, IF NO ERROR HAS BEEN FOUND, THE
3602                             ;*VALID OBJECT CODE FLAG IS SET. A COMPILE OK MESSAGE IS
3603                             ;*THEN PRINTED.
3604                             ;*
3605                             ;*IF ANY OF THE SPECIFIC DEFERRED COMMAND PROCESSOR
3606                             ;*ROUTINES RETURNS AN ERROR, A MESSAGE AND THE
3607                             ;*BAD LINE IS PRINTED. THE COMPILE ERROR FLAG IS SET
3608                             ;*AND THE NEXT LINE IS PROCESSED.
3609                             ;*
3610                             ;*WHEN COMPILATION IS DONE, THE COMPILE ERROR FLAG IS
3611                             ;*CHECKED. IF SET, THE VALID OBJECT CODE FLAG IS NOT
3612                             ;*SET AND CONTROL IS RETURNED TO COMMAND LEVEL.
3613                             ;*
3614                             ;* ROUTINES CALLED
3615                             ;*      SBSCN
3616                             ;*      ICDEC
3617                             ;*      REQUIRED DEFERRED COMMAND PROCESSOR (C$XX)
```

```
                                        ;*      TYPDS
                                        ;*      TYPE
                                        ;;*****************************************************************
                                        CORTE:
010310                                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
010310  010046                                 MOV     R1,-(SP)        ;;PUSH R1 ON STACK
010312  010146                                 MOV     R2,-(SP)        ;;PUSH R2 ON STACK
010314  010246                                 MOV     R3,-(SP)        ;;PUSH R3 ON STACK
010316  010346                                 MOV     R4,-(SP)        ;;PUSH R4 ON STACK
010320  010446                                 MOV     R5,-(SP)        ;;PUSH R5 ON STACK
010322  010546                                 TSTB    $FEMP           ;TEST IF SOURCE FILE EMPTY
010324  105737  001234                         BNE     20$             ;NO SOURCE, EXIT
010330  001132                                 CLRB    C$ERR           ;CLEAR COMPILE ERROR
010332  105037  001664                         JSR     PC,SBSCN        ;SEARCH FOR PARAMETER
010336  004737  004666                         BICB    #NOCK!BAII,OPFLGS ;CLEAR SWITCHES
010342  142737  000006  001245                 TSTB    (R1)            ;TEST IF EITHER PARAM GIVEN
010350  105711                                 BEQ     6$              ;NEITHER GIVEN BRANCH
010352  001415                                 CMPB    (R1),#',        ;TEST IF NO CHECK GIVEN
010354  121127  000054                         BEQ     5$              ;NO SKIP TO NEXT PARAM TEST
010360  001403                                 BISB    #NOCK,OPFLGS    ;ELSE SET NO CHECK SWITCH
010362  152737  000002  001245                 JSR     PC,SBSCN        ;BUMP TO NEXT PARAMETER
010370  004737  004666          5$:            TSTB    (R1)            ;TEST IF THAT NULL
010374  105711                                 BEQ     6$              ;YES - SKIP
010376  001403                                 BISB    #BAII,OPFLGS    ;SET BAI INHIBIT
010400  152737  000004  001245                 MOV     #OFILE,R5       ;SET OBJECT POINTER
010406  012705  034634          6$:            MOV     IBUFPT,R1       ;SET SOURCE FILE POINTER
010412  013701  001710                         MOV     OBJSZE,R3       ;SET OBJECT SIZE FOR CLEAR
010416  013703  001674                         MOV     R5,R4
010422  010504                                 CLR     (R4)+           ;CLEAR OBJECT FILE
010424  005024          1$:            DEC     R3                      ;DEC SIZE CNTR
010426  005303                                 BNE     1$              ;LOOP UNTIL DONE
010430  001375                                 CLRB    VLDOBJ          ;CLEAR VALID OBJECT INDICATOR
010432  105037  001235                         MOV     #1,R4           ;SET LINE NUMBER
010436  012704  000001                         MOV     JSRR4,R3        ;PUT JSR R4 CONSTANT IN R3
010442  013703  001720          2$:            MOV     R1,R0           ;STORE ADDRESS OF THIS LINE
010446  010100                                 CMPB    R4,(R1)+        ;TEST CORRECT LINE NUMBER IN SOURCE
010450  120421                                 BNE     21$
010452  001064                                 JSR     R4,ICDEC        ;DECODE INTERACTIVE COMMAND
010454  004437  004704                         22$
010460  010632                                 JSR     R4,@(R2)                ;JUMP TO COMMAND COMPILE ROUTINE
010462  004472  000000                         22$                     ;ERROR RETURN
010466  010632                         3$:     TSTB    (R1)+           ;TEST FOR NULL
010470  105721                                 BNE     3$              ;LOOP
010472  001376                                 INC     R4              ;BUMP LINE NUMBER
010474  005204                                 CMPB    R4,LNCNT        ;TEST IF LAST LINE PROCESSED
010476  120437  001243                         BHI     4$              ;DONE, EXIT
010502  101017                                 MOV     OBJSZE,TEMP1    ;GET OBJECT FILE SIZE(WORDS)
010504  013737  001674  001702                 ASL     TEMP1           ;MULTIPLY BY TWO(BYTES)
010512  006337  001702                         ADD     #OFILE,TEMP1    ;GET LAST ADDRESS OF OFILE
010516  062737  034634  001702                 SUB     #12,TEMP1       ;ALLOW FOR THE NEXT COMMAND
010524  162737  000012  001702                 CMP     R5,TEMP1        ;CHECK IF ROOM
010532  020537  001702                         BLOS    2$              ;YES - GO GET NEXT LINE
010536  101743                                 BR      23$             ;NO - TYPE MESSAGE
010540  000423                         4$:     TSTB    C$ERR           ;TEST IF COMPILE ERROR
010542  105737  001664                         BNE     35$             ;ERROR EXIT
010546  001010
```

```
3674  010550  013725  001716                    MOV     RTSPC,(R5)+     ;MOVE RETURN TO OBJ FILE
3675  010554  105137  001235                    COMB    VLDOBJ          ;SET OBJECT VALID
3676  010560  010537  001712                    MOV     R5,OFPTR        ;SET OBJECT FILE POINTER
3677  010564  104401  002772                    TYPE    ,COMPOK         ;TYPE COMPILE OK MESSAGE
3678
3679  010570                            35$:
3680  010570  012605                    MOV     (SP)+,R5        ;;POP STACK INTO R5
3681  010572  012604                    MOV     (SP)+,R4        ;;POP STACK INTO R4
3682  010574  012603                    MOV     (SP)+,R3        ;;POP STACK INTO R3
3683  010576  012602                    MOV     (SP)+,R2        ;;POP STACK INTO R2
3684  010600  012601                    MOV     (SP)+,R1        ;;POP STACK INTO R1
3685  010602  012600                    MOV     (SP)+,R0        ;;POP STACK INTO R0
3686  010604  005724                    TST     (R4)+           ;SETUP RETURN
3687  010606  000204                    RTS     R4              ;RETURN
3688
3689  010610  104401  002437    23$:    TYPE    ,SCTOBG         ;TYPE MESSAGE
3690  010614  000765                    BR      35$
3691  010616  104401  003007    20$:    TYPE    ,NOSRC          ;TYPE NO SOURCE MESSAGE
3692  010622  000762                    BR      35$
3693  010624  104401  003023    21$:    TYPE    ,INTERR         ;TYPE INTERNAL ERROR
3694  010630  000757                    BR      35$
3695  010632  104401  003053    22$:    TYPE    ,BADCOM         ;TYPE BAD COMMAND ERROR
3696  010636  005046                    CLR     -(SP)           ;CLEAR NEXT STACK WORD
3697  010640  112016                    MOVB    (R0)+,(SP)      ;MOVE LINE NUMBER TO STACK
3698  010642  104405                    TYPDS                   ;TYPE IT
3699  010644  104401  002510            TYPE    ,EQSGN          ;TYPE EQUAL SIGN
3700  010650  010037  010656            MOV     R0,40$          ;ADDRESS OF REST OF BAD LINE
3701  010654  104401                    TYPE                    ;TYPE BAD LINE
3702  010656  000000            40$:    .WORD
3703  010660  104401  001171            TYPE    ,$CRLF          ;TYPE CARRIAGE RETURN
3704  010664  152737  000377  001664  26$:    BISB    #377,CSERR      ;SET ERROR FLAG
3705  010672  000676                    BR      3$              ;PROCESS NEXT COMMAND
3706
3707
3708                                    ;*****************************************************************
3709                                    ;SBTTL  DEFERRED COMMAND PROCESSOR ROUTINES
3710                                    ;*ALL ROUTINES THAT PROCESS DEFERRED COMMANDS ARE
3711                                    ;*CALLED AS FOLLOWS:
3712                                    ;*      JSR     R4,C$XX WHERE XX IS THE COMMAND MNEMONIC
3713                                    ;*THE RETURN IS:
3714                                    ;*      RTS     R4      FOR ERROR RETURN
3715                                    ;*      RTS     R4+2    FOR NORMAL RETURN
3716                                    ;*
3717                                    ;*WHEN THE ROUTINE IS CALLED R1 POINTS TO THE COMMAND FIELD,
3718                                    ;*R3 CONTAINS THE JSR R4 CONSTANT,
3719                                    ;*R5 POINTS TO THE OBJECT FILE WHERE
3720                                    ;*THIS ROUTINE MUST INSERT THE OBJECT CODE, AND R2
3721                                    ;*POINTS TO THE 2ND WORD OF THE TABLE.
3722                                    ;*
3723                                    ;*THE OBJECT CODE WILL CONSIST OF JUMPS TO SPECIFIC SUBROUTINES
3724                                    ;*WHERE THE SPECIFIC COMMAND IS EXECUTED. THESE
3725                                    ;*PROCESSOR ROUTINES WILL INSERT THE JSR R4 (004437 OCTAL)
3726                                    ;*FOLLOWED BY THE ADDRESS OF THE COMMAND EXECUTION
3727                                    ;*ROUTINE. THIS ADDRESS IS TAKEN FROM THE 4TH WORD
3728                                    ;*OF THE INTERACTIVE COMMAND TABLE. THE EXCEPTION TO
3729                                    ;*THIS IS THE SUBSYSTEM FUNCTION INTERACTIVE COMMAND
```

```
                                ;*WHERE THE ADDRESS OF THE SUBSYSTEM COMMAND
                                ;*EXECUTION ROUTINE IS FOUND IN THE SUBSYSTEM COMMAND
                                ;*TABLE (SCTBL).
                                ;*
                                ;*THE COMMAND PROCESSOR ROUTINES ALSO PLACE THE
                                ;*PARAMETERS REQUIRED BY THE EXECUTION ROUTINES IN
                                ;*THE OBJECT FILE. THE NUMBER OF PARAMETERS WILL
                                ;*VARY FROM ONE COMMAND TO ANOTHER BUT IS ALWAYS
                                ;*THE SAME FOR A SPECIFIC COMMAND. THUS THE
                                ;*PROCESSOR ROUTINES KNOW HOW MANY PARAMETERS TO
                                ;*PLACE IN THE OBJECT FILE AND THE EXECUTION
                                ;*ROUTINES KNOW HOW MANY TO RETRIEVE.
                                ;;*****************************************************************

                                ;;*****************************************************************
                                .SBTTL  PRINT MESSAGE PROCESSOR
                                ;*ENTRY          JSR     R4,C$PM
                                ;*RETURN         RTS     R4          ERROR RETURN
                                ;*              RTS     R4+2        NO ERROR RETURN
                                ;*
                                ;*OBJECT CODE:
                                ;*      JSR     R4,E$PM
                                ;*      (MESSAGE)       WHERE MESSAGE IS UP TO 20 WORDS
                                ;*
                                ;*THIS ROUTINE GENERATES THE CODE TO PRINT A MESSAGE OF UP
                                ;*TO 20 WORDS (40 CHARACTERS) ON THE TERMINAL
                                ;;*****************************************************************

010674  004737  004666        C$PM:   JSR     PC,SBSCN        ;BUMP R1 PAST COMMAND FIELD
010700  105711                        TSTB    (R1)            ;TEST IF MESSAGE NULL
010702  001411                        BEQ     2$              ;EXIT IF YES (NO MESSAGE)
010704  010325                        MOV     R3,(R5)+        ;INSERT JSR R4 CONSTANT
010706  022222                        CMP     (R2)+,(R2)+     ;BUMP R2 TO 4TH WORD (EXECUTE ADDR)
010710  011225                        MOV     (R2),(R5)+      ;INSERT EXECUTION ROUTINE ADDRESS
010712  112125                1$:     MOVB    (R1)+,(R5)+     ;INSERT MESSAGE
010714  001376                        BNE     1$              ;LAST CHARACTER MOVED NULL?
                                                                ;LOOP IF NO
010716  032705  000001                BIT     #1,R5           ;TEST IF R5 IS EVEN.
010722  001401                        BEQ     2$              ;IF NOT, CLEAR NEXT LOCATION
010724  105025                        CLRB    (R5)+           ;AND MAKE R5 EVEN.
010726  105741                2$:     TSTB    -(R1)           ;DEC R1 TO POINT TO NULL IN SOURCE
010730  005724                        TST     (R4)+           ;SET GOOD RETURN
010732  000204                        RTS     R4              ;RETURN

                                ;;*****************************************************************
                                .SBTTL  REGISTER COMPARE, REGISTER WRITE, AND STATUS COMPARE PROCESSORS
                                ;*ENTRIES:      JSR     R4,C$RC FOR REGISTER COMPARE
                                ;*              JSR     R4,C$RW FOR REGISTER WRITE
                                ;*              JSR     R4,C$SC FOR STATUS COMPARE
                                ;*
                                ;*RETURN:       RTS     R4          ERROR RETURN
                                ;*              RTS     R4+2        NORMAL RETURN
                                ;*
                                ;*OBJECT CODE:
                                ;*              JSR     R4          E$RC OR E$RW OR E$SC
```

```
                        ;*              REGISTER OR STATUS WORD NUMBER
                        ;*              EXPECTED VALUE OR VALUE TO BE WRITTEN
                        ;*              MASK (RC & SC ONLY)
                        ;*
                        ;*THIS ROUTINE HAS THREE ENTRY POINTS, ONE FOR EACH
                        ;*OPERATION. THE LINK TO THE PROPER EXECUTION ROUTINE
                        ;*IS GENERATED.
                        ;*
                        ;*EACH PARAMETER IS TAKEN FROM THE COMMAND LINE IF IT IS PROVIDED.
                        ;*IF PROVIDED, IT IS ALSO STORED FOR POSSIBLE LATER USE. IF IT IS NOT
                        ;*SUPPLIED, THE VALUE GIVEN THE LAST TIME IT WAS SPECIFIED IS USED.
                        ;*NOTE THAT THE PARAMETER STORAGE FOR THE REGISTER COMPARE
                        ;*AND THE REGISTER WRITE (REGISTER NUMBER AND VALUE) IS THE SAME. THIS MEANS
                        ;*THAT WHEN ONE COMMAND CHANGES THE VALUE IT IS CHANGED FOR
                        ;*BOTH COMMANDS.
                        ;*
                        ;*THE REGISTER ASSIGNMENT IS:
                        ;*
                        ;*       0       CS1 (CONTROL AND STATUS 1)
                        ;*       1       WC (WORD COUNT)
                        ;*       2       BA (BUFFER ADDRESS)
                        ;*       3       DA (DESIRED TRACK AND SECTOR)
                        ;*       4       CS2 (CONTROL AND STATUS 2)
                        ;*       5       DS (DRIVE STATUS)
                        ;*       6       ER (ERROR REGISTER)
                        ;*       7       ASOF (ATTENTION SUMMARY AND OFFSET)
                        ;*       10      DC (DESIRED CYLINDER)
                        ;*       12      DB (DATA BUFFER)
                        ;*       13      MR1 (MAINTENANCE REGISTER 1)
                        ;*       14      ECC POSITION REGISTER
                        ;*       15      ECC PATTERN REGISTER
                        ;*       16      MR2 (MAINTENANCE REG 2)
                        ;*       17      MR3 (MAINTENANCE REG 3)
                        ;*
                        ;*THE STATUS WORD ASSIGNMENT IS:
                        ;*
                        ;*       0       LINE A WORD 0
                        ;*       1       LINE B WORD 0
                        ;*       2       LINE A WORD 1
                        ;*       3       LINE B WORD 1
                        ;*       4       LINE A WORD 2
                        ;*       5       LINE B WORD 2
                        ;*       6       LINE A WORD 3
                        ;*       7       LINE B WORD 3
                        ;;*****************************************************************
                        
010734  012737  001224  001702  C$RW:    MOV     #REGNUM,TEMP1   ;STORE RW PARAM BASE
010742  012737  000002  001704          MOV     #2,TEMP2        ;STORE NUMBER OF PARAM
010750  000415                        BR      C$RCWS          ;BRANCH TO COMMON RTE
010752  012737  001224  001702  C$RC:    MOV     #REGNUM,TEMP1   ;STORE RC PARAM BASE
010760  012737  000003  001704          MOV     #3,TEMP2        ;STORE NUMBER OF PARAM
010766  000406                        BR      C$RCWS          ;BRANCH TO COMMON RTE
010770  012737  001216  001702  C$SC:    MOV     #STATRD,TEMP1   ;STORE SC PARAM BASE
010776  012737  000003  001704          MOV     #3,TEMP2                ;STORE NUMBER OF PARAM
011004                          C$RCWS:
011004  010046                        MOV     R0,-(SP)        ;;PUSH R0 ON STACK
```

```
3842  011006  010446                        MOV     R4,-(SP)        ;;PUSH R4 ON STACK
3843  011010  013704  001704                MOV     TEMP2,R4        ;SET NUMBER OF PARAM
3844  011014  013700  001702                MOV     TEMP1,R0        ;SET PARAM BASE
3845
3846  011020  004737  004666        1$:     JSR     PC,SBSCN        ;BUMP R1 TO NEXT PARAM
3847  011024  105711                        TSTB    (R1)            ;TEST FOR NULL (REMAIN PARAM DEFAULT)
3848  011026  001425                        BEQ     3$              ;BRANCH IF YES
3849  011030  121127  000054                CMPB    (R1),#',        ;TEST IF THIS PARAM NULL
3850  011034  001417                        BEQ     2$              ;NULL PARAM, SET FOR NEXT
3851  011036  121127  000067                CMPB    (R1),#67        ;TEST 1ST CHAR OF PARAM
3852  011042  101407                        BLOS    40$             ;LESS THAN 7 - BRANCH
3853  011044  010346                        MOV     R3,-(SP)        ;STORE R3
3854  011046  004737  007056                JSR     PC,RGDCDE       ;GO DECODE REGISTER
3855  011052  011146                        21$                     ;ERROR RETURN
3856  011054  010310                        MOV     R3,(R0)         ;STORE REG NUMBER
3857  011056  012603                        MOV     (SP)+,R3        ;RESTORE R3
3858  011060  000405                        BR      2$
3859  011062  010146        40$:    MOV     R1,-(SP)        ;SET UP TO CONVERT PARAM
3860  011064  004737  031160                JSR     PC,OCTBIN       ;TO BINARY
3861  011070  011140                        20$
3862  011072  012610                        MOV     (SP)+,(R0)      ;STORE PARAM
3863  011074  005720                2$:     TST     (R0)+           ;BUMP R0 TO NEXT PARAM STORE
3864  011076  005304                        DEC     R4              ;DEC PARAM COUNT. TAKE
3865  011100  001347                        BNE     1$              ;ONLY 3 PARAMETERS
3866  011102  013700  001702        3$:     MOV     TEMP1,R0        ;RESET TO BASE FOR PARAM INSERTION
3867  011106  010325                        MOV     R3,(R5)+        ;INSERT JSR R4 CONSTANT
3868  011110  022222                        CMP     (R2)+,(R2)+     ;BUMP R2 TO 4TH WORD
3869  011112  011225                        MOV     (R2),(R5)+      ;INSERT EXECUTE ADDRESS
3870  011114  012025                        MOV     (R0)+,(R5)+     ;INSERT REGISTER OR STATUS WD NULL
3871  011116  012025                        MOV     (R0)+,(R5)+     ;INSERT EXPECTED VALUE
3872  011120  023727  001704  000002        CMP     TEMP2,#2        ;TEST IF RW(ONLY 2 PARAM)
3873  011126  001401                        BEQ     4$              ;IF YES, GET OUT. ELSE
3874  011130  012025                        MOV     (R0)+,(R5)+     ;INSERT MASK
3875  011132  012604        4$:     MOV     (SP)+,R4        ;RESSTORE R4 FOR RETURN
3876  011134  005724                        TST     (R4)+           ;NORMAL RETURN
3877  011136  000407                        BR      25$
3878  011140  104401  002640        20$:    TYPE    ,BADOCT         ;TYPE INVALID OCTAL MESSAGE
3879  011144  000402                        BR      22$
3880  011146  104401  003365        21$:    TYPE    ,BADSEL         ;BAD REG SELECTION MESSAGE
3881  011152  012604        22$:    MOV     (SP)+,R4        ;RESTORE R4 FOR RETURN
3882  011154  011404                        MOV     (R4),R4         ;BAD RETURN
3883  011156                        25$:
3884  011156  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
3885  011160  000204                        RTS     R4              ;RETURN
3886
3887                          ;;*****************************************************************
3888                          .SBTTL  BUFFER INITIALIZE PROCESSOR
3889                          ;*ENTRY:        JSR     R4,C$BI OR JSR R4,C$CBI
3890                          ;*RETURN:       RTS     R4      ERROR RETURN
3891                          ;*              RTS     R4+2    NORMAL ROUTINE
3892                          ;*
3893                          ;*OBJECT CODE:
3894                          ;*      JSR     R4,E$BI
3895                          ;*      <EXECUTION LINE COUNT CONTROL><PATTERN NAME>
3896                          ;*
3897                          ;*THIS ROUTINE GENERATES THE LINK TO THE BUFFER INITIALIZE EXECUTION
```

```
                                ;*THE PATTERN NAME IS ENTERED AS THE LOW ORDER BYTE OF THE PARAMETER.
                                ;*BIT 15 IF THE PARAMETER BYTE IS USED TO TELL THE BI EXECUTION
                                ;*IF THIS IS AN INTERNALLY GENERATED BI OR A USER COMMAND.  IF
                                ;*USER COMMAND, BIT 15 IS A ONE.  THIS INDICATOR CONTROLS LINE
                                ;*COUNT INCREMENT DURING EXECUTION.
                                ;*
                                ;*THIS ROUTINE HAS A SPECIAL ENTRY (C$CBI).  THIS ENTRY IS USED
                                ;*WHEN A DATA TRANSFER OPERATION REQUIRES BUFFER INITIALIZATION.
                                ;*THE COMPILER ROUTINE INSERTS A JSR TO THE SPECIAL ENTRY INTO THE
                                ;*OBJECT CODE BEFORE THE DATA TRANSFER JSR (SEE DESCRIPTION OF
                                ;*SUBSYSTEM FUNCTION PROCESSOR).
                                ;*
                                ;*THE RANDOM PATTERN IS GENERATED AND STORED IN THIS ROUTINE IF
                                ;*PATTERN R IS SELECTED.
                                ;;*****************************************************************

011162                          C$BI:
011162  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
011164  004737  004666                  JSR     PC,$BSCN        ;BUMP R1 TO NEXT PARAM
011170  111100                          MOVB    (R1),R0         ;MOVE PAT NAME INTO R0
011172  001002                          BNE     1$              ;IF NOT NULL, BRANCH, ELSE
011174  113700  001236                  MOVB    PATSEL,R0       ;MOVE "A" INTO R0
011200  052700  100000          1$:     BIS     #BIT15,R0       ;SET BIT 15 FOR LINE COUNT CONTROL
011204  000401                          BR      C$CBII          ;BRANCH AROUND SPECIAL ENTRY
011206                          C$CBI:
011206  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
011210  110037  001236          C$CBII: MOVB    R0,PATSEL       ;STORE PATTERN SELECT
011214  010325                          MOV     R3,(R5)+        ;INSERT JSR R4 CONSTANT
011216  022222                          CMP     (R2)+,(R2)+     ;BUMP R2 TO 4TH WORD TO
011220  011225                          MOV     (R2),(R5)+      ;INSERT EXECUTE ADDRESS
011222  010025                          MOV     R0,(R5)+        ;INSERT INDEX INTO PATTBL
011224  120027  000122                  CMPB    R0,#'R          ;RANDOM PATTERN?
011230  001015                          BNE     3$              ;NO - BRANCH OUT
011232  012700  001562                  MOV     #PATR,R0        ;GET ADDRESS OF PATR STORE
011236  004737  034170          2$:     JSR     PC,$RAND        ;GENERATE RANDOM VALUES
011242  013720  034266                  MOV     $HINUM,(R0)+    ;LOAD PATR WITH HI VALUE
011246  013720  034270                  MOV     $LONUM,(R0)+    ;LOAD PATR WITH LO VALUE
011252  022700  001662                  CMP     #PATR+100,R0    ;PATTERN FULL?
011256  001367                          BNE     2$              ;NO - DO IT AGAIN
011260  105137  001242                  COMB    PATRDF          ;SET PAT R DEFINED SWITCH
011264                          3$:
011264  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
011266  005724                          TST     (R4)+           ;SET NORMAL RETURN
011270  000204                          RTS     R4              ;RETURN

                                ;;*****************************************************************
                                .SBTTL  DATA COMPARE PROCESSOR
                                ;*ENTRY:        JSR     R4,C$DC
                                ;*RETURN:       RTS     R4      ERROR RETURN
                                ;*              RTS     R4+2    NORMAL RETURN
                                ;*
                                ;*OBJECT CODE:
                                ;*      JSR     R4,E$DC
                                ;*      COMPARE LENGTH (OCTAL)
                                ;*
                                ;*THIS ROUTINE GENERATES THE LINK TO THE DATA COMPARE EXECUTE.
                                ;*THE COMPARE LENGTH PARAMETER IS TAKEN FROM THE COMSZE
```

```
                                        ;*PARAMETER STORAGE LOCATION IF IT IS NOT GIVEN WITH THE COMMAND.
                                        ;*IF IT IS GIVEN, IT IS STORED IN COMSZE FOR POSSIBLE LATER
                                        ;*USE. (COMSZE WILL ALWAYS BE EITHER THE DATA COMPARE
                                        ;*LENGTH PARAMETER OR THE WORD COUNT OF THE LAST
                                        ;*INPUT DATA TRANSFER.)
                                        ;;*****************************************************************

011272                                  C$DC:
011272  010046                                  MOV     R0,-(SP)        ;;PUSH R0 ON STACK
011274  004737  004666                          JSR     PC,SBSCN        ;BUMP R1 TO NEXT PARAM
011300  105711                                  TSTB    (R1)            ;TEST IF PARAM NULL
011302  001406                                  BEQ     2$              ;BR IF YES
011304  010146                                  MOV     R1,-(SP)        ;SET UP FOR CONVERT
011306  004737  031160                          JSR     PC,OCTBIN       ;CONVERT PARAM TO BINARY
011312  011336                                  20$                     ;ERROR RETURN
011314  012637  001254                          MOV     (SP)+,COMSZE    ;STORE COMPARE LENGTH
011320  010325                          2$:     MOV     R3,(R5)+        ;INSERT JSR R4 CONSTANT
011322  022222                                  CMP     (R2)+,(R2)+     ;BUMP R2 TO WORD 4 AT ICTBL
011324  011225                                  MOV     (R2),(R5)+      ;INSERT EXECUTE RTE ADDRESS
011326  013725  001254                          MOV     COMSZE,(R5)+    ;INSERT COMPARE LENGTH
011332  005724                                  TST     (R4)+           ;SET FOR NORMAL RETURN
011334  000403                                  BR      30$
011336  104401  002640                  20$:    TYPE    ,BADOCT         ;TYPE BAD DECIMAL MESSAGE
011342  011404                                  MOV     (R4),R4         ;SET FOR ERROR RETURN
011344                                  30$:
011344  012600                                  MOV     (SP)+,R0        ;;POP STACK INTO R0
011346  000204                                  RTS     R4              ;RETURN

                                        ;;*****************************************************************
                                        .SBTTL  STALL PROCESSOR
                                        ;*ENTRY:        JSR     R4,C$ST
                                        ;*RETURN:       RTS     R4      ERROR RETURN
                                        ;*              RTS     R4+2    ;NORMAL RETURN
                                        ;*
                                        ;*OBJECT CODE:
                                        ;*      JSR     R4,E$ST
                                        ;*      STALL DURATION (OCTAL)
                                        ;*
                                        ;*THIS ROUTINE GENERATES THE LINK TO THE STALL EXECUTE.
                                        ;*THE PARAMETER, IF GIVEN IN THE INPUT COMMAND, IS
                                        ;*DECODED FROM ASCII DECIMAL INTO BINARY AND STORED
                                        ;*IN THE PARAMETER STORAGE LOCATION "STALL". IT IS THEN
                                        ;*PLACED IN THE OBJECT CODE. IF THE DELAY IS NOT
                                        ;*SPECIFIED IN THE COMMAND THE OLD VALUE OF
                                        ;*"STALL" IS USED.
                                        ;;*****************************************************************

011350  004737  004666          C$ST:   JSR     PC,SBSCN        ;BUMP R1 TO NEXT PARAM
011354  105711                          TSTB    (R1)            ;TEST IF PARAM NULL
011356  001406                          BEQ     1$              ;BR IF NULL
011360  010146                          MOV     R1,-(SP)        ;SET UP FOR CONVERT
011362  004737  031314                  JSR     PC,DECBIN       ;CONVERT PARAM TO BINARY
011366  011412                          20$                     ;ERROR RETURN
011370  012637  001252                  MOV     (SP)+,STALL     ;STORE STALL VALUE
011374  010325                  1$:     MOV     R3,(R5)+        ;INSERT JSR R4 CONSTANT
011376  022222                          CMP     (R2)+,(R2)+     ;BUMP R2 TO 4TH WORD ICTBL
```

```
011400  011225                          MOV     (R2),(R5)+      ;INSERT EXECUTE ADDRESS
011402  013725  001252                  MOV     STALL,(R5)+     ;INSERT STALL PARAMETER
011406  005724                          TST     (R4)+           ;SET UP NORMAL RETURN
011410  000403                          BR      30$             ;BR TO RETURN
011412  104401  002512          20$:    TYPE    ,BADDEC         ;TYPE BAD DECIMAL MESSAGE
011416  011404                          MOV     (R4),R4         ;SET UP ERROR RETURN
011420  000204                  30$:    RTS     R4              ;RETURN

                        ;;*****************************************************************
                        .SBTTL  UNIBUS INITIALIZE PROCESSOR
                        ;*ENTRY:        JSR     R4,CSUI
                        ;*RETURN:       RTS     R4+2    NO ERROR RETURN
                        ;*
                        ;*OBJECT CODE:
                        ;*      JSR     R4,ESUI
                        ;*
                        ;*THIS ROUTINE GENERATES THE UNIBUS INITIALIZE LINK
                        ;*INTO THE OJBECT CODE.
                        ;;*****************************************************************

011422  010325          CSUI:   MOV     R3,(R5)+        ;INSERT JSR R4 CONSTANT
011424  022222                  CMP     (R2)+,(R2)+     ;BUMP R2 TO 4TH WORD OF TABLE
011426  011225                  MOV     (R2),(R5)+      ;INSERT EXECUTE ADDRESS
011430  005724                  TST     (R4)+           ;NORMAL RETURN
011432  000204                  RTS     R4              ;RETURN

                        ;;*****************************************************************
                        .SBTTL  SUBCOMMAND TABLE
                        ;*THIS TABLE CONTAINS ALL THE SUBSYSTEM COMMANDS. THE TABLE
                        ;*FORMAT IS:
                        ;*      WORD1:  SUBCOMMAND MNEMONIC
                        ;*      WORD2:  ADDRESS OF EXECUTION SUBROUTINE FOR THIS COMMAND
                        ;*      WORD3:  THE NUMBER OF PARAMETERS THIS COMMAND REQUIRES
                        ;;*****************************************************************
                                .EVEN

042122                  SCTBL:  .ASCII  /RD/            ;READ DATA
021712  000005                  .WORD   E$RD,5
042127                          .ASCII  /WD/            ;WRITE DATA
021762  000005                  .WORD   E$WD,5
041527                          .ASCII  /WC/            ;WRITE CHECK
021776  000005                  .WORD   E$WC,5
044127                          .ASCII  /WH/            ;WRITE HEADER
021672  000005                  .WORD   E$WH,5
044122                          .ASCII  /RH/            ;READ HEADER
021646  000004                  .WORD   E$RH,4
045523                          .ASCII  /SK/            ;SEEK
021660  000004                  .WORD   E$SK,4
041503                          .ASCII  /CC/            ;CONTROLLER CLEAR
021540  000001                  .WORD   E$CC,1
051503                          .ASCII  /CS/            ;CLEAR SUBSYSTEM
021524  000001                  .WORD   E$CS,1
041504                          .ASCII  /DC/            ;DRIVE CLEAR
021564  000001                  .WORD   E$DC,1
041522                          .ASCII  /RC/            ;RECALIBRATE
021474  000001                  .WORD   E$RC,1
051504                          .ASCII  /DS/            ;DRIVE SELECT
```

```
4066  011532  021552  000001                .WORD   E$DS,1
4067  011536  040520                        .ASCII  /PA/            ;PACK ACKNOWLEDGE
4068  011540  021510  000001                .WORD   E$PA,1
4069  011544  046125                        .ASCII  /UL/            ;UNLOAD
4070  011546  021576  000001                .WORD   E$UL,1
4071  011552  051523                        .ASCII  /SS/            ;START SPINDLE
4072  011554  021610  000001                .WORD   E$SS,1
4073  011560  043117                        .ASCII  /OF/            ;OFFSET
4074  011562  021622  000002                .WORD   E$OF,2
4075  011566  044101                        .ASCII  /AH/            ;ALL HEADER READ
4076  011570  021634  000004                .WORD   E$AH,4
4077  011574  000000                        .WORD   0               ;NULL TO TERMINATE TABLE
4078
4079                                ;*****************************************************************
4080                                .SBTTL  SUBSYSTEM FUNCTION PROCESSOR
4081                                ;*ENTRY:        JSR     R4,C$SF
4082                                ;*RETURN:       RTS     R4      ERROR RETURN
4083                                ;*              RTS     R4+2    NORMAL RETURN
4084                                ;*OBJECT CODE:
4085                                ;*      JSR     R4,E$XX :WHERE E$XX IS THE COMMAND EXECUTE ROUTINE
4086                                ;*      OPERATION FLAGS :BIT 1 SET = NO CHECKING
4087                                ;*                      :BIT 2 SET = BUS ADDRESS INCREMENT INHIBIT
4088                                ;*                      :BIT 3 SET = 24 SECTOR FORMAT
4089                                ;*      DRIVE NUMBER    :-1 MEANS USE STORED PARAMETER "DRIVE",
4090                                ;*                       ELSE THIS IS DRIVE TO BE USED
4091                                ;*      CYLINDER NUMBER OR OFFSET :DEPENDING ON COMMAND
4092                                ;*      TRACK NUMBER
4093                                ;*      SECTOR NUMBER
4094                                ;*      WORD COUNT
4095                                ;*
4096                                ;*THE NUMBER OF PARAMETERS IS VARIABLE DEPENDING ON THE
4097                                ;*SUBSYSTEM COMMAND. THE NUMBER IS SPECIFIED IN THE THIRD
4098                                ;*WORD OF THE SUBSYSTEM COMMAND TABLE (SCTBL).
4099                                ;*
4100                                ;*THIS ROUTINE PROVIDES THE LINKS TO THE VARIOUS EXECUTION ROUTINES FOR
4101                                ;*SUBSYSTEM COMMANDS. IT DOES THIS BY PROVIDING THE PROPER DESTINATION
4102                                ;*ADDRESS FOR THE JSR. THE PARAMETERS REQUIRED BY THE
4103                                ;*EXECUTION ROUTINE IS PLACED IN THE OBJECT FILE IMMEDIATELY
4104                                ;*FOLLOWING THE JSR COMMAND.
4105                                ;*
4106                                ;*WHEN THE ROUTINE IS ENTERED, THE REGISTERS MUST BE SET
4107                                ;*AS FOLLOWS:
4108                                ;*      R0-NA
4109                                ;*      R1-POINTS TO THE SF MNEMONIC IN THE SOURCE FILE LINE
4110                                ;*      R2-NA
4111                                ;*      R3-CONTAINS JSR R4 CONSTANT
4112                                ;*      R4-NA
4113                                ;*      R5-POINTS TO THE 1ST UNUSED LOCATION IN OBJECT FILE
4114                                ;*
4115                                ;*IF THE SC PARAMETER IS GIVEN IN THE SOURCE LINE THE SC MNEMONIC
4116                                ;*IS USED TO LOCATE THE PROPER ENTRY IN THE TABLE. IF NONE
4117                                ;*IS FOUND, AN ERROR IS REPORTED. IF A HIT OCCURS, THE
4118                                ;*ADDRESS OF THE SECOND WORD OF THE TABLE IF LOADED INTO R2 AND
4119                                ;*STORED IN SUBCMD AS THE INDICATION OF THE LAST COMMAND
4120                                ;*SPECIFIED. IF THE SC PARAMETER IS NULL, THE STORED VALUE
4121                                ;*IN SUBCMD IS PUT IN R2 WHICH EFFECTIVELY LOCATES THE TABLE
```

```
                                ;*ENTRY.
                                ;*
                                ;*THE REMAINING PARAMETERS IN THE SOURCE ARE THEN
                                ;*PROCESSED. IF THE PARAMETER IS NULL, THE LAST SPECIFIED
                                ;*VALUE FOR THAT PARAMETER IS USED. IF THE PARAMETER
                                ;*IS GIVEN, IT IS STORED IN PARAMETER STORAGE AND BECOMES
                                ;*THE LAST VALUE GIVEN.
                                ;*SEVERAL SPECIAL CASES EXIST. THESE ARE:
                                ;*       .PATTERN SELECT SPECIFIED
                                ;*       .NULL DRIVE PARAMETER
                                ;*       .OFFSET COMMAND
                                ;*       .INVALID WORD COUNT
                                ;*
                                ;*SUPPLYING THE PATTERN SELECT PARAMETER REQUIRES OUTPUT BUFFER
                                ;*INITIALIZATION. THIS IS ACCOMPLISHED BY USING THE BUFFER
                                ;*INITIALIZE COMMAND PROCESSOR ROUTINE WITH A SPECIAL
                                ;*ENTRY (JSR R4, C$CBI). THIS GENERATES A LINK TO THE
                                ;*BUFFER INITIALIZE EXECUTION ROUTINE THAT IS IDENTICAL TO
                                ;*A LINK GENERATED BY A BI INTERACTIVE COMMAND. THE
                                ;*LINK TO BI IN THE OBJECT FILE WILL BE INSERTED BEFORE
                                ;*THE LINK TO THE SUBSYSTEM COMMAND.
                                ;*
                                ;*A NULL DRIVE PARAMETER IS SPECIAL BECAUSE IT REQUIRES
                                ;*CONSIDERATION WHEN A COMPILED TEST IS READ FROM PAPER TAPE.
                                ;*TO SUPPORT THIS, THE PARAMETER IS SET TO -1 IF THE DRIVE IS
                                ;*NOT SPECIFIED IN THE COMMAND. THE COMMAND EXECUTION
                                ;*ROUTINE KEYS OFF THIS AND GOES TO THE STORED DRIVE
                                ;*PARAMETER FOR THE DRIVE NUMBER.
                                ;*
                                ;*THE OFFSET COMMAND REQUIRES A UNIQUE PARAMETER (OFFSET)
                                ;*IN THE POSITION OFF THE CYLINDER NUMBER. TO PRESERVE
                                ;*THE STORED CYLINDER NUMBER THIS MUST BE SPECIAL CASE.
                                ;*
                                ;*THE WORD COUNT PARAMETER IS CHECKED TO INSURE THE
                                ;*BUFFER IS LARGE ENOUGH. IF NOT AN ERROR IS PRINTED.
                                ;;*****************************************************************

011576                          C$SF:
011576 010046                           MOV     R0,-(SP)        ;;PUSH R0 ON STACK
011600 010246                           MOV     R2,-(SP)        ;;PUSH R2 ON STACK
011602 004737 004666                    JSR     PC,SBSCN        ;BUMP R1 TO NEXT PARAM
011606 112137 001702                    MOVB    (R1)+,TEMP1     ;MOVE 1ST CHAR OF SUB CMND.
011612 001403                           BEQ     1$              ;BRANCH IF NULL
011614 111137 001703                    MOVB    (R1),TEMP1+1    ;MOVE 2ND CHAR OF SUB CMND
011620 001015                           BNE     3$              ;BRANCH IF NOT NULL
011622 005301                   1$:     DEC     R1              ;DECREMENT R1 TO INSURE IT DOESN'T
                                                                ;GET PAST THE NULL CHARACTER
011624 013702 001214                    MOV     SUBCMD,R2       ;GET 2ND WORD ADDR FOR LAST CMND
011630 105137 001666                    COMB    SAMDR           ;SET SAME DRIVE SWITCH
011634 024227 043117                    CMP     -(R2),#"OF      ;LAST COMMAND OFFSET?
011640 001002                           BNE     2$              ;IF NO, BRANCH ELSE
011642 105137 001665                    COMB    OFFLAG          ;SET OFFSET FLAG
011646 005722                   2$:     TST     (R2)+           ;BUMP R2 TO SECOND WORD
011650 000137 012242                    JMP     41$             ;GO TO FILL OBJECT
011654 124127 000054            3$:     CMPB    -(R1),#',       ;TEST IF 1ST CHAR COMMA
011660 001423                           BEQ     7$              ;BRANCH IF YES. ELSE
```

```
4178  011662  023727  001702  043117  31$:    CMP     TEMP1,#"OF      ;TEST IF OFFSET
4179  011670  001002                          BNE     4$              ;BRANCH IF NO. ELSE
4180  011672  105137  001665                  COMB    OFFLAG          ;SET OFFSET FLAG
4181  011676  012702  011434          4$:     MOV     #SCTBL,R2       ;LOAD ADDRESS OF SUBCMND TABLE
4182  011702  023722  001702          5$:     CMP     TEMP1,(R2)+     ;TEST IF TABLE ENTRY MATCH
4183  011706  001405                          BEQ     6$              ;YES, FOUND A HIT. BRANCH
4184  011710  005742                          TST     -(R2)           ;TEST IF TABLE ENTRY NULL
4185  011712  001502                          BEQ     26$             ;IF YES, NO MATCH IN TABLE, ERROR
4186  011714  062702  000006                  ADD     #6,R2           ;BUMP R2 TO NEXT TABLE ENTRY
4187  011720  000770                          BR      5$              ;BRANCH TO TEST NEXT ENTRY
4188  011722  010237  001214          6$:     MOV     R2,SUBCMD       ;STORE ADDRESS 2ND WORD, LAST CMND
4189  011726  000410                          BR      9$
4190  011730  013702  001214          7$:     MOV     SUBCMD,R2       ;GET 2ND WORD ADDR LAST CMND
4191  011734  024227  043117                  CMP     -(R2),#"OF      ;TEST IF LAST CMND OFFSET
4192  011740  001002                          BNE     8$              ;IF NO, BRANCH. ELSE
4193  011742  105137  001665                  COMB    OFFLAG          ;SET OFFLAG
4194  011746  005722                  8$:     TST     (R2)+           ;BUMP R2 BACK TO SECOND WORD
4195  011750  005000                  9$:     CLR     R0              ;CLR R0 FOR PARAM COUNTING
4196  011752  004737  004666          10$:    JSR     PC,SBSCN        ;BUMP R1 TO NEXT PARAM
4197  011756  121127  000054                  CMPB    (R1),#',        ;TEST IF COMMA
4198  011762  001005                          BNE     11$             ;BR IF NO
4199  011764  005700                          TST     R0              ;TEST IF DRIVE SELECT PARAM
4200  011766  001111                          BNE     18$             ;GO TO BUMP & LOOP
4201  011770  105137  001666                  COMB    SAMDR           ;SET SAME DRIVE SWITCH
4202  011774  000506                          BR      18$             ;GO TO BUMP & LOOP
4203  011776  105711                  11$:    TSTB    (R1)            ;TEST PARAM NULL
4204  012000  001005                          BNE     12$             ;NOT NULL
4205  012002  005700                          TST     R0              ;TEST IF DRIVE SELECT PARAM
4206  012004  001116                          BNE     41$             ;GO TO FILL OBJECT
4207  012006  105137  001666                  COMB    SAMDR           ;SET SAME DRIVE FLAG
4208  012012  000513                          BR      41$             ;GO TO FILL OBJECT
4209  012014  020027  000016          12$:    CMP     R0,#16          ;TEST IF TOO MANY PARAM
4210  012020  002017                          BGE     21$             ;BRANCH TO ERROR
4211  012022  020027  000012                  CMP     R0,#12          ;PATTERN SELECT PARAM?
4212  012026  001401                          BEQ     13$             ;IF YES BRANCH, ELSE
4213  012030  000437                          BR      14$             ;GO TO BUMP & LOOP
4214  012032  010046                  13$:    MOV     R0,-(SP)        ;SAVE R0
4215  012034  010246                          MOV     R2,-(SP)        ;SAVE R2
4216  012036  012702  004016                  MOV     #C$CBIS,R2      ;SET R2 WITH ADDRESS OF "BI" EXEC ROUT
4217  012042  111100                          MOVB    (R1),R0         ;LOAD R0 WITH PAT SELECT CHAR
4218  012044  004437  011206                  JSR     R4,C$CBI        ;JUMP TO SPECIAL BUFFER INITIALIZE
4219                                                                  ;ENTRY. A JSR R4, BI (PATTERN
4220                                                                  ;NAME) WILL BE INSERTED INTO
4221                                                                  ;OBJECT FILE.
4222  012050  000000                          .WORD   0               ;ERROR RETURN POINT
4223  012052  012602                          MOV     (SP)+,R2        ;RESTORE R2
4224  012054  012600                          MOV     (SP)+,R0        ;RESTORE R0
4225  012056  000455                          BR      18$             ;GO TO BUMP & LOOP
4226  012060  104401  002616          21$:    TYPE    ,IVDPAR         ;TYPE INVALID PARAMETERS
4227  012064  000415                          BR      26$
4228  012066                          22$:
4229  012066  104401  002640          24$:    TYPE    ,BADOCT         ;TYPE BAD OCTAL MESSAGE
4230  012072  000412                          BR      26$
4231  012074  005726                  25$:    TST     (SP)+           ;DUMP BAD VALUE
4232  012076  104401  003101                  TYPE    ,IVDWCT         ;TYPE INVALID WORD COUNT
4233  012102  000406                          BR      26$
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4234  012104  104401  003123          27$:    TYPE    ,IVDNC          ;TYPE INVALID COMMAND IN NO CHECK
4235  012110  000403                          BR      26$
4236  012112  005726                  28$:    TST     (SP)+           ;DUMP BAD DRIVE NUMBER
4237  012114  104401  003146                  TYPE    ,BADDRV         ;TYPE MESSAGE
4238  012120                          20$:
4239  012120  011404                  26$:    MOV     (R4),R4         ;SET UP ERROR RETURN
4240  012122                          55$:
4241  012122  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
4242  012124  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
4243  012126  000204                          RTS     R4              ;RETURN
4244  012130  010146                  14$:    MOV     R1,-(SP)        ;PUT ADDRESS OF PARAM ON STACK
4245  012132  004737  031160                  JSR     PC,OCTBIN       ;CONVERT ASCII OCTAL TO BINARY
4246  012136  012066                          24$                     ;BAD CONVERT, NON OCTAL NUMBER
4247  012140  020027  000010                  CMP     R0,#10          ;WORD COUNT PARAM?
4248  012144  001010                          BNE     17$             ;IF NO, BRANCH, ELSE
4249  012146  021637  001700                  CMP     (SP),MAXWDS     ;TEST IF WORD COUNT IF TO BIG
4250  012152  101405                          BLOS    17$             ;NO - SKIP
4251  012154  032737  000004  001245          BIT     #BAII,OPFLGS    ;ELSE TEST IF BAI INHIBIT SET
4252  012162  001001                          BNE     17$             ;YES - BIG WORD COUNT OKAY
4253  012164  000743                          BR      25$             ;ELSE GO REPORT ERROR
4254  012166  020027  000002          17$:    CMP     R0,#2           ;CYL NUM OR OFFSET PARAM
4255  012172  001412                          BEQ     19$             ;IF YES, BRANCH, ELSE STORE
4256  012174  005700                          TST     R0              ;DRIVE PARAMETER?
4257  012176  001003                          BNE     32$             ;NO - SKIP LEGAL DRIVE TEST
4258  012200  021627  000007                  CMP     (SP),#7         ;TEST DRIVE PARAMETER
4259  012204  101342                          BHI     28$             ;TO BIG, ERROR
4260  012206  012660  001176          32$:    MOV     (SP)+,DRIVE(R0) ;CONVERTED VALUE IN PROPER STORAGE
4261  012212  062700  000002          18$:    ADD     #2,R0           ;BUMP R0 TO NEXT PARAM NUM
4262  012216  000655                          BR      10$             ;LOOP FOR NEXT PARAM
4263  012220  105737  001665          19$:    TSTB    OFFLAG          ;TEST IF OFFSET FLAG SET
4264  012224  001003                          BNE     40$             ;IF YES, BRANCH TO STORE OFFSET
4265  012226  012637  001200                  MOV     (SP)+,CYLNUM    ;STORE CYLINDER NUMBER
4266  012232  000767                          BR      18$             ;BR TO BUMP & LOOP
4267  012234  012637  001256          40$:    MOV     (SP)+,LOFFST    ;STORE OFFSET VALUE
4268  012240  000764                          BR      18$             ;BRANCH TO BUMP & LOOP
4269  012242  010325                  41$:    MOV     R3,(R5)+        ;INSERT JSR R4 CONSTANT
4270  012244  012225                          MOV     (R2)+,(R5)+     ;INSERT EXECUTE ADDRESS
4271  012246  011200                          MOV     (R2),R0         ;GET NUM OF PARAM FOR THIS CMND
4272  012250  142737  000010  001245          BICB    #SECT20,OPFLGS  ;CLEAR 24 SECTOR FLAG
4273  012256  022737  000026  001212          CMP     #26,FORMAT      ;CHECK IF THAT IS CORRECT
4274  012264  001403                          BEQ     46$             ;YEP - SKIP
4275  012266  152737  000010  001245          BISB    #SECT20,OPFLGS  ;NOPE - SET THE FLAG
4276  012274  105737  001666          46$:    TSTB    SAMDR           ;SAME DRIVE SWITCH SET?
4277  012300  001405                          BEQ     42$             ;
4278  012302  112725  177777                  MOVB    #-1,(R5)+       ;INSERT DRIVE NUM OF -1
4279  012306  105037  001666                  CLRB    SAMDR           ;CLEAR SAME DRIVE SWITCH
4280  012312  000402                          BR      43$             ;
4281  012314  113725  001176          42$:    MOVB    DRIVE,(R5)+     ;INSERT DRIVE NUM PARAM
4282  012320  113725  001245          43$:    MOVB    OPFLGS,(R5)+    ;INSERT OPERATION FLAGS
4283  012324  005300                          DEC     R0              ;DEC PARAM NUMBER
4284  012326  001435                          BEQ     50$             ;IF NOW ZERO, EXIT
4285  012330  105737  001665                  TSTB    OFFLAG          ;TEST OFFSET FLAG SET
4286  012334  001405                          BEQ     44$             ;
4287  012336  013725  001256                  MOV     LOFFST,(R5)+    ;INSERT OFFSET VALUE
4288  012342  105037  001665                  CLRB    OFFLAG          ;CLEAR OFFSET FLAG
4289  012346  000402                          BR      45$             ;
```

