TM78,TU78 TM78 PERF EXER
CZTMJAO AH-E646A-MC
FICHE 1 OF 1 NOV 1980

MADE IN USA

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IDENTIFICATION

PRODUCT CODE: AC-E645A-MC

PRODUCT NAME: CZTMJA0 TM78 PERFORMANCE EXERCISER

MAINTAINER: DIAGNOSTIC ENGINEERING

DATE: JUNE 1,1980

AUTHOR: JEFF MEYER


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1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

THE FUNCTION OF THIS PROGRAM IS THREE FOLD.

1. DATA RELIABILITY PERFORMS A PREDEFINED SEQUENCE OF COMMANDS(*), ON A MAXIMUM OF 8 TU78 TYPE DRIVES IN SEQUENCE, WITH EXTENSIVE ERROR REPORTING FACILITIES(*). IT'S PURPOSE IS TO RECORD THE PERFORMANCE QUALITY OF EACH TRANSPORT THROUGH THE ACCUMULATION OF STATISTICS(*).

2. BRUTUS IS INTENDED AS A BRUTE FORCE ROUTINE TO EXECUTE A COMMAND OR SERIES OF UP TO SIX COMMANDS(*) CONTINUOUSLY, TO THE SAME SLAVE TRANSPORT REGARDLESS OF THE RESULTS OF THE OPERATION.

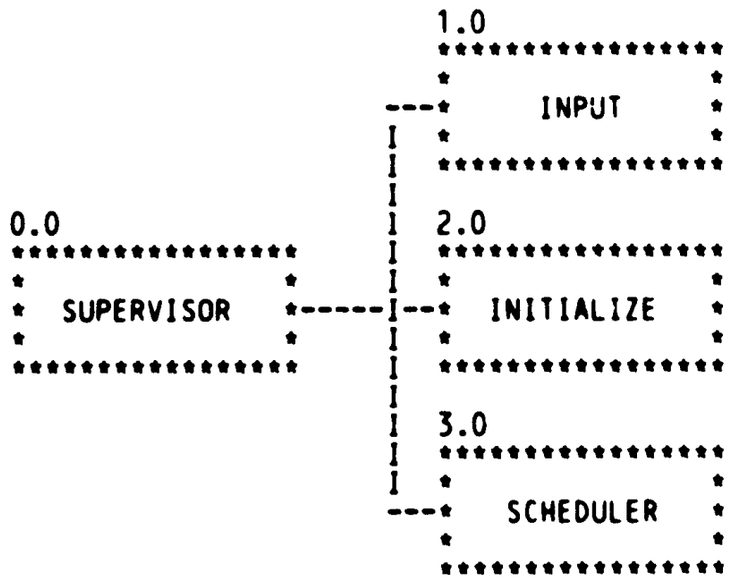
3. BRUTUS WITH ERRORS IS A COMBINATION OF THE ABOVE TWO. IT

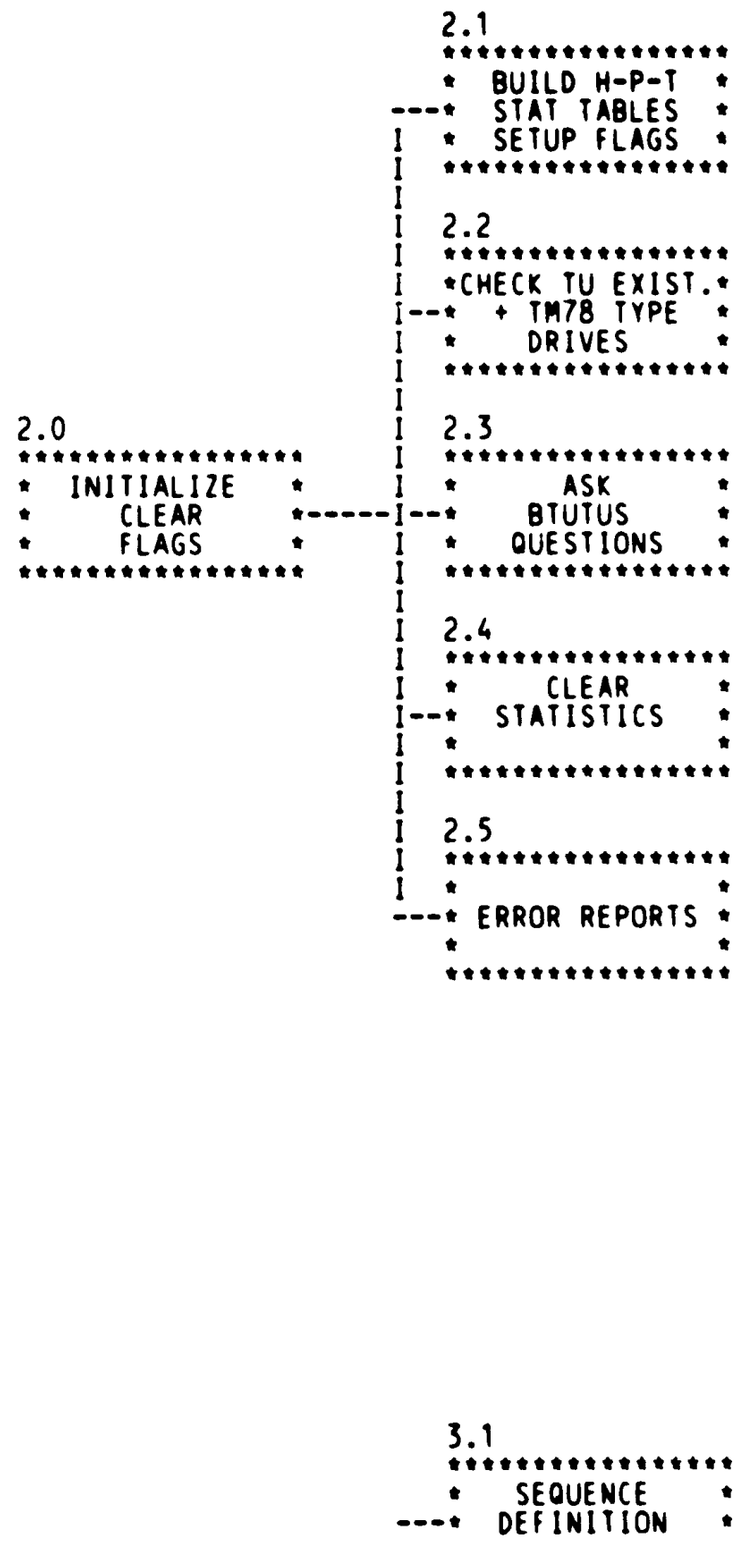
ADDS TO BRUTUS ERROR REPORTING FACILITIES AND ACCUMULATION OF STATISTICS SUPPLIED IN THE DATA RELIABILITY OPTION.

ALL THREE ARE CONVENIENTLY ACCESSED THROUGH THE TELETYPE USER INTERFACE.

(*) DEFINED IN DETAIL IN SECTIONS 3 AND 4

1.2 PROGRAM STRUCTURE

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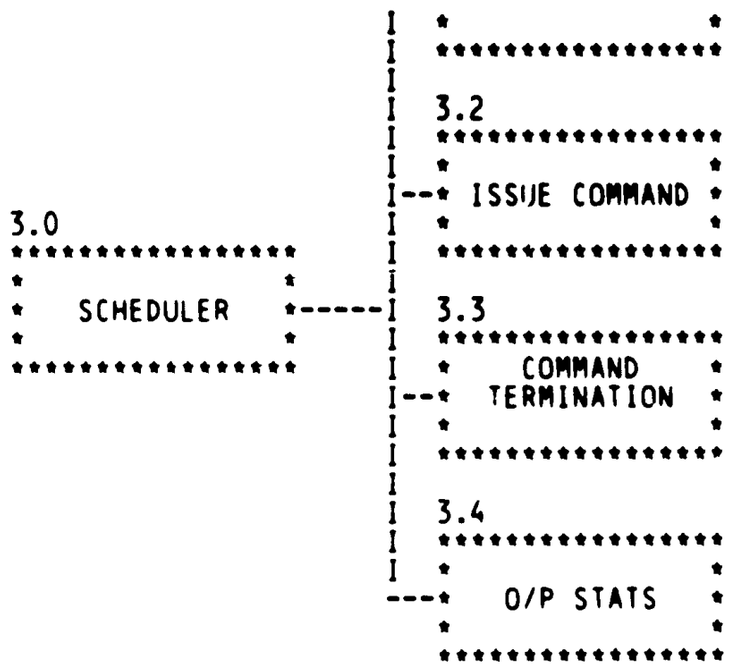
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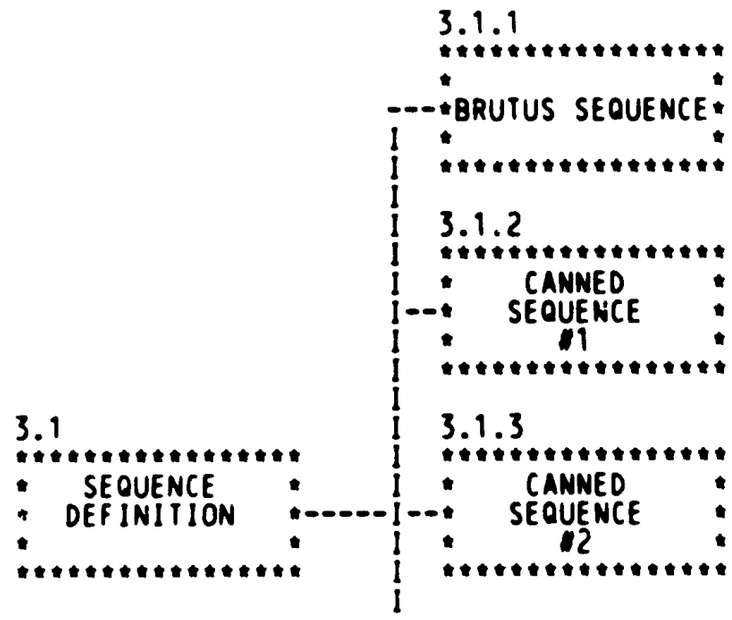
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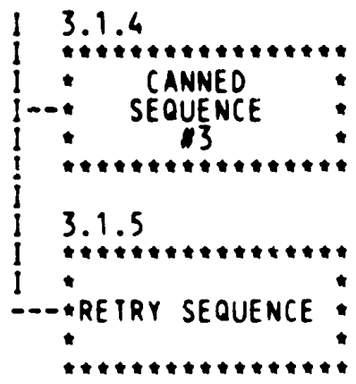
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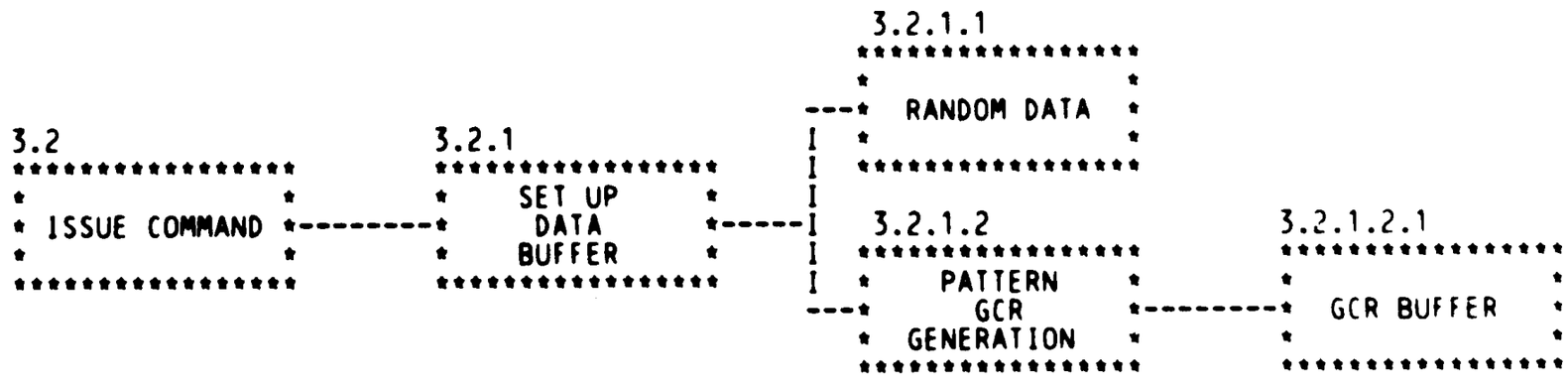
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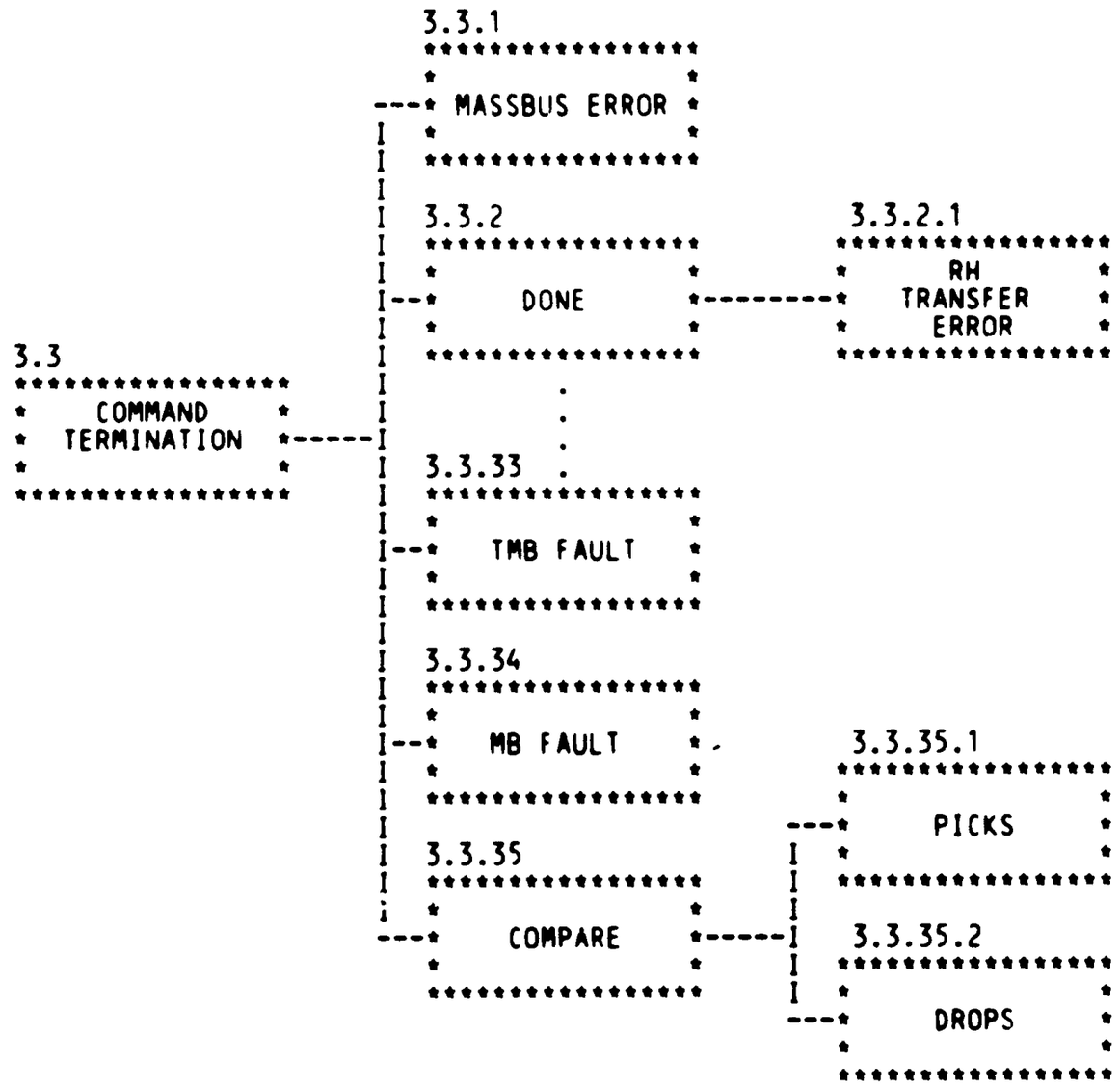

1.3 SYSTEM REQUIREMENTS

1.3.1 MINIMUM SYSTEM CONFIGURATIONS (HARDWARE)

1. PDP-11/05
2. 24K OF MEMORY.

3. CONSOLE

4. AT LEAST ONE TM78 (MAXIMUM 8)

5. AT LEAST ONE TU78 (NO MORE THAN 4 PER TM78) AND NO MORE THAN EIGHT

6. SOME PERIPHERAL LOAD DEVICE (POSSIBLE TM78 ITSELF)

1.3.2 MINIMUM SYSTEM CONFIGURATIONS (SOFTWARE)

1. DIAGNOSTIC SUPERVISOR

2. XXDP+ MONITOR AND DRIVER

1.4 RELATED DOCUMENTS AND STANDARDS

1. XXDP+ USERS MANUAL (CHQUSA.SEQ)

2. MASSBUS SPEC (DEC STD 159)

1.5 DIAGNOSTIC HIERARCY PREREQUISITES

1. DIAGNOSTIC SUPERVISOR

2. XXDP+ (LOAD DEVICE)

1.6 ASSUMPTIONS

THIS PERFORMANCE EXERCISER WILL NOT ISOLATE MALFUNCTIONS TO THE MODULE LEVEL.

2.0 OPERATING INSTRUCTIONS

2.1 BASIC INFORMATION TO VERIFY DEVICE STATUS

THINGS IN '' '' USER MUST TYPE IN.

1. BOOT XXDP+ MEDIA AND ANSWER QUESTIONS

2. .''R ZTMJA0 <CR>''

3. DRS-C>''START/PASS:1 <CR>''

4. CHANGE HW(L) ? ''Y<CR>''

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                                                              J 1
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5. # UNITS (D) ? "X<CR>" X = NUMBER OF TU78'S
TO BE TESTED (MAXIMUM EIGHT).

6. UNIT 0
RH ADDRESS (0) 172400 ? "<CR>" IF DEFAULT ADDRESS IS CORRECT.
"AAAAAA<CR>" AAAAAA=RH ADDRESS OF
UNIT IF NO DEFAULT.
VECTOR ADDRESS (0) 224 ? "<CR>" IF DEFAULT ADDRESS IS CORRECT.
"AAA<CR>" AAA = ADDRESS OF INTERRUPT
VECTOR FOR ABOVE
RH ADDRESS
TM78 # (D) 0 ? "<CR>" IF DEFAULT NUMBER IS CORRECT.
"X" X=TM78 NUMBER (0-7 ARE ALL POSSIBILITIES)
TU78 # (D) 0 ? "<CR>" IF DEFAULT NUMBER IS CORRECT.
"X" X=TU78 NUMBER (0-3 ARE ALL POSSIBILITIES)

THE ABOVE SEQUENCE WILL BE REPEATED FOR "X" TIMES, WHERE "X"
IS THE ANSWER IN STEP 5.

7. CHANGE SW (L) ? "N<CR>"

PROGRAM SHOULD NOW PRINT OUT A SERIAL # FOR EACH TU78 AND
STATISTICS AT THE END OF VERIFICATION FOR EACH TU78.

2.2 USER OPTIONS AVAILABLE IN DIAGNOSTIC

1. STEPS 1 + 2 OF SECTION 2.1 STAY THE SAME

2. DRS-C> (ENTER A COMMAND WITH APPROPRIATE FLAGS)*

3. CHANGE HW (L) ? THIS QUESTION ONLY APPEARS IF A START
COMMAND WAS ISSUED. IF YOU ANSWER YES THEN YOU CAN CHANGE
THE # OF UNITS TESTED AND THE INFORMATION PERTAINING TO EACH
UNIT. (SEE 6 IN SECTION 2.1) IF YOU ANSWER NO THEN THE #
OF UNITS AND THEIR LOCATION STAYS THE SAME AS INPUTTED THE
FIRST TIME.

4. CHANGE SW (L) ? IF YOU ANSWER NO TO THIS QUESTION THE PROGRAM
TAKES THE MOST RECENT ANSWERS TO THE QUESTION AND USES THEM
AGAIN. IF YOU ANSWER YES THEN THE FOLLOWING QUESTIONS FOLLOW:

1. BRUTUS OPTION (L) N ? <CR> IF YOU SAY NO THEN GOES TO
NEXT QUESTION. IF YES THEN YOU HAVE TWO OPTIONS.

A. BRUTUS WITH NO ERRORS OR STATISTICS
B. BRUTUS WITH ERRORS AND STATISTICS

THESE BRUTUS OPTIONS ALLOW THE USER TO INPUT A STRING OF
UP TO SIX COMMANDS.** THESE COMMANDS CAN BE ANY AVAILABLE
COMMAND IN ANY ORDER. THE UNITS WILL NOT BE DROPPED
REGUARDLESS OF THE ERRORS THAT OCCUR. THE PATTERN, RECORD
LENGTH, AND NUMBER OF CONSECUTIVE TIMES A COMMAND SHOULD BE
ISSUED ARE USER OPTIONS. BRUTUS WILL ALSO ALLOW YOU TO

RUN PAST EOT AND OFF TAPE. BRUTUS WITH ERRORS ALLOWS THE USER TO SELECT DATA COMPARES, RETRIES, STATISTICS AT END OF PASS, AND STATISTICS AT END OF TAPE.

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* REFER TO CHQUSA.SEQ MANUAL
** REFER TO SECTION 3.1 FOR COMMANDS OR TM78 PROGRAMMING MANUAL

2. CANNED SEQUENCE (1-4) 4 ? THIS ALLOWS FOR FOUR OPTIONS. ALL OPTIONS DO THE FOLLOWING:

   A. RECORD #
   B. FILE #
   C. REPORTS ERRORS
   D. UPDATES STATISTICS
   E. DROPS UNITS WHEN FATAL ERRORS OCCUR AND TRYS TO PICK UP DROPPED UNITS ON EVERY REWIND.

   1. CANNED SEQUENCE 1 REWINDS TAPE AND THEN READS THE TAPE UNTIL EOT, LEOT, OR FATAL ERROR IS FOUND.

   2. CANNED SEQUENCE 2 REWINDS TAPE AND THEN STARTING WITH PE WRITES, READ REVERSE, AND READS THE LENGTH OF TAPE. IT THEN REWINDS AND DOES THE SAME PROCEDURE IN GCR. THIS SEQUENCE DOES RETRIES, DATA COMPARES, RANDOM RECORD LENGTHS, (MAXIMUM 4K), AND RANDOM DATA PATTERNS.*

   3. CANNED SEQUENCE 3 REWINDS TAPE AND THEN STARTING WITH PE WRITES 24 RECORDS, WRITES TM, SPACE REVERSE FILE, READ REVERSE 24 RECORDS, READ FORWARD 24 RECORDS, AND SPACE FORWARD FILE. THIS SEQUENC EIS DONE THE LENGTH OF TAPE REWOUND AND REPEATED FOR GCR. DATA PATTERNS ARE CHANGED EVERY NEW FILE. RECORD LENGTH IS 2K. THIS SEQUENCE DOES RETRIES, AND DATA COMPARES.

   4. CANNED SEQUENCE 4 -- FUNCTIONAL SEQUENCE

      A.NOOP TEST:

         THIS TEST WILL ASSURE THAT THE NOOP FUNCTION WILL EXECUTE AND THAT A DONE INTERUPT CODE WILL BE RECIEVED.

      B.REWIND TEST:

         THIS TEST WILL ASSURE THAT THE REWIND FUNCTION WILL POSITION THE TAPE TO BOT WITH NO ERRORS.

         1.ISSUE A REWIND COMMAND
         2.CHECK FOR 'BOT'
         3.ERASE 200' OF TAPE TO GET OFF 'BOT'
         4.REWIND TAPE AGAIN
         5.CHECK FOR 'BOT'

      C.WRITE/READ TEST:

THIS TEST WILL CHECK BOTH READ AND WRITE
FUNCTIONS IN ALL DENSITIES (PE + GCR)
1.REWIND TAPE TO BOT
2.WRITE 200 RECORDS
A.ALL ONES DATA
B.1000 FRAMES
C.1600 BPI
3.CHECK FOR ERRORS
4.READ REVERSE THEN FORWARD ALL 200 RECORDS
5.REPEAT STEP 1-4 FOR GCR

D.WRITE CHECK TEST:

THIS TEST WILL CHECK FOR CORRECT OPERATION
OF THE WRITE CHECK REVERSE AND WRITE CHECK
FORWARD FUNCTIONS IN BOTH PE AND GCR.

1.REWIND
2.WRITE 1 RECORD
A.1000 FRAMES
B.PE MODE FIRST (1600 BPI)
3.ISSUE A WRITE CHECK REVERSE
4.ASSURE NO "WCE"
5.ISSUE A WRITE CHECK FORWARD
6.ASSURE NO "WCE"
7.REPEAT FOR GCR MODE.

E.SPACE TEST:

THIS TEST WILL ASSURE THAT PROPER POSITIONING
IS MAINTAINED BY BOTH SPACE FORWARD RECORD
AND SPACE REVERSE RECORD.
1.REWIND TAPE TO BOT
2.WRITE 200 RECORDS PE
A.EACH RECORD IS ONE FRAME LARGER THAN
THE LAST, STARTING WITH 100 FRAMES.
THIS WILL ALLOW FOR POSITION CHECKING
BY RECORD SIZE.
3.EACH RECORD IS ERROR CHECKED
4.DATA IS NOT CHECKED
5.SPACE REVERSE 177 RECORDS AND READ REVERSE
1, THE FRAME COUNT SHOULD BE 100. THIS IS
THE SIZE OF THE FIRST RECORD.
6.NOW, SPACE FORWARD 176 RECORDS AND READ
FORWARD 1 RECORD. THE FRAME COUNT SHOULD
BE 177. THIS IS THE SIZE OF THE NEXT TO LAST
RECORD.
7.CONTINUE SPACING REVERSE THEN FORWARD WHILE
DECREMENTING THE RECORD COUNT UNTIL ALL
POSSIBILITIES HAVE BEEN CHECKED.
8.REPEAT 1-7 FOR GCR (6250 BPI)

F.TAPE MARK WRITE/READ TEST:

THIS TEST WILL ASSURE THAT A TAPE MARK

CAN BE WRITTEN AND READ IN BOTH PE AND GCR.

1.REWIND TAPE TO BOT
2.ISSUE A WRITE TAPE MARK SET PE
3.CHECK FOR ERRORS
4.SPACE REVERSE FILE (TO TAPE MARK)
5.SPACE FORWARD FILE (TO TAPE MARK)
6.BOT SHOULD NOT BE REACHED
7.REPEAT STEPS 1-6 FOR GCR.

G.TAPE MARK SPACE TEST:

THIS TEST WILL ASSURE THAT SPACING WILL BE
TERMINATED BY THE RECOGNITION OF A TAPE MARK
BOTH IN PE AND GCR MODES.

1.REWIND TAPE
2.WRITE THE FOLLOWING PATTERN ON TAPE

:TM:20 REC:TM:40 REC:TM:60 REC:TM:100 REC:TM:

3.ASSURE NO ERRORS
4.SPACE REVERSE 200 RECORDS
5.TAPE SHOULD STOP ON EACH TAPE MARK
6.BOT SHOULD NEVER BE REACHED
7.CHECK FOR UNEXPECTED TAPE MARK INT CODE
8.REPEAT FOR GCR MODE

H.WORST CASE VACUUM COLUMN TEST

THIS TEST WILL ATTEMPT TO STRESS THE
VACUUM COLUMNS TO VERIFY THAT THEY WILL NOT
NOT RELEASE THE TAPE OR DROP VACUUM.

1.REWIND THE TAPE
2.WRITE A PATTERN ON TAPE CONSISTING
  OF 25 20 BYTE RECORDS.
3.REWIND THE TAPE
4.SPACE FORWARD 1 RECORD
5.REWIND
6.SPACE FORWARD 2 RECORDS
7.REWIND
8.CONTINUE INCREMENTING THE RECORD
  COUNT UNTIL ALL RECORDS HAVE BEEN
  SPACED OVER.
9.THEN BEGIN DECREMENTING THE RECORD
  COUNT UNTIL ZERO
10.REPEAT FOR GCR

I.ERASE TEST:

THIS TEST WILL ASSURE THAT THE ERASE FUNCTION
WILL INDEED ERASE TAPES.

1.REWIND TO BOT
2.ISSUE 200 ERASE 3'' COMMANDS

3.ASSURE NO ERRORS
4.REWIND TAPE TO BOT
5.ISSUE A READ COMMAND
6.EXPECT NOT CAPABLE INTERUPT CODE
7.REPEAT FOR GCR

J.SHORT AND LONG RECORD TEST

THIS TEST WILL CHECK TO SEE THAT
THE TM78/TU78 CAN WRITE AND READ
SHORT AND LONG RECORDS IN BOTH
PE AND GCR DENSITIES.

1.REWIND TAPE
2.SET BYTE COUNT TO ZERO
3.WRITE 20 RECORDS IN PE
4.READ REVERSE 20 RECORDS
5.READ FORWARD 20 RECORDS
6.INCREMENT BYTE COUNT AND
  REPEAT STEPS 3-5 UNTIL THE
  BYTE COUNT IS GREATER THAN 20
7.REWIND TAPE
8.SET BYTE COUNT TO 177777
9.WRITE 2 RECORDS WITH DATA PATTERN OF 000377
10.READ REVERSE 2 RECORDS
11.READ FORWARD 2 RECORDS
12.DECREMENT BYTE COUNT
13.REPEAT STEPS 9-12 UNTIL BYTE COUNT = 177776
14.REPEAT STEPS 1 --> 13 USING GCR MODE

K.CAPSTAN WORST CASE TEST:

THIS TEST WILL ASSURE THAT A CAPSTAN WRAP
WILL NOT RESULT AFTER A HIGH SPEED REWIND
FROM THE CENTER OF TAPE HAS BEEN ISSUED.

1.REWIND
2.ERASE 400' OF TAPE
3.WAIT FOR TAPE TO SETTLE (1 MIN.)
4.REWIND TAPE AT HIGH SPEED

---

* REFER TO SECTION 3.2 FOR DATA PATTERNS.

3.0 USER INFORMATION

3.1 COMMANDS

FUNCT CODE•GO	NAME	DESCRIPTION

03	NO-OP	GENERATE A UNIQUE NO-OP INT CODE..
05	UNLOAD	UNLOAD TAPE AND INTERRUPT IMMEDIATELY.
07	REWIND	REWIND TAPE AND INTERRUPT WHEN DONE.
11	SENSE	PUT STATUS INFO INTO CAS 6,7 AND 10.
13	DSE	ERASE THE REMAINDER OF TAPE AND REWIND.
15	WTM PE	WRITE A PE TAPE MARK.
17	WTM GCR	WRITE A GCR TAPE MARK.
21	SP FWD REC	SPACE FORWARD RECORD, STOP IF TAPE MARK.
23	SP REV REC	SPACE REVERSE RECORD, STOP IF TAPE MARK.
25	SP FWD FILE	SPACE FORWARD FILE (TO TAPE MARK).
27	SP REV FILE	SPACE REVERSE FILE (TO TAPE MARK).
31	SP FWD EITHER	SPACE FWD EITHER RECORD OR FILE
33	SP REV EITHER	SPAVE REV EITHER RECORD OR FILE
35	ERG PE	ERASE 3 INCHES OF TAPE, SET PE.
37	ETG GCR	ERASE 3 INCHES OF TAPE, SET GCR.
41	CLOSE FILE PE	WRITE 2 TAPE MARKS, SPACE REV 1, SET PE.
43	CLOSE FILE GCR	WRITE 2 TAPE MARKS, SPACE REV 1, SET GCR.
45	SPACE LEOT	SPACE FWD UNTIL 2 TAPE MARKS, SPACE REV 1.
47	SPACE FWD FILE/LEOT	SPACE FORWARD TO TAPE MARK, STOP IF 2 SUCCESSIVE TAPE MARKS (LOGICAL END OF TAPE), THEN SPACE REVERSE ONE TAPE MARK.
61	WRITE PE	WRITE PHASE ENCODED RECORDS.
63	WRITE GCR	WRITE GROUP CODED RECORDS.
71	READ FWD	READ RECORDS FORWARD.
77	READ REV	READ RECORDS REVERSE.

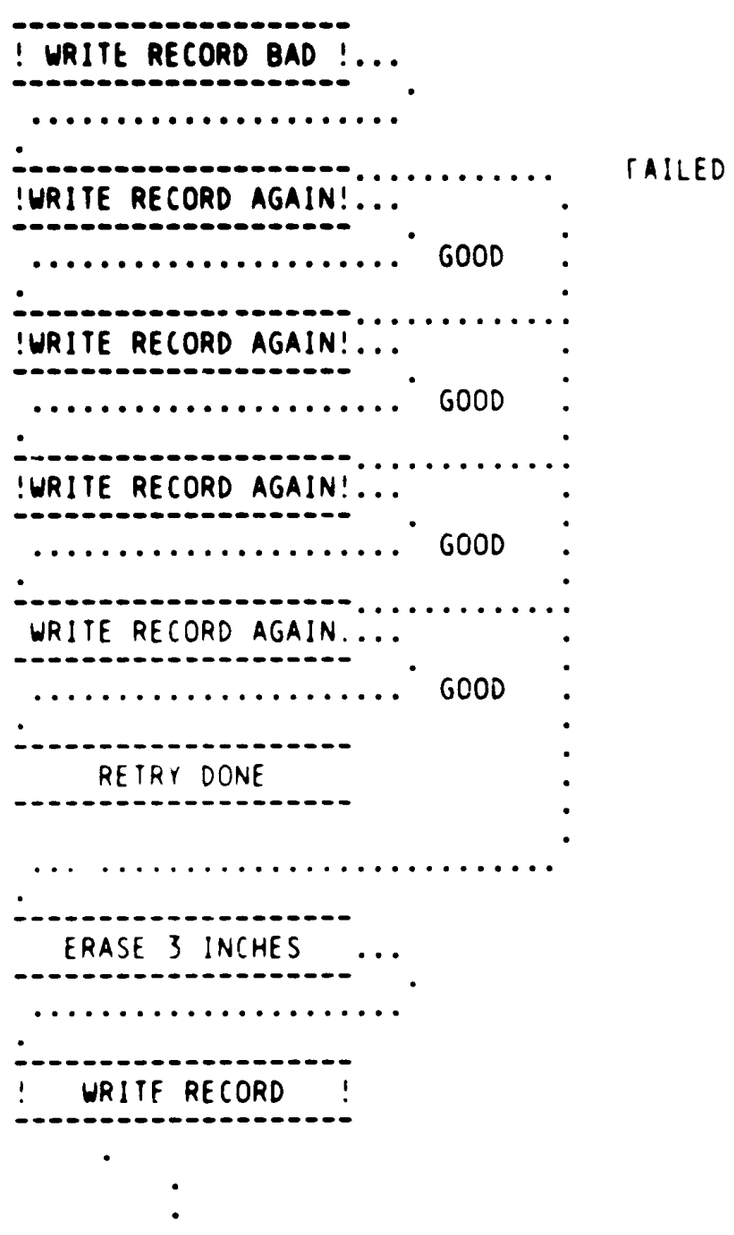
3.2 DATA PATTERNS

PATTERN #	DESCRIPTION
0	ALL ZEROES
1	ALL ONES
2	ALTERNATING BYTE OF ZEROES AND ONES
3	REPEATING 2 BYTES ONES 2 BYTES ZEROES
4	REPEATING 4 BYTES ONES 4 BYTES ZEROES
5	REPEATING 3 BYTES ZEROES 1 BYTE ONES
6	USER INPUTS 14 WORDS OF ANY PATTERN
7	INCREMENTING PATTERN 0-255
8	RANDOM PATTERN
9	WORSE CASE GCR PATTERN

3.3 RETRY SEQUENCES

3.3.1 WRITE RETRY SEQUENCE

A WRITE RETRY COMMAND WILL FOLLOW THE SEQUENCE BELOW.



IF WRITE GOOD FOUR CONSECUTIVE TIMES THEN SOFT WRITE ERROR.

IF AFTER ERASE 3 INCHES WRITE IS GOOD FOUR CONSECUTIVE TIMES THEN BAD TAPE SPOT.

IF AFTER ERASING 4 TIMES AND STILL CAN'T WRITE THE SAME RECORD GOOD FOUR CONSECUTIVE TIMES THEN HARD WRITE ERROR.

3.3.2 READ RETRY SEQUENCE

THE RETRY OF A FAILING READ OPERATION IS ACCOMPLLISHED
IN CONJUNCTION WITH THE TM78 OPERATIONAL MICRO CODE
WHEN A READ COMMAND IS ISSUED , THE SUPPRESS ERROR
REPOSITIONING (SER) IS DISABLED. IF THE TM78 DETECTS
AN ERROR IN PERFORMING THE READ OPERATION WHICH REQUIRES
RETRYING, IT REPOSITIONS THE TAPE AND RESPONDS TO THE HOST
PROCESSOR WITH AN INTERRUPT CODE OF 22 (RETRY). AT THIS
POINT THE HOST PROCESSOR REISSUES THE READ COMMAND. THIS
SEQUENCE WILL BE REPEATED UP TO TWELVE TIMES IF SUBSEQUENT
RETRIES ARE UNSUCCESSFUL. IF AFTER THE TM78 HAS ISSUED
THE 22 (RETRY) INTERRUPT THE TWELFTH TIME THE READ IS STILL
UNSUCCESSFUL, THE TM78 WILL ISSUE AN INTERRUPT OF 23 (READ
OPPOSITE) AND THE HOST PROCESSOR WILL RESPOND BY ISSUEING
A READ COMMAND IN THE OPPOSITE DIRECTION. THIS SEQUENCE
CAN CONTINUE UNTIL THE TM78 HAS RESPONDED WITH INTERRUPT
CODE 23 (READ OPPOSITE) EIGHT TIMES. AT THIS POINT THE
TM78 WILL RESPOND WITH ONE INTERRUPT CODE 22 (RETRY), AND
FINALLY INTERRUPT CODE 24 (UNREADABLE). THIS IS A HARD
READ ERROR.

4.0 ERROR INFORMATION

4.1 ERRORS REPORTED

INITIAL ERRORS REPORTED IN THE INIT CODE FOR ALL OPTIONS OF
THE PROGRAM.

1. INSUFFICIENT MEMORY AVAILABLE DIAGNOSTIC CANNOT RUN
2. THIS (TU #) ON THIS (RH ADDRESS) AND (TM78 #) IS NOT A TM78 TYPE DRIVE
3. TOO MANY UNITS TO BE TESTED UNDER BRUTUS, ONLY ONE ALLOWED
4. SUPERVISOR UAM FLAG IS SET, MUST BE CLEARED IN ORDER TO RUN BRUTUS OPTION
5. THIS (TM78 #) ON THIS RH ADDRESS WITH THIS (TU #) HAS NOT RESPONDED TO SENSE COMMAND
6. TOO MANY UNITS TO TEST UNKNOWN TAPE, ONLY ONE ALLOWED.
7. THIS TU # ON THIS TM78 # ON THIS RH ADDRESS HAS GENERATED AN INTERRUPT.
8. THIS TU # ON THIS TM78 # ON THIS RH ADDRESS IS NON EXISTENT.

ERRORS REPORTED EXCEPT IN BRUTUS:

1. TM = UNEXPECTED TAPE MARK FOUND

2. BOT = UNEXPECTED BEGINNING OF TAPE

3. EOT = TAPE IS POSITIONED BEYOND END OF TAPE MARKER.

4. LEOT = UNEXPECTED LOGICAL END OF TAPE.

5. FPT = A WRITE WAS ATTEMPTED ON A FILE PROTEDTED TAPE.

6. NOT RDY = TU IS ON LINE BUT TAPE IS REWINDING OR LOADING.

7. NOT AVL = TU IS NOT SWITCHED TO THIS PORT, BUT IS ON LINE.

8. OFF LINE = TU IS NOT SWITCHED ON LINE WITH A TAPE LOADED.

9. NON EX = TU DOES NOT EXIST OR POWER IS OFF.

10. LONG REC = THE LAST RECORD WAS LONGER THAN THE BYTE COUNT.

11. SHORT REC = WAS SHORTER THEN THE BYTE COUNT.

12. RETRY = ERROR, THE INITIAL OPERATION SHOULD BE REPEATED.

13. READ OPP = READ ERROR, THE INITIAL READ SHOULD BE PERFORMED IN OPPOSITE DIRECTION.

14. UNREAD = READ RETRIES HAVE FAILED TO READ THE RECORD.

15. ERROR = AN ERROR HAS OCCURRED WHICH REQUIRED A RETRY BUT SUPPRESS ERROR REPOSITIONING IS SET.

16. EOT ERROR = WRITE ERROR HAS OCCURRED BEYOND THE EOT MARKER, AND SER IS SET.

17. BAD TAPE = TAPE POSITION HAS BEEN LOST, OR WRITE RETRIES HAVE FAILED TO WRITE THE RECORD.

18. TM FAULT A = THE HARDWARE HAS FAILED OR A SOFTWARE BUG HAS BEEN DETECTED.

19. TU FAULT A = TAPE U[illegible] HAS FAILED.

20. TIMEOUT = IF TU DOES NOT RESPOND IN A GIVEN AMOUNT OF TIME.

21. HARD WRITE ERROR = UNABLE TO CORRECTLY WRITE A RECORD.

22. MEDIA ERROR = A CORRECTABLE WRITE ERROR HAS OCCURRED.

23. DATA DOES NOT COMPARE CORRECTLY

24. MASS BUS STATUS ERRORS

4.2 SAMPLE ERROR PRINTOUT

```
CZTMJA DVC FTL ERR  00023 ON UNIT 00 TST 001 SUB 000 PC. 024134
STATUS ERROR
RH ADDRESS  172400  TM78# 0   TU78# 0
ELAPSED TIME  0:05
CS1 144260   CS2 000100
ERROR OCCURRED WHILE EXCUTING COMMAND 61
RECORD # 18    FILE # 1
INTERRUPT CODE 25 FAILURE CODE 03
PATTERN #  7   RECORD LENGTH  2048
 COMMAND CODE 061 INTERRUPT CODE 025 FAILURE CODE 003
CHOTIE 000 RPFAIL 002 RAMT   377 CASSTA 100 MTA0   250 WMCSTA 300
CH1TIE 010 RPATH  046 RDON   000 CBUS   003 MTA1   002 WRTDAT 000
CH2TIE 000 RSTAT  000 RILL   002 DBUS   040 MTA2   126 DDRA   000
CH3TIE 000 RCMLP  001 RMK2   000 TUSEL0 000 MTA3   000 DDRB   000
CH4TIE 000 CRCWRD 306 REND   000 TUSEL1 200 MTA4   001 WMCERR 004
CH5TIE 000 ECCCOR 377 RPSTA  201 TAMT   000 MTA5   240 INSTA  044
CH6TIE 000 ECCSTA 221 RPOSTN 000 PSTAT  024 EXTRA  000 EXTRA  000
CH7TIE 000 RTIER  010 RDATA  000 PRDD   000 TACH   231031030222
CHPTIE 000 BYTCNT  377371  PADCNT  000000 ERRCNT  021351
```

NOTE: DESCRIPTIONS OF THE EXTENDED SENSE INFORMATION CAN BE FOUND IN THE 'TM78 TAPE CONTROLLER/FORMATTER' ENGINEERING SPECIFICATION.

SAMPLE DATA COMPARE ERROR PRINTOUT

```
CZTMJA DVC FTL ERR  00034 ON UNIT 00 TST 001 SUB 000 PC: 026650
DATA COMPARE ERROR
RH ADDRESS  172400  TM78# 0   TU78# 0
ELAPSED TIME  0:21
CS1  004276    CS2 000100
ERROR OCCURRED WHILE EXCUTING COMMAND  77
PATTERN #  8   RECORD LENGTH  2048
RECORD #  29   FILE #  0
BAD BYTE #      0  DATA EXPECTED  10000101   ACTUAL  10100110
BAD BYTE #      1  DATA EXPECTED  01001001   ACTUAL  10011000
BAD BYTE #      2  DATA EXPECTED  10100110   ACTUAL  01101101
BAD BYTE #      3  DATA EXPECTED  10011000   ACTUAL  10000000
BAD BYTE #      4  DATA EXPECTED  01101101   ACTUAL  10100001
BAD BYTE #      5  DATA EXPECTED  10000000   ACTUAL  11101000
BAD BYTE #      6  DATA EXPECTED  10100001   ACTUAL  00000000
BAD BYTE #      7  DATA EXPECTED  11101000   ACTUAL  00000000
NUMBER OF BYTES BAD IN A RECORD   1896
```

5.0 STATISTICAL REPORT

5.1 SAMPLE STATISTICAL PRINTOUT

```
  STATISTICAL REPORT FOR UNIT # 0

RH ADDRESS 172400   TM78# 0   TU78# 0

TAPE DENSITY -- 1600 BPI (PE)   OR -- 6250 BPI (GCR)


                                  WRITE          READ          READ REVERSE
STATUS ERRORS                        0             0                     0
NON-RECOVERABLE                      0             0                     0
BYTES TRANSFERRED             000004915     000004915             000004915
MEDIA ERRORS                         --            --                    --
DOUBLE TRACK CORRECTIONS             --            --                    --
SINGLE TRACK CORRECTIONS             --             0                     0
DATA COMPARE ERRORS                  --             0                     0

          BIT7    BIT6    BIT5    BIT4    BIT3    BIT2    BIT1    BIT0
        (TRACK7)(TRACK6)(TRACK5)(TRACK3)(TRACK9)(TRACK1)(TRACK8)(TRACK2)

DROPS     0       0       0       0       0       0       0       0
PICKS     0       0       0       0       0       0       0       0

UNIT DROPPED    0
```

5.2 STATISTICAL UPDATES

WRITE

STATUS ERRORS	UPDATED ON EVERY WRITE THAT IS NOT PERFECT THE FIRST TRY AT WRITING BUT DOES NOT WRITE PERFECT ON THE SAME SPOT OF TAPE WHEN RETRIED OR WHEN RETRIES SUPRESSED.
MEDIA ERRORS	UPDATED ON ANY WRITE THAT IS RETRIED AFTER AN ERASE AND IS SUCCESSFUL.
NON-RECOVERABLE	UPDATE IF RETRIES FAIL TO WRITE THE RECORD PERFECTLY ON TAPE.
BYTES WRITTEN	UPDATED AFTER EVERY SUCCESSFUL WRITE OPERATION

READ + READ REVERSE

STATUS ERRORS	UPDATE ONCE FOR EVERY READ THAT IS RETRIED AND SUCCESSFUL. UPDATED ON ANY INTERRUPT

BUT A DONE 0 OR 1.

NON-RECOVERABLE	UPDATED ON ANY READ UNABLE TO DO SO.
DOUBLE TRACK	UPDATED WHEN DOUBLE TRACK BIT HAS BEEN SET
SINGLE TRACK	UPDATED WHEN DOUBLE TRACK IS NOT SET AND SINGLE TRACK IS.
DATA COMPARE ERROPS	UPDATED WHEN DATA READ DOES NOT EXACTLY MATCH DATA WRITTEN
BYTES READ FORWARD AND REVERSE	UPDATED ON EVERY SUCCESSFUL READ OPERATION
DROPS AND PICKS	UPDATED ON DATA COMPARE ERRORS FOR BITS DROPPED OR PICKED IN EACH CHANNEL.
UNIT DROPPED	UPDATED EVERY TIME THIS UNIT WAS DROPPED REGARDLESS OF OTHER STATISTICS BEING UPDATED ON THE SAME ERROR.

&

```
1110                                    .TITLE PROGRAM HEADER AND TABLES
1111                                    .SBTTL  PROGRAM HEADER
1145
1147                                            .ENABL  ABS,AMA
1148            002000                  .       =       2000
1150
1151    002000                                  BGNMOD
1152
1153                                    ;++
1154                                    ; THE PROGRAM HEADER IS THE INTERFACE BETWEEN
1155                                    ; THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
1156                                    ;--
1157
1158    002000                                  POINTER BGNRPT,BGNSW,BGNSFT,BGNAU,BGNDU
1159
1167
1168    002000                                  HEADER  CZTMJA,0,0,600.,1,340
1169
1170    002122                                  DEVTYP  <TM78,TU78>
1171
1172    002134                                  DESCRIPT <PERFORMANCE EXERCISER>
1173
1179                                    .SBTTL  DISPATCH TABLE
1180
1181                                    ;++
1182                                    ; THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST.
1183                                    ; IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
1184                                    ;--
1185
1186    002162                                  DISPATCH 1
1187
1194                                    .SBTTL  DEFAULT HARDWARE P-TABLE
1195
1196                                    ;++
1197                                    ; THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
1198                                    ; THE TEST-DEVICE PARAMETERS.  THE STRUCTURE OF THIS TABLE
1199                                    ; IS IDENTICAL TO THE STRUCTURE OF THE RUN-TIME P-TABLE.
1200                                    ;--
1201
1202    002166                                  BGNHW   DFPTBL
1203
1204    002170  172400                          .WORD   172400
1205    002172  000224                          .WORD   224
1206    002174  000000                          .WORD   0
1207    002176  000000                          .WORD   0
1208    002200  000000                          .WORD   0
1209
1215
1216    002202                                  ENDHW
1217                                    .SBTTL  SOFTWARE P-TABLE
1218
1219                                    ;++
1220                                    ; THE SOFTWARE P-TABLE CONTAINS THE VALUES OF THE PROGRAM
1221                                    ; PARAMETERS THAT CAN BE CHANGED BY THE OPERATOR.
1222                                    ;--
1223
```

```
1224  002202                          BGNSW   SFPTBL
1225
1226  002204  000000          BRUTUS: .WORD   0               ;BRUTUS OPTION
1227  002206  000002          CANSEQ: .WORD   2               ;CANNED SEQUENCE NUMBER
1228  002210  000000          BRUERR: .WORD   0               ;BRUTUS WITH ERRORS
1229  002212  000000          STAEOP: .WORD   0               ;STATISTIC AT END OF PASS
1230  002214  000000          STAEOT: .WORD   0               ;STATISTICS ON END OF TAPE
1231  002216  000000          RETRY:  .WORD   0               ;AUTOREPOSITION ON OR OFF
1232  002220  004000          CHAREC: .WORD   4000            ;BYTES IN A RECORD
1233  002222  000000          PATTRN: .WORD   0               ;PATTERN NUMBER
1234  002224  000000          RALNTH: .WORD   0               ;RANDOM RECORD LENGTH
1235  002226  000000          DATCHK: .WORD   0               ;CHECK THE DATA
1236  002230  000000          CMDSTR: .WORD   0               ;LENGTH OF COMMAND STRING
1237  002232  000000          COMMD1: .WORD   0               ;FIRST COMMAND
1238  002234  000000          REP1:   .WORD   0               ;REPITION OF ABOVE COMMAND
1239  002236  000000          COMMD2: .WORD   0               ;SECOND COMMAND
1240  002240  000000          REP2:   .WORD   0               ;REPITION
1241  002242  000000          COMMD3: .WORD   0               ;THIRD COMMAND
1242  002244  000000          REP3:   .WORD   0               ;REPITION
1243  002246  000000          COMMD4: .WORD   0               ;FOURTH COMMAND
1244  002250  000000          REP4:   .WORD   0               ;REPITION
1245  002252  000000          COMMD5: .WORD   0               ;FIFTH COMMAND
1246  002254  000000          REP5:   .WORD   0               ;REPITION
1247  002256  000000          COMMD6: .WORD   0               ;SIXTH COMMAND
1248  002260  000000          REP6:   .WORD   0               ;REPITION
1249
1256
1257  002262                          ENDSW
1258
1259  002262                          ENDMOD
```

```
                                .TITLE GLOBAL AREAS
                                .SBTTL  GLOBAL EQUATES SECTION


002262                                  BGNMOD



                                ;++
                                ; THE GLOBAL EQUATES SECTION CONTAINS PROGRAM EQUATES THAT
                                ; ARE USED IN MORE THAN ONE TEST.
                                ;--

002262                                  EQUALS
(1)                             ;
(1)                             ; BIT DIFINITIONS
(1)                             ;
(1)         100000              BIT15== 100000
(1)         040000              BIT14== 40000
(1)         020000              BIT13== 20000
(1)         010000              BIT12== 10000
(1)         004000              BIT11== 4000
(1)         002000              BIT10== 2000
(1)         001000              BIT09== 1000
(1)         000400              BIT08== 400
(1)         000200              BIT07== 200
(1)         000100              BIT06== 100
(1)         000040              BIT05== 40
(1)         000020              BIT04== 20
(1)         000010              BIT03== 10
(1)         000004              BIT02== 4
(1)         000002              BIT01== 2
(1)         000001              BIT00== 1
(1)                             ;
(1)         001000              BIT9==  BIT09
(1)         000400              BIT8==  BIT08
(1)         000200              BIT7==  BIT07
(1)         000100              BIT6==  BIT06
(1)         000040              BIT5==  BIT05
(1)         000020              BIT4==  BIT04
(1)         000010              BIT3==  BIT03
(1)         000004              BIT2==  BIT02
(1)         000002              BIT1==  BIT01
(1)         000001              BIT0==  BIT00
(1)                             ;
(1)                             ; EVENT FLAG DEFINITIONS
(1)                             ;   EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
(1)                             ;
(1)         000040              EF.START==      32.                     ; START COMMAND WAS ISSUED
(1)         000037              EF.RESTART==    31.                     ; RESTART COMMAND WAS ISSUED
(1)         000036              EF.CONTINUE==   30.                     ; CONTINUE COMMAND WAS ISSUED
(1)         000035              EF.NEW==        29.                     ; A NEW PASS HAS BEEN STARTED
(1)         000034              EF.PWR==        28.                     ; A POWER-FAIL/POWER-UP OCCURRED
(1)                             ;
(1)                             ;
(1)                             ; PRIORITY LEVEL DEFINITIONS
```

```
    (1)                         ;
    (1)          000340         PRI07== 340
    (1)          000300         PRI06== 300
    (1)          000240         PRI05== 240
    (1)          000200         PRI04== 200
    (1)          000140         PRI03== 140
    (1)          000100         PRI02== 100
    (1)          000040         PRI01== 40
    (1)          000000         PRI00== 0
    (1)                         ;
    (1)                         ;OPERATOR FLAG BITS
    (1)                         ;
    (1)          000004         EVL==         4
    (1)          000010         LOT==        10
    (1)          000020         ADR==        20
    (1)          000040         IDU==        40
    (1)          000100         ISR==       100
    (1)          000200         UAM==       200
    (1)          000400         BOE==       400
    (1)          001000         PNT==      1000
    (1)          002000         PRI==      2000
    (1)          004000         IXE==      4000
    (1)          010000         IBE==     10000
    (1)          020000         IER==     20000
    (1)          040000         LOE==     40000
    (1)          100000         HOE==    100000
  1331
  1332                          ;
  1333                          ;HARDWARE INFORMATION AND STATISTIC OFFSETS
  1334                          ;
  1335
  1336
  1337
  1338          000000          RHADD==0          ;RH ADDRESS
  1339          000002          RHVEC==2          ;RH VECTOR ADDRESS
  1340          000004          TMNUM==4          ;TM NUMBER
  1341          000006          TUNUM==6          ;TU NUMBER
  1342          000010          SPUNIT==10        ;SUPERVISOR UNIT #
  1343          000012          SERWRT==12        ;STATUS WRITE ERRORS
  1344          000014          SERRFO==14        ;STATUS READ ERRORS
  1345          000016          SERRRV==16        ;STATUS READ REVERSE ERRORS
  1346          000020          NRECWR==20        ;NON-RECOVERABLE WRITES
  1347          000022          NRECRE==22        ;NON-RECOVERABLE READS
  1348          000024          NRECRR==24        ;NON-RECOVERABLE READ REVERSES
  1349          000026          BYWRHI==26        ;
  1350          000030          BYWRMD==30        ;BYTES WRITTEN
  1351          000032          BYWRLO==32        ;
  1352          000034          BYRFHI==34        ;
  1353          000036          BYRFMD==36        ;BYTES READ FORWARD
  1354          000040          BYRFLO==40        ;
  1355          000042          BYRRHI==42        ;
  1356          000044          BYRRMD==44        ;BYTES READ REVERSE
  1357          000046          BYRRLO==46        ;
  1358          000050          MEDIAE==50        ;MEDIA ERRORS
  1359          000052          DBLTRF==52        ;DOUBLE TRACK ERROR READ FORWARD
  1360          000054          DBLTRR==54        ;DOUBLE TRACK ERROR READ REVERSE
```

```
1361    000056    SNGTRF==56      ;SINGLE TRACK READ FORWARD
1362    000060    SNGTRR==60      ;SINGLE TRACK READ REVERSE
1363    000062    DERREF==62      ;DATA COMPARE ERROR FORWARD
1364    000064    DERRRV==64      ;DATA COMPARE ERROR REVERSE
1365    000066    DROP7==66       ;
1366    000070    DROP6==70       ;
1367    000072    DROP5==72       ;
1368    000074    DROP4==74       ;BITS DROP PER TRACK
1369    000076    DROP3==76       ;
1370    000100    DROP2==100      ;
1371    000102    DROP1==102
1372    000104    DROP0==104      ;
1373    000106    PICK7==106      ;
1374    000110    PICK6==110      ;
1375    000112    PICK5==112      ;
1376    000114    PICK4==114      ;
1377    000116    PICK3==116      ;BITS PICK PER TRACK
1378    000120    PICK2==120      ;
1379    000122    PICK1==122      ;
1380    000124    PICK0==124      ;
1381    000126    DRPUNT==126     ;UNIT DROPPED
1382    000130    OTHWRT==130     ;OTHER ERRORS WRITE
1383    000132    OTHRF0==132     ;OTHER ERRORS READ FORWARD
1384    000134    OTHRRV==134     ;OTHER ERRORS READ REVERSE
1385
1386
1387
1388
1389
1390
1391                              ;
1392                              ;EQUATES FOR COMMON ADDRESS SPACE (CAS)
1393                              ;
1394
1395
1396
1397    000000        BASE==0
1398    000002        WRDCNT==2
1399    000004        BSADDR==4
1400    000006        BYTCNT==6
1401    000010        UNSLCT==10
1402    000012        INTCDE==12
1403    000014        CMDADR==14
1404    000016        ATTBIT==16
1405    000020        DSE0==20
1406    000022        DATBUF==22
1407    000024        DIAGTS==24
1408    000026        DRVTYP==26
1409    000030        SERIAL==30
1410    000032        DIAGRQ==32
1411    000034        ACTDGD==34
1412    000036        NDTICD==36
1413    000040        NDTFC0==40
1414    000042        NDTFC1==42
1415    000044        NDTFC2==44
1416    000046        NDTFC3==46
```

```
1417          000050                  INTRAD==50
1418          000052                  INTRDA==52
1419
1420
1421
1422
1423                                  ;
1424                                  ;EQUATES FOR COMMANDS
1425                                  ;
1426
1427
1428
1429          000003                  NOOP==03
1430          000005                  UNLOAD==05
1431          000007                  REWIND==07
1432          000011                  SENSE==11
1433          000013                  DSE==13
1434          000015                  WTMPE==15
1435          000017                  WTMGCR==17
1436          000021                  SPFWRC==21
1437          000023                  SPRVRC==23
1438          000025                  SPFWFL==25
1439          000027                  SPRVFL==27
1440          000031                  SPFWEI==31
1441          000033                  SPRVEI==33
1442          000035                  ERGPE==35
1443          000037                  ERGGCR==37
1444          000041                  CLFLPE==41
1445          000043                  CLFGCR==43
1446          000045                  SPLEOT==45
1447          000047                  SFFLET==47
1448          000051                  WCKFWD==51
1449          000057                  WCKREV=57
1450          000061                  WRTPE==61
1451          000063                  WRTGCR==63
1452          000071                  REDFWD==71
1453          000073                  REDEXT==73
1454          000077                  REDREV==77
1455
1456
```

```
                                .SBTTL  GLOBAL DATA SECTION

                                ;++
                                ; THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
                                ; IN MORE THAN ONE TEST.
                                ;--



                                ;*****************************************************************************
                                ;
                                ;DATA USED ONLY FOR INITIALIZE MODULE
                                ;
                                ;*****************************************************************************


002262  002000                  MINSIZ:: .WORD  2000            ;SMALLEST AMOUNT OF FREE MEMORY NEEDED
002264  005426                  FETBL:: .WORD   EMSG2           ;MESSAGES FOR INIT CODE
002266  005747                          .WORD   EMSG5
002270  006163                          .WORD   EMSG7
002272  006304                          .WORD   EMSG10
002274  006412                          .WORD   EMSG11


002276  000000                  START1:: .WORD  0
002300  000000                  SERNUM:: .WORD  0               ;ASCII STORAGE OF SERIAL NUMBER
002302  000000                           .WORD  0
002304  000000                           .WORD  0

002306  000000                  USEPAT:: .WORD  0               ;USER INPUT PATTERN FLAG
002310  000000                  REPCMD:: .WORD  0               ;NUMBER OF TIMES COMMAND WILL BE EXECUTED



                                ;*****************************************************************************
                                ;
                                ;DATA FLAGS USED THROUGHOUT ALL MODULES
                                ;
                                ;*****************************************************************************


002312  000000                  BUFSIZ:: .WORD  0               ;SIZE OF FREE MEMORY BUFFER IN BYTES
002314  000000                  BRTEST:: .WORD  0               ;BRUTUS AND BRUTUS W/ERRORS COMBINED
002316  000000                  DISPLC:: .WORD  0               ;CONTAINS ADDRESS OF SPECIFIED DISPLACEMENT IN TABLE
002320  000000                  ERRFLG:: .WORD  0               ;SPECIFIES AN ERROR AND TYPE OF ERROR
002322  000000                  HOURS:: .WORD   0               ;ELASPED HOURS
002324  000000                  MINUTE::.WORD   0               ;ELAPSED MINUTES
002326  000000                  INTLZE:: .WORD  0               ;INITIALZE FLAG TELLS IF WENT THRU INIT CODE
002330  000000                  PTBLAD:: .WORD  0               ;ADDRESS OF HARD P-TABLE
002332  000000                  REDBUF:: .WORD  0               ;ADDRESS OF READ BUFFER
002334  000000                  STRST:: .WORD   0               ;START OR RESTART FLAG
002336  000000                  STRTBL:: .WORD  0               ;VARIABLE NEED IN DISPLACEMENT SUBROUTINES
002340  000000                  CONTER: .WORD   0               ;USER INPUT COMMMAND COUNTER
002342  000124                  STTBLH:: .WORD  124             ;LENGTH OF STAT TABLE
```

```
  1525  002344  000000                TBLCNT:: .WORD  0               ;NUMBER OF UNITS BEING TESTED
  1526  002346  000136                TBLNTH:: .WORD  136             ;LENGTH OF UNIT TABLE
  1527  002350  000004                PATLOP:: .WORD  4               ;NORMAL LENGTH OF PATTERN LOOP
  1528  002352  000000                TBLNUM:: .WORD  0               ;DUMMY TABLE COUNT
  1529  002354  000000                VRMADD:: .WORD  0               ;START OF FREE MEMORY
  1530  002356  000000                RHADDR:: .WORD  0               ;RH ADDRESS
  1531  002360  000000                CSRCLK:: .WORD  0               ;CSR CLOCK ADDRESS
  1532  002362  000000                LCLOCK:: .WORD  0               ;TICK COUNTER FOR CLOCK
  1533  002364  000000                HERTZ:: .WORD   0               ;HERTZ 60 OR 50
  1534  002366  000000                PRIRTY:: .WORD  0               ;PRIORITY OF CLOCK MINUS 1
  1535  002370  000000                TM78N:: .WORD   0               ;TM78 NUMBER
  1536  002372  000000                TU78N:: .WORD   0               ;TU78 NUMBER
  1537  002374  000000                INTRPT:: .WORD  0               ;INTERRUPT FLAG
  1538  002376  000000                INTVEC:: .WORD  0               ;INTERRUPT VECTOR
  1539  002400  000000                RHADD1: .WORD   0               ;TABLE STORES ALL THE RH ADDRESS
  1540  002402  000000                RHADD2: .WORD   0
  1541  002404  000000                RHADD3: .WORD   0
  1542  002406  000000                RHADD4: .WORD   0
  1543  002410  000000                RHADD5: .WORD   0
  1544  002412  000000                RHADD6: .WORD   0
  1545  002414  000000                RHADD7: .WORD   0
  1546  002416  000000                RHADD8: .WORD   0
  1547  002420  000000                R8:     .WORD   0               ;
  1548  002422  000000                R9:     .WORD   0               ;PSEUDO REGISTERS
  1549  002424  000000                R10:    .WORD   0               ;
  1550  002426  177777                GENFLG: .WORD   -1              ;GENERATION FLAG
  1551  002430  000000                BNRYNB: .WORD   0               ;BINARY NUMBER
  1552  002432  000000                BITPST: .WORD   0               ;BIT POSITION NUMBER
  1553  002434  000000                CHKBOT: .WORD   0               ;CHECK BOT STATUS AFTER REWIND
  1554  002436  000000                CHKUTM: .WORD   0               ;CHECK FOR UNEXPECTED TAPE MARK
  1555  002440  000000                ERASED: .WORD   0               ;NOT CAPABLE FLAG FOR FUNCTIONAL SEQ.
  1556  002442  000000                MESNUM: .WORD   0               ;FUNCTIONAL TEST MESSAGE NUMBER
  1557  002444  000000                DENFLG: .WORD   0               ;STATISTIC TABLE DENSITY SELECT FLAG
  1558  002446  000377                LNGDAT: .WORD   377                     ;DATA PATTERN FOR LONG RECORDS
  1559  002450  000000                BIGREC: .WORD   0                       ;LARGE RECORD FLAG
  1560
  1561
  1562
  1563
  1564
  1565                                ;*************************************************************************
  1566                                ;
  1567                                ;DATA USED FOR TEST MODULES ONLY
  1568                                ;
  1569                                ;*************************************************************************
  1570
  1571
  1572
  1573  002452  000000                CMMAND:: .WORD  0               ;HOLDS COMMAND TO BE EXECUTED
  1574  002454  000000                EICMMD:: .WORD  0               ;COMMAND W/ INTERRUPT ENABLE SET
  1575  002456  000000                BUFFER:: .WORD  0               ;BUFFER LENGTH
  1576  002460  000000                BUFLST:: .WORD  0               ;HOLD LAST BUFFER ADDRESS
  1577  002462  000000                RETRCD:: .WORD  0               ;RETRY COMMAND TO BE EXECUTED
  1578  002464  000000                STAFLG:: .WORD  0               ;STATISTIC PRINTOUT FLAG
  1579  002466  000000                AUTORW:: .WORD  0               ;AUTO REWIND FLAG
  1580  002470  000000                VISIT:: .WORD   0               ;RETRY VISIT FLAG
```

```
1581  002472  000000                EXPECT:: .WORD  0          ;EXPECTED DATA
1582  002474  000000                ACTUAL:: .WORD  0          ;ACTUAL DATA
1583  002476  000000                HRDCNT:: .WORD  0          ;HARD READ ERROR COUNT
1584  002500  000000                WTUFLG:: .WORD  0          ;WRONG TU FLAG
1585  002502  000000                WTMFLG:: .WORD  0          ;WRONG TM FLAG
1586  002504  000000                INTROK:: .WORD  0          ;INTERRUPT OK
1587  002506  000000                TAPMON:: .WORD  0          ;TM78 NUMBER
1588  002510  000000                DENSWT:: .WORD  0          ;DENSITY SWITCH FLAG
1589  002512  000000                DTCOMP:: .WORD  0          ;DATA COMPARE FLAG
1590  002514  000000                ERAFLG:: .WORD  0          ;ERASE FLAG FOR MEDIA ERROR
1591  002516  000000                DATRAN:: .WORD  0          ;DATA TRANSFER FLAG
1592  002520  000000                STORE:: .WORD   0          ;
1593  002522  000000                EXTERR:: .WORD  0          ;EXTENDED ERROR CODE
1594  002524  000000                EXTDSN:: .WORD  0          ;EXTENDED SENSE FLAG
1595  002526  000000                ICCODE:: .WORD  0          ;INTERRUPT CODE
1596  002530  000000                UNITFL:: .WORD  0          ;UNIT FLAG
1597  002532  000000                MASBUS:: .WORD  0          ;RH ADDRESS
1598  002534  000000                DRPFLG:: .WORD  0          ;DROP UNITS (1-8) FLAG
1599  002536  000000                PATCNT:: .WORD  0          ;PATTERN COUNTER
1600  002540  000000                EOTFLG:: .WORD  0          ;ALL UNITS AT END OF TAPE
1601  002542  000000                TIMOUT:: .WORD  0          ;TIME OUT
1602  002544  000000                TIMER:: .WORD   0          ;TIME OUT
1603  002546  000000                BADCNT:: .WORD  0          ;BAD WRITE RETRY COUNT
1604  002550  000000                GCRFLG:: .WORD  0          ;VISIT FLAG TO GCR ROUTINE
1605  002552  000000                GCRBIT:: .WORD  0          ;ROTATION BIT STORAGE
1606  002554  000000                OKAY::  .WORD   0          ;COMPARE FLAG
1607  002556  000000                WRTCNT:: .WORD  0          ;WRITE RETRY COUNT
1608  002560  000000                WRTYCT:: .WORD  0          ;WRITE RETRY COUNT
1609  002562  000000                ALLINT:: .WORD  0          ;UNIT INTERRUPT FLAGS
1610  002564  000000                RECTBL:: .WORD  0          ;MORE THAN ONE UNIT FLAG
1611  002566  000000                RECORD: .WORD   0
1612  002570  000000                FILENM: .WORD   0
1613  002572  000000                FIRBYT: .WORD   0
1614  002574  000000                GCRRPT: .WORD   0          ;GCR LOOP COUNTER
1615  002576  000000                GCRCNT: .WORD   0          ;BIT PATTERN COUNTER
1616  002600  000000                ALLEOT:: .WORD  0          ;ALL UNITS AT EOT
1617  002602  000000                REPITN:: .WORD  0          ;# OF TIMES COMMAND IS REPEATED
1618  002604  000000                RTYFLG:: .WORD  0          ;RETRY FLAG
1619  002606  000000                SENFLG: .WORD   0          ;SENSE READ FLAG
1620  002610  000000                RWDCNT:: .WORD  0          ;REWIND COMMAND COUNTER
1621  002612  000000                RWDFLG:: .WORD  0          ;REWIND FLAG
1622  002614  000020                PARMAX:: .WORD  20         ;MAXIMUM PARITY ERROR ALLOWED PER UNIT
1623  002616  000000                CMDSTG:: .WORD  0          ;STORAGE FOR COMMAND
1624  002620  000000                COUNT:: .WORD   0          ;COUNTER FOR NUMBER OF COMMANDS
1625  002622  000377                RPTFLG: .WORD   377        ;STATISTICAL REPORT FLAG
1626  002624  000252                BYTEA:  .WORD   252        ;GCR BIT PATTERN A
1627  002626  000125                BYTEB:  .WORD   125        ;GCR BIT PATTERN B
1628  002630  000011                GCRLOP: .WORD   11         ;GCR LOOP COUNTER MAXIMUM
1629  002632  153624                RANB:   .WORD   153624     ;RANDOM NUMBER GENERATOR BASE
1630  002634  032561                RANS:   .WORD   32561      ;RANDOM # SAVE LOCTION
1631  002636  153624                RANB2:  .WORD   153624     ;
1632  002640  032561                RANS2:  .WORD   32561      ;
1633
1634
1635
1636                                ;
```

```
1637                                    ;PARITY ERROR COUNTERS
1638                                    ;
1639
1640  002642  000000                    TRECNT:: .WORD  0
1641  002644  000000                             .WORD  0
1642  002646  000000                             .WORD  0
1643  002650  000000                             .WORD  0
1644  002652  000000                             .WORD  0
1645  002654  000000                             .WORD  0
1646  002656  000000                             .WORD  0
1647  002660  000000                             .WORD  0
1648
1649
1650
1651                                    ;
1652                                    ;INTERRUPT CODE RESPONSE LOCATIONS
1653                                    ;
1654
1655
1656
1657  002662  030602                    INTTBL: .WORD  MBTERM          ;MASS BUS TERMINATION INTERRUPT
1658  002664  030754                            .WORD  DONE            ;COMMAND FINISHED WITHOUT ERROR
1659  002666  032320                            .WORD  TM              ;UNEXPECTED TAPE MARK
1660  002670  032460                            .WORD  BOT             ;UNEXPECTED BEGINNING OF TAPE
1661  002672  032540                            .WORD  EOT             ;SUCCESSFUL WRITE AFTER EOT
1662  002674  033000                            .WORD  LEOT            ;UNEXPECTED LOGICAL EOT
1663  002676  033122                            .WORD  INOOP           ;NO-OP COMPLETED
1664  00270U  033052                            .WORD  IREWND          ;FIRST INTERRUPT FROM REWIND
1665  002702  033054                            .WORD  FPT             ;WRITE ATTEMPTED ON FILE PROTECT TAPE
1666  002704  033124                            .WORD  NOTRDY          ;TU IS NOT READY
1667  002706  033152                            .WORD  NOTAVL          ;TU IS NOT SWITCHED TO THIS PORT
1668  002710  033204                            .WORD  OFFLNE          ;TU IS NOT ON LINE
1669  002712  033232                            .WORD  NONEX           ;TU DOES NOT EXIST
1670  002714  033260                            .WORD  BLKTAP          ;BLANK TAPE OR CANNOT FIND RECORD
1671  002716  033324                            .WORD  ILLINT          ;ILLEGAL INTERRUPT
1672  002720  033352                            .WORD  ONLINE          ;A TAPE UNIT HAS COME ON LINE
1673  002722  033374                            .WORD  LONREC          ;RECORD WRITTEN BUT TOO LONG
1674  002724  033374                            .WORD  SHTREC          ;RECORD WRITTEN BUT TOO SHORT
1675  002726  033670                            .WORD  IRETRY          ;OPERATION SHOULD BE REPEATED
1676  002730  033732                            .WORD  READOP          ;READ SHOULD BE PERFORMED IN OPPOSITE DIRECTION
1677  002732  033774                            .WORD  UNRDAB          ;RETRIES HAVE FAILED TO READ THE RECORD
1678  002734  034050                            .WORD  ERROR           ;ERROR HAS OCCURRED BUT SER FLAG SET
1679  002736  034262                            .WORD  EOTERR          ;ERROR OCCURRED BEYOND EOT
1680  002740  034350                            .WORD  BADTAP          ;TAPE POSITION HAS BEEN LOST
1681  002742  034416                            .WORD  TMFALT          ;TM HARDWARE FAILURE - COMMAND INITIATED
1682  002744  034464                            .WORD  TUFALT          ;TU HARDWARE FAILURE - COMMAND INITIATED
1683  002746  034540                            .WORD  TMFALB          ;TM HARDWARE FAILURE - TM INITIATED
1684  002750  034516                            .WORD  TUFALB          ;TU HARDWARE FAILURE
1685  002752  034540                            .WORD  MBFALT          ;MASS BUS ERROR - TM INITIATED
1686
1687
1688
1689
1690                                    ;
1691                                    ;SEQUENCE SELECT TABLE
1692                                    ;
```

```
1693
1694
1695  002754  020174                  SEQSEL:: .WORD  BRTSEQ
1696  002756  020302                           .WORD  UNTAPE
1697  002760  020452                           .WORD  FIELD1
1698  002762  020770                           .WORD  FIELD2
1699  002764  021454                           .WORD  FUNCT
1700
1701
1702                                    ;
1703                                    ; COMMANDS FOR FIELD1
1704                                    ;
1705
1706  002766  000061                  CANA1:   .WORD   WRTPE
1707  002770  000077                           .WORD   REDREV
1708  002772  000071                           .WORD   REDFWD
1709  002774  000000                           .WORD   0
1710
1711  002776  000063                  CANB1:   .WORD   WRTGCR
1712  003000  000077                           .WORD   REDREV
1713  003002  000071                           .WORD   REDFWD
1714
1715
1716                                    ;
1717                                    ; COMMANDS FOR FIELD2 AND FIELD3
1718                                    ;
1719
1720
1721  003004  000061                  CANA2:   .WORD   WRTPE
1722  003006  000015                           .WORD   WTMPE
1723  003010  000027                           .WORD   SPRVFL
1724  003012  000077                           .WORD   REDREV
1725  003014  000071                           .WORD   REDFWD
1726  003016  000025                           .WORD   SPFWFL
1727  003020  000000                           .WORD   0
1728
1729  003022  000063                  CANB2:   .WORD   WRTGCR
1730  003024  000017                           .WORD   WTMGCR
1731  003026  000027                           .WORD   SPRVFL
1732  003030  000077                           .WORD   REDREV
1733  003032  000071                           .WORD   REDFWD
1734  003034  000025                           .WORD   SPFWFL
1735
1736
1737                                    ;
1738                                    ;COMMANDS FOR FUNCTIONAL SEQUENCE
1739                                    ;
1740
1741  003036  021556                  FCNTBL: F.NOP                    ;NOOP TEST
1742  003040  021606                          F.REW                    ;REWIND TEST
1743  003042  021632                          F.SNS                    ;SENSE TO CHECK FOR BOT
1744  003044  023532                          F.ER1                    ;ERASE TO MOVE TAPE
1745  003046  021606                          F.REW                    ;REWIND
1746  003050  021632                          F.SNS
1747
1748                                    ;       WRITE READ TEST
```

```
1749
1750  003052  021672                    F.WPE                   ;WRITE PE
1751  003054  022010                    F.RDR1                  ;READ REVERSE
1752  003056  022020                    F.RDF1                  ;READ FORWARD
1753  003060  021606                    F.REW                   ;REWIND
1754  003062  021730                    F.WGCR                  ;WRITE GCR
1755  003064  022052                    F.RDR2                  ;READ REVERSE
1756  003066  022062                    F.RDF2                  ;READ FORWARD
1757
1758                            ;       WRITE CHECK FUNCTIONAL TESTS
1759
1760  003070  021606            F.WC:   F.REW                   ;REWIND
1761  003072  022114                    F.WC1                   ;WRITE A RECORD
1762  003074  022202                    F.WC2                   ;WRITE CHECK REV
1763  003076  022226                    F.WC3                   ;WRITE CHECK FWD
1764
1765                            ;       SPACING FUNCTIONAL TESTS
1766
1767  003100  022306            F.SP:   F.SP1                   ;REWIND
1768  003102  022330                    F.SP2                   ;FORMAT TAPE
1769  003104  022450            F.SPRV: F.SP3                   ;SPACE REVERSE
1770  003106  022474                    F.SP4                   ;READ REVERSE
1771  003110  022526                    F.SP5                   ;SPACE FORWARD
1772  003112  022560            F.SPND: F.SP6                   ;READ FORWARD
1773
1774                            ;       TAPE MARK WRITE/READ FUNCTIONAL TEST
1775
1776  003114  021606                    F.REW                   ;REWIND
1777  003116  022674                    F.TM1                   ;WRITE A TM
1778  003120  022770                    F.TM2                   ;SPACE REV
1779  003122  023014                    F.TM3                   ;SPACE FORWARD
1780
1781                            ;       TAPE MARK SPACE TEST
1782
1783  003124  023066            F.TMS:  F.TMS1                  ;REWIND TAPE
1784  003126  023102                    F.TMS2                  ;WRITE A TM
1785  003130  023110                    F.TMS3                  ;WRITE RECORDS
1786  003132  023204                    F.TMS4                  ;SPACE
1787
1788                            ;       VACUUM COLUMNS WORST CASE TEST
1789
1790  003134  021606            F.VC:   F.REW                   ;REWIND
1791  003136  023276                    F.VC1                   ;FORMAT TAPE
1792  003140  021606                    F.REW                   ;REWIND TAPE
1793  003142  023370                    F.VC2                   ;SPACE WITH INCREMENTING RECORD COUNT
1794  003144  021606                    F.REW                   ;REWIND
1795  003146  023440                    F.VC3                   ;SPACE WITH DECREMENTING RECORD COUNT
1796
1797                            ;       ERASE FUNCTIONAL TEST
1798
1799  003150  021606            F.ER:   F.REW                   ;REWIND TAPE
1800  003152  023532                    F.ER1                   ;ERASE 40'
1801  003154  021606                    F.REW                   ;REWIND TAPE
1802  003156  023612                    F.ER2                   ;ATTEMPT TO READ
1803  003160  023642                    F.ER3                   ;CHECK FOR NOT CAPABLE
1804
```

```
1805                                    ;       SHORT AND LONG RECORD TEST
1806
1807  003162  023722                    F.SL:   F.SH1                   ;REWIND
1808  003164  023752                    F.SHRT: F.SH2                   ;WRITE
1809  003166  024046                            F.SH3                   ;READ REV
1810  003170  024100                            F.SH4                   ;READ FORWARD
1811
1812                                    ;       LONG RECORDS
1813
1814  003172  024156                            F.LNG1                  ;REWIND
1815  003174  024202                    F.LONG: F.LNG2                  ;WRITE
1816  003176  024276                            F.LNG3                  ;READ REV
1817  003200  024330                            F.LNG4                  ;READ FWD
1818
1819                                    ;       CAPSTAN WORST CASE TEST
1820
1821  003202  021606                            F.REW                   ;REWIND TAPE
1822  003204  024434                            F.CP1                   ;MOVE TAPE 400 '
1823  003206  024472                            F.CP2                   ;DELAY
1824
1825  003210  024550                            F.END                   ;END OF FUNCTIONAL TEST
1826
1827
1828                                    ;
1829                                    ;RETRY SELECT TABLE
1830                                    ;
1831
1832
1833  003212  000000                    RTYSEQ: .WORD   0
1834  003214  024564                            .WORD   RTRY01
1835  003216  024642                            .WORD   RTRY02
1836  003220  024652                            .WORD   RTRY03
1837  003222  024702                            .WORD   RTRY04
1838  003224  025030                            .WORD   RTRY05
1839  003226  025064                            .WORD   RTRY06
1840
1841
1842
1843                                    ;
1844                                    ;EXTENDED SENSE TABLE
1845                                    ;
1846
1847  003230      000                   COMCOD: .BYTE   0
1848  003231      000                   INTCOD: .BYTE   0
1849  003232      000                   FAILCD: .BYTE   0
1850  003233      000                   RPFAIL: .BYTE   0
1851  003234      000                   RPATH:  .BYTE   0
1852  003235      000                   RSTAT:  .BYTE   0
1853  003236      000                   RCMLP:  .BYTE   0
1854  003237      000                   RAMT:   .BYTE   0
1855  003240      000                   RDON:   .BYTE   0
1856  003241      000                   RILL:   .BYTE   0
1857  003242      000                   RMK2:   .BYTE   0
1858  003243      000                   REND:   .BYTE   0
1859  003244      000                   RPSTA:  .BYTE   0
1860  003245      000                   RPOSTN: .BYTE   0
```

```
1861  003246  000                 RDATA:  .BYTE   0
1862  003247  000                 CRCWRD: .BYTE   0
1863  003250  000                 ECCCOR: .BYTE   0
1864  003251  000                 ECCSTA: .BYTE   0
1865  003252  000                 CH0TIE: .BYTE   0
1866  003253  000                 CH1TIE: .BYTE   0
1867  003254  000                 CH2TIE: .BYTE   0
1868  003255  000                 CH3TIE: .BYTE   0
1869  003256  000                 CH4TIE: .BYTE   0
1870  003257  000                 CH5TIE: .BYTE   0
1871  003260  000                 CH6TIE: .BYTE   0
1872  003261  000                 C47TIE: .BYTE   0
1873  003262  000                 CHPTIE: .BYTE   0
1874  003263  000                 RTIER:  .BYTE   0
1875  003264  000                 TAMT:   .BYTE   0
1876  003265  000                 PSTAT:  .BYTE   0
1877  003266  000                 PRDD:   .BYTE   0
1878  003267  000                 CASSTA: .BYTE   0
1879  003270  000                 CBUS:   .BYTE   0
1880  003271  000                 DBUS:   .BYTE   0
1881  003272  000                 WMCSTA: .BYTE   0
1882  003273  000                 TUSEL0: .BYTE   0
1883  003274  000                 TUSEL1: .BYTE   0
1884  003275  000                 WRTDAT: .BYTE   0
1885  003276  000                 BCNTLO: .BYTE   0
1886  003277  000                 BCNTHI: .BYTE   0
1887  003300  000                 PDCNLO: .BYTE   0
1888  003301  000                 PDCNHI: .BYTE   0
1889  003302  000                 ERCNLO: .BYTE   0
1890  003303  000                 ERCNHI: .BYTE   0
1891  003304  000                 DDRA:   .BYTE   0
1892  003305  000                 DDRB:   .BYTE   0
1893  003306  000                 WMCERR: .BYTE   0
1894  003307  000                 INSTA:  .BYTE   0
1895  003310  000                 MTA0:   .BYTE   0
1896  003311  000                 MTA1:   .BYTE   0
1897  003312  000                 MTA2:   .BYTE   0
1898  003313  000                 MTA3:   .BYTE   0
1899  003314  000                 MTA4:   .BYTE   0
1900  003315  000                 MTA5:   .BYTE   0
1901  003316  000                 RETCT:  .BYTE   0
1902  003317  000                 RETCT1: .BYTE   0
1903  003320  000                 TUX:    .BYTE   0
1904  003321  000                 XFRCTL: .BYTE   0
1905  003322  000                 XRETRY: .BYTE   0
1906  003323  000                 ENAON:  .BYTE   0
1907                                      .EVEN
1908                              ;
1909                              ;PATTERN GENERATION ROUTINES
1910                              ;
1911
1912  003324  003350              PATGEN:: .WORD  PATZER
1913  003326  003360                       .WORD  PATONE
1914  003330  003370                       .WORD  PATTWO
1915  003332  003400                       .WORD  PATTHE
1916  003334  003410                       .WORD  PATFOR
```

```
 1917  003336  003420                          .WORD   PATFIV
 1918  003340  003430                          .WORD   PATSIX
 1919  003342  003464                          .WORD   PATSVN
 1920  003344  003466                          .WORD   PATEGT
 1921  003346  003476                          .WORD   PATNIN
 1922
 1923
 1924
 1925                                  ;
 1926                                  ;PATTERNS TO BE GENERATED
 1927                                  ;
 1928
 1929  003350  000000                  PATZER: .WORD   0
 1930  003352  000000                          .WORD   0
 1931  003354  000000                          .WORD   0
 1932  003356  000000                          .WORD   0
 1933
 1934  003360  177777                  PATONE: .WORD   177777
 1935  003362  177777                          .WORD   177777
 1936  003364  177777                          .WORD   177777
 1937  003366  177777                          .WORD   177777
 1938
 1939  003370  000377                  PATTWO: .WORD   377
 1940  003372  000377                          .WORD   377
 1941  003374  000377                          .WORD   377
 1942  003376  000377                          .WORD   377
 1943
 1944  003400  177777                  PATTHE: .WORD   177777
 1945  003402  000000                          .WORD   0
 1946  003404  177777                          .WORD   177777
 1947  003406  000000                          .WORD   0
 1948
 1949  003410  177777                  PATFOR: .WORD   177777
 1950  003412  177777                          .WORD   177777
 1951  003414  000000                          .WORD   0
 1952  003416  000000                          .WORD   0
 1953
 1954  003420  000000                  PATFIV: .WORD   0
 1955  003422  177400                          .WORD   177400
 1956  003424  000000                          .WORD   0
 1957  003426  177400                          .WORD   177400
 1958
 1959  003430  000000                  PATSIX: .WORD   0
 1960  003432  000000                          .WORD   0
 1961  003434  000000                          .WORD   0
 1962  003436  000000                          .WORD   0
 1963  003440  000000                          .WORD   0
 1964  003442  000000                          .WORD   0
 1965  003444  000000                          .WORD   0
 1966  003446  000000                          .WORD   0
 1967  003450  000000                          .WORD   0
 1968  003452  000000                          .WORD   0
 1969  003454  000000                          .WORD   0
 1970  003456  000000                          .WORD   0
 1971  003460  000000                          .WORD   0
 1972  003462  000000                          .WORD   0
```

```
 1973
 1974  003464  000400                PATSVN: .WORD   400
 1975
 1976
 1977  003466  000000                PATEG~: .WORD   0
 1978  003470  000000                        .WORD   0
 1979  003472  000000                        .WORD   0
 1980  003474  000000                        .WORD   0
 1981
 1982
 1983  003476  000000                PATNIN: .WORD   0
 1984  003500  000000                        .WORD   0
 1985  003502  000000                        .WORD   0
 1986  003504  000000                        .WORD   0
 1987
 1988
 1989
 1999
 2000
```

```
                                .SBTTL  GLOBAL TEXT SECTION

                                        .NLIST  BEX

                                ;++
                                ; THE GLOBAL TEXT SECTION CONTAINS FORMAT STATEMENTS,
                                ; MESSAGES, AND ASCII INFORMATION THAT ARE USED IN
                                ; MORE THAN ONE TEST.
                                ;--

                                ;
                                ;THE FOLLOWING MESSAGES ARE FOR THE HARDWARE P-TABLE
                                ;


003506  044122  040440  042104  MSG1::  .ASCIZ  /RH ADDRESS/
003521     126  041505  047524  MSG2::  .ASCIZ  /VECTOR ADDRESS/
003540  046524  034067  021440  MSG3::  .ASCIZ  /TM78 #/
003547     124  033525  020070  MSG4::  .ASCIZ  /TU78 #/



                                ;
                                ;THE FOLLOWING MESSAGES ARE FOR THE SOFTWARE P-TABLE
                                ;


003556  051102  052125  051525  MSG5::  .ASCIZ  /BRUTUS OPTION/
003574  040503  047126  042105  MSG6::  .ASCIZ  /CANNED SEQUENCE # (1-4)/



                                ;
                                ;THE FOLLOWING MESSAGES ARE FOR THE SOFTWARE P-TABLE AND BRUTUS
                                ;


003624  052123  052101  020123  MSG7:.  .ASCIZ  /STATS PRINTED AT EOT/
003651     102  052522  052524  MSG9::  .ASCIZ  /BRUTUS TO REPORT ERRORS/
003701     123  040524  051524  MSG10:: .ASCIZ  /STATS PRINTED AT EOP/



                                ;
                                ;THE FOLLOWING MESSAGES ARE FOR THE BRUTUS WITH ERRORS OPTION
                                ;


003726  040522  042116  046517  MSG11:: .ASCIZ  /RANDOM RECORD LENGTH/
003753     122  052105  044522  MSG12:: .ASCIZ  /RETRIES/
```

```
2065  003763    043  047440  020106  MSG13:: .ASCIZ  /# OF BYTES IN A RECORD (1,65535)/
2066  004024 040520  052124  051105  MSG14:: .ASCIZ  /PATTERN NUMBER (0-9)/
2067  004051    043  047440  020106  MSG15:: .ASCIZ  /# OF RECORDS IN A FILE (1,65535)/
2068  004112 040504  040524  041440  MSG17:: .ASCIZ  /DATA COMPARE/
2069  004127    110  053517  046440  MSG19:: .ASCIZ  /HOW MANY CMDS IN THE STRING  (1-6) /
2070  004173    122  050105  052111  MSG20:: .ASCIZ  /REPITITION OF CMD (1,65535)/
2071  004227    105  052116  051105  MSG21:: .ASCIZ  /ENTER COMMAND/
2072  004245    045  022516  020101  INPATT: .ASCIZ  /%N%A INPUT 14 WORDS OF YOUR OWN PATTERN/
2073  004315    077     000          MSG8::  .ASCIZ  /?/
2074
2075        004320                               .EVEN
2076
2077
2078
2084
2091
2092
```

```
                                .SBTTL  GLOBAL ERROR REPORT SECTION

                                ;++
                                ; THE GLOBAL ERROR REPORT SECTION CONTAINS THE PRINTB AND PRINTX CALLS
                                ; THAT ARE USED IN MORE THAN ONE TEST.  IT ALSO INCLUDES THE ASCII MESSAGES
                                ; THAT ARE USED BY THE PRINTB AND PRINTX CALLS..
                                ;--

                                ;
                                ; ERROR MESSAGES USED THROUGH OUT TEST MODULES
                                ;

004320                                  BGNMSG  ERRMS1
004320  022737  000004  002206          CMP     #4,CANSEQ               ;FUNCTIONAL SEQUENCE ?
004326  001016                          BNE     1$                      ;NO
004330                                  PUSH    R2
004332  013702  002442                  MOV     MESNUM,R2
004336                                  PRINTB  #FMTFCT,MESADR(R2)
004362                                  POP     R2
004364                          1$:     PRINTB  #FORM01,RHADDR,TM78N,TU78N
004420                                  PRINTB  #FORM23,HOURS,MINUTE
004450                                  PRINTB  #FORM02,RHADD(R1),UNSLCT(R1),CMDADR(R1)
004504                                  PRINTB  #FORM03,CMMAND
004530  004737  011404                  JSR     PC,HEDER
004534                                  ENDMSG

004536                                  BGNMSG  ERRMS2
004536  022737  000004  002206          CMP     #4,CANSEQ               ;FUNCTIONAL SEQ ?
004544  001016                          BNE     2$                      ;NO
004546                                  PUSH    R2
004550  013702  002442                  MOV     MESNUM,R2               ;GET WHICH TEST
004554                                  PRINTB  #FMTFCT,MESADR(R2)      ;PRINT FAILING TEST MESSAAGE
004600                                  POP     R2
004602  022737  000032  002526  2$:     CMP     #32,ICCODE      ;SEE IF FAULT B
004610  101015                          BHI     5$              ;BRANCH IF NOT
004612                                  PRINTB  #FORM27,RHADDR,TM78N
004642  000416                          BR      6$
004644                          5$:     PRINTB  #FORM04,RHADDR,TM78N,TU78N
004700                          6$:     PRINTB  #FORM23,HOURS,MINUTE
004730  004737  011404                  JSR     PC,HEDER
004734                                  ENDMSG

004736                                  BGNMSG  ERRMS3
004736  022737  000004  002206          CMP     #4,CANSEQ               ;FUNCTIONAL SEQUENCE
004744  001016                          BNE     10$                     ;NO
004746                                  PUSH    R2                      ;SAVE R2
004750  013702  014670                  MOV     MESADR,R2
004754                                  PRINTB  #FMTFCT,MESADR(R2)      ;PRINT FAILING TEST
005000                                  POP     R2
005002  004737  011640          10$:    JSR     PC,HEDER3
005006                                  ENDMSG
2161
```

```
2167
2174                                    ;
2175                                    ; FORMAT STATEMENTS USED IN PRINTF CALLS IN THE INIT CODE
2176                                    ;
2177
2178
2179
2180  005010  047045  040445  047503  RANDOM: .ASCIZ  /%N%ACONSECUTIVE WRITES FOLLOWED BY CONSECUTIVE READS WILL FAIL DATA COM
2181  005126  047045  040445  052040  SERLNB: .ASCII  /%N%A THE SERIAL # FOR TU# %D1%A ON TM78# %D1%A ON RHADD %O6/
2182  005221     045  022516  020101          .ASCIZ  /%N%A IS %T/
2183  005234  047045  040445  052502  ERRBUF: .ASCIZ  /%N%ABUFFER REQUESTED TOO LARGE SUBSTITUTED LARGEST AVAILABLE %D5/
2184  005335     045  022516  044501  EMSG1:  .ASCIZ  /%N%AINSUFFICIENT MEMORY AVAILABLE DIAGNOSTIC CAN NOT RUN/
2185  005426  047045  040445  044124  EMSG2:  .ASCII  /%N%ATHIS TU# %D1%A  ON TM78# %D1%A  ON RHADD %O6%/
2186  005507     045  022516  044501          .ASCIZ  /%N%AIS NOT A TM78 TYPE DRIVE./
2187  005545     045  022516  052101  EMSG3:  .ASCIZ  /%N%ATOO MANY UNITS TO BE TESTED UNDER BRUTUS, ONLY ONE ALLOWED/
2188  005644  047045  040445  040525  EMSG4:  .ASCIZ  /%N%AUAM FLAG IS SET. MUST BE CLEARED IN ORDER TO RUN BRUTUS OPTION/
2189  005747     045  022516  052101  EMSG5:  .ASCII  /%N%ATHIS TU# %D1%A  ON TM78# %D1%A  ON RHADD %O6/
2190  006027     045  022516  042101          .ASCIZ  /%N%ADID NOT RESPOND TO SENSE CMD./
2191  006071     045  022516  052101  EMSG6:  .ASCIZ  /%N%ATOO MANY UNITS TO TEST UNKNOWN TAPE, ONLY ALLOWED ONE/
2192  006163     045  022516  052101  EMSG7:  .ASCII  /%N%ATHIS TU# %D1%A  ON TM78# %D1%A  ON RHADD %O6/
2193  006243     045  022516  044101          .ASCIZ  /%N%AHAS GENERATED %O6%A  INTRPT./
2194  006304  047045  040445  044124  EMSG10: .ASCIZ  /%N%ATHIS TU#  %D1%A ON TM78#  %D1%A ON RHADD  %O6%A  IS NON EXISTENT./
2195  006412  047045  040445  044124  EMSG11: .ASCII  /%N%ATHIS TM78# %D1%A ON RHADD %O6%A IS NOT READY/
2196  006472  047045  040445  042522          .ASCIZ  /%N%AREG #52 = %O6%N/
2197                                  .EVEN
2198
2199
2200                                    ;
2201                                    ; FORMAT STATEMENTS USED IN ERROR MESSAGES
2202                                    ;
2203
2204
2205  006516  040445  044122  040440  FORMC1: .ASCIZ  /%ARH ADDRESS  %O6%A  TM78#  %D1%A  TU78#  %D1%N/
2206  006576  040445  051503  020061  FORM02: .ASCIZ  /%ACS1  %O6%A    CS2  %O6%A    CMDADR   %O6%N/
2207  006653     045  042501  051122  FORM03: .ASCIZ  /%AERROR OCCURRED WHILE EXECUTING COMMAND  %O2%N/
2208  006733     045  051101  020110  FORM04: .ASCIZ  /%ARH ADDRESS  %O6%A  TM78#  %D1%A  TU78#  %D1%N/
2209  007013     045  044501  052116  FORM05: .ASCIZ  /%AINTERRUPT CODE %O2%A FAILURE CODE  %O2%N/
2210  007066  040445  040502  020104  FORM06: .ASCIZ  /%ABAD BYTE #  %D5%A  DATA EXPECTED  %B8%A  ACTUAL  %B8%N/
2211  007157     045  022516  052501  FORM08: .ASCIZ  /%N%AUNIT DROPPED%N/
2212  007202  040445  042522  047503  FORM07: .ASCIZ  /%ARECORD #  %D5%A  FILE #  %D5%N/
2213  007243     045  050101  052101  FORM09: .ASCIZ  /%APATTERN #  %D2%A  RECORD LENGTH  %D5%N/
2214  007314  040445  05c516  041115  FORM10: .ASCIZ  /%ANUMBER OF BYTES BAD IN A RECORD  %D5%N/
2215  007365     045  020101  047503  FORM11: .ASCIZ  /%A COMMAND CODE %O3%A INTERRUPT CODE %O3%A FAILURE CODE %O3%N/
2216  007463     045  041501  030110  FORM12: .ASCIZ  /%ACH0TIE %O3%A RPFAIL %O3%A RAMT   %O3%A CASSTA %O3%A MTA0   %O3%A WMCS
2217  007603     045  041501  030510  FORM13: .ASCIZ  /%ACH1TIE %O3%A RPATH  %O3%A RDON   %O3%A CBUS   %O3%A MTA1   %O3%A WRTD
2218  007723     045  041501  031110  FORM14: .ASCIZ  /%ACH2TIE %O3%A RSTAT  %O3%A RILL   %O3%A DBUS   %O3%A MTA2   %O3%A DDRA
2219  010043     045  041501  031510  FORM15: .ASCIZ  /%ACH3TIE %O3%A RCMLP  %O3%A RMK2   %O3%A TUSEL0 %O3%A MTA3   %O3%A DDRB
2220  010163     045  041501  032110  FORM16: .ASCIZ  /%ACH4TIE %O3%A CRCWRD %O3%A REND   %O3%A TUSEL1 %O3%A MTA4   %O3%A WMCE
2221  010303     045  041501  032510  FORM17: .ASCIZ  /%ACH5TIE %O3%A ECCCOR %O3%A RPSTA  %O3%A TAMT   %O3%A MTA5   %O3%A INTS
2222  010423     045  041501  033110  FORM18: .ASCIZ  /%ACH6TIE %O3%A ECCSTA %O3%A RPOSTN %O3%A PSTAT  %O3%A RETCT  %O3%A RETC
2223  010543     045  041501  033510  FORM19: .ASCIZ  /%ACH7TIE %O3%A RTIER  %O3%A RDATA  %O3%A PRDD   %O3%A TUX    %O3%A XFRC
2224  010663     045  041501  050110  FORM20: .ASCIZ  /%ACHPTIE %O3%A XRETRY %O3%A ENAON  %O3%N/
2225  010734  040445  042522  042101  FORM21: .ASCIZ  /%AREAD EXTENDED SENSE FAILED%N/
2226  010773     045  022516  051101  FORM22: .ASCIZ  /%N%ARETRY SUCCESSFUL%N/
2227  011022  040445  046105  051501  FORM23: .ASCIZ  /%AELASPED TIME %D3%A:%Z2%N/
2228  011055     045  053501  051117  FORM24: .ASCIZ  /%AWORD COUNT  %O6%N/
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2229  011101  045  047101  020117  FORM25: .ASCIZ  /%ANO L CLOCK AVAILABLE%N/
2230  011132  040445  047520  042527  FORM26: .ASCIZ  /%APOWER FAILURE%N/
2231  011154  040445  044122  040440  FORM27: .ASCIZ  /%ARH ADDRESS %O6%A TM78# %D1%N/
2232  011213  045  022516  052101  FORM28: .ASCIZ  /%N%ATAPE IS POSITIONED BEYOND EOT MARKER%N/
2233  011266  040445  054502  041524  FORM29: .ASCIZ  /%ABYTCNT  %O6%A  PADCNT  %O6%A  ERRCNT  %O6%N/
2234  011344  040445  043133  047125  FMTFCT:  .ASCIZ /%AFUNCTIONAL SEQUENCE -- %T%N/
2235  011404  .EVEN
2236
2237  011404  005037  002606  HEDER:  CLR     SENFLG          ;SET UP EXTENDED SENSE FLAG
2238  011410  005737  002542          TST     TIMOUT          ;SEE IF UNIT TIMED OUT
2239  011414  001110                  BNE     1$              ;BRANCH IF SO
2240  011416  005737  002206          TST     CANSEQ          ;SEE IF CANNED SEQUENCE
2241  011422  001420                  BEQ     4$              ;BRANCH IF NOT
2242  011424  022737  000007  002452  CMP     #REWIND,CMMAND
2243  011432  001414                  BEQ     4$
2244  011434                          PRINTB  #FORM07,RECORD,FILENM
2245  011464                  4$:     PRINTB  #FORM05,ICCODE,EXTERR
2246  011514  022737  000001  002206  CMP     #1,CANSEQ       ;UNKNOWN TAPE ?
2247  011522  001420                  BEQ     2$              ;DON'T PRINT PATTERN OR REC LENGTH
2248  011524  022737  000060  002452  CMP     #60,CMMAND
2249  011532  101014                  BHI     2$
2250  011534                          PRINTB  #FORM09,PATTRN,CHAREC
2251  011564  005737  002524  2$:     TST     EXTDSN                  ;SEE IF EXTENDED SENSE UPDATED
2252  011570  001422                  BEQ     1$                      ;BRANCH IF NO
2253  011572  005037  002524          CLR     EXTDSN                  ;DO EXTEND READ
2254  011576  004737  035704          JSR     PC,EXREAD
2255  011602  005737  002606          TST     SENFLG                  ;SEE IF EXTEND SENSE COMPLETE
2256  011606  001411                  BEQ     3$                      ;BRANCH IF YES
2257  011610                          PRINTB  #FORM21
2258  011630  000402                  BR      1$                      ;SKIP EXTEND SENSE PRINTOUT
2259  011632  004737  012164  3$:     JSR     PC,EXTSEN
2260  011636  000207          1$:     RTS     PC
2261
2262  011640                  HEDER3: PRINTB  #FORM01,RHADDR,TM78N,TU78N
2263  011674                          PRINTB  #FORM23,HOURS,MINUTE
2264  011724                          PRINTB  #FORM02,RHADD(R1),UNSLCT(R1),CMDADR(R1)
2265  011760                          PRINTB  #FORM24,WRDCNT(R1)
2266  012004                          PRINTB  #FORM03,CMMAND
2267  012030  022737  000001  002206  CMP     #1,CANSEQ               ;UNKNOWN TAPE ?
2268  012036  001414                  BEQ     2$                      ;DON'T PRINT PATTERN OR REC LENGTH
2269  012040                          PRINTB  #FORM09,PATTRN,CHAREC
2270  012070  005737  002206  2$:     TST     CANSEQ
2271  012074  001414                  BEQ     1$
2272  012076                          PRINTB  #FORM07,RECORD,FILENM
2273  012126                  1$:     PRINTB  #FORM06,FIRBYT,EXPECT,ACTUAL
2274  012162  000207                  RTS     PC
2275
2276  012164                  EXTSEN: PRINTX  #FORM11,<B,COMCOD>,<B,INTCOD>,<B,FAILCD>
2277  012226                          PRINTX  #FORM12,<B,CHOTIE>,<B,RPFAIL>,<B,RAMT>,<B,CASSTA>,<B,MTA0>,<B,WMCSTA>
2278  012312                          PRINTX  #FORM13,<B,CH1TIE>,<B,RPATH>,<B,RDON>,<B,CBUS>,<B,MTA1>,<B,WRTDAT>
2279  012376                          PRINTX  #FORM14,<B,CH2TIE>,<B,RSTAT>,<B,RILL>,<B,DBUS>,<B,MTA2>,<B,DDRA>
2280  012462                          PRINTX  #FORM15,<B,CH3TIE>,<B,RCMLP>,<B,RMK2>,<B,TUSEL0>,<B,MTA3>,<B,DDRB>
2281  012546                          PRINTX  #FORM16,<B,CH4TIE>,<B,CRCWRD>,<B,REND>,<B,TUSEL1>,<B,MTA4>,<B,WMCERR>
2282  012632                          PRINTX  #FORM17,<B,CH5TIE>,<B,ECCCOR>,<B,RPSTA>,<B,TAMT>,<B,MTA5>,<B,INSTA>
2283  012716                          PRINTX  #FORM18,<B,CH6TIE>,<B,ECCSTA>,<B,RPOSTN>,<B,PSTAT>,<B,RETCT>,<B,RETCT1>
2284  013002                          PRINTX  #FORM19,<B,CH7TIE>,<B,RTIER>,<B,RDATA>,<B,PRDD>,<B,TUX>,<B,XFRCTL>
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2285  013066                          PRINTX  #FORM20,<B,CHPTIE>,<B,XRETRY>,<B,ENAON>
2286  013130                          PRINTX  #FORM29,BCNTLO,PDCNLO,ERCNLO
2287  013164  000207                 RTS     PC
2288
2289
2290
2291                                  ;
2292                                  ; ERROR MESSAGES FOR TEST MODULES
2293                                  ;
2294
2295
2296  013166  050117  051105  052101  ERM001:: .ASCIZ /OPERATION TIMED OUT/
2297  013212  047111  042524  051122  ERM002:: .ASCIZ /INTERRUPT FROM NON-EXISTENT UNIT/
2298  013253     127  047522  042524  ERM003:: .ASCIZ /WROTE ON TAPE BUT NOT PERFECTLY, RETRY/
2299  013322  047125  042504  044506  ERM004:: .ASCIZ /UNDEFINED INTERRUPT CODE RECEIVED/
2300  013364  050117  051105  052101  ERM005:: .ASCIZ /OPERATION COMPLETED BUT EXTENDED SENSE HAS STATUS OF INTEREST/
2301  013462  047125  054105  042520  ERM006:: .ASCIZ /UNEXPECTED TAPE MARK FOUND/
2302  013515     125  042516  050130  ERM007:: .ASCIZ /UNEXPECTED BEGINNING OF TAPE/
2303  013552  047125  054105  042520  ERM009:: .ASCIZ /UNEXPECTED LOGICAL EOT/
2304  013601     124  050101  020105  ERM010:: .ASCIZ /TAPE PROTECTED CAN'T WRITE/
2305  013634  052524  047440  020116  ERM011:: .ASCIZ /TU ON LINE, BUT NOT READY/
2306  013666  052524  047440  020116  ERM012:: .ASCIZ /TU ON LINE, WRONG PORT/
2307  013715     124  020125  051511  ERM013:: .ASCIZ /TU IS OFFLINE/
2308  013733     124  020125  047504  ERM014:: .ASCIZ /TU DOES NOT EXIST OR POWER OFF/
2309  013772  046102  047101  020113  ERM015:: .ASCIZ /BLANK TAPE/
2310  014005     125  044516  020124  ERM016:: .ASCIZ /UNIT JUST CAME ON LINE/
2311  014034  047514  043516  051040  ERM017:: .ASCIZ /LONG RECORD/
2312  014050  044123  051117  020124  ERM018:: .ASCIZ /SHORT RECORD/
2313  014065     122  050105  040505  ERM019:: .ASCIZ /REPEAT OPERATION/
2314  014106  042522  042522  042101  ERM020:: .ASCIZ /REREAD IN OPPOSITE DIRECTION/
2315  014143     125  051116  040505  ERM021:: .ASCIZ /UNREADABLE RECORD/
2316  014165     123  040524  052524  ERM022:: .ASCIZ /STATUS ERROR/
2317  014202  051127  052111  020105  ERM023:: .ASCIZ /WRITE ERROR BEYOND EOT/
2318  014231     102  042101  052040  ERM024:: .ASCIZ /BAD TAPE, POSITIONED LOST/
2319  014263     124  020115  040506  ERM025:: .ASCIZ /TM FAULT A/
2320  014276  052524  043040  052501  ERM026:: .ASCIZ /TU FAULT A/
2321  014311     124  020115  040506  ERM027:: .ASCIZ /TM FAULT B/
2322  014324  046524  051040  040505  ERM028:: .ASCIZ /TM READY DOESN'T SET/
2323  014351     124  020125  040506  ERM029:: .ASCIZ /TU FAULT B/
2324  014364  041115  043040  052501  ERM030:: .ASCIZ /MB FAULT/
2325  014375     115  051501  041123  ERM031:: .ASCIZ /MASSBUS STATUS ERROR/
2326  014422  040515  051523  052502  ERM032:: .ASCIZ /MASSBUS TERMINATION OF DATA TRANSFER/
2327  014467     104  052101  020101  ERM033:: .ASCIZ /DATA COMPARE ERROR/
2328  014512  040510  042122  053440  ERM034:: .ASCIZ /HARD WRITE ERROR/
2329  014533     115  051501  041123  ERM035:: .ASCIZ /MASSBUS TERMINATION OF NON DATA TRANSFER/
2330  014604  052524  034067  047040  ERM036:: .ASCIZ /TU78 NOT AT BOT AFTER REWIND/
2331  014641     105  040522  042523  ERM037:: .ASCIZ /ERASE FUNCTION FAILED/
2332        014670                          .EVEN
2333                                  ;       FUNCTIONAL SEQUENCE ERROR HEADER MESSAGES
2334  014670  014716                MESADR: FM.NOP
2335  014672  014731                        FM.REW
2336  014674  014746                        FM.WR
2337  014676  014767                        FM.WCK
2338  014700  015011                        FM.SP
2339  014702  015025                        FM.TM
2340  014704  015060                        FM.TS
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2341  014706  015106                          FM.WV
2342  014710  015145                          FM.E
2343  014712  015172                          FM.SL
2344  014714  015226                          FM.WC
2345
2346  014716  047516  050117  052040  FM.NOP:  .ASCIZ/NOOP TEST]/
2347  014731     122  053505  047111  FM.REW:  .ASCIZ/REWIND TEST]/
2348  014746  051127  052111  026505  FM.WR:   .ASCIZ/WRITE-READ TEST]/
2349  014767     127  044522  042524  FM.WCK:  .ASCIZ/WRITE CHECK TEST]/
2350  015011     123  040520  042503  FM.SP:   .ASCIZ/SPACE TEST]/
2351  015025     124  050101  020105  FM.TM:   .ASCIZ/TAPE MARK WRITE-READ TEST]/
2352  015060  040524  042520  046440  FM.TS:   .ASCIZ/TAPE MARK SPACE TEST]/
2353  015106  047527  051522  020124  FM.WV:   .ASCIZ/WORST CASE VACUUM COLUMN TEST]/
2354  015145     105  040522  042523  FM.E:    .ASCIZ/ERASE FUNCTION TEST]/
2355  015172  044123  051117  020124  FM.SL:  .ASCIZ/SHORT AND LONG RECORD TEST]/
2356  015226  047527  051522  020124  FM.WC:   .ASCIZ/WORST CASE CAPSTAN TEST]/
2357          015260                          .EVEN
2358                                          .LIST   BEX
2359
```

```
                        .SBTTL  GLOBAL SUBROUTINES SECTION

                        ;++
                        ; THE GLOBAL SUBROUTINES SECTION CONTAINS THE SUBROUTINES
                        ; THAT ARE USED IN MORE THAN ONE TEST.
                        ;--

                        ;*************************************
                        ;
                        ;       GLOBAL MACROS
                        ;
                        ;*************************************


                                .MACRO  RETURN

                                RTS     PC

                                .ENDM

                                .MACRO  CALL    XXX

                                JSR     PC,XXX

                                .ENDM

                                .MACRO  PUSH    ARG
                                .IRP    X,<ARG>
                                MOV     X,-(SP)         ;STORE X ON STACK
                                .ENDM
                                .ENDM

                                .MACRO  POP     ARG
                                .IRP    X,<ARG>
                                MOV     (SP)+,X         ;RESTORE X FROM STACK
                                .ENDM
                                .ENDM
                        ;--

                        ;*****************************************************************
                        ;
                        ;  SUBROUTINES USED IN THE INIT CODE ONLY
                        ;
                        ;*****************************************************************


                        ;*
                        ;*MODULE 2.1 (BUILDS HARDWARE P-TABLES AND STATISTIC TABLES)
                        ;*
                        ;*BEGINROUTINE (MOD = 2.1 GET HARDWARE P-TABLES /BLDTBL/)
                        ;*  TABLE COUNTER = 0
                        ;*  STORE NUMBER_OF_UNITS INTO UNIT#
                        ;*  DO WHILE UNIT # IS GREATER THAN ZERO
                        ;*  :  GET HARDWARE P-TABLE     (THIS IS A SUPERVISOR CALL AND WILL SET
```

```
                        ;*  :                                   OR RESET BRANCH_COMPLETE.  THE HARDWARE
                        ;*  :                                   TABLE WAS CREATED IN THE INPUT MODULE 1.0)
                        ;*  :  IF BRANCH_COMPLETE IS TRUE
                        ;*  :  :  THEN
                        ;*  :  :    RELOCATE HARDWARE P-TABLE
                        ;*  :  :    BUILD SPACE FOR A STATISTIC TABLE
                        ;*  :  :    STORE UNIT # IN P-TABLE
                        ;*  :  :    SUBTRACT TABLE LENGTH FROM MEMORY
                        ;*  :  :    TABLE COUNTER = TABLE COUNTER +1
                        ;*  :  ENDIF
                        ;*  :  DECREMENT UNIT#
                        ;*  ENDDO
                        ;*  CALCULATE MAXIMUM MEMORY AVAILABLE
                        ;*  CALCULATE START OF MEMORY
                        ;*  IF UNKNOWN TAPE OPTION
                        ;*  :  THEN
                        ;*  :    IF TABLE_COUNT GREATER THAN 1
                        ;*  :    :  THEN
                        ;*  :    :    SET ERROR FLAG
                        ;*  :    ENDIF
                        ;*  ENDIF
                        ;*  DIVIDE MEMORY IN HALF
                        ;*  CALCULATE START OF SECOND HALF OF MEMORY
                        ;*ENDROUTINE


015260                  BLDTBL: PUSH    <R1,R2,R3,R4,R5,R10>
015276  005037  002424          CLR     R10             ;CLEAR TEMP REGISTER
015302  005005                  CLR     R5              ;
015304  005037  002344          CLR     TBLCNT          ;RESET TABLE COUNTER
015310  013701  002012          MOV     L$UNIT,R1       ;TEMPORARY STORAGE OF # OF UNITS
015314  013737  002354  002330  MOV     VRMADD,PTBLAD   ;PTBLAD CONTAINS STARTING ADRESS OF P-TABLES
015322  013703  002330          MOV     PTBLAD,R3       ;TEMPORARY STORAGE OF FREE MEMORY
015326                  1$:     GPHARD  R5,R2           ;FIND LOCATION OF P-TABLE
015334                          BNCOMPLETE 3$           ;UNIT NOT FOUND
015336  012704  000004          MOV     #4,R4           ;COUNTER
015342  012223                  2$:     MOV     (R2)+,(R3)+     ;RELOCATE HARDWARE P-TABLE
015344  005304                  DEC     R4              ;DECREMENT COUNTER
015346  001375                  BNE     2$              ;LOOP UNTIL FULL TABLE IS MOVED
015350  010523                  MOV     R5,(R3)+        ;STORE SUPERVISOR UNIT NUMBER IN UNIT TABLE
015352  063703  002342          ADD     STTBLH,R3       ;GET START OF NEXT TABLE
015356  006237  002346          ASR     TBLNTH
015362  163737  002346  002312  SUB     TBLNTH,BUFSIZ   ;UPDATE AVAILABLE MEMORY
015370  006337  002346          ASL     TBLNTH
015374  063737  002346  002354  ADD     TBLNTH,VRMADD   ;UPDATE OF WHERE FREE MEMORY BEGINS
015402  005737  002424          TST     R10             ;HAVE WE BEEN HERE YET
015406  001003                  BNE     6$              ;YES , GET NEXT TABLE #
015410  005237  002424          INC     R10             ;NO , SET FOR GCR TABLE
015414  000744                  BR      1$              ;LOOP
015416  005037  002424          6$:     CLR     R10             ;SET FOR PE TABLE
015422  005237  002344          INC     TBLCNT          ;UPDATE # OF TABLES
015426  005205                  INC     R5              ;GET NEXT LOGICAL UNIT
015430  000402                  BR      5$
015432  005205                  3$:     INC     R5              ;GET NEXT UNIT
015434  000734                  BR      1$              ;
```

```
2521  015436  005301                    5$:     DEC     R1              ;GET NEXT UNIT
2522  015440  001332                            BNE     1$              ;AM I DONE?
2523  015442  022737  000001  002206            CMP     #1,CANSEQ       ;CHECK FOR UNKNOWN TAPE OPTION
2524  015450  001007                            BNE     4$              ;BRANCH IF NOT CHOSEN
2525  015452  022737  000001  002344            CMP     #1,TBLCNT       ;SEE IF ONLY ONE UNIT CHOSEN
2526  015460  001403                            BEQ     4$              ;BRANCH IF YES
2527  015462  012737  000006  002320            MOV     #6,ERRFLG       ;SET ERROR FLAG
2528  015470  042737  000001  002312    4$:     BIC     #1,BUFSIZ       ;MAKE EVEN BUFFER
2529  015476  013737  002354  002332            MOV     VRMADD,REDBUF
2530  015504  063737  002312  002332            ADD     BUFSIZ,REDBUF   ;REDBUF CONTAINS STARTING ADDRESS OF READ BUFFER
2531  015512                                    POP     <R10,R5,R4,R3,R2,R1>    ;
2532  015530  000207                            RTS     PC              ;GO HOME
2533
2534
2535
2536                                    ;*
2537                                    ;*MODULE 2.2 (CHECKS TO SEE IF DEVICE EXISTS)
2538                                    ;*
2539                                    ;*BEGINROUTINE (MOD = 2.2 /DEVCHK/)
2540                                    ;*  SET UP UNIT TABLE
2541                                    ;*  DO FOR 1 TO TABLE_COUNT OR ERROR_FLAG SET
2542                                    ;*  :  GET CORRECT CAS REGISTER FOR UNIT
2543                                    ;*  :  SET UP TIMEOUT_COUNTER
2544                                    ;*  :  SET INTERRUPT VECTOR UP
2545                                    ;*  :  GENERATE RH VECTOR TABLE
2546                                    ;*  :  STORE TM UNIT # IN MEMORY LOCATION
2547                                    ;*  :  STORE TM UNIT# IN UNIT SELECT LOCATION IN CAS
2548                                    ;*  :  FIND NON DATA TRANSFER COMMAND LOCATION FOR SPECIFIED TAPE UNIT#.
2549                                    ;*  :  CLEAR ATTENTION SUMMARY REG
2550                                    ;*  :  ENABLE INTERRUPTS
2551                                    ;*  :  LOAD TU SENSE COMMAND
2552                                    ;*  :  SEE IF NON-EXISTENT DRIVE
2553                                    ;*  :  LOWER PRIORITY
2554                                    ;*  :  DO UNTIL ERROR_FLAG SET OR ATTENTION BIT SET AND CORRECT ATTENTION ADDRESS SET
2555                                    ;*  :  :  INCREMENT TIMEOUT_COUNTER
2556                                    ;*  :  :  IF TIMEOUT_COUNTER EQUALS MAXIMUM TIME
2557                                    ;*  :  :  :  THEN-SET ERROR_FLAG
2558                                    ;*  :  :  ENDIF
2559                                    ;*  :  ENDDO
2560                                    ;*  :  IF ERROR_FLAG NOT SET
2561                                    ;*  :  :  THEN-
2562                                    ;*  :  :     IF DONE NOT SET
2563                                    ;*  :  :     :  THEN-SET ERROR FLAG
2564                                    ;*  :  :     ENDIF
2565                                    ;*  :  ENDIF
2566                                    ;*  :  IF ERROR_FLAG NOT SET
2567                                    ;*  :  :  THEN
2568                                    ;*  :  :  IF ILLEGAL DRIVE TYPE
2569                                    ;*  :  :  :  THEN-SET ERROR_FLAG
2570                                    ;*  :  :  ENDIF
2571                                    ;*  :  ENDIF
2572                                    ;*  :  IF ERROR_FLAG NOT SET
2573                                    ;*  :  :  THEN-IF START FLAG SET
2574                                    ;*  :  :        :  THEN
2575                                    ;*  :  :        :     PRINT SERIAL NUMBER
2576                                    ;*  :  :        ENDIF
```

```
                                        ;*  :  ENDIF
                                        ;*  ENDDO
                                        ;*  CLEAR ATTENTION SUMMARY REGISTER
                                        ;*ENDROUTINE



015532                                  DEVCHK: PUSH    <R1,R2,R3,R4,R5>
015544  012737  000001  002352                  MOV     #1,TBLNUM       ;SET UP COUNTER
015552  012737  036156  002376                  MOV     #INSERV,INTVEC  ;PUT INTERRUPT SERVICE ROUTINE INTO INTVEC
015560  013703  002352                  1$:     MOV     TBLNUM,R3       ;GET TABLE NUMBER
015564  005303                                  DEC     R3              ;FIX TABLE OFFSET
015566  006303                                  ASL     R3              ;
015570  012737  000000  002316                  MOV     #RHADD,DISPLC   ;GET RH ADDRESS
015576  004737  036076                          JSR     PC,TBLDIS       ;
015602  017763  164510  002400                  MOV     @DISPLC,RHADD1(R3)  ;PUT ADDRESS INTO ADDRESS TABLE
015610  013701  002316                          MOV     DISPLC,R1       ;GET PTABLE ADDRESS
015614  016103  000002                          MOV     RHVEC(R1),R3    ;
015620  062703  000002                          ADD     #2,R3           ;GET NEXT LOCATION AFTER RHVEC
015624  005013                                  CLR     (R3)            ;CLEAR THAT LOCATION
015626  005003                                  CLR     R3              ;SET UP TIME OUT COUNTER
015630                                          SETVEC  RHVEC(R1),INTVEC,PRIRTY
015656  062737  000010  002376                  ADD     #10,INTVEC      ;GET NEXT INTERRUPT LOCATION
015664  017701  164426                          MOV     @DISPLC,R1      ;TEMPORARY STORAGE OF RH ADDRESS
015670  017737  164422  002356                  MOV     @DISPLC,RHADDR  ;STORAGE FOR RH ADDRESS
015676  012761  001020  000024                  MOV     #1020,DIAGTS(R1)
015704  012737  000004  002316                  MOV     #TMNUM,DISPLC   ;FIND OFFSET FOR TM NUMBER
015712  004737  036076                          JSR     PC,TBLDIS       ;GET SPECIFIED LOCATION
015716  017705  164374                          MOV     @DISPLC,R5      ;R5 CONTAINS TMNUM
015722  017737  164370  002370                  MOV     @DISPLC,TM78N   ;STORAGE FOR TM78 NUMBER
015730  010537  002432                          MOV     R5,BITPST
015734  004737  036406                          JSR     PC,SHIFTL
015740  017761  164352  000010  3$:             MOV     @DISPLC,UNSLCT(R1)  ;STORE UNIT# IN UNIT SELECT
015746  012711  040000                          MOV     #40000,(R1)     ;CLEAR MASSBUS TRE BIT
015752  005011                                  CLR     (R1)            ;CLEAR TRE SHADOW
015754  000240                                  NOP                     ;GIVE HIM SOME TIME
015756  012737  000006  002316                  MOV     #TUNUM,DISPLC   ;FIND OFFSET FOR TU NUMBER
015764  004737  036076                          JSR     PC,TBLDIS       ;GET SPECIFIED LOCATION
015770  017702  164322                          MOV     @DISPLC,R2      ;R2 CONTAINS TU NUM
015774  017737  164316  002372                  MOV     @DISPLC,TU78N   ;STORAGE FOR TU78 NUMBER
016002  006302                                  ASL     R2              ;INCREMENT BY WORDS
016004  062702  000040                          ADD     #NDTFC0,R2      ;FIND LOCATION FOR TU SENSE CMD
016010  060102                                  ADD     R1,R2           ;FIND LOCATION FOR TUSENSE CMD
016012  005037  002374                          CLR     INTRPT          ;CLEAR INTERRUPT FLAG
016016  012761  000377  000016                  MOV     #377,ATTBIT(R1) ;CLEAR ATTENTION SUMMARY REG
016024  005011                                  CLR     (R1)
016026  005761  000052                          TST     INTRDA(R1)      ;TM78 READY ??
016032  100405                                  BMI     20$             ;YES , CONTINUE
016034  012737  000005  002320                  MOV     #5,ERRFLG       ;NO , FATAL ERROR
016042  000137  016504                          JMP     7$              ;EXIT
016046  012711  000100              20$:        MOV     #100,(R1)       ;ENABLE INTERRUPT
016052  012712  000011                          MOV     #SENSE,(R2)     ;PUT TU SENSE COMMAND INTO CAS REGISTER
016056  032761  010000  000010                  BIT     #10000,UNSLCT(R1)  ;SEE IF NON EXISTENT DRIVE
016064  001405                                  BEQ     4$              ;BRANCH IF DRIVE EXISTS
016066  012737  000004  002320                  MOV     #4,ERRFLG       ;NON EXISTENT DRIVE
016074  000137  016504                          JMP     7$
```

```
2633  016100                          4$:     SETPRI  #PRI00          ;ENABLE CPU INTERRUPTS
2634  016106                          8$:     DELAY   1               ;WAIT 10 USECONDS
2635  016136                                  BREAK
2636  016140  005737  002374                  TST     INTRPT          ;SEE IF RECEIVED INTERRUPT
2637  016144  001010                          BNE     13$             ;BRANCH WHEN GET INTERRUPT
2638  016146  005203                          INC     R3              ;TIMEOUT COUNTER
2639  016150  022703  023420                  CMP     #10000.,R3              ;SEE IF MACHINE HUNG
2640  016154  001354                          BNE     8$              ;WAIT SOME MORE
2641  016156  012737  000002  002320          MOV     #2,ERRFLG       ;TIME OUT TM78 HUMG
2642  016164  000547                          BR      7$              ;GET OUT
2643  016166                          13$:    SETPRI  PRIRTY
2644  016174  033761  002432  000016          BIT     BITPST,ATTBIT(R1)  ;SEE IF CORRECT UNIT TERMINATED
2645  016202  001005                          BNE     5$              ;BRANCH WHEN R4=ATTENTION BIT
2646  016204  005037  002374                  CLR     INTRPT          ;CLEAR INTERRUPT BIT
2647  016210  012711  000100                  MOV     #100,(R1)       ;ENABLE INTERRUPTS
2648  016214  000731                          BR      4$              ;GO BACK AND WAIT FOR CORRECT INTERRUPT
2649  016216  005037  002374          5$:     CLR     INTRPT          ;RESET INTERRUPT FLAG
2650  016222  013761  002370  000010          MOV     TM78N,UNSLCT(R1)
2651  016230  016105  000036                  MOV     NDTICD(R1),R5   ;MOVE UNIT THAT INTERRUPTED TU REGISTER
2652  016234  000305                          SWAB    R5              ;GET ATTENTION ADDRESS IN LOW BYTE
2653  016236  042705  177774                  BIC     #177774,R5      ;MASK OFF HIGH BITS
2654  016242  023705  002372                  CMP     TU78N,R5        ;SEE IF CORRECT UNIT
2655  016246  001314                          BNE     4$              ;BRANCH IF WRONG UNIT
2656  016250  122761  000001  000036          CMPB    #1,NDTICD(R1)  ;SEE IF DONE OCCURRED
2657  016256  001404                          BEQ     14$             ;BRANCH WHEN DONE
2658  016260  012737  000003  002320          MOV     #3,ERRFLG       ;SET UP FOR INTERRUPT ERROR
2659  016266  000506                          BR      7$              ;LEAVE MODULE
2660  016270  022761  000100  000026  14$:    CMP     #100,DRVTYP(R1) ;SEE IF CORRECT DRIVE TYPE
2661  016276  002004                          BGE     6$              ;SET ERROR FLAG IF LESS THAN
2662  016300  012737  000001  002320          MOV     #1,ERRFLG       ;DRIVE TYPE NOT TM78 TYPE
2663  016306  000476                          BR      7$              ;LEAVE MODULE
2664  016310  032761  040000  000020  6$:     BIT     #40000,DSE0(R1)         ;SEE IF TU IS THERE
2665  016316  001004                          BNE     15$             ;
2666  016320  012737  000004  002320          MOV     #4,ERRFLG               ;PRINT ERROR
2667  016326  000466                          BR      7$              ;LEAVE MODULE
2668  016330  005002                  15$:    CLR     R2              ;SET UP LOOP COUNTER
2669  016332  012703  002300                  MOV     #SERNUM,R3      ;GET STORAGE LOCATION FOR ASCII SERIAL #
2670  016336  000361  000030          12$:    SWAB    SERIAL(R1)      ;GET MOST SIGNIFICANT NUMBERS
2671  016342  116105  000030                  MOVB    SERIAL(R1),R5   ;MOVE TWO MOST SIGNIFICANT NUMBERS TO REG
2672  016346  042705  000017                  BIC     #17,R5          ;MASK OFF LOWER FOUR BITS
2673  016352  006205                          ASR     R5              ;
2674  016354  006205                          ASR     R5              ;SHIFT TO LOWER FOUR BITS
2675  016356  006205                          ASR     R5
2676  016360  006205                          ASR     R5
2677  016362  062705  000060                  ADD     #60,R5          ;CONVERT TO ASCII
2678  016366  110523                          MOVB    R5,(R3)+        ;MOVE TO OUTPUT STORAGE
2679  016370  116105  000030                  MOVB    SERIAL(R1),R5   ;GET NEXT MSB
2680  016374  042705  000360                  BIC     #360,R5         ;MASK OFF SECOND FOUR BITS
2681  016400  062705  000060                  ADD     #60,R5          ;CONVERT TO ASCII
2682  016404  110523                          MOVB    R5,(R3)+        ;MOVE TO OUTPUT STORAGE
2683  016406  005202                          INC     R2              ;INCREMENT LOOP COUNTER
2684  016410  022702  000001                  CMP     #1,R2           ;
2685  016414  001750                          BEQ     12$             ;GET NEXT TWO NUMBERS
2686  016416  005737  002276                  TST     START1
2687  016422  001420                          BEQ     2$
2688  016424                                  PRINTF  #SERLNB,TU78N,TM78N,RHADDR,#SERNUM
```

```
2689  016464  005237  002352          2$:     INC     TBLNUM              ;GET NEXT UNIT
2690  016470  023737  002352  002344          CMP     TBLNUM,TBLCNT       ;SEE IF LAST UNIT
2691  016476  003002                          BGT     7$                  ;CONTINUE
2692  016500  000137  015560                  JMP     1$                  ;START AGAIN
2693  016504  012761  000377  000016  7$:     MOV     #377,ATTBIT(R1) ;CLEAR ATTENTION SUMMARY REG
2694  016512                                  POP     <R5,R4,R3,R2,R1>        ;RESTORE REGISTERS
2695  016524  000207                          RTS     PC                  ;GO HOME
2696                                  ;*
2697                                  ;*MODULE 2.3 (QUESTIONS NEEDED TO BE ASKED FOR BRUTUS OPTIONS)
2698                                  ;*
2699                                  ;*BEGINROUTINE
2700                                  ;*  IF PROGRAM IN UNATTENDED MODE
2701                                  ;*  :  THEN
2702                                  ;*  :    SET ERROR FLAG
2703                                  ;*  :  ELSE
2704                                  ;*  :    CLEAR COMMAND LOCATIONS
2705                                  ;*  :    CLEAR DATA TRANSFER FLAG
2706                                  ;*  :    ASK HOW MANY COMMANDS IN STRING
2707                                  ;*  :    DO FOR NUMBER OF COMMANDS IN STRING
2708                                  ;*  :    :  ASK FOR COMMAND
2709                                  ;*  :    :  IF DATA TRANSFER COMMAND
2710                                  ;*  :    :  :  THEN
2711                                  ;*  :    :  :    SET DATA TRANSFER FLAG
2712                                  ;*  :    :  ENDIF
2713                                  ;*  :    :  ASK FOR REFITITION OF THAT COMMAND
2714                                  ;*  :    ENDDO
2715                                  ;*  :    IF DATA TRANSFER
2716                                  ;*  :    :  THEN
2717                                  ;*  :    :    IF BRUTUS WITH ERRORS
2718                                  ;*  :    :    :  THEN
2719                                  ;*  :    :    :    ASK ERROR AND STATISTIC INFORMATION
2720                                  ;*  :    :    :  ELSE
2721                                  ;*  :    :    :    INHIBIT ERROR AND STATISTICAL INFORMATION
2722                                  ;*  :    :    ENDIF
2723                                  ;*  :    :    ASK PATTERN NUMBER
2724                                  ;*  :    :    IF RANDOM PATTERN
2725                                  ;*  :    :    :  THEN
2726                                  ;*  :    :    :    ASK FOR RANDOM RECORD LENGTH
2727                                  ;*  :    :    :  ELSE
2728                                  ;*  :    :    :    ASK LENGTH OF RECORD
2729                                  ;*  :    :    :    CLEAR RANDOM RECORD LENGTH
2730                                  ;*  :    :    ENDIF
2731                                  ;*  :    :    SET UP LOOP OF PATTERN ACCORDING TO HOW OFTEN IT REPEATS
2732                                  ;*  :    :    IF USER SELECTS TO INPUT ITS OWN PATTERN
2733                                  ;*  :    :    :  THEN
2734                                  ;*  :    :    :    DO UNTIL=14
2735                                  ;*  :    :    :    :  INPUT PATTERN
2736                                  ;*  :    :    :    ENDDO
2737                                  ;*  :    :    ENDIF
2738                                  ;*  :    ENDIF
2739                                  ;*  ENDIF
2740                                  ;*ENDROUTINE
2741
2742
2743  016526                          BRUTQ:  PUSH    <R1,R2,R3,R4>
2744  016536                                  MANUAL                      ;SEE IF UAM FLAG IS SET
```

```
2745  016540                                    BCOMPLETE 1$            ;BRANCH IF MANUAL INTERVENTION ALLOWED
2746  016542  012737  000004  002320            MOV     #4,ERRFLG       ;SET ERROR FLAG UAM FLAG IS SET
2747  016550  000137  017364                    JMP     6$              ;RETURN
2748  016554  005037  002206          1$:       CLR     CANSEQ          ;
2749  016560  012701  002232                    MOV     #COMMD1,R1      ;GET START OF BRUTUS SOFTWARE P-TABLE
2750  016564  005021                    7$:     CLR     (R1)+           ;CLEAR BRUTUS SOFTWARE P-TABLE
2751  016566  022701  002262                    CMP     #REP6+2,R1      ;SEE IF DONE CLEARING
2752  016572  001374                            BNE     7$              ;BRANCH IF NOT DONE CLEARING
2753  016574  005037  002516                    CLR     DATRAN
2754  016600                                    GMANID  MSG19,CMDSTR,D,177777,1,6,NO  ;# OF CMDS IN STRING
2755  016620  012702  002232                    MOV     #COMMD1,R2
2756  016624  013737  002230  002340            MOV     CMDSTR,CONTER           ;STORE USER ANSWER
2757  016632  005237  002340                    INC     CONTER                  ;FIX FOR BRUTUS ROUTINE
2758  016636                            3$:     GMANID  MSG21,REPCMD,O,177777,3,77,NO   ;GET COMMAND
2759  016656  013722  002310                    MOV     REPCMD,(R2)+    ;GET NEXT LOCATION
2760  016662  022737  000050  002310            CMP     #50,REPCMD
2761  016670  002411                            BLT     4$
2762  016672                                    GMANID  MSG20,REPCMD,D,177777,1,177777,NO     ;REPITION OF CMD
2763  016712  000413                            BR      5$
2764  016714                            4$:     GMANID  MSG15,REPCMD,D,177777,1,177777,NO  ;RECORDS IN FILE
2765  016734  012737  000001  002516            MOV     #1,DATRAN       ;SET IF DATA TRANSFER
2766  016742  013722  002310            5$:     MOV     REPCMD,(R2)+    ;GET NEXT LOCATION
2767  016746  005337  002230                    DEC     CMDSTR          ;DECREMENT COUNTER
2768  016752  001331                            BNE     3$              ;SEE IF THERE IS ANOTHER COMMAND
2769
2770  016754                                    GMANIL  MSG9,BRUERR,177777,YES  ;ASK BRUTUS WITH ERRORS
2771  016770  005737  002516                    TST     DATRAN          ;SEE IF DATA TRANSFER COMMAND
2772  016774  001434                            BEQ     8$              ;BRANCH IF NON DATA TRANSFER
2773  016776  005737  002210                    TST     BRUERR          ;SEE IF ERRORS SHOULD BE REPORTED
2774  017002  001431                            BEQ     8$              ;
2775  017004                                    GMANIL  MSG10,STAEOP,177777,YES ;STATISTICS AT END OF PASS
2776  017020                                    GMANIL  MSG7,STAEOT,177777,YES  ;STATISTICS AT EOT
2777  017034                                    GMANIL  MSG12,RETRY,177777,YES  ;RETRIES
2778  017050                                    GMANIL  MSG17,DATCHK,177777,YES ;DATA CHECK
2779  017064  000413                            BR      2$              ;
2780  017066  005037  002212          8$:       CLR     STAEOP          ;
2781  017072  005037  002214                    CLR     STAEOT          ;
2782  017076  005037  002216                    CLR     RETRY           ;
2783  017102  005037  002226                    CLR     DATCHK          ;
2784  017106  005737  002516                    TST     DATRAN          ;
2785  017112  001524                            BEQ     6$
2786  017114                            2$:     GMANID  MSG14,PATTRN,D,177777,0,11,YES  ;PATTERN #
2787  017134  022737  000010  002222            CMP     #10,PATTRN      ;SEE IF RANDOM PATTERN
2788  017142  001024                            BNE     13$             ;BRANCH IF NOT
2789  017144  005737  002210                    TST     BRUERR          ;
2790  017150  001410                            BEQ     14$             ;
2791  017152                                    PRINTF  #RANDOM
2792  017172                            14$:    GMANIL  MSG11,RALNTH,177777,YES
2793  017206  005737  002224                    TST     RALNTH
2794  017212  001012                            BNE     12$
2795  017214                            13$:    GMANID  MSG13,CHAREC,D,177777,1,177777,YES  ;# OF BYTES IN RECORD
2796  017234  005037  002224                    CLR     RALNTH          ;NO RANDOM RECORD LENGTH
2797  017240  012737  000004  002350  12$:      MOV     #4,PATLOP       ;SET UP PATTERN LOOP
2798  017246  022737  000006  002222            CMP     #6,PATTRN       ;SEE IF USER PATTERN
2799  017254  001034                            BNE     9$              ;BRANCH IF NOT
2800  017256  012737  000016  002350            MOV     #16,PATLOP      ;SET UP PATTERN LOOP
```

```
2801  017264                                    PRINTF  #INPATT          ;PRINT STATEMENT
2802  017304  012704  003430                    MOV     #PATSIX,R4       ;R4 CONTAINS OFFSET
2803  017310  012703  000016                    MOV     #16,R3           ;SET LOOP UP
2804  017314                            10$:    GMANID  MSG8,USEPAT,0,177777,0,177777,NO
2805  017334  013724  002306                    MOV     USEPAT,(R4)+     ;GET AND STORE USER PATTERN
2806  017340  005303                            DEC     R3               ;DECREMENT LOOP
2807  017342  001364                            BNE     10$              ;SEE IF DONE
2808  017344  000407                            BR      6$               ;BRANCH IF DONE
2809  017346  022737  000007  002222    9$:     CMP     #7,PATTRN        ;SEE IF INCREMENT PATTERN
2810  017354  001003                            BNE     6$               ;BRANCH IF NOT
2811  017356  012737  000200  002350            MOV     #200,PATLOP      ;SET UP LOOP
2812  017364                            6$:     POP     <R4,R3,R2,R1>
2813  017374  000207                            RTS     PC
2814
2815
2816
2817                                    ;*
2818                                    ;*MODULE 2.4 (CLEAR STATISTIC TABLE FOR ALL USE)
2819                                    ;*
2820                                    ;*BEGINROUTINE (MOD = 2.4 CLEARS STATISTICS /CLRSTA/)
2821                                    ;*  DO 1 TO TABLE_COUNT
2822                                    ;*  :  MOVE UNIT# TO REG
2823                                    ;*  :  MOVE BYRFHI TO DISPLC  (FIRST STAT IN STATISTIC TABLE)
2824                                    ;*  :  CALL TBLDIS
2825                                    ;*  :  DO WHILE (RHADD + TBLNTH) IS GREATER THAN DISPLC
2826                                    ;*  :  :  CLEAR (DISPLC)                    ;CLEARS CONTENT OF DISPLAC
2827                                    ;*  :  :  INCREMENT DISPLC
2828                                    ;*  :  ENDDO
2829                                    ;*  ENDDO
2830                                    ;*ENDROUTINE
2831
2832
2833
2834  017376                            CLRSTA: PUSH    <R2>
2835  017400  012737  000001  002352            MOV     #1,TBLNUM        ;SET UP UNIT NUMBER
2836  017406  012737  000012  002316    1$:     MOV     #SERWRT,DISPLC   ;GET FIRST LOCATION OF STATISTIC TABLE
2837  017414  004737  036076                    JSR     PC,TBLDIS        ;GETS ADDRESS OF SPECIFIED LOCATION
2838  017420  013702  002316                    MOV     DISPLC,R2        ;R2 CONTAINS ADDRESS OF FIRST STAT OF TABLE
2839  017424  063702  002342                    ADD     STTBLH,R2        ;FIND END OF TABLE
2840  017430  005077  162662            2$:     CLR     @DISPLC          ;CLEAR SPECIFIED LOCATION
2841  017434  062737  000002  002316            ADD     #2,DISPLC        ;GET NEXT LOCATION
2842  017442  020237  002316                    CMP     R2,DISPLC        ;SEE IF REACH THE END OF STATISTIC TABLE
2843  017446  001370                            BNE     2$               ;IF NOT LOOP
2844  017450  005737  002444                    TST     DENFLG           ;DID WE DO GCR TABLE YET ?
2845  017454  001003                            BNE     3$               ;YES GET NEXT UNIT
2846  017456  005237  002444                    INC     DENFLG           ;NO DO NOW
2847  017462  000751                            BR      1$               ;LOOP
2848  017464  005037  002444            3$:     CLR     DENFLG           ;RESET DEN FLAG
2849  017470  005237  002352                    INC     TBLNUM           ;GET NEXT UNIT
2850  017474  023737  002352  002344            CMP     TBLNUM,TBLCNT    ;HAVE I CLEARED ALL TABLES
2851  017502  003741                            BLE     1$               ;LOOP UNTIL ALL TABLE HAVE BEEN CLEARED
2852  017504                                    POP     <R2>
2853  017506  000207                            RTS     PC
2854
2855
2856
```

```
                                        ;
                                        ;*
                                        ;*MODULE 2.5 (OUTPUTS FATAL ERRORS OF USER INPUT)
                                        ;*
                                        ;*BEGINROUTINE (MOD = 2.5 OUTPUT FATAL ERRORS OF USER INPUT /ERROUT/)
                                        ;*  GET UNIT TABLE ADDRESS
                                        ;*  SET UP ADDRESS TO START OF ERROR_TABLE
                                        ;*  ADD ERROR_FLAG TO START OF ERROR_TABLE
                                        ;*  MOVE ADDRESS TO PRINT ROUTINE
                                        ;*  PRINT ERROR
                                        ;*ENDROUTINE


017510                                  ERROUT: PUSH    <R1,R2>
017514  012737  000000  002316                  MOV     #RHADD,DISPLC   ;GET TABLE ADDRESS
017522  004737  036076                          JSR     PC,TBLDIS       ;
017526  017702  162564                          MOV     @DISPLC,R2      ;R2 CONTAINS ADDRESS OF TABLE
017532  013701  002320                          MOV     ERRFLG,R1       ;PUT ERROR FLAG INTO REG
017536  005301                                  DEC     R1              ;SETTING UP CORRECT ADDRESS
017540  006301                                  ASL     R1              ;DOUBLE BYTES TO MAKE WORD
017542  022701  000004                          CMP     #4,R1
017546  001422                                  BEQ     1$
017550  022701  000010                          CMP     #10,R1          ;
017554  001440                                  BEQ     3$              ;
017556                                          PRINTF  FETBL(R1),TU78N,TM78N,RHADDR
017612  000437                                  BR      2$
017614                                  1$:     PRINTF  FETBL(R1),TU78N,TM78N,RHADDR,NDTICD(R2)
017654  000416                                  BR      2$
017656                                  3$:     PRINTF  FETBL(R1),TM78N,RHADDR,INTRDA(R2)
017712                                  2$:     POP     <R2,R1>
017716  000207                                  RTS     PC


                                        ;*******************************************************************************
                                        ;
                                        ;SUBROUTINES USED IN TEST MODULE ONLY
                                        ;
                                        ;*******************************************************************************
```

```
                                        ;*
                                        ;*MODULE 3.1 SEQUENCE DEFINITION
                                        ;*
                                        ;*BEGINROUTINE (MOD = 3.1 SEQUENCE DEFINITION /SEQDEF/)
                                        ;*  GET RH ADDRESS
                                        ;*  IF NOT IN RETRY PROCESS
                                        ;*  :  THEN
                                        ;*  :    IF ALL END OF TAPE FLAG SET
                                        ;*  :    :  THEN
                                        ;*  :    :    LOAD A REWIND COMMAND
                                        ;*  :    :    LOAD REPITITION TO 1
                                        ;*  :    :    SET REWIND FLAG
                                        ;*  :    :    CLEAR EOT FLAG
                                        ;*  :    :    CLEAR ALLEOT FLAG
                                        ;*  :    :    CLEAR RECORD #
                                        ;*  :    :    CLEAR FILE #
                                        ;*  :    :    IF BRUTUS OPTION
                                        ;*  :    :    :  THEN
                                        ;*  :    :    :    SET SER BIT IN CAS REGISTERS
                                        ;*  :    :    :  ELSE
                                        ;*  :    :    :    IF RETRIES NOT ALLOWED
                                        ;*  :    :    :    :  THEN
                                        ;*  :    :    :    :    SET SER BIT
                                        ;*  :    :    :    :  ELSE
                                        ;*  :    :    :    :    IF NON-DATA TRANSFER COMMAND
                                        ;*  :    :    :    :    :  THEN
                                        ;*  :    :    :    :    :    CLEAR SER BIT
                                        ;*  :    :    :    :    :  ELSE
                                        ;*  :    :    :    :    :    IF WRITE COMMAND
                                        ;*  :    :    :    :    :    :  THEN
                                        ;*  :    :    :    :    :    :    SET SER BIT
                                        ;*  :    :    :    :    :    :  ELSE
                                        ;*  :    :    :    :    :    :    CLEAR SER BIT
                                        ;*  :    :    :    :    :    ENDIF
                                        ;*  :    :    :    :    ENDIF
                                        ;*  :    :    :    ENDIF
                                        ;*  :    :    :  ELSE
                                        ;*  :    :    :    CLEAR HARD ERROR COUNT
                                        ;*  :    :    :    CALL SEQUENCE SELECT
                                        ;*  :    :    ENDIF
                                        ;*  :    :  ELSE
                                        ;*  :    :    CALL RETRY SEQUENCE
                                        ;*  ENDIF
                                        ;*ENDROUTINE

017720                                  SEQDEF: PUSH    <R1,R3>
017724  012737  000000  002316                  MOV     #RHADD,DISPLC           ;GET RH ADDRESS
017732  004737  036076                          JSR     PC,TBLDIS               ;
017736  017701  162354                          MOV     @DISPLC,R1              ;R1 CONTAINS RH ADDRESS
017742  005737  002604                          TST     RTYFLG                  ;SEE IF RETRY IN PROGRESS
017746  001035                                  BNE     1$                      ;BRANCH IF YES
017750  023737  002600  002344                  CMP     ALLEOT,TBLCNT           ;SEE IF ALL UNITS AT EOT
017756  001037                                  BNE     2$                      ;BRANCH IF NOT ALL AT EOT
017760  012737  000007  002452                  MOV     #REWIND,CMMAND          ;REWIND ALL UNITS
017766  013737  002452  002462                  MOV     CMMAND,RETRCD
```

```
 2961  017774  012737  000001  002602          MOV     #1,REPITN
 2962  020002  005237  002510                  INC     DENSWT
 2963  020006  012737  000001  002466          MOV     #1,AUTORW               ;SET AUTO REWIND FLAG
 2964  020014  005037  002540                  CLR     EOTFLG                  ;CLEAR EOT FLAG
 2965  020020  005037  002600                  CLR     ALLEOT                  ;CLEAR ALL EOT FLAG
 2966  020024  005037  002534                  CLR     DRPFLG                  ;CLEAR DROP UNIT FLAG
 2967  020030  005037  002566                  CLR     RECORD
 2968  020034  005037  002570                  CLR     FILENM
 2969  020040  000415                          BR      3$                      ;
 2970  020042  013703  002604          1$:     MOV     RTYFLG,R3               ;R3 CONTAINS RETRY NUMBER
 2971  020046  006303                          ASL     R3                      ;CONVERT TO TABLE OFFSET
 2972  020050  004773  003212                  JSR     PC,@RTYSEQ(R3)          ;DO RETRY SEQUENCE
 2973  020054  000407                          BR      3$                      ;
 2974  020056  005037  002476          2$:     CLR     HRDCNT
 2975  020062  013703  002206                  MOV     CANSEQ,R3               ;R3 CONTAINS CANSEQ NUMBER
 2976  020066  006303                          ASL     R3                      ;CONVERT TO TABLE OFFSET
 2977  020070  004773  002754                  JSR     PC,@SEQSEL(R3)          ;DO CORRECT SEQUENCE
 2978  020074  022737  000001  002314  3$:     CMP     #1,BRTEST               ;SEE IF BRUTUS OPTION
 2979  020102  001004                          BNE     4$                      ;BRANCH IF NOT
 2980  020104  012761  100000  000014          MOV     #BIT15,CMDADR(R1)       ;SET SER FLAG
 2981  020112  000425                          BR      7$                      ;
 2982  020114  005737  002216          4$:     TST     RETRY                   ;SEE IF RETRIES ALLOWED
 2983  020120  001004                          BNE     5$                      ;BRANCH IF YES
 2984  020122  012761  100000  000014          MOV     #BIT15,CMDADR(R1)       ;SET SER FLAG
 2985  020130  000416                          BR      7$                      ;
 2986  020132  022737  000050  002452  5$:     CMP     #50,CMMAND              ;SEE IF NDT COMMAND
 2987  020140  101010                          BHI     6$                      ;BRANCH IF N D T
 2988  020142  022737  000070  002452          CMP     #70,CMMAND              ;SEE IF WRITE COMMAND
 2989  020150  103404                          BLO     6$                      ;BRANCH IF READ COMMAND
 2990  020152  012761  100000  000014          MOV     #BIT15,CMDADR(R1)       ;SET SER ON WRITE COMMAND
 2991  020160  000402                          BR      7$                      ;GO HOME
 2992  020162  005061  000014          6$:     CLR     CMDADR(R1)              ;CLEAR SER FLAG
 2993  020166                          7$:     POP     <R3,R1>                 ;RESTORE REGISTERS
 2994  020172  000207                          RTS     PC                      ;GO HOME
 2995
 2996
 2997
 2998                                  ;*
 2999                                  ;*BRUTUS SEQUENCE MODULE 3.1.1
 3000                                  ;*
 3001                                  ;*BEGINROUTINE (MOD - 3.1.1 BRUTUS SEQUENCE /BRTSEQ/)
 3002                                  ;*  IF INITIALIZE IS SET
 3003                                  ;*  :  THEN-LOAD ADDRESS OF COMMANDS
 3004                                  ;*  :       LOAD COUNTER WITH MAXIMUM COMMAND
 3005                                  ;*  ENDIF
 3006                                  ;*  LOAD COMMAND
 3007                                  ;*  CLEAR INITIALIZE
 3008                                  ;*  GET NEXT COMMAND ADDRESS
 3009                                  ;*  GET HOW MANY TIMES TO REPEAT COMMAND
 3010                                  ;*  LOAD RETRY
 3011                                  ;*  DECREMENT COUNT
 3012                                  ;*  IF COUNT IS ZERO
 3013                                  ;*  :  THEN-CLEAR COMMAND
 3014                                  ;*  :       RESET INITIALIZE
 3015                                  ;*  ENDIF
 3016                                  ;*ENDROUTINE
```

```
                                        BRTSEQ:
020174                                  3$:     TST     INTLZE                  ;SEE IF COMMAND POINTER SHOULD BE RESET
020174  005737  002326                          BEQ     1$                      ;BRANCH IF SEQUENCE IN PROGRESS
020200  001406                                  MOV     #COMMD1,CMDSTG          ;TEMPORARY STORAGE FOR COMMAND
020202  012737  002232  002616                  MOV     CONTER,COUNT                    ;COUNTER FOR MAXIMUM COMMANDS
020210  013737  002340  002620          1$:     MOV     @CMDSTG,CMMAND          ;PUT COMMAND INTO EXECUTE LOCATION
020216  017737  162374  002452                  CLR     INTLZE
020224  005037  002326                          ADD     #2,CMDSTG               ;GET NEXT COMMAND
020230  062737  000002  002616                  MOV     CMMAND,RETRCD           ;STORE COMMAND TO BE EXECUTED IN
020236  013737  002452  002462                                                  ;RETRY COMMAND LOCATION
                                                MOV     @CMDSTG,REPITN          ;
020244  017737  162346  002602                  ADD     #2,CMDSTG               ;GET NEXT COMMAND
020252  062737  000002  002616                  DEC     COUNT                   ;MAXIMUM LEFT TO BE ISSUED
020260  005337  002620                          BNE     2$                      ;BRANCH IF NOT DONE WITH SEQUENCE
020264  001005                                  CLR     CMMAND                  ;PUT ZERO INTO EXECUTE LOCATION
020266  005037  002452                          MOV     #1,INTLZE
020272  012737  000001  002326          2$:     RTS     PC
020300  000207

                                        ;*
                                        ;*UNKNOWN TAPE MODULE 3.1.2
                                        ;*
                                        ;*BEGINROUTINE (MODULE 3.1.2 - UNKNOWN TAPE /UNTAPE/)
                                        ;*  IF INITIALIZE SET
                                        ;*  :  THEN
                                        ;*  :    CLEAR INITIAILZE FLAG
                                        ;*  :    SELECT RETRIES
                                        ;*  :    SELECT RECORD LENGTH OF 2K BYTES
                                        ;*  :    CLEAR FILE #
                                        ;*  :    CLEAR RECORD #
                                        ;*  :    CLEAR DATA COMPARE
                                        ;*  :    LOAD REWIND COMMAND
                                        ;*  :    SET REPITITION OF COMMAND TO 1
                                        ;*  :  ELSE
                                        ;*  :    IF TAPE IS REWINDING FROM EOT
                                        ;*  :    :  THEN
                                        ;*  :    :    CLEAR EOT REWINDING FLAG
                                        ;*  :    :    MOVE 0 INTO COMMAND FOR END OF PASS
                                        ;*  :    :  ELSE
                                        ;*  :    :    LOAD READ FORWARD COMMAND
                                        ;*  :    :    INCREMENT RECORD #
                                        ;*  :    :    LOAD REPITITION OF COMMAND TO 1
                                        ;*  :    :    LOAD RETRY COMMAND
                                        ;*  :    ENDIF
                                        ;*  ENDIF
                                        ;*ENDROUTINE

020302  005037  002224          UNTAPE: CLR     RALNTH                  ;CLEAR RANDOM RECORD LENGTH
020306  005737  002326                  TST     INTLZE                  ;SEE IF WENT THROUGH INIT CODE
020312  001431                          BEQ     1$                      ;BRANCH IF NOT
020314  005037  002326                  CLR     INTLZE                  ;CLEAR INIT CODE FLAG
```

```
3073  020320  012737  000001  002216          MOV     #1,RETRY                ;SELECT RETRIES
3074  020326  012737  004000  002220          MOV     #4000,CHAREC            ;SELECT 2K RECORDS
3075  020334  005037  002570                  CLR     FILENM                  ;CLEAR FILE COUNTER
3076  020340  005037  002566                  CLR     RECORD                  ;CLEAR RECORD COUNTER
3077  020344  005037  002226                  CLR     DATCHK                  ;NO DATA COMPARE
3078  020350  012737  000007  002452          MOV     #REWIND,CMMAND          ;LOAD REWIND
3079  020356  013737  002452  002462          MOV     CMMAND,RETRCD
3080  020364  012737  000001  002602          MOV     #1,REPITN               ;LOAD REPITITION
3081  020372  000137  020450                  JMP     3$                      ;GET OUT
3082  020376  005737  002510          1$:     TST     DENSWT                  ;SEE IF REWINDING
3083  020402  001407                          BEQ     2$                      ;BRANCH IF NOT
3084  020404  005037  002510                  CLR     DENSWT                  ;RESET REWIND FLAG
3085  020410  012737  000000  002452          MOV     #0,CMMAND               ;SET UP FOR EOP
3086  020416  000137  020450                  JMP     3$                      ;GET OUT
3087  020422  012737  000071  002452  2$:     MOV     #REDFWD,CMMAND          ;SET UP READ COMMAND
3088  020430  005237  002566                  INC     RECORD                  ;INCREMENT RECORD COUNTER
3089  020434  012737  000001  002602          MOV     #1,REPITN               ;SET UP REPITITION
3090  020442  013737  002452  002462          MOV     CMMAND,RETRCD           ;SET UP RETRY COMMAND
3091  020450  000207                  3$:     RTS     PC                      ;GO HOME
3092
3093
3094
3095
3096                                  ;*
3097                                  ;*FIELD SERVICE SEQUENCE #1
3098                                  ;*
3099                                  ;*BEGINROUTINE (MODULE 3.1.3 - FIELD SERVICE 1 /FIELD1/)
3100                                  ;*  IF INITIALIZE SET
3101                                  ;*  :  THEN
3102                                  ;*  :    CLEAR INITIALIZE
3103                                  ;*  :    SET UP COUNT FOR DO LOOP
3104                                  ;*  :    ENABLE RETRIES
3105                                  ;*  :    SET RECORD LENGTH TO 2K BYTES
3106                                  ;*  :    SELECT RANDOM PATTERN
3107                                  ;*  :    SET RANDOM RECORD LENGTH
3108                                  ;*  :    SET UP HOW OFTEN PATTERN REPEATS ITSELF IN WORDS
3109                                  ;*  :    CLEAR FILE #
3110                                  ;*  :    ENABLE DATA COMPARE
3111                                  ;*  :    LOAD REWIND COMMAND
3112                                  ;*  :    CLEAR RECORD #
3113                                  ;*  :    LOAD REPITITION OF COMMAND
3114                                  ;*  :    GET ADDRESS OF WHERE COMMANDS START
3115                                  ;*  :  ELSE
3116                                  ;*  :    IF TAPE IS REWINDING FROM EOT
3117                                  ;*  :    :  THEN
3118                                  ;*  :    :    CLEAR RECORD #
3119                                  ;*  :    :    RESET COUNT FOR DO LOOP
3120                                  ;*  :    :    CLEAR EOT REWINDING FLAG
3121                                  ;*  :    :    IF DENSITY IS NOT GCR
3122                                  ;*  :    :    :  THEN
3123                                  ;*  :    :    :    LOAD ADDRESS FOR GCR COMMANDS
3124                                  ;*  :    :    :  ELSE
3125                                  ;*  :    :    :    LOAD ADDRESS FOR PE
3126                                  ;*  :    :    :    SET EOP FLAG
3127                                  ;*  :    :    ENDIF
3128                                  ;*  :    :  ELSE
```

```
3129                                    ;*  :    :    LOAD COMMAND
3130                                    ;*  :    :    GET ADDRESS OF NEXT COMMAND
3131                                    ;*  :    :    LOAD RETRY COMMAND
3132                                    ;*  :    :    LOAD REPITITION OF COMMAND TO 1
3133                                    ;*  :    :    IF WRITE COMMAND
3134                                    ;*  :    :    :  THEN
3135                                    ;*  :    :    :    INCREMENT RECORD #
3136                                    ;*  :    :    ENDIF
3137                                    ;*  :    :    DECREMENT LOOP COUNTER
3138                                    ;*  :    :    IF LOOP COUNTER EQUAL TO ZERO
3139                                    ;*  :    :    :  THEN
3140                                    ;*  :    :    :    RESET LOOP COUNTER
3141                                    ;*  :    :    :    RESET COMMAND ADDRESS
3142                                    ;*  :    :    ENDIF
3143                                    ;*  :  ENDIF
3144                                    ;*  ENDIF
3145                                    ;*ENDROUTINE
3146
3147
3148  020452                            FIELD1:
3149  020452  005737  002326                    TST     INTLZE          ;SEE IF WENT THRU INIT CODE
3150  020456  001452                            BEQ     1$              ;BRANCH IF NOT
3151  020460  005037  002326                    CLR     INTLZE          ;CLEAR INITIALIZE FLAG
3152  020464  012737  000003  002620            MOV     #3,COUNT        ;SET UP LOOP COUNTER
3153  020472  012737  000001  002216            MOV     #1,RETRY        ;RETRIES? YES
3154  020500  012737  004000  002220            MOV     #4000,CHAREC    ;2K SIZE RECORDS
3155  020506  012737  000010  002222            MOV     #10,PATTRN      ;RANDOM PATTERN, YES
3156  020514  005237  002224                    INC     RALNTH          ;SET RANDOM RECORD LENGTH
3157  020520  012737  000004  002350            MOV     #4,PATLOP       ;SET UP PATTERN LOOP COUNTER
3158  020526  005037  002570                    CLR     FILENM          ;CLEAR FILE NUMBER
3159  020532  012737  000001  002226            MOV     #1,DATCHK       ;DATA CHECKED, YES
3160  020540  012737  000007  002452            MOV     #REWIND,CMMAND  ;LOAD REWIND COMMAND
3161  020546  013737  002452  002462            MOV     CMMAND,RETRCD
3162  020554  005037  002566                    CLR     RECORD          ;CLEAR RECORD NUMBER
3163  020560  012737  000001  002602            MOV     #1,REPITN
3164  020566  012737  002766  002616            MOV     #CANA1,CMDSTG   ;LOAD PE SEQUENCE
3165  020574  005037  002444                    CLR     DENFLG          ;SET PE STATISTIC FLAG
3166  020600  000137  020766                    JMP     5$              ;GET OUT
3167  020604  005737  002510          1$:       TST     DENSWT          ;TEST IF REWINDING
3168  020610  001433                            BEQ     3$              ;BRANCH IF NOT
3169  020612  005037  002566                    CLR     RECORD          ;RESET RECORD COUNT
3170  020616  012737  000003  002620            MOV     #3,COUNT        ;
3171  020624  005037  002510                    CLR     DENSWT          ;RESET DENSITY SWITCH FLAG
3172  020630  022737  002776  002616            CMP     #CANB1,CMDSTG   ;SEE IF PE MODE
3173  020636  101406                            BLOS    2$              ;BRANCH IF GCR
3174  020640  005237  002444                    INC     DENFLG          ;SET GCR STAT FLAG
3175  020644  012737  002776  002616            MOV     #CANB1,CMDSTG   ;SET GCR MODE
3176  020652  000412                            BR      3$              ;
3177  020654  012737  002766  002616  2$:       MOV     #CANA1,CMDSTG   ;SET PE MODE
3178  020662  005037  002444                    CLR     DENFLG          ;SET PE STATISTIC FLAG
3179  020666  012737  000000  002452            MOV     #0,CMMAND       ;SET FOR END OF PASS
3180  020674  000137  020766                    JMP     5$
3181  020700  017737  161712  002452  3$:       MOV     @CMDSTG,CMMAND  ;LOAD COMMAND
3182  020706  062737  000002  002616            ADD     #2,CMDSTG       ;SET UP FOR NEXT COMMAND
3183  020714  013737  002452  002462            MOV     CMMAND,RETRCD   ;LOAD RETRY COMMAND
3184  020722  012737  000001  002602            MOV     #1,REPITN       ;LOAD REPITITION
```

```
3185  020730  022737  000067  002452          CMP     #67,CMMAND      ;SEE IF WRITE
3186  020736  103402                          BLO     4$              ;BRANCH IF NOT
3187  020740  005237  002566                  INC     RECORD          ;INCREMENT RECORD COUNT
3188  020744  005337  002620          4$:     DEC     COUNT           ;TEST LOOP
3189  020750  001006                          BNE     5$              ;BRANCH IF NOT DONE
3190  020752  012737  000003  002620          MOV     #3,COUNT        ;RESET TO START OF LOOP
3191  020760  162737  000006  002616          SUB     #6,CMDSTG       ;RESET COMMAND ADDRESS
3192  020766  000207                  5$:     RTS     PC              ;RETURN
3193
3194
3195
3196
3197                                  ;*
3198                                  ;*FIELD SERVICE SEQUENCE #2
3199                                  ;*
3200                                  ;*BEGINROUTINE (MODULE 3.1.4 - FIELD SERVICE 2 /FIELD2/)
3201                                  ;*   IF INITIALIZE SET
3202                                  ;*   :  THEN
3203                                  ;*   :     CLEAR INITIALIZE
3204                                  ;*   :     SET UP COUNT FOR DO LOOP
3205                                  ;*   :     ENABLE RETRIES
3206                                  ;*   :     SET RECORD LENGTH TO 2K BYTES
3207                                  ;*   :     START PATTERN AT ZERO
3208                                  ;*   :     CLEAR RANDOM RECORD LENGTH FLAG
3209                                  ;*   :     SET UP HOW OFTEN PATTERN REPEATS ITSELF IN WORDS
3210                                  ;*   :     CLEAR FILE #
3211                                  ;*   :     ENABLE DATA COMPARE
3212                                  ;*   :     LOAD REWIND COMMAND
3213                                  ;*   :     CLEAR RECORD #
3214                                  ;*   :     LOAD REPITITION OF COMMAND
3215                                  ;*   :     GET ADDRESS OF WHERE COMMANDS START
3216                                  ;*   :  ELSE
3217                                  ;*   :     IF TAPE IS REWINDING FROM EOT
3218                                  ;*   :     :  THEN
3219                                  ;*   :     :     CLEAR RECORD #
3220                                  ;*   :     :     RESET COUNT FOR DO LOOP
3221                                  ;*   :     :     CLEAR EOT REWINDING FLAG
3222                                  ;*   :     :     IF DENSITY IS NOT GCR
3223                                  ;*   :     :     :  THEN
3224                                  ;*   :     :     :     LOAD ADDRESS FOR GCR COMMANDS
3225                                  ;*   :     :     :  ELSE
3226                                  ;*   :     :     :     LOAD ADDRESS FOR PE
3227                                  ;*   :     :     :     SET EOP FLAG
3228                                  ;*   :     :     ENDIF
3229                                  ;*   :     :  ELSE
3230                                  ;*   :     :     LOAD COMMAND
3231                                  ;*   :     :     GET ADDRESS OF NEXT COMMAND
3232                                  ;*   :     :     LOAD RETRY COMMAND
3233                                  ;*   :     :     LOAD REPITITION OF COMMAND TO 1
3234                                  ;*   :     :     IF GCR TAPE MARK COMMAND
3235                                  ;*   :     :     :  THEN
3236                                  ;*   :     :     :     MOVE ONE TO REPITITION
3237                                  ;*   :     :     :     INCREMENT FILE #
3238                                  ;*   :     :     :  ELSE
3239                                  ;*   :     :     :     IF SPACE REVERSE FILE
3240                                  ;*   :     :     :     :  THEN
```

```
3241                                    ;*  :    :    :    :    DECREMENT FILE #
3242                                    ;*  :    :    :    :    MOVE ONE TO REPITITION
3243                                    ;*  :    :    :    :  ELSE
3244                                    ;*  :    :    :    :    IF SPACE FORWARD FILE
3245                                    ;*  :    :    :    :    :  THEN
3246                                    ;*  :    :    :    :    :    INCREMENT FILE #
3247                                    ;*  :    :    :    :    :    MOVE ONE TO REPITITION
3248                                    ;*  :    :    :    :    :  ELSE
3249                                    ;*  :    :    :    :    :    MOVE 24 TO RECORDS IN FILE
3250                                    ;*  :    :    :    :    ENDIF
3251                                    ;*  :    :    :    ENDIF
3252                                    ;*  :    :    :    DECREMENT COMMAND COUNTER
3253                                    ;*  :    :    :    IF COMMAND COUNTER EQUAL ZERO
3254                                    ;*  :    :    :    :  THEN
3255                                    ;*  :    :    :    :    RESET COMMAND COUNTER
3256                                    ;*  :    :    :    :    RESET COMMAND ADDRESS
3257                                    ;*  :    :    :    :    GET NEXT PATTERN
3258                                    ;*  :    :    :    :    IF USER PATTERN
3259                                    ;*  :    :    :    :    :  THEN
3260                                    ;*  :    :    :    :    :    GET NEXT PATTERN
3261                                    ;*  :    :    :    :    :  ELSE
3262                                    ;*  :    :    :    :    :    IF RANDOM PATTERN
3263                                    ;*  :    :    :    :    :    :  THEN
3264                                    ;*  :    :    :    :    :    :    GET NEXT PATTERN
3265                                    ;*  :    :    :    :    :    ENDIF
3266                                    ;*  :    :    :    :    ENDIF
3267                                    ;*  :    :    :    :    IF LAST PATTERN
3268                                    ;*  :    :    :    :    :  THEN
3269                                    ;*  :    :    :    :    :    START PATTERN LOOP OVER
3270                                    ;*  :    :    :    :    ENDIF
3271                                    ;*  :    :    :    ENDIF
3272                                    ;*  :    :    ENDIF
3273                                    ;*  :    ENDIF
3274                                    ;*  ENDIF
3275                                    ;*ENDROUTINE
3276
3277  020770  005737  002326            FIELD2: TST     INTLZE          ;SEE IF WENT THRU INIT CODE
3278  020774  001452                            BEQ     1$              ;BRANCH IF NOT
3279  020776  005037  002326                    CLR     INTLZE          ;CLEAR INITIALIZE FLAG
3280  021002  012737  000006  002620            MOV     #6,COUNT        ;SET UP LOOP COUNTER
3281  021010  012737  000001  002216            MOV     #1,RETRY        ;RETRIES? YES
3282  021016  012737  004000  002220            MOV     #4000,CHAREC    ;2K SIZE RECORDS
3283  021024  005037  002222                    CLR     PATTRN          ;START WITH ZERO PATTERN
3284  021030  005037  002224                    CLR     RALNTH          ;CLEAR RECORD LENGTH
3285  021034  012737  000004  002350            MOV     #4,PATLOP       ;SET UP PATTERN LOOP COUNTER
3286  021042  005037  002570                    CLR     FILENM          ;CLEAR FILE NUMBER
3287  021046  012737  000001  002226            MOV     #1,DATCHK       ;DATA CHECKED, YES
3288  021054  012737  000007  002452            MOV     #REWIND,CMMAND  ;LOAD REWIND COMMAND
3289  021062  013737  002452  002462            MOV     CMMAND,RETRCD
3290  021070  012737  000001  002566            MOV     #1,RECORD       ;SET RECORD NUMBER
3291  021076  012737  000001  002602            MOV     #1,REPITN
3292  021104  005037  002444                    CLR     DENFLG          ;SET PE STATISTIC FLAG
3293  021110  012737  003004  002616            MOV     #CANA2,CMDSTG   ;LOAD PE SEQUENCE
3294  021116  000137  021452                    JMP     5$              ;GET OUT
3295  021122  005737  002510            1$:     TST     DENSWT          ;TEST IF REWINDING
3296  021126  001440                            BEQ     3$              ;BRANCH IF NOT
```

```
3297  021130  005037  002222                CLR     PATTRN          ;START WITH ZERO PATTERN AFTER REWIND
3298  021134  012737  000001  002566        MOV     #1,RECORD       ;RESET RECORD NUMBER
3299  021142  005037  002570                CLR     FILENM
3300  021146  012737  000006  002620        MOV     #6,COUNT        ;
3301  021154  005037  002510                CLR     DENSWT          ;RESET DENSITY SWITCH FLAG
3302  021160  022737  003022  002616        CMP     #CANB2,CMDSTG   ;SEE IF PE MODE WAS SET
3303  021166  101406                        BLOS    2$              ;BR IF GCR WAS SET
3304  021170  005237  002444                INC     DENFLG          ;SET GCR STATISTIC FLAG
3305  021174  012737  003022  002616        MOV     #CANB2,CMDSTG   ;SET GCR MODE
3306  021202  000412                        BR      3$              ;
3307  021204  012737  003004  002616  2$:   MOV     #CANA2,CMDSTG   ;SET PE MODE
3308  021212  005037  002444                CLR     DENFLG          ;SET PE STATISTIC FLAG
3309  021216  012737  000000  002452        MOV     #0,CMMAND       ;SET FOR END OF PASS
3310  021224  000137  021452                JMP     5$
3311  021230  017737  161362  002452  3$:   MOV     @CMDSTG,CMMAND  ;LOAD COMMAND
3312  021236  062737  000002  002616        ADD     #2,CMDSTG       ;SET UP FOR NEXT COMMAND
3313  021244  013737  002452  002462        MOV     CMMAND,RETRCD   ;LOAD RETRY COMMAND
3314  021252  022737  000017  002452        CMP     #WTMGCR,CMMAND  ;SEE IF WRITE TM COMMAND
3315  021260  103406                        BLO     6$              ;BRANCH IF NOT
3316  021262  012737  000001  002602        MOV     #1,REPITN       ;SET REPITITION TO ONE
3317  021270  005237  002570                INC     FILENM          ;INCREMENT FILE NUMBER
3318  021274  000427                        BR      4$
3319  021276  022737  000027  002452  6$:   CMP     #SPRVFL.CMMAND  ;SEE IF SPACE REVERSE FILE
3320  021304  001006                        BNE     7$              ;BRANCH IF NOT
3321  021306  005337  002570                DEC     FILENM
3322  021312  012737  000001  002602        MOV     #1,REPITN       ;SET REPITITION TO ONE
3323  021320  000415                        BR      4$              ;
3324  021322  022737  000025  002452  7$:   CMP     #SPFWFL,CMMAND  ;SEE IF SPACE FORWARD COMMAND
3325  021330  001006                        BNE     10$             ;BRANCH IF NOT
3326  021332  005237  002570                INC     FILENM          ;
3327  021336  012737  000001  002602        MOV     #1,REPITN       ;
3328  021344  000403                        BR      4$
3329  021346  012737  000030  002602  10$:  MOV     #30,REPITN      ;LOAD REPITITION
3330  021354  005337  002620          4$:   DEC     COUNT           ;TEST LOOP
3331  021360  001034                        BNE     5$              ;BRANCH IF NOT DONE
3332  021362  012737  000006  002620        MOV     #6,COUNT        ;RESET TO START OF LOOP
3333  021370  162737  000014  002616        SUB     #14,CMDSTG      ;RESET COMMAND ADDRESS
3334  021376  005237  002222                INC     PATTRN          ;GET NEXT PATTERN
3335  021402  022737  000006  002222        CMP     #6,PATTRN       ;SEE IF USER PATTERN
3336  021410  001003                        BNE     8$              ;BRANCH IF NO
3337  021412  005237  002222                INC     PATTRN          ;GET NEXT PATTERN
3338  021416  000415                        BR      5$              ;
3339  021420  022737  000010  002222  8$:   CMP     #10,PATTRN      ;SEE IF RANDOM PATTERN
3340  021426  001003                        BNE     9$              ;BRANCH IF NO
3341  021430  005237  002222                INC     PATTRN          ;GET NEXT PATTERN
3342  021434  000406                        BR      5$              ;
3343  021436  022737  000011  002222  9$:   CMP     #11,PATTRN      ;SEE IF LAST PATTERN
3344  021444  101002                        BHI     5$              ;BRANCH IF NO
3345  021446  005037  002222                CLR     PATTRN          ;START AT FIRST PATTERN
3346  021452  000207                5$:     RTS     PC              ;RETURN
3347
3348
3349
3350
3351                                  ;
3352
```

```
                                        ;*
                                        ;*  FUNCTIONAL TESTS -- CANNED SEQUENCE 4
                                        ;*
                                        ;*BEGINROUTINE  (MODULE 3.1.5 - FUNCTIONAL TESTS /FUNCT/)
                                        ;*
                                        ;*  IF INITIALIZE SET
                                        ;*  :  THEN
                                        ;*  :    CLEAR INITIALIZE
                                        ;*  :    CLEAR RANDOM RECORD FLAG
                                        ;*  :    CLEAR FILE #
                                        ;*  :    CLEAR RECORD #
                                        ;*  :    DISABLE DATA CHECKING
                                        ;*  :    SET UP ONE REPITION PER COMMAND
                                        ;*  :    ENABLE RETRIES
                                        ;*  :    LOAD FUNCTION TABLE COMMAND LIST
                                        ;*  :    200 BYTES PER RECORD
                                        ;*  :    GO TO CORRECT FUNCTION TEST
                                        ;*  :    LOAD RETRY COMMAND
                                        ;*  :    RETURN TO SEQDEF
                                        ;*  :  ELSE
                                        ;*  :    GO TO CORRECT FUNCTION TEST
                                        ;*  :    LOAD RETRY COMMAND
                                        ;*  :    RETURN TO SEQDEF
                                        ;*  ENDIF
                                        ;*ENDROUTINE

021454                                  FUNCT:
021454                                          PUSH    <R1>
021456  005737  002326                          TST     INTLZE          ;SEE IF WENT THRU INIT CODE
021462  001425                          BEQ     1$              ;BRANCH IF NOT
021464  005037  002326                          CLR     INTLZE          ;CLEAR INITIALIZE FLAG
021470  012737  000001  002216                  MOV     #1,RETRY        ;RETRIES? YES
021476  012737  000200  002220                  MOV     #200,CHAREC     ;START WITH 200 BYTE RECORDS
021504  005037  002224                          CLR     RALNTH          ;CLEAR RANDOM RECORD LENGTH
021510  005037  002566                          CLR     RECORD          ;CLEAR RECORD NUMBER
021514  005037  002570                          CLR     FILENM          ;CLEAR FILE NUMBER
021520  005037  002226                          CLR     DATCHK          ;DATA CHECKED, NO
021524  005037  002442                          CLR     MESNUM          ;SET MESSAGE POINTER
021530  012737  003036  002616                  MOV     #FCNTBL,CMDSTG  ;LOAD FUNCTION TABLE ADDRESS
021536  017701  161054          1$:     MOV     @CMDSTG,R1      ;GET FUNCTION TABLE ADDRESS
021542  004711                          JSR     PC,(R1)         ;GO TO CORRECT FUNCTION TEST
021544  013737  002452  002462                  MOV     CMMAND,RETRCD
021552                                          POP     <R1>
021554  000207                          RTS     PC              ;RETURN


                                        ;*BEGINSUBROUTINE (NOOP FUNCTIONAL TEST -- F.NOP)
                                        ;*
                                        ;*  SET REPEAT COUNT TO 10
                                        ;*  LOAD NOOP COMMAND
                                        ;*  INCREMENT POINTER TO NEXT TEST
                                        ;*  RETURN
                                        ;*ENDSUBROUTINE

021556                                  F.NOP:                          ;NOOP TEST
021556  012737  000010  002602                  MOV     #10,REPITN      ;REPEAT 10 TIMES
```

```
3409  021564  012737  000003  002452          MOV     #NOOP,CMMAND    ;LOAD COMMAND
3410  021572  005037  002442                  CLR     MESNUM          ;SET MESSAGE POINTER
3411  021576  062737  000002  002616          ADD     #2,CMDSTG       ;NEXT STAGE
3412  021604                                  RETURN                  ;
3413
3414                                  ;*BEGINSUBROUTINE (REWIND FUNCTIONAL TEST -- -- F.REW)
3415                                  ;*
3416                                  ;*  SET REPEAT COUNT OF 1
3417                                  ;*  LOAD REWIND COMMAND
3418                                  ;*  SET POINTER TO NEXT STAGE
3419                                  ;*  RETURN
3420                                  ;*ENDSUBROUTINE
3421                                  ;*
3422                                  ;*BEGINSUBROUTINE (SENSE COMMAND ISSUED TO CHECK BOT STATUS AFTER REWIND)
3423                                  ;*
3424                                  ;*  LOAD SENSE COMMAND
3425                                  ;*  SET REPITION COUNT TO 1
3426                                  ;*  SET CHECK BOT WHEN DONE FLAG
3427                                  ;*  SET POINTER TO NEXT TEST
3428                                  ;*  RETURN
3429                                  ;*ENDSUBROUTINE
3430
3431  021606                          F.REW:                          ;REWIND TEST
3432  021606  012737  000001  002602          MOV     #1,REPITN       ;ONE TIME
3433  021614  012737  000007  002452          MOV     #REWIND,CMMAND  ;LOAD REWIND COMMAND
3434  021622  062737  000002  002616          ADD     #2,CMDSTG       ;NEXT TEST
3435  021630                                  RETURN
3436
3437  021632                          F.SNS:                          ;ISSUE SENSE TO CHECK BOT STATUS
3438  021632  012737  000002  002442          MOV     #2,MESNUM       ;SET MESAGE POINTER
3439  021640  012737  000011  002452          MOV     #SENSE,CMMAND   ;LOAD COMMAND
3440  021646  012737  177777  002434          MOV     #-1,CHKBOT      ;SET FLAG
3441  021654  062737  000002  002616          ADD     #2,CMDSTG       ;NEXT TEST
3442  021662  012737  000001  002602          MOV     #1,REPITN       ;ONE TIME ONLY
3443  021670                                  RETURN
3444
3445
3446                                  ;*BEGINSUBROUTINE (READ/WRITE FUNCTIONAL SUBROUTINES)
3447                                  ;*
3448                                  ;*BEGINROUTINE (WRITE)
3449                                  ;*
3450                                  ;*  IF WRITE PE
3451                                  ;*  :  THEN
3452                                  ;*  :    LOAD WRITE PE COMMAND
3453                                  ;*  :    USE 1000 BYTES PER RECORD
3454                                  ;*  :    SET REPITION TO 200
3455                                  ;*  :  ELSE
3456                                  ;*  :    LOAD WRITE GCR COMMAND
3457                                  ;*  :    USE 1000 BYTES/RECORD
3458                                  ;*  :    USE 1000 RECORDS
3459                                  ;*  ENDIF
3460                                  ;*  CLEAR CHECK BOT STATUS FLAG FROM LAST TEST
3461                                  ;*  USE DATA PATTER OF ALL ONES
3462                                  ;*  CLEAR RECORD #
3463                                  ;*  CLEAR FILE #
3464                                  ;*  SET POINTER TO NEXT STAGE
```

```
                                        ;*ENDROUTINE
                                        ;*
                                        ;*BEGINROUTINE (READ SUBROUTINES)
                                        ;*
                                        ;*  IF READ REVERSE
                                        ;*  :  THEN
                                        ;*  :    LOAD READ REVERSE COMMAND
                                        ;*  :  ELSE
                                        ;*  :    LOAD READ FORWARD COMMAND
                                        ;*  ENDIF
                                        ;*  CLEAR FILE NUMBER
                                        ;*  CLEAR RECORD NUMBER
                                        ;*  SET POINTER TO NEXT TEST
                                        ;*  RETURN
                                        ;*ENDROUTINE
                                        ;*
                                        ;*ENDSUBROUTINE

021672                                  F.WPE:                          ;WRITE PE
021672  005037  002444                          CLR     DENFLG          ;USE PE STAT TABLE
021676  012737  000004  002442                  MOV     #4,MESNUM       ;SET MESSAGE POINTER
021704  012737  000061  002452                  MOV     #WRTPE,CMMAND   ;LOAD COMMAND
021712  012737  001000  002220                  MOV     #1000,CHAREC    ;1000 BYTES/REC
021720  012737  000200  002602                  MOV     #200,REPITN     ;200 RECORDS
021726  000413                                  BR      F.WCOM          ;GO TO COMMON CODE

021730                                  F.WGCR:                         ;WRITE GCR
021730  005237  002444                          INC     DENFLG          ;SET GCR STAT FLAG
021734  012737  000063  002452                  MOV     #WRTGCR,CMMAND  ;LOAD COMMAND
021742  012737  001000  002220                  MOV     #1000,CHAREC    ;1000 BYTES/REC
021750  012737  001000  002602                  MOV     #1000,REPITN    ;1000 RECORDS
                                        ;       BR      F.WCOM          ;GO TO COMMON CODE

021756  012737  000001  002222  F.WCOM: MOV     #1,PATTRN       ;PATTER OF ALL ONES
021764  005037  002434                  CLR     CHKBOT          ;CLEAR THIS FLAG
021770  005037  002566                  CLR     RECORD          ;CLEAR REC #
021774  005037  002570                  CLR     FILENM          ;CLEAR FILE #
022000  062737  000002  002616          ADD     #2,CMDSTG       ;NEXT STAGE
022006                                  RETURN

022010  012737  000077  002452  F.RDR1: MOV     #REDREV,CMMAND  ;LOAD READ REVERSE
022016  000403                  BR      F.RD1           ;GO TO COMMON CODE
022020  012737  000071  002452  F.RDF1: MOV     #REDFWD,CMMAND  ;LOAD READ FORWARD
022026  012737  001000  002220  F.RD1:  MOV     #1000,CHAREC    ;1000 BYTES/REC
022034  012737  000200  002602          MOV     #200,REPITN     ;200 RECORDS
022042  062737  000002  002616          ADD     #2,CMDSTG       ;NEXT STAGE
022050                                  RETURN

                                        ;       READ GCR MODE

022052  012737  000077  002452  F.RDR2: MOV     #REDREV,CMMAND  ;LOAD READ REVERSE
022060  000403                  BR      F.RD2           ;GO TO COMMON CODE
022062  012737  000071  002452  F.RDF2: MOV     #REDFWD,CMMAND  ;LOAD READ FORWARD
022070  012737  001000  002220  F.RD2:  MOV     #1000,CHAREC    ;1000 BYTES/REC
022076  012737  001000  002602          MOV     #1000,REPITN    ;1000 RECORDS
022104  062737  000002  002616          ADD     #2,CMDSTG       ;NEXT COMMAND
```

```
3521  022112                                    RETURN
3522
3523
3524                                    ;*BEGINSUBROUTINE (WRITE CHECK FUNCTIONAL TEST -- F.WC)
3525                                    ;*  REWIND TAPE TO BOT
3526                                    ;*  WRITE A RECORD 100 BYTES LONG IN PE MODE
3527                                    ;*  ISSUE A WRITE CHECK REVERSE
3528                                    ;*  ISSUE A WRITE CHECK FORWARD
3529                                    ;*  ASSURE  "WCE" DOES NOT SET
3530                                    ;*  REPEAT FOR GCR MODE
3531                                    ;*ENDSUBROUTINE
3532
3533  022114  012737  000006  002442  F.WC1:  MOV   #6,MESNUM       ;SET MESSAGE POINTER
3534  022122  005737  002510                  TST   DENSWT         ;GCR ?
3535  022126  001006                          BNE   1$             ;YES
3536  022130  005037  002444                  CLR   DENFLG         ;SET PE STAT FLAG
3537  022134  012737  000061  002452          MOV   #WRTPE,CMMAND  ;LOAD WRITE COMMAND
3538  022142  000405                          BR    2$             ;BRANCH
3539  022144  012737  000063  002452  1$:     MOV   #WRTGCR,CMMAND ;LOAD WRITE GCR COMMAND
3540  022152  005237  002444                  INC   DENFLG         ;SET GCR STAT FLAG
3541  022156  012737  004000  002220  2$:     MOV   #4000,CHAREC   ;4000 BYTES/REC
3542  022164  012737  000001  002602          MOV   #1,REPITN      ;ONE TIME
3543  022172  062737  000002  002616          ADD   #2,CMDSTG      ;NEXT STAGE
3544  022200                                  RETURN
3545
3546  022202  012737  000001  002602  F.WC2:  MOV   #1,REPITN      ;ONE TIME
3547  022210  012737  000057  002452          MOV   #WCKREV,CMMAND ;LOAD WRITE CHECK REVERSE
3548  022216  062737  000002  002616          ADD   #2,CMDSTG      ;NEXT STAGE
3549  022224                                  RETURN               ;RETURN
3550
3551  022226  005737  002510          F.WC3:  TST   DENSWT         ;WHICH DENSITY
3552  022232  001406                          BEQ   1$             ;GCR NOW
3553  022234  062737  000002  002616          ADD   #2,CMDSTG      ;NEXT TEST
3554  022242  005037  002510                  CLR   DENSWT         ;CLEAR FLAG
3555  022246  000405                          BR    4$             ;EXIT
3556  022250  005237  002510          1$:     INC   DENSWT         ;SET GCR
3557  022254  012737  003070  002616          MOV   #F.WC,CMDSTG   ;AGAIN
3558  022262  012737  000001  002602  4$:     MOV   #1,REPITN      ;ONE TIME
3559  022270  012737  000051  002452          MOV   #WCKFWD,CMMAND ;WRITE CHECK FORWARD
3560  022276                                  RETURN
3561
3562
3563                                    ;*BEGINROUTINE (SPACING FUNCTIONAL TEST -- F.SP1)
3564                                    ;*
3565                                    ;*BEGINSUBROUTINE (REWIND TAPE)
3566                                    ;*
3567                                    ;*  CALL F.REW TO REWIND THE TAPE
3568                                    ;*  SET RECORD LENGTH COUNTER TO 100
3569                                    ;*  SET POINTER TO NEXT STAGE
3570                                    ;*  RETURN
3571                                    ;*ENDSUBROUTINE
3572
3573                                    ;*BEGINSUBROUTINE (FORMAT TAPE FOR SPACING TEST -- F.SP2)
3574                                    ;*
3575                                    ;*  SET REPEAT COUNT TO 1
3576                                    ;*  LOAD RECORD LENGTH FROM COUNTER "F.TMP1"
```

```
3577                                    ;*  IF DENSWT IS ZERO
3578                                    ;*  :  THEN
3579                                    ;*  :    LOAD WRITE PE COMMAND
3580                                    ;*  :  ELSE
3581                                    ;*  :    LOAD WRITE GCR COMMAND
3582                                    ;*  ENDIF
3583                                    ;*  INCREMENT COUNTER "F.TMP1" FOR NEXT RECORD LENGTH
3584                                    ;*  IF "F.TMP1" IS GREATER THAN 200
3585                                    ;*  :  THEN
3586                                    ;*  :    SET PROGRAM POINTER TO NEXT STAGE
3587                                    ;*  :    LOAD COUNTERS FOR NEXT STAGE
3588                                    ;*  :    F.TMP1 WITH 77
3589                                    ;*  :    F.TMPR WITH 100
3590                                    ;*  :    F.TMPF WITH 176
3591                                    ;*  :  ELSE
3592                                    ;*  :    RETURN
3593                                    ;*  ENDIF
3594                                    ;*ENDSUBROUTINE
3595
3596                                    ;*BEGINSUBROUTINE (DO SPACING VARYING RECORD LENGTHS
3597                                    ;*
3598                                    ;*  (*SPACE REVERSE -- F.SP3*)
3599                                    ;*
3600                                    ;*  LOAD SPACE REVERSE COMMAND
3601                                    ;*  SET REPITION FROM COUNTER "F.TMP1 '
3602                                    ;*  SET POINTER TO NEXT STAGE
3603                                    ;*  RETURN
3604                                    ;*
3605                                    ;*  (*READ REVERSE -- F.SP4*)
3606                                    ;*
3607                                    ;*  LOAD READ REVERSE COMMAND
3608                                    ;*  LOAD RECORD LENGTH FROM COUNTER F.R
3609                                    ;*  SET REPEAT COUNT TO 1
3610                                    ;*  SET NEXT STAGE POINTER
3611                                    ;*
3612                                    ;*  (*SPACE FORWARD RECORD -- F.SP5*)
3613                                    ;*
3614                                    ;*  DECREMENT SPACING COUNTER
3615                                    ;*  IF SPACING COUNTER (F.A) !S = 0
3616                                    ;*  :  THEN
3617                                    ;*  :    EXIT TEST
3618                                    ;*  :  ELSE
3619                                    ;*  :    LOAD SPACE FORWARD COMMAND
3620                                    ;*  :    LOAD REPEAT COUNT FROM COUNTER F.A
3621                                    ;*  :    SET POINTER TO NEXT STAGE
3622                                    ;*  :    RETURN
3623                                    ;*  ENDIF
3624                                    ;*
3625                                    ;*  (*READ FORWARD 1 RECORD -- F.SP6*)
3626                                    ;*
3627                                    ;*  LOAD READ FORWARD COMMAND
3628                                    ;*  SET REPEAT COUNT TO 1
3629                                    ;*  SET RECORD LENGTH FROM COUNTER F.F
3630                                    ;*  DECREMENT SPACE COUNTER F.A
3631                                    ;*  IF F.A = 0
3632                                    ;*  :  THEN
```

```
3633                                    ;*  :    SET POINTER TO NEXT TEST
3634                                    ;*  :  ELSE
3635                                    ;*  :    SET POINTER TO SPACE REVERSE SUBTEST
3636                                    ;*  ENDIF
3637                                    ;*ENDSUBROUTINE
3638
3639                                    ;       TEMPORARY LOCATIONS FOR SPACING TEST
3640
3641  022300  000000                    F.TMP1: .WORD 0
3642  022302  000000                    F.TMPR: .WORD 0
3643  022304  000000                    F.TMPF: .WORD 0
3644
3645
3646                                    ;       SPACING FUNCTIONAL ROUTINES
3647
3648  022306                    F.SP1:  CALL    F.REW                   ;USE REWIND CODE
3649  022312  012737  000010  002442            MOV     #10,MESNUM              ;SET MESSAGE POINTER
3650  022320  012737  000100  022300            MOV     #100,F.TMP1             ;SET UP TEMP FOR NEXT STAGE
3651  022326                                    RETURN
3652
3653  022330  012737  000001  002602  F.SP2:  MOV     #1,REPITN               ;ONLY ONCE
3654  022336  013737  022300  002220            MOV     F.TMP1,CHAREC           ;LOAD BYTES/REC
3655  022344  005737  002510                    TST     DENSWT                  ;WHICH DENSITY
3656  022350  001006                            BNE     1$                      ;BR FOR GCR
3657  022352  005037  002444                    CLR     DENFLG                  ;SET PE STAT FLAG
3658  022356  012737  000061  002452            MOV     #WRTPE,CMMAND           ;LOAD PE WRITE
3659  022364  000405                            BR      2$                      ;JUMP OVER SET GCR
3660  022366  012737  000063  002452  1$:     MOV     #WRTGCR,CMMAND          ;LOAD GCR WRITE
3661  022374  005237  002444                    INC     DENFLG                  ;SET GCR STAT FLAG
3662  022400  005237  022300            2$:     INC     F.TMP1                  ;INCREASE RECORD SIZE
3663  022404  022737  000200  022300            CMP     #200,F.TMP1             ;200 BYTES/REC YET ?
3664  022412  003401                            BLE     3$                      ;YES , QUIT
3665  022414                                    RETURN                          ;NO , HANG IN THERE
3666  022416  062737  000002  002616  3$:     ADD     #2,CMDSTG               ;NEXT SECTION
3667  022424  012737  000077  022300            MOV     #77,F.TMP1              ;SET UP COUNTERS FOR NEXT PART
3668  022432  012737  000100  022302            MOV     #100,F.TMPR             ;REVERSE READ SIZE
3669  022440  012737  000176  022304            MOV     #176,F.TMPF             ;FORWARD READ SIZE
3670  022446                                    RETURN
3671
3672  022450  012737  000023  002452  F.SP3:  MOV     #SPRVRC,CMMAND          ;LOAD SPACE REV RECORD
3673  022456  013737  022300  002602            MOV     F.TMP1,REPITN           ;REPEAT F.TMP1 TIMES
3674  022464  062737  000002  002616            ADD     #2,CMDSTG               ;NEXT PART
3675  022472                                    RETURN
3676
3677  022474  012737  000077  002452  F.SP4:  MOV     #REDREV,CMMAND          ;LOAD READ REVERSE
3678  022502  013737  022302  002220            MOV     F.TMPR,CHAREC           ;LOAD BYTES/REC
3679  022510  012737  000001  002602            MOV     #1,REPITN               ;ONE RECORD
3680  022516  062737  000002  002616            ADD     #2,CMDSTG               ;NEXT PART
3681  022524                                    RETURN
3682
3683  022526  005337  022300            F.SP5:  DEC     F.TMP1                  ;DECREASE SPACE COUNT
3684  022532  001441                            BEQ     F.SPDN                  ;IF ZERO QUIT
3685  022534  012737  000021  002452            MOV     #SPFWRC,CMMAND          ;LOAD SPACE FORWARD COMMAND
3686  022542  013737  022300  002602            MOV     F.TMP1,REPITN           ;LOAD SPACE COUNT
3687  022550  062737  000002  002616            ADD     #2,CMDSTG               ;NEXT STAGE
3688  022556                                    RETURN
```

```
3689
3690  022560  012737  000071  002452  F.SP6:  MOV     #REDFWD,CMMAND          ;LOAD READ FORWARD COMMAND
3691  022566  012737  000001  002602          MOV     #1,REPITN               ;ONE READ
3692  022574  013737  022304  002220          MOV     F.TMPF,CHAREC           ;LOAD BYTES/REC
3693  022602  005237  022302                  INC     F.TMPR                  ;DEC REVERSE COUNTER
3694  022606  005337  022304                  DEC     F.TMPF                  ;DECREMENT FORWARD COUNTER
3695  022612  005337  022300                  DEC     F.TMP1                  ;DECREMENT SPACE COUNTER
3696  022616  022737  000001  022300          CMP     #1,F.TMP1               ;DONE ?
3697  022624  001404                          BEQ     F.SPDN                  ;YES , EXIT
3698  022626  012737  003104  002616          MOV     #F.SPRV,CMDSTG          ;LOOP UNTIL DONE
3699  022634                                  RETURN
3700
3701                                  ;       ONCE SPACING FACTOR GOES TO ZERO
3702
3703  022636  005737  002510          F.SPDN: TST     DENSWT                  ;PE ?
3704  022642  001006                          BNE     1$                      ;NO,SET GCR
3705  022644  005237  002510                  INC     DENSWT                  ;
3706  022650  012737  003100  002616          MOV     #F.SP,CMDSTG            ;RESET SEQUENCE ADDRESS
3707  022656                                  RETURN
3708  022660  005037  002510          1$:     CLR     DENSWT                  ;CLEAR FLAG
3709  022664  012737  003114  002616          MOV     #F.SPND+2,CMDSTG        ;NEXT TEST
3710  022672                                  RETURN
3711
3712                                  ;*BEGINSUBROUTINE (TAPE MARK WRITE/READ)
3713                                  ;*  REWIND TO BOT
3714                                  ;*  ISSUE A WRITE TAPE MARK COMMAND PE
3715                                  ;*  SPACE REVERSE FILE (TO TAPE MARK)
3716                                  ;*  SPACE FORWARD FILE (TO TAPE MARK)
3717                                  ;*  REPEAT FOR GCR TAPE MARK
3718                                  ;*ENDSUBROUTINE
3719
3720
3721                                  ;       TAPE MARK WRITE / READ FUNCTIONAL TEST
3722
3723  022674  012737  000012  002442  F.TM1:  MOV     #12,MFSNUM              ;SET MESSAGE POINTER
3724  022702  005737  002510                  TST     DENSWT                  ;WHICH DENSITY
3725  022706  001406                          BEQ     1$                      ;BRANCH FOR PE
3726  022710  005237  002444                  INC     DENFLG                  ;SET GCR STAT FLAG
3727  022714  012737  000017  002452          MOV     #WTMGCR,CMMAND          ;LOAD GCR TAPE MARK COMMAND
3728  022722  000405                          BR      2$                      ;
3729  022724  012737  000015  002452  1$:     MOV     #WTMPE,CMMAND           ;LOAD WRITE PE TAPE MARK
3730  022732  005037  002444                  CLR     DENFLG                  ;SET PE STAT FLAG
3731  022736  012737  000001  002602  2$:     MOV     #1,REPITN               ;ONE TIME
3732  022744  005037  002566                  CLR     RECORD
3733  022750  005037  002570                  CLR     FILENM                  ;FILE # 0
3734  022754  005037  002220                  CLR     CHAREC                  ;SET TO ZERO
3735  022760  062737  000002  002616          ADD     #2,CMDSTG               ;SET NEXT PART
3736  022766                                  RETURN
3737
3738                                  ;       SPACE REVERSE TAPE MARK
3739
3740  022770  012737  000027  002452  F.TM2:  MOV     #SPRVFL,CMMAND          ;LOAD COMMAND
3741  022776  012737  000001  002602          MOV     #1,REPITN               ;ONE TIME
3742  023004  062737  000002  002616          ADD     #2,CMDSTG               ;NEXT
3743  023012                                  RETURN
3744
```

```
3745                                    ;       SPACE FORWARD TAPE MARK
3746
3747  023014  012737  000025  002452  F.TM3:  MOV     #SPFWFL,CMMAND          ;LOAD FORWARD SPACE
3748  023022  012737  000001  002602           MOV     #1,REPITN               ;ONE TAPE MARK
3749  023030  005737  002510                   TST     DENSWT                  ;CHANGE DENSITIES
3750  023034  001406                           BEQ     1$                      ;YES , USE GCR NOW
3751  023036  062737  000002  002616           ADD     #2,CMDSTG               ;NO QUIT
3752  023044  005037  002510                   CLR     DENSWT                  ;CLEAR FLAG
3753  023050  000405                           BR      2$                      ;QUIT
3754  023052  005237  002510           1$:     INC     DENSWT                  ;SET GCR MODE
3755  023056  162737  000006  002616           SUB     #6,CMDSTG               ;LOOP BACK
3756  023064                           2$:     RETURN
3757
3758                                    ;*BEGINSUBROUTINE (TAPE MARK SPACE TEST)
3759                                    ;*  REWIND TAPE
3760                                    ;*  WRITE ON TAPE THE FOLLOWING PATTERN
3761                                    ;*
3762                                    ;* TM:20 REC:TM:40 REC:TM:60 REC:TM:80 REC:TM:
3763                                    ;*
3764                                    ;*  SPACE REVERSE 200 RECORDS
3765                                    ;*  TAPE SHOULD STOP ON EACH RECORD
3766                                    ;*  5 SPACE REVERSE COMMANDS WILL HAVE TO BE ISSUED
3767                                    ;*  BOT SHOULD NEVER BE REACHED
3768                                    ;*  REPEAT FOR GCR MODE
3769                                    ;*ENDSUBROUTINE
3770
3771  023066                           F.TMS1: CALL    F.REW                   ;REWIND TAPE
3772  023072  012737  000024  022300           MOV     #20.,F.TMP1             ;LOAD RECORD COUNT
3773  023100                                   RETURN
3774
3775                                    ;       FORMAT THE TAPE
3776
3777  023102                           F.TMS2: CALL    F.TM1                   ;WRITE A TAPE MARK
3778  023106                                   RETURN
3779
3780  023110  012737  000014  002442  F.TMS3: MOV     #14,MESNUM              ;SET MESSAGE POINTER
3781  023116  012737  000061  002452           MOV     #WRTPE,CMMAND           ;LOAD WRITE COMMAND
3782  023124  013737  022300  002602           MOV     F.TMP1,REPITN           ;LOAD RECORD COUNT
3783  023132  012737  001000  002220           MOV     #1000,CHAREC            ;1000 BYTES / REC
3784  023140  062737  000024  022300           ADD     #20.,F.TMP1             ;INCREMENT RECORD COUNT
3785  023146  022737  000144  022300           CMP     #100.,F.TMP1            ;DONE ?
3786  023154  002007                           BGE     1$                      ;NO , LOOP
3787  023156  062737  000002  002616           ADD     #2,CMDSTG               ;YES
3788  023164  012737  000310  022300           MOV     #200.,F.TMP1            ;SET UP TOTAL RECORD COUNT
3789  023172  000403                           BR      2$                      ;
3790  023174  162737  000002  002616  1$:      SUB     #2,CMDSTG               ;BACK TO WRITE A TM
3791  023202                           2$:     RETURN
3792
3793                                    ;       HERE WE SPACE REVERSE
3794
3795  023204  012737  177777  002436  F.TMS4: MOV     #-1,CHKUTM              ;SET EXPECT UN-EXPECTED TM
3796  023212  012737  000001  002602           MOV     #1,REPITN               ;ONE RECORD
3797  023220  012737  000023  002452           MOV     #SPRVRC,CMMAND          ;LOAD SPACE REVERSE COMMAND
3798  023226  005337  022300                   DEC     F.TMP1                  ;DECREMENT RECORD COUNT
3799  023232  001020                           BNE     3$                      ;GO DO IT
3800  023234  005037  002436                   CLR     CHKUTM                  ;CLEAR UN-EXPECTED TM FLAG
```

```
3801  023240  005737  002510              TST     DENSWT                  ;DID WE DO GCR YET
3802  023244  001006                      BNE     2$                      ;YES , BRANCH
3803  023246  005237  002510              INC     DENSWT                  ;SET GCR NOW
3804  023252  012737  003124  002616      MOV     #F.TMS,CMDSTG           ;DO IT AGAIN
3805  023260  000405                      BR      3$                      ;RETURN
3806  023262  005037  002510      2$:     CLR     DENSWT                  ;RESET FLAG
3807  023266  062737  000002  002616      ADD     #2,CMDSTG               ;NEXT TEST
3808  023274                      3$:     RETURN
3809
3810
3811                                      ;*BEGINSUBROUTINE (WORST CASE VACUUM COLUMN TEST)
3812                                      ;*  REWIND
3813                                      ;*  FORMAT TAPE WITH 25 RECORDS OF 20 BYTES EACH
3814                                      ;*  REWIND TAPE
3815                                      ;*  CLEAR SPACE COUNT
3816                                      ;*  SPACE FORWARD ''SPACE COUNT + 1'' TIMES
3817                                      ;*  IF SPACE COUNT > 25
3818                                      ;*    THEN
3819                                      ;*      REWIND
3820                                      ;*      SPACE FORWARD ''SPACE COUNT - 1'' TIMES
3821                                      ;*      IF SPACE COUNT = 0
3822                                      ;*        THEN
3823                                      ;*          REPEAT FOR GCR MODE
3824                                      ;*        ELSE
3825                                      ;*          REWIND
3826                                      ;*      ENDIF
3827                                      ;*    ELSE
3828                                      ;*      REWIND
3829                                      ;*  ENDIF
3830                                      ;*ENDSUBROUTINE
3831
3832  023276  012737  000016  002442  F.VC1:  MOV     #16,MESNUM              ;SET MESSAGE POINTER
3833  023304  005737  002510                  TST     DENSWT                  ;WHICH DENSITY
3834  023310  001006                          BNE     1$                      ;BR FOR GCR
3835  023312  005037  002444                  CLR     DENFLG                  ;SET PE STAT FLAG
3836  023316  012737  000061  002452          MOV     #WRTPE,CMMAND           ;PE WRITE
3837  023324  000405                          BR      2$                      ;ENTER COMMON CODE
3838  023326  012737  000063  002452  1$:     MOV     #WRTGCR,CMMAND          ;GCR WRITE
3839  023334  005237  002444                  INC     DENFLG                  ;SET GCR STAT FLAG
3840  023340  012737  000025  002602  2$:     MOV     #25,REPITN              ;25 RECORDS
3841  023346  012737  000020  002220          MOV     #20,CHAREC              ;20 BYTES/REC
3842  023354  005037  022300                  CLR     F.TMP1                  ;CLEAR RECORD COUNT
3843  023360  062737  000002  002616          ADD     #2,CMDSTG               ;NEXT SECTION
3844  023366                                  RETURN                          ;RETURN
3845
3846  023370  005237  022300          F.VC2:  INC     F.TMP1                  ;INCREMENT SPACING COUNT
3847  023374  023727  022300  000025          CMP     F.TMP1,#25              ;DONE ?
3848  023402  003404                          BLE     1$                      ;NOT YET
3849  023404  062737  000002  002616          ADD     #2,CMDSTG               ;YES , NEXT SECTION
3850  023412  000411                          BR      10$
3851  023414  013737  022300  002602  1$:     MOV     F.TMP1,REPITN           ;LOAD SPACE COUNT
3852  023422  012737  000021  002452          MOV     #SPFWRC,CMMAND          ;LOAD SPACE FORWARD
3853  023430  162737  000002  002616          SUB     #2,CMDSTG               ;ISSUE A REWIND
3854  023436                          10$:    RETURN
3855
3856  023440  162737  000001  022300  F.VC3:  SUB     #1,F.TMP1               ;DECREMENT SPACE COUNT
```

```
3857  023446  001011                          BNE     1$                      ;BR IF NOT DONE
3858  023450  005737  002510                  TST     DENSWT                  ;REALLY DONE <BOTH DENS>
3859  023454  001020                          BNE     10$                     ;YES
3860  023456  005237  002510                  INC     DENSWT                  ;NO SET GCR NOW
3861  023462  012737  003134  002616          MOV     #F.VC,CMDSTG            ;AGAIN
3862  023470  000417                          BR      11$
3863  023472  013737  022300  002602  1$:     MOV     F.TMP1,REPITN           ;LOAD SPACE COUNT
3864  023500  012737  000021  002452          MOV     #SPFWRC,CMMAND          ;LOAD COMMAND
3865  023506  162737  000002  002616          SUB     #2,CMDSTG
3866  023514  000405                          BR      11$                     ;RETURN
3867  023516  005037  002510          10$:    CLR     DENSWT                  ;CLEAR FLAG
3868  023522  062737  000002  00261o          ADD     #2,CMDSTG               ;NEXT TEST
3869  023530                          11$:    RETURN
3870
3871                                  ;*BEGINSUBROUTINE (ERASE FUNCTIONAL TEST)
3872                                  ;*  REWIND
3873                                  ;*  ISSUE 200 -- 3" ERASE COMMANDS (40 FEET)
3874                                  ;*  REWIND
3875                                  ;*  ISSUE READ FORWARD
3876                                  ;*  EXPECT NOT CAPABLE
3877                                  ;*  REPEAT FOR GCR
3878                                  ;*ENDSUBROUTINE
3879
3880
3881  023532  012737  000020  002442  F.ER1:  MOV     #20,MESNUM              ;SET MESSAGE POINTER
3882  023540  005737  002510                  TST     DENSWT                  ;WHICH DENSITY
3883  023544  001006                          BNE     1$                      ;BRANCH FOR GCR
3884  023546  005037  002444                  CLR     DENFLG                  ;SET PE STAT FLAG
3885  023552  012737  000035  002452          MOV     #ERGPE,CMMAND           ;LOAD ERASE PE
3886  023560  000405                          BR      2$
3887  023562  012737  000037  002452  1$:     MOV     #ERGGCR,CMMAND          ;ERASE GCR
3888  023570  005237  002444                  INC     DENFLG                  ;SET GCR STAT FLAG
3889  023574  012737  000310  002602  2$:     MOV     #200.,REPITN            ;200 TIMES
3890  023602  062737  000002  002616          ADD     #2,CMDSTG               ;NEXT PART
3891  023610                                  RETURN
3892                                  ;       READ TAPE TO MAKE SURE IT WAS ERASED
3893
3894  023612  012737  000001  002602  F.ER2:  MOV     #1,REPITN               ;ONE TIME
3895  023620  012737  000071  002452          MOV     #REDFWD,CMMAND          ;LOAD READ
3896  023626  062737  000002  002616          ADD     #2,CMDSTG               ;NEXT PART
3897  023634  005037  002440                  CLR     ERASED                  ;CLEAR FLAG
3898  023640                                  RETURN
3899
3900                                  ;       CHECK TO SEE THAT NOT CAPABLE OCCURED
3901
3902  023642  005737  002440          F.ER3:  TST     ERASED                  ;DID WE GET A NON CAPABLE INT CODE
3903  023646  001004                          BNE     1$                      ;YES , EXIT
3904  023650                                  ERRDF   38.,ERM037,ERRMS1       ;PRINT ERASE FAILED
3905  023660  005737  002510          1$:     TST     DENSWT                  ;WHICH DENSITY
3906  023664  001006                          BNE     2$                      ;BRANCH IF GCR WAS DONE
3907  023666  005237  002510                  INC     DENSWT                  ;SET GCR
3908  023672  012737  003150  002616          MOV     #F.ER,CMDSTG            ;SET START OF ERASE TEST
3909  023700  000407                          BR      4$                      ;EXIT
3910  023702  005037  002510          2$:     CLR     DENSWT                  ;CLEAR DENSITY FLAG
3911  023706  062737  000002  002616          ADD     #2,CMDSTG               ;NEXT TEST
3912  023714  005037  002440                  CLR     ERASED                  ;
```

```
023720                          4$:     RETURN

                                ;*BEGINSUBROUTINE (SHORT AND LONG RECORD TEST)
                                ;*  REWIND TAPE
                                ;*  SET BYTE COUNT TO ZERO
                                ;*  WRITE 20 RECORDS IN PE
                                ;*  READ REVERSE 20 RECORDS
                                ;*  READ FORWARD 20 RECORDS
                                ;*  INCREMENT BYTE COUNT
                                ;*  IF BYTE COUNT IS GREATER THAN 20
                                ;*    THEN
                                ;*      CONTINUE
                                ;*    ELSE
                                ;*      GO BACK AND WRITE 20 RECORDS AGAIN
                                ;*  ENDIF
                                ;*  REWIND TAPE
                                ;*  SET BYTE COUNT TO MAX
                                ;*  WRITE 2 RECORDS IN PE
                                ;*  READ REVERSE 2 RECORDS
                                ;*  READ FORWARD 2 RECORDS
                                ;*  DECREMENT BYTE COUNT
                                ;*  IF BYTE COUNT IS MAX-4
                                ;*    THEN
                                ;*      CONTINUE
                                ;*    ELSE
                                ;*      WRITE 2 MORE RECORDS
                                ;*      READ REV THEN FORWARD OVER THEM
                                ;*    ENDIF
                                ;*  REPEAT OPERATION FOR GCR RECORDING MODE
                                ;*ENDSUBROUTINE

                                ;       SHORT RECORDS

023722  005037  002450        F.SH1:  CLR     BIGREC                  ;CLEAR BIG RECORD FLAG
023726                                CALL    F.REW                   ;REWIND
023732  012737  000001  022300        MOV     #1,F.TMP1               ;START WITH ONE BYTE PER REC
023740  005037  002566                CLR     RECORD                  ;RECORD 0
023744  005037  002570                CLR     FILENM                  ;FILE 0
023750                                RETURN                  ;RETURN

023752  012737  000022  002442  F.SH2:  MOV     #22,MESNUM              ;SET MESSAGE ADDRESS
023760  012737  000010  002222        MOV     #10,PATTRN              ;SET DATA PATTERN
023766  012737  000020  002602        MOV     #20,REPITN              ;20 RECORDS
023774  013737  022300  002220        MOV     F.TMP1,CHAREC           ;LOAD BYTE COUNT
024002  005737  002510                TST     DENSWT                  ;PE OR GCR
024006  001006                        BNE     1$                      ;BR IF GCR
024010  005037  002444                CLR     DENFLG                  ;SET PE STATISTICS
024014  012737  000061  002452        MOV     #WRTPE,CMMAND           ;ISSUE A WRITE PE
024022  000405                        BR      2$                      ;
024024  005237  002444        1$:     INC     DENFLG                  ;SET GCR STATISTICS
024030  012737  000063  002452        MOV     #WRTGCR,CMMAND          ;GCR WRITE
024036  062737  000002  002616  2$:     ADD     #2,CMDSTG               ;NEXT PART
024044                                RETURN

024046  012737  000020  002602  F.SH3:  MOV     #20,REPITN              ;20 RECORDS
024054  012737  000077  002452        MOV     #REDREV,CMMAND          ;READ REVERSE
```

```
3969  024062  013737  022300  002220          MOV     F.TMP1,CHAREC           ;LOAD BYTE COUNT
3970  024070  062737  000002  002616          ADD     #2,CMDSTG               ;NEXT
3971  024076                                  RETURN
3972
3973  024100  012737  000020  002602  F.SH4:  MOV     #20,REPITN              ;20 RECORDS
3974  024106  012737  000071  002452          MOV     #REDFWD,CMMAND          ;READ FORWARD
3975  024114  013737  022300  002220          MOV     F.TMP1,CHAREC           ;LOAD BYTE COUNT
3976  024122  005237  022300                  INC     F.TMP1                  ;INCREMENT BYTE COUNT
3977  024126  022737  000021  022300          CMP     #21,F.TMP1              ;DONE ?
3978  024134  001004                          BNE     1$                      ;NO , BRANCH
3979  024136  062737  000002  002616          ADD     #2,CMDSTG               ;NEXT
3980  024144  000403                          BR      2$                      ;EXIT
3981  024146  012737  003164  002616  1$:     MOV     #F.SHRT,CMDSTG          ;LOOP
3982  024154                          2$:     RETURN
3983
3984                                  ;       LONG RECORD TEST
3985
3986  024156                          F.LNG1: CALL    F.REW                   ;REWIND
3987  024162  005037  002566                  CLR     RECORD
3988  024166  005037  002570                  CLR     FILENM                  ;FILE 0
3989  024172  012737  177777  022300          MOV     #-1,F.TMP1              ;SET LARGEST BYTE COUNT
3990  024200                                  RETURN
3991
3992  024202  012737  000002  002602  F.LNG2: MOV     #2,REPITN               ;2 RECORDS
3993  024210  013737  022300  002220          MOV     F.TMP1,CHAREC           ;LOAD BYTE COUNT
3994  024216  012737  000377  002446          MOV     #000377,LNGDAT          ;SET LONG RECORD DATA
3995  024224  012737  177777  002450          MOV     #-1,BIGREC              ;SET BIGRECORD FLAG
3996  024232  005737  002510                  TST     DENSWT                  ;PE OR GCR ?
3997  024236  001006                          BNE     1$                      ;BR IF GCR
3998  024240  005037  002444                  CLR     DENFLG                  ;SET PE STATISTICS
3999  024244  012737  000061  002452          MOV     #WRTPE,CMMAND           ;WRITE PE
4000  024252  000405                          BR      2$                      ;
4001  024254  005237  002444          1$:     INC     DENFLG                  ;SET GCR STATISTICS
4002  024260  012737  000063  002452          MOV     #WRTGCR,CMMAND          ;WRITE GCR
4003  024266  062737  000002  002616  2$:     ADD     #2,CMDSTG               ;NEXT
4004  024274                                  RETURN
4005
4006  024276  012737  000002  002602  F.LNG3: MOV     #2,REPITN               ;2 RECORDS
4007  024304  012737  000077  002452          MOV     #REDREV,CMMAND          ;READ REVERSE
4008  024312  013737  022300  002220          MOV     F.TMP1,CHAREC           ;LOAD BYTE COUNT
4009  024320  062737  000002  002616          ADD     #2,CMDSTG               ;NEXT
4010  024326                                  RETURN
4011
4012  024330  012737  000002  002602  F.LNG4: MOV     #2,REPITN               ;2 RECORDS
4013  024336  012737  000071  002452          MOV     #REDFWD,CMMAND          ;READ FORWARD
4014  024344  013737  022300  002220          MOV     F.TMP1,CHAREC           ;LOAD BYTE COUNT
4015  024352  005337  022300                  DEC     F.TMP1                  ;COUNT DOWN
4016  024356  022737  177773  022300          CMP     #177773,F.TMP1          ;DONE ?
4017  024364  001404                          BEQ     2$                      ;YES , BRANCH
4018  024366  012737  003174  002616  1$:     MOV     #F.LONG,CMDSTG          ;LOOP UNTIL DONE
4019  024374  000416                          BR      3$                      ;EXIT
4020  024376  005737  002510          2$:     TST     DENSWT                  ;DONE
4021  024402  001006                          BNE     4$                      ;YES , BRANCH
4022  024404  005237  002510                  INC     DENSWT                  ;NO , SET GCR
4023  024410  012737  003162  002616          MOV     #F.SL,CMDSTG            ;GO BACK TO START
4024  024416  000405                          BR      3$                      ;
```

```
4025  024420  005037  002510          4$:     CLR     DENSWT                  ;RESET FLAGS
4026  024424  062737  000002  002616          ADD     #2,CMDSTG               ;NEXT
4027  024432                          3$:     RETURN
4028
4029
4030                                  ;*BEGINSUBROUTINE (CAPSTAN WORST CASE TEST)
4031                                  ;*  REWIND TAPE
4032                                  ;*  ERASE 400' OF TAPE SET PE (1600 ERASE 3'')
4033                                  ;*  WAIT 10 SECONDS
4034                                  ;*  REWIND AT HIGH SPEED
4035                                  ;*ENDSUBROUTINE
4036
4037  024434  005037  002450          F.CP1:  CLR     BIGREC                  ;CLEAR FROM LAST TEST
4038  024440  012737  000024  002442          MOV     #24,MESNUM              ;SET MESSAGE POINTER
4039  024446  012737  003100  002602          MOV     #1600.,REPITN           ;400 FEET
4040  024454  012737  000037  002452          MOV     #ERGGCR,CMMAND          ;ERASE COMMAND
4041  024462  062737  000002  002616          ADD     #2,CMDSTG               ;SET FOR NEXT STAGE
4042  024470                                  RETURN
4043
4044  024472  012701  000600          F.CP2:  MOV     #600,R1                 ;LOOP COUNT
4045  024476                          1$:     DELAY   250                     ;DELAY
4046  024526                                  BREAK                           ;KEEP ALIVE
4047  024530  005301                          DEC     R1
4048  024532  001361                          BNE     1$
4049  024534  000240                  PATCH:  NOP
4050  024536  000240                          NOP
4051  024540  000240                          NOP                             ;TEMPORARY PATCHING LOCATIONS
4052  024542                                  CALL    F.REW                   ;REWIND TAPE
4053  024546                                  RETURN                          ;RETURN
4054
4055  024550  012737  003036  002616  F.END:  MOV     #FCNTBL,CMDSTG          ;SET FOR NEXT PASS
4056  024556  005037  002452                  CLR     CMMAND                  ;LOAD END OF PASS COMMAND
4057  024562                                  RETURN
4058
4059
4060
4061                                  ;
4062                                  ;RETRY SUBROUTINES
4063                                  ;
4064
4065
4066  024564  005737  002470          RTRY01: TST     VISIT                   ;SEE IF FIRST TIME THROUGH LOOP
4067  024570  001016                          BNE     2$                      ;BRANCH IF NOT
4068  024572  005237  002470                  INC     VISIT                   ;SET VISIT FLAG
4069  024576  022737  000077  002452          CMP     #REDREV,CMMAND          ;SEE IF READ REVERSE COMMAND
4070  024604  001404                          BEQ     1$                      ;BRANCH IF READ REVERSE
4071  024606  012737  000023  002452          MOV     #SPRVRC,CMMAND          ;LOAD SPACE REVERSE COMMAND,
4072  024614  000411                          BR      3$                      ;GET OUT
4073  024616  012737  000021  002452  1$:     MOV     #SPFWRC,CMMAND          ;LOAD SPACE FORWARD COMMAND
4074  024624  000405                          BR      3$                      ;
4075  024626  013737  002462  002452  2$:     MOV     RETRCD,CMMAND           ;EXECUTE RETRY COMMAND
4076  024634  005037  002470                  CLR     VISIT                   ;CLEAR VISIT FLAG
4077  024640  000207                  3$:     RTS     PC
4078
4079
4080  024642  013737  002462  002452  RTRY02: MOV     RETRCD,CMMAND           ;REISSUE COMMAND
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 4081  024650  000207                          RTS     PC
 4082
 4083
 4084
 4085  024652  022737  000077  002462  RTRY03: CMP     #REDREV,RETRCD  ;SEE IF READ REVERSE COMMAND
 4086  024660  001404                          BEQ     1$              ;BRANCH IF READ REVARSE
 4087  024662  012737  000077  002452          MOV     #REDREV,CMMAND  ;LOAD READ REVERSE
 4088  024670  000403                          BR      2$              ;
 4089  024672  012737  000071  002452  1$:     MOV     #REDFWD,CMMAND  ;LOAD READ
 4090  024700  000207                  2$:     RTS     PC
 4091
 4092  024702  005737  002470          RTRY04: TST     VISIT           ;FIND WHAT LOOP
 4093  024706  001006                          BNE     1$              ;BRANCH IF DATA TRANS LOOP
 4094  024710  005237  002470                  INC     VISIT           ;SET VISIT FLAG
 4095  024714  012737  000023  002452          MOV     #SPRVRC,CMMAND  ;LOAD SPACE REVERSE CODE
 4096  024722  000441                          BR      4$              ;GET OUT
 4097  024724  023737  002556  002560  1$:     CMP     WRTCNT,WRTYCT   ;SEE IF ISSUE WRITE COMMAND
 4098  024732  001426                          BEQ     3$              ;BRANCH IF ISSUE WRITE COMMAND
 4099  024734  005237  002546                  INC     BADCNT          ;INCREMENT # OF BAD TRIES
 4100  024740  005037  002556                  CLR     WRTCNT          ;CLEAR WRITE RETRY COUNT
 4101  024744  005037  002560                  CLR     WRTYCT          ;CLEAR WRITE RETRY COUNT
 4102  024750  022737  000063  002462          CMP     #WRTGCR,RETRCD  ;SEE IF PE OR GCR
 4103  024756  001006                          BNE     2$              ;BRANCH IF PE
 4104  024760  012737  000037  002452          MOV     #ERGGCR,CMMAND  ;LOAD ERASE 3 INCHES GCR
 4105  024766  005237  002514                  INC     ERAFLG
 4106  024772  000415                          BR      4$              ;CONTINUE RETRY
 4107  024774  012737  000035  002452  2$:     MOV     #ERGPE,CMMAND   ;LOAD ERASE 3 INCHES PE
 4108  025002  005237  002514                  INC     ERAFLG
 4109  025006  000407                          BR      4$              ;CONTINUE RETRY
 4110  025010  013737  002462  002452  3$:     MOV     RETRCD,CMMAND   ;REISSUE WRITE
 4111  025016  005037  002470                  CLR     VISIT           ;SET UP FOR SPACE
 4112  025022  005237  002556                  INC     WRTCNT          ;SET UP FOR SUCCESSIVE WRITES
 4113  025026  000207                  4$:     RTS     PC              ;
 4114
 4115
 4116  025030  022737  000061  002452  RTRY05: CMP     #WRTPE,CMMAND           ;SEE IF WRITE PE
 4117  025036  001004                          BNE     1$                      ;BRANCH IF WRITE GCR
 4118  025040  012737  000041  002452          MOV     #CLFLPE,CMMAND          ;SET UP CLOSE PE TAPE
 4119  025046  000403                          BR      2$                      ;
 4120  025050  012737  000043  002452  1$:     MOV     #CLFGCR,CMMAND          ;SET UP CLOSE GCR TAPE
 4121  025056  005037  002604          2$:     CLR     RTYFLG
 4122  025062  000207                          RTS     PC              ;RETURN
 4123
 4124  025064  005737  002470          RTRY06: TST     VISIT           ;SEE IF HERE BEFORE
 4125  025070  001006                          BNE     1$              ;BRANCH IF YES
 4126  025072  005237  002470                  INC     VISIT           ;SET VISIT VLAG
 4127  025076  012737  000023  002452          MOV     #SPRVRC,CMMAND  ;SPACE REVERSE
 4128  025104  000417                          BR      4$              ;BRANCH OUT
 4129  025106  005037  002470          1$:     CLR     VISIT
 4130  025112  022737  000063  002462          CMP     #WRTGCR,RETRCD  ;SEE IF PE
 4131  025120  001404                          BEQ     2$              ;BRANCH IF GCR
 4132  025122  012737  000041  002452          MOV     #CLFLPE,CMMAND  ;CLOSE FILE PE
 4133  025130  000403                          BR      3$
 4134  025132  012737  000043  002452  2$:     MOV     #CLFGCR,CMMAND  ;CLOSE FILE GCR
 4135  025140  005037  002604          3$:     CLR     RTYFLG
 4136  025144  000207                  4$:     RTS     PC              ;GO HOME
```

```
4137
4138
4139
4140                                    ;*
4141                                    ;* ISSUE COMMAND MODULE 3.2
4142                                    ;*
4143                                    ;*BEGINROUTINE (MOD = 3.2 ISSUE COMMAND /ISSCMD/)
4144                                    ;*  FIND CORRECT CAS REG WITH RH ADD AND TM #
4145                                    ;*  LOAD TM # IN CAS REGISTER
4146                                    ;*  IF CMD IS LESS THAN 50
4147                                    ;*  :  THEN
4148                                    ;*  :    CLR DATRAN FLAG
4149                                    ;*  :    LOAD TM# IN CAS REG
4150                                    ;*  :    CLEAR ATTENTION SUMMARY REGISTER
4151                                    ;*  :    CLEAR TRE BIT IN CS1
4152                                    ;*  :    ENABLE INTERRUPTS
4153                                    ;*  :    LOAD CMD IN APPROPRIATE TU LOCATION IN CAS REG
4154                                    ;*  :  ELSE
4155                                    ;*  :    SET DATRAN FLAG
4156                                    ;*  :    SET UP RH REGISTER 14
4157                                    ;*  :    CALL 3.2.1 (SETUP DATA BUFFER)
4158                                    ;*  :    LOAD BYTE COUNT INTO CAS REG
4159                                    ;*  :    LOAD TU# IN CMD ADDRESS IN CAS REG
4160                                    ;*  :    CLEAR TRE BIT IN CS1
4161                                    ;*  :    ENABLE INTERRUPTS
4162                                    ;*  :    LOAD COMMAND INTO CAS REG
4163                                    ;*  ENDIF
4164                                    ;*ENDROUTINE
4165
4166
4167  025146                            ISSCMD: PUSH    <R1,R2>          ;
4168  025152  012737  000000  002316            MOV     #RHADD,DISPLC    ;MOVE INFORMATION DESIRED INTO TABLE DISPL
4169  025160  004737  036076                    JSR     PC,TBLDIS        ;GET RHADD FOR SPECIFIED TABLE
4170  025164  017701  155126                    MOV     @DISPLC,R1       ;TEMP STORAGE
4171  025170  012737  000004  002316            MOV     #TMNUM,DISPLC    ;FIND OFFSET FOR TM NUMBER
4172  025176  004737  036076                    JSR     PC,TBLDIS        ;GET ADDRESS
4173  025202  017761  155110  000010            MOV     @DISPLC,UNSLCT(R1)  ;PUT UNIT NUMBER INTO UNIT SELECT
4174  025210  022737  000050  002452            CMP     #50,CMMAND       ;SEE IF MOTION OR TRANSFER COMMAND
4175  025216  100425                            BMI     1$               ;BRANCH IF DATA TRANSFER COMMAND
4176  025220  005037  002516                    CLR     DATRAN           ;CLEAR FLAG
4177  025224  012737  000006  002316            MOV     #TUNUM,DISPLC    ;FIND OFFSET FOR TU NUMBER
4178  025232  004737  036076                    JSR     PC,TBLDIS        ;GET ADDRESS
4179  025236  017702  155054                    MOV     @DISPLC,R2       ;R2 CONTAINS TU NUMBER
4180  025242  006302                            ASL     R2               ;SHIFT FOR WORDS
4181  025244  062702  000040                    ADD     #NDTFCO,R2       ;GETTING LOCATION FOR MOTION COMMANDS
4182  025250  060102                            ADD     R1,R2            ;LOCATION FOR COMMAND
4183  025252  012711  040000                    MOV     #40000,(R1)      ;CLEAR TRE BIT
4184  025256  005011                            CLR     (R1)             ;CLEAR TRE BIT IN TM78 MEMORY
4185  025260  012711  000100                    MOV     #100,(R1)        ;SET INTERRUPT ENABLE BIT
4186  025264  013712  002452                    MOV     CMMAND,(R2)      ;PUT COMMAND INTO CAS
4187  025270  000444                            BR      2$               ;
4188
4189  025272  012737  000001  002516  1$:       MOV     #1,DATRAN        ;SET DATA TRANSFER FLAG
4190  025300  042761  077777  000014            BIC     #77777,CMDADR(R1)  ;SET FORMAT , SKIP COUNT,AND RECORD CNT TO  0
4191  025306  004737  025410                    JSR     PC,SETDBF        ;SETUP DATA BUFFER
4192  025312  013761  002456  000006            MOV     BUFFER,BYTCNT(R1)  ;SETUP BYTE COUNT
```

```
4193  025320  012737  000006  002316          MOV     #TUNUM,DISPLC   ;FIND OFFSET FOR TU NUMBER
4194  025326  004737  036076                  JSR     PC,TBLDIS       ;GET ADDRESS
4195  025332  057761  154760  000014          BIS     @DISPLC,CMDADR(R1)  ;PUT TU INTO COMMAND ADR
4196  025340  013737  002452  002454          MOV     CMMAND,EICMMD
4197  025346  062737  000100  002454          ADD     #100,EICMMD             ;SET INTERRUPT ENABLE BIT
4198  025354  012711  040000                  MOV     #40000,(R1)     ;CLEAR TRE BIT IN CS1
4199  025360  005011                          CLR     (R1)            ;CLEAR TRE BIT IN TM78 MEMORY
4200  025362  005737  002450                  TST     BIGREC          ;LARGE RECORD FLAG SET
4201  025366  001403                          BEQ     20$             ;NO , PROCEED AS USUAL
4202  025370  052761  000010  000010          BIS     #10,UNSLCT(R1)  ,SET BUS ADDRESS INCREMENT INHIBIT
4203  025376  013711  002454          20$:    MOV     EICMMD,(R1)     ;LOAD COMMAND
4204  025402                          2$:     POP     <R2,R1>         ;RESTORE REGISTERS
4205  025406  000207                          RTS     PC
4206
4207
4208
4209
4210
4211                                  ;*
4212                                  ;*SET UP DATA BUFFER MOD = 3.2.1
4213                                  ;*
4214                                  ;*BEGINROUTINE (MOD = 3.2.1 SET UP DATA BUFFER /SETDBF/)
4215                                  ;*  IF RANDOM RECORDS
4216                                  ;*  :  THEN
4217                                  ;*  :    DO UNTIL CORRECT SIZE
4218                                  ;*  :    :  CALL RANDOM GEN
4219                                  ;*  :    ENDDO
4220                                  ;*  :    STORE BYTES IN RECORD
4221                                  ;*  :    IF BUFFER NOT=CHARACTERS PER RECORD
4222                                  ;*  :    :  THEN
4223                                  ;*  :    :    RESET BUFFER GENERATION FLAG
4224                                  ;*  :    ENDIF
4225                                  ;*  ENDIF
4226                                  ;*  IF # OF_BYTES IS GREATER THAN BUFFSIZE (BYTE) (RECORDS)
4227                                  ;*  :  THEN
4228                                  ;*  :    PRINT BUFFER REQUESTED TOO LARGE, USING LARGEST AVAILABLE (X)
4229                                  ;*  :    MOVE BUFFER TO TEMPORARY LOCATION
4230                                  ;*  :  ELSE
4231                                  ;*  :    MOVE #_OF_BYTES TO TEMPORARY LOCATION
4232                                  ;*  ENDIF
4233                                  ;*  IF ODD # OF BYTES IN BUFFER
4234                                  ;*  :  THEN
4235                                  ;*  :    INCREMENT BUFFER
4236                                  ;*  ENDIF
4237                                  ;*  DIVIDE BYTES BY TWO
4238                                  ;*  TWO'S COMPLEMENT BYTES
4239                                  ;*  MOVE BYTES TO MTWC, (MASS BUS WORD COUNT)
4240                                  ;*  TWO'S COMPLEMENT BYTES
4241                                  ;*  CALCULATE END OF BUFFER
4242                                  ;*  IF READ COMMAND
4243                                  ;*  :  THEN
4244                                  ;*  :    ZERO READ BUFFER
4245                                  ;*  :    IF READ REVERSE
4246                                  ;*  :    :  THEN
4247                                  ;*  :    :    IF ODD BUFFER
4248                                  ;*  :    :    :  THEN
```

```
4249                                    ;*  :    :    :    ADJUST SKIP COUNT
4250                                    ;*  :    :    :    PUT END OF BUFFER INTO MASS BUS ADDRESS
4251                                    ;*  :    :    ENDIF
4252                                    ;*  :    :  ELSE
4253                                    ;*  :    :    PUT END OF READ BUFFER INTO MASS BUS ADDRESS
4254                                    ;*  :    ENDIF
4255                                    ;*  :  ELSE
4256                                    ;*  :    LOAD BEGINNING OF READ BUFFER INTO MASSBUS ADDRESS
4257                                    ;*  ENDIF
4258                                    ;*  IF WRITE COMMAND
4259                                    ;*  :  THEN
4260                                    ;*  :    IF NOT SAME PATTERN
4261                                    ;*  :    :  THEN
4262                                    ;*  :    :    CALL GENBUF (3.2.1.1)
4263                                    ;*  :    :    SET PATTERN # GENERATION FLAG
4264                                    ;*  :    ENDIF
4265                                    ;*  ENDIF
4266                                    ;*ENDROUTINE
4267
4268
4269
4270  025410                            SETDBF: PUSH    <R1,R2,R3,R4,R5>
4271  025422  023727  002452  000067            CMP     CMMAND,#67      ;SEE IF READ COMMAND
4272  025430  101025                            BHI     10$             ;BRANCH IF YES
4273  025432  005737  002224                   TST     RALNTH          ;SEE  IF RANDOM RECORD LENGTH
4274  025436  001422                            BEQ     10$             ;BRANCH IF NOT
4275  025440  023737  002564  002352            CMP     RECTBL,TBLNUM   ;SEE IF SAME COMMAND DIFFERENT TU
4276  025446  001416                            BEQ     10$             ;BRANCH IF YES
4277  025450  005737  002604                   TST     RTYFLG          ;RETRY IN PROGRESS?
4278  025454  001022                            BNE     9$              ;BRANCH AROUND BUF REGEN IF SO
4279  025456  004737  026120          11$:     JSR     PC,RANGEN       ;GET RANDOM RECORD LENGTH
4280  025462  042737  170000  002640            BIC     #170000,RANS2   ;KEEP RECOR LENGTH LOWER THAN 4K
4281  025470  005737  002640                   TST     RANS2           ;SEE !F ZERO
4282  025474  001770                            BEQ     11$             ;BRANCH IF YES
4283  025476  013737  002640  002220            MOV     RANS2,CHAREC    ;STORE NEW BYTES PER RECORD
4284  025504  023737  002456  002220  10$:      CMP     BUFFER,CHAREC   ;SEE IF SAME BUFFER SIZE
4285  025512  001403                            BEQ     9$              ;BRANCH IF NOT
4286  025514  012737  177777  002426            MOV     #-1,GENFLG      ;NEW BUFFER GENERATION FLAG
4287  025522  013705  002220          9$:      MOV     CHAREC,R5       ;R5 CONTAINS BYTE COUNT
4288  025526  005737  002450                   TST     BIGREC          ;BIG RECORD FLAG SET
4289  025532  001020                            BNE     1$              ;YES SKIP THIS SECTION
4290  025534  023737  002220  002312            CMP     CHAREC,BUFSIZ   ;SEE IF BYTE COUNT TOO LARGE
4291  025542  101414                            BLOS    1$              ;BRANCH IF ACCEPTABLE BYTE COUNT
4292  025544  013705  002312                   MOV     BUFSIZ,R5       ;R5 HAS LARGEST BYTE COUNT ALLOWED
4293  025550                                    PRINTF  #ERRBUF,BUFSIZ  ;PRINT ERROR
4294  025574  012737  000000  002316  1$:      MOV     #RHADD,DISPLC
4295  025602  004737  036076                   JSR     PC,TBLDIS       ;GET RH ADDRESS
4296  025606  017701  154504                   MOV     @DISPLC,R1      ;R1 CONTAINS RH ADDRESS
4297  025612  010537  002456                   MOV     R5,BUFFER       ;BUFFER CONTAINS # OF BYTES TO TRANSFER
4298  025616  010537  002220                   MOV     R5,CHAREC       ;RESTORE BYTE COUNT
4299  025622  010504                            MOV     R5,R4           ;R4 CONTAINS #OF BYTES
4300  025624  032705  000001                   BIT     #1,R5           ;SEE IF ODD BYTE
4301  025630  001401                            BEQ     2$              ;BRANCH IF BYTE COUNT EVEN
4302  025632  005205                            INC     R5              ;MAKE EVEN
4303  025634  000241                  2$:      CLC                     ;
4304  025636  006005                            ROR     R5              ;MAKE WORD
```

```
4305  025640  005405                          NEG     R5                ;COMPLIMENT WORD COUNT
4306  025642  010561  000002                  MOV     R5,WRDCNT(R1)     ;LOAD WORD COUNT
4307  025646  005737  002450                  TST     BIGREC            ;BIG RECORD FLAG SET
4308  025652  001404                          BEQ     20$               ;NO , CARRY ON
4309  025654  012761  002446  000004          MOV     #LNGDAT,BSADDR(R1)      ;SET ADDRESS TO BIG RECORD DATA
4310  025662  000510                          BR      7$                ;EXIT THIS SUBROUTINE
4311  025664  063704  002354          20$:    ADD     VRMADD,R4         ;R4 CONTAINS LAST MEMORY ADDRESS
4312  025670  010437  002460                  MOV     R4,BUFLST         ;STORE LAST ADDRESS OF BUFFER
4313  025674  022737  000051  002452          CMP     #WCKFWD,CMMAND    ;WRITE CHECK FORWARD
4314  025702  001464                          BEQ     6$                ;USE THE LAST WRITE BUFFER FOR COMPARE
4315  025704  022737  000061  002452          CMP     #61,CMMAND        ;WRITE COMMAND PE ?
4316  025712  001460                          BEQ     6$                ;BR IF YES
4317  025714  022737  000063  002452          CMP     #63,CMMAND        ;WRITE GCR ?
4318  025722  001454                          BEQ     6$                ;BR IF WRITE COMMAND
4319  025724  022737  000057  002452          CMP     #WCKREV,CMMAND    ;SEE IF WRITE CHECK REVERSE
4320  025732  001003                          BNE     14$               ;NO
4321  025734  013704  002354                  MOV     VRMADD,R4         ;LOAD LAST WRITE BUFFER ADDRESS
4322  025740  000412                          BR      15$               ;USE READ REVERSE COMMON CODE
4323  025742  022737  000077  002452  14$:    CMP     #REDREV,CMMAND    ;SEE IF READ REVERSE COMMAND
4324  025750  001404                          BEQ     3$                ;BRANCH IF YES
4325  025752  013761  002332  000004          MOV     REDBUF,BSADDR(R1)  ;SET UP STARTING READ BUFFER ADDRESS
4326  025760  000423                          BR      4$
4327  025762  013704  002332          3$:     MOV     REDBUF,R4         ;R4 CONTAINS START OF READ BUFFER
4328  025766  063704  002456          15$:    ADD     BUFFER,R4         ;R4 CONTAINS LAST ADDRESS OF BUFFER
4329  025772  032737  000001  002456          BIT     #1,BUFFER         ;SEE IF ODD BYTE
4330  026000  001407                          BEQ     8$                ;BRANCH IF NOT
4331  026002  052761  000400  000014          BIS     #400,CMDADR(R1)   ;ADJUST SKIP COUNT FOR ODD BYTE
4332  026010  005304                          DEC     R4                ;ADJUST ADDRESS FOR ODD BYTE
4333  026012  010461  000004                  MOV     R4,BSADDR(R1)     ;STORE READ REVERSE ADDRESS
4334  026016  000404                          BR      4$                ;
4335  026020  005304                  8$:     DEC     R4                ;MAKE CORRECT LAST ADDRESS
4336  026022  005304                          DEC     R4                ;
4337  026024  010461  000004                  MOV     R4,BSADDR(R1)     ;LOAD LAST ADDRESS OF BUFFER
4338  026030  013703  002332          4$:     MOV     REDBUF,R3         ;R3 CONTAINS START OF READ BUS ADDRESS
4339  026034  063703  002456                  ADD     BUFFER,R3               ;R3 CONTAINS LAST ADDRESS
4340  026040  013702  002332                  MOV     REDBUF,R2         ;R2 CONTAINS READ BUFFER ADDRESS
4341  026044  005022                  5$:     CLR     (R2)+             ;CLEAR READ BUFFER
4342  026046  020302                          CMP     R3,R2             ;SEE IF DONE
4343  026050  101375                          BHI     5$                ;BRANCH IF NOT
4344  026052  000403                          BR      12$               ;BRANCH IF YES
4345  026054  013761  002354  000004  6$:     MOV     VRMADD,BSADDR(R1)  ;LOAD START OF WRITE ADDRESS
4346  026062  023737  002222  002426  12$:    CMP     PATTRN,GENFLG     ;SEE IF SAME PATTERN
4347  026070  001405                          BEQ     7$                ;BRANCH TO END
4348  026072  004737  026160                  JSR     PC,GENBUF         ;GENERATE BUFFER
4349  026076  013737  002222  002426          MOV     PATTRN,GENFLG     ;SET PATTERN GENERATION FLAG
4350  026104                          7$:     POP     <R5,R4,R3,R2,R1>
4351  026116  000207                          RTS     PC
4352
4353
4354                                  ;*BEGINROUTINE (MODULE 3.2.1.1 = RANDOM DATA)
4355
4356
4357  026120                  RANGEN: PUSH    <R5>
4358  026122  012705  003466                  MOV     #PATEGT,R5        ;GET PATTERN LOCATION
4359  026126  063737  002640  002636  1$:     ADD     RANS2,RANB2       ;GENERATE RANDOM NUMBER
4360  026134  063737  002636  002640          ADD     RANB2,RANS2       ;
```

```
 4361  026142  013725  002640                    MOV     RANS2,(R5)+     ;STORE #
 4362  026146  022705  003476                    CMP     #PATEGT+10,R5   ;SEE IF DONE
 4363  026152  001365                            BNE     1$              ;BRANCH IF NOT
 4364  026154                                    POP     <R5>
 4365  026156  000207                            RTS     PC
 4366
 4367
 4368                                    ;*BEGINROUTINE (MODULE 3.2.1.2 = GCR PATTERN GENERATION)
 4369                                    ;*  STORE START OF WRITE BUFFER
 4370                                    ;*  STORE PATTERN #
 4371                                    ;*  MAKE PATTERN # WORD OFFSET
 4372                                    ;*  DO UNTIL BUFFER FULL
 4373                                    ;*  :  IF RANDOM PATTERN
 4374                                    ;*  :  :  THEN
 4375                                    ;*  :  :    CALL RANDOM GENERATOR
 4376                                    ;*  :  ENDIF
 4377                                    ;*  :  IF GCR PATTERN
 4378                                    ;*  :  :  THEN
 4379                                    ;*  :  :    CALL GCR PATTERN GENERATOR
 4380                                    ;*  :  :    SET GCR FLAG
 4381                                    ;*  :  ENDIF
 4382                                    ;*  :  CLEAR PATTERN COUNTER
 4383                                    ;*  :  GET PATTERN ADDRESS
 4384                                    ;*  :  DO UNTIL PATTERN BUFFER FULL
 4385                                    ;*  :  :  INCREMENT PATTERN COUNT
 4386                                    ;*  :  :  IF INCREMENT PATTERN
 4387                                    ;*  :  :  :  THEN
 4388                                    ;*  :  :  :    GENERATE NEXT WORD
 4389                                    ;*  :  :  ENDIF
 4390                                    ;*  :  ENDDO
 4391                                    ;*  ENDDO
 4392                                    ;*  CLEAR GCR PATTERN
 4393                                    ;*  INITIALIZE INCREMENT PATTERN
 4394                                    ;*ENDROUTINE
 4395
 4396  026160                            GENBUF: PUSH    <R3,R4,R5>
 4397  026166  013704  002354                    MOV     VRMADD,R4       ;R4 CONTAINS START OF BUFFER
 4398  026172  013703  002222                    MOV     PATTRN,R3       ;GET PATTERN #
 4399  026176  006303                            ASL     R3              ;MAKE INTO WORD OFFSET
 4400  026200  022737  000010  002222  1$:       CMP     #10,PATTRN              ;SEE IF RANDOM PATTERN
 4401  026206  001002                            BNE     6$              ;BRANCH IF NOT
 4402  026210  004737  026120                    JSR     PC,RANGEN       ;CALL RANDOM GENERATOR
 4403  026214  022737  000011  002222  6$:       CMP     #11,PATTRN      ;SEE IF GCR PATTERN
 4404  026222  101005                            BHI     2$              ;BRANCH IF NOT GCR
 4405  026224  004737  026342                    JSR     PC,GCRGEN       ;CALL GCR GENERATOR
 4406  026230  012737  000001  002550            MOV     #1,GCRFLG       ;
 4407  026236  005037  002536          2$:       CLR     PATCNT          ;PATTERN OFFSET
 4408  026242  016305  003324                    MOV     PATGEN(R3),R5   ;R5 CONTAINS PATTERN ADDRESS
 4409  026246  012524                    3$:     MOV     (R5)+,(R4)+     ;GENERATE BYTE OF BUFFER
 4410  026250  023704  002460                    CMP     BUFLST,R4       ;SEE IF LAST BYTE
 4411  026254  101421                            BLOS    5$              ;BRANCH IF DONE
 4412  026256  005237  002536                    INC     PATCNT          ;GET NEXT BYTE
 4413  026262  022737  000007  002222            CMP     #7,PATTRN       ;SEE IF 256 PATTERN
 4414  026270  001006                            BNE     4$              ;BRANCH IF NOT
 4415  026272  005305                            DEC     R5              ;STAY IN SAME BYTE
 4416  026274  105215                            INCB    (R5)
```

```
                                        INCB    (R5)
                                        DEC     R5
                                        INCB    (R5)
                                        INCB    (R5)
                        002350  002536  4$:     CMP     PATLOP,PATCNT   ;SEE IF DONE
                                        BNE     3$              ;BRANCH IF NOT DONE
                                        BR      1$              ;BRANCH TO GET MORE PATTERN
                        002550          5$:     CLR     GCRFLG
                        000400  003464          MOV     #400,PATSVN
                                        POP     <R5,R4,R3>
                                        RTS     PC

                                ;*BEGINROUTINE (MODULE 3.2.1.2.1 = GCR BUFFER)
                                ;*  GET PATTERN STORAGE ADDRESS
                                ;*  IF BEGINNING OF PATTERN
                                ;*  :  THEN
                                ;*  :    CLEAR BINARY COUNTERS
                                ;*  ENDIF
                                ;*  DO UNTIL GCR BUFFER FILLED
                                ;*  :  DO UNTIL MAXIMUM GCR LOOP REACHED
                                ;*  :  :  CHANGE BIT PATTERN
                                ;*  :  :  STORE BINARY COUNTER
                                ;*  :  ENDDO
                                ;*  :  IF LSB NOT SET
                                ;*  :  :  THEN
                                ;*  :  :    STORE BYTE A
                                ;*  :  :  ELSE
                                ;*  :  :    STORE BYTE B
                                ;*  :  ENDIF
                                ;*  :  INCREMENT LOOP COUNTER
                                ;*  :  SHIFT RIGHT FOR NEXT BYTE
                                ;*  :  IF BUFFER FILLED
                                ;*  :  :  THEN
                                ;*  :  :    INCREMENT GCR BUFFER
                                ;*  :  ENDIF
                                ;*  ENDDO
                                ;*ENDROUTINE

                                GCRGEN: PUSH    <R5>            ;
                        003476          MOV     #PATNIN,R5      ;R5 CONTAINS ADDRESS OF PATTERN STORAGE
                        002550          TST     GCRFLG          ;SEE IF BEGINNING OF PATTERN
                                        BNE     1$              ;BRANCH IF NOT
                        002552          CLR     GCRBIT          ;
                        002576          CLR     GCRCNT          ;SET UP BINARY COUNTER
                        002574          CLR     GCRRPT
                        002574  002630  1$:     CMP     GCRRPT,GCRLOP   ;SEE IF MAXIMUM LOOP COUNTER
                                        BNE     2$              ;BRANCH IF NOT REACHED
                        002574          CLR     GCRRPT          ;START PATTERN LOOP OVER
                        002576          INC     GCRCNT          ;CHANGE BIT PATTERN
                        002576  002552  MOV     GCRCNT,GCRBIT   ;SET GCRBIT WITH BINARY COUNTER
                                        BR      1$              ;
                        000001  002552  2$:     BIT     #1,GCRBIT       ;SEE IF LSB SET
                                        BNE     3$              ;BRANCH IF SET
                        002624          MOVB    BYTEA,(R5)+     ;MOVE BYTE A INTO PATTERN LOCATION
                                        BR      4$
                        002626          3$:     MOVB    BYTEB,(R5)+     ;MOVE BYTE B INTO PATTERN LOCATION
```

```
 4473  026444  005237  002574          4$:     INC     @CRRPT          ;INCREMENT LOOP COUNTER
 4474  026450  006037  002552                  ROR     GCRBIT          ;ROTATE TO SEE IF LSB SET
 4475  026454  022705  003506                  CMP     #PATNIN+10,R5   ;SEE IF BUFFER FILLED
 4476  026460  001344                          BNE     1$              ;BRANCH IF NOT
 4477  026462                                  POP     <R5>            ;
 4478  026464  000207                          RTS     PC              ;GO HOME
 4479
 4480                                  ;*
 4481                                  ;*MODULE 3.3 COMMAND TERMINATION
 4482                                  ;*
 4483
 4484
 4485
 4486                                  ;*BEGINROUTINE (MOD = 3.3 COMMAND TERMINATION /CMDTRM/)
 4487                                  ;*  CLR REGISTERS
 4488                                  ;*  IF COMMAND WAS A REWIND
 4489                                  ;*  :  THEN
 4490                                  ;*  :  :  DO UNTIL ALL UNITS INTERRUPTED OR TIMED_OUT
 4491                                  ;*  :  :  :  CLEAR INTERRUPT FLAG
 4492                                  ;*  :  :  :  ENABLE INTERRUPTS
 4493                                  ;*  :  :  :  DO UNTIL INTERRUPT FLAG SET OR TIME_OUT REACHED
 4494                                  ;*  :  :  :  :  INCREMENT TIME_OUT COUNTER
 4495                                  ;*  :  :  :  ENDDO
 4496                                  ;*  :  :  :  IF TIME_OUT HAS OCCURRED
 4497                                  ;*  :  :  :  :  THEN
 4498                                  ;*  :  :  :  :  :  IF BRUTUS W/ERRORS OR CANNED SEQUENCE
 4499                                  ;*  :  :  :  :  :  :  THEN
 4500                                  ;*  :  :  :  :  :  :  :  PRINT UNIT(S) THAT TIMED OUT
 4501                                  ;*  :  :  :  :  :  :  :  IF CANNED SEQUENCE OPTION
 4502                                  ;*  :  :  :  :  :  :  :  :  THEN
 4503                                  ;*  :  :  :  :  :  :  :  :  :  SET EOT FLAG FOR UNIT(S) TIMED OUT
 4504                                  ;*  :  :  :  :  :  :  :  :  ELSE
 4505                                  ;*  :  :  :  :  :  :  :  :     INCREMENT ALL EOT FLAG
 4506                                  ;*  :  :  :  :  :  :  :  ENDIF
 4507                                  ;*  :  :  :  :  :  :  ELSE
 4508                                  ;*  :  :  :  :  :  :     INCREMENT ALL EOT FLAG
 4509                                  ;*  :  :  :  :  :  ENDIF
 4510                                  ;*  :  :  :  :  ELSE
 4511                                  ;*  :  :  :  :     IF ILLEGAL INTERRUPT
 4512                                  ;*  :  :  :  :     :  THEN
 4513                                  ;*  :  :  :  :     :  :  IF BRUTUS W/ERRORS OR CANNED SEQUENCE
 4514                                  ;*  :  :  :  :     :  :  :  THEN
 4515                                  ;*  :  :  :  :     :  :  :     PRINT INTERRUPT THAT WAS UNEXPECTED
 4516                                  ;*  :  :  :  :     :  :  ENDIF
 4517                                  ;*  :  :  :  :     :  :  CLEAR INTERRUPT FLAG
 4518                                  ;*  :  :  :  :     :  ELSE
 4519                                  ;*  :  :  :  :     :     IF BRUTUS W/ERRORS OR CANNED SEQUENCE
 4520                                  ;*  :  :  :  :     :     :  THEN
 4521                                  ;*  :  :  :  :     :     :     CALL RESPECTIVE INTERRUPT SUBROUTINE
 4522                                  ;*  :  :  :  :     :     :     CLEAR INTERRUPT IN CAS SUMMARY REG
 4523                                  ;*  :  :  :  :     :     ENDIF
 4524                                  ;*  :  :  :  :     :     IF INPUT TU ON LINE INTERRUPT
 4525                                  ;*  :  :  :  :     :     :  THEN
 4526                                  ;*  :  :  :  :     :     :     INCREMENT ALL UNITS INTERRUPTED
 4527                                  ;*  :  :  :  :     :     ENDIF
 4528                                  ;*  :  :  :  :     ENDIF
```

```
4529                    ;*  :  :  :  ENDIF
4530                    ;*  :  :  ENDDO
4531                    ;*  :  ELSE
4532                    ;*  :     GET CORRECT UNIT TABLE
4533                    ;*  :     CLEAR INTERRUPT_FLAG
4534                    ;*  :     DO UNTIL LEGAL INTERRUPT OR TIME_OUT OCCURS
4535                    ;*  :     :  INCREMENT TIME_OUT_COUNTER
4536                    ;*  :     :  IF INTERRUPT FLAG SET
4537                    ;*  :     :  :  THEN
4538                    ;*  :     :  :     IF ILLEGAL INTERRUPT
4539                    ;*  :     :  :     :  THEN
4540                    ;*  :     :  :     :  :  IF BRUTUS W/ERRORS OR CANNED SEQUENCE
4541                    ;*  :     :  :     :  :  :  THEN
4542                    ;*  :     :  :     :  :  :     PRINT INTERRUPT THAT WAS UNEXPECTED
4543                    ;*  :     :  :     :  :  ENDIF
4544                    ;*  :     :  :     :  :  CLEAR INTERRUPT_FLAG
4545                    ;*  :     :  :     :  ELSE
4546                    ;*  :     :  :     :     SET LEGAL INTERRUPT FLAG
4547                    ;*  :     :  :     ENDIF
4548                    ;*  :     :  ENDIF
4549                    ;*  :     ENDDO
4550                    ;*  :     IF TIME OUT OCCURRED
4551                    ;*  :     :  THEN
4552                    ;*  :     :  :  IF BRUTUS W/NO ERRORS OR CANNED SEQUENCE
4553                    ;*  :     :  :  :  THEN
4554                    ;*  :     :  :  :     PRINT UNIT THAT TIMED OUT
4555                    ;*  :     :  :  :     IF CANNED SEQUENCE
4556                    ;*  :     :  :  :     :  THEN
4557                    ;*  :     :  :  :     :     SET EOT FLAG FOR UNIT THAT TIMED OUT
4558                    ;*  :     :  :  :     ENDIF
4559                    ;*  :     :  :  ENDIF
4560                    ;*  :     :  ELSE
4561                    ;*  :     :     IF BRUTUS
4562                    ;*  :     :     :  THEN
4563                    ;*  :     :     :  :  IF EOT INTERRPUT OR TM FAULT B OR TU FAULT B OR MB FAULT
4564                    ;*  :     :     :  :  :  THEN
4565                    ;*  :     :     :  :  :     CALL RESPECTIVE INTERRUPT ROUTINE
4566                    ;*  :     :     :  :  :     CLEAR INTERRUPT
4567                    ;*  :     :     :  :  ENDIF
4568                    ;*  :     :     :  ELSE
4569                    ;*  :     :     :     CALL RESPECTIVE INTERRUPT ROUTINE
4570                    ;*  :     :     :     CLEAR INTERRUPT
4571                    ;*  :     :     ENDIF
4572                    ;*  :     ENDIF
4573                    ;*  ENDIF
4574                    ;*  IF BRUTUS W/ERRORS OR CANNED SEQUENCE
4575                    ;*  :  THEN
4576                    ;*  :     IF NO ERRORS
4577                    ;*  :     :  THEN
4578                    ;*  :     :     IF READ COMMAND
4579                    ;*  :     :     :  THEN
4580                    ;*  :     :     :     IF BYTE_COUNT_CHECK SET
4581                    ;*  :     :     :     :  THEN
4582                    ;*  :     :     :     :  :  IF BYTE COUNT CORRECT
4583                    ;*  :     :     :     :  :  :  THEN
4584                    ;*  :     :     :     :  :  :  :  IF DATA COMPARE SET
```

```
4585                                    ;*  :     :     :     :  :  :  :  :  THEN
4586                                    ;*  :     :     :     :  :  :  :  :     CALL MODULE 3.3.2
4587                                    ;*  :     :     :     :  :  :  :  ENDIF
4588                                    ;*  :     :     :     :  :  :  ELSE
4589                                    ;*  :     :     :     :  :  :     PRINT ERROR
4590                                    ;*  :     :     :     :  :  ENDIF
4591                                    ;*  :     :     :     :  ELSE
4592                                    ;*  :     :     :     :     IF DATA COMPARE SET
4593                                    ;*  :     :     :     :     :  THEN
4594                                    ;*  :     :     :     :     :     CALL MODULE 3.3.2
4595                                    ;*  :     :     :     :     ENDIF
4596                                    ;*  :     :     :     ENDIF
4597                                    ;*  :     :     ENDIF
4598                                    ;*  :     ENDIF
4599                                    ;*  ENDIF
4600                                    ;*ENDROUTINE
4601
4602  026466                            CMDTRM: PUSH    <R1,R2,R3,R4,R5>
4603  026500  005037  002424                    CLR     R10
4604  026504  005001                            CLR     R1
4605  026506  005002                            CLR     R2
4606  026510  005003                            CLR     R3
4607  026512  005004                            CLR     R4
4608  026514  005005                            CLR     R5
4609  026516  022737  000007  002452            CMP     #REWIND,CMMAND  ;SEE IF REWIND WAS EXECUTED
4610  026524  001402                            BEQ     1$              ;BRANCH IF A REWIND COMMAND
4611  026526  000137  027530                    JMP     15$
4612  026532  006303                    1$:     ASL     R3              ;SHIFT FOR THE NUMBER OF UNITS
4613  026534  052703  000001                    BIS     #BIT00,R3       ;SET A BIT FOR EACH UNIT
4614  026540  005337  002612                    DEC     RWDFLG          ;GET NEXT UNIT
4615  026544  001372                            BNE     1$              ;BRANCH IF AL BITS FOR ALL UNITS NOT SET
4616  026546  005037  002374            2$:     CLR     INTRPT          ;CLEAR INTERRUPT FLAG SET IN SERVICE ROUTINE
4617  026552                                    SETPRI  #PRI00          ;ENABLE INTERRUPTS
4618  026560  005737  002374            3$:     TST     INTRPT          ;SEE IF INTERRUPT RECEIVED
4619  026564  001121                            BNE     7$              ;BRANCH IF INTERRUPT
4620  026566  005237  002424                    INC     R10             ;INCREMENT TIME OUT COUNTER
4621  026572                                    BREAK
4622  026574                                    DELAY   22
4623  026624  022737  177777  002424            CMP     #-1,R10         ;SEE IF TIME OUT REACHED
4624  026632  001352                            BNE     3$              ;IF NO TIME OUT LIMIT REACHED THEN BRANCH
4625  026634  005005                            CLR     R5
4626  026636  022737  000001  002314            CMP     #1,BRTEST       ;CHECKING FOR BRUTUS OPTION
4627  026644  001465                            BEQ     6$              ;BRANCH IF BRUTUS CHOSEN
4628  026646  010304                            MOV     R3,R4           ;R4 CONTAINS A BIT SET FOR EACH UNIT REWINDING
4629  026650  043704  002562                    BIC     ALLINT,R4       ;R4 HAS UNITS THAT TIMED OUT
4630  026654  005737  002210                    TST     BRUERR          ;SEE IF BRUTUS W/ERRORS
4631  026660  001006                            BNE     4$              ;BRANCH IF NOT CANNED SEQUENCE
4632  026662  050437  002540                    BIS     R4,EOTFLG       ;SET EOT FLAG FOR EACH UNIT THAT TIMED OUT
4633  026666  005237  002600                    INC     ALLEOT
4634  026672  050437  002534                    BIS     R4,DRPFLG       ;SET DROP FLAG FOR SCHEDULER
4635  026676  050437  002562            4$:     BIS     R4,ALLINT       ;SET INTERRUPT FLAG FOR EACH UNIT THAT TIMED OUT
4636  026702  005205                    5$:     INC     R5              ;SET UP UNIT COUNTER
4637  026704  005704                            TST     R4              ;SEE IF YOU GOT ALL UNIT ERRORS
4638  026706  001002                            BNE     50$
4639  026710  000137  027470                    JMP     14$             ;BRANCH IF DONE PRINTING ERRORS
4640  026714  006204                    50$:    ASR     R4              ;SEE IF ERROR SHOULD BE PRINTED FOR NEXT UNIT
```

```
4641  026716  103371                        BCC     5$              ;BRANCH IF NO ERROR
4642  026720  010537  002352                MOV     R5,TBLNUM       ;TBLNUM CONTAINS UNIT FOR DISPLACEMENT SUB
4643  026724  012737  000000  002316        MOV     #RHADD,DISPLC   ;LOOKING FOR RH ADDRESS
4644  026732  004737  036076                JSR     PC,TBLDIS
4645  026736  017701  153354                MOV     @DISPLC,R1      ;R1CONTAINS RH ADDRESS
4646  026742  013702  002316                MOV     DISPLC,R2               ;R2 CONTAINS P-TABLE ADDRESS
4647  026746  017737  153344  002356        MOV     @DISPLC,RHADDR  ;STORAGE FOR RH ADDRESS
4648  026754  016237  000004  002370        MOV     TMNUM(R2),TM78N ;STORAGE FOR TM78 NUMBER
4649  026762  016237  000006  002372        MOV     TUNUM(R2),TU78N ;STORAGE FOR TU78 NUMBER
4650  026770  005237  002542                INC     TIMOUT
4651  026774  016237  000010  002074        MOV     SPUNIT(R2),L$LUN
4652  027002                                ERRDF   1.,ERM001,ERRMS1
4653  027012  005037  002542                CLR     TIMOUT
4654  027016  000731                        BR      5$              ;GO LOOK FOR ANOTHER UNIT TIMED OUT
4655  027020  005237  002562        6$:     INC     ALLINT          ;FAKE AN INTERRUPT FOR BRUTUS OPTION
4656  027024  000137  027470                JMP     14$
4657
4658                                ;CHECKING TO SEE IF ILLEGAL INTERRUPT
4659
4660  027030  005037  002374        7$:     CLR     INTRPT          ;
4661  027034                                SETPRI  PRIRTY
4662  027042  013701  002532                MOV     MASBUS,R1       ;R1 CONTAINS RH ADDRESS OF INTERRUPT GENERATED
4663  027046  013737  002532  002356        MOV     MASBUS,RHADDR
4664  027054  012711  000100                MOV     #100,(R1)       ;RE ENABLE INTERRUPT BIT
4665  027060  005761  000016                TST     ATTBIT(R1)      ;IS THERE AN ATTENTION SET
4666  027064  001011                        BNE     8$              ;YES , GO HANDLE INTERUPT
4667  027066  016137  000010  002430        MOV     UNSLCT(R1),BNRYNB  ;SET UNIT THAT CAUSED MASS BUS ERROR
4668  027074  042737  177770  002430        BIC     #177770,BNRYNB  ;MASK DOWN TO UNIT NO. ONLY
4669  027102  005037  002506                CLR     TAPMON          ;NO ATTENTION BIT
4670  027106  000410                        BR      13$             ;PROCEED AS USUAL
4671  027110  016137  000016  002506  8$:   MOV     ATTBIT(R1),TAPMON  ;TAPMON CONTAINS TM ATTENTION BIT
4672  027116  013737  002506  002430        MOV     TAPMON,BNRYNB   ;SET UP FOR SHIFT SUBROUTINE
4673  027124  004737  036360                JSR     PC,SHIFTR       ;CONVERT BIT POSITION TO BINARY NUMBER
4674  027130  013737  002430  002370  13$:  MOV     BNRYNB,TM78N    ;TM78N CONTAINS BINARY EQUIVALENT TO BIT POSITION
4675  027136  013761  002370  000010        MOV     TM78N,UNSLCT(R1)  ;SET UNIT SELECT WITH TM# THAT INTERRUPTED
4676  027144  016137  000036  002372        MOV     NDTICD(R1),TU78N  ;TU78N CONTAINS ATTENTION ADDRESS
4677  027152  000337  002372                SWAB    TU78N           ;
4678  027156  116137  000036  002526        MOVB    NDTICD(R1),ICCODE  ;ICCODE CONTAINS INTERRUPT
4679  027164  113737  002372  002522        MOVB    TU78N,EXTERR
4680  027172  042737  177403  002522        BIC     #177403,EXTERR  ;EXTERR CONTAINS ERROR
4681  027200  006237  002522                ASR     EXTERR          ;  INFORMATION!
4682  027204  006237  002522                ASR     EXTERR
4683  027210  042737  177774  002372        BIC     #177774,TU78N   ;TU78N NOW CONTAINS TU78 NUMBER
4684  027216  013737  002344  002420        MOV     TBLCNT,R8       ;R8 CONTAINS NUMBER OF UNITS
4685  027224  013702  002330                MOV     PTBLAD,R2       ;R2 CONTAINS ADDRESS OF TABLE
4686  027230  012737  000001  002352        MOV     #1,TBLNUM
4687  027236  021237  002532        9$:     CMP     (R2),MASBUS     ;LOOKING FOR MASSBUS THAT CAUSE INTERRUPT
4688  027242  001435                        BEQ     12$             ;BRANCH IF FOUND UNIT WITH CORRECT RH
4689  027244  063702  002346        10$:    ADD     TBLNTH,R2       ;GET NEXT TABLE, R5 CONTAINS ADDRESS OF NEXT TABLE
4690  027250  063702  002346                ADD     TBLNTH,R2       ;NEXT TABLE IS AFTER GCR UNIT TABLE
4691  027254  005237  002352                INC     TBLNUM
4692  027260  005337  002420                DEC     R8              ;LOOP UNIT COUNTER
4693  027264  001364                        BNE     9$              ;TRY COMPARE AGAIN
4694                                ;
4695                                ;MUST BE AN ILLEGAL INTERRUPT
4696                                ;
```

```
4697  027266  022737  000001  002314          CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION
4698  027274  001413                          BEQ     11$             ;BRANCH IF YES
4699  027276  005237  002542                  INC     TIMOUT          ;
4700  027302  012737  000143  002074          MOV     #143,L$LUN      ;
4701  027310                                  ERRDF   2.,ERM002,ERRMS2
4702  027320  005037  002542                  CLR     TIMOUT
4703  027324  013761  002506  000016  11$:    MOV     TAPMON,ATTBIT(R1)  ;CLEARS ATTENTION SUMMARY INTERRUPT BIT
4704  027332  000137  026546                  JMP     2$              ;GO WAIT FOR ANOTHER INTERRUPT
4705  027336  026237  000004  002370  12$:    CMP     TMNUM(R2),TM78N ;SEE IF THIS TM GENERATED INTERRUPT
4706  027344  001337                          BNE     10$             ;BRANCH IF WRONG TM NUMBER
4707  027346  026237  000006  002372          CMP     TUNUM(R2),TU78N  ;SEE IF THIS TU GENERATED INTERRUPT
4708  027354  001333                          BNE     10$             ;BRANCH IF WRONG TU NUMBER
4709                                          ;
4710                                          ;MUST BE LEGAL INTERRUPT
4711                                          ;
4712  027356  016105  000036                  MOV     NDTICD(R1),R5   ;R5 CONTAINS INTERRUPT RECEIVED
4713  027362  042705  177400                  BIC     #177400,R5      ;
4714  027366  022705  000035                  CMP     #35,R5          ;SEE IF UNDEFINED INTERRUPT
4715  027372  101002                          BHI     47$             ;BRANCH IF NO
4716  027374  012705  000016                  MOV     #16,R5          ;SET UP FOR UNDEFINED INTERRUPT
4717  027400  006305                  47$:    ASL     R5              ;MAKE WORD ADDRESS OFFSET
4718  027402  016237  000010  002074          MOV     SPUNIT(R2),L$LUN
4719  027410  004775  002662                  JSR     PC,@INTTBL(R5)  ;CALL RESPECTIVE INTERRUPT SUBROUTINE
4720  027414  013761  002506  000016          MOV     TAPMON,ATTBIT(R1)  ;CLEAR ATTENTION SUMMARY INTERRUPT BIT
4721  027422  022705  000016                  CMP     #16,R5          ;SEE IF REWINDING INTERRUPT
4722  027426  001420                          BEQ     14$             ;BRANCH IF REWINDING
4723  027430  022705  000036                  CMP     #36,R5          ;SEE IF ONLINE INTERUPT
4724  027434  001415                          BEQ     14$             ;YES , DON'T COUNT THIS AS DONE
4725  027436  163737  002344  002420          SUB     TBLCNT,R8       ;GET CORRECT UNIT THAT INTERRUPTED
4726  027444  005437  002420                  NEG     R8              ;GET CORRECT NUMBER
4727  027450  013737  002420  002432          MOV     R8,BITPST       ;SET UP FOR BINARY TO BIT POSITION
4728  027456  004737  036406                  JSR     PC,SHIFTL       ;SHIFT
4729  027462  053737  002432  002562          BIS     BITPST,ALLINT   ;SET UNITS THAT HAVE INTERRUPTED
4730  027470  005037  002424          14$:    CLR     R10             ;RESET COUNTER
4731  027474  020337  002562                  CMP     R3,ALLINT       ;SEE IF ALL UNITS INTERRUPTED
4732  027500  001404                          BEQ     30$             ;RETURN TO SCHEDULER
4733  027502  012711  000100                  MOV     #100,(R1)       ;ENABLE INTERUPTS IN CASE WE DID EXT SENSE.
4734  027506  000137  026546                  JMP     2$              ;BRANCH IF ALL UNITS NOT INTERRUPTED
4735  027512  005037  002562          30$:    CLR     ALLINT          ;RESET ALL UNIT INTERRUPT FLAG
4736  027516  013737  002344  002352          MOV     TBLCNT,TBLNUM   ;
4737  027524  000137  030552                  JMP     25$             ;GO HOME
4738
4739                                          ;
4740                                          ;IF NO REWIND COMMAND
4741                                          ;
4742
4743  027530  005237  002464          15$:    INC     STAFLG          ;SET ONE UNIT STAT FLAG
4744  027534  012737  000000  002316          MOV     #RHADD,DISPLC   ;GETTING CORRECT RH ADDRESS
4745  027542  004737  036076                  JSR     PC,TBLDIS       ;
4746  027546  017701  152544                  MOV     @DISPLC,R1      ;R1 CONTAINS RH ADDRESS
4747  027552  005004                          CLR     R4              ;SET UP TIME OUT COUNTER
4748  027554  013702  002316                  MOV     DISPLC,R2       ;GET TABLE ADDRESS
4749  027560  010137  002356                  MOV     R1,RHADDR       ;STORE RH ADDRESS
4750  027564  016237  000004  002370          MOV     TMNUM(R2),TM78N ;STORE TM #
4751  027572  016237  000006  002372          MOV     TUNUM(R2),TU78N ;STORE TU #
4752  027600  005037  002374                  CLR     INTRPT          ;CLEAR INTERRUPT FLAG
```