```
4290  012350  013725  001200          44$:    MOV     CYLNUM,(R5)+    ;INSERT CYLINDER NUMBER
4291  012354  005300                  45$:    DEC     R0              ;DEC PARAM NUMBER
4292  012356  001421                          BEQ     50$             ;IF ZERO, EXIT
4293  012360  113725  001202                  MOVB    TRKNUM,(R5)+    ;INSERT TRACK NUMBER PARAM
4294  012364  005300                          DEC     R0              ;DEC PARAM NUMBER
4295  012366  001415                          BEQ     50$             ;IF ZERO, EXIT
4296  012370  113725  001204                  MOVB    SECNUM,(R5)+    ;INSERT SECTOR NUM PARAM
4297  012374  005300                          DEC     R0              ;DEC PARAM NUMBER
4298  012376  001411                          BEQ     50$             ;IF ZERO, EXIT
4299  012400  013725  001206                  MOV     WDCNT,(R5)+     ;INSERT WORD COUNT PARAM
4300  012404  023727  001702  042122          CMP     TEMP1,#"RD      ;TEST IF READ DATA COMMAND
4301  012412  001003                          BNE     50$             ;NO - BRANCH
4302  012414  013737  001206  001254          MOV     WDCNT,COMSZE    ;ELSE STORE WORD COUNT FOR DATA COMPARE
4303  012422  005724                  50$:    TST     (R4)+           ;SET UP NO ERROR RETURN
4304  012424  000636                          BR      55$
4305
4306                                  ;;*****************************************************************
4307                                  .SBTTL  OUTPUT TEST ROUTINE
4308                                  ;*      ENTRY:  JSR     R4,OTRTE
4309                                  ;*      RETURN: RTS     R4              ERROR RETURN
4310                                  ;*              RTS     R4+2            NORMAL RETURN
4311                                  ;*
4312                                  ;*THIS ROUTINE:
4313                                  ;*      1. DETERMINES WHICH FILE IS TO BE PUNCHE (SOURCE OR OBJECT)
4314                                  ;*      2. CHECKS IF THAT FILE HAS VALID CODE
4315                                  ;*      3. COMPUTES THE SIZE OF THAT FILE
4316                                  ;*      4. PUNCHES THE STORED PARAMETERS INCLUDING:
4317                                  ;*              A. THE TYPE OF CODE BEING PUNCHED (SOURCE OR OBJECT)
4318                                  ;*              B. THE SIZE OF THE FILE
4319                                  ;*              C$ WHICH OF THE USER DEFINED TEST PATTERNS HAVE
4320                                  ;*                 BEEN DEFINED
4321                                  ;*              D. ALL OF THE STORED TEST SPECIFIC PARAMETERS (DRIVE,
4322                                  ;*                 CYLINDER, TRACK, SECTOR, ITERATION COUNT, ETC.)
4323                                  ;*      5. CHECKS WHICH USER DEFINED OR RANDOM TEST PATTERNS HAS BEEN
4324                                  ;*         DEFINED AND PUNCHES THAT PATTERN.
4325                                  ;*      6.  PUNCHES THE SOURCE OR OBJECT FILE
4326                                  ;;*****************************************************************
4327
4328  012426                          OTRTE:
4329  012426  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
4330  012430  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
4331  012432  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
4332  012434  004737  004666                  JSR     PC,SBSCN                ;BUMP R1 TO NEXT PARAMETER
4333  012440  105711                          TSTB    (R1)                    ;TEST IF PARAM NULL
4334  012442  001526                          BEQ     20$                     ;IF YES, BRANCH TO ERROR
4335  012444  121127  000117                  CMPB    (R1),#'0                ;TEST IF PARAMETER IS "0"
4336  012450  001013                          BNE     2$
4337  012452  105737  001235                  TSTB    VLDOBJ                  ;TEST IF VALID OBJECT CODE
4338  012456  001523                          BEQ     21$                     ;BRANCH TO EXIT FOR ERROR
4339  012460  012737  043117  001174          MOV     #"OF,PUCODE             ;STORE OUTPUT DATA TYPE
4340  012466  013703  001712                  MOV     OFPTR,R3                ;GET OFILE POINTER(END OF FILE)
4341  012472  162703  034634                  SUB     #OFILE,R3               ;LENGTH OF FILE IS DIFFERENCE
4342  012476  000412                          BR      3$
4343  012500  105737  001234          2$:     TSTB    SFEMP                   ;TEST SOURCE FILE EMPTY
4344  012504  001113                          BNE     22$                     ;SFEMP SET, ERROR
4345  012506  012737  043123  001174          MOV     #"SF,PUCODE             ;SET PUNCH FILE CODE TO SOURCE
```

```
4346  012514  013703  001246                MOV     SFPTR,R3        ;GET ADDR OF END OF SF+1(1ST EMPTY)
4347  012520  163703  001710                SUB     IBUFPT,R3       ;DIFFERENCE IS SOURCE FILE LENGTH
4348  012524  010337  001250          3$:   MOV     R3,PUFLSZ       ;STORE BYTE COUNT IN PU FILE SIZE
4349  012530  012700  001174                MOV     #PUCODE,R0      ;GET ADDR OF START OF STORED PARAM
4350  012534  012703  000066                MOV     #66,R3          ;SET PUNCH COUNT
4351  012540  004437  012760                JSR     R4,PUNCH        ;GO PUNCH STORED PARAM
4352  012544  012742                        23$                     ;ERROR RETURN
4353  012546  012705  001237                MOV     #PATXDF,R5      ;GET ADDR OF PAT DEFINED SWITCHES
4354  012552  105725                  TSTB  (R5)+           ;TEST PAT X DEFINED
4355  012554  001407                        BEQ     4$              ;IF NOT BRANCH, ELSE
4356  012556  012703  000100                MOV     #100,R3         ;SET R3 FOR PUNCH COUNT AND
4357  012562  012700  001262                MOV     #PATX,R0        ;GET ADDR OF PATX
4358  012566  004437  012760                JSR     R4,PUNCH        ;PUNCH PATTERN X
4359  012572  012742                        23$
4360  012574  105725            4$:   TSTB    (R5)+                   ;TEST PAT Y DEFINED
4361  012576  001407                        BEQ     5$              ;IF NOT SET, BRANCH. ELSE
4362  012600  012700  001362                MOV     #PATY,R0        ;GET ADDR OF PAT Y AND
4363  012604  012703  000100                MOV     #100,R3         ;SET PUNCH COUNT AND
4364  012610  004437  012760                JSR     R4,PUNCH        ;PUNCH IT
4365  012614  012742                        23$
4366  012616  105725            5$:   TSTB    (R5)+                   ;TEST PAT Z DEFINED
4367  012620  001407                        BEQ     6$              ;IF NOT, BRANCH. ELSE
4368  012622  012700  001462                MOV     #PATZ,R0                ;GET ADDR OF PAT Z AND
4369  012626  012703  000100                MOV     #100,R3         ;SET PUNCH COUNT AND
4370  012632  004437  012760                JSR     R4,PUNCH        ;PUNCH PAT Z
4371  012636  012742                        23$                     ;ERROR RETURN
4372  012640  105715            6$:   TSTB    (R5)                    ;TEST RANDOM PATTERN DEFINED
4373  012642  001407                        BEQ     7$              ;IF NOT, BRANCH. ELSE
4374  012644  012703  000100                MOV     #100,R3         ;SET BYTE COUNT
4375  012650  012700  001562                MOV     #PATR,R0        ;SET ADDRESS OF RANDOM PAT
4376  012654  004437  012760                JSR     R4,PUNCH        ;PUNCH RANDOM PATTERN
4377  012660  012742                        23$                     ;ERROR RETURN
4378  012662  012700  034634          7$:   MOV     #OFILE,R0       ;GET ADDRESS OF OBJ FILE
4379  012666  023727  001174  043117        CMP     PUCODE,#"OF     ;TEST IF PUNCH CODE SAYS OBJ
4380  012674  001402                        BEQ     8$              ;IF EQ, R0 IS CORRECT. ELSE
4381  012676  013700  001710                MOV     IBUFPT,R0       ;LOAD R0 WITH ADDR OF SOURCE
4382  012702  013703  001250          8$:   MOV     PUFLSZ,R3               ;SET PUNCH COUNT
4383  012706  004437  012760                JSR     R4,PUNCH                ;PUNCH FILE
4384  012712  012742                        23$                     ;ERROR RETURN
4385  012714  005724                        TST     (R4)+           ;SET NORMAL RETURN
4386  012716  000414                        BR      30$                     ;GO TO RETURN
4387  012720  104401  002616          20$:  TYPE    ,IVDPAR                 ;TYPE INVALID PARAM
4388  012724  000410                        BR      25$
4389  012726  104401  002756          21$:  TYPE    ,IVDRUN                 ;TYPE NO OBJECT CODE
4390  012732  000405                        BR      25$
4391  012734  104401  003007          22$:  TYPE    ,NOSRC                  ;TYPE NO SOURCE CODE
4392  012740  000402                        BR      25$
4393  012742  104401  003207          23$:  TYPE    ,PUERR                  ;TYPE PUNCH ERROR
4394  012746  011404                  25$:  MOV     (R4),R4                 ;SET ERROR RETURN
4395  012750                          30$:
4396  012750  012605                        MOV     (SP)+,R5        ;;POP STACK INTO R5
4397  012752  012603                        MOV     (SP)+,R3        ;;POP STACK INTO R3
4398  012754  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
4399  012756  000204                        RTS     R4                      ;RETURN
4400                            ;;*****************************************************************
4401                            .SBTTL  PAPER TAPE PUNCH ROUTINE
```

```
                                        ;*       ENTRY:  JSR     R4,PUNCH
                                        ;*       RETURN: RTS     R4              ERROR RETURN
                                        ;*               RTS     R4+2            NORMAL RETURN
                                        ;*THIS ROUTINE WILL PUNCH THE NUMBER OF BYTES INDICATED BY THE VALUE
                                        ;*IN R3 FROM THE MEMORY AREA POINTED TO BY R0.
                                        ;;*****************************************************************

012760  042777  000100  166744  PUNCH:  BIC     #000100,@PTPSR          ;RESET INTERRUPT ENABLE
012766  032777  100200  166736  1$:     BIT     #100200,@PTPSR          ;TEST FOR ERROR OR READY
012774  001774                          BEQ     1$                      ;LOOP UNTIL ONE OR THE OTHER
012776  100406                          BMI     20$                     ;BR TO ERROR EXIT IF ERROR
013000  112077  166730                  MOVB    (R0)+,@PTPDB            ;LOAD BYTE FOR PUNCH
013004  005303                          DEC     R3                      ;DEC BYTE COUNT
013006  001367                          BNE     1$                      ;LOOP IF MORE TO PUNCH
013010  005724                          TST     (R4)+                   ;SET GOOD RETURN
013012  000204                          RTS     R4                      ;RETURN
013014  011404                  20$:    MOV     (R4),R4                 ;SET ERROR RETURN
013016  000204                          RTS     R4                      ;RETURN
                                        ;*****************************************************************
                                        .SBTTL  INPUT TEST AND INPUT STRING ROUTINE
                                        ;*       ENTRY:  JSR     R4,ITRTE OF ISRTE
                                        ;*       RETURN: RTS     R4              ERROR RETURN
                                        ;*               RTS     R4+2            NORMAL RETURN
                                        ;*
                                        ;*THIS ROUTINE HAS TWO ENTRY POINTS.  THE ENTRY AT ISRTE SETS THE
                                        ;*CHAIN FLAG.
                                        ;*
                                        ;*FIRST THE STORED PARAMETERS ARE READ IN.  THE USER DEFINED
                                        ;*PATTERN FLAGS ARE CHECKED.  IF PATXDF IS NOT 0, 100(8)
                                        ;*BYTES ARE READ AND STORED IN PATX; IF PATYDF IS NOT 0,
                                        ;*100(8) BYTES ARE READ AND STORED IN PATY; ETC FOR PATTERN Z.
                                        ;*THE PUCODE IS THEN CHECKED FOR OF OR SF AND THE NUMBER OF BYTES
                                        ;*INDICATED IN PUFLSZ IS READ AND STORED IN THE APPROPRIATE
                                        ;*FILE.  THE OUTPUT BUFFER IS THEN INITIALIZED TO THE PATTERN
                                        ;*INDICATED IN PATSEL.
                                        ;;*****************************************************************

013020  152737  000001  001663  ISRTE:  BISB    #1,CHNFLG               ;SET CHAIN FLAG
013026                          ITRTE:
013026  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
013030  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
013032  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
013034  012700  001174                  MOV     #PUCODE,R0              ;GET ADDRESS OF STORED PARAM
013040  012703  000066                  MOV     #66,R3                  ;SET NUMBER OF BYTES
013044  004437  013344                  JSR     R4,READ                 ;READ PARAMETERS FROM TAPE
013050  013322                          20$                             ;ERROR RETURN
013052  012705  001237                  MOV     #PATXDF,R5              ;GET ADDR OF PATD DEFINED FLAGS
013056  105725                          TSTB    (R5)+                   ;TEST PAT X DEFINED
013060  001407                          BEQ     1$                      ;BRANCH IF NOT SET, ELSE
013062  012703  000100                  MOV     #100,R3                 ;SET BYTE COUNT FOR PAT READ
013066  012700  001262                  MOV     #PATX,R0                ;SET FOR READ INTO PAT X
013072  004437  013402                  JSR     R4,RDCONT               ;READ IN PAT X
013076  013322                          20$                             ;ERROR RETURN
013100  105725                  1$:     TSTB    (R5)+                   ;TEST PAT Y DEFINED
013102  001407                          BEQ     2$                      ;IF NO, BRANCH. ELSE
013104  012703  000100                  MOV     #100,R3                 ;SET BYTE COUNT
```

```
 4458  013110  012700  001362                    MOV     #PATY,R0        ;SET FOR READ INTO PATY
 4459  013114  004437  013402                    JSR     R4,RDCONT       ;READ IN PAT Y
 4460  013120  013322                            20$                     ;ERROR RETURN
 4461  013122  105725                    2$:     TSTB    (R5)+           ;TEST PAT Z DEFINED
 4462  013124  001407                            BEQ     3$              ;IF NOT, BRANCH. ELSE
 4463  013126  012703  000100                    MOV     #100,R3         ;SET BYTE COUNT
 4464  013132  012700  001462                    MOV     #PATZ,R0        ;SET FOR READ INTO PAT Z
 4465  013136  004437  013402                    JSR     R4,RDCONT       ;READ IN PAT Z
 4466  013142  013322                            20$                     ;ERROR RETURN
 4467  013144  105715                    3$:     TSTB    (R5)            ;TEST RANDOM PATTERN DEFINED
 4468  013146  001407                            BEQ     4$              ;IF NOT, BRANCH. ELSE
 4469  013150  012703  000100                    MOV     #100,R3         ;SET BYTE COUNT
 4470  013154  012700  001562                    MOV     #PATR,R0        ;SET FOR READ RANDOM PAT
 4471  013160  004437  013402                    JSR     R4,RDCONT       ;READ RANDOM PATTERN
 4472  013164  013322                            20$                     ;ERROR RETURN
 4473  013166  152737  000377  001234    4$:     BISB    #377,SFEMP      ;SET NO SOURCE SWITCH
 4474  013174  012700  034634                    MOV     #OFILE,R0       ;GET ADDR OF OFILE
 4475  013200  023727  001174  043117            CMP     PUCODE,#"OF     ;TEST IF CODE IS OBJECT
 4476  013206  001006                            BNE     8$              ;BR IF NO, ELSE
 4477  013210  013737  001250  001712            MOV     PUFLSZ,OFPTR    ;GET FILE SIZE
 4478  013216  060037  001712                    ADD     R0,OFPTR        ;ADD IN START OF FILE ADDRESS
 4479  013222  000415                            BR      5$
 4480  013224  013700  001710            8$:     MOV     IBUFPT,R0       ;CORRECT R0 AND
 4481  013230  105037  001234                    CLRB    SFEMP           ;SOURCE FILE TO BE READ
 4482  013234  105037  001235                    CLRB    VLDOBJ          ;CLEAR VLDOBJ CAUSE SOURCE IS NEW
 4483  013240  010003                            MOV     R0,R3           ;LOAD R3 WITH ADD OF SOURCE BUFF
 4484  013242  063703  001250                    ADD     PUFLSZ,R3       ;COMPUTE SIZE OF SOURCE
 4485  013246  010337  001246                    MOV     R3,SFPTR        ;STORE END OF SOURCE CODE ADD
 4486  013252  105037  001663                    CLRB    CHNFLG          ;CLEAR CHAIN FLAG
 4487  013256  013703  001250            5$:     MOV     PUFLSZ,R3       ;GET SIZE OF DATA FILE
 4488  013262  004437  013402                    JSR     R4,RDCONT       ;READ FILE
 4489  013266  013322                            20$                     ;ERROR RETURN
 4490  013270  113737  001236  013302            MOVB    PATSEL,6$       ;GET PATTERN SELECT INDEX
 4491  013276  004437  020536                    JSR     R4,ESBI         ;GO TO BUFFER INITIALIZE
 4492  013302  000000                    6$:     .WORD   0
 4493  013304  105737  001663                    TSTB    CHNFLG          ;TEST CHAIN FLAG
 4494  013310  001402                            BEQ     7$
 4495  013312  004437  010036                    JSR     R4,RURTE        ;IF CHAIN FLAG SET GO TO RUN
 4496  013316  005724                    7$:     TST     (R4)+           ;SET NORMAL RETURN
 4497  013320  000405                            BR      30$
 4498  013322  104401  003223            20$:    TYPE    ,PRERR          ;TYPE READER ERROR
 4499  013326  105037  001663                    CLRB    CHNFLG          ;CLEAR CHAIN FLAG IF READ ERR
 4500  013332  011404                            MOV     (R4),R4         ;SET ERROR RETURN
 4501  013334                            30$:
 4502  013334  012605                            MOV     (SP)+,R5        ;;POP STACK INTO R5
 4503  013336  012603                            MOV     (SP)+,R3        ;;POP STACK INTO R3
 4504  013340  012600                            MOV     (SP)+,R0        ;;POP STACK INTO R0
 4505  013342  000204                            RTS     R4              ;RETURN
 4506                    ;;*************************************************************
 4507                    .SBTTL  PAPER TAPE PUNCH ROUTINE
 4508                    ;*      ENTRY:  JSR     R4,READ
 4509                    ;*      RETURN: RTS     R4              ERROR RETURN
 4510                    ;*              RTS     R4+2            NORMAL RETURN
 4511                    ;*
 4512                    ;*THIS ROUTINE READS THE NUMBER OF BYTES INDICATED IN R3 AND
 4513                    ;*STORES THEM IN CONSECUTIVE MEMORY LOCATIONS STARTING
```

```
                                        ;*AT THE ADDRESS IN R0.
                                        ;;*****************************************************************
                                        
013344  042777  000100  166354  READ:   BIC     #000100,@PTRSR          ;CLEAR INTERRUPT ENABLE
013352  005277  166350          WSTART: INC     @PTRSR                  ;SET READER GO BIT
013356  032777  100200  166342  WLOOP:  BIT     #100200,@PTRSR          ;TEST IF ERROR OR DONE
013364  001774                        BEQ     WLOOP                   ;LOOP
013366  100422                        BMI     XREAD                   ;GO TO ERROR EXIT IF ERROR
013370  117710  166334                MOVB    @PTRDB,(R0)             ;EMPTY DATA BUFFER
013374  001766                        BEQ     WSTART                  ;IF ZERO GO READ NEXT
013376  105720                        TSTB    (R0)+                   ;ELSE BUMP R0
013400  005303                        DEC     R3                      ;COUNT THAT CHARACTER
013402  005277  166320          RDCONT: INC     @PTRSR                  ;SET READER GO BIT
013406  032777  100200  166312  RDLOOP: BIT     #100200,@PTRSR          ;TEST FOR ERROR OR DONE
013414  001774                        BEQ     RDLOOP                  ;LOOP IF NO BITS SET
013416  100406                        BMI     XREAD                   ;IF BIT 15 SET GO TO ERROR
013420  117720  166304                MOVB    @PTRDB,(R0)+            ;ELSE STORE BYTE READ
013424  005303                        DEC     R3                      ;DEC BYTE COUNT
013426  001365                        BNE     RDCONT                  ;IF NOT ZERO, LOOP
013430  005724                        TST     (R4)+                   ;SET NORMAL RETURN
013432  000204                        RTS     R4                      ;RETURN
013434  011404          XREAD:  MOV     (R4),R4                 ;SET ERROR RETURN
013436  000204                  RTS     R4                      ;RETURN
                                ;*ENTRY:        JSR     R4,E$PM
                                ;*              (MESSAGE)
                                ;*RETURN:       RTS     R4
                                ;*THIS ROUTINE PRINTS THE MESSAGE FOUND IN THE OBJECT CODE
                                ;*FOLLOWING THE JSR TO E$PM. AFTER THE MESSAGE IS PRINTED R4 IS
                                ;*ADJUSTED TO SKIP OVER THE MESSAGE CONTENTS.
                                ;*ROUTINES CALLED:
                                ;*      TYPE
                                ;*
                                ;;*****************************************************************
                    013516              .=13516
013516  005237  001116  ESPM:   INC     LINNUM                  ;INCREMENT PSUEDO LINE COUNT
013522  023737  001232  001714        CMP     ITCNT,CNTSTR            ;CHECK IF FIRST PASS?
013530  001011                      BNE     2$                      ;NO, SKIP PRINT
013532  005737  001722              TST     LPCNT1                  ;TEST IF LOOP COUNT HAS COUNT
013536  001006                      BNE     2$                      ;YES - DON'T PRINT MESSAGE
013540  010437  013546              MOV     R4,1$                   ;GET ADDRESS OF MESSAGE
013544  104401                      TYPE                            ;TYPE MESSAGE
013546  000000          1$:     .WORD
013550  104401  001171              TYPE    $CRLF                   ;TYPE CARRIAGE RETURN
013554  105724          2$:     TSTB    (R4)+                   ;TEST FOR NULL (END OF MESSAGE)
013556  001376                  BNE     2$                      ;LOOP IF NOT THE END
013560  105714                  TSTB    (R4)                    ;TEST FOR SECOND NULL
013562  001001                  BNE     3$                      ;IF ONLY ONE NULL, EXIT
013564  105724                  TSTB    (R4)+                   ;BUMP PAST 2ND NULL
                                                                ;TWO NULLS MAY BE PRESENT TO
                                                                ;INSURE WORD ALIGNMENT
013566  000204          3$:     RTS     R4                      ;RETURN
                                ;;*****************************************************************
                                .SBTTL  COMMON DRIVER CALL
                                ;*ENTRY JSR     PC, DRVCAL WITH R5 POINTING TO ACTIVE PARAM BLK
                                ;*RETURN        RTS     PC
                                ;*
```

```
                                        ;#THIS ROUTINE CLEARS THE DONE FLAG, CALLS THE DRIVER WITH
                                        ;#THE ACTIVE PARAMETER BLOCK, AND CALLS THE WATCH DOG
                                        ;#TIMER.
                                        ;#
                                        ;#IT THEN LOOPS WAITING FOR "DONE" (INDICATING AN INTERRUPT
                                        ;#WITH OR WITHOUT ERROR) OR WAITING FOR CONTROLLER READY
                                        ;#(IF THE NO CHECK BIT IS SET IN THE ACTIVE PARAM
                                        ;#BLOCK). WHEN EITHER OCCURS THE ROUTINE RETURNS TO
                                        ;#THE CALLER.
                                        ;;*****************************************************************
013570  105037  001667                  DRVCAL: CLRB    DONE            ;CLEAR DONE FLAG
013574  010537  013604                          MOV     R5,1$           ;GET PARAM BLOCK ADDRESS
013600  004737  027264                          JSR     PC,C.INIT       ;CALL DRIVER
013604  000000                          1$:     .WORD                   ;PARAM BLK ADDRESS PARAMETER
013606  004737  023634                  2$:     JSR     PC,W.WTCH       ;CALL TIMER
013612  105737  001667                          TSTB    DONE            ;TEST IF DONE SET
013616  001011                          .       BNE     3$              ;IF YES, INT OCCURRED, OPCOMP.
013620  032765  000400  000014                  BIT     #NOCHK,P.PRST(R5) ;TEST IF NO CHECK OPERATION
013626  001767                          .       BEQ     2$              ;NO CHECK OFF, MUST GET DONE
013630  013702  023554                          MOV     RKBAS,R2        ;GET RKBASE ADDRESS
013634  105762  000000                          TSTB    RKCS1(R2)       ;TEST FOR READY
013640  100362                          .       BPL     2$              ;NOT READY, LOOP
013642  000207                          3$:     RTS     PC              ;RETURN
                                        ;;*****************************************************************
                                        .SBTTL  ERROR FREE RETURN FROM DRIVER
                                        ;#ENTRY JSR     PC, ERRFRE WITH R5 POINTING TO ACTIVE PARAM BLK
                                        ;#RETURN        RTS     PC
                                        ;#THIS ROUTINE SETS THE DONE FLAG AND RETURNS TO
                                        ;#THE INTERRUPT HANDLER.
                                        ;;*****************************************************************
013644  105137  001667                  ERRFRE: COMB    DONE            ;SET DONE FLAG
013650  000207                          .       RTS     PC              ;RETURN
                                        ;;*****************************************************************
                                        .SBTTL  ERROR RETURN FROM DRIVER (DRIVE ERROR)
                                        ;#ENTRY JSR     PC, DRVERR WITH R5 POINTING TO ACTIVE PARAM BLK
                                        ;#RETURN        RTS     PC
                                        ;#
                                        ;#THIS ROUTINE IS CALLED BY THE DRIVER WHEN AN ERROR
                                        ;#OCCURS IN THE SUBSYSTEM OPERATION OR WHEN A TIMEOUT
                                        ;#OCCURS.
                                        ;#
                                        ;#ALL SUBSYSTEM ERROR REPORTS ARE GENERATED IN THIS ROUTINE.
                                        ;#THE ERROR REPORTS WILL CONTAIN PREVIOUS OPERATION
                                        ;#INFORMATION AS WELL AS INFORMATION ABOUT THE FAILING
                                        ;#OPERATION. FAILURE INFORMATION IS TAKEN FROM THE
                                        ;#ACTIVE PARAM BLOCK AND PREVIOUS OPERATION INFORMATION
                                        ;#IS TAKEN FROM THE INACTIVE BLOCK.
                                        ;#
                                        ;#THE WORD IN LOCATION 72 OF THE PARAMETER BLOCK IS
                                        ;#A PRINT CONTROL WORD. THIS WORD  IS SET UP WHEN THE
                                        ;#PARAMETER BLOCK IS LOADED BEFORE THE CALL TO THE
                                        ;#DRIVER AND TELLS THE ERROR REPORT WHICH GROUPS OF
                                        ;#DATA IN THE PARAMETER BLOCK IS PERTINENT TO THIS
                                        ;#OPERATION. THIS ALLOWS THE REPORT TO BE CUSTOMIZED
                                        ;#AND SPECIFIC FOR THIS ERROR.
                                        ;#
```

```
                                        ;*EACH BIT IN THE PRINT CONTROL WORD INDICATES THAT A
                                        ;*GROUP OF WORDS OR BYTES IS OR IS NOT TO BE INCLUDED IN
                                        ;*THE REPORT. IF SET THAT GROUP IS INCLUDED. THE PARAMETER
                                        ;*BLOCK ELEMENTS TO PRINT CONTROL WORD BIT ASSIGNMENTS ARE
                                        ;*AS FOLLOWS:
                                        ;*          BIT              PARAMATER BLOCK ELEMENT
                                        ;*          ---              -----------------------
                                        ;*           0                       WORD 2
                                        ;*                                   BYTE 4,5,&6
                                        ;*           1                       BYTE 7
                                        ;*                                   WORD 10 & 12
                                        ;*           2                       WORD 16 & 20
                                        ;*           3                       WORD 22 & 24
                                        ;*           4                       WORD 26 & 30
                                        ;*           5                       WORD 32
                                        ;*           6                       WORD 34 THRU 62
                                        ;*
                                        ;*THE ERROR REPORT CAN BE ABBREVIATED TO THE FAILING
                                        ;*LINE NUMBER, THE DRIVE, AND COMMAND BY SETTING
                                        ;*SWITCH REGISTER 0. THE REST OF THE ERROR REPORT
                                        ;*IS SUPPRESSED, THE OTHER ERROR REPORTING CONTROLS
                                        ;*ARE STANDARD
                                        ;;*******************************************************
 013652  041412  051125  042522         CUROP:   .ASCIZ  <12>/CURRENT OPERATION:/<15><12>
 013660  052116  047440  042520
 013666  040522  044524  047117
 013674  006472  000012
 013700  050012  042522  044526         PREVOP: .ASCIZ  <12>/PREVIOUS OPERATION:/<15><12>
 013706  052517  020123  050117
 013714  051105  052101  047511
 013722  035116  005015     000
 013727     012  050101  046120         APRES:   .ASCIZ  <12>/APPLICABLE REGS:/<15><12>
 013734  041511  041101  042514
 013742  051040  043505  035123
 013750  005015     000
 013753     012  040520  040522         PARMGVN: .ASCIZ <12>/PARAMETERS GIVEN:/<15><12>
 013760  042515  042524  051522
 013766  043440  053111  047105
 013774  006472  000012
 014000  051412  041125  054523         SSTO:    .ASCIZ  <12>/SUBSYSTEM TIMEOUT/<15><12>
 014006  052123  046505  052040
 014014  046511  047505  052125
 014022  005015     000
 014025     012  052523  051502         SDETER: .ASCIZ  <12>/SUBSYSTEM DETECTED ERROR/<15><12>
 014032  051531  042524  020115
 014040  042504  042524  052103
 014046  042105  042440  051122
 014054  051117  005015     000
 014061     075  046503  042116         PLINE:   .ASCIZ  /=CMND LINE NUM /<15><12>
 014066  046040  047111  020105
 014074  052516  020115  005015
 014102     000
 014103     104  044522  042526         FDRIVE: .ASCIZ  /DRIVE=/
 014110  000075
 014112  046503  042116  000075         FCMND:   .ASCIZ  /CMND=/
 014120  054503  047114  051104         FPARM1: .ASCIZ  /CYLNDR  SECTOR  TRACK   OFFSET  /
```

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4682  014126  020040  042523  052103
4683  014134  051117  020040  051124
4684  014142  041501  020113  020040
4685  014150  043117  051506  052105
4686  014156  020040      000
4687  014161      102  044101  020040  FPARM2: .ASCIZ  /BAH     BAL     WDC/
4688  014166  020040  041040  046101
4689  014174  020040  020040  053440
4690  014202  041504      000
4691  014205      103  030523  020040  FPARM3: .ASCIZ  /CS1     CS2     /
4692  014212  020040  041440  031123
4693  014220  020040  020040  000040
4694  014226  041527  020040  020040  FPARM4: .ASCIZ  /WC      BA      /
4695  014234  020040  040502  020040
4696  014242  020040  020040      000
4697  014247      104  020101  020040  FPARM5: .ASCIZ  /DA      DC      /
4698  014254  020040  042040  020103
4699  014262  020040  020040  000040
4700  014270  051501  043117      000  FPARM6: .ASCIZ  /ASOF/
4701  014275      105  020122  020040  FPARM7: .ASCIZ  /ER      DS      A0      B0/<15><12>
4702  014302  020040  042040  020123
4703  014310  020040  020040  040440
4704  014316  020060  020040  020040
4705  014324  041040  006460  000012
4706  014332  030501  020040  020040  FPARM8: .ASCII  &A1      B1      A2      B2      A3      B3      &
4707  014340  020040  030502  020040
4708  014346  020040  020040  031101
4709  014354  020040  020040  020040
4710  014362  031102  020040  020040
4711  014370  020040  031501  020040
4712  014376  020040  020040  031502
4713  014404  020040  020040  020040
4714  014412  041505  027503  047520          .ASCIZ  &ECC/POS ECC/PAT&<15><12>
4715  014420  020123  041505  027503
4716  014426  040520  006524  000012
4717  014434  042012  052101  020101  FDATC:  .ASCIZ  <12>/DATA COMPARE ERR ON WORD /
4718  014442  047503  050115  051101
4719  014450  020105  051105  020122
4720  014456  047117  053440  051117
4721  014464  020104      000
4722  014467      075  047507  042117  GDDAT:  .ASCIZ  /=GOOD WORD/<15><12>
4723  014474  053440  051117  006504
4724  014502  000012
4725  014504  041075  042101  053440  BDDAT:  .ASCIZ  /=BAD WORD/<15><12>
4726  014512  051117  006504  000012
4727  014520  051412  040524  052524  SCERR:  .ASCIZ  <12>/STATUS COMPARE ERROR/<15><12>
4728  014526  020123  047503  050115
4729  014534  051101  020105  051105
4730  014542  047522  006522  000012
4731  014550  051475  040524  052524  STWDNM: .ASCIZ  /=STATUS WD NUM/<15><12>
4732  014556  020123  042127  047040
4733  014564  046525  005015      000
4734  014571      075  040515  045523  MSKLAB: .ASCIZ  /=MASK/<15><12>
4735  014576  005015      000
4736  014601      012  042522  044507  RCERR:  .ASCIZ  <12>/REGISTER COMPARE ERROR/<15><12>
4737  014606  052123  051105  041440
```

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 4738  014614  046517  040520  042522
 4739  014622  042440  051122  051117
 4740  014630  005015      000
 4741  014633      075  042522  020107  REGLAB: .ASCIZ  /=REG NUM/<15><12>
 4742  014640  052516  006515  000012
 4743  014646  051104  053111  020105  HARDER: .ASCIZ  /DRIVE HAS HARD ERROR/<15><12>
 4744  014654  040510  020123  040510
 4745  014662  042122  042440  051122
 4746  014670  051117  005015      000
 4747  014675      123  040524  052524  SCNCLR: .ASCIZ  /STATUS CHANGE NOT CLEARED/<15><12>
 4748  014702  020123  044103  047101
 4749  014710  042507  047040  052117
 4750  014716  041440  042514  051101
 4751  014724  042105  005015      000
 4752  014731      116  020117  051104  DSCNOT: .ASCIZ  /NO DRIVE STATUS CHANGE/<15><12>
 4753  014736  053111  020105  052123
 4754  014744  052101  051525  041440
 4755  014752  040510  043516  006505
 4756  014760  000012
 4757  014762  042523  055111  042105  STILSZ: .ASCIZ  /SEIZED OTHER PORT/<15><12>
 4758  014770  047440  044124  051105
 4759  014776  050040  051117  006524
 4760  015004  000012
 4761  015006  047125  054105  042520  BADATT: .ASCIZ  /UNEXPECTED ATTENTION/<15><12>
 4762  015014  052103  042105  040440
 4763  015022  052124  047105  044524
 4764  015030  047117  005015      000
 4765          015036                  .EVEN
 4766  015036                  DRVERR:
 4767  015036  010046                  MOV     R0,-(SP)        ;;PUSH R0 ON STACK
 4768  015040  010146                  MOV     R1,-(SP)        ;;PUSH R1 ON STACK
 4769  015042  010246                  MOV     R2,-(SP)        ;;PUSH R2 ON STACK
 4770  015044  010346                  MOV     R3,-(SP)        ;;PUSH R3 ON STACK
 4771  015046  010446                  MOV     R4,-(SP)        ;;PUSH R4 ON STACK
 4772  015050  105037  001671          CLRB    RPSWIT          ;CLEAR REPORT PASS SWITCH
 4773  015054  152737  000377  001667  BISB    #377,DONE       ;SET DONE FLAG
 4774  015062  032777  002000  164050  BIT     #SW10,@SWR      ;BELL ON ERROR?
 4775  015070  001402                  BEQ     1$              ;NO - BRANCH
 4776  015072  104401  001164          TYPE    ,$BELL          ;RING BELL
 4777  015076  032777  020000  164034  1$:     BIT     #SW13,@SWR      ;INHIBIT ERROR REPORT?
 4778  015104  001407                  BEQ     56$
 4779  015106  013702  023554          MOV     RKBAS,R2        ;GET BASE
 4780  015112  012762  100000  000000  MOV     #CCLR,RKCS1(R2)  ;RESET IE AND DO CONT CLEAR
 4781  015120  000137  015524          JMP     36$             ;JUMP TO EXIT
 4782  015124  105737  023452          56$:    TSTB    CEFLG                   ;TEST CONTROLLER ERROR FLAG
 4783  015130  001052                  BNE     3$                      ;SKIP TO TYPE OUT
 4784  015132  032765  000010  000014  BIT     #UEXATT,P.PRST(R5)  ;TEST UNEXPECTED ATTENTION
 4785  015140  001405                  BEQ     55$
 4786  015142  104401  015006          TYPE    ,BADATT                 ;UNEXPECTED ATTENTION REPORT
 4787  015146  012765  000044  000064  MOV     #44,PRTCON(R5)          ;SET PRINT CONTROL TO LIMIT REPORT
 4788  015154  032765  000020  000014  55$:    BIT     #DRVHRD,P.PRST(R5) ;TEST DRIVE HARD ERROR
 4789  015162  001402                  BEQ     50$                     ;NO - BRANCH
 4790  015164  104401  014646          TYPE    ,HARDER                 ;HARD ERROR REPORT
 4791  015170  032765  000040  000014  50$:    BIT     #DRVDSC,P.PRST(R5) ;TEST STATUS NOT CLEARED ERROR
 4792  015176  001402                  BEQ     51$                     ;NO - BRANCH
 4793  015200  104401  014675          TYPE    ,SCNCLR                 ;REPORT STATUS NOT CLEARED ERROR
```

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4794  015204  032765  004000  000014  51$:    BIT     #NODSC,P.PRST(R5)  ;TEST NO STATUS CHANGE
4795  015212  001402                          BEQ     52$                ;NO - BRANCH
4796  015214  104401  014731                  TYPE    ,DSCNOT            ;REPORT NO STATUS CHANGE ERROR
4797  015220  032765  010000  000014  52$:    BIT     #DRVSZD,P.PRST(R5) ;TEST DRIVE SEIZED
4798  015226  001402                          BEQ     54$                ;NO - BRANCH
4799  015230  104401  014762                  TYPE    ,STILSZ            ;REPORT STILL SEIZED ERROR
4800  015234  032765  010100  000014  54$:    BIT     #CMDTO!DRVSZD,P.PRST(R5) ;TEST TIMEOUT
4801  015242  001403                          BEQ     2$                 ;BR IF NO
4802  015244  104401  014000                  TYPE    ,SSTO              ;TYPE SUBSYSTEM TIMEOUT
4803  015250  000402                          BR      3$                 ;
4804  015252  104401  014025          2$:     TYPE    ,SDETER            ;TYPE SUBSYSTEM DET. ERR.
4805  015256  005002          3$:     CLR     R2                         ;CLEAR R2 (BYTE PRINT SWITCH)
4806  015260  013746  001116                  MOV     LINNUM,-(SP)       ;PUT LINE NUMBER ON STACK
4807  015264  104405                          TYPDS                      ;PRINT IT
4808  015266  104401  014061                  TYPE    ,PLINE             ;TYPE LINE NUM MESSAGE
4809  015272  010500          19$:    MOV     R5,R0                      ;SET R0 TO BEGINNING OF PARAM BLK
4810  015274  104401  014103                  TYPE    ,FDRIVE            ;TYPE "DRIVE"
4811  015300  005102                          COM     R2                 ;SET R2 FOR BYTE OPERATION
4812  015302  104414                          FPRINT                     ;PRINT FIRST LINE (DRIVE NUM)
4813  015304  104401  001171                  TYPE    ,$CRLF
4814  015310  104401  014112                  TYPE    ,FCMND             ;TYPE "COMMAND"
4815  015314  104414                          FPRINT                     ;PRINT 2ND LINE (COMMAND)
4816  015316  104401  001171                  TYPE    ,$CRLF
4817  015322  032765  000100  000014          BIT     #CMDTO,P.PRST(R5) ;TEST TIMEOUT
4818  015330  001402                          BEQ     25$
4819  015332  004737  016120                  JSR     PC,READRG          ;GO READ REGISTERS
4820  015336  105737  001671          25$:    TSTB    RPSWIT             ;TEST 2ND PASS
4821  015342  001006                          BNE     17$                ;YES - SKIP (SHORT FORM TEST)
4822  015344  032777  000001  163566          BIT     #SWO,@SWR          ;TEST IF SHORT REPORT SWITCH SET
4823  015352  001062                          BNE     30$                ;YES - EXIT
4824  015354  104401  013652                  TYPE    ,CUROP             ;TYPE "CURRENT OPERATION"
4825  015360  016503  000064          17$:    MOV     PRTCON(R5),R3      ;GET PRINT CONTROL WORD
4826  015364  032703  000003                  BIT     #3,R3              ;TEST IF GROUP 0 OR 1 TO BE PRINTED
4827  015370  001001                          BNE     4$                 ;YES SKIP TO PRINTING
4828  015372  000443                          BR      6$                 ;SKIP TO NEXT REPORT GROUP TEST
4829  015374  104401  013753          4$:     TYPE    ,PARMGVN           ;TYPE HEADING "PARAM GIVEN"
4830  015400  032703  000001                  BIT     #BIT0,R3           ;TEST FOR GROUP 0
4831  015404  001402                          BEQ     46$
4832  015406  104401  014120                  TYPE    ,FPARM1            ;TYPE GROUP 0 HEADINGS
4833  015412  032703  000002          46$:    BIT     #BIT1,R3           ;TEST FOR GROUP 1
4834  015416  001402                          BEQ     45$
4835  015420  104401  014161                  TYPE    ,FPARM2            ;TYPE GROUP 1 HEADINGS
4836  015424  104401  001171          45$:    TYPE    ,$CRLF
4837  015430  032703  000001                  BIT     #BIT0,R3           ;TEST IF MUST PRINT GROUP 0
4838  015434  001406                          BEQ     5$
4839  015436  005002                          CLR     R2                 ;CLEAR BYTE REPORT CONTROL
4840  015440  104414                          FPRINT                     ;PRINT LINE (CYLINDER)
4841  015442  005102                          COM     R2                 ;SET BYTE CONTROL
4842  015444  104414                          FPRINT                     ;PRINT LINE (SECTOR)
4843  015446  104414                          FPRINT                     ;PRINT LINE (TRACK)
4844  015450  104414                          FPRINT                     ;PRINT LINE (OFFSET)
4845  015452  010500          5$:     MOV     R5,R0                      ;SET TABLE POINTER FOR GROUP 1
4846  015454  062700  000007                  ADD     #P.BAHI,R0         ;SET ADDRESS
4847  015460  032703  000002                  BIT     #BIT1,R3           ;TEST IF MUST PRINT GROUP 1
4848  015464  001406                          BEQ     6$                 ;NO, SKIP TO NEXT GROUP TEST
4849  015466  052702  000001                  BIS     #1,R2              ;MAKE SURE R2 SAYS BYTE
```