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 4753  027604                                    SETPRI  #PRI00          ;ENABLE INTERRUPTS
 4754  027612  005737  002374          16$:     TST     INTRPT          ;SEE IF INTERRUPT RECEIVED
 4755  027616  001055                           BNE     19$             ;BRANCH IF SO
 4756  027620  005204                           INC     R4              ;INCREMENT TIME OUT COUNTER
 4757  027622                                    BREAK
 4758  027624  022704  177777                   CMP     #-1,R4          ;SEE IF TIMEOUT REACHED
 4759  027630  001370                           BNE     16$             ;BRANCH IF UNIT HAS NOT TIMED OUT
 4760  027632  005237  002544                   INC     TIMER
 4761  027636  022737  003000  002544          CMP     #3000,TIMER
 4762  027644  001362                           BNE     16$
 4763  027646  005037  002544                   CLR     TIMER
 4764  027652  022737  000001  002314          CMP     #1,BRTEST       ;SEE IF BRUTUS SEQUENCE
 4765  027660  001002                           BNE     40$             ;RETURN TO SCHEDULER
 4766  027662  000137  030552                   JMP     25$
 4767  027666  005237  002542          40$:     INC     TIMOUT
 4768  027672  016237  000010  002074          MOV     SPUNIT(R2),L$LUN  ;FILL IN UNIT # FOR APT
 4769  027700                                    ERRDF   3.,ERM001,ERRMS1
 4770  027710  005037  002542                   CLR     TIMOUT
 4771  027714  005737  002210                   TST     BRUERR          ;SEE IF BRUTUS W/ERRORS
 4772  027720  001402                           BEQ     41$             ;BRANCH IF NOT
 4773  027722  000137  030552                   JMP     25$             ;BRANCH IF BRUTUS W/ERRORS TO RETURN
 4774  027726  053737  002530  002540  41$:     BIS     UNITFL,EOTFLG   ;SET EOT FLAG FOR UNIT THAT TIMED OUT
 4775  027734  005237  002600                   INC     ALLEOT
 4776  027740  053737  002530  002534          BIS     UNITFL,DRPFLG   ;SET FLAG THAT TELLS SCHEDULER A UNIT WAS DROPPED
 4777  027746  000137  030552                   JMP     25$             ;RETURN TO SCHEDULER
 4778                                            ;
 4779                                            ;INTERRUPT RECEIVED
 4780                                            ;
 4781
 4782  027752  005037  002374          19$:     CLR     INTRPT          ;
 4783  027756                                    SETPRI  PRIRTY          ;RAISE PRIORITY
 4784  027764  013737  002532  002356          MOV     MASBUS,RHADDR   ;RHADDR CONTAINS RH THAT INTERRUPTED
 4785  027772  005737  002516                   TST     DATRAN          ;SEE IF DATA TRANSFER
 4786  027776  001161                           BNE     22$             ;GO SERVICE INTERRUPT
 4787  030000  013701  002356                   MOV     RHADDR,R1       ;
 4788  030004  005761  000016                   TST     ATTBIT(R1)      ;TEST FOR MASSBUS TERMINATION OF NDT INT
 4789  030010  001007                           BNE     26$             ;BRANCH TO HANDLE ATTENTION INTERUPT
 4790  030012  016137  000010  002430          MOV     UNSLCT(R1),BNRYNB  ;GET UNIT NUMBER OF FAULT
 4791  030020  042737  177770  002430          BIC     #177770,BNRYNB  ;MASK DOWN TO UNIT NUMBER ONLY
 4792  030026  000405                           BR      27$             ;GO HANDLE INTERUPT CODE
 4793  030030  016137  000016  002430  26$:     MOV     ATTBIT(R1),BNRYNB;GET TM
 4794  030036  004737  036360                   JSR     PC,SHIFTR       ;CONVERT TO NUMBER
 4795  030042  013737  002430  002432  27$:     MOV     BNRYNB,BITPST   ;
 4796  030050  004737  036406                   JSR     PC,SHIFTL       ;CONVERT TM NUMBER TO BIT POSITION
 4797  030054  013705  002432                   MOV     BITPST,R5       ;R5 CONTAINS TM CLEAR BIT
 4798  030060  013761  002430  000010          MOV     BNRYNB,UNSLCT(R1);SELECT UNIT
 4799  030066  013737  002430  002370          MOV     BNRYNB,TM78N    ;STORE TM #
 4800  030074  026237  000004  002430          CMP     TMNUM(R2),BNRYNB;SEE IF TM THAT IS EXPECTED
 4801  030102  001402                           BEQ     28$             ;BRANCH TO SEE CORRECT TU
 4802  030104  005237  002502                   INC     WTMFLG          ;SET WRONG TM FLAG
 4803  030110  016103  000036          28$:     MOV     NDTICD(R1),R3   ;R3 CONTAINS NON DATA TRANSFER INTERRUPT
 4804  030114  122703  000032                   CMPB    #32,R3          ;SEE IF TM FAULT B
 4805  030120  001420                           BEQ     20$             ;PROCESS INTERRUPT
 4806  030122  122703  000034                   CMPB    #34,R3          ;SEE IF MB FAULT B
 4807  030126  001415                           BEQ     20$             ;PROCESS INTERRUPT
 4808  030130  000303                           SWAB    R3              ;GET TU UNIT
```