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 4850  015472  104414                    FPRINT                  ;PRINT LINE (BUS ADD HI)
 4851  015474  005002                    CLR     R2              ;R2 SAYS WORD
 4852  015476  104414                    FPRINT                  ;PRINT LINE (BUS ADD LO)
 4853  015500  104414                    FPRINT                  ;PRINT LINE (WORD COUNT)
 4854  015502  104401  001171    6$:     TYPE    ,$CRLF
 4855  015506  104401  001172            TYPE    ,$LF
 4856  015512  105737  001671            TSTB    RPSWIT          ;TEST 2ND PASS
 4857  015516  001412                    BEQ     31$             ;NO - BRANCH AROUND EXIT
 4858  015520  004737  016670    30$:    JSR     PC,PRLPCT               ;PRINT LOOP COUNT
 4859  015524                    36$:
 4860  015524  012604                    MOV     (SP)+,R4        ;;POP STACK INTO R4
 4861  015526  012603                    MOV     (SP)+,R3        ;;POP STACK INTO R3
 4862  015530  012602                    MOV     (SP)+,R2        ;;POP STACK INTO R2
 4863  015532  012601                    MOV     (SP)+,R1        ;;POP STACK INTO R1
 4864  015534  012600                    MOV     (SP)+,R0        ;;POP STACK INTO R0
 4865  015536  004737  016622            JSR     PC,SWCONT       ;GO TO SWR LOOP CONTROL
 4866  015542  000207                    RTS     PC              ;RETURN
 4867  015544  104401  013727    31$:    TYPE    ,APRES          ;TYPE "APPLICABLE REGS"
 4868  015550  005002                    CLR     R2              ;MAKE SURE R2 SAYS WORD
 4869  015552  032703  000004            BIT     #BIT2,R3        ;TEST IF MUST PRINT GROUP 2
 4870  015556  001402                    BEQ     40$
 4871  015560  104401  014205            TYPE    ,FPARM3         ;TYPE GROUP 2 HEADINGS
 4872  015564  032703  000010    40$:    BIT     #BIT3,R3        ;TEST FOR GROUP 3
 4873  015570  001402                    BEQ     41$
 4874  015572  104401  014226            TYPE    ,FPARM4         ;TYPE GROUP 3 HEADINGS
 4875  015576  032703  000020    41$:    BIT     #BIT4,R3        ;TEST FOR GROUP 4
 4876  015602  001402                    BEQ     42$
 4877  015604  104401  014247            TYPE    ,FPARM5         ;TYPE GROUP 4 HEADINGS
 4878  015610  032703  000040    42$:    BIT     #BIT5,R3        ;TEST FOR GROUP 5
 4879  015614  001402                    BEQ     43$
 4880  015616  104401  014270            TYPE    ,FPARM6         ;TYPE GROUP 5 HEADINGS
 4881  015622  104401  001171    43$:    TYPE    ,$CRLF
 4882  015626  032703  000004            BIT     #BIT2,R3        ;TEST IF MUST PRINT GROUP 2
 4883  015632  001405                    BEQ     7$              ;NO - BRANCH
 4884  015634  010500                    MOV     R5,R0           ;SET TABLE PTR TO GROUP 2 VALUES
 4885  015636  062700  000016            ADD     #P.CS1,R0       ;SET ADDRESS
 4886  015642  104414                    FPRINT                  ;PRINT LINE (CS1)
 4887  015644  104414                    FPRINT                  ;PRINT LINE (CS2)
 4888  015646  032703  000010    7$:     BIT     #BIT3,R3        ;TEST IF MUST PRINT GROUP 3
 4889  015652  001405                    BEQ     8$              ;NO - BRANCH
 4890  015654  010500                    MOV     R5,R0           ;SET TABLE PTR TO GROUP 3 VALUES
 4891  015656  062700  000022            ADD     #P.WCR,R0       ;SET ADDRESS
 4892  015662  104414                    FPRINT                  ;PRINT LINE (WORD COUNT)
 4893  015664  104414                    FPRINT                  ;PRINT LINE (BUFFER ADD)
 4894  015666  032703  000020    8$:     BIT     #BIT4,R3        ;TEST IF MUST PRINT GROUP 4
 4895  015672  001405                    BEQ     9$              ;NO - BRANCH
 4896  015674  010500                    MOV     R5,R0           ;SET TABLE PTR TO GROUP 4 VALUES
 4897  015676  062700  000026            ADD     #P.DTS,R0       ;SET ADDRESS
 4898  015702  104414                    FPRINT                  ;PRINT LINE (DESIRED TRACK/SEC)
 4899  015704  104414                    FPRINT                  ;PRINT LINE (DESIRED CYLINDER)
 4900  015706  032703  000040    9$:     BIT     #BIT5,R3        ;TEST IF MUST PRINT GROUP 5
 4901  015712  001404                    BEQ     10$             ;NO - BR
 4902  015714  010500                    MOV     R5,R0           ;SET PTR TO GROUP 5 VALUE
 4903  015716  062700  000032            ADD     #P.ASOF,R0      ;SET ADDRESS
 4904  015722  104414                    FPRINT                  ;PRINT LINE (ATTN SUM & OFFSET)
 4905  015724  104401  001171    10$:    TYPE    ,$CRLF
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 4906  015730  104401  001172                    TYPE    $LF
 4907  015734  032703  000100                    BIT     #BIT6,R3        ;TEST IF MUST PRINT GROUP 6
 4908  015740  001427                            BEQ     15$             ;NO - BRANCH
 4909  015742  012704  000004                    MOV     #4,R4           ;SET COL COUNT TO 4
 4910  015746  104401  014275                    TYPE    ,FPARM7         ;TYPE GROUP 6 HEADINGS
 4911  015752  010500                            MOV     R5,R0           ;SET TABLE POINTER TO GROUP 6 VALUES
 4912  015754  062700  000034                    ADD     #P.ER,R0        ;SET ADDRESS
 4913  015760  104414                    11$:    FPRINT                  ;PRINT COLUMN
 4914  015762  005304                            DEC     R4              ;DEC COUNT, LOOP UNTIL ZERO
 4915  015764  001375                            BNE     11$
 4916  015766  104401  001171                    TYPE    ,$CRLF
 4917  015772  012704  000010                    MOV     #10,R4          ;SET COL COUNT TO 10
 4918  015776  104401  014332                    TYPE    ,FPARM8         ;TYPE GROUP 7 HEADINGS
 4919  016002  104414                    12$:    FPRINT                  ;PRINT COL
 4920  016004  005304                            DEC     R4              ;DEC COUNT, LOOP UNTIL ZERO
 4921  016006  001375                            BNE     12$
 4922  016010  104401  001171                    TYPE    ,$CRLF
 4923  016014  104401  001172                    TYPE    ,$LF
 4924  016020  023727  001116  000001    15$:    CMP     LINNUM,#1       ;TEST IF FIRST LINE IS ERROR
 4925  016026  101421                            BLOS    18$             ;IF YES BYPASS 2ND PASS (PREV OP)
 4926  016030  105737  001671                    TSTB    RPSWIT          ;TEST IF SECOND PASS IN REPORT
 4927  016034  001016                            BNE     18$             ;YES - EXIT
 4928  016036  105137  001671                    COMB    RPSWIT          ;SET SWITCH
 4929  016042  012705  002142                    MOV     #PARM0,R5       ;SET R5 TO PARAM 0
 4930  016046  105737  001670                    TSTB    PBSW            ;WAS THAT RIGHT?
 4931  016052  001002                            BNE     16$             ;YES - SKIP
 4932  016054  012705  002230                    MOV     #PARM1,R5       ;NO - SET TO PARAM 1
 4933  016060  104401  013700            16$:    TYPE    ,PREVOP         ;TYPE "PREVIOUS OP" HDR
 4934  016064  005002                            CLR     R2
 4935  016066  000137  015272                    JMP     19$             ;GO PRINT PREVIOUS OPS.
 4936  016072  105037  001671            18$:    CLRB    RPSWIT          ;RESET 2ND PASS SWITCH
 4937  016076  012705  002142                    MOV     #PARM0,R5       ;SET R5 TO PARAM 0
 4938  016102  105737  001670                    TSTB    PBSW            ;TEST PB SWITCH. WAS THAT RIGHT?
 4939  016106  001402                            BEQ     20$             ;YES - SKIP
 4940  016110  012705  002230                    MOV     #PARM1,R5       ;NO - SET R5 TO PARAM 1
 4941  016114  000137  015520            20$:    JMP     30$             ;GO TO EXIT
 4942                                    ;;**************************************************************
 4943                                    ;;**************************************************************
 4944                                    .SBTTL  READ RK611 AND DRIVE STATUS REGISTER ROUTINE
 4945                                    ;*ENTRY:        JSR     PC,READRG
 4946                                    ;*RETURN:       RTS     PC
 4947                                    ;*
 4948                                    ;*THIS ROUTINE READS ALL THE RK611 REGISTERS AND ENTERS THEM INTO THE
 4949                                    ;*PARAMETER BLOCK. IT THEN TRIES TO READ THE DRIVE STATUS REGISTERS
 4950                                    ;*AND IF SUCCESSFUL, PUTS THEM INTO THE BLOCK. IF AND ERROR OCCURS
 4951                                    ;*WHILE READING DRIVE REGISTERS, A MESSAGE IS PRINTED TO ALERT THE
 4952                                    ;*USER THAT THE DRIVE STATUS IS NOT VALID.
 4953                                    ;**************************************************************
 4954  016120                    READRG:
 4955  016120  010046                            MOV     R0,-(SP)        ;;PUSH R0 ON STACK
 4956  016122  010246                            MOV     R2,-(SP)        ;;PUSH R2 ON STACK
 4957  016124  010346                            MOV     R3,-(SP)        ;;PUSH R3 ON STACK
 4958  016126  012705  002142                    MOV     #PARM0,R5       ;GET ADDRESS OF PARM0
 4959  016132  105737  001670                    TSTB    PBSW            ;IS PARM0 PRESENTLY SELECTED?
 4960  016136  001402                            BEQ     8$              ;YES - SKIP
 4961  016140  012705  002230                    MOV     #PARM1,R5       ;ELSE GET ADDRESS OF PARM 1
```

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4962  016144  010500                  8$:   MOV     R5,R0           ;GET PARAM BLOCK ADDRESS
4963  016146  013702  023554              MOV     RKBAS,R2        ;GET RK BASE ADDRESS
4964  016152  062700  000016              ADD     #P.CS1,R0       ;BUMP BASE TO REG RETURN ENTRIES
4965  016156  016220  000000              MOV     RKCS1(R2),(R0)+ ;GET CS1
4966  016162  016220  000010              MOV     RKCS2(R2),(R0)+ ;GET CS2
4967  016166  016220  000002              MOV     RKWC(R2),(R0)+  ;GET WORD COUNT
4968  016172  016220  000004              MOV     RKBA(R2),(R0)+  ;GET BUFFER ADDRESS
4969  016176  016220  000006              MOV     RKDA(R2),(R0)+  ;GET DESIRED ADDRESS
4970  016202  016220  000020              MOV     RKDC(R2),(R0)+  ;GET DESIRED CYLINDER
4971  016206  016220  000016              MOV     RKASOF(R2),(R0)+ ;GET ATTENTION
4972  016212  016220  000014              MOV     RKER(R2),(R0)+  ;GET ERROR REG
4973  016216  016220  000012              MOV     RKDS(R2),(R0)+  ;RET STATUS REG
4974  016222  005065  000014              CLR     P.PRST(R5)      ;CLEAR PROG STATUS
4975  016226  012737  016416  023564      MOV     #6$,A.ABNL      ;SET TIME OUT RETURN
4976  016234  016203  000010              MOV     RKCS2(R2),R3    ;GET CS2 TO STORE DRIVE NUM
4977  016240  012762  100000  000000      MOV     #CCLR,RKCS1(R2) ;SET CLEAR CONTROLLER
4978  016246  042703  177770              BIC     #177770,R3      ;CLEAR ALL BUT DRIVE NUMBER
4979  016252  050362  000010              BIS     R3,RKCS2(R2)    ;INSERT DRIVE NUMBER
4980  016256  005003                      CLR     R3
4981  016260  110362  000026        3$:   MOVB    R3,RKMR1(R2)    ;SET DESIRED STATUS BYTE SELECT
4982  016264  012762  000001  000000      MOV     #1,RKCS1(R2)    ;DO DRIVE SELECT
4983  016272  013737  023600  023632      MOV     W.SEC,W.DRV     ;SET UP TIMEOUT DURATION
4984  016300  152737  000377  023616      BISB    #377,W.TIME     ;GIVE WATCH DOG SOMETHING TO TIME
4985  016306  032762  000200  000000  1$:   BIT     #RDY,RKCS1(R2)  ;TEST READY
4986  016314  001007                      BNE     2$
4987  016316  004737  023634              JSR     PC,W.WTCH       ;CALL HIM
4988  016322  032765  000100  000014      BIT     #CMDTO,P.PRST(R5)
                                                                  ;DID HE TIME OUT?
4989  016330  001033                      BNE     5$              ;YES- TYPE WARNING AND EXIT
4990  016332  000765                      BR      1$              ;NO - GO TEST READY AGAIN
4991  016334  005762  000000        2$:   TST     RKCS1(R2)       ;TEST CS1 FOR ERROR
4992  016340  100427                      BMI     5$              ;YES - SKIP
4993  016342  032762  000001  000012      BIT     #DRA,RKDS(R2)   ;TEST IF DRIVE AVAILABLE
4994  016350  001423                      BEQ     5$              ;NO - PRINT WARNING
4995  016352  016220  000034              MOV     RKMR2(R2),(R0)+ ;STORE BYTE A
4996  016356  016220  000036              MOV     RKMR3(R2),(R0)+ ;STORE BYTE B
4997  016362  020327  000003              CMP     R3,#3           ;TEST IF WORD 3 RETRIEVED
4998  016366  001402                      BEQ     4$              ;YES - EXIT
4999  016370  005203                      INC     R3              ;BUMP R3 TO NEXT WORD NUMBER
5000  016372  000732                      BR      3$              ;GO GET IT
5001  016374  012765  000177  000064  4$:   MOV     #177,PRTCON(R5) ;SET PRINT CONTROL
5002  016402  012737  015036  023564  7$:   MOV     #DRVERR,A.ABNL  ;RESTORE DRIVER RETURN
5003  016410  012603                      MOV     (SP)+,R3        ;;POP STACK INTO R3
5004  016412  012602                      MOV     (SP)+,R2        ;;POP STACK INTO R2
5005  016414  012600                      MOV     (SP)+,R0        ;;POP STACK INTO R0
5006  016416  000207              6$:     RTS     PC
5007  016420  104401  003240      5$:     TYPE    ,STNTVD         ;TYPE WARNING ABOUT STATUS VALID
5008  016424  012765  000077  000064      MOV     #77,PRTCON(R5)  ;DO NOT PRINT STATUS WORDS
5009  016432  005046                      CLR     -(SP)           ;;PUT NEW PS ON STACK
5010  016434  012746  016442              MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
5011  016440  000002                      RTI                     ;;POP NEW PC AND PS
5012  016442                      64$:
5013  016442  000757                      BR      7$
5014                              .SBTTL  ERROR RETURN FROM DRIVER (CONTROLLER ERROR)
5015                              ;*ENTRY: JSR    PC,CONERR WITH R5 POINTING TO ACTIVE PARAM BLK
5016                              ;*RETURN: RTS   PC
5017                              ;*
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5018                                    ;#THIS ROUTINE IS CALLED BY THE DRIVER WHEN AN ERROR
5019                                    ;#OCCURS WITH THE CONTROLLER ERROR BIT SET.
5020                                    ;;*****************************************************************
5021  016444                            CONERR:
5022  016444  010046                           MOV     R0,-(SP)        ;;PUSH R0 ON STACK
5023  016446  010146                           MOV     R1,-(SP)        ;;PUSH R1 ON STACK
5024  016450  152737  000377  001667           BISB    #377,DONE       ;SET DONE
5025  016456  032777  002000  162454           BIT     #SW10,@SWR      ;BELL ON ERROR?
5026  016464  001402                           BEQ     1$              ;NO - BRANCH
5027  016466  104401  001164                   TYPE    ,$BELL          ;RING BELL
5028  016472  032777  020000  162440  1$:      BIT     #SW13,@SWR      ;INHIBIT PRINT?
5029  016500  001024                           BNE     2$              ;YES - SKIP TO EXIT
5030  016502  013700  023570                   MOV     E.CONT,R0       ;GET ERROR WORD
5031  016506  100002                           BPL     3$
5032  016510  104401  014025                   TYPE    ,$DETER
5033  016514  005001                   3$:     CLR     R1
5034  016516  006300                   8$:     ASL     R0              ;SHIFT ERROR WORD LEFT TO TEST BIT 15
5035  016520  103405                           BCS     9$              ;IF CARRY TRUE GO REPORT ERROR
5036  016522  020127  000040                   CMP     R1,#40          ;TEST IF ALL BITS TESTED
5037  016526  001402                           BEQ     9$              ;GO REPORT NO ERROR ENTRY
5038  016530  005721                           TST     (R1)+           ;BUMP R1 BY 2
5039  016532  000771                           BR      8$              ;LOOP
5040  016534  016137  023454  016544   9$:     MOV     ETABL(R1),10$   ;GET ADDRESS OF ERROR MESSAGE
5041  016542  104401                           TYPE                    ;TYPE MESSAGE
5042  016544  000000                   10$:    .WORD                   ;ADDRESS OF MESSAGE GOES HERE
5043  016546  004737  016120                   JSR     PC,READRG       ;GO GET RK611 REGISTERS
5044  016552  005037  023570           2$:     CLR     E.CONT          ;CLEAR CONTROLLER ERROR WORD
5045  016556  152737  000001  023452           BISB    #1,CEFLG        ;SET CONTROLLER ERROR FLAG
5046  016564  004737  015036                   JSR     PC,DRVERR       ;GO REPORT
5047  016570  105037  023452                   CLRB    CEFLG           ;CLEAR ERROR FLAG
5048  016574  012601                           MOV     (SP)+,R1        ;;POP STACK INTO R1
5049  016576  012600                           MOV     (SP)+,R0        ;;POP STACK INTO R0
5050  016600  012762  000040  000010           MOV     #SCLR,RKCS2(R2) ;CLEAR CONTROLLER
5051  016606  012762  000100  000000           MOV     #IE,RKCS1(R2)   ;SET IE AGAIN
5052  016614  004737  016622                   JSR     PC,SWCONT       ;GO TO SWITCH CONTROL
5053  016620  000207                           RTS     PC              ;RETURN
5054                                    ;;*****************************************************************
5055                                    .SBTTL  SWITCH CONTROL TEST
5056                                    ;*ENTRY: JSR    PC,SWCONT
5057                                    ;*RETURN: RTS   PC              IF NO LOOP OR HALT
5058                                    ;*
5059                                    ;*      MOV     $LPERR,(SP)     IF LOOP ON ERROR
5060                                    ;*      RTS     PC
5061                                    ;*
5062                                    ;*      HALT                    IF HALT ON ERROR
5063                                    ;*      PRESS CONTINUE TO EXECUTE NEXT COMMAND OR LOOP ON
5064                                    ;*      ERROR (SWR 9).
5065                                    ;;*****************************************************************
5066  016622  032777  100000  162310   SWCONT: BIT     #SW15,@SWR      ;TEST HALT ON ERROR
5067  016630  001401                           BEQ     1$
5068  016632  000000                           HALT
5069  016634  032777  001000  162276   1$:     BIT     #SW9,@SWR       ;TEST LOOP ON ERROR
5070  016642  001411                           BEQ     2$
5071  016644  152737  000001  001103           BISB    #1,$ERFLG       ;SET ERFLG TO LOOP ON TEST FOREVER
5072  016652  013716  001110                   MOV     $LPERR,(SP)     ;FUDGE RETURN FOR LOOP
5073  016656  005046                           CLR     -(SP)           ;;PUT NEW PS ON STACK
```

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5074  016660  012746  016666          MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
5075  016664  000002                  RTI                     ;;POP NEW PC AND PS
5076  016666                  64$:
5077  016666  000207          2$:     RTS     PC              ;RETURN
5078                          ;;**************************************************************
5079                          .SBTTL  PRINT LOOP COUNTER IF NOT ZERO ROUTINE
5080                          ;;**************************************************************
5081  016670  005737  001722  PRLPCT: TST     LPCNT1          ;TEST IF LOOP COUNTER ZERO
5082  016674  001003                  BNE     1$              ;IF ZERO - EXIT
5083  016676  005737  001724          TST     LPCNT2
5084  016702  001412                  BEQ     3$
5085  016704  012746  001722  1$:     MOV     #LPCNT1,-(SP)   ;GET ADDRESS OF LOOP COUNTERS
5086  016710  004737  033700          JSR     PC,@#$DB2D      ;CALL CONVERSION
5087  016714  012637  016722          MOV     (SP)+,2$        ;STORE RESULTS FOR PRINT
5088  016720  104401                  TYPE
5089  016722  000000          2$:     .WORD                   ;RESULTS GO HERE
5090  016724  104401  003411          TYPE    ,LPLABL
5091  016730  000207          3$:     RTS     PC
5092                          ;;**************************************************************
5093                          .SBTTL  ERROR REPORT PRINT ROUTINE
5094                          ;*ENTRY:  FPRINT     (TRAP CALL):WITH R2 A SWITCH SUCH THAT
5095                          ;*                               IF NON-ZERO THE OCTAL TYPE
5096                          ;*                               OUT IS A BYTE AND IF ZERO IT
5097                          ;*                               IS A WORD.
5098                          ;*                              :WITH R0 CONTAINING THE
5099                          ;*                               ADDRESS OF THE DATA TO
5100                          ;*                               BE TYPED.
5101                          ;*RETURN: RTI
5102                          ;;**************************************************************
5103  016732  005702  FFPRINT: TST     R2              ;TEST IF BYTE OPERATION
5104  016734  001403          BEQ     1$              ;BRANCH IF NO, ELSE
5105  016736  005046          CLR     -(SP)           ;CLEAR WORD ON STACK
5106  016740  112016          MOVB    (R0)+,(SP)      ;MOVE BYTE FOR PRINT ON STACK
5107  016742  000401          BR      2$
5108  016744  012046  1$:     MOV     (R0)+,-(SP)     ;MOVE WORD ON STACK
5109  016746  104402  2$:     TYPOC                   ;TYPE BYTE OR WORD
5110  016750  104401  003530          TYPE    ,SPACE2
5111  016754  000002                  RTI             ;RETURN
5112                          ;;**************************************************************
5113                          .SBTTL  STATUS COMPARE EXECUTION
5114                          ;*ENTRY: JSR     R4,E$SC
5115                          ;*       <STATUS WORD NUMBER>
5116                          ;*       <EXPECTED VALUE>
5117                          ;*       <MASK>
5118                          ;*RETURN: RTS   R4
5119                          ;*
5120                          ;*THIS ROUTINE FIRST GOES TO THE DRIVER PARAMETER BLOCK TO CHECK
5121                          ;*IF THE STATUS HAS ALREADY BEEN RETRIEVED AND STORED THERE.  IF
5122                          ;*IT HAS, THE STATUS IN THE PARAMETER BLOCK IS USED IN THE
5123                          ;*TEST.  IF STATUS HAS NOT BEEN STORED, A DRIVE SELECT
5124                          ;*SPECIAL IS ISSUED TO THE DRIVE TO GET ALL THE STATUS
5125                          ;*WORDS.
5126                          ;*
5127                          ;*THE COMPARE ONLY TESTS THE BITS THAT CORRESPOND TO ONES
5128                          ;*IN THE MASK.  IF A MISCOMPARE OCCURS THE NUMBER OF THE
5129                          ;*STATUS WORD TESTED, THE EXPECTED VALUE, THE RECEIVED VALUE,
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                                ;*AND THE MASK ARE REPORTED.
                                ;;*****************************************************************
                        017610          .=17610
017610  012705  002142          ESSC:   MOV     #PARM0,R5       ;SET R5 TO BLOCK 0
017614  005237  001116                  INC     LINNUM          ;INCREMENT LINE COUNT
017620  105737  001670                  TSTB    PBSW            ;TEST PARAM BLOCK SWITCH
017624  001402                          BEQ     1$              ;IF BLOCK 0 SELECTED BRANCH
017626  012705  002230                  MOV     #PARM1,R5       ;ELSE SET R5 TO BLOCK 1
017632  032765  001000  000014  1$:     BIT     #PBSVAL,P.PRST(R5) ;TEST STATUS VALID BIT
017640  001005                          BNE     2$              ;STATUS VALID, GO TO TEST
017642  112765  000141  000001          MOVB    #RDSTAT,P.CMND(R5) ;SET TO DO READ STATUS
017650  004737  013570                  JSR     PC,DRVCAL       ;GO TO DRIVER CALL
017654  012400                  2$:     MOV     (R4)+,R0        ;STORE STATUS WORD NUMBER
017656  012401                          MOV     (R4)+,R1        ;STORE EXPECTED VALUE
017660  012402                          MOV     (R4)+,R2        ;STORE MASK
017662  006300                          ASL     R0              ;SHIFT ST WD FOR CORRECT INDEX
017664  062700  000040                  ADD     #P.ADD,R0       ;ADD BLOCK OFFSET FOR STATUS WORDS
017670  060500                          ADD     R5,R0           ;COMPUTE STATUS WORD ADDRESS
017672  011003                          MOV     (R0),R3         ;STORE IT
017674  005102                          COM     R2              ;COMPLIMENT MASK
017676  040201                          BIC     R2,R1           ;CLEAR UNTESTED BITS IN
017700  040203                          BIC     R2,R3           ;EXPECTED & RECEIVED VALUES
017702  020103                          CMP     R1,R3           ;COMPARE FOR EQUAL
017704  001447                          BEQ     3$              ;EQUAL - EXIT
017706  032777  002000  161224          BIT     #SW10,@SWR      ;BELL ON ERROR?
017714  001402                          BEQ     4$              ;NO - BRANCH
017716  104401  001164                  TYPE    ,$BELL
017722  032777  020000  161210  4$:     BIT     #SW13,@SWR      ;INHIBIT PRINT?
017730  001033                          BNE     5$              ;YES - BRANCH
017732  162704  000006                  SUB     #6,R4           ;BACK UP R4 TO PARAMETERS
017736  013746  001116                  MOV     LINNUM,-(SP)    ;PUT LINE NUMBER ON STACK
017742  104405                          TYPDS                   ;TYPE IT
017744  104401  014061                  TYPE    ,PLINE          ;LABEL IT
017750  104401  014520                  TYPE    ,SCERR          ;TYPE STATUS COMPARE ERR
017754  012446                          MOV     (R4)+,-(SP)     ;GET STATUS WORD
017756  104402                          TYPOC                   ;TYPE IT
017760  104401  014550                  TYPE    ,STWDNM         ;TYPE LABEL
017764  012446                          MOV     (R4)+,-(SP)     ;GET GOOD WORD
017766  104402                          TYPOC                   ;TYPE IT
017770  104401  014467                  TYPE    ,GDDAT          ;TYPE LABEL
017774  011046                          MOV     (R0),-(SP)      ;GET BAD WORD
017776  104402                          TYPOC                   ;TYPE IT
020000  104401  014504                  TYPE    ,BDDAT          ;TYPE LABEL
020004  012446                          MOV     (R4)+,-(SP)     ;GET MASK
020006  104402                          TYPOC                   ;TYPE IT
020010  104401  014571                  TYPE    ,MSKLAB         ;TYPE LABEL
020014  004737  016670                  JSR     PC,PRLPCT
020020  004737  016622          5$:     JSR     PC,SWCONT       ;GO TO SWITCH CONTROL FOR LOOP
020024  000204          3$:     RTS     R4                      ;RETURN
                                ;;*****************************************************************
                                .SBTTL  REGISTER COMPARE EXECUTION
                                ;*ENTRY: JSR     R4      ESREGC
                                ;*       <REGISTER NUMBER>
                                ;*       <EXPECTED VALUE>
                                ;*       <MASK>
                                ;*RETURN: RTS   R4
```

```
                                        ;*
                                        ;*THIS ROUTINE DIRECTLY ACCESSES THE DESIRED RK611 REGISTER AND COMPARES
                                        ;*IT TO THE EXPECTED VALUE.  ONLY THE BITS THAT CORRESPOND TO ONES
                                        ;*IN THE MASK ARE COMPARED.
                                        ;*
                                        ;*THE REGISTER NUMBER APPEARING IN THE PARAMETER IS AN OCTAL
                                        ;*VALUE.  THIS VALUE IS USED AS AN INDEX TO SELECT THE DESIRED
                                        ;*REGISTER.  SINCE THE REGISTERS ARE ON WORD BOUNDARIES, THE VALUE
                                        ;*MUST BE SHIFTED LEFT ONE BIT BEFORE IT IS USED AS THE INDEX.
                                        ;*
                                        ;*IF A COMPARE PRODUCES AN ERROR, THE REGISTER NUMBER, THE EXPECTED VALUE, THE
                                        ;*VALUE READ, AND THE MASK ARE PRINTED ON THE CONSOLE.
                                        ;*
                                        ;;*****************************************************************
020026  005237  001116          E$REGC: INC     LINNUM          ;INCREMENT PSUEDO LINE CNT
020032  012400                          MOV     (R4)+,R0        ;GET REGISTER NUMBER
020034  012401                          MOV     (R4)+,R1        ;GET EXPECTED VALUE
020036  012402                          MOV     (R4)+,R2        ;GET MASK
020040  006300                          ASL     R0              ;MAKE REGNUM CORRECT FOR INDEX
020042  063700  023554                  ADD     RKBAS,R0        ;COMPUTE ADDRESS
020046  011003                          MOV     (R0),R3         ;GET CONTENTS
020050  010300                          MOV     R3,R0           ;STORE AGAIN FOR REPORT IF ERROR
020052  005102                          COM     R2              ;COMPLEMENT MASK
020054  040201                          BIC     R2,R1           ;CLEAR UNTESTED BITS IN EXP. VAL.
020056  040200                          BIC     R2,R0           ;CLEAR UNTESTED BITS FROM REG
020060  020001                          CMP     R0,R1           ;COMP TWO VALUES
020062  001447                          BEQ     1$              ;IF ZERO, NO ERROR. BRANCH
020064  032777  002000  161046          BIT     #SW10,@SWR      ;BELL ON ERROR?
020072  001402                          BEQ     3$              ;NO - BRANCH
020074  104401  001164                  TYPE    ,$BELL          ;RING BELL
020100  032777  020000  161032  3$:     BIT     #SW13,@SWR      ;INHIBIT PRINT?
020106  001033                          BNE     2$              ;YES - BRANCH
020110  162704  000006                  SUB     #6,R4           ;REPOSITION R4 FOR REPORT DATA
020114  013746  001116                  MOV     LINNUM,-(SP)    ;PUT LINE NUMBER ON STACK
020120  104405                          TYPDS                   ;TYPE IT
020122  104401  014061                  TYPE    ,PLINE          ;LABEL IT
020126  104401  014601                  TYPE    ,RCERR          ;TYPE REG COMP ERROR
020132  012446                          MOV     (R4)+,-(SP)     ;GET REGISTER NUMBER
020134  104402                          TYPOC                   ;TYPE IT
020136  104401  014633                  TYPE    ,REGLAB         ;LABEL IT
020142  012446                          MOV     (R4)+,-(SP)     ;GET GOOD WORD
020144  104402                          TYPOC                   ;TYPE IT
020146  104401  014467                  TYPE    ,GDDAT          ;LABEL IT
020152  010346                          MOV     R3,-(SP)        ;GET BAD WORD
020154  104402                          TYPOC                   ;TYPE IT
020156  104401  014504                  TYPE    ,BDDAT          ;LABEL IT
020162  012446                          MOV     (R4)+,-(SP)     ;GET MASK
020164  104402                          TYPOC                   ;TYPE IT
020166  104401  014571                  TYPE    ,MSKLAB         ;LABEL IT
020172  004737  016670                  JSR     PC,PRLPCT
020176  004737  016622          2$:     JSR     PC,SWCONT       ;GO TO SWITCH CONTROL FOR LOOP
020202  000204                  1$:     RTS     R4
                                        ;;*****************************************************************
                                        .SBTTL  DATA COMPARE EXECUTION
                                        ;*ENTRY: JSR     R4,E.DATC
                                        ;*       <NUMBER OF WORDS>
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                                        ;*RETURN: RTS   R4
                                        ;*THIS ROUTINE WILL COMPARE THE CONTENTS OF THE INPUT BUFFER
                                        ;*TO THE CONTENTS OF THE OUTPUT BUFFER.  THE NUMBER OF
                                        ;*WORDS COMPARED IS SPECIFIED AS THE PARAMETER.
                                        ;*
                                        ;*IF A MISCOMPARE OCCURS, THE GOOD AND BAD WORD IS
                                        ;*REPORTED.  THE NUMBER OF THE WORD THAT MISCOMPARED IS
                                        ;*ALSO PRINTED.  ONLY THE FIRST 10 MISCOMPARES WILL BE
                                        ;*PRINTED UNLESS SWITCH REGISTER 1 IS SET.  IN THAT
                                        ;*CASE ALL MISCOMPARES ARE PRINTED.
                                        ;*****************************************************************
020204                                  E$DATC:
020204 010546                                   MOV     R5,-(SP)        ;PUSH R5 ON STACK
020206 005237 001116                            INC     LINNUM          ;INCREMENT PSUEDO LINE COUNTER
020212 013700 001710                            MOV     IBUFPT,R0       ;START OF INPUT BUFFER
020216 013701 001706                            MOV     OBUFPT,R1       ;START OF OUTPUT BUFFER
020222 012402                                   MOV     (R4)+,R2        ;COMPARE COUNT
020224 005003                                   CLR     R3              ;ERROR COUNT
020226 005005                                   CLR     R5              ;CLEAR COUNT FOR REPORT
020230 022021                           1$:     CMP     (R0)+,(R1)+     ;COMPARE DATA
020232 001004                                   BNE     2$              ;ERROR
020234 005205                           4$:     INC     R5              ;COUNT FOR PRINT
020236 005302                                   DEC     R2              ;COUNT FOR COMPARE LENGTH
020240 001455                                   BEQ     11$             ;EXIT - OK
020242 000772                                   BR      1$              ;LOOP
020244 032777 002000 160666             2$:     BIT     #SW10,@SWR      ;BELL ON ERROR?
020252 001402                                   BEQ     5$              ;NO - BRANCH
020254 104401 001164                            TYPE    ,$BELL          ;RING BELL
020260 032777 000004 160652             5$:     BIT     #SW2,@SWR       ;INHIBIT PRINT?
020266 001053                                   BNE     12$             ;YES - SKIP PRINT
020270 005703                                   TST     R3              ;ANY ERRORS YET COUNTED?
020272 001005                                   BNE     6$              ;YES - DON'T PRINT LINE NUMBER
020274 013746 001116                            MOV     LINNUM,-(SP)    ;PUT LINE NUMBER ON STACK
020300 104405                                   TYPDS                   ;TYPE IT
020302 104401 014061                            TYPE    ,PLINE          ;LABEL IT
020306 020327 000012                    6$:     CMP     R3,#12          ;TEST FOR TO MANY ERRORS
020312 101404                                   BLOS    3$              ;NO - SKIP SWR TEST
020314 032777 000002 160616                     BIT     #SW1,@SWR       ;TEST SWITCH 1 SET
020322 001417                                   BEQ     13$             ;EXIT WITH ERROR
020324 104401 014434                    3$:     TYPE    ,FDATC          ;TYPE DATA COMPARE ERROR
020330 010546                                   MOV     R5,-(SP)        ;ERROR WORD POSITION
020332 104402                                   TYPOC                   ;PRINT IT
020334 104401 001171                            TYPE    ,$CRLF          ;RETURN CARRIAGE
020340 024041                                   CMP     -(R0),-(R1)     ;BACK UP DATA POINTERS
020342 012146                                   MOV     (R1)+,-(SP)     ;GOOD WORD
020344 104402                                   TYPOC                   ;TYPE IT
020346 104401 014467                            TYPE    ,GDDAT          ;TYPE LABEL
020352 012046                                   MOV     (R0)+,-(SP)     ;BAD WORD
020354 104402                                   TYPOC                   ;TYPE IT
020356 104401 014504                            TYPE    ,BDDAT          ;LABEL IT
020362 005203                           13$:    INC     R3              ;COUNT ERROR
020364 000723                                   BR      4$
020366 005703                           11$:    TST     R3              ;TEST IF ANY ERRORS OCCURED
020370 001414                                   BEQ     14$             ;NO - EXIT
020372 032777 020000 160540                     BIT     #SW13,@SWR      ;CHECK IF INHIBIT TYPE OUT
020400 001006                                   BNE     12$             ;YES, RETURN
```

```
5298  020402  010346                        MOV     R3,-(SP)        ;PUT ERROR COUNT ON STACK
5299  020404  104402                        TYPOC                   ;TYPE IT
5300  020406  104401  003273                TYPE    ,TOTMSC         ;LABEL IT
5301  020412  004737  016670                JSR     PC,PRLPCT
5302  020416  004737  016622        12$:    JSR     PC,SWCONT       ;GO TO SWITCH CONTROL
5303  020422                        14$:
5304  020422  012605                        MOV     (SP)+,R5        ;;POP STACK INTO R5
5305  020424  000204                        RTS     R4              ;RETURN TO OBJECT CODE
5306                                ;;*****************************************************************
5307                                .SBTTL  REGISTER WRITE EXECUTION
5308                                ;*ENTRY: JSR     R4,ESRW
5309                                ;*       <REG NUMBER>
5310                                ;*       <VALUE>
5311                                ;*RETURN: RTS    R4
5312                                ;*
5313                                ;*THIS ROUTINE PLACES THE VALUE GIVEN IN THE REGISTER
5314                                ;*SPECIFIED.  NO ATTEMPT IS MADE TO PROTECT THE USER
5315                                ;*AGAINST WRITING READ-ONLY BITS OR AGAINST CAUSING
5316                                ;*UNEXPECTED INTERRUPTS.
5317                                ;;*****************************************************************
5318  020426  005237  001116        ESRW:   INC     LINNUM          ;INCREMENT PSUEDO LN CNT
5319  020432  012400                        MOV     (R4)+,R0        ;GET REG NUM
5320  020434  006300                        ASL     R0              ;ALIGN R0 (REGISTER NUM) FOR INDEX
5321  020436  063700  023554                ADD     RKBAS,R0        ;COMPUTE ADDRESS
5322  020442  012410                        MOV     (R4)+,(R0)      ;LOAD VALUE
5323  020444  000204                        RTS     R4              ;RETURN
5324                                ;;*****************************************************************
5325                                .SBTTL  STALL EXECUTION
5326                                ;*ENTRY: JSR     R4,E$ST
5327                                ;*       <NUM OF MILLISECONDS>
5328                                ;*RETURN: RTS    R4
5329                                ;*
5330                                ;*THIS ROUTINE WILL DELAY THE PROGRAM EXECUTION FOR
5331                                ;*THE TIME SPECIFIED.  THE DRIVER WATCHDOG TIMER IS
5332                                ;*USED FOR THE DELAY TIMING.
5333                                ;;*****************************************************************
5334  020446  005237  001116        E$ST:   INC     LINNUM          ;INCREMENT LINE COUNT
5335  020452  012737  000340  177776        MOV     #PR7,PS         ;LOCK OUT ANY INTERRUPTS
5336  020460  012437  023632                MOV     (R4)+,W.DRV     ;LOAD MS DELAY INTO TIMER
5337  020464  112737  000177  023616        MOVB    #177,W.TIME     ;FAKE TIMER TO THINK IT IS
5338                                                                ;WATCHING A DRIVE
5339  020472  010637  001704                MOV     SP,TEMP2        ;STORE STACK POINTER
5340  020476  012737  020512  023564        MOV     #2$,A.ABNL      ;SET UP TIMER RETURN
5341  020504  004737  023634        1$:     JSR     PC,W.WTCH       ;CALL TIMER
5342  020510  000775                        BR      1$              ;LOOP ON TIMER
5343  020512  013706  001704        2$:     MOV     TEMP2,SP        ;RESTORE STACK POINTER
5344  020516  012737  015036  023564        MOV     #DRVERR,A.ABNL  ;RESTORE ABNORMAL RETURN
5345  020524  012737  000000  177776        MOV     #PR0,PS         ;ALLOW ALL INTERRUPTS
5346  020532  000204                        RTS     R4              ;RETURN
5347                                ;;*****************************************************************
5348                                .SBTTL  BUFFER INITIALIZE EXECUTION
5349                                ;*ENTRY: JSR     R4,E$BI
5350                                ;*       <EXECUTION LINE COUNTER CONTROL> <PATTERN>
5351                                ;*RETURN: RTS    R4
5352                                ;*
5353                                ;*THIS ROUTINE FIRST CHECKS LINE COUNT CONTROL AND IF A ONE
```

```
                                        ;*INCREMENTS LINNUM.
                                        ;*
                                        ;*THE SELECTED PATTERN IS THEN GENERATED AND THE ENTIRE OUTPUT
                                        ;*BUFFER IS INITIALIZED.
                                        ;;*****************************************************************
                    020536                      .=20536
020536  005714                  ESBI:   TST     (R4)            ;TEST IF LINE COUNT TO BE INC.
020540  100002                          BPL     1$              ;BRANCH IF NO
020542  005237  001116                  INC     LINNUM          ;INC LINE COUNT
020546  013737  001706  001704  1$:     MOV     OBUFPT,TEMP2    ;COMPUTE AND STORE
020554  063737  001700  001704          ADD     MAXWDS,TEMP2    ;THE LAST USABLE BUFFER LOC
020562  063737  001700  001704          ADD     MAXWDS,TEMP2    ;DO AGAIN FOR LAST BUFF ADDRESS
020570  013702  001706                  MOV     OBUFPT,R2       ;SET BUFFER POINTER
020574  012401                          MOV     (R4)+,R1        ;GET PARAMETER
020576  120127  000122                  CMPB    R1,#'R          ;RANDOM PATTERN?
020602  001004                          BNE     2$              ;NO
020604  012701  001562                  MOV     #PATR,R1        ;GET ADDRESS OF STORED PAT
020610  000137  021240                  JMP     26$             ;GO INITIALIZE WITH PATTERN
020614  120127  000130          2$:     CMPB    R1,#'X          ;PAT X?
020620  001004                          BNE     3$              ;NO
020622  012701  001262                  MOV     #PATX,R1        ;GET ADDRESS OF STORED PAT
020626  000137  021240                  JMP     26$             ;GO INITIALIZE WITH PATTERN
020632  120127  000131          3$:     CMPB    R1,#'Y          ;PAT Y?
020636  001003                          BNE     4$              ;NO
020640  012701  001362                  MOV     #PATY,R1        ;GET ADDRESS
020644  000575                          BR      26$             ;GO INITIALIZE WITH PATTERN
020646  120127  000132          4$:     CMPB    R1,#'Z          ;PAT Z?
020652  001003                          BNE     5$              ;NO
020654  012701  001462                  MOV     #PATZ,R1        ;GET ADDRESS
020660  000567                          BR      26$             ;GO INITIALIZE WITH PATTERN
020662  120127  000101          5$:     CMPB    R1,#'A          ;TEST IF PAT A
020666  001013                          BNE     8$
020670  012701  177777                  MOV     #177777,R1      ;1ST AND LAST WORD OF PATTERN
020674  005003                          CLR     R3              ;OTHER 30 WORDS
020676  012700  000036          6$:     MOV     #36,R0          ;SET COUNT FOR OTHER 30 WORDS
020702  010122                          MOV     R1,(R2)+        ;PUT 1ST WORD IN BUFFER
020704  010322                  7$:     MOV     R3,(R2)+        ;PUT IN OTHER 30 LOOP
020706  005300                          DEC     R0
020710  001375                          BNE     7$
020712  010122                          MOV     R1,(R2)+        ;PUT LAST WORD OF PAT IN BUFF
020714  000561                          BR      28$             ;GO SPREAD THRU BUFFER
020716  120127  000102          8$:     CMPB    R1,#'B          ;PAT B?
020722  001004                          BNE     9$              ;NO
020724  005001                          CLR     R1              ;1ST AND LAST WORD OF PATTERN
020726  012703  177777                  MOV     #177777,R3      ;OTHER 30 WORDS
020732  000761                          BR      6$              ;GO INITIALIZE WITH PATTERN
020734  120127  000103          9$:     CMPB    R1,#'C          ;PAT C?
020740  001004                          BNE     10$
020742  012701  125252                  MOV     #125252,R1      ;1ST AND LAST WORD OF PATTERN
020746  010103                          MOV     R1,R3           ;OTHER 30 THE SAME
020750  000752                          BR      6$              ;GO INITIALIZE WITH PATTERN
020752  120127  000104          10$:    CMPB    R1,#'D          ;PAT D?
020756  001004                          BNE     11$
020760  012701  052525                  MOV     #052525,R1      ;1ST AND LAST WORD
020764  010103                          MOV     R1,R3           ;OTHER 30 THE SAME
020766  000743                          BR      6$              ;GO INITIALIZE WITH PATTERN
```

```
5410  020770  120127  000105        11$:    CMPB    R1,#'E          ;PAT E?
5411  020774  001023                        BNE     15$
5412  020776  012701  000001                MOV     #1,R1           ;BASE WORD FOR PATTERN GEN
5413  021002  012700  000020                MOV     #20,R0          ;SET A LOOP CNTR
5414  021006  010122                12$:    MOV     R1,(R2)+        ;BASE WORD INTO BUFFER
5415  021010  005300                        DEC     R0              ;DEC COUNTER
5416  021012  001403                        BEQ     13$             ;1ST HALF GENERATED, EXIT
5417  021014  006301                        ASL     R1              ;TWO OPERATIONS TO
5418  021016  005201                        INC     R1              ;CONTINUE THE PATTERN
5419  021020  000772                        BR      12$             ;LOOP
5420  021022  042701  100000        13$:    BIC     #100000 ,R1     ;SET BASE FOR SECOND HALF
5421  021026  012700  000020                MOV     #20,R0          ;SET A COUNT
5422  021032  010122                14$:    MOV     R1,(R2)+        ;PUT WORD INTO BUFFER
5423  021034  005300                        DEC     R0              ;DEC COUNTER
5424  021036  001510                        BEQ     28$             ;PATTERN GENERATED, GO SPREAD IT
5425  021040  006201                        ASR     R1              ;SHIFT FOR NEXT WORD OF PAT
5426  021042  000773                        BR      14$             ;LOOP
5427  021044  120127  000106        15$:    CMPB    R1,#'F          ;PAT F?
5428  021050  001016                        BNE     18$
5429  021052  012701  177777                MOV     #177777,R1      ;BASE WORD FOR PATTERN
5430  021056  012700  000021                MOV     #21,R0          ;SET COUNTER
5431  021062  010122                16$:    MOV     R1,(R2)+        ;PUT IN BUFFER
5432  021064  005300                        DEC     R0              ;DEC COUNT
5433  021066  001402                        BEQ     17$             ;1ST HALF GENERATED, EXIT
5434  021070  006301                        ASL     R1              ;SHIFT FOR NEXT WD OF PAT
5435  021072  000773                        BR      16$
5436  021074  052701  100000        17$:    BIS     #100000,R1      ;SET BASE FOR 2ND HALF
5437  021100  012700  000017                MOV     #17,R0          ;SET COUNT
5438  021104  000752                        BR      14$             ;GO MAKE USE OF PREVIOUS
5439                                                                ;PATTERN GENERATION OP.
5440  021106  120127  000107        18$:    CMPB    R1,#'G          ;PAT G?
5441  021112  001021                        BNE     22$
5442  021114  012701  177777                MOV     #177777,R1      ;BASE WORD FOR PATTERN G
5443  021120  006101                        ROL     R1              ;THIS SETS CARRY AND RESETS BIT 0
5444  021122  012700  000020                MOV     #20,R0          ;SET COUNT
5445  021126  010122                19$:    MOV     R1,(R2)+        ;PUT IN BUFFER
5446  021130  005300                        DEC     R0              ;DEC COUNT
5447  021132  001402                        BEQ     20$             ;EXIT 1ST HALF IF ZERO
5448  021134  006101                        ROL     R1              ;SHIFT PATTERN
5449  021136  000773                        BR      19$             ;LOOP
5450  021140  012700  000020        20$:    MOV     #20,R0          ;SET 2ND HALF COUNT
5451  021144  006001                21$:    ROR     R1              ;SHIFT THE PATTERN
5452  021146  010122                        MOV     R1,(R2)+        ;PUT IN BUFFER
5453  021150  005300                        DEC     R0              ;DEC COUNT
5454  021152  001442                        BEQ     28$             ;
5455  021154  000773                        BR      21$             ;LOOP
5456  021156  120127  000110        22$:    CMPB    R1,#'H          ;PAT H?
5457  021162  001017                        BNE     24$
5458  021164  012701  000001                MOV     #1,R1           ;BASE WORD FOR PATTERN
5459  021170  012700  000020                MOV     #20,R0          ;SET COUNT
5460  021174  010122                31$:    MOV     R1,(R2)+        ;PUT IN BUFFER
5461  021176  005300                        DEC     R0              ;DEC COUNT
5462  021200  001402                        BEQ     23$             ;EXIT 1ST HALF IF ZERO
5463  021202  006301                        ASL     R1              ;SHIFT PATTERN
5464  021204  000773                        BR      31$             ;LOOP
5465  021206  010122                23$:    MOV     R1,(R2)+        ;PUT LAST WD GENERATED IN AGAIN
```

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5466  021210  012701  040000                MOV     #40000,R1       ;SET NEW BASE FOR 2ND HALF
5467  021214  012700  000017                MOV     #17,R0          ;SET COUNT
5468  021220  000704                        BR      14$             ;GO USE PREV GENERATE OPERATION
5469  021222  120127  000111        24$:    CMPB    R1,#'I          ;PAT I
5470  021226  001000                        BNE     25$             ;NO BUT FORCE USE OF PAT I
5471  021230  012701  155555        25$:    MOV     #155555,R1      ;WORST CASE PAT
5472  021234  010103                        MOV     R1,R3           ;ALL WORDS THE SAME
5473  021236  000617                        BR      6$              ;GO INITIALIZE WITH PATTERN
5474  021240  012700  000040        26$:    MOV     #40,R0          ;SET COUNT
5475  021244  012122        27$:    MOV     (R1)+,(R2)+     ;PUT IN BUFFER
5476  021246  020237  001704                CMP     R2,TEMP2        ;CHECK BUFFER FULL
5477  021252  001417                        BEQ     30$             ;YES, EXIT
5478  021254  005300                        DEC     R0              ;DEC COUNT
5479  021256  001372                        BNE     27$             ;NO - LOOP
5480  021260  022701  001562        28$:    CMP     #PATR,R1
5481  021264  001007                        BNE     29$
5482  021266  010201                        MOV     R2,R1
5483  021270  005741        32$:    TST     -(R1)
5484  021272  012122                        MOV     (R1)+,(R2)+
5485  021274  020237  001704                CMP     R2,TEMP2
5486  021300  001373                        BNE     32$
5487  021302  000403                        BR      30$
5488  021304  013701  001706        29$:    MOV     OBUFPT,R1       ;RESET R1 TO START OF
5489                                                        ;OUTPUT BUFFER.  FROM THIS
5490                                                        ;POINT ON THE INITIALIZE
5491                                                        ;PATTERN IS SPREAD THROUGH THE
5492                                                        ;OBUFF.
5493  021310  000753                        BR      26$             ;LOOP
5494  021312  000204        30$:    RTS     R4              ;RETURN
5495            ;;*****************************************************************
5496            .SBTTL  PARAMETER BLOCK SELECTION
5497            ;*ENTRY: JSR    PC,PBSEL
5498            ;*RETURN: RTS   PC
5499            ;*
5500            ;*THIS ROUTINE SELECTS THE PARAMETER BLOCK TO BE USED IN THE
5501            ;*NEXT OPERATION AND SETS THE PARAMETER BLOCK SWITCH ACCORDINGLY.
5502            ;*R5 IS LOADED WITH THE PARAM BLOCK ADDRESS.
5503            ;*
5504            ;*IN ADDITION, THIS ROUTINE TAKES CARE OF INSERTING THE DRIVE
5505            ;*NUMBER AND NO CHECK INDICATOR IN THAT PARAM BLOCK.
5506            ;*IT ALSO INCREMENTS THE LINNUM (PSUEDO LINE COUNT).
5507            ;*****************************************************************
5508  021314  005237  001116        PBSEL:  INC     LINNUM          ;INCREMENT LINE NUMBER COUNT
5509  021320  012705  002142                MOV     #PARM0,R5       ;SET R5 WITH PARAM0
5510  021324  105737  001670                TSTB    PBSW            ;IS PARAM0 TO BE USED NEXT
5511  021330  001002                        BNE     1$              ;YES (PARAM1 WAS USED LAST)
5512  021332  012705  002230                MOV     #PARM1,R5       ;NO - SET TO PARAM1
5513  021336  105137  001670        1$:     COMB    PBSW            ;SET PBSW
5514  021342  111465  000000                MOVB    (R4),P.DRVN(R5) ;MOV IN DRIVE PARAM
5515  021346  105714                        TSTB    (R4)            ;WAS IT A DRIVE NUM
5516  021350  100403                        BMI     2$              ;NO? GO CHANGE IT
5517  021352  112437  001176                MOVB    (R4)+,DRIVE     ;YES? PUT IT IN PARAM STORAGE TOO.
5518  021356  000404                        BR      3$
5519  021360  113765  001176  000000  2$:   MOVB    DRIVE,P.DRVN(R5) ;GET STORED DRIVE NUMBER
5520  021366  105724                        TSTB    (R4)+           ;BUMP R4
5521  021370  005065  000014        3$:     CLR     P.PRST(R5)      ;CLEAR PROG STAT WORD
```