```
 4809  030132  042703  177774                    BIC     #177774,R3      ;MASK OFF GARBAGE
 4810  030136  010337  002372                    MOV     R3,TU78N        ;STORE TU#
 4811  030142  005737  002502                    TST     WTMFLG          ;SEE IF WRONG TM
 4812  030146  001005                            BNE     20$             ;PROCESS INTERRUPT
 4813  030150  026203  000006                    CMP     TUNUM(R2),R3    ;SEE IF CORRECT TU
 4814  030154  001402                            BEQ     20$             ;PROCESS INTERRUPT
 4815  030156  005237  002500                    INC     WTUFLG          ;SET WRONG TU FLAG
 4816  030162  116103  000036          20$:      MOVB    NDTICD(R1),R3   ;GET INTERRUPT CODE
 4817  030166  042703  177700                    BIC     #177700,R3      ;MASK OFF EXTRA BITS
 4818  030172  010337  002526                    MOV     R3,ICCODE       ;STORE INTERRUPT CODE
 4819  030176  016137  000036  002522            MOV     NDTICD(R1),EXTERR  ;
 4820  030204  000337  002522                    SWAB    EXTERR          ;
 4821  030210  042737  177403  002522            BIC     #177403,EXTERR  ;GET EXTENDED INFORMATION
 4822  030216  006237  002522                    ASR     EXTERR          ;
 4823  030222  006237  002522                    ASR     EXTERR          ;
 4824  030226  006303                            ASL     R3              ;MAKE WORD DISPLACEMENT
 4825  030230  005737  002502                    TST     WTMFLG          ;SEE IF WRONG TM INTERRUPT
 4826  030234  001003                            BNE     29$             ;BRANCH IF YES
 4827  030236  005737  002500                    TST     WTUFLG          ;SEE IF WRONG TU INTERRUPT
 4828  030242  001404                            BEQ     33$             ;BRANCH IF NO
 4829  030244  012737  000143  002074  29$:      MOV     #143,L$LUN      ;STORE ASYNCHRONOUS INTERRUPT IN UNIT #
 4830  030252  000403                            BR      34$             ;PROCESS INTERRUPT
 4831  030254  016237  000010  002074  33$:      MOV     SPUNIT(R2),L$LUN  ;STORE P TABLE UNIT # FOR APT
 4832  030262  022703  000071          34$:      CMP     #71,R3          ;SEE IF NON-EXISTENT INTERRUPT
 4833  030266  101002                            BHI     45$             ;BRANCH IF NOT
 4834  030270  012703  000034                    MOV     #34,R3          ;SET FOR NON-EXISTENT INTERRUPT
 4835  030274  004773  002662          45$:      JSR     PC,@INTTBL(R3)  ;CALL RESPECTIVE INTERRUPT SUBROUTINE
 4836  030300  010561  000016                    MOV     R5,ATTBIT(R1)   ;CLEAR INTERRUPT BIT
 4837  030304  022737  000143  002074            CMP     #143,L$LUN      ;SEE IF CORRECT UNIT
 4838  030312  001412                            BEQ     31$             ;BRANCH IF NOT
 4839  030314  022737  000017  002526            CMP     #17,ICCODE      ;SEE IF TU ON LINE
 4840  030322  001406                            BEQ     31$             ;BRANCH IF YES
 4841  030324  022737  000033  002526            CMP     #33,ICCODE      ;SEE IF TU FAULT B
 4842  030332  001402                            BEQ     31$             ;BRANCH IF YES
 4843  030334  005237  002504                    INC     INTROK          ;SET CORRECT INTERRUPT RECEIVED
 4844  030340  000463                    31$:    BR      17$             ;
 4845  030342  116103  000012          22$:      MOVB    INTCDE(R1),R3   ;GET DATA TRANSFER INTERRUPT CODE
 4846  030346  042703  177700                    BIC     #177700,R3              ;MASK OFF EXTRA BITS
 4847  030352  010337  002526                    MOV     R3,ICCODE
 4848  030356  016137  000012  002522            MOV     INTCDE(R1),EXTERR
 4849  030364  000337  002522                    SWAB    EXTERR
 4850  030370  042737  177403  002522            BIC     #177403,EXTERR
 4851  030376  006237  002522                    ASR     EXTERR
 4852  030402  006237  002522                    ASR     EXTERR
 4853  030406  006303                            ASL     R3              ;MAKE WORD DISPLACEMENT
 4854  030410  016237  000010  002074            MOV     SPUNIT(R2),L$LUN
 4855  030416  022703  000071                    CMP     #71,R3          ;SEE IF NON-EXISTENT INTERRUPT
 4856  030422  101002                            BHI     44$             ;BRANCH IF NOT
 4857  030424  012703  000034                    MOV     #34,R3          ;SET FOR NON-EXISTENT INTERRUPT
 4858  030430  004773  002662          44$:      JSR     PC,@INTTBL(R3)  ;CALL RESPECTIVE INTERRUPT SUBROUTINE
 4859  030434  005061  000012                    CLR     INTCDE(R1)      ;CLEAR DATA TRANSFER INTERRUPT CODE
 4860  030440  005237  002504                    INC     INTROK          ;SET CORRECT INTERRUPT RECEIVED
 4861  030444  022737  000001  002314            CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION
 4862  030452  001416                            BEQ     17$             ;END IF BRUTUS OPTION
 4863  030454  022737  000070  002452            CMP     #70,CMMAND      ;SEE IF READ COMMAND
 4864  030462  101012                            BHI     17$             ;END OF ROUTINE ON WRITE
```

```
 4865  030464  005737  002512                    TST     DTCOMP          ;SEE IF SHOULD DATA COMPARE
 4866  030470  001407                            BEQ     17$             ;BRANCH IF NOT
 4867  030472  005037  002512                    CLR     DTCOMP          ;RESET FLAG
 4868  030476  005737  002226            23$:    TST     DATCHK          ;SEE IF DATA COMPARE OPTION CHOSEN
 4869  030502  001402                            BEQ     17$             ;BRANCH IF NOT
 4870  030504  004737  035122                    JSR     PC,COMPAR       ;DO THE DATA CHECK
 4871  030510  122761  000000  000016  17$:     CMPB    #0,ATTBIT(R1)   ;SEE IF SECOND INTERRUPT
 4872  030516  001003                            BNE     21$             ;BRANCH IF NOT
 4873  030520  005737  002504                    TST     INTROK          ;SEE IF CORRECT INTERRUPT
 4874  030524  001012                            BNE     25$             ;BRANCH IF SO
 4875  030526  005037  002516            21$:    CLR     DATRAN          ;CLEAR DATA TRANSFER
 4876  030532  005037  002502                    CLR     WTMFLG          ;
 4877  030536  005037  002500                    CLR     WTUFLG          ;
 4878  030542  012711  000100                    MOV     #100,(R1)       ;REENABLE INTERRUPTS
 4879  030546  000137  027530                    JMP     15$             ;PROCESS SECOND INTERRUPT
 4880  030552  005037  002504            25$:    CLR     INTROK          ;
 4881  030556  005037  002502                    CLR     WTMFLG          ;CLEAR WRONG TM FLAG
 4882  030562  005037  002500                    CLR     WTUFLG          ;CLEAR WRONG TU FLAG
 4883  030566                                    POP     <R5,R4,R3,R2,R1>
 4884  030600  000207                            RTS     PC
 4885
 4886
 4887                                    ;
 4888                                    ;INTERRUPT SERVICE ROUTINES MODULE 3.3.1
 4889                                    ;
 4890
 4891
 4892
 4893                                    ;*BEGINROUTINE (MOD = 3.3.1 INTERRUPT RESPONSES)
 4894                                    ;*  BEGINSUBROUTINE (00 MASS BUS TERMINATION)
 4895                                    ;*  :  CLEAR TIMER
 4896                                    ;*  :  IF NOT BRUTUS OPTION
 4897                                    ;*  :  :  THEN
 4898                                    ;*  :  :    PRINT ERROR MESSAGE
 4899                                    ;*  :  :    IF NOT BRUTUS WITH ERROR
 4900                                    ;*  :  :    :  THEN
 4901                                    ;*  :  :    :    GET UNIT #
 4902                                    ;*  :  :    :    SET EOT FLAG
 4903                                    ;*  :  :    :    SET DROP UNIT FLAG
 4904                                    ;*  :  :    :    PRINT UNIT DROPPED
 4905                                    ;*  :  :    ENDIF
 4906                                    ;*  :  ENDIF
 4907                                    ;*  :  SET TM CLEAR
 4908                                    ;*  :  DO UNTIL TM READY SET OR TIME OUT REACHED
 4909                                    ;*  :  :  IF TM READY NOT SET
 4910                                    ;*  :  :  :  THEN
 4911                                    ;*  :  :  :    INCREMENT TIMER
 4912                                    ;*  :  :  :    IF TIMER REACHES MAX
 4913                                    ;*  :  :  :    :  THEN
 4914                                    ;*  :  :  :    :    IF NOT BRUTUS OPTION
 4915                                    ;*  :  :  :    :    :  THEN
 4916                                    ;*  :  :  :    :    :    PRINT MESSAGE
 4917                                    ;*  :  :  :    :    ENDIF
 4918                                    ;*  :  :  :    ENDIF
 4919                                    ;*  :  :  ENDIF
 4920                                    ;*  :  ENDDO
```