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5522  021374  132714  000004                  BITB    #BAII,(R4)              ;TEST BAI INHIBIT SWITCH
5523  021400  001403                          BEQ     4$                      ;NOT SET, SKIP
5524  021402  052765  100000  000014          BIS     #DTBAII,P.PRST(R5)      ;SET FOR INHIBIT INCREMENT
5525  021410  132714  000002          4$:     BITB    #NOCK,(R4)              ;TEST IF NO CHECK
5526  021414  001403                          BEQ     5$                      ;NO - SKIP
5527  021416  052765  000400  000014          BIS     #NOCHK,P.PRST(R5)       ;SET NO CHECK
5528  021424  142765  000004  000007  5$:     BICB    #B.CDT,P.CS1H(R5)       ;CLR OLD INFO
5529  021432  153765  001244  000007          BISB    DRVTYP,P.CS1H(R5)       ;SET DRIVE TYPE
5530  021440  142765  000020  000007          BICB    #B.CFMT,P.CS1H(R5)      ;CLEAR 24 SECTOR MODE
5531  021446  132724  000010                  BITB    #SECT20,(R4)+           ;WAS THAT RIGHT?
5532  021452  001403                          BEQ     6$                      ;YES - SKIP TO EXIT
5533  021454  152765  000020  000007          BISB    #B.CFMT,P.CS1H(R5)      ;NO - SET THE 24 SECTOR MODE BIT
5534  021462  000207                  6$:     RTS     PC                      ;RETURN
5535                                          ;*************************************************************
5536                                          .SBTTL  UNIBUS INITIALIZE EXECUTE
5537                                          ;*ENTRY:        JSR     R4,ESUI
5538                                          ;*RETURN:       RTS     R4
5539                                          ;*
5540                                          ;*THIS ROUTINE EXECUTES A UNIBUS INITIALIZE
5541                                          ;*
5542                                          ;*************************************************************
5543  021464  000005                  ESUI:   RESET                           ;UNIBUS RESET
5544  021466  005237  001116                  INC     LINNUM                  ;INCREMENT LINE NUMBER
5545  021472  000204                          RTS     R4                      ;RETURN
5546                                          ;*************************************************************
5547                                          .SBTTL  SUBSYSTEM COMMANDS EXECUTION
5548                                          ;*ENTRY: JSR    R4,ESXX WHERE XX IS THE SUBSYSTEM CMND
5549                                          ;*       <NO CHECK> <DRIVE>
5550                                          ;*       <CYL NUM> OR <OFFSET>
5551                                          ;*       <TRACK> <SECTOR>
5552                                          ;*       <WORD COUNT>
5553                                          ;*RETURN: RTS   R4
5554                                          ;*
5555                                          ;*THIS ROUTINE HAS MANY ENTRY POINTS, ONE FOR EACH SUBSYSTEM
5556                                          ;*COMMAND.  EACH ENTRY IS SPECIAL IN THAT THE PROPER FUNCTION
5557                                          ;*CODE IS PUT INTO THE PARAMETER BLOCK ALONG WITH THE
5558                                          ;*APPLICABLE PARAMETERS.
5559                                          ;*
5560                                          ;*THE PRINT CONTROL WORD IS PUT INTO THE LAST WORD (WORD 66)
5561                                          ;*OF THE PARAMETER BLOCK.  THIS WORD CONTROLS WHICH INFORMATION
5562                                          ;*IN THE PARAMETER BLOCK IS PRINTED IF AN ERROR OCCURS.
5563                                          ;*REFER TO DRVERR FOR A DESCRIPTION OF THE WORD AND
5564                                          ;*THE RESULTING DATA REPORTED.
5565                                          ;*************************************************************
5566  021474  112703  000113  ESRC:   MOVB    #RECAL,R3               ;RECALIBRATE ENTRY
5567  021500  012700  000104          MOV     #104,R0                 ;REPORT FORMAT ENTRY
5568  021504  000137  022132          JMP     ONEP
5569  021510  112703  000103  ESPA:   MOVB    #PACK,R3                ;PACK ACK ENTRY
5570  021514  012700  000104          MOV     #104,R0                 ;REPORT FORMAT
5571  021520  000137  022132          JMP     ONEP
5572  021524  112703  000177  ESCS:   MOVB    #SUBCLR,R3              ;SUBSYSTEM CLEAR ENTRY
5573  021530  012700  000104          MOV     #104,R0                 ;REPORT FORMAT
5574  021534  000137  022132          JMP     ONEP
5575  021540  112703  000176  ESCC:   MOVB    #CONCLR,R3              ;CONTROLLER CLEAR ENTRY
5576  021544  012700  000104          MOV     #104,R0                 ;REPORT FORMAT
5577  021550  000570                  BR      ONEP
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5578  021552  112703  000101          E$DS:   MOVB    #SELDRV,R3      ;DRIVE SELECT ENTRY
5579  021556  012700  000104                  MOV     #104,R0         ;REPORT FORMAT
5580  021562  000563                          BR      ONEP
5581  021564  112703  000105          E$DC:   MOVB    #CLEAR,R3       ;DRIVE CLEAR ENTRY
5582  021570  012700  000104                  MOV     #104,R0         ;REPORT FORMAT
5583  021574  000556                          BR      ONEP
5584  021576  112703  000107          E$UL:   MOVB    #UNLOAD,R3      ;UNLOAD ENTRY
5585  021602  012700  000104                  MOV     #104,R0         ;REPORT FORMAT
5586  021606  000551                          BR      ONEP
5587  021610  112703  000111          E$SS:   MOVB    #SRTSPL,R3      ;START SPINDLE ENTRY
5588  021614  012700  000104                  MOV     #104,R0         ;REPORT FORMAT
5589  021620  000544                          BR      ONEP
5590  021622  112703  000115          E$OF:   MOVB    #OFFSET,R3      ;OFFSET ENTRY
5591  021626  012700  000165                  MOV     #165,R0         ;REPORT FORMAT
5592  021632  000527                          BR      TWOP
5593  021634  112703  000164          E$AH:   MOVB    #RDALHD,R3      ;READ ALL HEADERS
5594  021640  012700  000165                  MOV     #165,R0         ;SET REPORT FORMAT
5595  021644  000501                          BR      THREEP
5596  021646  112703  000125          E$RH:   MOVB    #RDHEAD,R3      ;READ HEADER ENTRY
5597  021652  012700  000165                  MOV     #165,R0         ;REPORT FORMAT
5598  021656  000474                          BR      THREEP
5599  021660  112703  000117          E$SK:   MOVB    #SEEK,R3        ;SEEK ENTRY
5600  021664  012700  000165                  MOV     #165,R0         ;REPORT FORMAT
5601  021670  000467                          BR      THREEP
5602  021672  004737  021314          E$WH:   JSR     PC,PBSEL
5603  021676  112765  000127  000001          MOVB    #WRHEAD,P.CMND(R5)
5604  021704  004737  022302                  JSR     PC,BLDHDR
5605  021710  000437                          BR      SETADD
5606  021712  010046          E$RD:   MOV     R0,-(SP)        ;STORE R0
5607  021714  010146                  MOV     R1,-(SP)        ;AND R1
5608  021716  013700  001710                  MOV     IBUFPT,R0       ;SET R0 AT START OF INPUT BUFF
5609  021722  013701  001700                  MOV     MAXWDS,R1       ;SET R1 WITH NUMBER OF WORDS
5610  021726  005020          1$:     CLR     (R0)+           ;CLEAR BUFFER LOCATION
5611  021730  005301                  DEC     R1              ;DECREMENT COUNT
5612  021732  001375                  BNE     1$              ;LOOP UNTIL DONE
5613  021734  012601                  MOV     (SP)+,R1        ;RESTORE R1
5614  021736  012600                  MOV     (SP)+,R0        ;AND R0
5615  021740  004737  021314                  JSR     PC,PBSEL        ;READ DATA, GET PB ASSIGNMENT
5616  021744  112765  000121  000001          MOVB    #RDDATA,P.CMND(R5) ;LOAD FUNCTION CODE
5617  021752  013765  001710  000010          MOV     IBUFPT,P.BALO(R5) ;LOAD BUFFER ADDRESS
5618  021760  000416                          BR      FOURP
5619  021762  004737  021314          E$WD:   JSR     PC,PBSEL        ;WRITE DATA, GET PB ASSIGNMENT
5620  021766  112765  000123  000001          MOVB    #WRDATA,P.CMND(R5) ;LOAD FUNCTION CODE
5621  021774  000405                          BR      SETADD
5622  021776  004737  021314          E$WC:   JSR     PC,PBSEL        ;WRITE CHECK,GET PB ASSIGNMENT
5623  022002  112765  000131  000001          MOVB    #WRTCHK,P.CMND(R5) ;LOAD FUNCTION CODE
5624  022010  013765  001706  000010  SETADD: MOV     OBUFPT,P.BALO(R5) ;LOAD BUFFER ADDRESS FOR WRITES
5625  022016  012700  000177          FOURP:  MOV     #177,R0         ;REPORT FORMAT
5626  022022  012465  000002                  MOV     (R4)+,P.CYLN(R5) ;LOAD CYL ADDRESS
5627  022026  112465  000005                  MOVB    (R4)+,P.TRCK(R5) ;LOAD TRACK ADDRESS
5628  022032  112465  000004                  MOVB    (R4)+,P.SECT(R5) ;LOAD SECTOR ADDRESS
5629  022036  012465  000012                  MOV     (R4)+,P.WC(R5) ;LOAD WORD COUNT
5630  022042  005465  000012                  NEG     P.WC(R5)        ;MAKE WORD COUNT 2'S COMP
5631  022046  000435                          BR      GODRV
5632  022050  004737  021314          THREEP: JSR     PC,PBSEL        ;GET PB ASSIGNMENT
5633  022054  022703  000164                  CMP     #RDALHD,R3      ;TEST IF READ ALL HEADERS COMMAND
```

```
5634  022060  001003                        BNE     1$                      ;NO - SKIP
5635  022062  012765  001736  000010        MOV     #HDBUFF,P.BALO(R5)  ;LOAD ADDRESS OF HEADER BUFFER
5636  022070  110365  000001          1$:   MOVB    R3,P.CMND(R5) ;LOAD FUNCTION CODE
5637  022074  012465  000002                MOV     (R4)+,P.CYLN(R5) ;LOAD CYL ADDRESS
5638  022100  112465  000005                MOVB    (R4)+,P.TRCK(R5) ;LOAD TRACK ADD
5639  022104  112465  000004                MOVB    (R4)+,P.SECT(R5) ;LOAD SECTOR ADDRESS
5640  022110  000414                        BR      GODRV
5641  022112  004737  021314          TWOP: JSR     PC,PBSEL                ;GET PB ASSIGNMENT
5642  022116  110365  000001                MOVB    R3,P.CMND(R5) ;LOAD FUNCTION CODE
5643  022122  112465  000006                MOVB    (R4)+,P.OFST(R5) ;LOAD OFFSET
5644  022126  105724                        TSTB    (R4)+                   ;BUMP R4 TO NXT COMD
5645  022130  000404                        BR      GODRV
5646  022132  004737  021314          ONEP: JSR     PC,PBSEL                ;GET PB ASSIGNMENT
5647  022136  110365  000001                MOVB    R3,P.CMND(R5) ;LOAD FUNCTION CODE
5648  022142  010065  000064          GODRV: MOV    R0,PRTCON(R5)           ;INSERT FORMAT WORD
5649  022146  004737  013570                JSR     PC,DRVCAL               ;CALL DRIVER
5650  022152  000204                        RTS     R4                      ;RETURN
5651                                  ;;*****************************************************************
5652                                  .SBTTL  COPY TAPE ROUTINE
5653                                  ;*THIS ROUTINE WILL PUNCH A TAPE THAT IS IDENTICAL TO THE
5654                                  ;*TAPE BEING READ, EITHER SOURCE OR OBJECT.
5655
5656  022154  104412                  CTRTE: SAVREG
5657  022156  042777  000100  157542        BIC     #000100,@PTRSR  ;RESET IE, PTR
5658  022164  042777  000100  157540        BIC     #000100,@PTPSR  ;RESET IE, PTP
5659  022172  005277  157530                INC     @PTRSR  ;SET READER ENABLE
5660  022176  032777  100200  157522  1$:   BIT     #100200,@PTRSR  ;CHECK PTR DONE OR ERROR
5661  022204  001774                        BEQ     1$                      ;NO - LOOP
5662  022206  100425                        BMI     20$                     ;ERROR - EXIT
5663  022210  032777  100200  157514  2$:   BIT     #100200,@PTPSR  ;CHECK PTP DONE OR ERROR
5664  022216  001774                        BEQ     2$                      ;NO - LOOP
5665  022220  100423                        BMI     30$                     ;ERROR - EXIT
5666  022222  005277  157500          5$:   INC     @PTRSR                  ;START READ
5667  022226  032777  100200  157472  3$:   BIT     #100200,@PTRSR  ;TEST DONE OR ERROR
5668  022234  001774                        BEQ     3$                      ;NEITHER - LOOP
5669  022236  100411                        BMI     20$                     ;ERROR - EXIT
5670  022240  117777  157464  157466        MOVB    @PTRDB,@PTPDB   ;MOVE DATA TO PUNCH
5671  022246  032777  100200  157456  4$:   BIT     #100200,@PTPSR  ;CHECK IF DONE OR ERROR
5672  022254  001774                        BEQ     4$                      ;NEITHER - LOOP
5673  022256  100404                        BMI     30$                     ;ERROR -EXIT
5674  022260  000760                        BR      5$                      ;DO NEXT READ
5675  022262  104401  003223          20$:  TYPE    ,PRERR                  ;READER ERROR
5676  022266  000402                        BR      40$
5677  022270  104401  003207          30$:  TYPE    ,PUERR                  ;PUNCH ERROR
5678  022274  104413                  40$:  RESREG
5679  022276  005724                        TST     (R4)+                   ;GOOD RETURN
5680  022300  000204                        RTS     R4                      ;RETURN
5681                                  ;;*****************************************************************
5682                                  .SBTTL  ROUTINE TO BUILD HEADERS
5683                                  ;*THIS ROUTINE WILL BUILD HEADERS AS THEY ARE EXPECTED TO BE FOUND
5684                                  ;*ON THE PACK WHEN THE SECTOR FIELD OF A WRITE HEADER COMMAND IS
5685                                  ;*SPECIFIED AS ZERO. IF ANY VALUE OTHER THAN 0 IS ENTERED AS THE
5686                                  ;*SECTOR VALUE THE ROUTINE GOES TO THE SPECIAL DATA PATTERN BUFFERS
5687                                  ;*AND TRANSFERS THE DATA FOUND IN PAT X, PAT Y, AND THE FIRST TWO
5688                                  ;*WORDS OF PAT Z INTO THE OUPUT BUFFER TO BE WRITTEN AS THE HEADERS.
5689                                  ;;*****************************************************************
```

```
5690  022302  104412                BLDHDR: SAVREG
5691  022304  012700  000026                MOV     #26,R0          ;PRESET FOR 26 SECTORS
5692  022310  005037  001702                CLR     TEMP1           ;CLEAR LOCATION TO BE USED AS FLAG
5693  022314  132765  000020  000007        BITB    #8.CFMT,P.CS1H(R5)  ;TEST IF THAT IS RIGHT
5694  022322  001405                        BEQ     5$              ;YES - SKIP
5695  022324  012700  000024                MOV     #24,R0          ;NO - SET FOR 24 SECTORS
5696  022330  052737  001000  001702        BIS     #BIT9,TEMP1
5697  022336  013705  001706        5$:     MOV     OBUFPT,R5       ;GET BUFFER ADDRESS
5698  022342  012401                        MOV     (R4)+,R1        ;GET CYL NUMBER PARAMETER
5699  022344  112402                        MOVB    (R4)+,R2        ;GET TRACK PAREMETER
5700  022346  112403                        MOVB    (R4)+,R3        ;GET SECTER PARAMETER
5701  022350  001025                        BNE     2$              ;IF SECTOR NOT 0, GO GETHDRS FROM PAT X,Y,Z BUF
5702  022352  006302                        ASL     R2              ;ADJUST TRACK FOR CORRECT POSITION
5703  022354  006302                        ASL     R2
5704  022356  006302                        ASL     R2
5705  022360  006302                        ASL     R2
5706  022362  006302                        ASL     R2
5707  022364  052702  140000                BIS     #140000,R2      ;SET NO BAD SECTOR BITS
5708  022370  053702  001702                BIS     TEMP1,R2        ;INSERT FORMAT BIT
5709  022374  010103        1$:     MOV     R1,R3           ;COMPUTE VRC
5710  022376  010204                MOV     R2,R4
5711  022400  040104                BIC     R1,R4
5712  022402  040203                BIC     R2,R3
5713  022404  050403                BIS     R4,R3
5714  022406  010125                MOV     R1,(R5)+        ;INSERT WORD 1
5715  022410  010225                MOV     R2,(R5)+        ;INSERT WORD 2
5716  022412  010325                MOV     R3,(R5)+        ;INSERT WORD 3
5717  022414  005202                INC     R2              ;BUMP SECTOR COUNT
5718  022416  005300                DEC     R0              ;DECREMENT COUNTER
5719  022420  001365                BNE     1$              ;LOOP IF NOT YET ZERO
5720  022422  000410                BR      4$              ;EXIT
5721  022424  012701  001262        2$:     MOV     #PATX,R1        ;GET ADDRESS OF PAT X BUFFER
5722  022430  010003                MOV     R0,R3           ;MULTIPLY SECTOR COUNT BY 3
5723  022432  006300                ASL     R0              ;TO GEY THE NUMBER OF WORDS REQUIRED
5724  022434  060300                ADD     R3,R0
5725  022436  012125        3$:     MOV     (R1)+,(R5)+     ;MOVE HEADER WORD
5726  022440  005300                DEC     R0              ;DEC COUNT
5727  022442  001375                BNE     3$              ;LOOP UNTIL DONE
5728  022444  104413        4$:     RESREG
5729  022446  000207                RTS     PC
5730                    ;;*****************************************************************
5731                    .SBTTL  DRIVE TYPE CHANGE ROUTINE
5732                    ;*ENTRY         JSR     R4,DTRTE
5733                    ;*
5734                    ;*      WITH R1 POINTING TO COMMAND FIELD FOR DT COMMAND
5735                    ;*
5736                    ;*ERROR RETURN:         MOV     (R4),R4
5737                    ;*                     RTS     R4
5738                    ;*NO ERROR RETURN:      TST     (R4)+
5739                    ;*                     RTS     R4
5740                    ;*
5741                    ;*THIS ROUTINE CHANGES THE "DRVTYP' PARAMETER BY STORING
5742                    ;*IN IT THE VALUE SPECIFIED BY THE 'DT'COMMAND
5743                    ;;*****************************************************************
5744
5745  022450        DTRTE:
```

```
5746  022450  010146                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
5747  022452  004737  004666                JSR     PC,SBSCN        ;BUMP R1 TO NEXT PARAM
5748  022456  105711                        TSTB    (R1)            ;TEST IF NULL
5749  022460  001453                        BEQ     1$              ;BR IF YES & EXIT
5750  022462  121127  000077                CMPB    (R1),#'?        ;SEE IF "?"
5751  022466  001014                        BNE     4$              ;BR IF NO
5752  022470  105737  001244                TSTB    DRVTYP          ;ELSE TEST EXISTING DRIVE TYPE
5753  022474  001403                        BEQ     5$              ;BR IF RK06
5754  022476  012746  000007                MOV     #7,-(SP)        ;ELSE SETUP FOR RK07
5755  022502  000402                        BR      6$
5756  022504  012746  000006        5$:     MOV     #6,-(SP)
5757  022510  104402                6$:     TYPOC
5758  022512  104401  001171                TYPE    ,$CRLF
5759  022516  000434                        BR      1$
5760
5761  022520  121127  000054        4$:     CMPB    (R1),#',        ;SEE IF NULL
5762  022524  001431                        BEQ     1$              ;BR IF YES, NO CHANGE-EXIT
5763  022526  010146                        MOV     R1,-(SP)        ;ELSE GET ADDR OF ASCII CHAR
5764  022530  004737  031160                JSR     PC,OCTBIN       ;CONVERY TO BINARY
5765  022534  022614                        2$                      ;ERROR RETURN
5766  022536  112637  001244                MOVB    (SP)+,DRVTYP    ;PUT CHAR IN REG
5767  022542  123727  001244  000006        CMPB    DRVTYP,#6       ;SEE IF RK06
5768  022550  001411                        BEQ     7$              ;BR IF YES
5769  022552  123727  001244  000007        CMPB    DRVTYP,#7       ;SEE IF RK07
5770  022560  001410                        BEQ     8$              ;BR IF YES
5771  022562  104401  003166                TYPE    ,BADTYP         ;PRINT ERROR MSG
5772  022566  011404                29$:    MOV     (R4),R4         ;SET ERR RETURN
5773  022570                        30$:
5774  022570  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
5775  022572  000204                        RTS     R4
5776
5777  022574  105037  001244        7$:     CLRB    DRVTYP          ;CLEAR FOR RK06
5778  022600  000403                        BR      1$              ;EXIT
5779  022602  112737  000004  001244  8$:   MOVB    #4,DRVTYP       ;SET TO LOAD RK07 TO P.CS1H(R5)
5780  022610  005724                1$:     TST     (R4)+           ;SET NO ERR RETURN
5781  022612  000766                        BR      30$             ;EXIT
5782
5783  022614  104401  002640        2$:     TYPE    ,BADOCT         ;INVALID OCT NUMBER
5784  022620  000762                        BR      29$             ;EXIT
5785                                ;;*****************************************************************
5786                                .SBTTL  ERROR MESSAGES FOR CONTROLLER ERROR RETURN
5787  022622  046103  040505  020122  CERR0:  .ASCIZ  /CLEAR CONTROLLER DID NOT CLEAR ERROR/<15><12>
5788  022630  047503  052116  047522
5789  022636  046114  051105  042040
5790  022644  042111  047040  052117
5791  022652  041440  042514  051101
5792  022660  042440  051122  051117
5793  022666  005015     000
5794  022671     116  020117  052101  CERR1:  .ASCIZ  /NO ATTENTION IS ATTENTION SUMMARY REGISTER/<15><12>
5795  022676  042524  052116  047511
5796  022704  020116  051511  040440
5797  022712  052124  047105  044524
5798  022720  047117  051440  046525
5799  022726  040515  054522  051040
5800  022734  043505  051511  042524
5801  022742  006522  000012
```

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5802  022746  047125  047523  044514  CERR2:  .ASCIZ  /UNSOLICITED ATTENTION/<15><12>
5803  022754  044503  042524  020104
5804  022762  052101  042524  052116
5805  022770  047511  006516  000012
5806  022776  047125  054105  042520  CERR3:  .ASCIZ  /UNEXPECTED DATA TYPE ERROR/<15><12>
5807  023004  052103  042105  042040
5808  023012  052101  020101  054524
5809  023020  042520  042440  051122
5810  023026  051117  005015     000
5811  023033     101  052124  047105  CERR4:  .ASCIZ  /ATTENTION DID NOT RESET WITH DRIVE CLEAR/<15><12>
5812  023040  044524  047117  042040
5813  023046  042111  047040  052117
5814  023054  051040  051505  052105
5815  023062  053440  052111  020110
5816  023070  051104  053111  020105
5817  023076  046103  040505  006522
5818  023104  000012
5819  023106  052101  042524  052116  CERR5:  .ASCIZ  /ATTENTION DID NOT CLEAR WITH SUS-SYSTEM CLEAR/<15><12>
5820  023114  047511  020116  044504
5821  023122  020104  047516  020124
5822  023130  046103  040505  020122
5823  023136  044527  044124  051440
5824  023144  051525  051455  051531
5825  023152  042524  020115  046103
5826  023160  040505  006522  000012
5827  023166  046111  042514  040507  CERR6:  .ASCIZ  /ILLEGAL DRIVER COMMAND/<15><12>
5828  023174  020114  051104  053111
5829  023202  051105  041440  046517
5830  023210  040515  042116  005015
5831  023216     000
5832  023217     104  052101  020101  CERR8:  .ASCIZ  /DATA LATE WHEN UNLOADING HEADER/<15><12>
5833  023224  040514  042524  053440
5834  023232  042510  020116  047125
5835  023240  047514  042101  047111
5836  023246  020107  042510  042101
5837  023254  051105  005015     000
5838  023261     103  047117  051124  CERR9:  .ASCIZ  /CONTROLLER ERROR DURING DRIVE SERVICING/<15><12>
5839  023266  046117  042514  020122
5840  023274  051105  047522  020122
5841  023302  052504  044522  043516
5842  023310  042040  044522  042526
5843  023316  051440  051105  044526
5844  023324  044503  043516  005015
5845  023332     000
5846  023333     104  044522  042526  CERR10: .ASCIZ  /DRIVE PARITY WHILE GATHERING STATUS/<15><12>
5847  023340  050040  051101  052111
5848  023346  020131  044127  046111
5849  023354  020105  040507  044124
5850  023362  051105  047111  020107
5851  023370  052123  052101  051525
5852  023376  005015     000
5853  023401     115  046125  044524  CERR15: .ASCIZ  /MULTIPLE DRIVE SELECT/<15><12>
5854  023406  046120  020105  051104
5855  023414  053111  020105  042523
5856  023422  042514  052103  005015
5857  023430     000
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5858  023431  116     020117  051105  CERR7:  .ASCIZ  /NO ERROR ENTRY/<15><12>
5859  023436  047522  020122  047105
5860  023444  051124  006531  000012
5861                                  .EQUIV  CERR7,CERR11
5862                                  .EQUIV  CERR7,CERR12
5863                                  .EQUIV  CERR7,CERR13
5864                                  .EQUIV  CERR7,CERR14
5865                                  .EQUIV  CERR7,CERR16
5866  023452  000             CEFLG:  .BYTE   0               ;CONTROLLER ERROR FLAG
5867          023454                  .EVEN
5868  023454  023401          ETABL:  .WORD   CERR15
5869  023456  023431                  .WORD   CERR14
5870  023460  023431                  .WORD   CERR13
5871  023462  023431                  .WORD   CERR12
5872  023464  023431                  .WORD   CERR11
5873  023466  023333                  .WORD   CERR10
5874  023470  023261                  .WORD   CERR9
5875  023472  023217                  .WORD   CERR8
5876  023474  023431                  .WORD   CERR7
5877  023476  023166                  .WORD   CERR6
5878  023500  023106                  .WORD   CERR5
5879  023502  023033                  .WORD   CERR4
5880  023504  022776                  .WORD   CERR3
5881  023506  022746                  .WORD   CERR2
5882  023510  022671                  .WORD   CERR1
5883  023512  022622                  .WORD   CERR0
5884  023514  023431                  .WORD   CERR16
5885
5886                          .SBTTL  TEMPORARY CONTROLLER REGISTER STORAGE
5887
5888  023516  000000          T.CS1:  .WORD   0               ;TEMPORARY STORAGE FOR COMMAND AND STATUS
5889                                                          ;  REGISTER 1
5890  023520  000000          T.CS2:  .WORD   0               ;TEMPORARY STORAGE FOR COMMAND AND STATUS
5891                                                          ;  REGISTER 2
5892  023522  000000          T.WCR:  .WORD   0               ;TEMPORARY STORAGE FOR WORD COUNT REGISTER
5893  023524  000000          T.BA:   .WORD   0               ;TEMPORARY STORAGE FOR BUS ADDRESS REGISTER
5894  023526  000000          T.DA:   .WORD   0               ;TEMPORARY STORAGE FOR DISK TRACK AND SECTOR
5895  023530  000000          T.DC:   .WORD   0               ;TEMPORARY STORAGE FOR DRIVE CYLINDER
5896  023532  000000          T.ASOF: .WORD   0               ;TEMPORARY STORAGE FOR ATTENTION SUMMARY
5897                                                          ;  AND OFFSET
5898  023534  000000          T.ER:   .WORD   0               ;TEMPORARY STORAGE FOR ERROR REGISTER
5899  023536  000000          T.DS:   .WORD   0               ;TEMPORARY STORAGE FOR DRIVE STATUS REGISTER
5900  023540  000000          T.MR1:  .WORD   0               ;TEMPORARY STORAGE FOR MAINTENANCE REGISTER 1
5901  023542  000000          T.MR2:  .WORD   0               ;TEMPORARY STORAGE FOR MAINTENANCE REGISTER 2
5902  023544  000000          T.MR3:  .WORD   0               ;TEMPORARY STORAGE FOR MAINTENANCE REGISTER 3
5903  023546  000000          T.POS:  .WORD   0               ;TEMPORARY STORAGE FOR ECC POSITION
5904  023550  000000          T.PAT:  .WORD   0               ;TEMPORARY STORAGE FOR ECC PATTERN
5905  023552  000000          T.DB:   .WORD   0               ;TEMPORARY STORAGE FOR DATA BUFFER REGISTER
5906
5907                          .SBTTL  DRIVER PARAMERTERS
5908
5909  023554  177440          RKBAS:  .WORD   177440          ;ADDRESS OF RK611 UNIBUS ADDRESS BLOCK
5910  023556  000210          RKVEC:  .WORD   210             ;ADDRESS OF R611 VECTOR
5911  023560  000240          RKPRI:  .WORD   PR5             ;RK611 INTERRUPT PRIORITY
5912  023562  013644          A.NORM: ERRFRE                  ;ADDRESS OF NORMAL RETURN FROM DRIVER
5913  023564  015036          A.ABNL: DRVERR                  ;ADDRESS OF ABNORMAL RETURN FROM DRIVER
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5914  023566  016444                  A.CONT: CONERR                  ;ADDRESS OF CONTROLLER ERROR RETURN
5915  023570  000000                  E.CONT: .WORD   0               ;CONTROLLER ERROR STATUS
5916                                                                  ;  THIS LOCATION IS CLEARED WHEN EVERY COMMAND
5917                                                                  ;  IS INITIATED.  IF A CONTROLLER ERROR
5918                                                                  ;  OCCURS THE FOLLOWING BIT ASSIGNMENT IS
5919                                                                  ;  USED:
5920                                                                  ;
5921          000001                  E.CCLR= BIT0                    ;CLEAR CONTROLLER DID NOT CLEAR ERROR
5922          000002                  E.NOAT= BIT1                    ;NO ATTENTION IN ATTENTION SUMMARY REG
5923          000004                  E.UATT= BIT2                    ;UNSOLICATED ATTENTION (SEQUENTIAL ONLY)
5924          000010                  E.UDAT= BIT3                    ;UNEXPECTED DATA TYPE ERROR
5925          000020                  E.CLAT= BIT4                    ;ATTENTION DID NOT RESET WITH CLEAR
5926          000040                  E.SCLR= BIT5                    ;SUBSYSTEM CLEAR DID NOT CLEAR DRIVE
5927                                                                  ;  ATTENTION
5928          000100                  E.ILLD= BIT6                    ;ILLEGAL DRIVER COMMAND
5929          000400                  E.DLT=  BIT8                    ;DATA LATE WHEN UNLOADING HEADER
5930          001000                  E.CERR= BIT9                    ;CONTROLLER ERROR DURING DRIVER SERVICING
5931          002000                  E.DPAR= BIT10                   ;DRIVE DETECTED PARITY ERROR
5932          040000                  E.CMTO= BIT14                   ;CONTROLLER COMMAND TIME OUT (QUEUED ONLY)
5933          100000                  E.MDS=  BIT15                   ;MULTIPLE DRIVE SELECT
5934
5935  023572  000000                  0.WAIT: .WORD   0               ;PARAMETER BLOCK OF THE DRIVE
5936                                                                  ;WAITING FOR COMMAND COMPLETION
5937  023574  000400                  W.MTIM: .WORD   400             ;LOOP COUNTER FOR MILISECOND SCAN OF DRIVE
5938  023576  000400                  W.MILI: .WORD   400             ;16 MILISECOND TIME FOR PROGRAM
5939                                                                  ;
5940                                                                  ;        CPU     VALUE
5941                                                                  ;        ---     -----
5942                                                                  ;
5943                                                                  ;        11/05   100
5944                                                                  ;        11/10
5945                                                                  ;        11/20
5946                                                                  ;        11/34
5947                                                                  ;        11/40
5948                                                                  ;        11/45   400
5949                                                                  ;        11/50
5950                                                                  ;        11/70
5951  023600  000300                  W.SEC:  .WORD   300             ;SECOND COUNT COUNT FOR ALL COMMANDS
5952                                                                  ;  EXCEPT START SPINDLE
5953  023602  003000                  W.BSEC: .WORD   3000            ;8 SECOND FOR DRIVE CYCLE DOWN
5954  023604  030000                  W.MIN:  .WORD   30000           ;MINUTE TIME FOR START SPINDLE
5955  023606  000000                  HDR.AD: .WORD   0               ;ADDRESS USED FOR READ ALL HEADERS
5956  023610  000000                  HDR.CT: .WORD   0               ;NUMBER OF HEADERS LEFT TO READ FOR READ
5957                                                                  ;  ALL HEADERS
5958  023612     000                  I.ISRL: .BYTE   0               ;INTERRUPT OR RELEASED COMMAND ISSUED
5959  023613     002     004    010   H.HEAD: .BYTE   2,4,10          ;HEAD DECODES
5960  023616     000                  W.TIME: .BYTE   0               ;DRIVES BEING WATCH-DOG TIMED
5961
5962                                  .SBTTL  INTERRUPT MASKS
5963
5964  023617     000                  INTMSK: .BYTE   0               ;INTERRUPT MASKS FOR DRIVE IN PARAMETER BLOCK
5965
5966                                  ;       INTERRUPT MASK TABLE
5967
5968  023620     001                  I.DRV:  .BYTE   1               ;INTERRUPT MASK FOR DRIVE 0
5969  023621     002                          .BYTE   2               ;INTERRUPT MASK FOR DRIVE 1
```

```
 5970  023622  004                    .BYTE   4               ;INTERRUPT MASK FOR DRIVE 2
 5971  023623  010                    .BYTE   10              ;INTERRUPT MASK FOR DRIVE 3
 5972  023624  020                    .BYTE   20              ;INTERRUPT MASK FOR DRIVE 4
 5973  023625  040                    .BYTE   40              ;INTERRUPT MASK FOR DRIVE 5
 5974  023626  100                    .BYTE   100             ;INTERRUPT MASK FOR DRIVE 6
 5975  023627  200                    .BYTE   200             ;INTERRUPT MASK FOR DRIVE 7
 5976
 5977                          .SBTTL  PARAMETER BLOCK TABLE
 5978
 5979  023630  002142          PBLKT:  PARM0                   ;ADDRESS OF PARAMETER BLOCK GIVEN WITH
 5980                                                          ;DRIVE CALL.  MUST BE LOADED INTO PBLKT
 5981
 5982
 5983                          .SBTTL  TIME FOR WATCH-DOG TIMER
 5984
 5985  023632  000000          W.DRV:  .WORD   0               ;TIME FOR INSTRUCTION IN PARAMETER BLOCK
```

```
                                .SBTTL  RK611/RK06-RK07 UNIBUS DRIVER FOR SEQUENTIAL OPERATIONS (REV. 0.10)

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                                ;*DIGITAL EQUIPMENT CORP.
                                ;*MAYNARD, MA. 01754
                                ;*AUTHOR: ROY SPITZER

                                .SBTTL   *WATCH-DOG TIMER

                                ;;*****************************************************************
                                ;*
                                ;*      THE WATCH-DOG TIMER DOES A PSEUDO-TIMING OF RK06-RK07 UNIBUS
                                ;*      SUBSYSTEM COMMAND. SINCE ONE CAN NOT GUARANTEE THAT A
                                ;*      REAL-TIME CLOCK (KW11-P OR KW11-L) IS ON THE SYSTEM
                                ;*      THE RK06-RK07 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 ORDER EXCEEDED ITS TIME LIMIT
                                ;*
                                ;*      OTHERWISE AN ABNORMAL RETURN TO THE ROUTINE ADDRESS
                                ;*      BY LOCATION A.ABNL WILL OCCUR AND THE CMDTO FLAG
                                ;*      IN THE PROGRAM DEVICE STATUS REGISTER OF THE
                                ;*      APPROPRIATE PARAMETER BLOCK WILL BE SET.
                                ;*
                                ;;*****************************************************************

023634  010546          W.WTCH: MOV     R5,-(SP)        ;SAVE R5 ON THE STACK
023636  010446                  MOV     R4,-(SP)        ;SAVE R4 ON THE STACK
023640  010346                  MOV     R3,-(SP)        ;SAVE R3 ON THE STACK
023642  010246                  MOV     R2,-(SP)        ;SAVE R2 ON STACK
023644  013746  177776          MOV     PS,-(SP)        ;SAVE PROGRAM STATUS WORD ON STACK
023650  005337  023574          DEC     W.MTIM          ;DECREMENT MILLISECOND TIMER
023654  001034                  BNE     20$             ;IF NOT ZERO RETURN
023656  013737  023576  023574  MOV     W.MILI,W.MTIM   ;REINITIALIZE MILLISECOND TIMER
023664  105737  023616          TSTB    W.TIME          ;CHECK IF DRIVE IS BEING TIMED
023670  001426                  BEQ     20$             ;NO, RETURN
023672  013737  023560  177776  MOV     RKPRI,PS        ;LOCK OUT RK06-RK07 INTERRUPTS
023700  013702  023554          MOV     RKBAS,R2        ;LOAD BASE OF RK06-RK07 REGISTERS
023704  005337  023632          DEC     W.DRV           ;DECREMENT COMMAND TIMER
023710  001016                  BNE     20$             ;RETURN IF NO TIME OUT
```

```
 6042  023712  105037  023616                 CLRB    W.TIME          ;RESET TIMING INDICATOR
 6043  023716  013705  023630                 MOV     PBLKT,R5        ;LOAD ADDRESS OF PARAMETER BLOCK
 6044                                                                   ;  TABLE FOR INDEXING
 6045  023722  052765  000100  000014         BIS     #CMDTO,P.PRST(R5) ;SET COMMAND TIME OUT
 6046  023730  020537  023572                 CMP     R5,0.WAIT       ;CHECK IF DRIVER IS WAITING FOR
 6047                                                                   ;  COMMAND COMPLETION
 6048  023734  001002                         BNE     5$              ;NO, DO NOT ALTER WAITING FOR
 6049                                                                   ;  COMMAND COMPLETION
 6050  023736  005037  023572                 CLR     0.WAIT          ;CLEAR WAIT FOR COMMAND COMPLETION
 6051  023742  004737  027216          5$:    JSR     PC,R.ABNL       ;BRANCH TO ERROR ROUTINE
 6052  023746  012637  177776          20$:   MOV     (SP)+,PS        ;RESTORE PSW
 6053  023752  012602                         MOV     (SP)+,R2        ;RESTORE R2
 6054  023754  012603                         MOV     (SP)+,R3        ;RESTORE R3
 6055  023756  012604                         MOV     (SP)+,R4        ;RESTORE R4
 6056  023760  012605                         MOV     (SP)+,R5        ;RESTORE R5
 6057  023762  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
                        ;*
                        ;;*****************************************************************

023764  010546          I.INTR: MOV     R5,-(SP)        ;STORE R5 ON THE STACK
023766  010446                  MOV     R4,-(SP)        ;STORE R4 ON THE STACK
023770  010346                  MOV     R3,-(SP)        ;STORE R3 ON THE STACK
023772  010246                  MOV     R2,-(SP)        ;STORE R2 ON THE STACK
023774  010146                  MOV     R1,-(SP)        ;STORE R1 ON THE STACK
023776  010046                  MOV     R0,-(SP)        ;STORE R0 ON THE STACK
024000  013702  023554          MOV     RKBAS,R2        ;LOAD R2 TO ADDRESS RK06 REGISTER
024004  016237  000010  023520  MOV     RKCS2(R2),T.CS2 ;STORE CS2
024012  032737  001000  023520  BIT     #MDS,T.CS2      ;CHECK IF MULTIPLE DRIVE SELECT
024020  001407                  BEQ     1$              ;NO, CONTINUE PROCESSING
024022  052737  100000  023570  BIS     #E.MDS,E.CONT   ;SET MULTIPLE DRIVE SELECT
024030  004737  027242          JSR     PC,R.CONT       ;REPORT ERROR
```

```
6114  024034  000137  026214                  JMP     I.RTRN          ;RETURN
6115
6116  024040  105737  023612          1$:     TSTB    I.ISRL          ;CHECK IF INTERRUPT OR RELEASE
6117  024044  001410                          BEQ     6$              ;NO, CHECK IF DRIVE AVAILABLE
6118  024046  100403                          BMI     5$              ;CHECK IF RELEASE COMMAND
6119  024050  105037  023612                  CLRB    I.ISRL          ;YES,CLEAR FLAG
6120  024054  000473                          BR      I.IOO           ;CONTINUE PROCESSING INTERRUPT
6121
6122  024056  105037  023612          5$:     CLRB    I.ISRL          ;CLEAR FLAG
6123  024062  000137  025176                  JMP     I.ATTN          ;GO PROCESS DRIVE ATTENTIONS
6124
6125  024066  032737  010400  023520  6$:     BIT     #NED!UFE,T.CS2  ;CHECK FOR NON-EXISTENT DRIVE OR
6126                                                                  ;   UNIT FIELD ERROR
6127  024074  001413                          BEQ     7$              ;NO, WAIT FOR DUAL ACCESS INTERRUPT
6128  024076  013704  023520                  MOV     T.CS2,R4        ;LOAD R4 FOR DRIVE NUMBER
6129  024102  042704  177770                  BIC     #^C<DRVMSK>,R4  ;KEEP DRIVE BITS
6130  024106  013705  023630                  MOV     PBLKT,R5        ;STORE PARAMETER BLOCK ADDRESS
6131  024112  016237  000000  023516          MOV     RKCS1(R2),T.CS1 ;LOAD TEMPORARY CS1 FOR STATUS REPORT
6132  024120  000137  024406                  JMP     I.ERRC          ;REPORT ERROR
6133
6134  024124  016237  000012  023536  7$:     MOV     RKDS(R2),T.DS   ;STORE STATUS REGISTER FOR COMPARISON
6135  024132  032737  000001  023536          BIT     #DRA,T.DS       ;CHECK IF DRIVE SEIZED BY OTHER
6136                                                                  ;   PORT
6137  024140  001041                          BNE     I.IOO           ;NO, CONTINUE PROCESSING INTERRUPT
6138
6139                                          ;CHECK IF ANY DATA TRANSFER ERROR EXISTS
6140  024142  032737  164000  023520          BIT     #DLT!WCE!UPE!NEM,T.CS2
6141
6142  024150  001007                          BNE     10$             ;INDICATE ERROR
6143  024152  016237  000014  023534          MOV     RKER(R2),T.ER   ;STORE ERROR REGISTER
6144
6145                                  ;       CHECK FOR DATA TRANSFER ERROR TYPE ERROR
6146  024160  032737  125700  023534          BIT     #DCK!OPI!WLE!COE!HVRC!BSE!ECH,T.ER
6147
6148  024166  001407                          BEQ     11$             ;NO, WAIT FOR RELEASE OF RK06 DRIVE
6149
6150  024170  052737  000010  023570  10$:    BIS     #E.UDAT,E.CONT  ;SET UNEXPECTED DATA TYPE ERROR
6151  024176  004737  027242                  JSR     PC,R.CONT       ;REPORT ERROR
6152  024202  000137  026214                  JMP     I.RTRN          ;RESTORE REGISTERS
6153
6154  024206  105037  023616          11$:    CLRB    W.TIME          ;RESET TIMING ON THIS DRIVE
6155  024212  005037  023632                  CLR     W.DRV           ;CLEAR TIMING COUNT FOR THIS DRIVE
6156  024216  013705  023630                  MOV     PBLKT,R5        ;LOAD R5 WITH PARAMETER BLOCK
6157                                                                  ;   ADDRESS
6158  024222  052765  010000  000014          BIS     #DRVSZD,P.PRST(R5) ;SET DRIVE SEIZED IN THE
6159                                                                  ;   PROGRAM DRIVE STATUS REGISTER
6160  024230  005037  023572                  CLR     O.WAIT          ;CLEAR WAIT FOR COMMAND COMPLETION
6161  024234  004737  027216                  JSR     PC,R.ABNL       ;INDICATE ABNORMAL TERMINATION
6162  024240  000137  026214                  JMP     I.RTRN          ;GO RESTORE REGISTERS
6163
6164  024244  013705  023572          I.IOO:  MOV     O.WAIT,R5       ;LOAD PARAMETER BLOCK ADDRESS INTO R5
6165  024250  001002                          BNE     2$              ;IS COMMAND WAITING PROCESSING
6166                                                                  ;   YES, DO PROCESSING
6167  024252  000137  025176                  JMP     I.ATTN          ;NO, PROCESS ATTENTION
6168
6169  024256  013704  023520          2$:     MOV     T.CS2,R4        ;STORE RKCS2 FOR DRIVE NUMBER
```

```
 6170  024262  042704  177770                    BIC     #^C<DRVMSK>,R4  ;MASK OUT UNNECESSARY BITS
 6171
 6172
 6173  024266  126504  000000                    CMPB    P.DRVN(R5),R4   ;CHECK IF DRIVE NUMBER IS EXPECTED
 6174  024272  001401                            BEQ     3$              ;YES, CONTINUE
 6175  024274  000000                            HALT                    ;NO, DRIVER ERROR
 6176  024276  122765  000164  000001  3$:       CMPB    #RDALHD,P.CMND(R5) ;CHECK IF READ ALL HEADERS
 6177  024304  001002                            BNE     10$             ;NO, EXECUTE NORMAL DATA TRANSFER
 6178  024306  000137  024644                    JMP     I.HDAL          ;GO EXECUTE SPECIAL HEADER SEQUENCE
 6179
 6180  024312  005037  023572          10$:     CLR     O.WAIT          ;CLEAR WAIT FOR COMMAND COMPLETION
 6181  024316  005037  023632                    CLR     W.DRV           ;CLEAR WATCH-DOG TIME
 6182  024322  105037  023616                    CLRB    W.TIME          ;RESET TIMING ON THIS DRIVE
 6183  024326  016237  000000  023516            MOV     RKCS1(R2),T.CS1 ;STORE COMMAND AND STATUS REGISTER 1
 6184  024334  032737  100000  023516            BIT     #CERR,T.CS1     ;CHECK IF CONTROLLER ERROR
 6185  024342  001021                            BNE     I.ERRC          ;YES, PROCESS ERROR
 6186  024344  016237  000016  023532            MOV     RKASOF(R2),T.ASOF ;STORE ATTENTION SUMMARY
 6187  024352  133737  023617  023533            BITB    INTMSK,T.ASOF+1 ;CHECK IF DRIVE ATTENTION SET
 6188  024360  001004                            BNE     15$             ;YES, REPORT ERROR
 6189  024362  004737  027230                    JSR     PC,R.NORM       ;INDICATE NORMAL RETURN
 6190  024366  000137  026214                    JMP     I.RTRN          ;RESTORE REGISTERS
 6191
 6192  024372  052765  000010  000014  15$:     BIS     #UEXATT,P.PRST(R5) ;SET UNEXPECTED ATTENTION
 6193
 6194  024400  004737  026664          I.ERRA:  JSR     PC,I.CSTS       ;STORE CONTROLLER STATUS
 6195  024404  000405                            BR      I.ERR           ;STORE PATTERN AND POSITION INFORMATION
 6196
 6197  024406  013765  023516  000016  I.ERRC:  MOV     T.CS1,P.CS1(R5) ;GET ERROR RKCS1
 6198  024414  004737  026706                    JSR     PC,I.CST1       ;GET REST OF CONTROLLER STATUS
 6199  024420  016265  000032  000062  I.ERR:   MOV     RKECPT(R2),P.EPAT(R5) ;STORE ECC PATTERN
 6200  024426  016265  000030  000060          MOV     RKECPS(R2),P.EPOS(R5) ;STORE ECC POSITION
 6201  024434  004037  026232                    JSR     R0,I.CCLR       ;CLEAR CONTROLLER
 6202  024440  026214                            I.RTRN                  ;ERROR RETURN
 6203  024442  032765  010400  000020            BIT     #NED!UFE,P.CS2(R5) ;CHECK IF IT WAS NON-EXISTENT DRIVE OR
 6204                                                                    ;  UNIT FIELD ERROR
 6205  024450  001046                            BNE     5$              ;YES, REPORT ERROR
 6206  024452  004037  026770                    JSR     R0,I.STAT       ;GATHER DRIVE STATUS
 6207  024456  026214                            I.RTRN                  ;ERROR RETURN
 6208  024460  112737  000005  023516            MOVB    #DR.CLR,T.CS1   ;LOAD COMMAND
 6209  024466  004037  026314                    JSR     R0,I.ISSU       ;ISSUE DRIVE CLEAR
 6210  024472  026214                            I.RTRN                  ;ERROR RETURN
 6211  024474  133737  023617  023533            BITB    INTMSK,T.ASOF+1 ;CHECK IF ATTENTION RESET
 6212  024502  001407                            BEQ     2$              ;NO, INDICATE DRIVE ERROR
 6213  024504  052737  000020  023570            BIS     #E.CLAT,E.CONT  ;SET ATTENTION DID NOT RESET
 6214                                                                    ;  WITH CLEAR
 6215  024512  004737  027242                    JSR     PC,R.CONT       ;REPORT CONTROLLER ERROR
 6216  024516  000137  026214                    JMP     I.RTRN          ;GO RESTORE REGISTERS
 6217
 6218  024522  032737  040000  023542  2$:      BIT     #S.DSC,T.MR2    ;CHECK IF DRIVE STATUS CHANGE CLEARED
 6219  024530  001403                            BEQ     3$              ;YES, CHECK FAULT
 6220  024532  052765  000040  000014            BIS     #DRVDSC,P.PRST(R5) ;SET DSC DID NOT CLEAR
 6221  024540  032737  001000  023544  3$:       BIT     #S.PAR,T.MR3    ;CHECK IF DRIVE PARITY ERROR
 6222  024546  001407                            BEQ     5$              ;NO, INDICATE ABNORMAL TERMINATION
 6223  024550  052737  002000  023570            BIS     #E.DPAR,E.CONT  ;SET DRIVE PARITY ERROR
 6224  024556  004737  027242                    JSR     PC,R.CONT       ;INDICATE CONTROLLER ERROR
 6225  024562  000137  026214                    JMP     I.RTRN          ;RETURN
```

```
6226
6227  024566  032765  000020  000014  5$:     BIT     #DRVHRD,P.PRST(R5) ;CHECK IF HARD DRIVE ERROR
6228  024574  001017                          BNE     10$             ;YES, GO REPORT ERROR
6229  024576  032737  020000  023542          BIT     #S.PIP,T.MR2    ;CHECK IF DRIVE IS CYCLING DOWN
6230  024604  001413                          BEQ     10$             ;NO, REPORT ERROR
6231  024606  052765  020000  000014          BIS     #E.UNLD,P.PRST(R5) ;SET DRIVE UNLOADING
6232  024614  113737  023617  023616          MOVB    INTMSK,W.TIME   ;SET UP 8 SECONDS FOR DRIVE TO CYCLE UP
6233  024622  013737  023602  023632          MOV     W.BSEC,W.DRV
6234  024630  000137  026214                  JMP     I.RTRN          ;GO RESTORE REGISTERS
6235  .
6236  024634  004737  027216          10$:    JSR     PC,R.ABNL       ;GO REPORT ERROR
6237  024640  000137  026214                  JMP     I.RTRN          ;GO RESTORE REGISTERS
6238
6239                                  .SBTTL   *READ ALL HEADERS INTERRUPT SEQUENCE
6240
6241  024644  016237  000000  023516  I.HDAL: MOV     RKCS1(R2),T.CS1 ;STORE CS1 TO CHECK CONTROLLER
6242                                                                  ;  ERROR
6243  024652  032737  100000  023516          BIT     #CERR,T.CS1     ;CHECK IF CONTROLLER ERROR
6244  024660  001422                          BEQ     5$              ;NO, CHECK FOR ATTENTION
6245
6246  024662  005037  023572                  CLR     O.WAIT          ;CLEAR WAITING FOR COMMAND COMPLETE
6247  024666  105037  023616                  CLRB    W.TIME          ;RESET TIMING ON DRIVE
6248  024672  005037  023632                  CLR     W.DRV           ;CLEAR TIME OUT COUNT
6249  024676  013765  023516  000016          MOV     T.CS1,P.CS1(R5) ;STORE ERROR RKCS1
6250  024704  004737  026706                  JSR     PC,I.CST1       ;STORE CONTROLLER REGISTERS
6251  024710  004037  026232                  JSR     R0,I.CCLR       ;CLEAR CONTROLLER
6252  024714  026214                          I.RTRN                  ;ERROR RETURN
6253  024716  004737  027216                  JSR     PC,R.ABNL       ;INDICATE ERROR RETURN
6254  024722  000137  026214                  JMP     I.RTRN          ;RESTORE REGISTERS
6255
6256  024726  016237  000016  023532  5$:     MOV     RKASOF(R2),T.ASOF ;STORE ATTENTION SUMMARY
6257  024734  133737  023617  023533          BITB    INTMSK,T.ASOF+1 ;CHECK IF DRIVE ATTENTION IS SET
6258  024742  001410                          BEQ     7$              ;NO, CHECK IF READ ALL HEADERS
6259  024744  005037  023572                  CLR     O.WAIT          ;CLEAR WAITING FOR COMMAND COMPLETION
6260  024750  105037  023616                  CLRB    W.TIME          ;RESET TIMING ON DRIVE
6261  024754  005037  023632                  CLR     W.DRV           ;CLEAR TIME OUT COUNT
6262  024760  000137  024400                  JMP     I.ERRA          ;GO REPORT ERROR
6263
6264  024764  013701  023606          7$:     MOV     HDR.AD,R1       ;GET MAIN MEMORY ADDRESS
6265  024770  016221  000024                  MOV     RKDB(R2),(R1)+  ;GET FIRST WORD OF HEADER
6266  024774  016221  000024                  MOV     RKDB(R2),(R1)+  ;GET SECOND WORD OF HEADER
6267  025000  016221  000024                  MOV     RKDB(R2),(R1)+  ;GET THIRD WORD OF HEADER
6268  025004  010137  023606                  MOV     R1,HDR.AD       ;STORE ADDRESS FOR NEXT HEADER
6269  025010  016237  000010  023520          MOV     RKCS2(R2),T.CS2 ;STORE CS2 TO CHECK FOR DATA LATE
6270  025016  032737  100000  023520          BIT     #DLT,T.CS2      ;CHECK FOR DATA LATE
6271  025024  001055                          BNE     35$             ;YES, REPORT ERROR
6272  025026  005337  023610                  DEC     HDR.CT          ;DECREMENT NUMBER OF HEADER YET TO READ
6273  025032  001026                          BNE     25$             ;IF NON-ZERO, GO ISSUE NEXT READ HEADER
6274  025034  005037  023572                  CLR     O.WAIT          ;CLEAR DRIVER WAITING FOR COMMAND COMPLETION
6275  025040  005037  023632                  CLR     W.DRV           ;CLEAR TIME OUT COUNT FOR THIS DRIVE
6276  025044  105037  023616                  CLRB    W.TIME          ;CLEAR WATCH DOG TIME ON THIS DRIVE
6277  025050  012762  000003  000026          MOV     #3,RKMR1(R2)    ;LOAD MAINTENANCE REGISTER FOR SECTOR COUNT
6278  025056  112737  000001  023516          MOVB    #DR.SEL,T.CS1   ;LOAD SELECT COMMAND
6279  025064  004037  026314                  JSR     R0,I.ISSU       ;GET SECTOR COUNT
6280  025070  026214                          I.RTRN                  ;ERROR RETURN
6281  025072  013765  023544  000056          MOV     T.MR3,P.B11(R5) ;LOAD SECTOR COUNT
```

```
6282  025100  004737  027230                  JSR     PC,R.NORM       ;INDICATE NORMAL TERMINATION
6283  025104  000137  026214                  JMP     I.RTRN          ;RESTORE REGISTERS
6284
6285  025110  016562  000002  000020  25$:    MOV     P.CYLN(R5),RKDCYL(R2) ;LOAD CYLINDER ADDRESS REGISTER
6286  025116  016562  000004  000006          MOV     P.SECT(R5),RKDA(R2) ;LOAD SECTOR AND TRACK
6287  025124  116565  000007  000017          MOVB    P.CS1H(R5),P.CS1+1(R5) ;STORE BITS 8-15 OF CS1
6288  025132  042765  165777  000016          BIC     #^C<CDT!CFMT>,P.CS1(R5) ;CLEAR ALL BITS EXCEPT FORMAT AND
6289                                                                  ;  DRIVE TYPE
6290  025140  112765  000125  000016          MOVB    #RDHEAD,P.CS1(R5)  ;STORE COMMAND ISSUED
6291  025146  016562  000016  000000          MOV     P.CS1(R5),RKCS1(R2)  ;ISSUE READ HEADER
6292  025154  000137  026214                  JMP     I.RTRN          ;RESTORE REGISTERS
6293
6294  025160  052737  000400  023570  35$:    BIS     #E.DLT,E.CONT   ;SET DATA LATE WHILE UNLOADING HEADER
6295  025166  004737  027242                  JSR     PC,R.CONT       ;REPORT ERROR
6296  025172  000137  026214                  JMP     I.RTRN          ;RESTORE REGISTERS
6297
6298                                  .SBTTL   *DRIVE ATTENTION SCANNER
6299
6300  025176  016237  000000  023516  I.ATTN: MOV     RKCS1(R2),T.CS1 ;STORE COMMAND AND STATUS
6301                                                                  ;  REGISTER 1 FOR COMPARISON
6302  025204  032737  100000  023516          BIT     #CERR,T.CS1     ;CHECK IF CONTROLLER ERROR OCCURRED
6303  025212  001441                          BEQ     5$              ;NO, CHECK IF ATTENTION
6304
6305                                          ;CHECK IF ANY DATA TRANSFER TYPE ERROR EXISTS
6306  025214  032737  164000  023520          BIT     #DLT!WCE!UPE!NEM,T.CS2
6307
6308  025222  001007                          BNE     1$              ;INDICATE ERROR
6309  025224  016237  000014  023534          MOV     RKER(R2),T.ER   ;STORE ERROR REGISTER
6310
6311                                  ;       CHECK FOR DATA TRANSFER ERROR TYPE
6312  025232  032737  125700  023534          BIT     #DCK!OPI!WLE!COE!HVRC!BSE!ECH,T.ER
6313
6314  025240  001407                          BEQ     2$              ;NO DATA TRANSFER ERROR
6315
6316  025242  052737  000010  023570  1$:     BIS     #E.UDAT,E.CONT  ;SET UNEXPECTED DATA TYPE ERROR
6317  025250  004737  027242                  JSR     PC,R.CONT       ;REPORT ERROR
6318  025254  000137  026214                  JMP     I.RTRN          ;RESTORE REGISTERS
6319
6320  025260  013704  023520          2$:     MOV     T.CS2,R4        ;SAVE CS2 FOR REGISTER NUMBER
6321  025264  042704  177770                  BIC     #^C<DRVMSK>,R4  ;STRIP OFF JUNK
6322  025270  105037  023616                  CLRB    W.TIME          ;CLEAR WATCH DOG TIMER
6323  025274  005037  023632                  CLR     W.DRV           ;RESET TIMER VALUE
6324  025300  013705  023630                  MOV     PBLKT,R5        ;STORE PARAMETER BLOCK ADDRESS IN R5
6325
6326                                  ;       CLEAR DRIVE POSITIONING AND DRIVE POSITIONED FOR DATA TRANSFER
6327                                  ;         IN PROGRAM DEVICE STATUS REGISTER
6328  025304  042765  000006  000014          BIC     #DRVPOS!DRVPDT,P.PRST(R5)
6329
6330  025312  000137  024406                  JMP     I.ERRC          ;GO REPORT ERROR
6331
6332  025316  032737  040000  023516  5$:     BIT     #DI,T.CS1       ;CHECK IF ANY DRIVE ATTENTION
6333  025324  001002                          BNE     6$              ;YES, PROCESS INTERRUPT
6334  025326  000137  026214                  JMP     I.RTRN          ;RESTORE REGISTERS
6335
6336  025332  016237  000016  023532  6$:     MOV     RKASOF(R2),T.ASOF ;STORE ATTENTION SUMMARY
6337  025340  105737  023533                  TSTB    T.ASOF+1        ;CHECK IF ANY ATTENTIONS SET
```

```
6338  025344  001007                        BNE     7$                      ;YES GO PROCESS INTERRUPT
6339  025346  052737  000002  023570        BIS     #E.NOAT,E.CONT          ;SET NO ATTENTION IN ATTENTION SUMMARY
6340  025354  004737  027242                JSR     PC,R.CONT               ;GO REPORT ERROR
6341  025360  000137  026214                JMP     I.RTRN                  ;GO RESTORE REGISTERS
6342
6343  025364  133737  023617  023533  7$:   BITB    INTMSK,T.ASOF+1         ;CHECK IF DESIRED INTERRUPT
6344  025372  001007                        BNE     8$                      ;YES, GO PROCESS IT
6345  025374  052737  000004  023570        BIS     #E.UATT,E.CONT          ;SET UNSOLICATED ATTENTION
6346  025402  004737  027242                JSR     PC,R.CONT               ;GO REPORT ERROR
6347  025406  000137  026214                JMP     I.RTRN                  ;GO RESTORE REGISTERS
6348
6349  025412  013705  023630          8$:   MOV     PBLKT,R5                ;STORE PARAMETER BLOCK TABLE
6350  025416  116504  000000                MOVB    P.DRVN(R5),R4           ;STORE DRIVE NUMBER
6351  025422  032765  020000  000014        BIT     #E.UNLD,P.PRST(R5)  ;CHECK IF DRIVE UNLOADING
6352  025430  001402                        BEQ     11$                     ;NO, CONTINUE
6353  025432  000137  026114                JMP     I.UNLD                  ;SERVICE DRIVE IN POSITION AFTER ERROR
6354
6355  025436  042765  000002  000014  11$:   BIC     #DRVPOS,P.PRST(R5)  ;RESET DRIVE POSITIONING
6356  025444  005062  000026                CLR     RKMR1(R2)               ;CLEAR MAINTENANCE REGISTER 1
6357  025450  112737  000001  023516        MOVB    #DR.SEL,T.CS1           ;LOAD COMMAND
6358  025456  004037  026314                JSR     R0,I.ISSU               ;SELECT DRIVE WITH ATTENTION HIGH
6359  025462  026214                        I.RTRN                          ;ERROR RETURN
6360  025464  013765  023544  000042        MOV     T.MR3,P.BOO(R5)         ;STORE STATUS BYTE 00 MESS B
6361  025472  032765  000200  000042        BIT     #S.FLT,P.BOO(R5)  ;CHECK IF DRIVE FAULT
6362  025500  001401                        BEQ     12$                     ;NO, CHECK FOR DRIVE STATUS CHANGE
6363  025502  000461                        BR      I.AERR                  ;PROCESS ERROR
6364
6365  025504  013765  023542  000040  12$:   MOV     T.MR2,P.A00(R5)         ;STORE MAINTENANCE REGISTER 2
6366  025512  032765  040000  000040        BIT     #S.DSC,P.A00(R5)  ;CHECK FOR DRIVE STATUS CHANGE
6367  025520  001004                        BNE     13$                     ;YES, PROCESS DRIVE STATUS CHANGE
6368  025522  052765  004000  000014        BIS     #NODSC,P.PRST(R5)  ;SET NO DRIVE STATUS CHANGE
6369  025530  000446                        BR      I.AERR                  ;PROCESS ERROR
6370
6371  025532  112737  000005  023516  13$:   MOVB    #DR.CLR,T.CS1           ;LOAD COMMAND
6372  025540  004037  026314                JSR     R0,I.ISSU               ;CLEAR DRIVE STATUS CHANGE
6373  025544  026214                        I.RTRN                          ;ERROR RETUN
6374  025546  013765  023532  000032        MOV     T.ASOF,P.ASOF(R5)  ;STORE ATTENTION SUMMARY
6375  025554  133765  023617  000033        BITB    INTMSK,P.ASOF+1(R5)  ;CHECK IF ATTENTION RESET
6376  025562  001407                        BEQ     15$                     ;YES, CONTINUE INTERRUPT PROCESSING
6377  025564  052737  000020  023570        BIS     #E.CLAT,E.CONT          ;SET ATTENTION DID NOT RESET
6378                                                                        ;   WITH DRIVE CLEAR
6379  025572  004737  027242                JSR     PC,R.CONT               ;FLAG ERROR
6380  025576  000137  026214                JMP     I.RTRN                  ;RESTORE REGISTERS
6381
6382  025602  013765  023542  000040  15$:   MOV     T.MR2,P.A00(R5)         ;STORE MAINTENANCE REGISTER 2
6383  025610  032765  040000  000040        BIT     #S.DSC,P.A00(R5)  ;CHECK IF DRIVE STATUS CHANGE
6384                                                                        ;   RESET
6385  025616  001404                        BEQ     16$                     ;YES, CONTINUE INTERRUPT PROCESSING
6386  025620  052765  000040  000014        BIS     #DRVDSC,P.PRST(R5)  ;SET DRIVE STATUS CHANGE DID NOT CLEAR
6387  025626  000407                        BR      I.AERR                  ;GO PROCESS ERROR
6388
6389  025630  105037  023616          16$:   CLRB    W.TIME                  ;RESET TIMING ON THIS DRIVE
6390  025634  005037  023632                CLR     W.DRV                   ;CLEAR DRIVE TIMING COUNT
6391  025640  004737  027230                JSR     PC,R.NORM               ;REPORT SUCCESSFUL COMMAND COMPLETETION
6392  025644  000563                        BR      I.RTRN                  ;RESTORE REGISTERS
6393
```

```
                                        .SBTTL   #ATTENTION ERROR HANDLER

025646  042765  000004  000014  I.AERR: BIC     #DRVPDT,P.PRST(R5) ;RESET POSITIONING IN PROGRESS BECAUSE
                                                                   ;  OF DATA TRANSFER
025654  105037  023616                 CLRB    W.TIME             ;CLEAR TIMING FOR THIS DRIVE
025660  005037  023632                 CLR     W.DRV              ;RESET WATCH-DOG TIME
025664  042765  177741  000016         BIC     #177741,P.CS1(R5)  ;KEEP COMMAND ISSUED
025672  042737  000036  023516         BIC     #36,T.CS1          ;KEEP CURRENT CONTROLLER STATUS
025700  053765  023516  000016         BIS     T.CS1,P.CS1(R5)    ;MAKE GOOD MESSAGE
025706  013765  023520  000020         MOV     T.CS2,P.CS2(R5)    ;STORE CONTROLLER REGISTERS
025714  013765  023522  000022         MOV     T.WCR,P.WCR(R5)
025722  013765  023524  000024         MOV     T.BA,P.BAR(R5)
025730  013765  023526  000026         MOV     T.DA,P.DTS(R5)
025736  013765  023530  000030         MOV     T.DC,P.DCYL(R5)
025744  013765  023532  000032         MOV     T.ASOF,P.ASOF(R5)
025752  013765  023534  000034         MOV     T.ER,P.ER(R5)
025760  013765  023536  000036         MOV     T.DS,P.DS(R5)
025766  004037  026770                 JSR     R0,I.STAT          ;GATHER DRIVE STATUS
025772  026214                         I.RTRN                     ;ERROR RETURN
025774  112737  000005  023516         MOVB    #DR.CLR,T.CS1      ;LOAD COMMAND
026002  004037  026314                 JSR     R0,I.ISSU          ;CLEAR DRIVE ERRORS
026006  026214                         I.RTRN                     ;ERROR RETURN
026010  133737  023617  023533         BITB    INTMSK,T.ASOF+1    ;CHECK IF ATTENTION RESET
026016  001407                         BEQ     2$                 ;YES, FLAG DRIVE ERROR
026020  052737  000020  023570         BIS     #E.CLAT,E.CONT     ;SET ATTENTION DID NOT RESET
026026  004737  027242                 JSR     PC,R.CONT          ;REPORT ERROR
026032  000137  026214                 JMP     I.RTRN             ;RESTORE REGISTERS

026036  032765  000020  000014  2$:    BIT     #DRVHRD,P.PRST(R5) ;CHECK IF AHARD DRIVE ERROR
026044  001017                         BNE     10$                ;YES, REPORT ERROR
026046  032737  020000  023542         BIT     #S.PIP,T.MR2       ;CHECK IF DRIVE IS UNLOADING
026054  001413                         BEQ     10$                ;NO, REPORT ERROR
026056  052765  020000  000014         BIS     #E.UNLD,P.PRST(R5) ;SET DRIVE UNLOADING DUE TO ERROR
026064  113737  023617  023616         MOVB    INTMSK,W.TIME      ;SET TIMING ON THIS DRIVE
026072  013737  023602  023632         MOV     W.8SEC,W.DRV       ;LOAD 8 SECONDS FOR CYCLE UP TIME
026100  000137  026214                 JMP     I.RTRN             ;RESTORE REGISTERS

026104  004737  027216         10$:    JSR     PC,R.ABNL          ;REPORT ERROR
026110  000137  026214                 JMP     I.RTRN             ;RESTORE REGISTERS

                                        .SBTTL   #ERROR CAUSING DRIVE TO UNLOAD

026114  052765  020000  000014  I.UNLD: BIS     #E.UNLD,P.PRST(R5) ;CLEAR DRIVE UNLOADING BECAUSE OF ERROR
026122  112737  000005  023516         MOVB    #DR.CLR,T.CS1      ;LOAD IN DRIVE CLEAR
026130  004037  026314                 JSR     R0,I.ISSU          ;GO ISSUE DRIVE CLEAR
026134  026214                         I.RTRN                     ;ERROR RETURN
026136  136437  023617  023533         BITB    INTMSK(R4),T.ASOF+1 ;CHECK IF ATTENTION CLEARED
026144  001406                         BEQ     15$                ;YES, CONTINUE
026146  012737  000020  023570         MOV     #E.CLAT,E.CONT     ;SET ATTENTION DID NOT RESET
026154  004737  027242                 JSR     PC,R.CONT          ;REPORT ERROR
026160  000415                         BR      I.RTRN             ;RESTORE REGISTERS

026162  032737  040000  023542  15$:    BIT     #S.DSC,T.MR2       ;CHECK IF DRIVE STAUS CHANGE RESET
026170  001403                         BEQ     20$                ;YES, CONTINUE
026172  052765  000040  000014         BIS     #DRVDSC,P.PRST(R5) ;SET DRIVE STAUS CHANGE DID NOT CLEAR
026200  105037  023616         20$:    CLRB    W.TIME             ;RESET TIMING ON THIS DRIVE
```

```
 6450  026204  005037  023632                  CLR     W.DRV           ;CLEAR TIME COUNT
 6451  026210  004737  027216                  JSR     PC,R.ABNL       ;REPORT ERROR
 6452
 6453  026214  012600                I.RTRN:   MOV     (SP)+,R0        ;RESTORE R0
 6454  026216  012601                          MOV     (SP)+,R1        ;RESTORE R1
 6455  026220  012602                          MOV     (SP)+,R2        ;RESTORE R2
 6456  026222  012603                          MOV     (SP)+,R3        ;RESTORE R3
 6457  026224  012604                          MOV     (SP)+,R4        ;RESTORE R4
 6458  026226  012605                          MOV     (SP)+,R5        ;RESTORE R5
 6459  026230  000002                          RTI                     ;RETURN
 6460
```

```
                        .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
                        ;;*
                        ;;*****************************************************************

026232  012762  100000  000000  I.CCLR: MOV     #CCLR,RKCS1(R2) ;CLEAR CONTROLLER
026240  016237  000000  023516          MOV     RKCS1(R2),T.CS1 ;STORE COMMAND AND STATUS REGISTER 1
026246  032737  100000  023516          BIT     #CERR,T.CS1     ;CHECK IF CONTROLLER CLEAR DID
                                                                ;  CLEAR ERROR
026254  001407                          BEQ     5$              ;YES, RETURN TO DRIVER PROCESSING
026256  052737  000001  023570          BIS     #E.CCLR,E.CONT  ;SET CLEAR CONTROLLER DID NOT CLEAR ERROR
026264  004737  027242                  JSR     PC,R.CONT       ;REPORT CONTROLLER ERROR
026270  011000                          MOV     (R0),R0         ;SET UP ERROR RETURN
026272  000200                          RTS     R0              ;RETURN

026274  012762  000100  000000  5$:     MOV     #IE,RKCS1(R2)   ;SET INTERRUPT ENABLE
026302  112737  177777  023612          MOVB    #-1,I.ISRL      ;SET INTERRUPT ENABLE ISSUED
026310  005720                          TST     (R0)+           ;ADJUST FOR NORMAL RETURN
026312  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,I.ISSU
                                ;*      <ADDRESS OF ERROR RETURN>
                                ;*      RETURN
                                ;*
                                ;*      ROUTINES USED:
                                ;*      --------------
                                ;*
                                ;*              I.CCLR
                                ;*              I.STOR
                                ;*
                                ;*****************************************************************

026314  013746  023516          I.ISSU: MOV     T.CS1,-(SP)     ;STORE COMMAND ISSUED
026320  005037  023520                  CLR     T.CS2           ;CLEAR TEMPORARY CS2
026324  116537  000000  023520          MOVB    P.DRVN(R5),T.CS2 ;LOAD IN DRIVE NUMBER
026332  013762  023520  000010          MOV     T.CS2,RKCS2(R2) ;LOAD DRIVE NUMBER FOR COMMAND
026340  116537  000007  023517          MOVB    P.CS1H(R5),T.CS1+1 ;STORE BITS 8-15 OF CS1
026346  142737  177753  023517          BICB    #^C<B.CDT!B.CFMT>,T.CS1+1 ;CLEAR ALL BITS EXCEPT
                                                                ;  FORMAT AND DRIVE TYPE
026354  013762  023516  000000          MOV     T.CS1,RKCS1(R2) ;ISSUE COMMAND
026362  105762  000000          1$:     TSTB    RKCS1(R2)       ;WAIT FOR READY
026366  100375                  BPL     1$
026370  004737  026536          JSR     PC,I.STOR       ;GO STORE REGISTERS
026374  032737  100000  023516  BIT     #CERR,T.CS1     ;CHECK IF CONTROLLER ERROR OCCUERED
026402  001437                  BEQ     5$              ;NO, RETURN
026404  032737  001000  023520  BIT     #MDS,T.CS2      ;CHECK IF MULTIPLE DRIVE SELECT
026412  001406                  BEQ     2$              ;NO, CHECK FOR OTHER CONTROLLER ERRORS
026414  052737  100000  023570  BIS     #E.MDS,E.CONT   ;SET MULTIPLE DRIVE SELECT FLAG
026422  004737  027242          JSR     PC,R.CONT       ;REPORT CONTROLLER ERROR
026426  000440                  BR      10$             ;RETURN

                                ;CHECK IF ANY CONTROLLER ERROR IS SET
026430  032737  024000  023516  2$:     BIT     #CTO!SPAR,T.CS1
026436  001027                  BNE     7$
026440  032737  176400  023520  BIT     #UFE!PGE!NEM!NED!UPE!WCE!DLT,T.CS2
026446  001023                  BNE     7$
026450  032737  131761  023534  BIT     #ILC!DTYE!FMTE!ECH!BSE!HVRC!COE!DTE!OPI!DCK,T.ER
026456  001017                  BNE     7$

026460  122716  000005          CMPB    #DR.CLR,(SP)    ;CHECK IF CLEAR DRIVE
```

```
 6552  026464  001003                      BNE     3$                      ;NO, DO NOT SET DRIVE HARD ERROR
 6553  026466  052765  000020  000014      BIS     #DRVHRD,P.PRST(R5) ;SET HARD DRIVE ERROR
 6554  026474  004037  026232        3$:   JSR     R0,I.CCLR               ;GO ISSUE A CONTROLLER CLEAR
 6555  026500  026530                      10$                             ;ERROR RETURN
 6556  026502  012762  000100  000000  5$: MOV     #IE,RKCS1(R2)           ;SET INTERRUPT ENABLE
 6557  026510  005726                      TST     (SP)+                   ;ADJUST STACK
 6558  026512  005720                      TST     (R0)+                   ;ADJUST R0 FOR NORMAL RETURN
 6559  026514  000200                      RTS     R0                      ;RETURN
 6560
 6561  026516  052737  001000  023570  7$: BIS     #E.CERR,E.CONT          ;SET CONTROLLER ERROR DURING
 6562                                                                      ;  DRIVER SERVICING
 6563  026524  004737  027242              JSR     PC,R.CONT               ;REPORT ERROR
 6564  026530  005726                10$:  TST     (SP)+                   ;ADJUST STACK
 6565  026532  011000                      MOV     (R0),R0                 ;ADJUST R0 FOR ERROR RETURN
 6566  026534  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
                                ;*
                                ;;*****************************************************************

026536  016237  000000  023516  I.STOR: MOV     RKCS1(R2),T.CS1 ;STORE ALL CONTROLLER REGISTERS
026544  016237  000010  023520          MOV     RKCS2(R2),T.CS2 ;  EXCEPT DATA BUFFER
026552  016237  000002  023522          MOV     RKWC(R2),T.WCR
026560  016237  000004  023524          MOV     RKBA(R2),T.BA
026566  016237  000006  023526          MOV     RKDA(R2),T.DA
026574  016237  000012  023536          MOV     RKDS(R2),T.DS
026602  016237  000014  023534          MOV     RKER(R2),T.ER
026610  016237  000016  023532          MOV     RKASOF(R2),T.ASOF
026616  016237  000020  023530          MOV     RKDCYL(R2),T.DC
026624  016237  000026  023540          MOV     RKMR1(R2),T.MR1
026632  016237  000034  023542          MOV     RKMR2(R2),T.MR2
026640  016237  000036  023544          MOV     RKMR3(R2),T.MR3
026646  016237  000030  023546          MOV     RKECPS(R2),T.POS
026654  016237  000032  023550          MOV     RKECPT(R2),T.PAT
026662  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
                                ;*
                                ;*****************************************************************

026664  042765  177741  000016  I.CSTS: BIC     #177741,P.CS1(R5)       ;CLEAR ALL BITS EXCEPT FUNCTION
                                                                        ;OF LAST COMMAND ISSUED
026672  042737  000036  023516          BIC     #36,T.CS1               ;CLEAR FUNCTION OF CS1 STATUS
026700  053765  023516  000016          BIS     T.CS1,P.CS1(R5)         ;GENERATE CS1 STATUS INFORMATION
026706  016265  000010  000020  I.CST1: MOV     RKCS2(R2),P.CS2(R5)     ;STORE COMMAND AND STATUS REGISTER 2
026714  016265  000002  000022          MOV     RKWC(R2),P.WCR(R5)      ;STORE WORD COUNT REGISTER
026722  016265  000004  000024          MOV     RKBA(R2),P.BAR(R5)      ;STORE BUS ADDRESS REGISTER
026730  016265  000006  000026          MOV     RKDA(R2),P.DTS(R5)      ;STORE DESIRED TRACK AND SECTOR
026736  016265  000012  000036          MOV     RKDS(R2),P.DS(R5)       ;STORE DRIVE STATUS REGISTER
026744  016265  000014  000034          MOV     RKER(R2),P.ER(R5)       ;STORE ERROR REGISTER
026752  016265  000016  000032          MOV     RKASOF(R2),P.ASOF(R5)   ;STORE ATTENTION SUMMARY AND
                                                                        ;  OFFSET
026760  016265  000020  000030          MOV     RKDCYL(R2),P.DCYL(R5)   ;STORE CYLINDER ADDRESS
026766  000207                  RTS     PC                              ;RETURN
```

```
                                .SBTTL   *GATHER DRIVE STATUS

                                ;;*****************************************************************
                                ;;*
                                ;;*       THIS SUBROUTINE WILL BE USED TO GATHER DRIVE STATUS
                                ;;*       BYTE 01, 10, AND 11. IT IS ASSUMED THAT THE DRIVE
                                ;;*       HAS PREVIOUSLY BEEN SEIZED.  IT RUNS AT PRIORITY 7.
                                ;;*
                                ;;*CALL   JSR     R0,I.STAT
                                ;;*       <ADDRESS OF ERROR RETURN>
                                ;;*       RETURN
                                ;;*
                                ;;*       THIS ROUTINE ASSUMES THE FOLLOWING REGISTERS CONTAIN:
                                ;;*
                                ;;*
                                ;;*               REGISTER                CONTENTS
                                ;;*               --------                --------
                                ;;*
                                ;;*               R2                      RK06 BASE ADDRESS
                                ;;*               R5                      ADDRESS OF PARAMETER BLOCK
                                ;;*
                                ;;*       ROUTINES USED:
                                ;;*               I.ISSU
                                ;;*
                                ;;*****************************************************************

026770  012762  000001  000026  I.STAT: MOV     #1,RKMR1(R2)            ;LOAD MAINTENANCE REGISTER 1
                                                                        ;   FOR STATUS BYTE 01
026776  112737  000001  023516          MOVB    #DR.SEL,T.CS1           ;LOAD COMMAND
027004  004037  026314                  JSR     R0,I.ISSU               ;GET STATUS BYTES 01
027010  027200                          3$                              ;ERROR RETURN
027012  013765  023542  000044          MOV     T.MR2,P.A01(R5)         ;STORE STATUS BYTE 01 MESS A
027020  013765  023544  000046          MOV     T.MR3,P.B01(R5)         ;STORE STATUS BYTE 01 MESS B
027026  012762  000002  000026          MOV     #2,RKMR1(R2)            ;LOAD MAINTENANCE REGISTER 1
                                                                        ;   FOR STATUS BYTE 10
027034  112737  000001  023516          MOVB    #DR.SEL,T.CS1           ;LOAD COMMAND
027042  004037  026314                  JSR     R0,I.ISSU               ;GET STATUS BYTES 10
027046  027200                          3$                              ;ERROR RETURN
027050  013765  023542  000050          MOV     T.MR2,P.A10(R5)         ;STORE STATUS BYTE 10 MESS A
027056  013765  023544  000052          MOV     T.MR3,P.B10(R5)         ;STORE STATUS BYTE 10 MESS B
027064  012762  000003  000026          MOV     #3,RKMR1(R2)            ;LOAD MAINTENANCE REGISTER
                                                                        ;   FOR STATUS BYTE 11
027072  112737  000001  023516          MOVB    #DR.SEL,T.CS1           ;LOAD COMMAND
027100  004037  026314                  JSR     R0,I.ISSU               ;GET STATUS BYTES 11
027104  027200                          3$                              ;ERROR RETURN
027106  013765  023542  000054          MOV     T.MR2,P.A11(R5)         ;STORE STATUS BYTE 11 MESS A
027114  013765  023544  000056          MOV     T.MR3,P.B11(R5)         ;STORE STATUS BYTE 11 MESS B
027122  005062  000026                  CLR     RKMR1(R2)               ;LOAD MAINTENANCE REGISTER 1
                                                                        ;   FOR STATUS BYTE 00
027126  112737  000001  023516          MOVB    #DR.SEL,T.CS1           ;LOAD COMMAND
027134  004037  026314                  JSR     R0,I.ISSU               ;GET STATUS BYTES 00
027140  027200                          3$                              ;ERROR RETURN
027142  013765  023542  000040          MOV     T.MR2,P.A00(R5)         ;STORE STATUS BYTE 00 MESS A
027150  013765  023544  000042          MOV     T.MR3,P.B00(R5)         ;STORE STATUS BYTE 00 MESS B
027156  032737  001000  023544          BIT     #S.PAR,T.MR3            ;CHECK IF BAD PARITY DETECTED BY DRIVE
027164  001407                          BEQ     5$                      ;NO, RETURN NORMALLY
```

```
 6700  027166  052737  002000  023570          BIS     #E.DPAR,E.CONT          ;INDICATE BAD PARITY DETECTED BY DRIVE
 6701  027174  004737  027242                  JSR     PC,R.CONT               ;REPORT ERROR
 6702  027200  011000                  3$:     MOV     (R0),R0                 ;LOAD R0 FOR ERROR RETURN
 6703  027202  000200                          RTS     R0                      ;RETURN
 6704
 6705  027204  052765  001000  000014  5$:     BIS     #PBSVAL,P.PRST(R5)      ;SET PARAMETER BLOCK STATUS VALID
 6706  027212  005720                          TST     (R0)+                   ;ADJUST R0 FOR NORMAL RETURN
 6707  027214  000200                          RTS     R0                      ;RETURN
 6708
```

```
                                        .SBTTL  *COMMON DRIVER RETURNS

                                R.ABNL: CLRB    INTMSK          ;INHIBIT FUTURE DRIVE INTERRUPT REPORTING
                                        JSR     PC,@A.ABNL      ;INDICATE ABNORMAL RETURN
                                        RTS     PC              ;RETURN

                                R.NORM: CLRB    INTMSK          ;INHIBIT FUTURE DRIVE INTERRUPT REPORTING
                                        JSR     PC,@A.NORM      ;INDICATE NORMAL RETURN
                                        RTS     PC              ;RETURN

                                R.CONT: CLRB    INTMSK          ;INHIBIT FUTURE DRIVE INTERRUPT REPORTING
                                        CLRB    W.TIME          ;RESET WATCH DOG TIMING ON THIS DRIVE
                                        CLR     W.DRV           ;CLEAR TIMING COUNT FOR THIS DRIVE
                                        JSR     PC,@A.CONT      ;INDICATE CONTROLLER ERROR RETURN
                                        RTS     PC              ;RETURN
```

```
                                .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 DRIVER WILL LOAD THE
                                ;;*      LOCATIONS, PBLKT AND INTMSK.
                                ;;*
                                ;;*      ROUTINES USED:
                                ;;*              W.WTCH
                                ;;*              I.CSTS
                                ;;*              I.STAT
                                ;;*              I.CCLR
                                ;;*
                                ;;*****************************************************************

027264  010546          C.INIT: MOV     R5,-(SP)        ;STORE R5 ON STACK
027266  010446                  MOV     R4,-(SP)        ;STORE R4 ON STACK
027270  010346                  MOV     R3,-(SP)        ;STORE R3 ON STACK
027272  010246                  MOV     R2,-(SP)        ;STORE R2 ON STACK
027274  010146                  MOV     R1,-(SP)        ;STORE R1 ON STACK
027276  010046                  MOV     R0,-(SP)        ;STORE R0 ON STACK
027300  013746  177776          MOV     PS,-(SP)        ;STORE PSW ON STACK
027304  013737  023560  177776  MOV     RKPRI,PS        ;LOCK OUT RK06 INTERRUPTS
027312  017605  000016          MOV     @16(SP),R5      ;STORE PARAMETER BLOCK ADDRESS
027316  062766  000002  000016  ADD     #2,16(SP)       ;ADJUST RETURN
027324  016504  000000          MOV     P.DRVN(R5),R4   ;STORE DRIVE NUMBER
027330  042704  177770          BIC     #^C<DRVMSK>,R4  ;MASK OUT JUNK
027334  010537  023630          MOV     R5,PBLKT        ;LOAD PARAMETER BLOCK TABLE
027340  116437  023620  023617  MOVB    I.DRV(R4),INTMSK ;LOAD INTERRUPT MASK
027346  116437  023620  023616  MOVB    I.DRV(R4),W.TIME ;SET WATCH-DOG TIMER FLAG
027354  013737  023600  023632  MOV     W.SEC,W.DRV     ;LOAD WATCH-DOG TIME

027362  013702  023554          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
```

```
 6780  027366  042765  075176  000014          BIC     #^C<DRVUSE!W.WCK!NOCHK!DRPDRV!DTBAII>,P.PRST(R5)
 6781
 6782  027374  010500                          MOV     R5,R0           ;STORE PARAMETER BLOCK ADDRESS
 6783  027376  062700  000016                  ADD     #P.CS1,R0       ;CALCULATE FIRST LOCATION TO BE CLEARED
 6784  027402  010501                          MOV     R5,R1           ;STORE PARAMETER BLOCK ADDRESS
 6785  027404  062701  000062                  ADD     #P.EPAT,R1      ;CALCULATE LAST LOCATION TO BE CLEARED
 6786
 6787  027410  005020                  1$:     CLR     (R0)+           ;CLEAR RETURN PARAMETER
 6788  027412  020001                          CMP     R0,R1           ;CHECK IF FINISHED
 6789  027414  101775                          BLOS    1$              ;NO, CLEAR NEXT RETURN PARAMETER
 6790  027416  105037  023612                  CLRB    I.ISRL          ;CLEAR RELEASE OR INTERRUPT ISSUED
 6791  027422  010465  000020                  MOV     R4,P.CS2(R5)    ;STORE DRIVE NUMBER
 6792  027426  005062  000026                  CLR     RKMRI(R2)       ;CLEAR RK06 MAINTENANCE REGISTER 1
 6793  027432  132765  000040  000001          BITB    #BIT5,P.CMND(R5) ;CHECK IF SPECIAL COMMAND
 6794  027440  001402                          BEQ     3$              ;NO, PROCESS
 6795  027442  000137  030156                  JMP     C.SPEC          ;JUMP TO SPECIAL COMMAND PROCESSOR
 6796
 6797  027446  122765  000107  000001  3$:     CMPB    #UNLOAD,P.CMND(R5) ;CHECK IF POSITIONING COMMAND
 6798                                                                  ;  START SPINDLE
 6799                                                                  ;  RECALIBRATE
 6800                                                                  ;  OFFSET
 6801                                                                  ;  SEEK
 6802                                                                  ;  UNLOAD
 6803
 6804  027454  101174                          BHI     25$             ;NO, DRIVE COMMAND
 6805                                                                  ;  SELECT DRIVE
 6806                                                                  ;  PACK ACKNOWLEDGE
 6807                                                                  ;  CLEAR
 6808
 6809  027456  122765  000117  000001          CMPB    #SEEK,P.CMND(R5) ;CHECK IF DATA TRANSFER
 6810  027464  103540                          BLO     20$             ;YES, DATA TRANSFER COMMAND
 6811                                                                  ;  READ DATA
 6812                                                                  ;  WRITE DATA
 6813                                                                  ;  READ HEADER
 6814                                                                  ;  WRITE HEADER
 6815                                                                  ;  WRITE CHECK
 6816  027466  016562  000020  000010          MOV     P.CS2(R5),RKCS2(R2) ;LOAD DRIVE NUMBER
 6817  027474  052765  000002  000014          BIS     #DRVPOS,P.PRST(R5) ;SET DRIVE POSITIONING
 6818  027502  005037  023572                  CLR     O.WAIT          ;CLEAR WAIT FOR COMMAND
 6819  027506  122765  000117  000001          CMPB    #SEEK,P.CMND(R5) ;CHECK IF SEEK
 6820  027514  001007                          BNE     5$              ;NO, CHECK FOR OFFSET
 6821  027516  016562  000002  000020          MOV     P.CYLN(R5),RKDCYL(R2) ;LOAD CYLINDER ADDRESS
 6822  027524  016562  000004  000006          MOV     P.SECT(R5),RKDA(R2) ;LOAD SECTOR AND TRACK
 6823  027532  000431                          BR      8$              ;GO ISSUE COMMAND
 6824
 6825  027534  122765  000115  000001  5$:     CMPB    #OFFSET,P.CMND(R5) ;CHECK IF OFFSET
 6826  027542  001007                          BNE     6$              ;NO, CHECK FOR UNLOAD
 6827  027544  116565  000006  000032          MOVB    P.OFST(R5),P.ASOF(R5) ;STORE OFFSET
 6828  027552  016562  000032  000016          MOV     P.ASOF(R5),RKASOF(R2) ;LOAD OFFSET REGISTER
 6829  027560  000416                          BR      8$              ;GO ISSUE COMMAND
 6830
 6831  027562  122765  000111  000001  6$:     CMPB    #SRTSPL,P.CMND(R5) ;CHECK IF START SPINDLE
 6832  027570  001003                          BNE     7$              ;NO, CHECK IF RECAL
 6833  027572  013737  023604  023632          MOV     W.MIN,W.DRV     ;LOAD WATCH DOG TIME FOR 1 MINUTE
 6834  027600  122765  000113  000001  7$:     CMPB    #RECAL,P.CMND(R5) ;CHECK IF RECAL
 6835  027606  001003                          BNE     8$              ;NO, CONTINUE
```

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6836  027610  013737  023602  023632          MOV     W.8SEC,W.DRV     ;LOAD RECAL TIME FOR 8 SECONDS
6837  027616  116565  000007  000017  8$:     MOVB    P.CS1H(R5),P.CS1+1(R5) ;STORE BITS 8-15 OF CS1
6838  027624  042765  165777  000016          BIC     #^C<CFMT!CDT>,P.CS1(R5) ;CLEAR ALL BITS EXCEPT FORMAT
6839                                                                  ;  AND DRIVE TYPE
6840  027632  116565  000001  000016          MOVB    P.CMND(R5),P.CS1(R5) ;MOVE COMMAND INTO CS1
6841  027640  042765  000200  000014          BIC     #W.WCK,P.PRST(R5) ;RESET WRITE FOR WRITE CHECK
6842  027646  032765  000400  000014          BIT     #NOCHK,P.PRST(R5) ;CHECK IN NO CHECK MODE
6843  027654  001533                          BEQ     30$              ;NO, SKIP CLEAR OF INTERRUPT ENABLE
6844  027656  042765  000100  000016          BIC     #IE,P.CS1(R5)    ;CLEAR INTERRUPT ENABLE
6845  027664  016562  000016  000000          MOV     P.CS1(R5),RKCS1(R2) ;ISSUE COMMAND
6846  027672  004737  023634          10$:    JSR     PC,W.WTCH        ;CALL WATCH DOG TIMER
6847  027676  016237  000000  023516          MOV     RKCS1(R2),T.CS1  ;STORE COMMAND AND STATUS REGISTER 1
6848  027704  032737  000200  023516          BIT     #RDY,T.CS1       ;WAIT FOR READY
6849  027712  001767                          BEQ     10$
6850  027714  032737  100000  023516          BIT     #CERR,T.CS1      ;CHECK FOR ERROR
6851  027722  001011                          BNE     15$              ;YES, GIVE NORMAL RETURN
6852  027724  004737  023634          11$:    JSR     PC,W.WTCH        ;CALL WATCH DOG TIMER
6853  027730  016237  000016  023532          MOV     RKASOF(R2),T.ASOF ;STORE ATTENTION SUMMARY
6854  027736  133737  023617  023533          BITB    INTMSK,T.ASOF+1  ;CHECK IF INTERRUPT HAS OCCURRED
6855  027744  001767                          BEQ     11$              ;WAIT FOR DRIVE INTERRUPT
6856  027746  105037  023616          15$:    CLRB    W.TIME           ;RESET TIMING ON THIS DRIVE
6857  027752  005037  023632                  CLR     W.DRV            ;CLEAR DRIVE TIMING COUNT
6858  027756  004737  027230                  JSR     PC,R.NORM        ;INDICATE COMMAND IS FINISHED
6859  027762  000137  031136                  JMP     C.RTRN           ;RESTORE REGISTERS
6860
6861  027766  016562  000010  000004  20$:    MOV     P.BALO(R5),RKBA(R2) ;LOAD BUS ADDRESS REGISTER
6862  027774  016562  000012  000002          MOV     P.WC(R5),RKWC(R2) ;LOAD WORD COUNT REGISTER
6863  030002  016562  000002  000020          MOV     P.CYLN(R5),RKDCYL(R2) ;LOAD CYLINDER ADDRESS REGISTER
6864  030010  016562  000004  000006          MOV     P.SECT(R5),RKDA(R2) ;LOAD SECTOR AND TRACK NUMBER
6865  030016  122765  000131  000001          CMPB    #WRTCHK,P.CMND(R5) ;CHECK IF WRITE CHECK COMMAND
6866  030024  001010                          BNE     25$              ;NO, GO ISSUE THE COMMAND
6867  030026  032765  000200  000014          BIT     #W.WCK,P.PRST(R5) ;CHECK IF WRITE COMMAND SHOULD BE ISSUED
6868  030034  001404                          BEQ     25$              ;NO, GO ISSUE THE COMMAND
6869  030036  012765  000123  000016          MOV     #WRDATA,P.CS1(R5) ;ISSUE WRITE COMMAND
6870  030044  000406                          BR      26$              ;GO ISSUE COMMAND
6871
6872  030046  116565  000001  000016  25$:    MOVB    P.CMND(R5),P.CS1(R5) ;MOVE COMMAND INTO CS1
6873  030054  042765  000200  000014          BIC     #W.WCK,P.PRST(R5) ;RESET WRITE FOR WRITE CHECK
6874  030062  116565  000007  000017  26$:    MOVB    P.CS1H(R5),P.CS1+1(R5) ;STORE BITS 8-15 OF CS1
6875  030070  142765  177750  000017          BICB    #^C<B.CFMT!B.CDT!B.BA16!B.BA17>,P.CS1+1(R5) ;CLEAR ALL BITS EXCEPT
6876                                                                  ;  FORMAT, DRIVE TYPE, AND BUS ADDRESS
6877                                                                  ;  BITS 16-17
6878  030076  010537  023572                  MOV     R5,O.WAIT        ;LOAD WAITING FOR COMMAND
6879  030102  032765  100000  000014          BIT     #DTBAII,P.PRST(R5) ;CHECK IF INHIBIT BUS ADDRESS INCREMENT
6880  030110  001403                          BEQ     27$              ;NO, LOAD CS2
6881  030112  052765  000020  000020          BIS     #BAI,P.CS2(R5)   ;SET INHIBIT BUS ADDRESS INCREMENT
6882  030120  016562  000020  000010  27$:    MOV     P.CS2(R5),RKCS2(R2) ;LOAD CS2
6883  030126  032765  000400  000014          BIT     #NOCHK,P.PRST(R5) ;CHECK IN NO CHECK MODE
6884  030134  001403                          BEQ     30$              ;NO, SKIP CLEAR OF INTERRUPT ENABLE
6885  030136  042765  000100  000016          BIC     #IE,P.CS1(R5)    ;CLEAR INTERRUPT ENABLE
6886  030144  016562  000016  000000  30$:    MOV     P.CS1(R5),RKCS1(R2) ;ISSUE COMMAND
6887  030152  000137  031136                  JMP     C.RTRN           ;RESTORE REGISTERS
6888
6889                                  .SBTTL   *SPECIAL COMMAND PROCESSING
6890
6891  030156  122765  000141  000001  C.SPEC: CMPB    #RDSTAT,P.CMND(R5) ;CHECK IF READ DRIVE STATUS
```