```
4921                                    ;*  ENDSUBROUTINE
4922                                    ;*
4923                                    ;*
4924                                    ;*  BEGINSUBROUTINE (01 DONE)
4925                                    ;*  :  IF NOT BRUTUS OPTION
4926                                    ;*  :  :  THEN
4927                                    ;*  :  :    GET RH ADDRESS
4928                                    ;*  :  :    IF TRANSFER ERROR
4929                                    ;*  :  :    :  THEN
4930                                    ;*  :  :    :    CALL RH TRANSFER SUBROUTINE
4931                                    ;*  :  :    ENDIF
4932                                    ;*  :  :    IF NOT DATA TRANSFER COMMAND
4933                                    ;*  :  :    :  THEN
4934                                    ;*  :  :    :    IF EOT BIT SET
4935                                    ;*  :  :    :    :  THEN
4936                                    ;*  :  :    :    :    IF CLOSE FILE PE
4937                                    ;*  :  :    :    :    :  THEN
4938                                    ;*  :  :    :    :    :    INCREMENT ALL EOT FLAG
4939                                    ;*  :  :    :    :    ENDIF
4940                                    ;*  :  :    :    :    IF CLOSE FILE GCR
4941                                    ;*  :  :    :    :    :  THEN
4942                                    ;*  :  :    :    :    :    INCREMENT ALL EOT FLAG
4943                                    ;*  :  :    :    :    ENDIF
4944                                    ;*  :  :    :    ENDIF
4945                                    ;*  :  :    :  ELSE
4946                                    ;*  :  :    :    STORE TABLE ADDRESS
4947                                    ;*  :  :    :    IF READ COMMAND
4948                                    ;*  :  :    :    :  THEN
4949                                    ;*  :  :    :    :    SET DATA COMPARE EXTENDED SENSE FLAG
4950                                    ;*  :  :    :    :    IF RETRY FLAG SET
4951                                    ;*  :  :    :    :    :  THEN
4952                                    ;*  :  :    :    :    :    CLEAR RETRY FLAG
4953                                    ;*  :  :    :    :    :    INCREMENT READ RECOVERY
4954                                    ;*  :  :    :    :    :    PRINT RECOVERED
4955                                    ;*  :  :    :    :    :    INCREMENT APPROPRIATE READ FOR A STATUS ERROR
4956                                    ;*  :  :    :    :    ENDIF
4957                                    ;*  :  :    :    :    IF ERROR CORRECT
4958                                    ;*  :  :    :    :    :  THEN
4959                                    ;*  :  :    :    :    :    PRINT ERROR
4960                                    ;*  :  :    :    :    :    IF DOUBLE TRACK ERROR
4961                                    ;*  :  :    :    :    :    :  THEN
4962                                    ;*  :  :    :    :    :    :    INCREMENT APPROPRIATE STAT
4963                                    ;*  :  :    :    :    :    :  ELSE
4964                                    ;*  :  :    :    :    :    :    INCREMENT SINGLE TRACK STAT
4965                                    ;*  :  :    :    :    :    ENDIF
4966                                    ;*  :  :    :    :    ENDIF
4967                                    ;*  :  :    :    :  ELSE
4968                                    ;*  :  :    :    :    IF RETRY NOT SET
4969                                    ;*  :  :    :    :    :  THEN
4970                                    ;*  :  :    :    :    :    IF DONE+1
4971                                    ;*  :  :    :    :    :    :  THEN
4972                                    ;*  :  :    :    :    :    :    SETUP FOR WRITE RETRY
4973                                    ;*  :  :    :    :    :    :  ELSE
4974                                    ;*  :  :    :    :    :    :    UPDATE WRITE STATUS ERROR
4975                                    ;*  :  :    :    :    :    ENDIF
4976                                    ;*  :  :    :    :    :  ELSE
```

```
4977                    ;*  :  :  :  :  :  IF DONE+0
4978                    ;*  :  :  :  :  :  THEN
4979                    ;*  :  :  :  :  :    IF WRITE RETRY 4TH TIME
4980                    ;*  :  :  :  :  :    :  THEN
4981                    ;*  :  :  :  :  :    :    UPDATE STATUS OR MEDIA ERROR
4982                    ;*  :  :  :  :  :    :    PRINT WRITE RECOVERY
4983                    ;*  :  :  :  :  :    :    CLEAR RETRY FLAGS
4984                    ;*  :  :  :  :  :    :  ELSE
4985                    ;*  :  :  :  :  :    :    INCREMENT RETRY COUNT
4986                    ;*  :  :  :  :  :    ENDIF
4987                    ;*  :  :  :  :  :  ELSE
4988                    ;*  :  :  :  :  :    IF WRITE BAD 4TH TIME
4989                    ;*  :  :  :  :  :    :  THEN
4990                    ;*  :  :  :  :  :    :    PRINT UNRECOVERABLE
4991                    ;*  :  :  :  :  :    :    INCREMENT STAT
4992                    ;*  :  :  :  :  :    :    CLEAR RETRY FLAG
4993                    ;*  :  :  :  :  :    :    IF NOT BRUTUS WITH ERROR
4994                    ;*  :  :  :  :  :    :    :  THEN
4995                    ;*  :  :  :  :  :    :    :    GET TABLE #
4996                    ;*  :  :  :  :  :    :    :    DROP UNIT
4997                    ;*  :  :  :  :  :    :    :    SET EOT
4998                    ;*  :  :  :  :  :    :    :    SET DROP FLAG
4999                    ;*  :  :  :  :  :    :    :    INCREMENT ALL EOT
5000                    ;*  :  :  :  :  :    :    :    PRINT DROP UNIT
5001                    ;*  :  :  :  :  :    :    :    INCREMENT DROP STAT
5002                    ;*  :  :  :  :  :    :    ENDIF
5003                    ;*  :  :  :  :  :    :  ELSE
5004                    ;*  :  :  :  :  :    :    PRINT ERROR
5005                    ;*  :  :  :  :  :    ENDIF
5006                    ;*  :  :  :  :  :  ENDIF
5007                    ;*  :  :  :  :  ENDIF
5008                    ;*  :  :  :  ENDIF
5009                    ;*  :  :  ENDIF
5010                    ;*  :  :  ELSE
5011                    ;*  :  :    CLEAR RETRY FLAG
5012                    ;*  :  ENDIF
5013                    ;*  ENDSUBROUTINE
5014                    ;*
5015                    ;*
5016                    ;*
5017                    ;*  BEGINSUBROUTINE (MOD = 3.3.2.1 TRANSFER OR PARITY MASSBUS ERRORS)
5018                    ;*  :  STORE UNIT NUMBER
5019                    ;*  :  PRINT ERROR
5020                    ;*  :  CREATE TABLE OFFSET
5021                    ;*  :  INCREMENT MASSBUS ERROR COUNT
5022                    ;*  :  IF MAXIMUM PARITY ERROR REACHED
5023                    ;*  :  :  THEN
5024                    ;*  :  :    PRINT UNIT DROPPED
5025                    ;*  :  :    SET EOT FLAG
5026                    ;*  :  :    SET DROP FLAG
5027                    ;*  :  :    CLEAR MAXIMUM ERROR COUNT
5028                    ;*  :  :    INCREMENT DROP UNIT
5029                    ;*  :  :  ELSE
5030                    ;*  :  :    IF DATA TRANSFER COMMAND
5031                    ;*  :  :    :  THEN
5032                    ;*  :  :    :    IF RETRIES ALLOWED
```

```
5033                    ;*  :  :     :     :  THEN
5034                    ;*  :  :     :     :    IF RETRY NOT ALREADY IN PROGRESS
5035                    ;*  :  :     :     :    :  THEN
5036                    ;*  :  :     :     :    :    CLEAR VISIT FLAG
5037                    ;*  :  :     :     :    :    SET RETRY=1
5038                    ;*  :  :     :     :    ENDIF
5039                    ;*  :  :     :   ENDIF
5040                    ;*  :  :   ENDIF
5041                    ;*  :  ENDIF
5042                    ;*  ENDSUBROUTINE
5043                    ;*
5044                    ;*  BEGINSUBROUTINE (02 TM INTERRUPT)
5045                    ;*  :  IF NOT BRUTUS OPTION
5046                    ;*  :  :  THEN
5047                    ;*  :  :    IF UNKNOWN TAPE OPTION
5048                    ;*  :  :    :  THEN
5049                    ;*  :  :    :    INCREMENT FILE #
5050                    ;*  :  :    :    IF ONE RECORD
5051                    ;*  :  :    :    :  THEN
5052                    ;*  :  :    :    :    IF MORE THAN ONE FILE
5053                    ;*  :  :    :    :    :  THEN
5054                    ;*  :  :    :    :    :    CLEAR RECORD
5055                    ;*  :  :    :    :    :    JMP LEOT
5056                    ;*  :  :    :    :    :  ELSE
5057                    ;*  :  :    :    :    :    CLEAR RECORD
5058                    ;*  :  :    :    :    ENDIF
5059                    ;*  :  :    :    ENDIF
5060                    ;*  :  :    :  ELSE
5061                    ;*  :  :    :    PRINT ERROR
5062                    ;*  :  :    :    IF DATA TRANSFER COMMAND
5063                    ;*  :  :    :    :  THEN
5064                    ;*  :  :    :    :    UPDATE STATUS ERROR READ FWD OR REVERSE
5065                    ;*  :  :    :    ENDIF
5066                    ;*  :  :    ENDIF
5067                    ;*  :  ENDIF
5068                    ;*  ENDSUBROUTINE
5069                    ;*
5070                    ;*
5071                    ;*
5072                    ;*  BEGINSUBROUTINE (03 BOT)
5073                    ;*  :  IF NO BRUTUS OPTION
5074                    ;*  :  :  THEN
5075                    ;*  :  :  PRINT ERROR (UNEXPECTED BEGINNING OF TAPE)
5076                    ;*  :  :  IF CANNED SEQUENCE
5077                    ;*  :  :  :  THEN
5078                    ;*  :  :  :    SET EOT FLAG (DROP UNIT)
5079                    ;*  :  :  :    PRINT UNIT DROPPED
5080                    ;*  :  :  :    UPDATE DROPPED UNIT STAT
5081                    ;*  :  :  ENDIF
5082                    ;*  :  :  STATUS ERRORS READ REV
5083                    ;*  :  ENDIF
5084                    ;*  ENDSUBROUTINE
5085                    ;*
5086                    ;*
5087                    ;*
5088                    ;*  BEGINSUBROUTINE (04 EOT INTERRUP' RECEIVED)
```

```
5089                                    ;*  :  GET TABLE #
5090                                    ;*  :  IF NOT BRUTUS
5091                                    ;*  :  :  THEN
5092                                    ;*  :  :    IF EOT FLAG SET
5093                                    ;*  :  :    :  THEN
5094                                    ;*  :  :    :    INCREMENT ALL EOT FLAG
5095                                    ;*  :  :    :  ELSE
5096                                    ;*  :  :    :    IF BRUTUS W/ERRORS
5097                                    ;*  :  :    :    :  THEN
5098                                    ;*  :  :    :    :    PRINT ERROR
5099                                    ;*  :  :    :    ENDIF
5100                                    ;*  :  :    :    IF DATA TRANSFER
5101                                    ;*  :  :    :    :  THEN
5102                                    ;*  :  :    :    :    IF EXTENDED ERROR 1
5103                                    ;*  :  :    :    :    :  THEN
5104                                    ;*  :  :    :    :    :    IF NOT UNKNOWN TAPE
5105                                    ;*  :  :    :    :    :    :  THEN
5106                                    ;*  :  :    :    :    :    :    CLEAR RETRY FLAGS
5107                                    ;*  :  :    :    :    :    :    SET UP TO SPACE REVERSE AND CLOSE FILE
5108                                    ;*  :  :    :    :    :    ENDIF
5109                                    ;*  :  :    :    :    :  ELSE
5110                                    ;*  :  :    :    :    :    IF NOT UNKNOWN TAPE
5111                                    ;*  :  :    :    :    :    :  THEN
5112                                    ;*  :  :    :    :    :    :    SET UP TO CLOSE FILE
5113                                    ;*  :  :    :    :    :    ENDIF
5114                                    ;*  :  :    :    :    :    UPDATE BYTES READ
5115                                    ;*  :  :    :    :    ENDIF
5116                                    ;*  :  :    :    ENDIF
5117                                    ;*  :  :    :    SET EOT FLAG
5118                                    ;*  :  :    ENDIF
5119                                    ;*  :  ENDIF
5120                                    ;*  ENDSUBROUTINE
5121                                    ;*
5122                                    ;*
5123                                    ;*
5124                                    ;*  BEGINROUTINE (05 LEOT)
5125                                    ;*  :  IF BRUTUS WITH ERRORS
5126                                    ;*  :  :  THEN
5127                                    ;*  :  :    PRINT MESSAGE
5128                                    ;*  :  ENDIF
5129                                    ;*  :  IF NOT BRUTUS OPTION
5130                                    ;*  :  :  THEN
5131                                    ;*  :  :    GET TABLE #
5132                                    ;*  :  :    INCREMENT ALL EOT
5133                                    ;*  :  :    SET EOT FLAG
5134                                    ;*  :  ENDIF
5135                                    ;*  ENDROUTINE
5136                                    ;*
5137                                    ;*
5138                                    ;*
5139                                    ;*  BEGINSUBROUTINE (10 FPT, 11 NOT READY, 12 NOT AVL, 13 OFFLINE, 14 NON EX)
5140                                    ;*  :  IF NOT BRUTUS OPTION
5141                                    ;*  :  :    THEN
5142                                    ;*  :  :    IF INTERRUPT=10
5143                                    ;*  :  :    :  THEN
5144                                    ;*  :  :    :    PRINT ERROR (A WRITE WAS ATTEMPTED ON A FILE PROTECTED TAPE)
```

```
5145                    ;*  :  :    ENDIF
5146                    ;*  :  :    IF INTERRUPT=11
5147                    ;*  :  :    :  THEN
5148                    ;*  :  :    :     PRINT ERROR (TU IS ON LINE BUT TAPE IS REWINDING OR LOADING)
5149                    ;*  :  :    ENDIF
5150                    ;*  :  :    IF INTERRUPT=12
5151                    ;*  :  :    :  THEN
5152                    ;*  :  :    :     PRINT ERROR (TU IS NOT SWITCHED TO THIS PORT, BUT IS ON LINE.)
5153                    ;*  :  :    ENDIF
5154                    ;*  :  :    IF INTERRUPT=13
5155                    ;*  :  :    :  THEN
5156                    ;*  :  :    :     PRINT ERROR (TU IS NOT SWITCHED ON LINE BUT TAPE IS REWINDING OR LOADI
5157                    ;*  :  :    ENDIF
5158                    ;*  :  :    IF INTERRUPT=14
5159                    ;*  :  :    :  THEN
5160                    ;*  :  :    :     PRINT ERROR (TU DOES NOT EXIST OR POWER IS OFF)
5161                    ;*  :  :    ENDIF
5162                    ;*  :  :    IF INTERRUPT=15
5163                    ;*  :  :    :  THEN
5164                    ;*  :  :    :    PRINT ERROR (BLANK TAPE)
5165                    ;*  :  :    ENDIF
5166                    ;*  :  :    IF INTERRUPT=16
5167                    ;*  :  :    :  THEN
5168                    ;*  :  :    :    PRINT ERROR (ILLEGAL INTERRUPT)
5169                    ;*  :  :    ENDIF
5170                    ;*  :  :    IF CANNED SEQUENCE
5171                    ;*  :  :    :  THEN
5172                    ;*  :  :    :     SET EOT FLAG (DROP UNIT)
5173                    ;*  :  :    ENDIF
5174                    ;*  :  :    IF NOT BRUTUS W/ERRORS
5175                    ;*  :  :    :  THEN
5176                    ;*  :  :    :    GET TABLE #
5177                    ;*  :  :    :    SET EOT FLAG
5178                    ;*  :  :    :    SET DROP UNIIT FLAG
5179                    ;*  :  :    :    INCREEMNT ALL EOT FLAG
5180                    ;*  :  :    :    PRINT UNIT DROPPED
5181                    ;*  :  :    :    INCREMENT DROP UNIT STATISTIC
5182                    ;*  :  :    ENDIF
5183                    ;*  :  ENDIF
5184                    ;*  ENDSUBROUTINE
5185                    ;*
5186                    ;*
5187                    ;*
5188                    ;*  BEGINSUBROUTINE (17 ON LINE)
5189                    ;*  :  IF NOT BRUTUS OPTION
5190                    ;*  :  :  THEN
5191                    ;*  :  :    PRINT MESSAGE
5192                    ;*  :  ENDIF
5193                    ;*  ENDSUBROUTINE
5194                    ;*
5195                    ;*
5196                    ;*
5197                    ;*  BEGINSUBROUTINE (20 LONG RECORD, 21 SHORT RECORD)
5198                    ;*  :  IF NOT BRUTUS OPTION
5199                    ;*  :  :  THEN
5200                    ;*  :  :    IF NOT UNKNOWN TAPE
```

```
5201                    ;*  :  :     :  THEN
5202                    ;*  :  :     :    IF INTERRUPT=20
5203                    ;*  :  :     :    :  THEN
5204                    ;*  :  :     :    :    PRINT ERROR LONG RECORD
5205                    ;*  :  :     :    :  ELSE
5206                    ;*  :  :     :    :    PRINT ERROR SHORT RECORD
5207                    ;*  :  :     :    ENDIF
5208                    ;*  :  :     IF READ FORWARD COMMAND
5209                    ;*  :  :     :  THEN
5210                    ;*  :  :     :    IF ABLE TO ISSUE READ SENSE
5211                    ;*  :  :     :    :  THEN
5212                    ;*  :  :     :    :    IF DOUBLE TRACK ERROR
5213                    ;*  :  :     :    :    :  THEN
5214                    ;*  :  :     :    :    :    UPDATE DOUBLE TRACK READ FORWARD STAT
5215                    ;*  :  :     :    :    ENDIF
5216                    ;*  :  :     :    :    IF SINGLE TRACK ERROR AND NO DOUBLE TRACK ERROR
5217                    ;*  :  :     :    :    :  THEN
5218                    ;*  :  :     :    :    :    UPDATE SINGLE TRACK READ FORWARD STAT
5219                    ;*  :  :     :    :    ENDIF
5220                    ;*  :  :     :    ENDIF
5221                    ;*  :  :     :    INCREMENT STATUS ERROR READ FORWARD
5222                    ;*  :  :     :  ELSE
5223                    ;*  :  :     :    IF ABLE TO ISSUE READ SENSE COMMAND
5224                    ;*  :  :     :    :  THEN
5225                    ;*  :  :     :    :    IF DOUBLE TRACK ERROR
5226                    ;*  :  :     :    :    :  THEN
5227                    ;*  :  :     :    :    :    UPDATE DOUBLE TRACK RR STAT
5228                    ;*  :  :     :    :    ENDIF
5229                    ;*  :  :     :    :    IF SINGLE TRACK AND NOT DOUBLE TRACK ERROR
5230                    ;*  :  :     :    :    :  THEN
5231                    ;*  :  :     :    :    :    UPDATE SINGLE TRACK RR STAT
5232                    ;*  :  :     :    :    ENDIF
5233                    ;*  :  :     :    :    INCREMENT STATUS ERROR RR
5234                    ;*  :  :     :    ENDIF
5235                    ;*  :  :     ENDIF
5236                    ;*  :  :     IF READ COMMAND
5237                    ;*  :  :     :  THEN
5238                    ;*  :  :     :    UPDATE BYTES READ FORWARD
5239                    ;*  :  :     :  ELSE
5240                    ;*  :  :     :    UPDATE BYTES READ REVERSE
5241                    ;*  :  :     ENDIF
5242                    ;*  :  ENDIF
5243                    ;*  ENDSUBROUTINE
5244                    ;*
5245                    ;*
5246                    ;*
5247                    ;*  BEGINSUBROUTINE (22 RETRY)
5248                    ;*  IF NOT BRUTUS OPTION
5249                    ;*  :  THEN
5250                    ;*  :  :  PRINT ERROR (THE INITIAL OPERATION SHOULD BE REPEATED)
5251                    ;*  :  :  IF RETRIES SELECTED
5252                    ;*  :  :  :  THEN
5253                    ;*  :  :  :     SET RETRY FLAG-2
5254                    ;*  :  :  ENDIF
5255                    ;*  :  ENDIF
5256                    ;*  ENDSUBROUTINE
```

```
5257                                    ;*
5258                                    ;*
5259                                    ;*
5260                                    ;*  BEGINSUBROUTINE (24 READ OPP)
5261                                    ;*  :  IF NOT BRUTUS OPTION
5262                                    ;*  :  :  THEN
5263                                    ;*  :  :    PRINT ERROR (THE INITIAL READ SHOULD BE PERFORMED IN THE OPPOSITE DIRECTION)
5264                                    ;*  :  :    IF RETRIES SELECTED
5265                                    ;*  :  :    :  THEN
5266                                    ;*  :  :    :    SET RETRY FLAG=3
5267                                    ;*  :  :    ENDIF
5268                                    ;*  :  ENDIF
5269                                    ;*  ENDSUBROUTINE
5270                                    ;*
5271                                    ;*
5272                                    ;*
5273                                    ;*  BEGINSUBROUTINE (24 UNREAD)
5274                                    ;*  :  IF NOT BRUTUS OPTION
5275                                    ;*  :  :  THEN
5276                                    ;*  :  :    PRINT ERROR (READ RETRIES HAVE FAILED TO READ THE RECORD)
5277                                    ;*  :  :    UPDATE NON RECOVERABLE READ REVERSE OR
5278                                    ;*  :  :    UPDATE NON RECOVERABLE READ FORWARD
5279                                    ;*  :  ENDIF
5280                                    ;*  :  CLEAR RETRY FLAG
5281                                    ;*  ENDSUBROUTINE
5282                                    ;*
5283                                    ;*
5284                                    ;*
5285                                    ;*  BEGINSUBROUTINE (25 ERROR)
5286                                    ;*  :  IF NOT BRUTUS OPTION
5287                                    ;*  :  :  THEN
5288                                    ;*  :  :    PRINT ERROR WITH EXTENDED SENSE
5289                                    ;*  :  :    IF NO RETRY ALLOWED
5290                                    ;*  :  :    :  THEN
5291                                    ;*  :  :    :    IF READ COMMAND
5292                                    ;*  :  :    :    :  THEN
5293                                    ;*  :  :    :    :    INCREMENT STATUS ERROR READ F OR R.
5294                                    ;*  :  :    :    :  ELSE
5295                                    ;*  :  :    :    :    INCREMENT WRITE STATS
5296                                    ;*  :  :    :    ENDIF
5297                                    ;*  :  :    :  ELSE
5298                                    ;*  :  :    :    IF WRITE
5299                                    ;*  :  :    :    :  THEN
5300                                    ;*  :  :    :    :    CLEAR VISIT FLAG
5301                                    ;*  :  :    :    :    IF RETRIED MAXIMUM
5302                                    ;*  :  :    :    :    :  THEN
5303                                    ;*  :  :    :    :    :    PRINT ERROR
5304                                    ;*  :  :    :    :    :    UPDATE STATS
5305                                    ;*  :  :    :    :    :    CLEAR RETRY COUNT
5306                                    ;*  :  :    :    :    :    CLEAR RETRY FLAG
5307                                    ;*  :  :    :    :    :    IF NOT BRUTUS WITH ERRORS
5308                                    ;*  :  :    :    :    :    :  THEN
5309                                    ;*  :  :    :    :    :    :    SET EOT FLAG
5310                                    ;*  :  :    :    :    :    :    INCREMENT ALL EOT FLAG
5311                                    ;*  :  :    :    :    :    :    SET DROP FLAG
5312                                    ;*  :  :    :    :    :    :    PRINT UNIT DROPPED
```

```
5313                    ;*  :  :    :    :    :    :    INCREMENT UNIT DROPPED FLAG
5314                    ;*  :  :    :    :    :    :  ELSE
5315                    ;*  :  :    :    :    :    :    MOV 4 TO RETRY FLAG
5316                    ;*  :  :    :    :    :    ENDIF
5317                    ;*  :  :    :    :    ENDIF
5318                    ;*  :  :    :    ENDIF
5319                    ;*  :  :    ENDIF
5320                    ;*  :  ENDIF
5321                    ;*  ENDSUBROUTINE
5322                    ;*
5323                    ;*
5324                    ;*
5325                    ;*  BEGINSUBROUTINE (26 EOT ERROR)
5326                    ;*  :  IF BRUTUS W/ERRORS OR CANNED SEQUENCE NOT EQUAL TO 1
5327                    ;*  :  :  THEN
5328                    ;*  :  :    PRINT ERROR (A WRITE ERROR HAS OCCURRED BEYOND THE EOT MARKER)
5329                    ;*  :  :    SET RETRY FLAG=6
5330                    ;*  :  :    INCREMENT ALL EOT
5331                    ;*  :  :    INCREMENT EOT FLAG
5332                    ;*  :  ENDIF
5333                    ;*  ENDSUBROUTINE
5334                    ;*
5335                    ;*
5336                    ;*
5337                    ;*  BEGINSUBROUTINE (27 BAD TAPE)
5338                    ;*  :  IF NOT BRUTUS
5339                    ;*  :  :  THEN
5340                    ;*  :  :    PRINT ERROR (TAPE POSITION HAS BEEN LOST)
5341                    ;*  :  :    IF CANNED SEQUENCE OR UNKNOWN TAPE
5342                    ;*  :  :    :  THEN
5343                    ;*  :  :    :    SET EOT FLAG (DROP UNIT)
5344                    ;*  :  :    :    INCREMENT ALL EOT FLAG
5345                    ;*  :  :    :    INCREMENT DROP FLAG
5346                    ;*  :  :    :    UPDATE DROP UNIT STAT
5347                    ;*  :  :    ENDIF
5348                    ;*  :  ENDIF
5349                    ;*  ENDSUBROUTINE
5350                    ;*
5351                    ;*
5352                    ;*
5353                    ;*
5354                    ;*
5355                    ;*
5356                    ;*  BEGINSUBROUTINE (30 TM FAULT A, 31 TU FAULT A)
5357                    ;*  :  IF NOT BRUTUS
5358                    ;*  :  :  THEN
5359                    ;*  :  :    PRINT ERROR (TAPE UNIT HAS FAILED)
5360                    ;*  :  :    IF CANNED SEQUENCE OR UNKNOWN TAPE
5361                    ;*  :  :    :  THEN
5362                    ;*  :  :    :    SET EOT FLAG (DROP UNIT)
5363                    ;*  :  :    :    SET DROP FLAG
5364                    ;*  :  :    :    INCREMENT ALL EOT FLAG
5365                    ;*  :  :    :    PRINT UNIT DROPPED
5366                    ;*  :  :    :    INCREMENT DROP UNIT STAT
5367                    ;*  :  :    ENDIF
5368                    ;*  :  ENDIF
```

```
5369                                    ;*  ENDSUBROUTINE
5370                                    ;*
5371                                    ;*
5372                                    ;*
5373                                    ;*
5374                                    ;*  BEGINSUBROUTINE (33 TU FAULT B)
5375                                    ;*  :  IF NOT BRUTUS
5376                                    ;*  :  :  THEN
5377                                    ;*  :  :    PRINT ERROR
5378                                    ;*  :  ENDIF
5379                                    ;*  ENDSUBROUTINE
5380                                    ;*
5381                                    ;*
5382                                    ;*
5383                                    ;*  BEGINSUBROUTINE (32 TM FAULT, 34 MB FAULT)
5384                                    ;*  :  CLEAR TIME OUT COUNTER
5385                                    ;*  :  FIND RH ADDRESS THAT INTERRUPTED
5386                                    ;*  :  FIND TM THAT INTERRUPTED
5387                                    ;*  :  IF NOT BRUTUS
5388                                    ;*  :  :  THEN
5389                                    ;*  :  :    PRINT CORRECT ERROR MESSAGE
5390                                    ;*  :  :    IF CANNED SEQUENCE
5391                                    ;*  :  :    :  THEN
5392                                    ;*  :  :    :    DROP ALL UNITS ON TM
5393                                    ;*  :  :    :    SET EOT FLAG
5394                                    ;*  :  :    :    SET DROP FLAG
5395                                    ;*  :  :    :    INCREMENT APPROPRIATE ALL EOT FLAG
5396                                    ;*  :  :    :    INCREMENT APPROPRIATE DROP UNIT STAT
5397                                    ;*  :  :    ENDIF
5398                                    ;*  :  ENDIF
5399                                    ;*  :  INITIATE A TM CLEAR
5400                                    ;*  :  DO UNTIL TM READY OR TIME OUT
5401                                    ;*  :  :  INCREMENT TIMEOUT COUNTER
5402                                    ;*  :  :  TEST TM READY
5403                                    ;*  :  ENDDO
5404                                    ;*  :  IF NOT BRUTUS
5405                                    ;*  :  :  THEN
5406                                    ;*  :  :    IF TIME OUT
5407                                    ;*  :  :    :  THEN
5408                                    ;*  :  :    :    PRINT UNIT THAT TIMED OUT
5409                                    ;*  :  :    ENDIF
5410                                    ;*  :  ENDIF
5411                                    ;*  ENDSUBROUTINE
5412                                    ;*ENDROUTINE
5413                                    ;
5414                                    ;INTERRUPT SERVICE ROUTINES MODULE 3.3.1
5415                                    ;
5416
5417
5418  030602                            MBTERM: PUSH    <R4>
5419  030604  005004                           CLR     R4                      ;SET UP TIME OUT COUNTER
5420  030606  022737  000001  002314           CMP     #1,BRTEST               ;SEE IF BRUTUS OPTION
5421  030614  001424                           BEQ     1$                      ;BRANCH IF BRUTUS
5422  030616  005737  002516                   TST     DATRAN          ;DATA TRANSFER TERMINATION ?
5423  030622  001005                           BNE     4$              ;YES , PRINT CORRECT MESSAGE
5424  030624                                   ERRDF   33.,ERM035,ERRMS1       ;NO , PRINT NON DATA XFER MESSAGE
```

```
5425  030634  000404                          BR      5$                ;CONTINUE
5426  030636                          4$:     ERRDF   33.,ERM032,ERRMS1
5427  030646  005737  002210          5$:     TST     BRUERR                    ;SEE IF BRUTUS W/ERRORS
5428  030652  001005                          BNE     1$                        ;BRANCH IF BRUTUS W/ERRORS
5429  030654  013737  002352  002432          MOV     TBLNUM,BITPST             ;
5430  030662  004737  035024                  JSR     PC,DROPIT                 ;GO DROP THE UNIT
5431  030666  052761  040000  000000  1$:     BIS     #BIT14,BASE(R1)           ;SET RH11/70 ERROR CLEAR
5432  030674  042761  040000  000000          BIC     #BIT14,BASE(R1)           ;CLEAR 'TRE' BIT IN TM78
5433  030702  052761  040000  000052          BIS     #BIT14,INTRDA(R1)         ;SET TM CLEAR
5434  030710  032761  100000  000052  3$:     BIT     #BIT15,INTRDA(R1)         ;SEE IF TM READY
5435  030716  001014                          BNE     2$                        ;BRANCH IF SET
5436  030720  005204                          INC     R4                        ;
5437  030722  022704  177777                  CMP     #-1,R4                    ;SEE  IF TIMED OUT
5438  030726  001370                          BNE     3$                        ;
5439  030730  022737  000001  002314          CMP     #1,BRTEST                 ;IF BRUTUS
5440  030736  001404                          BEQ     2$                        ;RETURN
5441  030740                                  ERRDF   29.,ERM028,ERRMS1
5442  030750                          2$:     POP     <R4>
5443  030752  000207                          RTS     PC
5444
5445
5446  030754                          DONE:   PUSH    <R1,R2,R3,R4,R5>
5447  030766  022737  000001  002314          CMP     #1,BRTEST         ;
5448  030774  001004                          BNE     8$                ;IF NOT BRUTUS THEN CONTINUE
5449  030776  005037  002604                  CLR     RTYFLG
5450  031002  000137  032100                  JMP     7$                ;
5451  031006  012737  000000  002316  8$:     MOV     #RHADD,DISPLC     ;SET UP TO FIND UNIT
5452  031014  004737  036076                  JSR     PC,TBLDIS         ;GET ADDRESS
5453  031020  017701  151272                  MOV     @DISPLC,R1        ;STORE RH ADDRESS IN R1
5454  031024  011103                          MOV     (R1),R3           ;R3 CONTAINS CONTNTS OF RH ADDRESS
5455  031026  032703  060000                  BIT     #60000,R3         ;SEE IF TRE OR MCPE ERROR
5456  031032  001404                          BEQ     9$                ;BRANCH IF NO ERRORS
5457  031034  004737  032114                  JSR     PC,RHTREB         ;CALL TRE OR MCPE ERROR ROUTINE
5458  031040  000137  032100                  JMP     7$
5459  031044  005737  002516          9$:     TST     DATRAN            ;SEE IF DATA TRANSFER
5460  031050  001062                          BNE     10$               ;BRANCH IF YES
5461  031052  013737  002352  002432          MOV     TBLNUM,BITPST     ;
5462  031060  004737  036406                  JSR     PC,SHIFTL         ;GET UNIT BIT MAP
5463  031064  006237  002432                  ASR     BITPST            ;CORRECT MAP
5464  031070  033737  002432  002540          BIT     BITPST,EOTFLG     ;SEE IF EOT FLAG SET
5465  031076  001023                          BNE     25$               ;BRANCH IF YES
5466  031100  005737  002434                  TST     CHKBOT            ;CHECK BOT STATUS FLAG SET
5467  031104  001416                          BEQ     26$               ;NO EXIT
5468  031106  032761  002000  000020          BIT     #BIT10,DSE0(R1)   ;IS BOT SET
5469  031114  001012                          BNE     26$               ;YES , EXIT
5470  031116                                  ERRDF   40.,ERM036,ERRMS1         ;NO , ERROR SHOULD BE .
5471  031126  053737  002432  002534          BIS     BITPST,DRPFLG     ;DROP UNIT
5472  031134  053737  002432  002540          BIS     BITPST,EOTFLG
5473  031142  000137  032100          26$:    JMP     7$                ;GET OUT
5474  031146  022737  000041  002452  25$:    CMP     #CLFLPE,CMMAND    ;SEE IF CLOSE TAPE PE
5475  031154  001004                          BNE     11$               ;BRANCH IF NOT
5476  031156  005237  002600                  INC     ALLEOT
5477  031162  000137  032100                  JMP     7$                ;GET OUT
5478  031166  022737  000043  002452  11$:    CMP     #CLFGCR,CMMAND    ;SEE IF CLOSE TAPE GCR
5479  031174  001402                          BEQ     14$               ;BRANCH IF YES
5480  031176  000137  032100                  JMP     7$
```