```
6892  030164  001132                        BNE     10$                     ;NO, PROCESS OTHER COMMANDS
6893  030166  016562  000020  000010        MOV     P.CS2(R5),RKCS2(R2) ;LOAD CS2 FOR COMMAND
6894  030174  116565  000007  000017        MOVB    P.CS1H(R5),P.CS1+1(R5) ;STORE BITS 8-15 OF CS1
6895  030202  042765  165777  000016        BIC     #^C<CFMT!CDT>,P.CS1(R5) ;CLEAR ALL BITS EXCEPT FORMAT
6896                                                                        ;  AND DRIVE TYPE
6897  030210  112765  000001  000016        MOVB    #DR.SEL,P.CS1(R5) ;STORE COMMAND
6898  030216  016562  000016  000000        MOV     P.CS1(R5),RKCS1(R2) ;ISSUE COMMAND
6899  030224  004737  023634          2$:   JSR     PC,W.WTCH               ;CALL WATCH-DOG TIMER
6900  030230  016265  000000  000016        MOV     RKCS1(R2),P.CS1(R5) ;STORE COMMAND AND STATUS REG. 1
6901  030236  032765  000200  000016        BIT     #RDY,P.CS1(R5)  ;WAIT FOR READY
6902  030244  001767                        BEQ     2$
6903  030246  004737  026706                JSR     PC,I.CST1               ;STORE CONTROLLER REGISTERS
6904  030252  016265  000034  000040        MOV     RKMR2(R2),P.A00(R5) ;STORE STATUS BYTE 00 MESSAGE A
6905  030260  016265  000036  000042        MOV     RKMR3(R2),P.B00(R5) ;STORE STATUS BYTE 00 MESSAGE B
6906  030266  032765  100000  000016        BIT     #CERR,P.CS1(R5) ;CHECK IF CONTROLLER ERROR
6907  030274  001436                        BEQ     6$                      ;NO, GATHER DRIVE STATUS
6908  030276  105037  023616                CLRB    W.TIME                  ;RESET WATCH DOG TIMING ON THIS DRIVE
6909  030302  005037  023632                CLR     W.DRV                   ;CLEAR WATCH DOG COUNT
6910  030306  032765  000400  000014        BIT     #NOCHK,P.PRST(R5) ;CHECK IF NO CHECK MODE
6911  030314  001043                        BNE     8$                      ;YES, INDICATE NORMAL RETURN
6912  030316  032765  001000  000020        BIT     #MDS,P.CS2(R5)  ;CHECK IF MULTIPLE DRIVE SELECT
6913  030324  001043                        BNE     9$                      ;YES, INDICATE CONTROLLER ERROR
6914  030326  004037  026232                JSR     R0,I.CCLR               ;CLEAR ERROR
6915  030332  031136                        C.RTRN                          ;ERROR RETURN
6916  030334  032765  010400  000020        BIT     #NED!UFE,P.CS2(R5) ;CHECK IF NON-EXISTENT DRIVE OR UNIT FIELD ERROR
6917  030342  001007                        BNE     5$                      ;REPORT ERROR
6918  030344  032765  000001  000036        BIT     #DRA,P.DS(R5)   ;CHECK IF DRIVE AVAILIABLE
6919  030352  001003                        BNE     5$                      ;YES, REPORT ERROR
6920  030354  052765  010000  000014        BIS     #DRVSZD,P.PRST(R5) ;INDICATE DRIVE IS SEIZED BY OTHER PORT
6921  030362  004737  027216          5$:   JSR     PC,R.ABNL               ;INDICATE ABNORMAL RETURN
6922  030366  000137  031136                JMP     C.RTRN                  ;RESTORE REGISTERS
6923
6924  030372  004037  026770          6$:   JSR     R0,I.STAT               ;GATHER DRIVE STATUS
6925  030376  031136                        C.RTRN                          ;ERROR RETURN
6926  030400  105037  023616                CLRB    W.TIME                  ;STOP WATCH-DOG TIMING ON DRIVE
6927  030404  005037  023632                CLR     W.DRV                   ;RESET WATCH-DOG TIME
6928  030410  032765  000400  000014        BIT     #NOCHK,P.PRST(R5) ;CHECK IF NO CHECK MODE
6929  030416  001402                        BEQ     8$                      ;NO, REPORT ERROR
6930  030420  005062  000000                CLR     RKCS1(R2)               ;CLEAR INTERRUPT ENABLE
6931  030424  004737  027230          8$:   JSR     PC,R.NORM               ;REPORT COMMAND COMPLETE
6932  030430  000137  031136                JMP     C.RTRN                  ;RESTORE REGISTERS
6933
6934  030434  052737  100000  023570  9$:   BIS     #E.MDS,E.CONT   ;SET MULTIPLE DRIVE SELECT
6935  030442  004737  027242                JSR     PC,R.CONT               ;INDICATE CONTROLLER ERROR
6936  030446  000137  031136                JMP     C.RTRN
6937
6938  030452  122765  000140  000001  10$:   CMPB    #RELEAS,P.CMND(R5) ;CHECK IF RELEASE COMMAND
6939  030460  001040                        BNE     13$                     ;NO, CHECK IF READ ALL HEADERS
6940  030462  010537  023572                MOV     R5,O.WAIT               ;STORE PARAMETER BLOCK ADDRESS IN
6941                                                                        ;  WAIT FOR COMMAND
6942  030466  052765  000010  000020        BIS     #RLS,P.CS2(R5)  ;SET RELEASE BIT
6943  030474  016562  000020  000010        MOV     P.CS2(R5),RKCS2(R2) ;LOAD CS2 FOR DESELECT
6944  030502  112737  000001  023612        MOVB    #1,I.ISRL               ;SET FLAG FOR RELEASE COMMAND
6945  030510  116565  000007  000017        MOVB    P.CS1H(R5),P.CS1+1(R5);STORE BITS 8-15 OF CS1
6946  030516  042765  165777  000016        BIC     #^C<CFMT!CDT>,P.CS1(R5) ;CLEAR ALL BITS EXCEPT FORMAT
6947                                                                        ;  AND DRIVE TYPE
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```
6948  030524  112765  000101  000016          MOVB    #SELDRV,P.CS1(R5) ;STORE COMMAND
6949  030532  032765  000400  000014          BIT     #NOCHK,P.PRST(R5) ;CHECK IF NO CHECK MODE
6950  030540  001403                          BEQ     11$               ;NO, DO NOT RESET INTERRUPT ENABLE
6951  030542  042765  000100  000016          BIC     #IE,P.CS1(R5)     ;RESET INTERRUPT ENABLE
6952  030550  016562  000016  000000  11$:     MOV     P.CS1(R5),RKCS1(R2) ;ISSUE COMMAND
6953  030556  000137  031136                  JMP     C.RTRN            ;RESTORE REGISTERS
6954
6955  030562  122765  000164  000001  13$:     CMPB    #RDALHD,P.CMND(R5) ;CHECK IF READ ALL HEADERS
6956  030570  001053                          BNE     30$               ;NO, CHECK IF CONTROLLER CLEAR
6957  030572  010537  023572                  MOV     R5,O.WAIT         ;SET WAITING FOR COMMAND COMMPLETION
6958  030576  016537  000010  023606          MOV     P.BAL0(R5),HDR.AD ;LOAD HEADER ADDRESS
6959  030604  132765  000020  000007          BITB    #8.CFMT,P.CS1H(R5) ;CHECK IF 22 SECTOR FORMANT
6960  030612  001404                          BEQ     14$               ;YES, LOAD 22 IN HEADER COUNT
6961  030614  012737  000024  023610          MOV     #20.,HDR.CT       ;LOAD 20 IN SECTOR COUNT
6962  030622  000403                          BR      22$               ;GO ISSUE READ HEADER COMMAND
6963
6964  030624  012737  000026  023610  14$:     MOV     #22.,HDR.CT       ;LOAD 22 IN SECTOR COUNT
6965  030632  016562  000002  000020  22$:     MOV     P.CYLN(R5),RKDCYL(R2) ;LOAD CYLINDER ADDRESS
6966  030640  016562  000004  000006          MOV     P.SECT(R5),RKDA(R2) ;LOAD TRACK NUMBER
6967  030646  016562  000020  000010          MOV     P.CS2(R5),RKCS2(R2) ;LOAD DRIVE NUMBER
6968  030654  116565  000007  000017          MOVB    P.CS1H(R5),P.CS1+1(R5) ;STORE BITS 8-15 OF CS1
6969  030662  042765  165777  000016          BIC     #^C<CFMT!CDT>,P.CS1(R5) ;CLEAR ALL BITS EXCEPT DRIVE TYPE
6970                                                  ;  AND FORMAT
6971  030670  112765  000125  000016          MOVB    #RDHEAD,P.CS1(R5) ;STORE READ HEADER COMMAND
6972  030676  032765  000400  000014          BIT     #NOCHK,P.PRST(R5) ;CHECK IF NO CHECK MODE
6973  030704  001027                          BNE     34$               ;YES, INDICATE ILLEGAL DRIVER COMMAND
6974  030706  016562  000016  000000          MOV     P.CS1(R5),RKCS1(R2) ;ISSUE READ HEADER
6975  030714  000137  031136                  JMP     C.RTRN            ;RESTORE REGISTERS
6976
6977  030720  122765  000176  000001  30$:     CMPB    #CONCLR,P.CMND(R5) ;CHECK IF CONTROLLER CLEAR
6978  030726  001012                          BNE     32$               ;NO, CHECK IF SUBSYSTEM CLEAR
6979  030730  004037  026232                  JSR     R0,I.CCLR         ;CLEAR CONTROLLER
6980  030734  031136                          C.RTRN                    ;ERROR RETURN
6981  030736  032765  000400  000014          BIT     #NOCHK,P.PRST(R5) ;CHECK IF NO CHECK MODE
6982  030744  001472                          BEQ     40$               ;NO, INDICATE NORMAL RETURN
6983  030746  005062  000000                  CLR     RKCS1(R2)         ;RESET INTERRUPT ENABLE
6984  030752  000467                          BR      40$               ;INDICATE NORMAL RETURN
6985
6986  030754  122765  000177  000001  32$:     CMPB    #SUBCLR,P.CMND(R5) ;CHECK IF SUBSYSTEM CLEAR
6987  030762  001406                          BEQ     36$               ;YES, CLEAR SUBSYSTEM
6988  030764  052737  000100  023570  34$:     BIS     #E.ILLD,E.CONT    ;SET ILLEGAL DRIVER COMMAND
6989  030772  004737  027242                  JSR     PC,R.CONT         ;REPORT ERROR
6990  030776  000457                          BR      C.RTRN            ;RESTORE REGISTERS
6991
6992  031000  012762  000040  000010  36$:     MOV     #SCLR,RKCS2(R2)   ;ISSUE SUBSYSTEM CLEAR
6993  031006  016265  000000  000016          MOV     RKCS1(R2),P.CS1(R5) ;STORE COMMAND AND STATUS REGISTER 1
6994  031014  032765  100000  000016          BIT     #CERR,P.CS1(R5)   ;CLEAR IF CONTROLLER ERROR RESET
6995  031022  001406                          BEQ     37$               ;NO, FINISH COMMAND
6996  031024  052737  000001  023570          BIS     #BIT0,E.CONT      ;SET CLEAR SUBSYSTEM DID NOT CLEAR
6997                                                  ;  CONTROLLER ERROR
6998  031032  004737  027242                  JSR     PC,R.CONT         ;REPORT ERROR
6999  031036  000437                          BR      C.RTRN            ;RESTORE REGISTERS
7000
7001  031040  013746  023576          37$:     MOV     W.MILI,-(SP)      ;LOAD 16 MILI-SECOND COUNT FOR ATTENTION
7002                                                  ;  TO DISAPPEAR
7003  031044  016265  000000  000016  38$:     MOV     RKCS1(R2),P.CS1(R5) ;STORE CS1
```

```
7004  031052  032765  040000  000016          BIT     #DI,P.CS1(R5)   ;CHECK IF ATTENTIONS CLEARED
7005  031060  001411                          BEQ     39$             ;YES, FINISH COMMAND
7006  031062  005316                          DEC     (SP)            ;DECREMENT 16 MILISECOND COUNT
7007  031064  001367                          BNE     38$             ;CHECK DRIVE INTERRUPT AGAIN
7008  031066  005726                          TST     (SP)+           ;ADJUST STACK
7009  031070  052737  000040  023570          BIS     #E.SCLR,E.CONT  ;SET SUBSYSTEM CLEAR DID NOT CLEAR
7010                                                                  ;  DRIVE ATTENTIONS
7011  031076  004737  027242                  JSR     PC,R.CONT       ;REPORT ERROR
7012  031102  000415                          BR      C.RTRN          ;RESTORE REGISTER
7013
7014  031104  005726                  39$:    TST     (SP)+           ;ADJUST STACK
7015  031106  032765  000400  000014          BIT     #NOCHK,P.PRST(R5) ;CHECK IF NO CHECK MODE
7016  031114  001010                          BNE     C.RTRN          ;YES, RESTORE REGISTERS
7017  031116  112737  177777  023612          MOVB    #-1,I.ISRL      ;SET INTERRUPT ENABLE SET
7018  031124  012762  000100  000000          MOV     #IE,RKCS1(R2)   ;SET INTERRUPT ENABLE
7019  031132  004737  027230                  JSR     PC,R.NORM       ;INDICATE NORMAL TERMINATION
7020
7021  031136  012637  177776          C.RTRN: MOV     (SP)+,PS        ;RESTORE PSW
7022  031142  012600                          MOV     (SP)+,R0        ;RESTORE R0
7023  031144  012601                          MOV     (SP)+,R1        ;RESTORE R1
7024  031146  012602                          MOV     (SP)+,R2        ;RESTORE R2
7025  031150  012603                          MOV     (SP)+,R3        ;RESTORE R3
7026  031152  012604                          MOV     (SP)+,R4        ;RESTORE R4
7027  031154  012605                          MOV     (SP)+,R5        ;RESTORE R5
7028  031156  000207                          RTS     PC              ;RETURN
7029                                  .SBTTL  OCTAL TO BINARY CONVERSION ROUTINE
7030
7031                                  ;;**************************************************************
7032                                  ;;*
7033                                  ;;*     THIS ROUTINE WILL CHECK A STRING OF ASCII CHARACTERS TERMINATED
7034                                  ;;*     WITH A NULL <000> OR COMMA.  IF THE CHARACTERS ARE LEGAL
7035                                  ;;*     IT  WILL GENERATE TWO BINARY WORDS PLACING THE LOW 16 BITS
7036                                  ;;*     ON THE STACK AND THE HIGH 16 BITS IN LOCATION $HIOCT.
7037                                  ;;*
7038                                  ;;*CALL
7039                                  ;;*     MOV     <ADDRESS OF ASCII STRING>,-(SP)
7040                                  ;;*     JSR     PC,OCTBIN
7041                                  ;;*     <ADDRESS OF ERROR RETURN>
7042                                  ;;*     RETURN
7043                                  ;;*
7044                                  ;;**************************************************************
7045
7046  031160  010046          OCTBIN: MOV     R0,-(SP)        ;SAVE R0
7047  031162  010146                  MOV     R1,-(SP)        ;SAVE R1
7048  031164  010246                  MOV     R2,-(SP)        ;SAVE R2
7049  031166  016600  000010          MOV     10(SP),R0       ;GET ADDRESS OF ASCII STRING
7050  031172  005001                  CLR     R1              ;CLEAR DATA WORDS
7051  031174  005002                  CLR     R2
7052  031176  112046          2$:     MOVB    (R0)+,-(SP)     ;PICK THIS CHARACTER
7053  031200  001423                  BEQ     3$              ;IF ZERO GET OUT
7054  031202  121627  000054          CMPB    (SP),#',        ;CHECK IF COMMA
7055  031206  001420                  BEQ     3$              ;IF COMMA GET OUT
7056  031210  122716  000060          CMPB    #'0,(SP)        ;MAKE SURE THIS CHARACTER IS
7057  031214  003030                  BGT     4$              ;  AN OCTAL DIGIT
7058  031216  122716  000067          CMPB    #'7,(SP)
7059  031222  002425                  BLT     4$
```

```
7060  031224  006301                        ASL     R1              ; *2
7061  031226  006102                        ROL     R2
7062  031230  006301                        ASL     R1              ; *4
7063  031232  006102                        ROL     R2
7064  031234  006301                        ASL     R1              ; *8
7065  031236  006102                        ROL     R2
7066  031240  042716  177770                BIC     #^C7,(SP)       ;STRIP THE ASCII JUNK
7067  031244  062601                        ADD     (SP)+,R1        ;ADD THIS DIGIT
7068  031246  000753                        BR      2$              ;LOOP
7069  031250  005726                3$:     TST     (SP)+           ;CLEAN PARTIAL FROM STACK
7070  031252  010166  000010                MOV     R1,10(SP)       ;SAVE RESULT
7071  031256  010237  031312                MOV     R2,$HIOCT
7072  031262  012602                        MOV     (SP)+,R2        ;RESTORE R2
7073  031264  012601                        MOV     (SP)+,R1        ;RESTORE R1
7074  031266  012600                        MOV     (SP)+,R0        ;RESTORE R0
7075  031270  062716  000002                ADD     #2,(SP)         ;ADJUST RETURN
7076  031274  000207                        RTS     PC              ;RETURN
7077
7078  031276  005726                4$:     TST     (SP)+           ;CLEAN UP PARTIAL FROM STACK
7079  031300  012602                        MOV     (SP)+,R2        ;RESTORE R2
7080  031302  012601                        MOV     (SP)+,R1        ;RESTORE R1
7081  031304  012600                        MOV     (SP)+,R0        ;RESTORE R0
7082  031306  013616                        MOV     @(SP)+,(SP)     ;PUT ADDRESS OF ERROR ROUTINE ON STACK
7083  031310  000207                        RTS     PC              ;GO PROCESS ERROR
7084  031312  000000        $HIOCT: .WORD   0               ;HIGH ORDER BITS GO HERE
7085                        .SBTTL  DECIMAL TO BINARY CONVERSION ROUTINE
7086
7087                ;;*****************************************************************
7088                ;*
7089                ;*      THIS ROUTINE WILL CHECK A STRING OF ASCII CHARACTERS TERMINATED
7090                ;*      WITH A NULL <000> OR COMMA.  IF THE CHARACTERS ARE LEGAL,
7091                ;*      IT WILL GENERATE A  BINARY WORD PLACING IT ON THE STACK.
7092                ;*
7093                ;*CALL
7094                ;*      MOV     <ADDRESS OF ASCII STRING>,-(SP)
7095                ;*      JSR     PC,DECBIN
7096                ;*      <ADDRESS OF ERROR RETURN>
7097                ;*      RETURN
7098                ;*
7099                ;;*****************************************************************
7100
7101  031314  010046        DECBIN: MOV     R0,-(SP)        ;SAVE R0
7102  031316  010146                MOV     R1,-(SP)        ;SAVE R1
7103  031320  010246                MOV     R2,-(SP)        ;SAVE R2
7104  031322  016600  000010        MOV     10(SP),R0       ;GET ADDRESS OF ASCII STRING
7105  031326  005046                CLR     -(SP)           ;CLEAR DATA WORD
7106  031330  005002                CLR     R2              ;SIGN SET POSITIVE
7107  031332  122710  000055        CMPB    #'-,(R0)        ;SEE IF A MINUS SIGN
7108  031336  001001                BNE     2$              ;BRANCH IF NO MINUS SIGN
7109  031340  112002                MOVB    (R0)+,R2        ;SAVE FOR LATER USE
7110  031342  112001        2$:     MOVB    (R0)+,R1        ;PICKUP THIS CHARACTER
7111  031344  001427                BEQ     3$              ;GET OUT IF ZERO
7112  031346  120127  000054        CMPB    R1,#',          ;CHECK IF COMMA
7113  031352  001424                BEQ     3$              ;GET OUT IF COMMA
7114  031354  122701  000060        CMPB    #'0,R1          ;MAKE SURE THIS CHARACTER IS
7115  031360  003034                BGT     5$              ;  A DIGIT BETWEEN 0 & 9
```

```
7116  031362  122701  000071          CMPB    #'9,R1
7117  031366  002431                  BLT     5$
7118  031370  032716  170000          BIT     #170000,(SP)    ;DON'T LET MUMBER GET TO BIG
7119  031374  001026                  BNE     5$              ;BRANCH IF NUMBER WOULD OVERFLOW
7120  031376  006316                  ASL     (SP)            ; *2
7121  031400  011646                  MOV     (SP),-(SP)      ;SAVE FOR LATER
7122  031402  006316                  ASL     (SP)            ; *4
7123  031404  006316                  ASL     (SP)            ; *8
7124  031406  062616                  ADD     (SP)+,(SP)      ; *10
7125  031410  102420                  BVS     5$              ;OVERFLOW ISN'T ALLOWED
7126  031412  162701  000060          SUB     #'0,R1          ;STRIP AWAY THE ASCII JUNK
7127  031416  060116                  ADD     R1,(SP)         ;ADD IN THIS DIGIT
7128  031420  102414                  BVS     5$              ;OVERFLOW ISN'T ALLOWED
7129  031422  000747                  BR      2$              ;LOOP
7130  031424  005702          3$:     TST     R2              ;CHECK IF NUMBER IS NEGATIVE
7131  031426  001401                  BEQ     4$              ;BRANCH IF NO
7132  031430  005416                  NEG     (SP)            ;YES--NEGATE THE NUMBER
7133  031432  012666  000010  4$:     MOV     (SP)+,10(SP)    ;SAVE RESULT
7134  031436  012602                  MOV     (SP)+,R2        ;RESTORE R2
7135  031440  012601                  MOV     (SP)+,R1        ;RESTORE R1
7136  031442  012600                  MOV     (SP)+,R0        ;RESTORE R0
7137  031444  062716  000002          ADD     #2,(SP)         ;ADJUST RETURN
7138  031450  000207                  RTS     PC              ;RETURN
7139
7140  031452  005726          5$:     TST     (SP)+           ;CLEAN PARTIAL NUMBER FROM STACK
7141  031454  012602                  MOV     (SP)+,R2        ;RESTORE R2
7142  031456  012601                  MOV     (SP)+,R1        ;RESTORE R1
7143  031460  012600                  MOV     (SP)+,R0        ;RESTORE R0
7144  031462  013616                  MOV     @(SP)+,(SP)     ;PUT ADDRESS OF ERROR ON STACK
7145  031464  000207                  RTS     PC              ;GO PROCESS ERROR
7146                          .SBTTL  TYPE ROUTINE
7147
7148                          ;;*****************************************************************
7149                          ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
7150                          ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
7151                          ;*NOTE1:        $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
7152                          ;*NOTE2:        $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
7153                          ;*NOTE3:        $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
7154                          ;*
7155                          ;*CALL:
7156                          ;*1) USING A TRAP INSTRUCTION
7157                          ;*      TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
7158                          ;*OR
7159                          ;*      TYPE
7160                          ;*      MESADR
7161                          ;*
7162
7163  031466  105737  001157  $TYPE:   TSTB    $TPFLG          ;;IS THERE A TERMINAL?
7164  031472  100002                  BPL     1$              ;;BR IF YES
7165  031474  000000                  HALT                    ;;HALT HERE IF NO TERMINAL
7166  031476  000407                  BR      3$              ;;LEAVE
7167  031500  010046          1$:     MOV     R0,-(SP)        ;;SAVE R0
7168  031502  017600  000002          MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
7169  031506  112046          2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
7170  031510  001005                  BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
7171  031512  005726                  TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
```

```
7172  031514  012600                60$:    MOV     (SP)+,R0        ;;RESTORE R0
7173  031516  062716  000002        3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
7174  031522  000002                        RTI                     ;;RETURN
7175  031524  122716  000011        4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
7176  031530  001430                        BEQ     8$
7177  031532  122716  000200                CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
7178  031536  001006                        BNE     5$
7179  031540  005726                        TST     (SP)+           ;;POP  <CR><LF> EQUIV
7180  031542  104401                        TYPE                    ;;TYPE A CR AND LF
7181  031544  001171                        $CRLF
7182  031546  105037  031702              CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
7183  031552  000755                      BR      2$              ;;GET NEXT CHARACTER
7184  031554  004737  031636        5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
7185  031560  123726  001156        6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
7186  031564  001350                        BNE     2$              ;;IF NO GO GET NEXT CHAR.
7187  031566  013746  001154              MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
7188                                                                ;;AND THE NULL CHAR.
7189  031572  105366  000001        7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
7190  031576  002770                        BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
7191  031600  004737  031636              JSR     PC,$TYPEC       ;;GO TYPE A NULL
7192  031604  105337  031702              DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
7193  031610  000770                      BR      7$              ;;LOOP
7194
7195                                    ;HORIZONTAL TAB PROCESSOR
7196
7197  031612  112716  000040        8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
7198  031616  004737  031636        9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
7199  031622  132737  000007  031702        BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
7200  031630  001372                        BNE     9$              ;;TAB STOP
7201  031632  005726                        TST     (SP)+           ;;POP SPACE OFF STACK
7202  031634  000724                      BR      2$              ;;GET NEXT CHARACTER
7203  031636  105777  147306        $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
7204  031642  100375                        BPL     $TYPEC
7205  031644  116677  000002  147300        MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
7206  031652  122766  000015  000002        CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
7207  031660  001003                        BNE     1$              ;;BRANCH IF NO
7208  031662  105037  031702              CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
7209  031666  000406                      BR      $TYPEX          ;;EXIT
7210  031670  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
7211  031676  001402                        BEQ     $TYPEX          ;;BRANCH IF YES
7212  031700  105227                        INCB    (PC)+           ;;COUNT THE CHARACTER
7213  031702  000000              $CHARCNT:.WORD   0               ;;CHARACTER COUNT STORAGE
7214  031704  000207              $TYPEX: RTS     PC
7215
7216                                    .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
7217
7218                                    ;;**************************************************************
7219                                    ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
7220                                    ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
7221                                    ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
7222                                    ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
7223                                    ;*REPLACED WITH SPACES.
7224                                    ;*CALL:
7225                                    ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
7226                                    ;*      TYPDS                   ;;GO TO THE ROUTINE
7227
```

```
                                        $TYPDS:
                                                MOV     R0,-(SP)        ;;PUSH R0 ON STACK
                                                MOV     R1,-(SP)        ;;PUSH R1 ON STACK
                                                MOV     R2,-(SP)        ;;PUSH R2 ON STACK
                                                MOV     R3,-(SP)        ;;PUSH R3 ON STACK
                                                MOV     R5,-(SP)        ;;PUSH R5 ON STACK
                                                MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
                                                MOV     20(SP),R5       ;;GET THE INPUT NUMBER
                                                BPL     1$              ;;BR IF INPUT IS POS.
                                                NEG     R5              ;;MAKE THE BINARY NUMBER POS.
                                                MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
                                        1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
                                                MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
                                                MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
                                        2$:     CLR     R2              ;;CLEAR THE BCD NUMBER
                                                MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
                                        3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
                                                BLT     4$              ;;BR IF DONE
                                                INC     R2              ;;INCREASE THE BCD DIGIT BY 1
                                                BR      3$
                                        4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
                                                TST     R2              ;;CHECK IF BCD DIGIT=0
                                                BNE     5$              ;;FALL THROUGH IF 0
                                                TSTB    (SP)            ;;STILL DOING LEADING 0'S?
                                                BMI     7$              ;;BR IF YES
                                        5$:     ASLB    (SP)            ;;MSD?
                                                BCC     6$              ;;BR IF NO
                                                MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
                                        6$:     BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
                                        7$:     BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
                                                MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
                                                TST     (R0)+           ;;JUST INCREMENTING
                                                CMP     R0,#10          ;;CHECK THE TABLE INDEX
                                                BLT     2$              ;;GO DO THE NEXT DIGIT
                                                BGT     8$              ;;GO TO EXIT
                                                MOV     R5,R2           ;;GET THE LSD
                                                BR      6$              ;;GO CHANGE TO ASCII
                                        8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
                                                BPL     9$              ;;BR IF NO
                                                MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
                                        9$:     CLRB    (R3)            ;;SET THE TERMINATOR
                                                MOV     (SP)+,R5        ;;POP STACK INTO R5
                                                MOV     (SP)+,R3        ;;POP STACK INTO R3
                                                MOV     (SP)+,R2        ;;POP STACK INTO R2
                                                MOV     (SP)+,R1        ;;POP STACK INTO R1
                                                MOV     (SP)+,R0        ;;POP STACK INTO R0
                                                TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
                                                MOV     2(SP),4(SP)     ;;ADJUST THE STACK
                                                MOV     (SP)+,(SP)
                                                RTI                     ;;RETURN TO USER
                                        $DTBL:  10000.
                                                1000.
                                                100.
                                                10.
                                        $DBLK:  .BLKW   4
                                        .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE
```

```
                                ;;*****************************************************************
                                ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
                                ;*OCTAL (ASCII) NUMBER AND TYPE IT.
                                ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
                                ;*CALL:
                                ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                ;*      TYPOS                   ;;CALL FOR TYPEOUT
                                ;*      .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
                                ;*      .BYTE   M               ;;M=1 OR 0
                                ;*                                      ;;1=TYPE LEADING ZEROS
                                ;*                                      ;;0=SUPPRESS LEADING ZEROS
                                ;*
                                ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
                                ;*$TYPOS OR $TYPOC
                                ;*CALL:
                                ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                ;*      TYPON                   ;;CALL FOR TYPEOUT
                                ;*
                                ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
                                ;*CALL:
                                ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                ;*      TYPOC                   ;;CALL FOR TYPEOUT
032132  017646  000000          $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
032136  116637  000001  032355          MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
032144  112637  032357          MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
032150  062716  000002          ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
032154  000406                  BR      $TYPON
032156  112737  000001  032355  $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
032164  112737  000006  032357          MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
032172  112737  000005  032354  $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
032200  010346                  MOV     R3,-(SP)        ;;SAVE R3
032202  010446                  MOV     R4,-(SP)        ;;SAVE R4
032204  010546                  MOV     R5,-(SP)        ;;SAVE R5
032206  113704  032357          MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
032212  005404                  NEG     R4
032214  062704  000006          ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
032220  110437  032356          MOVB    R4,$OMODE       ;;SAVE IT FOR USE
032224  113704  032355          MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
032230  016605  000012          MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
032234  005003                  CLR     R3              ;;CLEAR THE OUTPUT WORD
032236  006105          1$:     ROL     R5              ;;ROTATE MSB INTO "C"
032240  000404                  BR      3$              ;;GO DO MSB
032242  006105          2$:     ROL     R5              ;;FORM THIS DIGIT
032244  006105                  ROL     R5
032246  006105                  ROL     R5
032250  010503                  MOV     R5,R3
032252  006103          3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
032254  105337  032356          DECB    $OMODE          ;;TYPE THIS DIGIT?
032260  100016                  BPL     7$              ;;BR IF NO
032262  042703  177770          BIC     #177770,R3      ;;GET RID OF JUNK
032266  001002                  BNE     4$              ;;TEST FOR 0
032270  005704                  TST     R4              ;;SUPPRESS THIS 0?
032272  001403                  BEQ     5$              ;;BR IF YES
032274  005204          4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
```

```
 7340  032276  052703  000060            BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
 7341  032302  052703  000040      5$:   BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
 7342  032306  110337  032352            MOVB    R3,@$           ;;SAVE FOR TYPING
 7343  032312  104401  032352            TYPE    ,@$             ;;GO TYPE THIS DIGIT
 7344  032316  105337  032354      7$:   DECB    $OCNT           ;;COUNT BY 1
 7345  032322  003347                    BGT     2$              ;;BR IF MORE TO DO
 7346  032324  002402                    BLT     6$              ;;BR IF DONE
 7347  032326  005204                    INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
 7348  032330  000744                    BR      2$              ;;GO DO THE LAST DIGIT
 7349  032332  012605            6$:     MOV     (SP)+,R5        ;;RESTORE R5
 7350  032334  012604                    MOV     (SP)+,R4        ;;RESTORE R4
 7351  032336  012603                    MOV     (SP)+,R3        ;;RESTORE R3
 7352  032340  016666  000002  000004    MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
 7353  032346  012616                    MOV     (SP)+,(SP)
 7354  032350  000002                    RTI                     ;;RETURN
 7355  032352     000            8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
 7356  032353     000                    .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
 7357  032354     000            $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
 7358  032355     000            $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
 7359  032356  000000            $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
 7360                            .SBTTL  TTY INPUT ROUTINE
 7361
 7362                            ;;**************************************************************
 7363                            .ENABL  LSB
 7364  032360  000000            $TKCNT: .WORD   0               ;;NUMBER OF ITEMS IN QUEUE
 7365  032362  000000            $TKQIN: .WORD   0               ;;INPUT POINTER
 7366  032364  000000            $TKQOUT: .WORD  0               ;;OUTPUT POINTER
 7367  032366  000001            $TKQSRT: .BLKB  1               ;;TTY KEYBOARD QUEUE
 7368          032367            $TKQEND=.
 7369          032370            .EVEN
 7370
 7371                            ;*TK INITIALIZE ROUTINE
 7372                            ;*THIS ROUTINE WILL INITIALIZE THE TTY KEYBOARD INPUT QUEUE
 7373                            ;*SETUP THE INTERRUPT VECTOR AND TURN ON THE KEYBOARD INTERRUPT
 7374                            ;
 7375                            ;*CALL:
 7376                            ;*      JSR     PC,$TKINT
 7377                            ;*      RETURN
 7378
 7379  032370  005037  032360    $TKINT: CLR     $TKCNT          ;;CLEAR COUNT OF ITEMS IN QUEUE
 7380  032374  012737  032366  032362    MOV     #$TKQSRT,$TKQIN ;;MOVE THE STARTING ADDRESS OF THE
 7381  032402  013737  032362  032364    MOV     $TKQIN,$TKQOUT  ;;QUEUE INTO THE INPUT & OUTPUT POINTERS.
 7382  032410  012737  032440  000060    MOV     #$TKSRV,@#TKVEC ;;INITIALIZE THE KEYBOARD VECTOR
 7383  032416  012737  000200  000062    MOV     #200,@#TKVEC+2  ;;"BR" LEVEL 4
 7384  032424  005777  146516            TST     @$TKB           ;;CLEAR DONE FLAG
 7385  032430  012777  000100  146506    MOV     #100,@$TKS      ;;ENABLE TTY KEYBOARD INTERRUPT
 7386  032436  000207                    RTS     PC              ;;RETURN TO CALLER
 7387
 7388                            ;*TK SERVICE ROUTINE
 7389                            ;*THIS ROUTINE WILL SERVICE THE TTY KEYBOARD INTERRUPT
 7390                            ;*BY READING THE CHARACTER FROM THE INPUT BUFFER AND PUTTING
 7391                            ;*IT IN THE QUEUE.
 7392                            ;*IF THE CHARACTER IS A "CONTROL-C" (↑C) $TKINT IS CALLED AND
 7393                            ;*UPON RETURN EXIT IS MADE TO THE "CONTROL-C" RESTART ADDRESS (UDTSRT)
 7394                            ;
 7395  032440  117746  146502    $TKSRV: MOVB    @$TKB,-(SP)     ;;PICKUP THE CHARACTER
```

```
7396  032444  042716  177600                  BIC     #^C177,(SP)     ;;STRIP THE JUNK
7397  032450  021627  000003                  CMP     (SP),#3         ;;IS IT A CONTROL C?
7398  032454  001007                          BNE     1$              ;;BRANCH IF NO
7399  032456  104401  033636                  TYPE    $CNTLC          ;;TYPE A CONTROL-C (^C)
7400  032462  004737  032370                  JSR     PC,$TKINT       ;;INIT THE KEYBOARD
7401  032466  005726                          TST     (SP)+           ;;CLEAN UP STACK
7402  032470  000137  004116                  JMP     UDTSRT          ;;CONTROL C RESTART
7403  032474  021627  000007          1$:     CMP     (SP),#7         ;;IS IT A CONTROL G?
7404  032500  001004                          BNE     2$              ;;BRANCH IF NO
7405  032502  022737  000176  001140          CMP     #SWREG,SWR      ;;IS SOFT-SWR SELECTED?
7406  032510  001500                          BEQ     6$              ;;GO TO SWR CHANGE
7407
7408  032512                          2$:
7409  032512  022737  000001  032360          CMP     #1,$TKCNT       ;;IS THE QUEUE FULL?
7410  032520  001004                          BNE     3$              ;;BRANCH IF NO
7411  032522  104401  001164                  TYPE    $BELL           ;;RING THE TTY BELL
7412  032526  005726                          TST     (SP)+           ;;CLEAN CHARACTER OFF OF STACK
7413  032530  000451                          BR      5$              ;;EXIT
7414  032532  021627  000023          3$:     CMP     (SP),#23        ;;IS IT A CONTROL-S?
7415  032536  001021                          BNE     32$             ;;BRANCH IF NO
7416  032540  005077  146400                  CLR     @$TKS           ;;DISABLE TTY KEYBOARD INTERRUPTS
7417  032544  005726                          TST     (SP)+           ;;CLEAN CHAR OFF STACK
7418  032546  105777  146372          31$:    TSTB    @$TKS           ;;WAIT FOR A CHAR
7419  032552  100375                          BPL     31$             ;;LOOP UNTIL ITS THERE
7420  032554  117746  146366                  MOVB    @$TKB,-(SP)     ;;GET THE CHARACTER
7421  032560  042716  177600                  BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
7422  032564  022627  000021                  CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
7423  032570  001366                          BNE     31$             ;;BRANCH IF NO
7424  032572  012777  000100  146344          MOV     #100,@$TKS      ;;REENABLE TTY KEYBOARD INTERRUPTS
7425  032600  000002                          RTI                     ;;RETURN
7426  032602  005237  032360          32$:    INC     $TKCNT          ;;COUNT THIS CHARACTER
7427  032606  021627  000140                  CMP     (SP),#140       ;;IS IT UPPER CASE?
7428  032612  002405                          BLT     4$              ;;BRANCH IF YES
7429  032614  021627  000175                  CMP     (SP),#175       ;;IS IT A SPECIAL CHAR?
7430  032620  003002                          BGT     4$              ;;BRANCH IF YES
7431  032622  042716  000040                  BIC     #40,(SP)        ;;MAKE IT UPPER CASE
7432  032626  112677  177530          4$:     MOVB    (SP)+,@$TKQIN   ;;AND PUT IT IN QUEUE
7433  032632  005237  032362                  INC     $TKQIN          ;;UPDATE THE POINTER
7434  032636  023727  032362  032367          CMP     $TKQIN,#$TKQEND ;;GO OFF THE END?
7435  032644  001003                          BNE     5$              ;;BRANCH IF NO
7436  032646  012737  032366  032362          MOV     #$TKQSRT,$TKQIN ;;RESET THE POINTER
7437  032654  000002                  5$:     RTI                     ;;RETURN
7438
7439                                  ;;**********************************************************************
7440                                  ;*SOFTWARE SWITCH REGISTER CHANGE ROUTINE.
7441                                  ;*ROUTINE IS ENTERED  FROM THE TRAP HANDLER, AND WILL
7442                                  ;*SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP
7443                                  ;*CALL WHEN OPERATING IN TTY INTERRUPT MODE.
7444  032656  022737  000176  001140  $CKSWR: CMP     #SWREG,SWR      ;;IS THE SOFT-SWR SELECTED
7445  032664  001124                          BNE     15$             ;;EXIT IF NOT
7446  032666  105777  146252                  TSTB    @$TKS           ;;IS A CHAR WAITING?
7447  032672  100121                          BPL     15$             ;;IF NOT, EXIT
7448  032674  117746  146246                  MOVB    @$TKB,-(SP)     ;;YES
7449  032700  042716  177600                  BIC     #^C177,(SP)     ;;MAKE IT  7-BIT ASCII
7450  032704  021627  000007                  CMP     (SP),#7         ;;IS IT A CONTROL-G?
7451  032710  001300                          BNE     2$              ;;IF NOT, PUT IT IN THE TTY QUEUE
```

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                                                        ;;AND EXIT
                                                        ;;*****************************************************************
                                                        ;;*CONTROL IS PASSED TO THIS POINT FROM EITHER THE TTY INTERRUPT SERVICE
                                                        ;;*ROUTINE OR FROM THE SOFTWARE SWITCH REGISTER TRAP CALL, AS A RESULT OF A
                                                        ;;*CONTROL-G BEING TYPED, AND THE SOFTWARE SWITCH REGISTER BEING SELECTED.
032712  123727  001134  000001  6$:     CMPB    $AUTOB,#1       ;;ARE WE RUNNING IN AUTO-MODE?
032720  001674                          BEQ     2$              ;;BRANCH IF YES
032722  005726                          TST     (SP)+           ;;CLEAR CONTROL-G OFF STACK
032724  004737  032370                  JSR     PC,$TKINT       ;;FLUSH THE TTY INPUT QUEUE
032730  005077  146210                  CLR     @$TKS           ;;DISABLE TTY KEYBOARD INTERRUPTS
032734  112737  000001  001135          MOVB    #1,$INTAG       ;;SET INTERRUPT MODE INDICATOR

032742  104401  033650                  TYPE    ,$CNTLG         ;;ECHO THE CONTROL-G (↑G)
032746  104401  033655          $GTSWR: TYPE    ,$MSWR          ;;TYPE CURRENT CONTENTS
032752  013746  000176                  MOV     $WREG,-(SP)     ;;SAVE $WREG FOR TYPEOUT
032756  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
032760  104401  033666                  TYPE    ,$MNEW          ;;PROMPT FOR NEW SWR
032764  005046                  19$:    CLR     -(SP)           ;;CLEAR COUNTER
032766  005046                          CLR     -(SP)           ;;THE NEW SWR
032770  105777  146150          7$:     TSTB    @$TKS           ;;CHAR THERE?
032774  100375                          BPL     7$              ;;IF NOT TRY AGAIN

032776  117746  146144                  MOVB    @$TKB,-(SP)     ;;PICK UP CHAR
033002  042716  177600                  BIC     #↑C177,(SP)     ;;MAKE IT 7-BIT ASCII

033006  021627  000003                  CMP     (SP),#3         ;;IS IT A CONTROL-C?
033012  001015                          BNE     9$              ;;BRANCH IF NOT
033014  104401  033636                  TYPE    ,$CNTLC         ;;YES, ECHO CONTROL-C (↑C)
033020  062706  000006                  ADD     #6,SP           ;;CLEAN UP STACK
033024  123727  001135  000001          CMPB    $INTAG,#1       ;;REENABLE TTY KEYBOARD INTERRUPTS?
033032  001003                          BNE     8$              ;;BRANCH IF NO
033034  012777  000100  146102          MOV     #100,@$TKS      ;;ALLOW TTY KEYBOARD INTERRUPTS
033042  000137  004116          8$:     JMP     @DTSRT          ;;CONTROL-C RESTART


033046  021627  000025          9$:     CMP     (SP),#25        ;;IS IT A CONTROL-U?
033052  001005                          BNE     10$             ;;BRANCH IF NOT
033054  104401  033643                  TYPE    ,$CNTLU         ;;YES, ECHO CONTROL-U (↑U)
033060  062706  000006          20$:    ADD     #6,SP           ;;IGNORE PREVIOUS INPUT
033064  000737                          BR      19$             ;;LET'S TRY IT AGAIN


033066  021627  000015          10$:    CMP     (SP),#15        ;;IS IT A <CR>?
033072  001022                          BNE     16$             ;;BRANCH IF NO
033074  005766  000004                  TST     4(SP)           ;;YES, IS IT THE FIRST CHAR?
033100  001403                          BEQ     11$             ;;BRANCH IF YES
033102  016677  000002  146030          MOV     2(SP),@SWR      ;;SAVE NEW SWR
033110  062706  000006          11$:    ADD     #6,SP           ;;CLEAR UP STACK
033114  104401  001171          14$:    TYPE    ,$CRLF          ;;ECHO <CR> AND <LF>
033120  123727  001135  000001          CMPB    $INTAG,#1       ;;RE-ENABLE TTY KBD INTERRUPTS?
033126  001003                          BNE     15$             ;;BRANCH IF NOT
033130  012777  000100  146006          MOV     #100,@$TKS      ;;RE-ENABLE TTY KBD INTERRUPTS
033136  000002                  15$:    RTI                     ;;RETURN
033140  004737  031636          16$:    JSR     PC,$TYPEC       ;;ECHO CHAR
033144  021627  000060                  CMP     (SP),#60        ;;CHAR < 0?
```

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 7508  033150  002420                        BLT     18$                     ;;BRANCH IF YES
 7509  033152  021627  000067                CMP     (SP),#67                ;;CHAR > 7?
 7510  033156  003015                        BGT     18$                     ;;BRANCH IF YES
 7511  033160  042726  000060                BIC     #60,(SP)+               ;;STRIP-OFF ASCII
 7512  033164  005766  000002                TST     2(SP)                   ;;IS THIS THE FIRST CHAR
 7513  033170  001403                        BEQ     17$                     ;;BRANCH IF YES
 7514  033172  006316                        ASL     (SP)                    ;;NO, SHIFT PRESENT
 7515  033174  006316                        ASL     (SP)                    ;;   CHAR OVER TO MAKE
 7516  033176  006316                        ASL     (SP)                    ;;   ROOM FOR NEW ONE.
 7517  033200  005266  000002        17$:    INC     2(SP)                   ;;KEEP COUNT OF CHAR
 7518  033204  056616  177776                BIS     -2(SP),(SP)             ;;SET IN NEW CHAR
 7519  033210  000667                        BR      7$                      ;;GET THE NEXT ONE
 7520  033212  104401  001170        18$:    TYPE    ,$QUES                  ;;TYPE ?<CR><LF>
 7521  033216  000720                        BR      20$                     ;;SIMULATE CONTROL-U
 7522                                .DSABL  LSB
 7523
 7524
 7525                                ;;*****************************************************************
 7526                                ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
 7527                                ;*CALL:
 7528                                ;*      RDCHR                           ;;GET A CHARACTER FROM THE QUEUE
 7529                                ;*      RETURN HERE                     ;;CHARACTER IS ON THE STACK
 7530                                ;*                                      ;;WITH PARITY BIT STRIPPED OFF
 7531                                ;
 7532
 7533  033220  011646                $RDCHR: MOV     (SP),-(SP)              ;;PUSH DOWN THE PC AND
 7534  033222  016666  000004  000002        MOV     4(SP),2(SP)             ;;THE PS
 7535  033230  005066  000004                CLR     4(SP)                   ;;GET READY FOR A CHARACTER
 7536  033234  005046                        CLR     -(SP)                   ;;PUT NEW PS ON STACK
 7537  033236  012746  033244                MOV     #64$,-(SP)              ;;PUT NEW PC ON  STACK
 7538  033242  000002                        RTI                             ;;POP NEW PC AND PS
 7539  033244                        64$:
 7540  033244  005737  032360        1$:     TST     $TKCNT                  ;;WAIT ON A CHARACTER
 7541  033250  001775                        BEQ     1$
 7542  033252  005337  032360                DEC     $TKCNT                  ;;DECREMENT THE COUNTER
 7543  033256  117766  177102  000004        MOVB    @$TKQOUT,4(SP)          ;;GET ONE CHARACTER
 7544  033264  005237  032364                INC     $TKQOUT                 ;;UPDATE THE POINTER
 7545  033270  023727  032364  032367        CMP     $TKQOUT,#$TKQEND        ;;DID IT GO OFF OF THE END?
 7546  033276  001003                        BNE     2$                      ;;BRANCH IF NO
 7547  033300  012737  032366  032364        MOV     #$TKQSRT,$TKQOUT        ;;RESET THE POINTER
 7548  033306  000002                2$:     RTI                             ;;RETURN
 7549                                ;;*****************************************************************
 7550                                ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
 7551                                ;*CALL:
 7552                                ;*      RDLIN                           ;;INPUT A STRING FROM THE TTY
 7553                                ;*      RETURN HERE                     ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
 7554                                ;*                                      ;;TERMINATOR WILL BE A BYTE OF ALL 0'S
 7555
 7556  033310  010346                $RDLIN: MOV     R3,-(SP)                ;;SAVE R3
 7557  033312  005046                        CLR     -(SP)                   ;;CLEAR THE RUBOUT KEY
 7558  033314  012703  033544        1$:     MOV     #$TTYIN,R3              ;;GET ADDRESS
 7559  033320  022703  033636        2$:     CMP     #$TTYIN+72,R3           ;;BUFFER FULL?
 7560  033324  101456                        BLOS    4$                      ;;BR IF YES
 7561  033326  104410                        RDCHR                           ;;GO READ ONE CHARACTER FROM THE TTY
 7562  033330  112613                        MOVB    (SP)+,(R3)              ;;GET CHARACTER
 7563  033332  122713  000177        10$:    CMPB    #177,(R3)               ;;IS IT A RUBOUT
```

```
7564  033336  001022                        BNE     5$              ;;BR IF NO
7565  033340  005716                        TST     (SP)            ;;IS THIS THE FIRST RUBOUT?
7566  033342  001007                        BNE     6$              ;;BR IF NO
7567  033344  112737  000134  033542        MOVB    #'\,9$          ;;TYPE A BACK SLASH
7568  033352  104401  033542                TYPE    9$
7569  033356  012716  177777                MOV     #-1,(SP)        ;;SET THE RUBOUT KEY
7570  033362  005303              6$:       DEC     R3              ;;BACKUP BY ONE
7571  033364  020327  033544                CMP     R3,#$TTYIN      ;;STACK EMPTY?
7572  033370  103434                        BLO     4$              ;;BR IF YES
7573  033372  111337  033542                MOVB    (R3),9$         ;;SETUP TO TYPEOUT THE DELETED CHAR.
7574  033376  104401  033542                TYPE    9$              ;;GO TYPE
7575  033402  000746                        BR      2$              ;;GO READ ANOTHER CHAR.
7576  033404  005716              5$:       TST     (SP)            ;;RUBOUT KEY SET?
7577  033406  001406                        BEQ     7$              ;;BR IF NO
7578  033410  112737  000134  033542        MOVB    #'\,9$          ;;TYPE A BACK SLASH
7579  033416  104401  033542                TYPE    9$
7580  033422  005016                        CLR     (SP)            ;;CLEAR THE RUBOUT KEY
7581  033424  122713  000025        7$:     CMPB    #25,(R3)        ;;IS CHARACTER A CTRL U?
7582  033430  001003                        BNE     8$              ;;BR IF NO
7583  033432  104401  033643                TYPE    $CNTLU          ;;TYPE A CONTROL "U"
7584  033436  000726                        BR      1$              ;;GO START OVER
7585  033440  122713  000022        8$:     CMPB    #22,(R3)        ;;IS CHARACTER A "↑R"?
7586  033444  001011                        BNE     3$              ;;BRANCH IF NO
7587  033446  105013                        CLRB    (R3)            ;;CLEAR THE CHARACTER
7588  033450  104401  001171                TYPE    ,$CRLF          ;;TYPE A "CR" & "LF"
7589  033454  104401  033544                TYPE    ,$TTYIN         ;;TYPE THE INPUT STRING
7590  033460  000717                        BR      2$              ;;GO PICKUP ANOTHER CHACTER
7591  033462  104401  001170        4$:     TYPE    $QUES           ;;TYPE A '?'
7592  033466  000712                        BR      1$              ;;CLEAR THE BUFFER AND LOOP
7593  033470  111337  033542        3$:     MOVB    (R3),9$         ;;ECHO THE CHARACTER
7594  033474  104401  033542                TYPE    9$
7595  033500  122723  000015                CMPB    #15,(R3)+       ;;CHECK FOR RETURN
7596  033504  001305                        BNE     2$              ;;LOOP IF NOT RETURN
7597  033506  105063  177777                CLRB    -1(R3)          ;;CLEAR RETURN (THE 15)
7598  033512  104401  001172                TYPE    $LF             ;;TYPE A LINE FEED
7599  033516  005726                        TST     (SP)+           ;;CLEAN RUBOUT KEY FROM THE STACK
7600  033520  012603                        MOV     (SP)+,R3        ;;RESTORE R3
7601  033522  011646                        MOV     (SP),-(SP)      ;;ADJUST THE STACK AND PUT ADDRESS OF THE
7602  033524  016666  000004  000002        MOV     4(SP),2(SP)     ;;      FIRST ASCII CHARACTER ON IT
7603  033532  012766  033544  000004        MOV     #$TTYIN,4(SP)
7604  033540  000002                        RTI                     ;;RETURN
7605  033542     000          9$:          .BYTE   0               ;;STORAGE FOR ASCII CHAR. TO TYPE
7606  033543     000                       .BYTE   0               ;;TERMINATOR
7607  033544  000072           $TTYIN:     .BLKB   72              ;;RESERVE 72 BYTES FOR TTY INPUT
7608  033636  041536  005015  000  $CNTLC: .ASCIZ  /↑C/<15><12>    ;;CONTROL "C"
7609  033643     136  006525  000012 $CNTLU: .ASCIZ  /↑U/<15><12>  ;;CONTROL "U"
7610  033650  043536  005015  000  $CNTLG: .ASCIZ  /↑G/<15><12>    ;;CONTROL "G"
7611  033655     015  051412  051127 $MSWR:  .ASCIZ  <15><12>/SWR = /
7612  033662  036440  000040
7613  033666  020040  042516  020127 $MNEW:  .ASCIZ  /  NEW = /
7614  033674  020075     000
7615          033700                       .EVEN
7616                                       .SBTTL  DOUBLE LENGTH BINARY TO DECIMAL ASCII CONVERT ROUTINE
7617
7618                                       ;;*****************************************************************
7619                                       ;*THIS ROUTINE WILL CONVERT A 32-BIT BINARY NUMBER TO AN UNSIGNED
```

```
                                        ;*DECIMAL (ASCII) NUMBER. THE SIGN OF THE BINARY NUMBER MUST BE
                                        ;*POSITIVE.
                                        ;*CALL
                                        ;*      MOV     #PNTR,-(SP)     ;;POINTER TO LOW WORD OF BINARY NUMBER
                                        ;*      JSR     PC,@#$DB2D
                                        ;*      RETURN                  ;;THE FIRST ADDRESS OF ASCIZ
                                                                        ;;IS ON THE STACK

033700  104412                  $DB2D:  SAVREG                          ;;SAVE REGISTERS
033702  016602  000002                  MOV     2(SP),R2                ;;PICKUP THE DATA POINTER
033706  012700  034060                  MOV     #$DECVL,R0              ;;GET ADDRESS OF "$DECVL" STRING
033712  010066  000002                  MOV     R0,2(SP)                ;;PUT ADDRESS OF ASCIZ STRING ON STACK
033716  012201                          MOV     (R2)+,R1                ;;PICKUP THE BINARY NUMBER
033720  012202                          MOV     (R2)+,R2
033722  012737  000012  033776          MOV     #10.,4$                 ;;SET UP TO DO 10 CONVERSIONS
033730  012704  034010                  MOV     #$TNPWR,R4              ;;ADDRESS OF TEN POWER
033734  012705  034012                  MOV     #$TNPWR+2,R5
033740  005003                  1$:     CLR     R3                      ;;CLEAR PARTIAL
033742  161401                  2$:     SUB     (R4),R1                 ;;SUBTRACT TEN POWER
033744  005602                          SBC     R2
033746  161502                          SUB     (R5),R2
033750  002402                          BLT     3$                      ;;BR IF TEN POWER TO LARGE
033752  005203                          INC     R3                      ;;ADD 1 TO PARTIAL
033754  000772                          BR      2$                      ;;LOOP
033756  062401                  3$:     ADD     (R4)+,R1                ;;RESTORE SUBTRACTED VALUE
033760  005502                          ADC     R2
033762  062402                          ADD     (R4)+,R2
033764  022525                          CMP     (R5)+,(R5)+             ;;MOVE TO NEXT TEN POWER
033766  052703  000060                  BIS     #'0,R3                  ;;CHANGE PARTIAL TO ASCII
033772  110320                          MOVB    R3,(R0)+                ;;SAVE IT
033774  005327                          DEC     (PC)+                   ;;DONE?
033776  000000                  4$:     .WORD   0
034000  001357                          BNE     1$                      ;;BR IF NO
034002  105020                          CLRB    (R0)+                   ;;TERMINATOR
034004  104413                          RESREG                          ;;RESTORE REGISTERS
034006  000207                          RTS     PC                      ;;RETURN
034010  145000                  $TNPWR: 145000                          ;;1.0E09
034012  035632                          35632
034014  160400                          160400                          ;;1.0E08
034016  002765                          2765
034020  113200                          113200                          ;;1.0E07
034022  000230                          230
034024  041100                          041100                          ;;1.0E06
034026  000017                          17
034030  103240                          103240                          ;;1.0E05
034032  000001                          1
034034  023420                          23420                           ;;1.0E04
034036  000000                          0
034040  001750                          1750                            ;;1.0E03
034042  000000                          0
034044  000144                          144                             ;;1.0E02
034046  000000                          0
034050  000012                          12                              ;;1.0E01
034052  000000                          0
034054  000001                          1                               ;;1.0E00
```

```
7676  034056  000000                          0
7677  034060  000014          $DECVL: .BLKB   12.             ;;RESERVE STORAGE FOR ASCIZ STRING
7678                          .SBTTL  SAVE AND RESTORE R0-R5 ROUTINES
7679
7680                          ;;*****************************************************************
7681                          ;*SAVE R0-R5
7682                          ;*CALL:
7683                          ;*      SAVREG
7684                          ;*UPON RETURN FROM $SAVREG THE STACK WILL LOOK LIKE:
7685                          ;*
7686                          ;*TOP---(+16)
7687                          ;* +2---(+18)
7688                          ;* +4---R5
7689                          ;* +6---R4
7690                          ;* +8---R3
7691                          ;*+10---R2
7692                          ;*+12---R1
7693                          ;*+14---R0
7694
7695  034074                  $SAVREG:
7696  034074  010046                  MOV     R0,-(SP)        ;;PUSH R0 ON STACK
7697  034076  010146                  MOV     R1,-(SP)        ;;PUSH R1 ON STACK
7698  034100  010246                  MOV     R2,-(SP)        ;;PUSH R2 ON STACK
7699  034102  010346                  MOV     R3,-(SP)        ;;PUSH R3 ON STACK
7700  034104  010446                  MOV     R4,-(SP)        ;;PUSH R4 ON STACK
7701  034106  010546                  MOV     R5,-(SP)        ;;PUSH R5 ON STACK
7702  034110  016646  000022          MOV     22(SP),-(SP)    ;;SAVE PS OF MAIN FLOW
7703  034114  016646  000022          MOV     22(SP),-(SP)    ;;SAVE PC OF MAIN FLOW
7704  034120  016646  000022          MOV     22(SP),-(SP)    ;;SAVE PS OF CALL
7705  034124  016646  000022          MOV     22(SP),-(SP)    ;;SAVE PC OF CALL
7706  034130  000002                  RTI
7707
7708                          ;*RESTORE R0-R5
7709                          ;*CALL:
7710                          ;*      RESREG
7711  034132                  $RESREG:
7712  034132  012666  000022          MOV     (SP)+,22(SP)    ;;RESTORE PC OF CALL
7713  034136  012666  000022          MOV     (SP)+,22(SP)    ;;RESTORE PS OF CALL
7714  034142  012666  000022          MOV     (SP)+,22(SP)    ;;RESTORE PC OF MAIN FLOW
7715  034146  012666  000022          MOV     (SP)+,22(SP)    ;;RESTORE PS OF MAIN FLOW
7716  034152  012605                  MOV     (SP)+,R5        ;;POP STACK INTO R5
7717  034154  012604                  MOV     (SP)+,R4        ;;POP STACK INTO R4
7718  034156  012603                  MOV     (SP)+,R3        ;;POP STACK INTO R3
7719  034160  012602                  MOV     (SP)+,R2        ;;POP STACK INTO R2
7720  034162  012601                  MOV     (SP)+,R1        ;;POP STACK INTO R1
7721  034164  012600                  MOV     (SP)+,R0        ;;POP STACK INTO R0
7722  034166  000002                  RTI
7723                          .SBTTL  RANDOM NUMBER GENERATOR ROUTINE
7724
7725                          ;;*****************************************************************
7726                          ;*THIS ROUTINE IS A DOUBLE PRECISION PSEUDO RANDOM NUMBER GENERATOR
7727                          ;*WITH A RANGE OF 0 TO 2(+33)-1.
7728                          ;*CALL:
7729                          ;*      JSR     PC,$RAND        ;;CALL THE ROUTINE
7730                          ;*      RETURN                  ;;RETURN HERE THE RANDOM
7731                          ;*                              ;;NUMBER WILL BE IN
```

```
7732
7733
7734  034170
7735  034170  010046                  $RAND:  MOV     R0,-(SP)        ;;PUSH R0 ON STACK
7736  034172  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
7737  034174  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
7738  034176  013700  034270                  MOV     $LONUM,R0       ;;SET R0 WITH LOW
7739  034202  013701  034266                  MOV     $HINUM,R1       ;;SET R1 WITH HIGH
7740  034206  012702  177771                  MOV     #-7,R2          ;;SET SHIFT COUNT
7741  034212  006300                  1$:     ASL     R0              ;;SHIFT R0 LEFT AND
7742  034214  006101                          ROL     R1              ;;ROTATE CARRY INTO R1 AND
7743  034216  005202                          INC     R2              ;;CHECK FOR DONE
7744  034220  001374                          BNE     1$              ;;CONTINUE SHIFT LOOP
7745  034222  063700  034270                  ADD     $LONUM,R0       ;;ADD NUMBER TO MAKE X 129
7746  034226  005501                          ADC     R1              ;;PROPOGATE CARRY
7747  034230  063701  034266                  ADD     $HINUM,R1       ;;ADD NUMBER TO MAKE X 129
7748  034234  062700  001057                  ADD     #1057,R0        ;;ADD LOW CONSTANT
7749  034240  005501                          ADC     R1              ;;PROPOGATE CARRY
7750  034242  062701  047401                  ADD     #47401,R1       ;;ADD HIGH CONSTANT
7751  034246  010037  034270                  MOV     R0,$LONUM       ;;SAVE R0
7752  034252  010137  034266                  MOV     R1,$HINUM       ;;SAVE R1
7753  034256  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
7754  034260  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
7755  034262  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
7756  034264  000207                          RTS     PC              ;;RETURN
7757  034266  176543          $HINUM: .WORD   176543
7758  034270  123456          $LONUM: .WORD   123456
7759                           .SBTTL  ROUTINE TO SIZE MEMORY
7760
7761                           ;;**************************************************************
7762                           ;*CALL:
7763                           ;*      JSR     PC,$SIZE
7764                           ;*      RETURN
7765                           ;*$LSTAD WILL CONTAIN THE LAST AVAILABLE MEMORY LOCATION
7766
7767  034272  010046          $SIZE:  MOV     R0,-(SP)        ;;SAVE R0 ON THE STACK
7768  034274  010146                  MOV     R1,-(SP)        ;;SAVE R1 ON THE STACK
7769  034276  013746  000004          MOV     @#ERRVEC,-(SP)  ;;SAVE PRESENT ERROR VECTOR PS & PC
7770  034302  013746  000006          MOV     @#ERRVEC+2,-(SP)
7771  034306  010600                  MOV     SP,R0           ;;SAVE THE STACK POINTER
7772                           ;;SET THE ERRVEC PS TO THE PRESENT PS
7773  034310  104400                  TRAP                    ;;PUSH OLD PSW AND PC ON STACK
7774  034312  012637  000006          MOV     (SP)+,@#ERRVEC+2        ;;SAVE THE PSW IN @#ERRVEC+2
7775  034316  012737  034336  000004  MOV     #2$,@#ERRVEC    ;;SET FOR TIMEOUT
7776  034324  012701  020000          MOV     #20000,R1       ;;FIRST ADDRESS
7777  034330  005711          1$:     TST     (R1)            ;;TEST THIS ADDRESS
7778  034332  005721                  TST     (R1)+           ;;STEP TO NEXT ADDRESS
7779  034334  000775                  BR      1$              ;;TRY ANOTHER
7780  034336  162701  000002  2$:     SUB     #2,R1           ;;DROP BACK
7781  034342  010006                  MOV     R0,SP           ;;RESTORE THE STACK
7782  034344  012637  000006          MOV     (SP)+,@#ERRVEC+2 ;;RESTORE ERROR VECTOR
7783  034350  012637  000004          MOV     (SP)+,@#ERRVEC
7784  034354  010137  034366          MOV     R1,$LSTAD       ;;LAST ADDRESS
7785  034360  012601                  MOV     (SP)+,R1        ;;RESTORE R1
7786  034362  012600                  MOV     (SP)+,R0        ;;RESTORE R0
7787  034364  000207                  RTS     PC
```

```
 7788  034366  000000                    $LSTAD: .WORD   0                ;;CONTAINS THE LAST ADDRESS
 7789                                    .SBTTL  POWER DOWN AND UP ROUTINES
 7790
 7791                                    ;;*****************************************************************
 7792                                    ;POWER DOWN ROUTINE
 7793  034370  012737  034530  000024    $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
 7794  034376  012737  000340  000026            MOV     #340,@#PWRVEC+2  ;;PRIO:7
 7795  034404  010046                            MOV     R0,-(SP)         ;;PUSH R0 ON STACK
 7796  034406  010146                            MOV     R1,-(SP)         ;;PUSH R1 ON STACK
 7797  034410  010246                            MOV     R2,-(SP)         ;;PUSH R2 ON STACK
 7798  034412  010346                            MOV     R3,-(SP)         ;;PUSH R3 ON STACK
 7799  034414  010446                            MOV     R4,-(SP)         ;;PUSH R4 ON STACK
 7800  034416  010546                            MOV     R5,-(SP)         ;;PUSH R5 ON STACK
 7801  034420  017746  144514                    MOV     @SWR,-(SP)       ;;PUSH @SWR ON STACK
 7802  034424  010637  034534                    MOV     SP,$SAVR6        ;;SAVE SP
 7803  034430  012737  034442  000024            MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
 7804  034436  000000                            HALT
 7805  034440  000776                            BR      .-2              ;;HANG UP
 7806
 7807                                    ;;*****************************************************************
 7808                                    ;POWER UP ROUTINE
 7809  034442  012737  034530  000024    $PWRUP: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
 7810  034450  013706  034534                    MOV     $SAVR6,SP        ;;GET SP
 7811  034454  005037  034534                    CLR     $SAVR6           ;;WAIT LOOP FOR THE TTY
 7812  034460  005237  034534            1$:     INC     $SAVR6           ;;WAIT FOR THE INC
 7813  034464  001375                            BNE     1$               ;;OF  WORD
 7814  034466  012677  144446                    MOV     (SP)+,@SWR       ;;POP STACK INTO @SWR
 7815  034472  012605                            MOV     (SP)+,R5         ;;POP STACK INTO R5
 7816  034474  012604                            MOV     (SP)+,R4         ;;POP STACK INTO R4
 7817  034476  012603                            MOV     (SP)+,R3         ;;POP STACK INTO R3
 7818  034500  012602                            MOV     (SP)+,R2         ;;POP STACK INTO R2
 7819  034502  012601                            MOV     (SP)+,R1         ;;POP STACK INTO R1
 7820  034504  012600                            MOV     (SP)+,R0         ;;POP STACK INTO R0
 7821  034506  012737  034370  000024            MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
 7822  034514  012737  000340  000026            MOV     #340,@#PWRVEC+2  ;;PRIO:7
 7823  034522  104401                            TYPE                     ;REPORT THE POWER FAILURE
 7824  034524  034536            $PWRMG: .WORD   $POWER                   ;;POWER FAIL MESSAGE POINTER
 7825  034526  000002                    RTI
 7826  034530  000000            $ILLUP: HALT                             ;;THE POWER UP SEQUENCE WAS STARTED
 7827  034532  000776                    BR      .-2                      ;;  BEFORE THE POWER DOWN WAS COMPLETE
 7828  034534  000000            $SAVR6: 0                                ;;PUT THE SP HERE
 7829  034536  005015  047520  042527  $POWER: .ASCIZ  <15><12>"POWER"
 7830  034544  000122
 7831                                    .EVEN
 7832                                    .SBTTL  TRAP DECODER
 7833
 7834                                    ;;*****************************************************************
 7835                                    ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
 7836                                    ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
 7837                                    ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
 7838                                    ;*GO TO THAT ROUTINE.
 7839
 7840  034546  010046            $TRAP:  MOV     R0,-(SP)                 ;;SAVE R0
 7841  034550  016600  000002            MOV     2(SP),R0                 ;;GET TRAP ADDRESS
 7842  034554  005740                    TST     -(R0)                    ;;BACKUP BY 2
 7843  034556  111000                    MOVB    (R0),R0                  ;;GET RIGHT BYTE OF TRAP
```

```
7844  034560  006300                        ASL     R0              ;;POSITION FOR INDEXING
7845  034562  016000  034602                MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
7846  034566  000200                        RTS     R0              ;;GO TO ROUTINE
7847
7848
7849                                  ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO
7850
7851  034570  011646                $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
7852  034572  016666  000004  000002        MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
7853  034600  000002                        RTI                     ;;RESTORE THE PSW
7854
7855                                  .SBTTL  TRAP TABLE
7856
7857                                  ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
7858                                  ;*BY THE "TRAP" INSTRUCTION.
7859
7860                                  ;       ROUTINE
7861                                  ;       -------
7862  034602  034570                $TRPAD: .WORD   $TRAP2
7863  034604  031466                        $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
7864  034606  032156                        $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
7865  034610  032132                        $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
7866  034612  032172                        $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
7867  034614  031706                        $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)
7868
7869  034616  032746                        $GTSWR  ;;CALL=GTSWR    TRAP+6(104406)  GET SOFT-SWR SETTING
7870
7871  034620  032656                        $CKSWR  ;;CALL=CKSWR    TRAP+7(104407)  TEST FOR CHANGE IN SOFT-SWR
7872  034622  033220                        $RDCHR  ;;CALL=RDCHR    TRAP+10(104410) TTY TYPEIN CHARACTER ROUTINE
7873  034624  033310                        $RDLIN  ;;CALL=RDLIN    TRAP+11(104411) TTY TYPEIN STRING ROUTINE
7874  034626  034074                        $SAVREG ;;CALL=SAVREG   TRAP+12(104412) SAVE R0-R5 ROUTINE
7875  034630  034132                        $RESREG ;;CALL=RESREG   TRAP+13(104413) RESTORE R0-R5 ROUTINE
7876  034632  016732                        FFPRINT ;;CALL=FPRINT   TRAP+14(104414) FAILURE PRINT ROUTINE
7877  034634  000000                OFILE:  .WORD   0
7878  034636  046511  042515  044504  HPDATA: .ASCII  /IMMEDIATE COMMAND SUMMARY:/<15><12><12>
7879  034644  052101  020105  047503
7880  034652  046515  047101  020104
7881  034660  052523  046515  051101
7882  034666  035131  005015    012
7883  034673     103  046517  040515          .ASCII  /COMMAND                    NMENONIC        PARAMETERS/<15><12><12>
7884  034700  042116  020040  020040
7885  034706  020040  020040  020040
7886  034714  020040  020040  020040
7887  034722  047040  042515  047516
7888  034730  044516  020103  020040
7889  034736  020040  050040  051101
7890  034744  046501  052105  051105
7891  034752  006523  005012
7892  034756  051104  053111  020105          .ASCII  /DRIVE SELECT                 DN          ,DRIVE NUMBER/<15><12>
7893  034764  042523  042514  052103
7894  034772  020040  020040  020040
7895  035000  020040  020040  020040
7896  035006  020040  042040  020116
7897  035014  020040  020040  020040
7898  035022  020040  042054  044522
7899  035030  042526  047040  046525
```

```
7900  035036  042502  006522     012
7901  035043     040  020040  020040          .ASCII  /                                ,? (PRINT DRIVE SELECTED)/<15><12
7902  035050  020040  020040  020040
7903  035056  020040  020040  020040
7904  035064  020040  020040  020040
7905  035072  020040  020040  020040
7906  035100  020040  020040  020040
7907  035106  020040  026040  020077
7908  035114  050050  044522  052116
7909  035122  042040  044522  042526
7910  035130  051440  046105  041505
7911  035136  042524  024504  005015
7912  035144     012
7913  035145     106  051117  040515          .ASCII  /FORMAT SELECT           FT      ,FORMAT(24 OR 26)/<15><12>
7914  035152  020124  042523  042514
7915  035160  052103  020040  020040
7916  035166  020040  020040  020040
7917  035174  020040  020040  052106
7918  035202  020040  020040  020040
7919  035210  020040  026040  047506
7920  035216  046522  052101  031050
7921  035224  020064  051117  031040
7922  035232  024466  005015
7923  035236  020040  020040  020040          .ASCII  /                                ,? (PRINT FORMAT SELECTED)/<15><1
7924  035244  020040  020040  020040
7925  035252  020040  020040  020040
7926  035260  020040  020040  020040
7927  035266  020040  020040  020040
7928  035274  020040  020040  020040
7929  035302  020040  037454  024040
7930  035310  051120  047111  020124
7931  035316  047506  046522  052101
7932  035324  051440  046105  041505
7933  035332  042524  024504  005015
7934  035340  052517  050124  052125          .ASCII  /OUTPUT TEST             OT      ,O (OBJECT)/<15><12>
7935  035346  052040  051505  020124
7936  035354  020040  020040  020040
7937  035362  020040  020040  020040
7938  035370  020040  047440  020124
7939  035376  020040  020040  020040
7940  035404  020040  047454  024040
7941  035412  041117  042512  052103
7942  035420  006451     012
7943  035423     040  020040  020040          .ASCII  /                                ,S (SOURCE)/<15><12><12>
7944  035430  020040  020040  020040
7945  035436  020040  020040  020040
7946  035444  020040  020040  020040
7947  035452  020040  020040  020040
7948  035460  020040  020040  020040
7949  035466  020040  026040  020123
7950  035474  051450  052517  041522
7951  035502  024505  005015     012
7952  035507     111  050116  052125          .ASCII  /INPUT TEST              IT/<15><12><12>
7953  035514  052040  051505  020124
7954  035522  020040  020040  020040
7955  035530  020040  020040  020040
```

```
7956  035536  020040  020040  052111
7957  035544  005015     012
7958  035547     111  050116  052125          .ASCII  /INPUT STRING                IS/<15><12><12>
7959  035554  051440  051124  047111
7960  035562  020107  020040  020040
7961  035570  020040  020040  020040
7962  035576  020040  020040  051511
7963  035604  005015     012
7964  035607     103  050117  020131          .ASCII  /COPY TAPE                   CT/<15><12><12>
7965  035614  040524  042520  020040
7966  035622  020040  020040  020040
7967  035630  020040  020040  020040
7968  035636  020040  020040  052103
7969  035644  005015     012
7970  035647     111  042524  040522          .ASCII  /ITERATION COUNT             IC          ,NNNNN (DECIMAL COUNT)/<15><12>
7971  035654  044524  047117  041440
7972  035662  052517  052116  020040
7973  035670  020040  020040  020040
7974  035676  020040  020040  041511
7975  035704  020040  020040  020040
7976  035712  020040  026040  047116
7977  035720  047116  020116  042050
7978  035726  041505  046511  046101
7979  035734  041440  052517  052116
7980  035742  006451     012
7981  035745     040  020040  020040          .ASCII  /                                ,? (PRINT COUNT)/<15><12><12>
7982  035752  020040  020040  020040
7983  035760  020040  020040  020040
7984  035766  020040  020040  020040
7985  035774  020040  020040  020040
7986  036002  020040  020040  020040
7987  036010  020040  026040  020077
7988  036016  050050  044522  052116
7989  036024  041440  052517  052116
7990  036032  006451  005012
7991  036036  052502  043106  051105          .ASCII  /BUFFER DUMP                 BD          ,BUFFER NAME(H,R,W,X,Y, OR Z)/<15
7992  036044  042040  046525  020120
7993  036052  020040  020040  020040
7994  036060  020040  020040  020040
7995  036066  020040  041040  020104
7996  036074  020040  020040  020040
7997  036102  020040  041054  043125
7998  036110  042506  020122  040516
7999  036116  042515  044050  051054
8000  036124  053454  054054  054454
8001  036132  020054  051117  055040
8002  036140  006451     012
8003  036143     040  020040  020040          .ASCII  /                                ,NUMBER OF WORDS/<15><12>
8004  036150  020040  020040  020040
8005  036156  020040  020040  020040
8006  036164  020040  020040  020040
8007  036172  020040  020040  020040
8008  036200  020040  020040  020040
8009  036206  020040  026040  052516
8010  036214  041115  051105  047440
8011  036222  020106  047527  042122
```

```
8012   036230   006523      012
8013   036233      123   042520   044503          .ASCII  /SPECIAL DATA PATTERN       DP        ,PATTERN NAME (X,Y,Z)/<15><12>
8014   036240   046101   042040   052101
8015   036246   020101   040520   052124
8016   036254   051105   020116   020040
8017   036262   020040   020040   050104
8018   036270   020040   020040   020040
8019   036276   020040   026040   040520
8020   036304   052124   051105   020116
8021   036312   040516   042515   024040
8022   036320   026130   026131   024532
8023   036326   005015
8024   036330   020040   020040   020040          .ASCII  /                                 ,DDDD...D(32 WORDS)/<15><12><12>
8025   036336   020040   020040   020040
8026   036344   020040   020040   020040
8027   036352   020040   020040   020040
8028   036360   020040   020040   020040
8029   036366   020040   020040   020040
8030   036374   020040   042054   042104
8031   036402   027104   027056   024104
8032   036410   031063   053440   051117
8033   036416   051504   006451   005012
8034   036424   042105   052111   041040          .ASCII  /EDIT BUFFER                EB        ,PATTER NAME (X,Y,Z)/<15><12>
8035   036432   043125   042506   020122
8036   036440   020040   020040   020040
8037   036446   020040   020040   020040
8038   036454   020040   042440   020102
8039   036462   020040   020040   020040
8040   036470   020040   050054   052101
8041   036476   042524   020122   040516
8042   036504   042515   024040   026130
8043   036512   026131   024532   005015
8044   036520   020040   020040   020040          .ASCII  /                                 ,STARTING WORD NUMBER/<15><12>
8045   036526   020040   020040   020040
8046   036534   020040   020040   020040
8047   036542   020040   020040   020040
8048   036550   020040   020040   020040
8049   036556   020040   020040   020040
8050   036564   020040   051454   040524
8051   036572   052122   047111   020107
8052   036600   047527   042122   047040
8053   036606   046525   042502   006522
8054   036614      012
8055   036615      040   020040   020040          .ASCII  /                                 ,DD..D(UP TO 32 WORDS)/<15><12>
8056   036622   020040   020040   020040
8057   036630   020040   020040   020040
8058   036636   020040   020040   020040
8059   036644   020040   020040   020040
8060   036652   020040   020040   020040
8061   036660   020040   026040   042104
8062   036666   027056   024104   050125
8063   036674   052040   020117   031063
8064   036702   053440   051117   051504
8065   036710   006451      012
8066   036713      103   046517   044520          .ASCII  /COMPILE                   CO        ,NC (NO CHECK)/<15><12>
8067   036720   042514   020040   020040
```

```
8068  036726  020040  020040  020040
8069  036734  020040  020040  020040
8070  036742  020040  020040  047503
8071  036750  020040  020040  020040
8072  036756  020040  026040  041516
8073  036764  024040  047516  041440
8074  036772  042510  045503  006451
8075  037000      012
8076  037001      040  020040  020040          .ASCII  /                                ,BII (BUS INCREMENT INHIBIT)/<15>
8077  037006  020040  020040  020040
8078  037014  020040  020040  020040
8079  037022  020040  020040  020040
8080  037030  020040  020040  020040
8081  037036  020040  020040  020040
8082  037044  020040  026040  044502
8083  037052  020111  041050  051525
8084  037060  044440  041516  042522
8085  037066  042515  052116  044440
8086  037074  044116  041111  052111
8087  037102  006451  005012
8088  037106  042105  052111  040440          .ASCII  /EDIT ADD LINE              EA          ,LINE NUMBER/<15><12>
8089  037114  042104  046040  047111
8090  037122  020105  020040  020040
8091  037130  020040  020040  020040
8092  037136  020040  042440  020101
8093  037144  020040  020040  020040
8094  037152  020040  046054  047111
8095  037160  020105  052516  041115
8096  037166  051105  005015
8097  037172  020040  020040  020040          .ASCII  /                                ,NEW COMMAND/<15><12><12>
8098  037200  020040  020040  020040
8099  037206  020040  020040  020040
8100  037214  020040  020040  020040
8101  037222  020040  020040  020040
8102  037230  020040  020040  020040
8103  037236  020040  047054  053505
8104  037244  041440  046517  040515
8105  037252  042116  005015      012
8106  037257      105  044504  020124          .ASCII  /EDIT DELETE LINE           ED          ,LINE NUMBER/<15><12><12>
8107  037264  042504  042514  042524
8108  037272  046040  047111  020105
8109  037300  020040  020040  020040
8110  037306  020040  020040  042105
8111  037314  020040  020040  020040
8112  037322  020040  026040  044514
8113  037330  042516  047040  046525
8114  037336  042502  006522  005012
8115  037344  051120  047111  020124          .ASCII  /PRINT TEST                 PT/<15><12><12>
8116  037352  042524  052123  020040
8117  037360  020040  020040  020040
8118  037366  020040  020040  020040
8119  037374  020040  050040  006524
8120  037402  005012
8121  037404  051120  047111  020124          .ASCII  /PRINT LINE                 PL          ,LINE NUMBER/<15><12><12>
8122  037412  044514  042516  020040
8123  037420  020040  020040  020040
```

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8124  037426  020040  020040  020040
8125  037434  020040  050040  020114
8126  037442  020040  020040  020040
8127  037450  020040  046054  047111
8128  037456  020105  052516  041115
8129  037464  051105  005015    012
8130  037471     116  053505  052040          .ASCII  /NEW TEST                    NT/<15><12><12>
8131  037476  051505  020124  020040
8132  037504  020040  020040  020040
8133  037512  020040  020040  020040
8134  037520  020040  020040  052116
8135  037526  005015    012
8136  037531     122  047125  020040          .ASCII  /RUN                        RU/<15><12><12>
8137  037536  020040  020040  020040
8138  037544  020040  020040  020040
8139  037552  020040  020040  020040
8140  037560  020040  020040  052522
8141  037566  005015    012
8142  037571     120  044522  052116          .ASCII  /PRINT REGISTER             PR          ,REGISTER NAME OR NUMBER/<15><12>
8143  037576  051040  043505  051511
8144  037604  042524  020122  020040
8145  037612  020040  020040  020040
8146  037620  020040  020040  051120
8147  037626  020040  020040  020040
8148  037634  020040  026040  042522
8149  037642  044507  052123  051105
8150  037650  047040  046501  020105
8151  037656  051117  047040  046525
8152  037664  042502  006522  005012
8153  037672  042510  050114  020040          .ASCII  /HELP                       HP/<15><12><12>
8154  037700  020040  020040  020040
8155  037706  020040  020040  020040
8156  037714  020040  020040  020040
8157  037722  020040  044040  006520
8158  037730  005012
8159  037732  044524  042515  047440          .ASCII  /TIME OUT CHANGE            TO          ,NNNNN (DECIMAL)/<15><12>
8160  037740  052125  041440  040510
8161  037746  043516  020105  020040
8162  037754  020040  020040  020040
8163  037762  020040  052040  020117
8164  037770  020040  020040  020040
8165  037776  020040  047054  047116
8166  040004  047116  024040  042504
8167  040012  044503  040515  024514
8168  040020  005015
8169  040022  020040  020040  020040          .ASCII  /                                   ,? (PRINT CONSTANT)/<15><12><12>
8170  040030  020040  020040  020040
8171  040036  020040  020040  020040
8172  040044  020040  020040  020040
8173  040052  020040  020040  020040
8174  040060  020040  020040  020040
8175  040066  020040  037454  024040
8176  040074  051120  047111  020124
8177  040102  047503  051516  040524
8178  040110  052116  006451  005012
8179  040116  046101  020114  042504          .ASCII  /ALL DECIMAL VALUES MUST BE 65535(10) OR LESS/<15><12><12><12>
```

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8180  040124  044503  040515  020114
8181  040132  040526  052514  051505
8182  040140  046440  051525  020124
8183  040146  042502  033040  032465
8184  040154  032463  030450  024460
8185  040162  047440  020122  042514
8186  040170  051523  005015  005012
8187  040176  042504  042506  051122          .ASCII  /DEFERRED COMMAND SUMMARY:/<15><12><12>
8188  040204  042105  041440  046517
8189  040212  040515  042116  051440
8190  040220  046525  040515  054522
8191  040226  006472  005012
8192  040232  047503  046515  047101          .ASCII  /COMMAND                    NMENONIC      PARAMETER/<15><12><12>
8193  040240  020104  020040  020040
8194  040246  020040  020040  020040
8195  040254  020040  020040  020040
8196  040262  020040  046516  047105
8197  040270  047117  041511  020040
8198  040276  020040  020040  040520
8199  040304  040522  042515  042524
8200  040312  006522  005012
8201  040316  052523  051502  051531          .ASCII  /SUBSYSTEM FUNCTION          SF          ,SUBSYSTEM CMND/<15><12>
8202  040324  042524  020115  052506
8203  040332  041516  044524  047117
8204  040340  020040  020040  020040
8205  040346  020040  020040  051440
8206  040354  020106  020040  020040
8207  040362  020040  020040  051454
8208  040370  041125  054523  052123
8209  040376  046505  041440  047115
8210  040404  006504      012
8211  040407      040  020040  020040          .ASCII  /                                 ,DRIVE NUM/<15><12>
8212  040414  020040  020040  020040
8213  040422  020040  020040  020040
8214  040430  020040  020040  020040
8215  040436  020040  020040  020040
8216  040444  020040  020040  020040
8217  040452  020040  020040  026040
8218  040460  051104  053111  020105
8219  040466  052516  006515      012
8220  040473      040  020040  020040          .ASCII  /                                 ,CYLINDER/<15><12>
8221  040500  020040  020040  020040
8222  040506  020040  020040  020040
8223  040514  020040  020040  020040
8224  040522  020040  020040  020040
8225  040530  020040  020040  020040
8226  040536  020040  020040  026040
8227  040544  054503  044514  042116
8228  040552  051105  005015
8229  040556  020040  020040  020040          .ASCII  /                                 ,TRACK/<15><12>
8230  040564  020040  020040  020040
8231  040572  020040  020040  020040
8232  040600  020040  020040  020040
8233  040606  020040  020040  020040
8234  040614  020040  020040  020040
8235  040622  020040  020040  052054
```

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8236  040630  040522  045503  005015
8237  040636  020040  020040  020040          .ASCII  /                                ,SECTOR/<15><12>
8238  040644  020040  020040  020040
8239  040652  020040  020040  020040
8240  040660  020040  020040  020040
8241  040666  020040  020040  020040
8242  040674  020040  020040  020040
8243  040702  020040  020040  051454
8244  040710  041505  047524  006522
8245  040716      012
8246  040717      040  020040  020040          .ASCII  /                                ,WORD COUNT/<15><12>
8247  040724  020040  020040  020040
8248  040732  020040  020040  020040
8249  040740  020040  020040  020040
8250  040746  020040  020040  020040
8251  040754  020040  020040  020040
8252  040762  020040  020040  026040
8253  040770  047527  042122  041440
8254  040776  052517  052116  005015
8255  041004  020040  020040  020040          .ASCII  /                                ,DATA PATTERN/<15><12>
8256  041012  020040  020040  020040
8257  041020  020040  020040  020040
8258  041026  020040  020040  020040
8259  041034  020040  020040  020040
8260  041042  020040  020040  020040
8261  041050  020040  020040  042054
8262  041056  052101  020101  040520
8263  041064  052124  051105  006516
8264  041072      012
8265  041073      102  043125  042506          .ASCII  /BUFFER INITIALIZE          BI    ,PATTERN SELECT/<15><12><12>
8266  041100  020122  047111  052111
8267  041106  040511  044514  042532
8268  041114  020040  020040  020040
8269  041122  020040  020040  020040
8270  041130  044502  020040  020040
8271  041136  020040  020040  026040
8272  041144  040520  052124  051105
8273  041152  020116  042523  042514
8274  041160  052103  005015      012
8275  041165      104  052101  020101          .ASCII  /DATA COMPARE               DC    ,NNNNNN (OCTAL)/<15><12><12>
8276  041172  047503  050115  051101
8277  041200  020105  020040  020040
8278  041206  020040  020040  020040
8279  041214  020040  020040  020040
8280  041222  041504  020040  020040
8281  041230  020040  020040  026040
8282  041236  047116  047116  047116
8283  041244  024040  041517  040524
8284  041252  024514  005015      012
8285  041257      123  040524  052524          .ASCII  /STATUS COMPARE             SC    ,STATUS WD SELECT/<15><12>
8286  041264  020123  047503  050115
8287  041272  051101  020105  020040
8288  041300  020040  020040  020040
8289  041306  020040  020040  020040
8290  041314  041523  020040  020040
8291  041322  020040  020040  026040
```

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 8292  041330  052123  052101  051525
 8293  041336  053440  020104  042523
 8294  041344  042514  052103  005015
 8295  041352  020040  020040  020040          .ASCII  /                                       ,EXPECTED VALUE/<15><12>
 8296  041360  020040  020040  020040
 8297  041366  020040  020040  020040
 8298  041374  020040  020040  020040
 8299  041402  020040  020040  020040
 8300  041410  020040  020040  020040
 8301  041416  020040  020040  042454
 8302  041424  050130  041505  042524
 8303  041432  020104  040526  052514
 8304  041440  006505      012
 8305  041443      040  020040  020040          .ASCII  /                                       ,MASK/<15><12><12>
 8306  041450  020040  020040  020040
 8307  041456  020040  020040  020040
 8308  041464  020040  020040  020040
 8309  041472  020040  020040  020040
 8310  041500  020040  020040  020040
 8311  041506  020040  020040  026040
 8312  041514  040515  045523  005015
 8313  041522      012
 8314  041523      122  043505  051511          .ASCIZ  /REGISTER WRITE                 RW      ,REG NAME OR NUM/<15><12>
 8315  041530  042524  020122  051127
 8316  041536  052111  020105  020040
 8317  041544  020040  020040  020040
 8318  041552  020040  020040  020040
 8319  041560  053522  020040  020040
 8320  041566  020040  020040  026040
 8321  041574  042522  020107  040516
 8322  041602  042515  047440  020122
 8323  041610  052516  006515  000012
 8324                                          .EVEN
 8325  041616  020040  020040  020040  ENDLOC: .ASCII  /                                       ,VALUE/<15><12><12>
 8326  041624  020040  020040  020040
 8327  041632  020040  020040  020040
 8328  041640  020040  020040  020040
 8329  041646  020040  020040  020040
 8330  041654  020040  020040  020040
 8331  041662  020040  020040  053054
 8332  041670  046101  042525  005015
 8333  041676      012
 8334  041677      122  043505  051511          .ASCII  /REGISTER COMPARE               RC      ,REG NAME OR NUM/<15><12>
 8335  041704  042524  020122  047503
 8336  041712  050115  051101  020105
 8337  041720  020040  020040  020040
 8338  041726  020040  020040  020040
 8339  041734  041522  020040  020040
 8340  041742  020040  020040  026040
 8341  041750  042522  020107  040516
 8342  041756  042515  047440  020122
 8343  041764  052516  006515      012
 8344  041771      040  020040  020040          .ASCII  /                                       ,EXPECTED VALUE/<15><12>
 8345  041776  020040  020040  020040
 8346  042004  020040  020040  020040
 8347  042012  020040  020040  020040
```

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8348  042020  020040  020040  020040
8349  042026  020040  020040  020040
8350  042034  020040  020040  026040
8351  042042  054105  042520  052103
8352  042050  042105  053040  046101
8353  042056  042520  005015
8354  042062  020040  020040  020040          .ASCII  /                                       ,MASK/<15><12><12>
8355  042070  020040  020040  020040
8356  042076  020040  020040  020040
8357  042104  020040  020040  020040
8358  042112  020040  020040  020040
8359  042120  020040  020040  020040
8360  042126  020040  020040  046454
8361  042134  051501  006513  005012
8362  042142  052123  046101  020114          .ASCII  /STALL                          ST     ,NNNNN (DECIMAL)/<15><12><12>
8363  042150  020040  020040  020040
8364  042156  020040  020040  020040
8365  042164  020040  020040  020040
8366  042172  020040  020040  051440
8367  042200  020124  020040  020040
8368  042206  020040  020040  047054
8369  042214  047116  047116  024040
8370  042222  042504  044503  040515
8371  042230  024514  005015     012
8372  042235     120  044522  052116          .ASCII  /PRINT MESSAGE                  PM     ,MESSAGE/<15><12><12>
8373  042242  046440  051505  040523
8374  042250  042507  020040  020040
8375  042256  020040  020040  020040
8376  042264  020040  020040  020040
8377  042272  046520  020040  020040
8378  042300  020040  020040  026040
8379  042306  042515  051523  043501
8380  042314  006505  005012
8381  042320  047125  041111  051525          .ASCII  /UNIBUS INITIALIZE              UI/<15><12><12>
8382  042326  044440  044516  044524
8383  042334  046101  055111  020105
8384  042342  020040  020040  020040
8385  042350  020040  020040  052440
8386  042356  006511  005012
8387  042362  046101  020114  042504          .ASCII  /ALL DECIMAL VALUES MUST BE LESS THAN 65535(10)/<15><12><12><12><12>
8388  042370  044503  040515  020114
8389  042376  040526  052514  051505
8390  042404  046440  051525  020124
8391  042412  042502  046040  051505
8392  042420  020123  044124  047101
8393  042426  033040  032465  032463
8394  042434  030450  024460  005015
8395  042442  005012
8396  042444  052523  051502  051531          .ASCII  /SUBSYSTEM COMMANDS:/<15><12><12>
8397  042452  042524  020115  047503
8398  042460  046515  047101  051504
8399  042466  006472  005012
8400  042472  047503  046515  047101          .ASCII  /COMMAND              NMENONIC/<15><12><12>
8401  042500  020104  020040  020040
8402  042506  020040  020040  020040
8403  042514  020040  046516  047105
```