```
 5481  031202  005037  002604          14$:    CLR     RTYFLG          ;RESET RETRY FLAG
 5482  031206  005237  002600                  INC     ALLEOT
 5483  031212  000137  032100                  JMP     7$              ;GET OUT
 5484  031216  013702  002316          10$:    MOV     DISPLC,R2       ;STORE UNIT TABLE ADDRESS IN R2
 5485  031222  022737  000070  002452          CMP     #70,CMMAND      ;SEE IF READ OR WRITE COMMAND
 5486  031230  101146                          BHI     3$              ;BRANCH IF WRITE COMMAND
 5487  031232  005237  002512                  INC     DTCOMP          ;SET FOR DATA COMPARE
 5488  031236  005737  002604                  TST     RTYFLG          ;SEE IF RETRY SET
 5489  031242  001423                          BEQ     2$              ;BRANCH IF NOT
 5490  031244  005037  002604                  CLR     RTYFLG          ;RESET RETRY FLAG
 5491  031250  022737  000077  002462          CMP     #REDREV,RETRCD
 5492  031256  001003                          BNE     15$
 5493  031260  005262  000016                  INC     SERRRV(R2)      ;UPDATE STATUS ERROR READ REV
 5494  031264  000402                          BR      16$             ;
 5495  031266  005262  000014          15$:    INC     SERRFO(R2)      ;UPDATE STATUS ERROR READ FWD
 5496  031272                          16$:    PRINTB  #FORM22
 5497  031312  032761  002000  000012  2$:     BIT     #2000,INTCDE(R1)  ;SEE IF COMMAND EXECUTED PERFECTLY
 5498  031320  001456                          BEQ     4$              ;BRANCH IF YES
 5499  031322  005237  002524                  INC     EXTDSN          ;UPDATE EXTENDED SENSE FLAG
 5500  031326                                  ERRSOFT 6.,ERM005,ERRMS1
 5501  031336  005737  002606                  TST     SENFLG          ;SEE IF READ SENSE FAILED
 5502  031342  001045                          BNE     4$              ;BRANCH IF YES
 5503  031344  022737  000077  002452          CMP     #REDREV,CMMAND  ;SEE IF READ REVERSE
 5504  031352  001421                          BEQ     13$             ;BRANCH IF YES
 5505  031354  132737  000002  003251          BITB    #2,ECCSTA       ;SEE IF SINGLE TRACK ERROR
 5506  031362  001403                          BEQ     12$             ;BRANCH IF NOT
 5507  031364  005262  000052                  INC     DBLTRF(R2)      ;INCREMENT DOUBLE TRACK ERROR FORWARD
 5508  031370  000432                          BR      4$
 5509  031372  132737  000001  003251  12$:    BITB    #1,ECCSTA       ;SEE IF DOUBLE TRACK ERROR
 5510  031400  001003                          BNE     23$             ;BRANCH IF NOT
 5511  031402  005262  000132                  INC     OTHRFO(R2)
 5512  031406  000423                          BR      4$
 5513  031410  005262  000056          23$:    INC     SNGTRF(R2)      ;INCREMENT SINGLE TRACK ERROR FORWARD
 5514  031414  000420                          BR      4$
 5515  031416  132737  000002  003251  13$:    BITB    #2,ECCSTA       ;SEE IF DOUBLE TRACK ERROR READ REV
 5516  031424  001403                          BEQ     17$             ;BRANCH IF NOT
 5517  031426  005262  000054                  INC     DBLTRR(R2)              ;UPDATE STATE
 5518  031432  000411                          BR      4$
 5519  031434  132737  000001  003251  17$:    BITB    #1,ECCSTA       ;SEE IF SINGLE TRACK ERROR READ REV
 5520  031442  001003                          BNE     24$             ;BRANCH IF NOT
 5521  031444  005262  000134                  INC     OTHRRV(R2)
 5522  031450  000402                          BR      4$
 5523  031452  005262  000060          24$:    INC     SNGTRR(R2)      ;UPDATE STATS
 5524  031456  022737  000070  002452  4$:     CMP     #70,CMMAND      ;SEE IF READ COMMAND
 5525  031464  101030                          BHI     3$              ;BRANCH IF NOT
 5526  031466  022737  000077  002452          CMP     #REDREV,CMMAND  ;SEE IF READ REVERSE COMMAND
 5527  031474  001412                          BEQ     1$              ;BRANCH IF READ REVERSE
 5528  031476  012703  000040                  MOV     #BYRFLO,R3      ;STORE OFFSETS
 5529  031502  012704  000036                  MOV     #BYRFMD,R4      ;  IN REGISTERS
 5530  031506  012705  000034                  MOV     #BYRFHI,R5      ;FOR DECIMAL CONVERSION SUBROUTINE
 5531  031512  004737  035640                  JSR     PC,DECMAL       ;STORE BYTES READ
 5532  031516  000137  032100                  JMP     7$              ;GO TO RETURN
 5533  031522  012703  000046          1$:     MOV     #BYRRLO,R3      ;STORE OFFSETS
 5534  031526  012704  000044                  MOV     #BYRRMD,R4      ;IN REGISTERS
 5535  031532  012705  000042                  MOV     #BYRRHI,R5      ;FOR CONVERSION AND UPDATE PURPOSES
 5536  031536  004737  035640                  JSR     PC,DECMAL       ;STORE BYTES READ REVERSE
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 5537  031542  000137  032100                  JMP     7$                  ;GO TO RETURN
 5538  031546  005737  002604          3$:     TST     RTYFLG              ;TEST RETRY
 5539  031552  001027                          BNE     5$                  ;BRANCH IF RETRY IN PROGRESS
 5540  031554  032761  002000  000012          BIT     #2000,INTCDE(R1)    ;SEE IF DONE+1
 5541  031562  001412                          BEQ     18$                 ;BRANCH IF NO
 5542  031564  012737  000004  002604          MOV     #4,RTYFLG           ;SETUP WRITE RETRY
 5543  031572  005237  002524                  INC     EXTDSN
 5544  031576                                  ERRSOFT 36.,ERM003,ERRMS1
 5545  031606  000534                          BR      7$
 5546  031610  012703  000032          18$:    MOV     #BYWRLO,R3          ;STORE OFFSETS
 5547  031614  012704  000030                  MOV     #BYWRMD,R4          ;IN REGISTERS
 5548  031620  012705  000026                  MOV     #BYWRHI,R5          ;
 5549  031624  004737  035640                  JSR     PC,DECMAL           ;UPDATE STATS
 5550  031630  000523                          BR      7$
 5551  031632  032761  002000  000012  5$:     BIT     #2000,INTCDE(R1)    ;SEE IF DONE+1
 5552  031640  001047                          BNE     21$                 ;BRANCH IF DONE+1
 5553  031642  022737  000003  002560          CMP     #3,WRTYCT           ;SEE IF WRITE RETRY COUNT=4TH TIME
 5554  031650  001111                          BNE     6$                  ;BRANCH IF LESS THAN FOURTH TIME
 5555  031652  012703  000032                  MOV     #BYWRLO,R3          ;STORE
 5556  031656  012704  000030                  MOV     #BYWRMD,R4          ;OFFSETS INTO
 5557  031662  012705  000026                  MOV     #BYWRHI,R5          ;REGISTERS
 5558  031666  004737  035640                  JSR     PC,DECMAL           ;UPDATE BYTES WRITTEN
 5559  031672  005737  002514                  TST     ERAFLG              ;SEE IF MEDIA ERROR OR STATUS ERROR
 5560  031676  001003                          BNE     19$                 ;BRANCH IF MEDIA ERROR
 5561  031700  005262  000130                  INC     OTHWRT(R2)          ;UPDATE STATUS ERROR
 5562  031704  000402                          BR      20$                 ;
 5563  031706  005262  000050          19$:    INC     MEDIAE(R2)          ;UPDATE MEDIA ERROR
 5564  031712                          20$:    PRINTB  #FORM22
 5565  031732  005037  002560                  CLR     WRTYCT              ;RESET COUNTER
 5566  031736  005037  002556                  CLR     WRTCNT              ;RESET WRITE RETRY COUNTER
 5567  031742  005037  002546                  CLR     BADCNT              ;RESET
 5568  031746  005037  002514                  CLR     ERAFLG              ;FLAGS
 5569  031752  005037  002604                  CLR     RTYFLG              ;
 5570  031756  000450                          BR      7$                  ;BRANCH OUT
 5571  031760  022737  000004  002546  21$:    CMP     #4,BADCNT           ;SEE IF FAILED 4 TIMES
 5572  031766  001407                          BEQ     22$                 ;BRANCH IF YES
 5573  031770  005237  002524                  INC     EXTDSN              ;UPDATE EXTENDED SENSE
 5574  031774                                  ERRSOFT 4.,ERM003,ERRMS1
 5575  032004  000435                          BR      7$                  ;
 5576  032006  005037  002546          22$:    CLR     BADCNT              ;RESET ALL RETRY COUNTERS
 5577  032012  005037  002514                  CLR     ERAFLG              ;
 5578  032016  005037  002560                  CLR     WRTYCT              ;
 5579  032022  005037  002556                  CLR     WRTCNT              ;
 5580  032026  005262  000020                  INC     NRECWR(R2)          ;UPDATE STATS
 5581  032032  005237  002524                  INC     EXTDSN              ;EXTENDED SENSE
 5582  032036                                  ERRHRD  35.,ERM034,ERRMS1
 5583  032046  005037  002604                  CLR     RTYFLG              ;RESET RETRY FLAG
 5584  032052  005737  002210                  TST     BRUERR              ;SEE IF BRUTUS W/ERRORS
 5585  032056  001010                          BNE     7$                  ;BRANCH IF YES
 5586  032060  013737  002352  002432          MOV     TBLNUM,BITPST       ;GET TABLE #
 5587  032066  004737  035024                  JSR     PC,DROPIT           ;GO DROP THE UNIT
 5588  032072  000402                          BR      7$
 5589  032074  005237  002560          6$:     INC     WRTYCT              ;ANOTHER SUCCESSFUL PASS OF RETRY
 5590  032100                          7$:     POP     <R5,R4,R3,R2,R1>
 5591  032112  000207                          RTS     PC
 5592
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                                        RHTREB: PUSH    <R3,R4>
032120  016237  000010  002074                MOV     SPUNIT(R2),L$LUN
032126                                        ERRDF   32.,ERM031,ERRMS1
032136  013704  002352                        MOV     TBLNUM,R4       ;GET TABLE NUMBER
032142  005304                                DEC     R4              ;CREATE CORRECT OFFSET
032144  006304                                ASL     R4              ;
032146  005264  002642                        INC     TRECNT(R4)      ;INCREMENT ERROR COUNT
032152  023764  002614  002642          4$:   CMP     PARMAX,TRECNT(R4)  ;SEE IF MAXIMUM PARITY ERRORS HAVE
                                                                      ;BEEN REACHED
032160  001036                                BNE     1$              ;BRANCH IF MAXIMUM NOT REACHED
032162  005737  002210                        TST     BRUERR          ;BRUTUS W/ERRORS
032166  001030                                BNE     2$              ;BRANCH IF YES
032170                                        PRINTB  #FORM08
032210  010437  002432                        MOV     R4,BITPST       ;
032214  004737  036406                        JSR     PC,SHIFTL       ;CALCULATE CORRECT BIT POSITION
032220  006237  002432                        ASR     BITPST          ;CONVERT FOR EOT FLAG
032224  053737  002432  002540                BIS     BITPST,EOTFLG   ;SET EOT FLAG
032232  005237  002600                        INC     ALLEOT
032236  053737  002432  002534                BIS     BITPST,DRPFLG   ;SET DROP UNIT FLAG
032244  005262  000126                        INC     DRPUNT(R2)
032250  005064  002642          2$:   CLR     TRECNT(R4)      ;CLEAR TRE COUNTER
032254  000416                                BR      3$              ;GO HOME
032256  005737  002516          1$:   TST     DATRAN          ;SEE IF DATA TRANSFER COMMAND
032262  001413                                BEQ     3$              ;GO HOME IF NON-DATA TRANSFER
032264  005737  002216                        TST     RETRY           ;SEE IF RETRY ALLOWED
032270  001410                                BEQ     3$              ;GO HOME IF RETRY NOT ALLOWED
032272  005737  002604                        TST     RTYFLG          ;SEE IF RETRY IN PROGRESS
032276  001005                                BNE     3$              ;GO HOME IF RETRY IN PROGRESS
032300  005037  002470                        CLR     VISIT
032304  012737  000001  002604                MOV     #1,RTYFLG       ;SET UP FOR RETRY
032312                                  3$:   POP     <R4,R3>         ;RESTORE REGISTERS
032316  000207                                RTS     PC              ;GO HOME

032320  005737  002436          TM:   TST     CHKUTM          ;SEE IF FUNCTIONAL SEQUENCE CAUSED THIS
032324  001054                                BNE     5$              ;YES HE SURE DID , EXIT
032326  022737  000001  002314                CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION CHOSEN
032334  001450                                BEQ     5$              ;BRANCH IF BRUTUS TO RETURN
032336  022737  000001  002206                CMP     #1,CANSEQ       ;SEE IF UNKNOWN TAPE OPTION
032344  001022                                BNE     1$              ;BRANCH IF NOT UNKNOWN TAPE
032346  005237  002570                        INC     FILENM          ;INCREMENT FILE NUMBER
032352  022737  000001  002566                CMP     #1,RECORD       ;SEE IF LEOT
032360  001010                                BNE     4$              ;BRANCH IF NOT
032362  022737  000001  002570                CMP     #1,FILENM       ;SEE IF FILE #=1
032370  001404                                BEQ     4$              ;BRANCH IF YES
032372  005037  002566                        CLR     RECORD          ;CLEAR RECORD #
032376  000137  033000                        JMP     LEOT            ;JUMP TO LEOT
032402  005037  002566          4$:   CLR     RECORD
032406  000137  032456                        JMP     5$              ;BRANCH FOR UNKNOWN TAPE TO RETURN
032412  005237  002524          1$:   INC     EXTDSN
032416                                        ERRDF   7.,ERM006,ERRMS1
032426  005737  002516                        TST     DATRAN          ;SEE IF DATA TRANSFER COMMAND
032432  001411                                BEQ     5$              ;RETURN IF NOT DATA TRANSFER COMMAND
032434  022737  000077  002452                CMP     #REDREV,CMMAND  ;SEE IF READ REVERSE COMMAND
032442  001403                                BEQ     2$              ;BRANCH IF READ REVERSE COMMAND
```

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5649  032444  005262  000014                    INC     SERRFO(R2)      ;INCREMENT STATUS ERRORS READ
5650  032450  000402                            BR      5$
5651  032452  005262  000016            2$:     INC     SERRRV(R2)      ;INCREMENT STATUS ERRORS READ REVERSE
5652  032456  000207                    5$:     RTS     PC              ;GO HOME
5653
5654  032460  022737  000001  002314    BOT:    CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION
5655  032466  001423                            BEQ     2$              ;BRANCH IF BRUTUS OPTION
5656  032470  005237  002524                    INC     EXTDSN
5657  032474                                    ERRDF   8.,ERM007,ERRMS1
5658  032504  005737  002210                    TST     BRUERR          ;SEE IF BRUTUS W/ERRORS
5659  032510  001005                            BNE     1$              ;BRANCH IF BRUTUS W/ERRORS
5660  032512  013737  002352  002432            MOV     TBLNUM,BITPST   ;STORE TABLE NUMBER IN BIT POSITION
5661  032520  004737  035024                    JSR     PC,DROPIT       ;GO DROP THE UNIT
5662  032524  005737  002516            1$:     TST     DATRAN          ;SEE IF DATA TRANSFER COMMAND
5663  032530  001402                            BEQ     2$              ;BRANCH IF NOT
5664  032532  005262  000016                    INC     SERRRV(R2)      ;INCREMENT STATUS ERROR READ REVERSE
5665  032536  000207                    2$:     RTS     PC              ;GO HOME
5666
5667  032540                            EOT:    PUSH    <R3,R4,R5>
5668  032546  013737  002352  002432            MOV     TBLNUM,BITPST   ;FIND CORRECT UNIT
5669  032554  004737  036406                    JSR     PC,SHIFTL       ;TO SET UP DROP FLAG
5670  032560  006237  002432                    ASR     BITPST          ;CONVERT FOR EOT FLAG
5671  032564  022737  000001  002314            CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION
5672  032572  001476                            BEQ     5$
5673  032574  033737  002432  002540            BIT     BITPST,EOTFLG   ;SEE IF AT EOT
5674  032602  001403                            BEQ     6$              ;BRANCH IF NOT
5675  032604  005237  002600                    INC     ALLEOT          ;SET ALL UNITS EOT FLAG
5676  032610  000467                            BR      5$              ;GET OUT
5677  032612  005737  002210            6$:     TST     BRUERR          ;SEE IF BRUTUS W/ERRORS
5678  032616  001426                            BEQ     1$              ;BRANCH IF NOT
5679  032620                                    PRINTB  #FORM28
5680  032640                                    PRINTB  #FORM01,RHADDR,TM78N,TU78N
5681  032674  005737  002516            1$:     TST     DATRAN          ;SEE IF DATA TRANSFER COMMAND
5682  032700  001425                            BEQ     4$              ;BRANCH IF NOT
5683  032702  005737  002522                    TST     EXTERR          ;SEE IF EXTENDED ERROR 1 OR 0
5684  032706  001412                            BEQ     2$              ;BRANCH IF ZERO
5685  032710  005037  002560                    CLR     WRTYCT          ;CLEAR WRITE
5686  032714  005037  002556                    CLR     WRTCNT          ;RETRY
5687  032720  005037  002546                    CLR     BADCNT          ;FLAGS
5688  032724  012737  000006  002604            MOV     #6,RTYFLG       ;SPACE REVERSE AND CLOSE FILE
5689  032732  000413                            BR      3$              ;
5690  032734  012703  000032            2$:     MOV     #BYWRLO,R3      ;STORE OFFSETS
5691  032740  012704  000030                    MOV     #BYWRMD,R4      ;INTO
5692  032744  012705  000026                    MOV     #BYWRHI,R5      ;REGISTERS
5693  032750  004737  035640                    JSR     PC,DECMAL       ;UPDATE # OF BYTES WRITTEN
5694  032754  012737  000005  002604    4$:     MOV     #5,RTYFLG       ;SET UP TO CLOSE FILE
5695  032762  053737  002432  002540    3$:     BIS     BITPST,EOTFLG   ;SET EOT BIT
5696  032770                            5$:     POP     <R5,R4,R3>
5697  032776  000207                            RTS     PC
5698
5699  033000  022737  000001  002314    LEOT:   CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION
5700  033006  001420                            BEQ     1$              ;BRANCH IF NOT
5701  033010                                    ERRDF   10.,ERM009,ERRMS1
5702  033020  013737  002352  002432            MOV     TBLNUM,BITPST   ;SET UP
5703  033026  004737  036406                    JSR     PC,SHIFTL       ;TO DROP UNIT
5704  033032  006237  002432                    ASR     BITPST          ;CONVERT FOR EOT FLAG
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 5705  033036  005237  002600                  INC     ALLEOT          ;
 5706  033042  053737  002432  002540          BIS     BITPST,EOTFLG   ;BY SETTING EOT FLAG
 5707  033050  000207                  1$:     RTS     PC
 5708
 5709
 5710
 5711  033052  000207                  IREWND: RTS     PC              ;GO HOME
 5712
 5713
 5714  033054  022737  000001  002314  FPT:    CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION
 5715  033062  001416                          BEQ     FPTOUT          ;BRANCH IF BRUTUS OPTION CHOSEN
 5716  033064  005237  002524                  INC     EXTDSN
 5717  033070                                  ERRDF   11.,ERM010,ERRMS1
 5718  033100  005737  002210          CHEAT:  TST     BRUERR          ;SEE IF BRUTUS W/ERRORS OPTION CHOSEN
 5719  033104  001005                          BNE     FPTOUT          ;BRANCH  TO RETURN IF BRUTUS W/ERRORS
 5720  033106  013737  002352  002432          MOV     TBLNUM,BITPST   ;SET UP
 5721  033114  004737  035024                  JSR     PC,DROPIT       ;GO DROP THE UNIT
 5722  033120  000207                  FPTOUT: RTS     PC
 5723
 5724  033122  000207                  INOOP:  RTS     PC              ;RETURN
 5725
 5726  033124  022737  000001  002314  NOTRDY: CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION
 5727  033132  001406                          BEQ     1$              ;BRANCH IF BRUTUS OPTION
 5728  033134                                  ERRDF   12.,ERM011,ERRMS1
 5729  033144  000137  033100                  JMP     CHEAT           ;LOOP TO ABOVE CODE IN FPT
 5730  033150  000207                  1$:     RTS     PC              ;GO HOME
 5731
 5732  033152  022737  000001  002314  NOTAVL: CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION
 5733  033160  001410                          BEQ     1$              ;BRANCH IF BRUTUS OPTION
 5734  033162  005237  002524                  INC     EXTDSN
 5735  033166                                  ERRDF   13.,ERM012,ERRMS1
 5736  033176  000137  033100                  JMP     CHEAT           ;LOOP TO ABOVE CODE IN FPT
 5737  033202  000207                  1$:     RTS     PC              ;GO HOME
 5738
 5739  033204  022737  000001  002314  OFFLNE: CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION
 5740  033212  001406                          BEQ     1$              ;BRANCH IF BRUTUS OPTION
 5741  033214                                  ERRDF   14.,ERM013,ERRMS1
 5742  033224  000137  033100                  JMP     CHEAT           ;LOOP TO ABOVE CODE IN FPT
 5743  033230  000207                  1$:     RTS     PC              ;GO HOME
 5744
 5745  033232  022737  000001  002314  NONEX:  CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION
 5746  033240  001406                          BEQ     1$              ;BRANCH IF BRUTUS W/ERRORS
 5747  033242                                  ERRDF   15.,ERM014,ERRMS1
 5748  033252  000137  033100                  JMP     CHEAT           ;LOOP TO ABOVE CODE IN FPT
 5749  033256  000207                  1$:     RTS     PC              ;GO HOME
 5750
 5751  033260  022737  000004  002206  BLKTAP: CMP     #4,CANSEQ       ;FUNCTIONAL SEQUENCE ?
 5752  033266  001003                          BNE     2$              ;NO
 5753  033270  005237  002440                  INC     ERASED          ;YES , SET ERASED FLAG
 5754  033274  000412                          BR      1$              ;EXIT
 5755  033276  022737  000001  002314  2$:     CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION
 5756  033304  001406                          BEQ     1$              ;GO HOME
 5757  033306                                  ERRDF   16.,ERM015,ERRMS1
 5758  033316  000137  033100                  JMP     CHEAT           ;LOOP TO ABOVE CODE IN FPT
 5759  033322  000207                  1$:     RTS     PC
 5760
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 5761  033324  022737  000001  002314  ILLINT: CMP     #1,BRTEST       ;SEE IF BRUTUS
 5762  033332  001406                          BEQ     1$              ;BRANCH IF BRUTUS OPTION
 5763  033334                                  ERRDF   5.,ERM004,ERRMS1
 5764  033344  000137  033100                  JMP     CHEAT           ;LOOP TO ABOVE CODE IN FPT
 5765  033350  000207                  1$:     RTS     PC              ;GO HOME
 5766
 5767  033352  022737  000001  002314  ONLINE: CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION
 5768  033360  001404                          BEQ     1$              ;BRANCH IF BRUTUS
 5769  033362                                  ERRDF   17.,ERM016,ERRMS1
 5770  033372  000207                  1$:     RTS     PC              ;RETURN
 5771
 5772  033374                          S4TREC:
 5773  033374                          LONREC: PUSH    <R3,R4,R5>
 5774  033402  022737  000001  002314          CMP     #1,BRTEST       ;SEE IF BRUTUS
 5775  033410  001523                          BEQ     10$             ;YES, GO HOME
 5776  033412  005037  002604                  CLR     RTYFLG          ;CLEAR RETRY FLAG
 5777  033416  022737  000001  002206          CMP     #1,CANSEQ       ;SEE IF UNKNOWN TAPE
 5778  033424  001470                          BEQ     8$              ;YES, BRANCH
 5779  033426  005237  002524                  INC     EXTDSN          ;DO EXTENDED SENSE
 5780  033432  022737  000020  002526          CMP     #20,ICCODE      ;SEE IF LONG RECORD
 5781  033440  001005                          BNE     1$              ;BRANCH IF NOT
 5782  033442                                  ERRDF   18.,ERM017,ERRMS1
 5783  033452  000404                          BR      2$
 5784  033454                          1$:     ERRDF   19.,ERM018,ERRMS1
 5785  033464  022737  000077  002452  2$:     CMP     #REDREV,CMMAND  ;SEE IF READ REVERSE
 5786  033472  001423                          BEQ     5$              ;BRANCH IF RR
 5787  033474  005737  002606                  TST     SENFLG          ;SEE IF READ SENSE FAILED
 5788  033500  001015                          BNE     4$              ;BRANCH IF FAILED
 5789  033502  132737  000002  003251          BITB    #2,ECCSTA       ;SEE IF DOUBLE TRACK READ FORWARD
 5790  033510  001403                          BEQ     3$              ;BRANCH IF NOT
 5791  033512  005262  000052                  INC     DBLTRF(R2)      ;INCREMENT DOUBLE TRACK ERROR FORWARD
 5792  033516  000406                          BR      4$              ;GO UPDATE BYTES
 5793  033520  132737  000001  003251  3$:     BITB    #1,ECCSTA       ;SEE IF SINGLE TRACK READ FORWARD
 5794  033526  001402                          BEQ     4$              ;
 5795  033530  005262  000056                  INC     SNGTRF(R2)      ;INCREMENT SINGLE TRACK ERROR FORWARD
 5796  033534  005262  000014          4$:     INC     SERRFO(R2)      ;INCREMENT STATUS ERROR READ FORWARD
 5797  033540  000422                          BR      8$              ;
 5798  033542  005737  002606          5$:     TST     SENFLG          ;SEE IF READ SENSE FAILED
 5799  033546  001015                          BNE     7$              ;BRANCH IF FAILED
 5800  033550  132737  000002  003251          BITB    #2,ECCSTA       ;SEE IF DOUBLE TRACK READ REVERSE
 5801  033556  001403                          BEQ     6$              ;BRANCH IF NOT
 5802  033560  005262  000054                  INC     DBLTRR(R2)      ;INCREMENT DOUBLE TRACK READ REVERSE
 5803  033564  000406                          BR      7$              ;
 5804  033566  132737  000001  003251  6$:     BITB    #1,ECCSTA       ;SEE IF SINGLE TRACK READ REVERSE
 5805  033574  001402                          BEQ     7$              ;BRANCH IF NOT
 5806  033576  005262  000060                  INC     SNGTRR(R2)      ;INCREMENT SINGLE TRACK READ REVERSE
 5807  033602  005262  000016          7$:     INC     SERRRV(R2)      ;INCREMENT STATUS ERROR READ REVERSE
 5808  033606  022737  000077  002452  8$:     CMP     #REDREV,CMMAND  ;SEE IF READ REVERSE COMMAND
 5809  033614  001411                          BEQ     9$              ;BRANCH IF RR
 5810  033616  012703  000040                  MOV     #BYRFLO,R3      ;STORE STATISTICS
 5811  033622  012704  000036                  MOV     #BYRFMD,R4      ;OFFSETS IN
 5812  033626  012705  000034                  MOV     #BYRFHI,R5      ;REGISTERS
 5813  033632  004737  035640                  JSR     PC,DECMAL       ;STORE DECIMAL BYTES READ
 5814  033636  000410                          BR      10$             ;GO HOME
 5815  033640  012703  000046          9$      MOV     #BYRRLO,R3      ;STORE STATISTICS
 5816  033644  012704  000044                  MOV     #BYRRMD,R4      ;OFFSETS IN
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 5817  033650  012705  000042                    MOV     #BYRRHI,R5      ;REGISTERS
 5818  033654  004737  035640                    JSR     PC,DECMAL       ;STORE DECIMAL BYTES RR
 5819  033660                          10$:      POP     <R5,R4,R3>
 5820  033666  000207                            RTS     PC              ;RETURN
 5821
 5822
 5823  033670  022737  000001  002314  IRETRY:   CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION
 5824  033676  001414                            BEQ     5$              ;BRANCH IF YES
 5825  033700  005237  002524                    INC     EXTDSN
 5826  033704                                    ERRSOFT 20.,ERM019,ERRMS1
 5827  033714  005737  002216                    TST     RETRY           ;SEE IF RETRIES SELECTED
 5828  033720  001403                            BEQ     5$              ;BRANCH IF NOT
 5829  033722  012737  000002  002604            MOV     #2,RTYFLG       ;SET RETRY FLAG
 5830  033730  000207                    5$:     RTS     PC              ;GO HOME
 5831
 5832  033732  022737  000001  002314  READOP:   CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION
 5833  033740  001414                            BEQ     5$              ;
 5834  033742  005237  002524                    INC     EXTDSN
 5835  033746                                    ERRSOFT 21.,ERM020,ERRMS1
 5836  033756  005737  002216                    TST     RETRY           ;SEE IF RETRIES SELECTED
 5837  033762  001403                            BEQ     5$              ;BRANCH IF NO RETRIES SELECTED
 5838  033764  012737  000003  002604            MOV     #3,RTYFLG       ;SET RETRY FLAG
 5839  033772  000207                    5$:     RTS     PC              ;GO HOME
 5840
 5841  033774  022737  000001  002314  UNRDAB:   CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION
 5842  034002  001417                            BEQ     2$              ;BRANCH IF BRUTUS OPTION
 5843  034004  005237  002524                    INC     EXTDSN
 5844  034010                                    ERRHRD  22.,ERM021,ERRMS1
 5845  034020  022737  000077  002462            CMP     #REDREV,RETRCD  ;SEE IF READ REVERSE COMMAND
 5846  034026  001403                            BEQ     1$
 5847  034030  005262  000022                    INC     NRECRE(R2)      ;INCREMENT NON-RECOVERABLE READS
 5848  034034  000402                            BR      2$
 5849  034036  005262  000024            1$:     INC     NRECRR(R2)      ;INCREMENT NON-RECOVERABLE READ REVERSE
 5850  034042  005037  002604            2$:     CLR     RTYFLG
 5851  034046  000207                            RTS     PC
 5852
 5853  034050  022737  000001  002314  ERROR:    CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION
 5854  034056  001500                            BEQ     5$              ;
 5855  034060  022737  000004  002546            CMP     #4,BADCNT       ;SEE IF HARD ERROR
 5856  034066  001436                            BEQ     6$              ;BRANCH IF SO
 5857  034070  005237  002524                    INC     EXTDSN
 5858  034074                                    ERRSOFT 23.,ERM022,ERRMS1
 5859  034104  005737  002216                    TST     RETRY           ;ARE RETRIES ALLOWED
 5860  034110  001021                            BNE     3$              ;
 5861  034112  022737  000070  002452            CMP     #70,CMMAND      ;SEE IF READ OR WRITE OPERATION
 5862  034120  101012                            BHI     2$              ;BRANCH IF WRITE COMMAND
 5863  034122  022737  000077  002452            CMP     #REDREV,CMMAND  ;SEE IF READ REVERSE COMMAND
 5864  034130  001403                            BEQ     1$              ;BRANCH IF READ REVERSE
 5865  034132  005262  000014                    INC     SERR%0(R2)      ;INCREMENT READ STATUS ERROR
 5866  034136  000450                            BR      5$              ;
 5867  034140  005262  000016            1$:     INC     SERRRV(R2)      ;INCREMENT READ REVERSE STATUS ERROR
 5868  034144  000445                            BR      5$              ;
 5869  034146  005262  000012            2$:     INC     SERWRT(R2)      ;INCREMENT WRITE STATUS ERROR
 5870  034152  000442                            BR      5$
 5871  034154  023727  002452  000070    3$:     CMP     CMMAND,#70      ;SEE IF READ OR WRITE
 5872  034162  101036                            BHI     5$              ;BRANCH IF READ
```

```
 5873  034164  005037  002470          6$:     CLR     VISIT           ;CLEAR WRITE VISIT FLAG
 5874  034170  022737  000004  002546          CMP     #4,BADCNT       ;SEE IF RETRIED ENOUGH
 5875  034176  001025                          BNE     4$              ;BRANCH IF NOT DONE
 5876  034200  005037  002546                  CLR     BADCNT          ;RESET BAD COUNT
 5877  034204  005262  000020                  INC     NRECWR(R2)      ;UPDATE NON-RECOVERABLE WRITE
 5878  034210  005237  002524                  INC     EXTDSN          ;
 5879  034214                                  ERRHRD  35.,ERM034,ERRMS1
 5880  034224  005037  002604                  CLR     RTYFLG          ;RESET RETRIES
 5881  034230  005737  002210                  TST     BRUERR          ;SEE IF BRUTUS W/ERRORS
 5882  034234  001011                          BNE     5$              ;BRANCH IF B W/ERRORS
 5883  034236  013737  002352  002432          MOV     TBLNUM,BITPST   ;GET UNIT #
 5884  034244  004737  035024                  JSR     PC,DROPIT       ;GO DROP THE UNIT
 5885  034250  000403                          BR      5$
 5886  034252  012737  000004  002604  4$:     MOV     #4,RTYFLG       ;SET RETRY FLAG
 5887  034260  000207                  5$:     RTS     PC              ;GO HOME
 5888
 5889  034262  022737  000001  002314  EOTERR: CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION
 5890  034270  001426                          BEQ     3$              ;IF BRUTUS GO HOME
 5891  034272  005737  002210                  TST     BRUERR          ;SEE IF BRUTUS W/ERRORS
 5892  034276  001404                          BEQ     1$              ;BRANCH IF NOT
 5893  034300                                  ERRSOFT 24.,ERM023,ERRMS1
 5894  034310  013737  002352  002432  1$:     MOV     TBLNUM,BITPST   ;
 5895  034316  004737  036406                  JSR     PC,SHIFTL       ;MAKE TABLE NUMBER CORRESPOND TO BIT POSITION
 5896  034322  006237  002432                  ASR     BITPST          ;CONVERT FOR EOT FLAG
 5897  034326  053737  002432  002540          BIS     BITPST,EOTFLG   ;DROP UNIT
 5898  034334  005037  002470                  CLR     VISIT
 5899  034340  012737  000006  002604          MOV     #6,RTYFLG       ;SET UP FOR RETRY SIX
 5900  034346  000207                  3$:     RTS     PC              ;GO HOME
 5901
 5902  034350  022737  000001  002314  BADTAP: CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION
 5903  034356  001416                          BEQ     4$              ;GO HOME
 5904  034360  005237  002524                  INC     EXTDSN
 5905  034364                                  ERRDF   25.,ERM024,ERRMS1
 5906  034374  005737  002210                  TST     BRUERR          ;SEE IF BRUTUS W/ERRORS
 5907  034400  001005                          BNE     4$              ;BRANCH IF BRUTUS W/ERRORS
 5908  034402  013737  002352  002432          MOV     TBLNUM,BITPST   ;
 5909  034410  004737  035024                  JSR     PC,DROPIT       ;GO DROP THE UNIT
 5910  034414  000207                  4$:     RTS     PC
 5911
 5912  034416  022737  000001  002314  TMFALT: CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION
 5913  034424  001416                          BEQ     TMOUT           ;BRANCH IF BRUTUS OPTION
 5914  034426  005237  002524                  INC     EXTDSN
 5915  034432                                  ERRDF   26.,ERM025,ERRMS1
 5916  034442  005737  002210          CHEATA: TST     BRUERR          ;SEE IF BRUTUS W/ERRORS
 5917  034446  001005                          BNE     TMOUT           ;BRANCH IF BRUTUS W/ERRORS
 5918  034450  013737  002352  002432          MOV     TBLNUM,BITPST   ;
 5919  034456  004737  035024                  JSR     PC,DROPIT       ;GO DROP THE UNIT
 5920  034462  000207                  TMOUT:  RTS     PC              ;GO HOME
 5921
 5922  034464  022737  000001  002314  TUFALT: CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION
 5923  034472  001410                          BEQ     1$              ;BRANCH IF BRUTUS OPTION
 5924  034474  005237  002524                  INC     EXTDSN
 5925  034500                                  ERRDF   27.,ERM026,ERRMS1
 5926  034510  000137  034442                  JMP     CHEATA          ;LOOP TO ABOVE CODE IN TMFALT
 5927  034514  000207                  1$:     RTS     PC              ;GO HOME
 5928
```

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5929  034516  022737  000001  002314  TUFALB: CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION
5930  034524  001404                          BEQ     1$              ;BRANCH IF BRUTUS
5931  034526                                  ERRDF   30.,ERM029,ERRMS2
5932  034536  000207                  1$:     RTS     PC              ;RETURN
5933
5934  034540                          MBFALT:
5935  034540                          TMFALB: PUSH    <R1,R2,R3,R4>
5936  034550  005004                          CLR     R4              ;SET UP TIME OUT COUNTER
5937  034552  013701  002532                  MOV     MASBUS,R1       ;R1 CONTAINS RH ADDRESS
5938  034556  016137  000016  002430          MOV     ATTBIT(R1),BNRYNB  ;STORE ATTENTION BIT IN BINARY NUMBER
5939  034564  004737  036360                  JSR     PC,SHIFTR       ;CONVERT BIT POSITION TO BINARY NUMBER
5940  034570  053761  002430  000010          BIS     BNRYNB,UNSLCT(R1)  ;SET UNIT SELECT WITH A TM NUMBER
5941  034576  013737  002430  002370          MOV     BNRYNB,TM78N    ;
5942  034604  022737  000001  002314          CMP     #1,BRTEST       ;SEE IF BRUTUS OPTION
5943  034612  001450                          BEQ     4$              ;BRANCH TO TM READY
5944  034614  022737  000034  002526          CMP     #34,ICCODE      ;SEE IF MB FAULT
5945  034622  001005                          BNE     8$              ;BRANCH IF NOT
5946  034624                                  ERRDF   31.,ERM030,ERRMS2
5947  034634  000404                          BR      9$
5948  034636                          8$:     ERRDF   28.,ERM027,ERRMS2
5949  034646  005737  002210          9$:     TST     BRUERR          ;SEEIF BRUTUS W/ERRORS
5950  034652  001030                          BNE     4$              ;BRANCH IF BRUTUS W/ERRORS TO TM READY
5951  034654  012703  000001                  MOV     #1,R3           ;R3 CONTAINS TABLE NUMBER
5952  034660  013702  002330                  MOV     PTBLAD,R2       ;R2 CONTAINS TABLE ADDRESS
5953  034664  021201                  1$:     CMP     (R2),R1         ;SEE IF SAME RH
5954  034666  001411                          BEQ     2$              ;BRANCH IF SAME RH
5955  034670  005203                  3$:     INC     R3              ;GET NEXT TABLE
5956  034672  020337  002344                  CMP     R3,TBLCNT       ;SEE IF LOOK AT ALL TABLES
5957  034676  101016                          BHI     4$              ;BRANCH IF LOOK AT ALL TABLES
5958  034700  063702  002346          6$:     ADD     TBLNTH,R2       ;GET ADDRESS OF NEXT TABLE
5959  034704  063702  002346                  ADD     TBLNTH,R2       ;
5960  034710  000765                          BR      1$              ;BRANCH TO COMPARE
5961  034712  023762  002430  000004  2$:     CMP     BNRYNB,TMNUM(R2)  ;SEE IF SAME TM NUMBER
5962  034720  001367                          BNE     6$              ;BRANCH IF TM'S DON'T MATCH
5963  034722  010337  002432                  MOV     R3,BITPST       ;BIT POSITION CONTAINS TABLE NUMBER
5964  034726  004737  035024                  JSR     PC,DROPIT       ;GO DROP THE UNIT
5965  034732  000756                          BR      3$              ;GET NEXT UNIT
5966  034734  052761  040000  000052  4$:     BIS     #BIT14,INTRDA(R1)  ;SET TM CLEAR
5967  034742  032761  100000  000052  10$:    BIT     #BIT15,INTRDA(R1)  ;SEE IF TM READY
5968  034750  001020                          BNE     5$              ;BRANCH IF TM READY IS SET
5969  034752  005204                          INC     R4              ;INCREMENT TIME OUT COUNTER
5970  034754  022704  177777                  CMP     #-1,R4          ;SEE IF REACHED TIME OUT
5971  034760  001370                          BNE     10$             ;NO TIME OUT REACHED
5972  034762  022737  000001  002314          CMP     #1,BRTEST       ;SEE IF BRUTUS W/ERRORS
5973  034770  001410                          BEQ     5$
5974  034772  005237  002542                  INC     TIMOUT
5975  034776                                  ERRDF   29.,ERM028,ERRMS2
5976  035006  005037  002542                  CLR     TIMOUT
5977  035012                          5$:     POP     <R4,R3,R2,R1>
5978  035022  000207                          RTS     PC
5979
5980
5981  035024  004737  036406          DROPIT: JSR     PC,SHIFTL       ;CONVERT UNIT TO BIT POSITION
5982  035030  006237  002432                  ASR     BITPST          ;CONVERT FOR EOT FLAG
5983  035034  033737  002432  002534          BIT     BITPST,DRPFLG   ;ALREADY DROPPED ?
5984  035042  001014                          BNE     1$              ;BRANCH IF DROPPED
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 5985  035044  053737  002432  002534          BIS     BITPST,DRPFLG   ;ELSE - SET DROP FLAG
 5986  035052  033737  002432  002540          BIT     BITPST,EOTFLG   ;WAS UNIT AT EOT ?
 5987  035060  001005                          BNE     1$              ;IF SO DONT INCREMENT ALLEOT
 5988  035062  053737  002432  002540          BIS     BITPST,EOTFLG   ;DROP UNIT
 5989  035070  005237  002600                  INC     ALLEOT          ;
 5990  035074                          1$:     PRINTB  #FORM08         ;
 5991  035114  005262  000126                  INC     DRPUNT(R2)      ;UPDATE STATS
 5992  035120  000207                          RTS     PC              ;GO KEEP UP THE GOOD WORK
 5993
 5994
 5995                                  ;*BEGINROUTINE (MOD = 3.3.5 DATA COMPARE)
 5996                                  ;*  CLEAR COUNTERS
 5997                                  ;*  STORE WRITE BUFFER ADDRESS
 5998                                  ;*  STORE READ BUFFER ADDRESS
 5999                                  ;*  STORE BYTES PER RECORD
 6000                                  ;*  DO UNTIL LOOP FLAG
 6001                                  ;*  :  IF EVEN BYTE RECORD
 6002                                  ;*  :  :  THEN
 6003                                  ;*  :  :    COMPARE BUFFER
 6004                                  ;*  :  :  ELSE
 6005                                  ;*  :  :    COMPARE BYTE
 6006                                  ;*  :  ENDIF
 6007                                  ;*  :  IF NOT EQUAL
 6008                                  ;*  :  :  THEN
 6009                                  ;*  :  :    COMPARE LOWEST BYTE
 6010                                  ;*  :  :    IF NOT EQUAL
 6011                                  ;*  :  :    :  THEN
 6012                                  ;*  :  :    :    STORE EXPECTED
 6013                                  ;*  :  :    :    STORE ACTUAL
 6014                                  ;*  :  :    :    STORE BYTE # IN RECORD
 6015                                  ;*  :  :    :    CALL DROP DR PICK ROUTINE
 6016                                  ;*  :  :    :    INCREMENT BAD BYTE COUNT
 6017                                  ;*  :  :    :    IF DID NOT PRINT ERROR
 6018                                  ;*  :  :    :    :  THEN
 6019                                  ;*  :  :    :    :    INCREMENT PRINT ERROR FLAG
 6020                                  ;*  :  :    :    :    IF READ FWD COMMAND
 6021                                  ;*  :  :    :    :    :  THEN
 6022                                  ;*  :  :    :    :    :    INCREMENT FWD DATA ERROR
 6023                                  ;*  :  :    :    :    :  ELSE
 6024                                  ;*  :  :    :    :    :    INCREMENT REVERSE DATA ERROR
 6025                                  ;*  :  :    :    :    ENDIF
 6026                                  ;*  :  :    :    :    STORE UNIT NUMBER
 6027                                  ;*  :  :    :    :    PRINT ERROR
 6028                                  ;*  :  :    :    :  ELSE
 6029                                  ;*  :  :    :    :    IF MAXIMUM BYTES NOT PRINTED
 6030                                  ;*  :  :    :    :    :  THEN
 6031                                  ;*  :  :    :    :    :    PRINT BYTE BAD
 6032                                  ;*  :  :    :    :    :    UPDATE BYTE BAD
 6033                                  ;*  :  :    :    :    ENDIF
 6034                                  ;*  :  :    :    ENDIF
 6035                                  ;*  :  :    :  ELSE
 6036                                  ;*  :  :    :    GET NEXT BYTE IN BOTH BUFFERS
 6037                                  ;*  :  :    :    DECREMENT BYTE COUNT
 6038                                  ;*  :  :    :    IF CHECKED HIGH BYTE
 6039                                  ;*  :  :    :    :  THEN
 6040                                  ;*  :  :    :    :    GET NEXT BYTE IN BOTH BUFFERS
```

```
6041                                    ;*  :  :     :     :    DECREMENT BYTE COUNT
6042                                    ;*  :  :     :     :  ELSE
6043                                    ;*  :  :     :     :    IF NOT LAST BYTE
6044                                    ;*  :  :     :     :    : THEN
6045                                    ;*  :  :     :     :    :   CLEAR LOOP FLAG
6046                                    ;*  :  :     :     :    : ELSE
6047                                    ;*  :  :     :     :    :   PRINT # OF BYTES BAD
6048                                    ;*  :  :     :     :    :   SET LOOP FLAG
6049                                    ;*  :  :     :     :    ENDIF
6050                                    ;*  :  :     :   ENDIF
6051                                    ;*  :  :   ENDIF
6052                                    ;*  :  ENDIF
6053                                    ;*  ENDDO
6054                                    ;*ENDROUTINE
6055
6056  035122                            COMPAR: PUSH    <R3,R4,R5>
6057  035130  005037  002554                    CLR     OKAY
6058  035134  005037  002424                    CLR     R10             ;CLEAR TEMPORARY REGISTERS
6059  035140  005037  002422                    CLR     R9              ;
6060  035144  013705  002354                    MOV     VRMADD,R5       ;R5 CONTAINS START OF WRITE BUFFER
6061  035150  013704  002332                    MOV     REDBUF,R4       ;R4 CONTAINS START OF READ BUFFER
6062  035154  013703  002220                    MOV     CHAREC,R3       ;R3 CONTAINS BYTES IN RECORD
6063  035160  022703  000001            2$:     CMP     #1,R3           ;SEE IF ODD BYTE BUFFER
6064  035164  001402                            BEQ     11$             ;BRANCH IF YES
6065  035166  021415                            CMP     (R4),(R5)       ;SEE IF BYTES COMPARE
6066  035170  001473                            BEQ     4$              ;BRANCH IF YES
6067  035172  005237  002554           11$:     INC     OKAY            ;SET BYTE OKAY FLAG
6068  035176  121415                            CMPB    (R4),(R5)       ;SEE IF LSB OKAY
6069  035200  001467                            BEQ     4$              ;BRANCH IF LSB OKAY
6070  035202  111537  002472                    MOVB    (R5),EXPECT     ;STORE EXPECTED DATA
6071  035206  111437  002474                    MOVB    (R4),ACTUAL     ;STORE ACTUAL DATA
6072  035212  010537  002572                    MOV     R5,FIRBYT               ;FIRBYT CONTAINS ADDRESS OF FAIL BYTE
6073  035216  163737  002354  002572           SUB     VRMADD,FIRBYT           ;FIRBYT NOW CONTAINS FAIL BYTE NUMBER
6074  035224  004737  035472                    JSR     PC,DRPPCK       ;CALL DROP PICK ROUTINE
6075  035230  005237  002424                    INC     R10             ;R10 IS NUMBER OF BYTES BAD IN RECORD
6076  035234  005737  002422                    TST     R9              ;SEE IF ALREADY PRINTED ERROR
6077  035240  001023                            BNE     7$              ;BRANCH IF ERROR PRINTED
6078  035242  005237  002422                    INC     R9              ;SET PRINT FLAG
6079  035246  022737  000077  002452           CMP     #REDREV,CMMAND  ;SEE IF READ REVERSE
6080  035254  001403                            BEQ     3$              ;BRANCH IF RR
6081  035256  005262  000062                    INC     DERREF(R2)      ;UPDATE READ DATA ERROR
6082  035262  000402                            BR      6$              ;
6083  035264  005262  000064            3$:     INC     DERRRV(R2)      ;UPDATE RR DATA ERROR
6084  035270  016237  000010  002074    6$:     MOV     SPUNIT(R2),L$LUN
6085  035276                                    ERRDF   34.,ERM033,ERRMS3
6086  035306  000424                            BR      4$              ;
6087  035310  022737  000010  002422    7$:     CMP     #10,R9          ;SEE IF 8 BAD BYTES FOUND
6088  035316  001420                            BEQ     4$              ;BRANCH IF YES
6089  035320                                    PRINTB  #FORM06,FIRBYT,EXPECT,ACTUAL
6090  035354  005237  002422                    INC     R9              ;UPDATES BYTE PRINTED
6091  035360  005204                    4$:     INC     R4              ;GET NEXT BYTE
6092  035362  005205                            INC     R5              ;GET NEXT BUFFER BYTE
6093  035364  005303                            DEC     R3              ;DECREMENT BYTES
6094  035366  005737  002554                    TST     OKAY            ;SEE IF WORD OKAY
6095  035372  001004                            BNE     12$             ;BRANCH IF NOT
6096  035374  005204                            INC     R4              ;GET NEXT WORD
```