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8404  042522  047117  041511  005015
8405  042530      012
8406  042531      122  040505  020104          .ASCII  /READ DATA              RD/<15><12>
8407  042536  040504  040524  020040
8408  042544  020040  020040  020040
8409  042552  020040  020040  020040
8410  042560  042122  005015
8411  042564  051127  052111  020105          .ASCII  /WRITE DATA             WD/<15><12>
8412  042572  040504  040524  020040
8413  042600  020040  020040  020040
8414  042606  020040  020040  053440
8415  042614  006504      012
8416  042617      127  044522  042524          .ASCII  /WRITE CHECK            WC/<15><12>
8417  042624  041440  042510  045503
8418  042632  020040  020040  020040
8419  042640  020040  020040  020040
8420  042646  041527  005015
8421  042652  051127  052111  020105          .ASCII  /WRITE HEADERS          WH/<15><12>
8422  042660  042510  042101  051105
8423  042666  020123  020040  020040
8424  042674  020040  020040  053440
8425  042702  006510      012
8426  042705      122  040505  020104          .ASCII  /READ HEADER            RH/<15><12>
8427  042712  042510  042101  051105
8428  042720  020040  020040  020040
8429  042726  020040  020040  020040
8430  042734  044122  005015
8431  042740  042523  042505  020040          .ASCII  /SEEK                   SK/<15><12>
8432  042746  020040  020040  020040
8433  042754  020040  020040  020040
8434  042762  020040  020040  051440
8435  042770  006513      012
8436  042773      103  042514  051101          .ASCII  /CLEAR SUBSYSTEM        CS/<15><12>
8437  043000  051440  041125  054523
8438  043006  052123  046505  020040
8439  043014  020040  020040  020040
8440  043022  051503  005015
8441  043026  047503  052116  047522          .ASCII  /CONTROLLER CLEAR       CC/<15><12>
8442  043034  046114  051105  041440
8443  043042  042514  051101  020040
8444  043050  020040  020040  041440
8445  043056  006503      012
8446  043061      104  044522  042526          .ASCII  /DRIVE CLEAR            DC/<15><12>
8447  043066  041440  042514  051101
8448  043074  020040  020040  020040
8449  043102  020040  020040  020040
8450  043110  041504  005015
8451  043114  042522  040503  044514          .ASCII  /RECALIBRATE            RC/<15><12>
8452  043122  051102  052101  020105
8453  043130  020040  020040  020040
8454  043136  020040  020040  051040
8455  043144  006503      012
8456  043147      104  044522  042526          .ASCII  /DRIVE SELECT           DS/<15><12>
8457  043154  051440  046105  041505
8458  043162  020124  020040  020040
8459  043170  020040  020040  020040
```

```
8460  043176  051504  005015
8461  043202  040520  045503  040440          .ASCII  /PACK ACK              PA/<15><12>
8462  043210  045503  020040  020040
8463  043216  020040  020040  020040
8464  043224  020040  020040  050040
8465  043232  006501     012
8466  043235     125  046116  040517          .ASCII  /UNLOAD               UL/<15><12>
8467  043242  020104  020040  020040
8468  043250  020040  020040  020040
8469  043256  020040  020040  020040
8470  043264  046125  005015
8471  043270  052123  051101  020124          .ASCII  /START SPINDLE        SS/<15><12>
8472  043276  050123  047111  046104
8473  043304  020105  020040  020040
8474  043312  020040  020040  051440
8475  043320  006523     012
8476  043323     117  043106  042523          .ASCII  /OFFSET               OF/<15><12>
8477  043330  020124  020040  020040
8478  043336  020040  020040  020040
8479  043344  020040  020040  020040
8480  043352  043117  005015
8481  043356  042522  042101  040440          .ASCII  /READ ALL HEADERS     AH/<15><12><12><12>
8482  043364  046114  044040  040505
8483  043372  042504  051522  020040
8484  043400  020040  020040  040440
8485  043406  006510  005012     012
8486  043413     104  052101  020101          .ASCII  /DATA PATTERNS:/<15><12><12>
8487  043420  040520  052124  051105
8488  043426  051516  006472  005012
8489  043434  040520  052124  051105          .ASCII  /PATTERNS "A" THROUGH "I" ARE PROVIDED./<15><12>
8490  043442  051516  021040  021101
8491  043450  052040  051110  052517
8492  043456  044107  021040  021111
8493  043464  040440  042522  050040
8494  043472  047522  044526  042504
8495  043500  027104  005015
8496  043504  042522  042506  020122          .ASCIZ  /REFER TO THE FUNCTIONAL SPEC FOR DETAILS./<15><12><12>
8497  043512  047524  052040  042510
8498  043520  043040  047125  052103
8499  043526  047511  040516  020114
8500  043534  050123  041505  043040
8501  043542  051117  042040  052105
8502  043550  044501  051514  006456
8503  043556  005012     000
8504          000001                          .END
```

```
ACLO   = 000010  1906#
APRES    013727  4657#  4867
A.ABNL   023564  4975#  5002*  5340*  5344*  5913#  6712
A.CONT   023566  5914#  6722
A.NORM   023562  5912#  6716
BADATT   015006  4761#  4786
BADCOM   003053  2243#  2478  3695
BADDEC   002512  2201#  2694  2793  2868  2982  3062  4014
BADDRV   003146  2255#  3028  4237
BADOCT   002640  2216#  2953  3026  3190  3258  3482  3878  3976  4229  5783
BADSEL   003365  2283#  3260  3880
BADTYP   003166  2258#  5771
BAI    = 000020  1865#  6881
BAII   = 000004  1732#  3633  3642  4251  5522
BA16   = 000400  1841#
BA17   = 001000  1842#
BDDAT    014504  4725#  5172  5231  5291
BDRTE    007530  2361   3416#
BIT0   = 000001  1631#  1838  1855  1881  1903  2051  2422  4830  4837  5921  6996
BIT00  = 000001  1621#  1631
BIT01  = 000002  1620#  1630
BIT02  = 000004  1619#  1629
BIT03  = 000010  1618#  1628
BIT04  = 000020  1617#  1627
BIT05  = 000040  1616#  1626
BIT06  = 000100  1615#  1625
BIT07  = 000200  1614#  1624
BIT08  = 000400  1613#  1623
BIT09  = 001000  1612#  1622
BIT1   = 000002  1630#  1731  1856  1883  2052  4833  4847  5922
BIT10  = 002000  1611#  1843  1872  1894  1929  1943  1956  1971  1985  2064  5931
BIT11  = 004000  1610#  1844  1873  1895  1914  1930  1944  1957  1972  1986  2065
BIT12  = 010000  1609#  1846  1874  1896  1931  1945  1958  1959  1973  1987  2066
BIT13  = 020000  1608#  1847  1875  1897  1915  1932  1946  1960  1974  1988  2067
BIT14  = 040000  1607#  1848  1876  1898  1916  1933  1947  1961  1975  1989  2068  5932
BIT15  = 100000  1606#  1849  1850  1877  1899  1917  1934  1994  2069  3090  3920  5933
BIT2   = 000004  1629#  1732  1857  1884  1885  1905  2053  4869  4882  5923
BIT3   = 000010  1628#  1733  1863  1864  1886  1906  2054  4872  4888  5924
BIT4   = 000020  1627#  1858  1865  1887  1907  1908  1923  1965  1979  2055  4875  4894  5925
BIT5   = 000040  1626#  1866  1867  1888  1909  1924  1938  1951  1966  1980  2056  4878  4900
                 5926    6793
BIT6   = 000100  1625#  1839  1868  1889  1910  1925  1939  1952  1967  1981  2057  4907  5928
BIT7   = 000200  1624#  1840  1869  1890  1911  1912  1926  1940  1953  1968  1982  2059
BIT8   = 000400  1623#  1841  1870  1891  1892  1913  1927  1941  1954  1969  1983  2060  5929
BIT9   = 001000  1622#  1842  1871  1893  1928  1942  1955  1970  1984  2061  5696  5930
BLDHDR   022302  5604    5690#
BPTVEC= 000014  1638#
BSE    = 000200  1890#  6146  6312  6548
B.BA16= 000001  1855#  6875
B.BA17= 000002  1856#  6875
B.CDT  = 000004  1857#  5528  6529  6875
B.CFMT= 000020  1858#  5530  5533  5693  6529  6875  6959
CCLR   = 100000  1850#  4780  4977  6482
CDT    = 002000  1843#  6288  6838  6895  6946  6969
CEFLG    023452  4782  5045*  5047*  5866#
CERR   = 100000  1849#  3533  6184  6243  6302  6484  6535  6850  6906  6994
```

```
CERR0   022622          5787#   5883
CERR1   022671          5794#   5882
CERR10  023333          5846#   5873
CERR11  023431          5861#   5872
CERR12  023431          5862#   5871
CERR13  023431          5863#   5870
CERR14  023431          5864#   5869
CERR15  023401          5853#   5868
CERR16  023431          5865#   5884
CERR2   022746          5802#   5881
CERR3   022776          5806#   5880
CERR4   023033          5811#   5879
CERR5   023106          5819#   5878
CERR6   023166          5827#   5877
CERR7   023431          5858#   5861    5862    5863    5864    5865    5876
CERR8   023217          5832#   5875
CERR9   023261          5838#   5874
CFMT  = 010000          1846#   6288    6838    6895    6946    6969
CHNFLG  001663          1754#   3563    4439*   4486*   4493    4499*
CKSWR = 104407          7871#
CLEAR = 000105          1809#   5581
CLR   = 000040          1866#
CMDTO = 000100          2057#   4800    4817    4988    6045
CNTSTR  001714          1772#   3536*   3558*   4549
COE   = 001000          1893#   6146    6312    6548
COMLEV  004416          2439    2460#   2477    2482    3406    3567
COMMA   004665          2554#   2558
COMPOK  002772          2232#   3677
COMSZE  001254          1739#   3969*   3973    4302*
CONCLR= 000176          1827#   5575    6977
CONERR  016444          5021#   5914
CORTE   010310          2343    3622#
CR    = 000015          1546#   7206    7216
CRLF  = 000200          1547#   7177    7216
CTO   = 004000          1844#   6544
CTRTE   022154          2331    5656#
CUROP   013652          4649#   4824
CVTBUF  006336          3088#   3153    3172
CYLNUM  001200          1706#   4265*   4290
C$BI    011162          2365    3914#
C$CBI   011206          3922#   4218
C$CBII  011210          3921    3924#
C$CBIS  004016          2365#   4216
C$DC    011272          2367    3961#
C$ERR   001664          1755#   3631*   3672    3704*
C$PM    010674          2377    3759#
C$RC    010752          2371    3835#
C$RCWS  011004          3834    3837    3840#
C$RW    010734          2373    3832#
C$SC    010770          2369    3838#
C$SF    011576          2363    4159#
C$ST    011350          2375    4001#
C$UI    011422          2379    4030#
C.INIT  027264          4582    6755#
C.RTRN  031136          6859    6887    6915    6922    6925    6932    6936    6953    6975    6980    6990    6999    7012
                        7016    7021#
```

```
C.SPEC  030156          6795  6891#
DCK   = 100000          1899# 6146  6312  6548
DCLO  = 000020          1908#
DCMDPR  004510          2474  2505#
DDISP = 177570          1553# 1687  2401
DDT   = 000400          1913#
DECBIN  031314          2646  2749  2837  2976  3056  4005  7101#
DESL  = 000010          1863#
DI    = 040000          1848# 3533  6332  7004
DISPLA  001142          1687# 2401* 2409*
DISPRE  000174          1653# 2409
DLT   = 100000          1877# 6140  6270  6306  6546
DMD   = 000040          1924#
DMPHDR  003465          2295# 3465
DNRTE   006144          2323  3005#
DONE    001667          1758# 4580* 4585  4600* 4773* 5024*
DPRTE   006356          2341  3092#
DPRTE1  006362          3091  3093#
DRA   = 000001          1903# 4993  6135  6918
DRDY  = 000200          1912#
DRIVE   001176          1705# 3012  3021* 4260* 4281  5517* 5519
DROT  = 000040          1909#
DRPAR = 000010          1886#
DRPDRV= 002000          2064# 6780
DRVCAL  013570          4580# 5141  5649
DRVDSC= 000040          2056# 4791  6220  6386  6448
DRVERR  015036          4766# 5002  5046  5344  5913
DRVHRD= 000020          2055# 4788  6227  6422  6553
DRVMSK= 000007          1862# 6129  6170  6321  6766
DRVPDT= 000004          2053# 6328  6396
DRVPOS= 000002          2052# 6328  6355  6817
DRVSZD= 010000          2066# 4797  4800  6158  6920
DRVTYP  001244          1728# 5529  5752  5766* 5767  5769  5777* 5779*
DRVUSE= 000001          2051# 6780
DRY   = 000200          1911#
DR.CLR= 000005          1834# 6208  6371  6413  6437  6551
DR.SEL= 000001          1833# 6278  6357  6672  6679  6686  6693  6897
DSC   = 040000          1916#
DSCNOT  014731          4752# 4796
DSWR  = 177570          1552# 1686  2400
DTBAII= 100000          2069# 5524  6780  6879
DTE   = 010000          1896# 6548
DTRTE   022450          2325  5745#
DTYE  = 000040          1888# 6548
EARTE   004764          2345  2628#
EBRTE   006346          2339  3090#
ECCW  = 020000          1932#
ECH   = 000100          1889# 6146  6312  6548
EDRTE   005266          2347  2739#
EMTVEC= 000030          1641#
ENDLOC  041616          2417  2419  2423  3361  8325#
EQSGN   002510          2200# 2861  2905  3699
ERRFRE  013644          4600# 5912
ERRVEC= 000004          1634# 2398  2399* 2410* 7769  7770  7774* 7775* 7782* 7783*
ETABL   023454          5040  5868#
ESAH'   021634          4076  5593#
```

```
ESBI     020536            2365    4491    5360#
ESCC     021540            4058    5575#
ESCS     021524            4060    5572#
ESDATC   020204            2367    5253#
ESDC     021564            4062    5581#
ESDS     021552            4066    5578#
ESOF     021622            4074    5590#
ESPA     021510            4068    5569#
ESPM     013516            2377    4548#
ESRC     021474            4064    5566#
ESRD     021712            4046    5606#
ESREGC   020026            2371    5200#
ESRH     021646            4054    5596#
ESRW     020426            2373    5318#
ESSC     017610            2369    5133#
ESSK     021660            4056    5599#
ESSS     021610            4072    5587#
ESST     020446            2375    5334#
ESUI     021464            2379    5543#
ESUL     021576            4070    5584#
ESWC     021776            4050    5622#
ESWD     021762            4048    5619#
ESWH     021672            4052    5602#
E.CCLR=  000001            5921#   6487
E.CERR=  001000            5930#   6561
E.CLAT=  000020            5925#   6213    6377    6418    6442
E.CMTO=  040000            5932#
E.CONT   023570            5030    5044*   5915#   6112*   6150*   6213*   6223*   6294*   6316*   6339*   6345*   6377*   6418*
                           6442*   6487*   6539*   6561*   6700*   6934*   6988*   6996*   7009*
E.DLT =  000400            5929#   6294
E.DPAR=  002000            5931#   6223    6700
E.ILLD=  000100            5928#   6988
E.MDS =  100000            5933#   6112    6539    6934
E.NOAT=  000002            5922#   6339
E.SCLR=  000040            5926#   7009
E.UATT=  000004            5923#   6345
E.UDAT=  000010            5924#   6150    6316
E.UNLD=  020000            2067#   6231    6351    6426    6436
FCMND    014112            4680#   4814
FDATC    014434            4717#   5281
FDRIVE   014103            4678#   4810
FFPRIN   016732            5103#   7876
FMTE  =  000020            1887#   6548
FORMAT   001212            1711#   2942    2949*   4273
FOURP    022016            5618    5625#
FPARM1   014120            4681#   4832
FPARM2   014161            4687#   4835
FPARM3   014205            4691#   4871
FPARM4   014226            4694#   4874
FPARM5   014247            4697#   4877
FPARM6   014270            4700#   4880
FPARM7   014275            4701#   4910
FPARM8   014332            4706#   4918
FPRINT=  104414            4812    4815    4840    4842    4843    4844    4850    4852    4853    4886    4887    4892    4893
                           4898    4899    4904    4913    4919    7876#
FTRTE    006000            2337    2937#
```

```
GDDAT   014467          4722#   5169    5228    5288
GNS   = ****** U        1652    7863    7864    7865    7866    7867    7869    7871    7872    7873    7874    7875    7876
GO    = 000001          1838#
GODRV   022142          5631    5640    5645    5648#
GTSWR = 104406          7869#
HARDER  014646          4743#   4790
HCRC  = 000400          1891#
HDBUFF  001736          1781#   3448    5635
HDR.AD  023606          5955#   6264    6268#   6958#
HDR.CT  023610          5956#   6272#   6961#   6964#
HELPQ   002400          2186#   2440
HPDATA  034636          3364    7878#
HPFILE  002656          2219#   3360
HPRTE   007366          2359    3358#
HPVLD   001672          1761#   2438    2476#   3358
HT    = 000011          1544#   7175    7216
HVRC  = 000400          1892#   6146    6312    6548
H.HEAD  023613          5959#
IBUFPT  001710          1770#   2423#   2424#   2511    2512    2522    2635    2756    2844    2900    3389    3427    3644
                        4347    4381    4480    5256    5608    5617
ICDEC   004704          2463    2586#   2656    3656
ICRTE   006254          2335    3046#
ICTBL   003534          2320#   2591
IDAE  = 002000          1894#
IE    = 000100          1839#   5051    6492    6556    6844    6885    6951    7018
ILC   = 000001          1881#   6548
ILF   = 000004          1884#
INTERR  003023          2238#   3693
INTMSK  023617          5964#   6187    6211    6232    6257    6343    6375    6416    6427    6440    6711#   6715#   6719#
                        6768#   6854
INTR  = 000300          1829#
IOBFSZ  003321          2276#   2433
IOTVEC= 000020          1639#
IR    = 000100          1868#
ISRTE   013020          2333    4439#
ITCNT   001232          1719#   3051    3058#   3536    4549
ITRTE   013026          2329    3565    4440#
IVDADD  002554          2207#   2698
IVDEDT  002532          2204#   2696    2791
IVDLN   002575          2210#   2700    2795    2870
IVDNC   003123          2251#   4234
IVDPAR  002616          2213#   3188    3484    4226    4387
IVDRUN  002756          2230#   3568    4389
IVDWCT  003101          2247#   4232
I.AERR  025646          6363    6369    6387    6396#
I.ATTN  025176          6123    6167    6300#
I.CCLR  026232          6201    6251    6482#   6554    6914    6979
I.CSTS  026664          6194    6629#
I.CSTI  026706          6198    6250    6633#   6903
I.DRV   023620          5968#   6768    6769
I.ERR   024420          6195    6199#
I.ERRA  024400          6194#   6262
I.ERRC  024406          6132    6185    6197#   6330
I.HDAL  024644          6178    6241#
I.INTR  023764          2413    6102#
I.ISRL  023612          5958#   6116    6119#   6122#   6493#   6790#   6944#   7017#
```

```
I.ISSU   026314          6209   6279   6358   6372   6414   6438   6524#  6673   6680   6687   6694
I.IOO    024244          6120   6137   6164#
I.RTRN   026214          6114   6152   6162   6190   6202   6207   6210   6216   6225   6234   6237   6252   6254
                         6280   6283   6292   6296   6318   6334   6341   6347   6359   6373   6380   6392   6412
                         6415   6420   6429   6432   6439   6444   6453#
I.STAT   026770          6206   6411   6670#  6924
I.STOR   026536          6534   6584#
I.UNLD   026114          6353   6436#
JSRR4    001720          1774#  3652
KIPARO=  ******  U       7765
LCNTOF   003431          2290#  3554
LF     = 000012          1545#  7210   7216
LINNUM   001116          1752#  3390*  3539*  3562*  4548*  4806   4924   5134*  5160   5200*  5219   5255*  5274
                         5318*  5334*  5362*  5508*  5544*
LNCNT    001243          1727#  2509*  2530*  2531   2649   2664*  2752   2782*  2840   3391*  3663
LOC2$    010152          3537   3541   3543#
LOC3$    010246          3557   3560#  3569
LOFFST   001256          1740#  4267*  4287
LPCNT1   001722          1775#  3525*  3551*  4551   5081   5085
LPCNT2   001724          1776#  3526*  3552*  5083
LPLABL   003411          2287#  5090
LPRET    010132          3538#  3555   3559
MAXWDS   001700          1766#  2428*  2510   2520   2636   3394   4249   5364   5365   5609
MCLK   = 000400          1927#
MDS    = 001000          1871#  6110   6537   6912
MERD   = 001000          1928#
MESMSK= 000017           1921#
MEWD   = 002000          1929#
MIND   = 000200          1926#
MSKLAB   014571          4734#  5175   5234
MSP    = 000100          1925#
M.CADD= 017760           1997#
M.CDIF= 017760           1996#
M.DRV  = 000007          1993#
M.HEAD= 007000           2000#
M.ID   = 000003          1995#
M.PAR  = 100000          1994#
M.SECT= 000760           1999#
M.SER  = 077770          1998#
NED    = 010000          1874#  6125   6203   6546   6916
NEM    = 004000          1873#  6140   6306   6546
NOCHK  = 000400          2060#  4587   5527   6780   6842   6883   6910   6928   6949   6972   6981   7015
NOCK   = 000002          1731#  3633   3638   5525
NODSC  = 004000          2065#  4794   6368
NOROOM   002465          2196#  2525   2640
NOSRC    003007          2235#  2872   2916   3691   4391
NTRTE    007416          2353   3383#
NULL     004664          2553#  2556   2643   2654
NXF    = 000004          1885#
OBJSZE   001674          1763#  3398   3645   3665
OBUFPT   001706          1769#  2417*  3431   5257   5363   5366   5488   5624   5697
OCTBIN   031160          2947   3019   3123   3173   3245   3460   3860   3967   4245   5764   7046#
OFFLAG   001665          1756#  4173*  4180*  4193*  4263   4285   4288*
OFFSET= 000115           1813#  5590   6825
OFILE    034634          3388   3540   3643   3667   4341   4378   4474   7877#
OFPTR    001712          1771#  3388*  3399   3676*  4340   4477*  4478*
```

```
OFST   = 000004  1905#
ONEP     022132  5568  5571  5574  5577  5580  5583  5586  5589  5646#
OPFLGS   001245  1730#  3633*  3638*  3642*  4251  4272*  4275*  4282
OPI    = 020000  1897#  6146  6312  6548
OR     = 000200  1869#
OTRTE    012426  2327  4328#
O.WAIT   023572  5935#  6046  6050*  6160*  6164  6180*  6246*  6259*  6274*  6818*  6878*  6940*  6957*
PACK   = 000103  1808#  5569
PARMGV   013753  4661#  4829
PARM0    002142  2099#  4929  4937  4958  5133  5509  5979
PARM1    002230  2132#  4932  4940  4961  5137  5512
PAT    = 000020  1923#
PATPTR   001676  1764#
PATR     001562  1749#  3931  3935  4375  4470  5370  5480
PATRDF   001242  1726#  3937*
PATSEL   001236  1722#  3919  3924*  4490
PATX     001262  1743#  3106  3436  4357  4452  5374  5721
PATXDF   001237  1723#  3107*  4353  4448
PATY     001362  1745#  3111  3440  4362  4458  5378
PATYDF   001240  1724#  3112*
PATZ     001462  1747#  3116  3444  4368  4464  5382
PATZDF   001241  1725#  3117*
PBLKT    023630  5979#  6043  6130  6156  6324  6349  6767*
PBSEL    021314  5508#  5602  5615  5619  5622  5632  5641  5646
PBSVAL=  001000  2061#  5138  6705
PBSW     001670  1759#  4930  4938  4959  5135  5510  5513*
PCA    = 004000  1930#
PCD    = 010000  1931#
PGE    = 002000  1872#  6546
PIP    = 020000  1915#
PIRQ   = 177772  1551#
PIRQVE=  000240  1645#
PLINE    014061  4674#  4808  5162  5221  5276
PLRTE    005500  2351  2826#
PRERR    003223  2264#  4498  5675
PREVOP   013700  4653#  4933
PRINH    001662  1753#
PRLPCT   016670  3560  4858  5081#  5176  5235  5301
PROGID   002316  2177#  2430
PRRTE    006742  2357  3234#
PRTCON=  000064  2095#  4787*  4825  5001*  5008*  5648*
PR0    = 000000  1568#  5345
PR1    = 000040  1569#
PR2    = 000100  1570#
PR3    = 000140  1571#
PR4    = 000200  1572#
PR5    = 000240  1573#  5911
PR6    = 000300  1574#
PR7    = 000340  1575#  2414  5335
PS     = 177776  1548#  1549  5335*  5345*  6032  6038*  6052*  6761  6762*  7021*
PSW    = 177776  1549#
PTPDB    001734  1780#  4413*  5670*
PTPSR    001732  1779#  4409*  4410  5658*  5663  5671
PTRDB    001730  1778#  4522  4530  5670
PTRSR    001726  1777#  4517*  4518*  4519  4526*  4527  5657*  5659*  5660  5666*  5667
PTRTE    005700  2349  2895#
```

```
PUCODE  001174          1704#  4339*  4345*  4349   4379   4444   4475
PUERR   003207          2261#  4393   5677
PUFLSZ  001250          1736#  4348*  4382   4477   4484   4487
PUNCH   012760          4351   4358   4364   4370   4376   4383   4409#
PWRVEC= 000024          1640#  2394*  2395*  7793*  7794*  7803*  7809*  7821*  7822*
P.ASOF= 000032          2082#  4903   6374*  6375   6408*  6639*  6827*  6828
P.A00 = 000040          2085#  5146   6365*  6366   6362*  6383   6696*  6904*
P.A01 = 000044          2087#  6675*
P.A10 = 000050          2089#  6682*
P.A11 = 000054          2091#  6689*
P.BAHI= 000007          2044#  4846
P.BALO= 000010          2045#  5617*  5624*  5635*  6861   6958
P.BAR = 000024          2079#  6405*  6635*
P.B00 = 000042          2086#  6360*  6361   6697*  6905*
P.B01 = 000046          2088#  6676*
P.B10 = 000052          2090#  6683*
P.B11 = 000056          2092#  6281*  6690*
P.CMND= 000001          2038#  5140*  5603*  5616*  5620*  5623*  5636*  5642*  5647*  6176   6793   6797   6809
                        6819   6825   6831   6834   6840   6865   6872   6891   6938   6955   6977   6986
P.CS1 = 000016          2076#  4885   4964   6197*  6249*  6287*  6288*  6290*  6291   6400*  6402*  6629*  6632*
                        6783   6837*  6838*  6840*  6844*  6845   6869*  6872*  6874*  6875*  6885*  6886   6894*
                        6895*  6897*  6898   6900*  6901   6906   6945*  6946*  6948*  6951*  6952   6968*  6969*
                        6971*  6974   6993*  6994   7003*  7004
P.CS1H= 000007          2043#  5528*  5529*  5530*  5533*  5693   6287   6528   6837   6874   6894   6945   6959
                        6968
P.CS2 = 000020          2077#  6203   6403*  6633*  6791*  6816   6881*  6882   6893   6912   6916   6942*  6943
                        6967
P.CYLN= 000002          2039#  5626*  5637*  6285   6821   6863   6965
P.DCYL= 000030          2081#  6407*  6641*
P.DRVN= 000000          2037#  5514*  5519*  6173   6350   6526   6765
P.DS  = 000036          2084#  6410*  6637*  6918
P.DTS = 000026          2080#  4897   6406*  6636*
P.EPAT= 000062          2094#  6199*  6785
P.EPOS= 000060          2093#  6200*
P.ER  = 000034          2083#  4912   6409*  6638*
P.OFST= 000006          2042#  5643*  6827
P.PRST= 000014          2047#  4587   4784   4788   4791   4794   4797   4800   4817   4974*  4988   5138   5521*
                        5524*  5527*  6045*  6158*  6192*  6220*  6227   6231*  6328*  6351   6355*  6368*  6386*
                        6396*  6422   6426*  6436*  6448*  6553*  6705*  6780*  6817*  6841*  6842   6867   6873*
                        6879   6883   6910   6920#  6928   6949   6972   6981   7015
P.SECT= 000004          2040#  5628*  5639*  6286   6822   6864   6966
P.TRCK= 000005          2041#  5627*  5638*
P.WC  = 000012          2046#  5629*  5630*  6862
P.WCR = 000022          2078#  4891   6404*  6634*
QNEWSW= 000000          1797   3223   3224   3321   3322   3813   3814   5644
Q.INIT= 040000          2068#
RCERR   014601          4736#  5222
RDALHD= 000164          1826#  5593   5633   6176   6955
RDCHR = 104410          7561   7872#
RDCONT  013402          4453   4459   4465   4471   4488   4526#  4532
RDDATA= 000121          1815#  5616
RDGATE= 100000          1934#
RDHEAD= 000125          1817#  5596   6290   6971
RDLIN = 104411          2461   3182   7873#
RDLOOP  013406          4527#  4528
RDSTAT= 000141          1825#  5140   6891
```

```
RDY    = 000200  1840#  4985   6848   6901
READ     013344  4446   4517#
READRG   016120  4819   4954#  5043
RECAL  = 000113  1812#  5566   6834
REGLAB   014633  4741#  5225
REGNUM   001224  1716#  3248*  3249   3832   3835
REGVAL   001226  1717#
RELEAS=  000140  1824#  6938
RESREG=  104413  5678   5728   7655   7875#
RESVEC=  000010  1635#
RGDCDE   007056  3241   3278#  3854
RKASOF=  000016  1793#  4971   6186   6256   6336   6591   6639   6828*  6853
RKBA   = 000004  1788#  4968   6587   6635   6861*
RKBAS    023554  3252   3531   4589   4779   4963   5205   5321   5909#  6039   6108   6772
RKCS1  = 000000  1786#  3533   4590   4780*  4965   4977*  4982*  4985   4991   5051*  6131   6183   6241
                 6291*  6300   6482*  6483   6492*  6531*  6532   6556*  6584   6845*  6847   6886*  6898*
                 6900   6930*  6952*  6974*  6983*  6993   7003   7018*
RKCS2  = 000010  1790#  3535*  4966   4976   4979*  5050*  6109   6269   6527*  6585   6633   6816*  6882*
                 6893*  6943*  6967*  6992*
RKDA   = 000006  1789#  4969   6286*  6588   6636   6822*  6864*  6966*
RKDB   = 000024  1796#  6265   6266   6267
RKDC   = 000020  1794#  4970
RKDCYL= 000020  1795#  6285*  6592   6641   6821*  6863*  6965*
RKDS   = 000012  1791#  4973   4993   6134   6589   6637
RKECPS= 000030  1801#  6200   6596
RKECPT= 000032  1803#  6199   6597
RKER   = 000014  1792#  4972   6143   6309   6590   6638
RKMR1  = 000026  1797#  4981*  6277*  6356*  6593   6670*  6677*  6684*  6691*  6792*
RKMR2  = 000034  1798#  4995   6594   6904
RKMR3  = 000036  1799#  4996   6595   6905
RKPAT  = 000032  1802#
RKPOS  = 000030  1800#
RKPRI    023560  5911#  6038   6762
RKVEC    023556  2412   5910#
RKWC   = 000002  1787#  4967   6586   6634   6862*
RLS    = 000010  1864#  6942
RMASK    001230  1718#
RPSWIT   001671  1760#  4772*  4820   4856   4926   4928*  4936*
RTSPC    001716  1773#  3674
RUEXIT   010302  3529   3542   3566   3568#
RURETN   010276  3564   3567#
RURTE    010036  2355   3525#  4495
R.ABNL   027216  6051   6161   6236   6253   6431   6451   6711#  6921
R.CONT   027242  6113   6151   6215   6224   6295   6317   6340   6346   6379   6419   6443   6488   6540
                 6563   6701   6719#  6935   6989   6998   7011
R.NORM   027230  6189   6282   6391   6715#  6858   6931   7019
SAMDR    001666  1757#  4170*  4201*  4207*  4276   4279*
SAVREG=  104412  5656   5690   7629   7874#
SBSCN    004666  2555#  2642   2653   2745   2833   2937   2966   3007   3046   3100   3121   3152   3236
                 3422   3450   3632   3639   3759   3846   3916   3963   4001   4162   4196   4332   5747
SCERR    014520  4727#  5163
SCLR   = 000040  1867#  3535   5050   6992
SCNCLR   014675  4747#  4793
SCTBL    011434  4045#  4181
SCTOBG   002437  2192#  3689
SDETER   014025  4669#  4804   5032
```

```
SECNUM  001204          1708#  4296
SECT20= 000010          1733#  4272   4275   5531
SEEK  = 000117          1814#  5599   6809   6819
SELDRV= 000101          1807#  5578   6948
SETADD  022010          5605   5621   5624#
SFEMP   001234          1720#  2507   2517*  2784*  2831   2898   3386*  3530*  3629   4343   4473*  4481*
SFPTR   001246          1735#  2511*  2519   2535*  2634   2674*  2690   2759   2773   2781*  2852   2901   3389*
                        3392   4346   4485*
SKI   = 000002          1883#
SMASK   001222          1715#
SPACE2  003530          2302#  3469   5110
SPACE6  003521          2300#  3181
SPAR  = 020000          1847#  6544
SPDLSS= 000020          1907#
SRTSPL= 000111          1811#  5587   6831
SSTO    014000          4665#  4802
STACK = 001100          1539#  2390   3538   3561
STALL   001252          1738#  4007*  4011
STAR    002435          2191#  2460   2594
STATRD  001216          1713#  3838
STILSZ  014762          4757#  4799
STKLMT= 177774          1550#
STNTVD  003240          2267#  5007
STVAL   001220          1714#
STWDNM  014550          4731#  5166
SUBCLR= 000177          1828#  5572   6986
SUBCMD  001214          1712#  4169   4188*  4190
SVAL  = 100000          1917#
SWCONT  016622          4865   5052   5066#  5177   5236   5302
SWR     001140          1686#  2388   2400*  2402   2408*  3543   3547   3556   4774   4777   4822   5025   5028
                        5066   5069   5154   5157   5213   5216   5267   5270   5279   5296   7405   7444   7499*
                        7801   7814*
SWREG   000176          1654#  2408   7405   7444   7467
SW0   = 000001          1603#  4822
SW00  = 000001          1593#  1603
SW01  = 000002          1592#  1602
SW02  = 000004          1591#  1601
SW03  = 000010          1590#  1600
SW04  = 000020          1589#  1599
SW05  = 000040          1588#  1598
SW06  = 000100          1587#  1597
SW07  = 000200          1586#  1596
SW08  = 000400          1585#  1595
SW09  = 001000          1584#  1594
SW1   = 000002          1602#  5279
SW10  = 002000          1583#  4774   5025   5154   5213   5267
SW11  = 004000          1582#  3556
SW12  = 010000          1581#
SW13  = 020000          1580#  4777   5028   5157   5216   5296
SW14  = 040000          1579#  3543
SW15  = 100000          1578#  5066
SW2   = 000004          1601#  5270
SW3   = 000010          1600#
SW4   = 000020          1599#
SW5   = 000040          1598#
SW6   = 000100          1597#
```

```
SW7    = 000200            1596#
SW8    = 000400            1595#
SW9    = 001000            1594#   3547    5069
S.ACLO= 000100             1952#
S.BRHM= 000100             1967#
S.BRKE= 040000             1989#
S.CART= 000400             1969#
S.DCLO= 010000             1959#
S.DIB  = 002000            1985#
S.DOOR= 000200             1968#
S.DRA  = 000040            1938#
S.DROT= 020000             1960#
S.DRY  = 000200            1940#
S.DSC  = 040000            1947#   6218    6366    6383    6446
S.FLT  = 000200            1953#   6361
S.FORM= 001000             1942#
S.FWD  = 002000            1971#
S.HDFL= 000200             1982#
S.HDHM= 000040             1966#
S.ICYL= 000040             1951#
S.ILF  = 000400            1954#
S.LIMD= 020000             1988#
S.LOAD= 010000             1973#
S.MHD  = 000400            1983#
S.NMOV= 010000             1987#
S.OFF  = 002000            1943#
S.PAR  = 001000            1955#   6221    6698
S.PIP  = 020000            1946#   6229    6424
S.PLO  = 004000            1986#
S.REV  = 004000            1972#
S.RTZ  = 020000            1974#
S.SECT= 000020             1979#
S.SKI  = 002000            1956#
S.SPIN= 010000             1945#
S.SPLS= 010000             1958#
S.SPOK= 001000             1970#
S.TYPE= 000400             1941#
S.UNLD= 040000             1975#
S.UNS  = 040000            1961#
S.VV   = 000100            1939#
S.WCLK= 000040             1980#
S.WGAT= 000100             1981#
S.WLE  = 004000            1957#
S.WRL  = 004000            1944#
S.XDOK= 000020             1965#
S.XERR= 001000             1984#
TBITVE= 000014             1636#
TEMP1   001702             1767#   2520*   2521*   2522*   2523    2587*   2588*   2589    3090*   3092*   3119    3665*   3666*
                           3667#   3668#   3669    3832*   3835*   3838*   3844    3866    4163*   4165*   4178    4182    4300
                           5692#   5696#   5708
TEMP2   001704             1768#   3833*   3836*   3839*   3843    3872    5339*   5343    5363*   5364*   5365*   5476    5485
THREEP  022050             5595    5598    5601    5632#
TKVEC  = 000060            1643#   7382*   7383*
TORTE   006062             2321    2966#
TOTMSC  003273             2272#   5300
TOVAL   001260             1742#   2971    2978*   3527
```

```
TPVEC =  000064          1644#
TRAPVE=  000034          1642#   2392*   2393*
TRKNUM   001202          1707#   4293
TRTVEC=  000014          1637#
TWOP     022112          5592    5641#
TYPDS =  104405          2860    2904    2972    3052    3698    4807    5161    5220    5275    7867#
TYPE  =  104401          2430    2433    2440    2460    2478    2480    2481    2525    2640    2694    2696    2698    2700
                         2791    2793    2795    2861    2863    2865    2868    2870    2872    2905    2907    2909    2916
                         2944    2953    2973    2982    3014    3026    3028    3053    3062    3181    3188    3190    3255
                         3258    3260    3360    3361    3364    3465    3469    3477    3479    3482    3484    3554    3568
                         3677    3689    3691    3693    3695    3699    3701    3703    3878    3880    3976    4014    4226
                         4229    4232    4234    4237    4387    4389    4391    4393    4498    4554    4556    4776    4786
                         4790    4793    4796    4799    4802    4804    4808    4810    4813    4814    4816    4824    4829
                         4832    4835    4836    4854    4855    4867    4871    4874    4877    4880    4881    4905    4906
                         4910    4916    4918    4922    4923    4933    5007    5027    5032    5041    5088    5090    5110
                         5156    5162    5163    5166    5169    5172    5175    5215    5221    5222    5225    5228    5231
                         5234    5269    5276    5281    5284    5288    5291    5300    5675    5677    5758    5771    5783
                         7180    7274    7343    7399    7411    7465    7466    7469    7480    7490    7501    7520    7568
                         7574    7579    7583    7588    7589    7591    7594    7598    7823    7863#
TYPOC =  104402          2432    2943    3013    3254    3468    3471    5109    5165    5168    5171    5174    5224    5227
                         5230    5233    5283    5287    5290    5299    5757    7468    7864#
TYPON =  104404          7866#
TYPOS =  104403          7865#
T.ASOF   023532          5896#   6186*   6187    6211    6256*   6257    6336*   6337    6343    6374    6408    6416    6440
                         6591*   6853*   6854
T.BA     023524          5893#   6405    6587*
T.CS1    023516          5888#   6131*   6183*   6184    6197    6208*   6241*   6243    6249    6278*   6300*   6302    6332
                         6357*   6371*   6401*   6402    6413*   6437*   6483*   6484    6524    6528*   6529*   6531    6535
                         6544    6584*   6631*   6632    6672*   6679*   6686*   6693*   6847*   6848    6850
T.CS2    023520          5890#   6109*   6110    6125    6128    6140    6169    6269*   6270    6306    6320    6403    6525*
                         6526*   6527    6537    6546    6585*
T.DA     023526          5894#   6406    6588*
T.DB     023552          5905#
T.DC     023530          5895#   6407    6592*
T.DS     023536          5899#   6134*   6135    6410    6589*
T.ER     023534          5898#   6143*   6146    6309*   6312    6409    6548    6590*
T.MR1    023540          5900#   6593*
T.MR2    023542          5901#   6218    6229    6365    6382    6424    6446    6594*   6675    6682    6689    6696
T.MR3    023544          5902#   6221    6281    6360    6595*   6676    6683    6690    6697    6698
T.PAT    023550          5904#   6597*
T.POS    023546          5903#   6596*
T.WCR    023522          5892#   6404    6586*
UDTSRT   004116          1656    2383#   7402    7485
UEXATT=  000010          2054#   4784    6192
UFE   =  000400          1870#   6125    6203    6546    6916
UNLOAD=  000107          1810#   5584    6797
UNS   =  040000          1898#
UPE   =  020000          1875#   6140    6306    6546
VLDOBJ   001235          1721#   3387*   3528    3650*   3675*   4337    4482*
VV    =  000100          1910#
WCE   =  040000          1876#   6140    6306    6546
WDCNT    001206          1709#   3457    4299    4302
WLE   =  004000          1895#   6146    6312
WLOOP    013356          4519#   4520
WRDATA=  000123          1816#   5620    6869
WRHEAD=  000127          1818#   5603
```

```
WRL    = 004000  1914#
WRTCHK= 000131  1819#  5623  6865
WRTGAT= 040000  1933#
WSTART  013352  4518#  4523
W.DRV   023632  4983*  5336*  5985#  6040*  6155*  6181*  6233*  6248*  6261*  6275*  6323*  6390*  6399*
                6428*  6450*  6721*  6770*  6833*  6836*  6857*  6909*  6927*
W.MILI  023576  5938#  6035  7001
W.MIN   023604  5954#  6833
W.MTIM  023574  5937#  6033*  6035*
W.SEC   023600  3527*  4983  5951#  6770
W.TIME  023616  4984*  5337*  5960#  6036  6042*  6154*  6182*  6232*  6247*  6260*  6276*  6322*  6389*
                6398*  6427*  6449*  6720*  6769*  6856*  6908*  6926*
W.WCK  = 000200  2059#  6780  6841  6867  6873
W.WTCH  023634  4584  4987  5341  6028#  6846  6852  6899
W.8SEC  023602  5953#  6233  6428  6836
XREAD   013434  4521  4529  4535#
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$BDADR  001122  1678#
$BDDAT  001126  1680#
$BELL   001164  1698#  4776  5027  5156  5215  5269  7411  7608
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$CM3   = 000000  1696#
$CNTLC  033636  7399  7480  7608#
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$CNTLU  033643  7490  7583  7609#
$CRLF   001171  1700#  2865  2909  2944  2973  3014  3053  3255  3477  3479  3703  4556  4813
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$DB2D   033700  5086  7629#
$DECVL  034060  7631  7677#
$DTBL   032112  7243  7278#
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$ERMAX  001115  1675#
$ERRPC  001116  1676#  1752
$ERRTB  002316  2176#
$ERTTL  001112  1673#
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$FILLC  001156  1694#  7185  7216
$FILLS  001155  1693#  7216
$GDADR  001120  1677#
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$GTSWR  032746  7466#  7869
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$HINUM  034266  3933  7739  7747  7752*  7757#
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$ILLUP  034530  7793  7809  7826#
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$ITEMB  001114  1674#
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$LONUM  034270  3934  7738  7745  7751*  7758#
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$LPERR  001110  1672#  3537*  5072
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$MSWR   033655          7466    7611#
$NULL   001154          1692#   7187    7216
$OCNT   032354          7315*   7344*   7357#
$OMODE  032356          7310*   7314*   7319    7322*   7333*   7359#
$PASS   001100          1667#
$POWER  034536          7824    7829#
$PWRDN  034370          2394    7793#   7821
$PWRMG  034524          7824#
$PWRUP  034442          7803    7809#
$QUES   001170          1699#   2481    7216    7520    7591    7608
$RAND   034170          3932    7734#
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$RDDEC= ****** U        7874
$RDLIN  033310          7556#   7873
$RDOCT= ****** U        7874
$RDSZ = 000072          7549#
$RESRE  034132          7711#   7875
$R2A  = ****** U        7876
$SAVRE  034074          7695#   7874
$SAVR6  034534          7802*   7810    7811*   7812*   7828#
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$SIZE   034272          2415    7767#
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$TIMES  001160          1696#
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$TKCNT  032360          7364#   7379*   7409    7426*   7540    7542*
$TKINT  032370          2429    7379#   7400    7461
$TKQEN= 032367          7368#   7434    7545
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$TKQSR  032366          7367#   7380    7436    7547
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$TPFLG  001157          1695#   7163    7216
$TPS    001150          1690#   7203    7216
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$TRAP2  034570          7851#   7862
$TRP  = 000015          7855#   7864#   7865#   7866#   7867#   7868#   7869    7870#   7871    7872#   7873#   7874#   7875#
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$TTYIN  033544          2480    7558    7559    7571    7589    7603    7607#
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$TYPE   031466          7163#   7855    7863
$TYPEC  031636          7184    7191    7198    7203#   7204    7506
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$TYPOC  032156          7313#   7864
$TYPON  032172          7312    7315#   7866
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                        6899   6953   6975   6993   7020   7029
$OFILL  032355          7309#  7313#  7323   7358#
.       = 043561        1648#  1652#  1655#  1665#  1702   1743#  1745#  1747#  1749#  1762#  1781#  2319#  2389
                        4547#  4765#  5132#  5359#  5867#  7216   7282#  7363   7367#  7368   7369#  7607#  7608
                        7615#  7677#  7805   7827
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ENDCOM  1646#
ERROR   1540#
ESCAPE  1646#
GETPRI  1510#  1646#  7773
GETSWR  1646#
MULT    1646#
MYTAGS  1658#  1703
NEWTST  1646#
PARMBK     1#  2096  2129
PARMDF     1#  2001
POP     1646#  2704  2797  2874  2918  3030  3193  3262  3403  3486  3679  3883  3939  3978  4240
        4395   4501  4859  5003  5048  5303  5773  7269  7716  7753  7814  7815
PUSH    1646#  2628  2739  2826  2895  3005  3093  3234  3383  3416  3622  3840  3914  3922  3961
        4159   4328  4440  4766  4954  5021  5253  5745  7228  7696  7734  7795  7801
P.DRVR     1#  5885
REGDEF     1#  1783
REPORT  1646#
R.DRIV     1#  5986
R.QDRV     1#
SCOPE   1541#
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SETTRA  1510#  7855#  7864  7865  7866  7867  7869  7871  7872  7873  7874  7875  7876
SETUP   1646#  2383
SKIP    1646#
SLASH   1646#
SPACE   1646#
STARS   1646#  1661  1702  2304  2318  2381  2441  2457  2484  2503  2541  2552  2562  2584  2606
        2713   2737  2807  2824  2882  2893  2925  2936  2956  2965  2984  3034  3044  3065  3087
        3201   3232  3266  3277  3346  3356  3367  3381  3407  3415  3494  3571  3620  3708  3742
        3744   3756  3775  3830  3887  3912  3943  3959  3982  3999  4018  4028  4036  4043  4079
        4157   4306  4326  4400  4407  4420  4437  4506  4515  4546  4565  4579  4593  4599  4602
        4648   4942  4943  4953  5020  5054  5065  5078  5080  5092  5102  5112  5131  5179  5199
        5238   5252  5306  5317  5324  5333  5347  5358  5495  5507  5535  5542  5546  5565  5651
        5681   5689  5730  5743  5785  5995  6026  6060  6100  6463  6480  6498  6522  6569  6582
        6601   6627  6646  6668  6726  6753  7031  7044  7087  7099  7148  7218  7285  7362  7439
        7454   7525  7549  7618  7680  7725  7761  7791  7807  7834
SWRSU   1646#  2396#
S.DRVE     1#  1935
TRMTRP  7855#
TYPBIN  1646#
TYPDEC  1646#
TYPNAM  1646#
TYPNUM  1646#
TYPOCS  1646#
TYPOCT  1646#  7467
TYPTXT  1646#
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$OCTBN     1#  7029
$$CMRE  1659#
$$CMTM  1659#
$$ESCA  1646#
$$NEWT  1646#
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.EQUAT  1510#  1536
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.SETUP   1510#   2383
.SWRHI   1510#   1522
.SWRLO   1510#   1532#   1533    1534
.$CATC   1510#   1646
.$CMTA   1510#   1659
.$DB2D   1510#   7616
.$POWE   1510#   7709
.$RAND   1510#   7723
.$READ   1510#   7360
.$SAVE   1510#   7678
.$SIZE   1510#   7759
.$TRAP   1510#   7832
.$TYPD   1510#   7216
.$TYPE   1510#   7146
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. ABS.  043561     000

 ERRORS DETECTED:  0

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 RUN-TIME:  30 23 1 SECONDS
 RUN-TIME RATIO:  604/55=10.8
 CORE USED:  42K  (83 PAGES)

 DOCUMENT PAGES:  177

EOF1CZR6RCSEQ              00010000      780223            PDP10 411
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