```
6097  035376  005205                          INC     R5              ;GET NEXT WORD
6098  035400  005303                          DEC     R3              ;DECREMENT BYTES
6099  035402  000410                          BR      13$             ;
6100  035404  005703                  12$:    TST     R3              ;SEE IF LAST BYTE
6101  035406  001406                          BEQ     13$             ;BRANCH IF YES
6102  035410  022737  000001  002554          CMP     #1,OKAY         ;SEE IF CHECKED BOTH BYTES
6103  035416  001665                          BEQ     11$             ;BRANCH IF NO
6104  035420  005037  002554                  CLR     OKAY            ;CONTINUE AND RESET FLAG
6105  035424  005703                  13$:    TST     R3              ;SEE IF LAST BYTES
6106  035426  001254                          BNE     2$              ;BRANCH IF NOT LAST BYTE
6107  035430  005737  002424          5$:     TST     R10             ;SEE IF ERROR OCCURRED
6108  035434  001412                          BEQ     8$              ;BRANCH IF NO ERROR
6109  035436                                  PRINTB  #FORM10,R10
6110  035462                          8$:     POP     <R5,R4,R3>
6111  035470  000207                          RTS     PC              ;RETURN
6112
6113
6114
6115                                  ;*BEGINROUTINE (MODULE 3.3.5.2 = PICKS)
6116
6117  035472                          DRPPCK: PUSH    <R4,R5>
6118  035476  013705  002472                  MOV     EXPECT,R5       ;
6119  035502  042705  177400                  BIC     #177400,R5      ;TAKE LOWER BYTE OF R5
6120  035506  143705  002474                  BICB    ACTUAL,R5       ;R5 CONTAINS BITS DROPPED
6121  035512  001404                          BEQ     1$              ;TO PICK ROUTINE
6122  035514  012704  000066                  MOV     #DROP7,R4       ;R4 CONTAINS DROP OFFSETS
6123  035520  004737  035560                  JSR     PC,PCKDRP       ;CALL DROP UPDATE
6124  035524  012704  000106          1$:     MOV     #PICK7,R4       ;SET UP TO FIND PICKS
6125  035530  013705  002474                  MOV     ACTUAL,R5       ;
6126  035534  042705  177400                  BIC     #177400,R5      ;BIC UPPER BYTE OF R5
6127  035540  043705  002472                  BIC     EXPECT,R5       ;R5 CONTAINS BITS PICKED
6128  035544  001402                          BEQ     2$              ;LEAVE
6129  035546  004737  035560                  JSR     PC,PCKDRP       ;CALL PICK UPDATE
6130  035552                          2$:     POP     <R5,R4>
6131  035556  000207                          RTS     PC              ;
6132
6133
6134
6135                                  ;*BEGINROUTINE (MODULE 3.3.5.1 = DROPS)
6136
6137  035560  010437  002520          PCKDRP: MOV     R4,STORE        ;STORE OFFSET
6138  035564  010537  002430                  MOV     R5,BNRYNB       ;
6139  035570  004737  036360                  JSR     PC,SHIFTR       ;FIND BIT DROPPED OR PICKED
6140  035574  013737  002430  002432          MOV     BNRYNB,BITPST   ;SET UP TO CLEAR BITS DROPPED OR PICKED
6141  035602  006327  002430                  ASL     BNRYNB          ;MAKE OFFSET INTO WORD
6142  035606  063737  002430  002520          ADD     BNRYNB,STORE    ;
6143  035614  060237  002520                  ADD     P2,STORE        ;ADD TABLE ADDRESS TO OFFSET
6144  035620  005277  144674                  INC     @STORE          ;UPDATE STATS
6145  035624  004737  036406                  JSR     PC,SHIFTL       ;FIND DROPPED BIT LOCATION
6146  035630  043705  002432                  BIC     BITPST,R5       ;CLEAR BIT DROPPED OR PICKED
6147  035634  001351                          BNE     PCKDRP          ;BRANCH IF NOT DONE
6148  035636  000207                          RTS     PC              ;GO HOME
6149
6150
6151
6152
```

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6153
6154                                    ;
6155                                    ;STORE BYTES TRANSFERRED IN MAXIMUM WORDS OF 9999 DECIMAL
6156                                    ;
6157
6158
6159
6160  035640  060205                    DECMAL: ADD     R2,R5           ;R5 CONTAINS HIGH BYTE ADDRESS
6161  035642  060204                            ADD     R2,R4           ;R4 CONTAINS MEDIUM BYTE ADDRESS
6162  035644  060203                            ADD     R2,R3           ;R3 CONTAINS CON BYTE ADDRESS
6163  035646  066113  000006                    ADD     BYTCNT(R1),(R3)  ;ADD BYTES TRANSFERRED TO LOW ORDER LOCATIONS
6164  035652  022713  023420                    CMP     #23420,(R3)     ;SEE IF LSB IS GREATER THAN 100000
6165  035656  101011                            BHI     1$              ;RETURN IF NOT
6166  035660  005214                            INC     (R4)            ;PSEUDO CARRY
6167  035662  162713  023420                    SUB     #23420,(R3)     ;RESET LEAST SIGNIFICANT BIT
6168  035666  022714  023420                    CMP     #23420,(R4)     ;SEE IF MIDDLE BITS OVERFLOW
6169  035672  101003                            BHI     1$              ;RETURN
6170  035674  005215                            INC     (R5)            ;PSEUDO CARRY
6171  035676  162714  023420                    SUB     #23420,(R4)     ;RESET MIDDLE BITS
6172  035702  000207                    1$:     RTS     PC              ;
6173
6174
6175
6176  035704                            EXREAD: PUSH    <R3>
6177  035706  005003                            CLR     R3
6178  035710  016261  000004  000010            MOV     TMNUM(R2),UNSLCT(R1)    ;LOAD TM NUMBER
6179  035716  012761  000036  000002            MOV     #36,WRDCNT(R1)          ;LOAD # OF WORDS TO TRANSFER
6180  035724  005461  000002                    NEG     WRDCNT(R1)              ;COMPLIMENT WORD COUNT
6181  035730  012761  003230  000004            MOV     #COMCOD,BSADDR(R1)      ;LOAD BUS ADDRESS
6182  035736  056261  000006  000014            BIS     TUNUM(R2),CMDADR(R1)    ;LOAD TU NUMBER
6183  035744  012711  040000                    MOV     #40000,(R1)             ;CLEAR TRE BIT IN CS1
6184  035750  005011                            CLR     (R1)                    ;CLEAR TRE BIT IN TM78 MEMORY
6185  035752  012711  000173                    MOV     #173,(R1)               ;ISSUE COMMAND
6186  035756  005037  002374                    CLR     INTRPT                  ;CLEAR INTERRUPT
6187  035762                                    SETPRI  #PRIOO          ;
6188  035770  005737  002374            1$:     TST     INTRPT                  ;SEE IF INTERRUPT RECEIVED
6189  035774  001023                            BNE     2$                      ;BRANCH IF INTERRUPT RECEIVED
6190  035776  005203                            INC     R3                      ;
6191  036000                                    DELAY   1               ;
6192  036030  022703  023420                    CMP     #10000.,R3              ;SEE IF TIME OUT REACHED
6193  036034  001355                            BNE     1$                      ;GO WAIT FOR INTERRUPT
6194  036036  005237  002606                    INC     SENFLG                  ;EXTENDED SENSE UNAVAILABLE
6195  036042  000413                            BR      3$                      ;
6196  036044  005037  002374            2$:     CLR     INTRPT                  ;
6197  036050  122761  000001  000012            CMPB    #1,INTCDE(R1)           ;SEE IF DONE INTERRUPT
6198  036056  001003                            BNE     4$                      ;BRANCH IF NOT DONE
6199  036060  005037  002606                    CLR     SENFLG                  ;EXTENDED SENSE AVAILABLE
6200  036064  000402                            BR      3$                      ;
6201  036066  005237  002606            4$:     INC     SENFLG                  ;EXTENDED SENSE UNAVAILABLE
6202  036072                            3$:     POP     <R3>                    ;
6203  036074  000207                            RTS     PC                      ;GO HOME
6204
6205
6206
6207
6208                                    ;*****************************************************************************
```

```
6209                                    ;
6210                                    ;SUBROUTINES USED THROUGHOUT THE PROGRAM
6211                                    ;
6212                                    ;*****************************************************************************
6213
6214
6215
6216                                    ;
6217                                    ;FINDS SPECIFIED LOCATION IN SPECIFIED UNIT TABLE
6218                                    ;
6219
6220
6221
6222  036076                            TBLDIS: PUSH    <R1,R2>         ;STORE R1
6223  036102  005001                            CLR     R1              ;SET UP DUMMY
6224  036104  013702  002352                    MOV     TBLNUM,R2       ;TEMPORARY STORAGE
6225  036110  005302                    1$:     DEC     R2              ;FINDS START OF TABLE
6226  036112  001405                            BEQ     2$              ;BRANCH IF ONLY ONE TABLE
6227  036114  063701  002346                    ADD     TBLNTH,R1       ;
6228  036120  063701  002346                    ADD     TBLNTH,R1       ;BEGINNING OF NEXT TABLE
6229  036124  000771                            BR      1$              ;ADD ANOTHER TABLE
6230
6231  036126  005737  002444            2$:     TST     DENFLG          ;WHICH DENSITY TABLE
6232  036132  001402                            BEQ     3$              ;BR , FOR PE TABLE
6233  036134  063701  002346                    ADD     TBLNTH,R1       ;SET FOR GCR TABLE
6234  036140  063701  002336            3$:     ADD     STRTBL,R1       ;START OF TABLES IN MEMORY
6235  036144  060137  002316                    ADD     R1,DISPLC       ;FIND SPECIFIED DATA
6236  036150                                    POP     <R2,R1>         ;RESTORE REGISTER
6237  036154  000207                            RTS     PC              ;GO HOME
6238
6239
6240                                    ;
6241                                    ;INTERRUPT SUBROUTINES
6242                                    ;
6243
6244  036156  013737  002400  002532    INSERV: MOV     RHADD1,MASBUS   ;PUTS CORRECT VECTOR ADDRESS FOR
6245  036164  000433                            BR      1$              ;INTERRUPT GENERATED INTO COMMON
6246  036166  013737  002402  002532            MOV     RHADD2,MASBUS   ;LOCATION CALL MASBUS.
6247  036174  000427                            BR      1$
6248  036176  013737  002404  002532            MOV     RHADD3,MASBUS
6249  036204  000423                            BR      1$
6250  036206  013737  002406  002532            MOV     RHADD4,MASBUS
6251  036214  000417                            BR      1$
6252  036216  013737  002410  002532            MOV     RHADD5,MASBUS
6253  036224  000413                            BR      1$
6254  036226  013737  002412  002532            MOV     RHADD6,MASBUS
6255  036234  000407                            BR      1$
6256  036236  013737  002414  002532            MOV     RHADD7,MASBUS
6257  036244  000403                            BR      1$
6258  036246  013737  002416  002532            MOV     RHADD8,MASBUS
6259  036254  005237  002374            1$:     INC     INTRPT          ;SET INTERRUPT FLAG
6260  036260  000002                            RTI
6261
6262  036262  042737  000200  002360    INTCLK: BIC     #200,CSRCLK     ;CLEAR MONITOR BIT IN L CLOCK CSR
6263  036270  005237  002362                    INC     LCLOCK          ;INCREMENT TICK COUNTER
6264  036274  022737  000074  002364            CMP     #74,HERTZ       ;SEE WHAT HERTZ CLOCK RUNS AT
```

```
                                        BEQ     1$              ;BRANCH IF 60 HERTZ
                                        CMP     #5670,LCLOCK    ;SEE IF 50 HERTZ MINUTE UP
                                        BEQ     2$              ;BRANCH IF YES
                                        BR      3$              ;BRANCH IF NO
                                1$:     CMP     #7020,LCLOCK    ;SEE IF MINUTE UP
                                        BNE     3$              ;BRANCH IF NOT
                                2$:     INC     MINUTE          ;INCREMENT MINUTE
                                        CLR     LCLOCK          ;CLEAR TICK COUNTER
                                        CMP     #70,MINUTE      ;SEE IF HOUR UP
                                        BNE     3$              ;BRANCH IF NO
                                        INC     HOURS           ;INCREMENT HOURS
                                        CLR     MINUTE          ;CLEAR MINUTE COUNTER
                                3$:     RTI

                                ;
                                ;BIT NUMBER TO BINARY NUMBER ROUTINE
                                ;

                                SHIFTR: PUSH    <R1>            ;STORE R1
                                        MOV     #-1,R1
                                1$:     INC     R1              ;SET UP COUNTER FOR BINARY NUMBER
                                        ASR     BNRYNB          ;SHIFT BIT POSITION
                                        BCC     1$              ;BRANCH UNTIL SET BIT POSITION IS IN CARRY
                                        MOV     R1,BNRYNB       ;STORE BINARY NUMBER INTO BNRYNB
                                        POP     <R1>            ;RESTORE R1
                                        RTS     PC              ;GO HOME


                                ;
                                ;BINARY NUMBER CONVERSION TO ASSOCIATED BIT POSITION
                                ;

                                SHIFTL: PUSH    <R1>            ;STORE R1
                                        MOV     #1,R1           ;SET UP BIT TO SHIFT
                                1$:     DEC     BITPST          ;SEE IF BIT SHIFTED ENOUGH
                                        BLT     2$              ;BRANCH WHEN DONE
                                        ASL     R1              ;SHIFT
                                        BR      1$              ;GO SEE IF SHIFT SOME MORE
                                2$:     MOV     R1,BITPST       ;STORE BIT POSITION INTO BITPST
                                        POP     <R1>            ;RESTORE R1
                                        RTS     PC              ;GO HOME


                                RANSET: MOV     RANB,RANB2      ;RESTORE RANDOM NUMBER
                                        MOV     RANS,RANS2              ;
                                        RTS     PC


                                        ENDMOD
```

```
                                        .TITLE MISCELLANEOUS SECTIONS
                                        .SBTTL  REPORT CODING SECTION

036454                                         BGNMOD

                                        ;++
                                        ; THE REPORT CODING SECTION CONTAINS THE
                                        ; "PRINTS" CALLS THAT GENERATE STATISTICAL REPORTS.
                                        ;--

036454                                         BGNRPT




                                        ;*
                                        ;*MODULE 3.5 (OUTPUT STATISTICS)
                                        ;*
                                        ;*BEGINROUTINE (MOD = 3.5 OUTPUT STATISTICS)
                                        ;*   IF CALLED BY USER COMMAND
                                        ;*   :  THEN-MOVE MAXIMUM # OF TABLES INTO COUNT
                                        ;*   :  ELSE-MOVE ONE INTO COUNT
                                        ;*   ENDIF
                                        ;*   DO FOR 1 TO COUNT
                                        ;*   :  IF UNIT DROPPED
                                        ;*   :  :  THEN
                                        ;*   :  :     GET STATISTIC TABLE FOR UNIT GIVEN
                                        ;*   :  :     OUTPUT STATISTICS
                                        ;*   :  ENDIF
                                        ;*   ENDDO
                                        ;*ENDROUTINE





036454                                         PUSH    <R1,R2,R3,DENFLG>
036466  013737  002330  002336                 MOV     PTBLAD,STRTBL   ;SET UP DISPLACEMENT SUBROUTINE
036474  013703  002352                         MOV     TBLNUM,R3
036500  012701  000001                         MOV     #1,R1           ;COUNTER FOR # OF UNITS TO BE OUTPUT
036504  005737  002464                         TST     STAFLG          ;SEE IF STATS CALLED FROM PROGRAM
036510  001014                                 BNE     1$              ;BRANCH IF YES
036512  013701  002344                         MOV     TBLCNT,R1       ;RESET COUNTER IF END OF PASS
036516  012737  000001  002352                 MOV     #1,TBLNUM       ;
036524  005037  002444                         CLR     DENFLG          ;START WITH PE STATISTICS
036530  006037  002622          4$:            ROR     RPTFLG          ;SEE IF UNIT DROPPED
036534  103402                                 BCS     1$              ;BRANCH IF UNIT STAT HAVE BEEN PRINTED
036536  000137  037560                         JMP     3$              ;
036542  012737  000000  002316  1$:            MOV     #0,DISPLC       ;MOVE OFFSET OF TABLE TO TEMPORARY STORAGE
036550  004737  036076                         JSR     PC,TBLDIS       ;GET BEGINNING TABLE ADDRESS
036554  013702  002316                         MOV     DISPLC,R2       ;STORE ADDRESS OF TABLE IN REG
036560                                         PRINTS  #FMT1,SPUNIT(R2)  ;PRINT OUT HEADER
036604                                         PRINTS  #FMT2,RHADD(R2),TMNUM(R2),TUNUM(R2)
036640  022737  000001  002204                 CMP     #1,BRUTUS       ;BRUTUS OPTION
036646  001430                                 BEQ     6$              ;YES DO NOT PRINT BOTH DENSITIES
036650  022737  000001  002206                 CMP     #1,CANSEQ       ;UNKNOWN TAPE
```

```
036656  001424                              BEQ     6$              ;YES WE DON'T KNOW WHAT DENSITY
036660  005737  002444                      TST     DENFLG          ;PE OR GCR STATISTICS ?
036664  001011                              BNE     5$              ;BR FOR GCR
036666                                      PRINTS  #FMTPE          ;PRINT PE HEADER
036706  000410                              BR      6$              ;
036710                              5$:     PRINTS  #FMTGCR         ;PRINT GCR HEADER MESSAGE
036730                              6$:     PRINTS  #FMT3
036750                                      PRINTS  #FMT4,SERWRT(R2),SERRFO(R2),SERRRV(R2)
037004                                      PRINTS  #FMT5,NRECWR(R2),NRECRE(R2),NRECRR(R2)
037040                                      PRINTS  #FMT6,BYWRHI(R2),BYWRMD(R2),BYWRLO(R2),BYRFHI(R2),BYRFMD(R2),BYRFLO(R2)
037110                                      PRINTS  #FMT7,BYRRHI(R2),BYRRMD(R2),BYRRLO(R2)
037144                                      PRINTS  #FMT8,MEDIAE(R2)
037170                                      PRINTS  #FMT9,DBLTRF(R2),DBLTRR(R2)
037220                                      PRINTS  #FMT10,SNGTRF(R2),SNGTRR(R2)
037250                                      PRINTS  #FMT11,DERREF(R2),DERRRV(R2)
037300                                      PRINTS  #FMT17,OTHWRT(R2),OTHRFO(R2),OTHRRV(R2,
037334                                      PRINTS  #FMT12
037354                                      PRINTS  #FMT13
037374                                      PRINTS  #FMT14,DROP7(R2),DROP6(R2),DROP5(R2),DROP4(R2),DROP3(R2),DROP2(R2),DROP1
037454                                      PRINTS  #FMT15,PICK7(R2),PICK6(R2),PICK5(R2),PICK4(R2),PICK3(R2),PICK2(R2),PICK1
037534                                      PRINTS  #FMT16,DRPUNT(R2)
037560  005737  002464              3$:     TST     STAFLG          ;SEE IF ONLY PRINT ONE DENSITY TABLE
037564  001017                              BNE     10$             ;BR OUT ONLY ONE TABLE
037566  022737  000001  002204              CMP     #1,BRUTUS       ;BRUTUS OPTION ?
037574  001413                              BEQ     10$             ;YES , ONLY ONE DENSITY
037576  022737  000001  002206              CMP     #1,CANSEQ       ;UNKNOWN TAPE ?
037604  001407                              BEQ     10$             ;YES , ONLY ONE DENSITY
037606  005737  002444                      TST     DENFLG          ;WHICH DENSITY TABLE WAS JUST PRINTED
037612  001004                              BNE     10$             ;ALL DONE
037614  005237  002444                      INC     DENFLG          ;SET FOR GCR NOW
037620  000137  036542                      JMP     1$              ;BACK FOR MORE
037624  005237  002352              10$:    INC     TBLNUM          ;NEXT UNIT
037630  005037  002444                      CLR     DENFLG          ;SET FOR PE
037634  005301                              DEC     R1              ;CORRECT NUMBER OF UNITS PRINTED
037636  001402                              BEQ     2$              ;BRANCH IF NO
037640  000137  036530                      JMP     4$              ;
037644  010337  002352              2$:     MOV     R3,TBLNUM       ;RESTORE TBLNUM
037650  012737  000377  002622              MOV     #377,RPTFLG     ;RESET GROUP REPORT FLAG
037656                                      POP     <DENFLG,R3,R2,R1>

037670                                      EXIT    RPT

                                            .NLIST  BEX
037674  047045  040445  051440      FMT1:   .ASCIZ  /%N%A STATISTICAL REPORT FOR UNIT #%D2%N/
037744  047045  040445  044122      FMT2:   .ASCIZ  /%N%ARH ADDRESS  %O6%A  TM78#  %D1%A  TU78#  %D1%N/
040026  047045  040445  040524      FMTPE:  .ASCIZ  /%N%ATAPE DENSITY -- 1600 BPI (PE)%N/
040072  047045  040445  040524      FMTGCR: .ASCIZ  /%N%ATAPE DENSITY -- 6250 BPI (GCR)%N/
040137     045  022516  020101      FMT3:   .ASCIZ  /%N%A                           WRITE                READ             READ REVERS
040250  047045  047045  040445      FMT4:   .ASCIZ  /%N%N%ASTATUS ERRORS                     %D5%A                %D5%A                %D
040361     045  022516  047101      FMT5:   .ASCIZ  /%N%ANON-RECOVERABLE                   %D5%A                %D5%A               %D5/
040470  047045  040445  054502      FMT6:   .ASCIZ  /%N%ABYTES TRANSFERRED   %D4%Z4%Z4%A      %D4%Z4%Z4/
040553     045  020101  020040      FMT7:   .ASCIZ  /%A        %D4%Z4%Z4/
040575     045  022516  046501      FMT8:   .ASCIZ  /%N%AMEDIA ERRORS                      %D5%A              --                  --/
040701     045  022516  042101      FMT9:   .ASCIZ  /%N%ADOUBLE TRACK CORRECTIONS --                         %D5%A               %D5/
041010  047045  040445  044523      FMT10:  .ASCIZ  /%N%ASINGLE TRACK CORRECTIONS --                         %D5%A               %D5/
041117     045  022516  042101      FMT11:  .ASCIZ  /%N%ADATA COMPARE ERRORS        --                       %D5%A               %D5/
```

```
 6487  041226  047045  047045  040445  FMT12:  .ASCIZ  /%N%N%A        BIT7    BIT6    BIT5    BIT4    BIT3    BIT2    BIT1    B
 6488  041341     045  022516  020101  FMT13:  .ASCIZ  /%N%A      (TRACK7)(TRACK6)(TRACK5)(TRACK3)(TRACK9)(TRACK1)(TRACK8)(TRAC
 6489  041454  047045  047045  040445  FMT14:  .ASCIZ  /%N%N%ADROPS  %D5%A   %D5%A   %D5%A   %D5%A   %D5%A   %D5%A   %D5%A   %D
 6490  041565     045  022516  022516  FMT15:  .ASCIZ  /%N%N%APICKS  %D5%A   %D5%A   %D5%A   %D5%A   %D5%A   %D5%A   %D5%A   %D
 6491  041676  047045  047045  040445  FMT16:  .ASCIZ  /%N%N%ATIMES DROPPED   %D5%N/
 6492  041732  047045  040445  052117  FMT17:  .ASCIZ  /%N%AOTHER                      %D5%A           %D5%A           %D5/
 6493
 6494                                          .LIST   BEX
 6506
 6507          042042                          .EVEN
 6508
 6509  042042                                  ENDRPT
 6510                                  .SBTTL  INITIALIZE SECTION
 6511
 6512                                  ;++
 6513                                  ; THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
 6514                                  ; AT THE BEGINNING OF EACH PASS.
 6515                                  ;--
 6516
 6517  042044                                  BGNINIT
 6518
 6528
 6529
 6530
 6531                                  ;*
 6532                                  ;*BEGINROUTINE (MOD 2.0 INIT)
 6533                                  ;*   CLEAR START FLAG
 6534                                  ;*   CLEAR START RESTART FLAG
 6535                                  ;*   CLEAR ERROR FLAG
 6536                                  ;*   IF NO RESTART COMMAND
 6537                                  ;*   :   THEN
 6538                                  ;*   :     IF START COMMAND
 6539                                  ;*   :     :   THEN
 6540                                  ;*   :     :     INCREMENT START FLAG
 6541                                  ;*   :     :   ELSE
 6542                                  ;*   :     :     GET FAKE P-TABLES FOR END OF PASS PURPOSES
 6543                                  ;*   :     :     IF NOT CONTINUE
 6544                                  ;*   :     :     :   THEN
 6545                                  ;*   :     :     :     IF POWER FAIL
 6546                                  ;*   :     :     :     :   THEN
 6547                                  ;*   :     :     :     :     PRINT ERROR
 6548                                  ;*   :     :     :     :     HALT
 6549                                  ;*   :     :     :     ENDIF
 6550                                  ;*   :     :   -  :   ELSE
 6551                                  ;*   :     :     :     GO TO END INITIALIZE
 6552                                  ;*   :     :     ENDIF
 6553                                  ;*   :     ENDIF
 6554                                  ;*   ENDIF
 6555                                  ;*   INCREMENT START/RESTART FLAG
 6556                                  ;*   CLEAR HOURS COUNTER
 6557                                  ;*   CLEAR MINUTE COUNTER
 6558                                  ;*   SET INITIALIZE FLAG
 6559                                  ;*   RESET PATTERN GENERATION FLAG
 6560                                  ;*   IF CLOCK
 6561                                  ;*   :   THEN
 6562                                  ;*   :     SET UP INFORMATION
```

```
                                ;*  :  ELSE
                                ;*  :    PRINT NO CLOCK AVAILABLE
                                ;*  ENDIF
                                ;*  SIZE MEMORY
                                ;*  IF START/RESTART SET
                                ;*  :  THEN
                                ;*  :    INITIALIZE RANDOM PATTERN
                                ;*  :    BUILD DEVICE TABLES
                                ;*  :    CALL DEVICE CHECK
                                ;*  :    CALL BRUTUS QUESTIONS
                                ;*  :    CALL CLEAR STATISTICS
                                ;*  ENDIF
                                ;*  SET UP BRUTUS/BRUTUS WITH ERRORS FLAG
                                ;*ENDROUTINE

042044  005037  002276                  CLR     START1
042050  005037  002334                  CLR     STRST           ;INITIALIZE START OR RESTART FLAG
042054  005037  002320                  CLR     ERRFLG          ;INITIALIZE ERROR FLAG
042060                                  READEF  #EF.RESTART     ;SUPERVISOR CMD TO SEE IF A RESTART CMD WAS USED
042066                                  BNCOMPLETE 10$          ;BRANCH IF NOT FOUND
042070  000442                          BR      6$
042072                          10$:    READEF  #EF.START       ;SUPERVISOR CMD TO SEE IF A START CMD WAS USED
042100                                  BNCOMPLETE 14$          ;IF NO START THEN SKIP A FEW LINES
042102  005237  002276                  INC     START1          ;INCREMENT START FLAG
042106  000433                          BR      6$
042110  005005                  14$:    CLR     R5
042112                          12$:    GPHARD  R5,R4           ;
042120  005205                          INC     R5              ;DUMMY GPHARD'S SO PASS COUNT
042122  023705  002012                  CMP     L$UNIT,R5       ;IS CORRECT
042126  001371                          BNE     12$
042130                                  READEF  #EF.CONTINUE    ;SEE IF CONTINUE
042136                                  BCOMPLETE  11$          ;BRANCH IF YES
042140                                  READEF  #EF.PWR         ;SEE IF POWER FAILURE
042146                                  BNCOMPLETE      9$      ;BRANCH IF NOT
042150                                  PRINTF  #FORM26         ;
042170  000000                          HALT                    ;STOP
042172  000137  042712            9$:   JMP     5$
042176                          6$:     BRESET
042200                                  DELAY   250             ;LET THINGS SETTLE (SPECIALLY TM78!!)
042230  005237  002334                  INC     STRST           ;SET START RESTART FLAG
042234  005037  002322                  CLR     HOURS           ;RESET TIME
042240  005037  002444                  CLR     DENFLG          ;USE PE FIRST
042244  005037  002324                  CLR     MINUTE          ;RESET MINUTES
042250  012737  000001  002326          MOV     #1,INTLZE       ;SET THE INITIALIZE FLAG
042256  012737  177777  002426          MOV     #-1,GENFLG      ;RESET GENERATION FLAG
042264                                  CLOCK   L,R1            ;SEE IF L CLOCK
042274                                  BNCOMPLETE 1$           ;BRANCH IF NOT
042276  011137  002360                  MOV     (R1),CSRCLK     ;STORE CLOCK ADDRESS
042302  016137  000002  002366          MOV     2(R1),PRIRTY    ;CLOCK PRIORITY
042310  016137  000006  002364          MOV     6(R1),HERTZ     ;POWER IN HERTZ
042316  006337  002366                  ASL     PRIRTY          ;
042322  006337  002366                  ASL     PRIRTY          ;
042326  006337  002366                  ASL     PRIRTY          ;SHIFT FOR CORRECT PRIORITY
042332  006337  002366                  ASL     PRIRTY          ;
042336  006337  002366                  ASL     PRIRTY          ;
```

```
042342                                      SETVEC  4(R1),#INTCLK,PRIRTY  ;
042370  162737  000040  002366              SUB     #40,PRIRTY        ;GET ONE PRIORITY LESS THAN CLOCK
042376                                      SETPRI  PRIRTY            ;SET PRIORITY
042404  000415                              BR      8$                ;
042406                              1$:     PRINTF  #FORM25           ;PRINT NO CLOCK
042426  005037  002360                      CLR     CSRCLK            ;CLEAR CLOCK ADDRESS
042432  012737  000340  002366              MOV     #340,PRIRTY       ;SET PRIORITY TO SEVEN
042440                              8$:     MEMORY  VRMADD            ;GET MEMORY
042446  017737  137702  002312              MOV     @VRMADD,BUFSIZ    ;STORE SIZE OF MEMORY IN BUFFER SIZE
042454  023737  002312  002262              CMP     BUFSIZ,MINSIZ     ;SEE IF 2K AVAILABLE
042462  101011                              BHI     11$               ;BRANCH IF YES
042464                                      PRINTF  #EMSG1
042504                                      DOCLN                     ;SUPERVISOR ABORT CMD
042506  005737  002334              11$:    TST     STRST
042512  001477                              BEQ     5$
042514  004737  036436                      JSR     PC,RANSET         ;CLEAR RANDOM PATTERN
042520  004737  015260                      JSR     PC,BLDTBL         ;BUILD UNIT TABLES (STATS)
042524  005737  002320                      TST     ERRFLG
042530  001411                              BEQ     7$
042532                                      PRINTF  #EMSG6
042552                                      DOCLN
042554  013737  002330  002336      7$:     MOV     PTBLAD,STRTBL     ;SET UP DISPLACEMENT SUBROUTINE FOR PTABLES
042562  004737  015532                      JSR     PC,DEVCHK         ;SEE IF TEST DEVICES REALLY EXIST
042566  005737  002320                      TST     ERRFLG            ;CHECK IF DEVICES WERE NOT THERE
042572  001403                              BEQ     2$                ;SKIP IF NO ERROR
042574  004737  017510                      JSR     PC,ERROUT         ;PRINT ERROR DEVICE NON EXISTENT
042600                                      DOCLN                     ;SUPERVISOR ABORT CMD

042602  005737  002204              2$:     TST     BRUTUS            ;SEE IF BRUTUS OPTION CHOSEN
042606  001004                              BNE     13$               ;IF NOT BRANCH
042610  005037  002210                      CLR     BRUERR
042614  000137  042706                      JMP     4$
042620  022737  000001  002344      13$:    CMP     #1,TBLCNT         ;SEE IF ONLY ONE TABLE
042626  001411                              BEQ     3$                ;BRANCH IF ONE TABLE
042630                                      PRINTF  #EMSG3
042650                                      DOCLN                     ;ABORT TEST

042652  004737  016526              3$:     JSR     PC,BRUTQ          ;ASK BRUTUS QUESTIONS
042656  005737  002320                      TST     ERRFLG            ;SEE IF MANUAL INHIBIT FLAG WAS SET
042662  001411                              BEQ     4$                ;BRANCH IF NOT
042664                                      PRINTF  #EMSG4
042704                                      DOCLN                     ;ABORT TEST

042706  004737  017376              4$:     JSR     PC,CLRSTA         ;CLEAR STATISTICS

042712  013737  002204  002314      5$:     MOV     BRUTUS,BRTEST     ;COMBINED
042720  063737  002210  002314              ADD     BRUERR,BRTEST     ;THE TWO PAGES
042726  005737  002360                      TST     CSRCLK            ;DO WE HAVE A CLOCK ?
042732  001403                              BEQ     20$               ;NO , EXIT INIT
042734  012777  000100  137416              MOV     #100,@CSRCLK      ;ENABLE INTERRUPTS

042742                              20$:    EXIT    INIT


                                            .EVEN
```

```
  6675  042746                                  ENDINIT
  6676
  6677  042750                            BGNPROT
  6678  042750  000000                           .WORD   0               ;CSR OFFSET
  6679  042752  000004                           .WORD   4               ;TM #
  6680  042754  000006                           .WORD   6               ;TU #
  6681  042756                            ENDPROT
  6682
  6683  042756                            BGNAUTO
  6684
  6685  042756                            ENDAUTO
  6686
  6698
  6699
  6700                                    .SBTTL  CLEANUP CODING SECTION
  6701
  6702                                    ;++
  6703                                    ; THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
  6704                                    ; AT THE END OF EACH PASS.
  6705                                    ;--
  6706
  6707  042760                                  BGNCLN
  6708
  6715  042760  005737  002360                   TST     CSRCLK          ;DO WE HAVE A CLOCK ?
  6716  042764  001403                           BEQ     1$              ;NO , DO NOT ACCESS CSRCLK
  6717  042766  012777  000000  137364           MOV     #0,@CSRCLK      ;SHUT OFF CLOCK
  6718  042774  005037  002464            1$:    CLR     STAFLG          ;RESET STATISTIC FLAG
  6719  043000  005037  002444                   CLR     DENFLG          ;SET PE STAT MODE
  6720  043004  005037  002510                   CLR     DENSWT          ;SET PE MODE
  6721  043010  012737  000001  002326           MOV     #1,INTLZE       ;SET INITIALIZE FLAG
  6722  043016  012737  000377  002622           MOV     #377,RPTFLG     ;SET STATISTIC REPORT FLAG
  6723  043024                                  EXIT    CLN
  6724
  6736
  6737                                          .EVEN
  6738
  6739  043030                                  ENDCLN
  6740                                    .SBTTL  DROP UNIT SECTION
  6741
  6742                                    ;++
  6743                                    ; THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
  6744                                    ; TO NO LONGER BE TESTED.
  6745                                    ;--
  6746
  6747  043032                                  BGNDU
  6748
  6754
  6755  043032                                  EXIT    DU
  6756
  6768
  6769                                          .EVEN
  6770
  6771  043036                                  ENDDU
  6772                                    .SBTTL  ADD UNIT SECTION
  6773
  6774                                    ;++
```

```
                                ; THE ADD-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
                                ;  TO BE (A) TESTED FOR THE FIRST TIME, OR (B) RESUMED IN TESTING.  IF
                                ;  "EF.AUNIT" IS SET, THE UNIT WILL BE TESTED AS A NEW UNIT.
                                ;--

043040                                  BGNAU

043040                                  EXIT    AU

                                        .EVEN

043044                                  ENDAU

043046                                  ENDMOD
```

```
                                        .TITLE HARDWARE TESTS
                                        .SBTTL  TEST 1:
043046                                          BGNMOD
                                        ;       SUBROUTINE ONLY USED IN THE SCHEDULER
                                        ;       ASYERR -- CHECK FOR ASYNCRONOUS ERRRORS
                                        ;       1.TM FAULT
                                        ;       2.TU FAULT
                                        ;       3.TU ONLINE
043046                          ASYERR: PUSH    <R4>                    ;SAVE R4
043050  012737  000000  002316          MOV     #RHADD,DISPLC           ;GET TABLE ADDRESS OF RH11/70 CS1 ADDRESS
043056  004737  036076                  JSR     PC,TBLDIS               ;FOR UNIT UNDER TEST
043062  013704  002316                  MOV     DISPLC,R4               ;SAVE TABLE ADDRESS
043066  016437  000004  002432          MOV     TMNUM(R4),BITPST        ;GET TM #
043074  004737  036406                  JSR     PC,SHIFTL               ;MAKE BIT POSITION
043100  033764  002432  000016          BIT     BITPST,ATTBIT(R4)       ;ANY ASYNC ERRORS ?
043106  001445                          BEQ     20$                     ;NO , CONTINUE NORMALLY
043110  016437  000010  002074          MOV     SPUNIT(R4),L$LUN        ;STORE SUPERVISOR UNIT NUMBER
043116  016437  000004  002370          MOV     TMNUM(R4),TM78N         ;STORE TM78 NUMBER
043124  016437  000006  002372          MOV     TUNUM(R4),TU78N         ;STORE TU78 NUMBER
043132  011404                          MOV     (R4),R4                 ;GET RH11/70 ADDRESS
043134  010437  002356                  MOV     R4,RHADDR               ;STORE RH ADDRESS
043140  012764  040000  000000          MOV     #40000,RHADD(R4)        ;CLEAR 'TRE'
043146  005064  000000                  CLR     RHADD(R4)               ;CLEAR TM78'S 'TRE'
043152  016404  000036                  MOV     NDTICD(R4),R4           ;GET INTERUPT CODE
043156  010437  002522                  MOV     R4,EXTERR               ;STORE INT. CODE AND FAIL CODE
043162  000337  002522                  SWAB    EXTERR                  ;
043166  042737  177403  002522          BIC     #177403,EXTERR          ;MAKE ONLY FAILURE CODE
043174  006237  002522                  ASR     EXTERR                  ;
043200  006237  002522                  ASR     EXTERR                  ;
043204  042704  177700                  BIC     #177700,R4              ;MASK DOWN TO INTERUPT CODE ONLY
043210  010437  002526                  MOV     R4,ICCODE               ;STORE INTERUPT CODE
043214  006304                          ASL     R4                      ;MAKE WORD OFFSET
043216  004774  002662                  JSR     PC,@INTTBL(R4)          ;GO TO INTERUPT HANDLER
043222                          20$:    POP     <R4>
043224                                  RETURN
043226                                  BGNTST
                                        ;*
                                        ;*MODULE 3.0 SCHEDULER
                                        ;*
                                        ;*BEGINROUTINE (MOD=3.0 SCHEDULER /SCHDLR/)
                                        ;*  IF START OR RESTART
```

```
6936                                ;*  :  THEN
6937                                ;*  :    CLEAR SCHEDULER FLAGS
6938                                ;*  ENDIF
6939                                ;*  DO WHILE ALL END OF TAPE FALSE
6940                                ;*  :  CALL 3.1 (SEQUENCE DEFINITION)
6941                                ;*  :  MOVE TABLE ADDRESS TO STRTBL
6942                                ;*  :  DO TABLENUM=1, TABLE COUNTER
6943                                ;*  :  :  CALL 3.2 (ISSUE COMMAND)
6944                                ;*  :  :  IF COMMAND NOT = TO REWIND
6945                                ;*  :  :  :  THEN
6946                                ;*  :  :  :    CALL 3.3 (COMMAND TERMINATION)
6947                                ;*  :  :  :  ELSE
6948                                ;*  :  :  :    SET REWIND_FLAG
6949                                ;*  :  :  :    INCREMENT REWIND COUNTER
6950                                ;*  :  :  :    IF REWIND COUNTER = TABLE_COUNT
6951                                ;*  :  :  :    :  THEN
6952                                ;*  :  :  :    :    CALL 3.3 (COMMAND TERMINATION)
6953                                ;*  :  :  :    :    RESET REWIND COUNTER
6954                                ;*  :  :  :    ENDIF
6955                                ;*  :  :  ENDIF
6956                                ;*  :  :  IF DROP_UNIT SET
6957                                ;*  :  :  :  THEN
6958                                ;*  :  :  :    CALL 3.4 (DROP UNIT)
6959                                ;*  :  :  :    CALL 3.5 (OUTPUT STATISTICS)
6960                                ;*  :  :  ENDIF
6961                                ;*  :  :  IF RETRY FLAG IS SET
6962                                ;*  :  :  :  THEN
6963                                ;*  :  :  :    CALL 3.1 (SEQUENCE DEFINITION)
6964                                ;*  :  :  :    SUBTRACT 1 FROM TABLENUM
6965                                ;*  :  :  :  ELSE-
6966                                ;*  :  :  :    IF REPITITION NOT EQUAL TO ZERO
6967                                ;*  :  :  :    :  THEN-DEC REPITITION
6968                                ;*  :  :  :    ENDIF
6969                                ;*  :  :  ENDIF
6970                                ;*  :  :  IF END_OF_TAPE SET
6971                                ;*  :  :  :  THEN
6972                                ;*  :  :  :    INCREMENT COUNTER
6973                                ;*  :  :  :    IF COUNTER=TABLE COUNTER
6974                                ;*  :  :  :    :  THEN
6975                                ;*  :  :  :    :    SET ALL_END_OF_TAPE FLAG
6976                                ;*  :  :  :    ENDIF
6977                                ;*  :  :  ENDIF
6978                                ;*  :  ENDDO
6979                                ;*  ENDDO
6980                                ;*  IF AUTO REWIND
6981                                ;*  :  THEN
6982                                ;*  :    IF NO STATS AT EOT
6983                                ;*  :    :  THEN
6984                                ;*  :    :    IF STATS AT EOP
6985                                ;*  :    :    :  THEN
6986                                ;*  :    :    :    CALL 3.5 (OUTPUT STATISTICS)
6987                                ;*  :    :    ENDIF
6988                                ;*  :    ENDIF
6989                                ;*  :  ELSE
6990                                ;*  :    IF STATS EOP
6991                                ;*  :    :  THEN
```

```
                                        ;*  :     :    CALL MOD 3.5 (OUTPUT STATISTICS)
                                        ;*  :    ENDIF
                                        ;*  ENDIF
                                        ;*ENDROUTINE



043226                                       PUSH   <R1,R2,R3,R4>

043236  005737  002334                       TST    STRST             ;SEE IF START OR RESTART COMMAND
043242  001406                               BEQ    16$               ;BRANCH IF NOT
043244  012701  002452                       MOV    #CMMAND,R1        ;GET FIRST DATA WORD FROM TEST MODULE
043250  005021                         1$:   CLR    (R1)+             ;CLEAR FIRST DATA WORD GET NEXT ONE
043252  022701  002612                       CMP    #RWDFLG,R1        ;SEE IF LAST WORD
043256  100374                               BPL    1$                ;BRANCH IF NOT LAST LOCATION
043260  013737  002330  002336  16$:   MOV    PTBLAD,STRTBL     ;SET UP INDEX TABLE POINTER
043266  012737  000001  002352  2$:    MOV    #1,TBLNUM         ;SET UP LOOP ON UNIT TABLES
043274  005037  002564                       CLR    RECTBL            ;RESET MULTIPLE UNIT FLAG
043300  004737  017720                       JSR    PC,SEQDEF         ;CALL MODULE 3.1 SEQUENCE DEFINITION
043304  013703  002602                       MOV    REPITN,R3
043310  005737  002452                       TST    CMMAND            ;SEE IF END OF PASS
043314  001002                               BNE    3$                ;IF END OF PASS LEAVE SCHEDULER
043316  000137  044000                       JMP    13$
043322  013737  002352  002432  3$:    MOV    TBLNUM,BITPST     ;SET UP UNIT COUNTER
043330  004737  036406                       JSR    PC,SHIFTL
043334  006237  002432                       ASR    BITPST            ;MUST CORRECT SHIFT FOR UNIT #
043340  013701  002432                       MOV    BITPST,R1
043344  013703  002602                       MOV    REPITN,R3         ;RESTORE REPITITION #
043350  022737  000003  002206         CMP    #3,CANSEQ         ;SEE IF FIELD SERVICE #2 SEQUENCE
043356  003013                               BGT    5$                ;BRANCH IF NO
043360  022737  000077  002452         CMP    #REDREV,CMMAND    ;SEE IF READ REVERSE
043366  001004                               BNE    18$               ;BRANCH IF NO
043370  013737  002602  002566         MOV    REPITN,RECORD     ;RESTORE RECORD
043376  000403                               BR     5$                ;CONTINUE
043400  012737  000001  002566  18$:   MOV    #1,RECORD         ;RESET RECORD
043406  010137  002530                 5$:   MOV    R1,UNITFL
043412  030137  002540                       BIT    R1,EOTFLG         ;SEE IF UNIT SHOULD BE SKIPPED
043416  001131                               BNE    11$               ;BRANCH IF UNIT AT EOT
043420                                       CALL   ASYERR            ;CHECK FOR ASYNC ERRORS ?
043424  030137  002540                       BIT    R1,EOTFLG         ;DID WE DROP UNIT OR EOT
043430  001124                               BNE    11$               ;YES , REPORT AND PROCEED
                                       ;     BR     20$               ;NO , TRY TO ISSUE COMMAND
043432  004737  025146                 20$:  JSR    PC,ISSCMD         ;CALL MODULE 3.2 (ISSUE COMMAND)
043436  022737  000007  002452         CMP    #REWIND,CMMAND    ;SEE IF COMMAND ISSUED WAS A REWIND
043444  001017                               BNE    6$                ;BRANCH ON NO  REWIND
043446  004737  036436                       JSR    PC,RANSET         ;RESET RANDOM PATTERN
043452  012737  177777  002426         MOV    #-1,GENFLG        ;RESET RANDOM PATTERN ON REWIND
043460  005237  002612                       INC    RWDFLG            ;SET REWIND FLAG
043464  005237  002610                       INC    RWDCNT            ;SET REWIND COUNTER
043470  023737  002610  002344         CMP    RWDCNT,TBLCNT     ;SEE IF ALL UNITS REWINDING
043476  001121                               BNE    4$                ;BRANCH AROUND COMMAND TERMINATION
043500  005037  002610                       CLR    RWDCNT            ;CLEAR REWIND COUNTER ALL UNITS REWINDING
043504  004737  026466                 6$:   JSR    PC,CMDTRM         ;CALL MODULE 3.3 (COMMAND TERMINATION)
043510  005137  002534                       COM    DRPFLG            ;COMPLEMENT DROP FLAG
043514  043737  002534  002622         BIC    DRPFLG,RPTFLG     ;CLEAR UNIT BIT NOT DROPPED
043522  013737  002534  002622         MOV    DRPFLG,RPTFLG
```

```
 7048  043530  005137  002534                    COM     DRPFLG                  ;RESET DROP FLAG
 7049  043534  022737  000377  002622            CMP     #377,RPTFLG             ;SEE IF ANY UNITS DROPPED FROM REWIND
 7050  043542  001004                            BNE     19$                     ;BRANCH IF NOT
 7051  043544                                    DORPT
 7052  043546  012703  000001                    MOV     #1,R3                   ;SET REPITITION TO ONE
 7053  043552  000415                            BR      10$
 7054  043554  012737  000377  002622  19$:     MOV     #377,RPTFLG             ;RESET DROP UNIT REPORT FLAG
 7055  043562  030137  002534                    BIT     R1,DRPFLG               ;SEE IF UNIT SHOULD BE DROPPED
 7056  043566  001407                            BEQ     10$                     ;BRANCH IF UNIT OKAY
 7057  043570                                    DORPT                           ;CALL DO REPORT ROUTINE
 7058  043572  005037  002464                    CLR     STAFLG                  ;CLEAR ONE UNIT FLAG
 7059  043576  005037  002604                    CLR     RTYFLG
 7060  043602  012703  000001                    MOV     #1,R3
 7061  043606  005737  002604          10$:     TST     RTYFLG                  ;SEE IF COMMAND SHOULD RETRY
 7062  043612  001403                            BEQ     15$                     ;BRANCH IF NO RETRY
 7063  043614  004737  017720                    JSR     PC,SEQDEF               ;GET RETRY SEQUENCE
 7064  043620  000704                            BR      20$                     ;BRANCH AROUND REPITITION
 7065  043622  005037  002476          15$:     CLR     HRDCNT                  ;CLEAR MAXIMUM ERROR COUNT
 7066  043626  013737  002462  002452            MOV     RETRCD,CMMAND
 7067  043634                                    BREAK
 7068  043636  022703  000001                    CMP     #1,R3                   ;SEE IF ISSUED LAST REPITITION
 7069  043642  001417                            BEQ     11$                     ;IF YES, THEN CONTINUE
 7070  043644  005303                            DEC     R3                      ;ELSE DECREMENT REPITITION
 7071  043646  022737  000003  002206            CMP     #3,CANSEQ               ;SEE IF FIELD SERVICE CANNED SEQUENCE 2
 7072  043654  003254                            BGT     5$                      ;BRANCH IF NOT
 7073  043656  022737  000077  002452            CMP     #RDREV,CMMAND           ;SEE IF READ REVERSE COMMAND
 7074  043664  001003                            BNE     17$                     ;BRANCH IF NOT
 7075  043666  005337  002566                    DEC     RECORD                  ;DECREMENT RECORD #
 7076  043672  000645                            BR      5$                      ;CONTINUE LOOP
 7077  043674  005237  002566          17$:     INC     RECORD                  ;INCREMENT RECORD #
 7078  043700  000642                            BR      5$                      ;ISSUE SAME COMMAND
 7079  043702  030137  002534          11$:     BIT     R1,DRPFLG               ;SEE IF STATISTICS HAVE BEEN OUTPUTED
 7080  043706  001015                            BNE     4$                      ;BRANCH IF DROP UNIT SET
 7081  043710  030137  002540                    BIT     R1,EOTFLG               ;SEE IF UNIT AT EOT
 7082  043714  001412                            BEQ     4$                      ;BRANCH IF UNIT NOT AT EOT
 7083  043716  050137  002534                    BIS     R1,DRPFLG
 7084  043722  005737  002214                    TST     STAEOT                  ;SEE IF USER WANTS STATS AT EOT
 7085  043726  001405                            BEQ     4$                      ;BRANCH IF NO
 7086  043730  005237  002464                    INC     STAFLG                  ;SET ONE UNIT FLAG
 7087  043734                                    DORPT                           ;CALL DO REPORT
 7088  043736  005037  002464                    CLR     STAFLG                  ;CLEAR ONE UNIT FLAG
 7089  043742  005237  002352          4$:      INC     TBLNUM                  ;GET NEXT UNIT
 7090  043746  005037  002514                    CLR     ERAFLG                  ;CLEAR MEDIA ERROR FLAG
 7091  043752  013737  002352  002564            MOV     TBLNUM,RECTBL           ;SET TABLE NUMBERS EQUAL
 7092  043760  023737  002352  002344            CMP     TBLNUM,TBLCNT           ;SEE IF LAST UNIT
 7093  043766  101002                            BHI     7$                      ;LOOP IF NOT DONE
 7094  043770  000137  043322                    JMP     3$                      ;NOT END OF PASS
 7095  043774  000137  043266          7$:      JMP     2$                      ;
 7096  044000  005737  002466          13$:     TST     AUTORW                  ;SEE IF REWIND FROM EOT
 7097  044004  001403                            BEQ     9$                      ;BRANCH IF NOT
 7098  044006  005737  002214                    TST     STAEOT                  ;SEE IF STATS AT EOT
 7099  044012  001006                            BNE     14$                     ;BRANCH IF YES
 7100  044014  005737  002212          9$:      TST     STAEOP                  ;SEE IF STATS AT EOP
 7101  044020  001403                            BEQ     14$                     ;BRANCH IF NOT
 7102  044022  005037  002464                    CLR     STAFLG                  ;CLEAR SINGLE UNIT FLAG
 7103  044026                                    DORPT                           ;CALL DO REPORT STATISTICS
```

```
 7104  044030  005037  002466          14$:    CLR     AUTORW
 7105  044034  005037  002622                  CLR     RPTFLG
 7106  044040                                  POP     <R4,R3,R2,R1>
 7107
 7108
 7109
 7110  044050                                  EXIT    TST
 7111
 7123
 7124                                          .EVEN
 7125
 7126  044054                                  ENDTST
 7127
 7133  044056                                  ENDMOD
 7134
```

```
                                .TITLE PARAMETER CODING
                                .SBTTL  HARDWARE PARAMETER CODING SECTION
044056                                  BGNMOD
                                ;++
                                ; THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
                                ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
                                ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
                                ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
                                ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
                                ; WITH THE OPERATOR.
                                ;--
044056                                  BGNHRD
044060                                  GPRMA   MSG1,0,0,0,177777,YES
044070                                  GPRMA   MSG2,2,0,0,177777,YES
044100                                  GPRMD   MSG3,4,D,177777,0,7,YES
044112                                  GPRMD   MSG4,6,D,177777,0,3,YES
044124                                  ENDHRD
                                .SBTTL  SOFTWARE PARAMETER CODING SECTION
                                ;++
                                ; THE SOFTWARE PARAMETER CODING SECTION CONTAINS MACROS
                                ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
                                ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
                                ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
                                ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
                                ; WITH THE OPERATOR.
                                ;--
044124                                  BGNSFT
044126                                  GPRML   MSG5,0,177777,YES
044134                                  XFERT   1$
044136                                  GPRMD   MSG6,2,D,177777,1.,4.,YES
044150                                  GPRML   MSG10,6,177777,YES
044156                                  GPRML   MSG7,10,177777,YES
044164                          1$:
                                        .EVEN
044164                                  ENDSFT
044164                                  LASTAD
044170                          L$LAST::
```

```
 7261  044170                          ENDMOD
 7262          000001          .END
```

```
ACTDGD= 000034 G  1411#
ACTUAL  002474 G  1582#  2273  6071*  6089  6120  6125
ADR   = 000020 G  1330#
ALLEOT  002600 G  1616#  2957  2965*  4633*  4775*  5476*  5482*  5612*  5675*  5705*  5989*
ALLINT  002562 G  1609#  4629  4635*  4655*  4729*  4731  4735*
ASSEMB= 000010    1125
ASYERR  043046    6890#  7030
ATTBIT= 000016 G  1404#  2621*  2644  2693*  4665  4671  4703*  4720*  4788  4793  4836*  4871  5938
                  6896
AUTORW  002466 G  1579#  2963*  7096  7104*
BADCNT  002546 G  1603#  4099*  5567*  5571  5576*  5687*  5855  5874  5876*
BADTAP  034350    1680  5902#
BASE  = 000000 G  1397#  5431*  5432*
BCNTHI  003277    1886#
BCNTLO  003276    1885#  2286
BIGREC  002450    1559#  3946*  3995*  4037*  4200  4288  4307
BITPST  002432    1552#  2607*  2644  4727*  4729  4795*  4797  5429*  5461*  5463*  5464  5471  5472
                  5586*  5608*  5610*  5611  5613  5660*  5668*  5670*  5673  5695  5702*  5704*  5706
                  5720*  5883*  5894*  5896*  5897  5908*  5918*  5963*  5982*  5983  5985  5986  5988
                  6140*  6146  6300*  6304*  6894*  6896  7015*  7017*  7018
BIT0  = 000001 G  1330#
BIT00 = 000001 G  1330#  4613
BIT01 = 000002 G  1330#
BIT02 = 000004 G  1330#
BIT03 = 000010 G  1330#
BIT04 = 000020 G  1330#
BIT05 = 000040 G  1330#
BIT06 = 000100 G  1330#
BIT07 = 000200 G  1330#
BIT08 = 000400 G  1330#
BIT09 = 001000 G  1330#
BIT1  = 000002 G  1330#
BIT10 = 002000 G  1330#  5468
BIT11 = 004000 G  1330#
BIT12 = 010000 G  1330#
BIT13 = 020000 G  1330#
BIT14 = 040000 G  1330#  5431  5432  5433  5966
BIT15 = 100000 G  1330#  2980  2984  2990  5434  5967
BIT2  = 000004 G  1330#
BIT3  = 000010 G  1330#
BIT4  = 000020 G  1330#
BIT5  = 000040 G  1330#
BIT6  = 000100 G  1330#
BIT7  = 000200 G  1330#
BIT8  = 000400 G  1330#
BIT9  = 001000 G  1330#
BLDTBL  015260    2492#  6635
BLKTAP  033260    1670  5751#
BNRYNB  002430    1551#  4667*  4668*  4672*  4674  4790*  4791*  4793*  4795  4798  4799  4800  5938*
                  5940  5941  5961  6138*  6140  6141*  6142  6286*  6288*
BOE   = 000400 G  1330#
BOT     032460    1660  5654#
BRTEST  002314 G  1513#  2978  4626  4697  4764  4861  5420  5439  5447  5630  5654  5671  5699
                  5714  5726  5732  5739  5745  5755  5761  5767  5774  5823  5832  5841  5853
                  5889  5902  5912  5922  5929  5942  5972  6664*  6665*
BRTSEQ  020174    1695  3020#
```

```
BRUERR  002210          1228#  2770   2773   2789   4630   4771   5427   5584   5605   5658   5677   5718   5881
                        5891   5906   5916   5949   6649*  6665
BRUTQ   016526          2743#  6656
BRUTUS  002204          1226#  6428   6454   6647   6664
BSADDR= 000004 G        1399#  4309*  4325*  4333*  4337*  4345*  6181*
BUFFER  002456 G        1575#  4192   4284   4297*  4328   4329   4339
BUFLST  002460 G        1576#  4312*  4410
BUFSIZ  002312 G        1512#  2508*  2528*  2530   4290   4292   4293   6627*  6628
BYRFHI= 000034 G        1352#  5530   5812   6440
BYRFLO= 000040 G        1354#  5528   5810   6440
BYRFMD= 000036 G        1353#  5529   5811   6440
BYRRHI= 000042 G        1355#  5535   5817   6441
BYRRLO= 000046 G        1357#  5533   5815   6441
BYRRMD= 000044 G        1356#  5534   5816   6441
BYTCNT= 000006 G        1400#  4192*  6163
BYTEA   002624          1626#  4470
BYTEB   002626          1627#  4472
BYWRHI= 000026 G        1349#  5548   5557   5692   6440
BYWRLO= 000032 G        1351#  5546   5555   5690   6440
BYWRMD= 000030 G        1350#  5547   5556   5691   6440
CANA1   002766          1706#  3164   3177
CANA2   003004          1721#  3293   3307
CANB1   002776          1711#  3172   3175
CANB2   003022          1729#  3302   3305
CANSEQ  002206          1227#  2118   2132   2148   2240   2246   2267   2270   2523   2748*  2975   5632   5751
                        5777   6430   6456   7020   7071
CASSTA  003267          1878#  2277
CBUS    003270          1879#  2278
CHAREC  002220          1232#  2250   2269   2795   3074*  3154*  3282*  3385*  3487*  3494*  3508*  3518*  3541*
                        3654*  3678*  3692*  3734*  3783*  3841*  3956*  3969*  3975*  3993*  4008*  4014*  4283*
                        4284   4287   4290   4298*  6062
CHEAT   033100          5718#  5729   5736   5742   5748   5758   5764
CHEATA  034442          5916#  5926
CHKBOT  002434          1553#  3440*  3499*  5466
CHKUTM  002436          1554#  3795*  3800*  5628
CHPTIE  003262          1873#  2285
CHOTIE  003252          1865#  2277
CH1TIE  003253          1866#  2278
CH2TIE  003254          1867#  2279
CH3TIE  003255          1868#  2280
CH4TIE  003256          1869#  2281
CH5TIE  003257          1870#  2282
CH6TIE  003260          1871#  2283
CH7TIE  003261          1872#  2284
CLFGCR= 000043 G        1445#  4120   4134   5478
CLFLPE= 000041 G        1444#  4118   4132   5474
CLRSTA  017376          2834#  6662
CMDADR= 000014 G        1403#  2126   2264   2980*  2984*  2990*  2992*  4190*  4195*  4331*  6182*
CMDSTG  002616 G        1623#  3023*  3025   3027*  3030   3031*  3164*  3172   3175*  3177*  3181   3182*  3191*
                        3293*  3302   3305*  3307*  3311   3312*  3333*  3391*  3392   3411*  3434*  3441*  3502*
                        3510*  3520*  3543*  3548*  3553*  3557*  3666*  3674*  3680*  3687*  3698*  3706*  3709*
                        3735*  3742*  3751*  3755*  3787*  3790*  3804*  3807*  3843*  3849*  3853*  3861*  3865*
                        3868*  3890*  3896*  3908*  3911*  3964*  3970*  3979*  3981*  4003*  4009*  4018*  4023*
                        4026*  4041*  4055*
CMDSTR  002230          1236#  2754   2756   2767*
CMDTRM  026466          4602#  7044
```

```
CMMAND  002452 G  1573# 2127  2242  2248  2266  2959* 2960  2986  2988  3025* 3028  3034* 3078*
                  3079  3085* 3087* 3090  3160* 3161  3179* 3181* 3183  3185  3288* 3289  3309*
                  3311* 3313  3314  3319  3324  3394  3409* 3433* 3439* 3486* 3493* 3505* 3507*
                  3515* 3517* 3537* 3539* 3547* 3559* 3658* 3660* 3672* 3677* 3685* 3690* 3727*
                  3729* 3740* 3747* 3781* 3797* 3836* 3838* 3852* 3864* 3885* 3887* 3895* 3960*
                  3963* 3968* 3974* 3999* 4002* 4007* 4013* 4040* 4056* 4069  4071* 4073* 4075*
                  4080* 4087* 4089* 4095* 4104* 4107* 4110* 4116  4118* 4120* 4127* 4132* 4134*
                  4174  4186  4196  4271  4313  4315  4317  4319  4323  4609  4863  5474  5478
                  5485  5503  5524  5526  5647  5785  5808  5861  5863  5871  6079  7003  7012
                  7022  7035  7066* 7073
COMCOD  003230    1847# 2276  6181
COMMD1  002232    1237# 2749  2755  3023
COMMD2  002236    1239#
COMMD3  002242    1241#
COMMD4  002246    1243#
COMMD5  002252    1245#
COMMD6  002256    1247#
COMPAR  035122    4870  6056#
CONTER  002340    1523# 2756* 2757* 3024
COUNT   002620 G  1624# 3024* 3032* 3152* 3170* 3188* 3190* 3280* 3300* 3330* 3332*
CRCWRD  003247    1862# 2281
CSRCLK  002360 G  1531# 6262* 6611* 6624* 6666  6668* 6715  6717*
C$AU  = 000052    1125# 6804
C$AUTO= 000061    1125# 6685
C$BRK = 000022    1125# 2635  4046  4621  4757  7067
C$BSEG= 000004    1125#
C$BSUB= 000002    1125#
C$CEFG= 000045    1125#
C$CLCK= 000062    1125# 6609
C$CLEA= 000012    1125# 6739
C$CLOS= 000035    1125#
C$CLP1= 000006    1125#
C$CVEC= 000036    1125#
C$DCLN= 000044    1125# 6631  6639  6645  6654  6660
C$DODU= 000051    1125#
C$DRPT= 000024    1125# 7051  7057  7087  7103
C$DU  = 000053    1125# 6771
C$EDIT= 000003    1125# 1168
C$ERDF= 000055    1125# 3904  4652  4701  4769  5424  5426  5441  5470  5597  5644  5657  5701
                  5717  5728  5735  5741  5747  5757  5763  5769  5782  5784  5905  5915  5925
                  5931  5946  5948  5975  6085
C$ERHR= 000056    1125# 5582  5844  5879
C$ERRO= 000060    1125#
C$ERSF= 000054    1125#
C$ERSO= 000057    1125# 5500  5544  5574  5826  5835  5858  5893
C$ESCA= 000010    1125#
C$ESEG= 000005    1125#
C$ESUB= 000003    1125#
C$ETST= 000001    1125# 7126
C$EXIT= 000032    1125# 6670  6723  7110
C$GETB= 000026    1125#
C$GETW= 000027    1125#
C$GMAN= 000043    1125# 2754  2758  2762  2764  2770  2775  2776  2777  2778  2786  2792  2795
                  2804
C$GPHR= 000042    1125# 2499  6590
C$GPLO= 000030    1125#
```

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C$GPRI= 000040           1125#
C$INIT= 000011           1125#   6675
C$INLP= 000020           1125#
C$MANI= 000050           1125#   2744
C$MEM = 000031           1125#   6626
C$MSG = 000023           1125#   2129    2145    2155
C$OPEN= 000034           1125#
C$PNTB= 000014           1125#   2122    2124    2125    2126    2127    2136    2140    2142    2143    2152    2244    2245
                         2250    2257    2262    2263    2264    2265    2266    2269    2272    2273    5496    5564    5607
                         5679    5680    5990    6089    6109
C$PNTF= 000017           1125#   2688    2791    2801    2882    2884    2886    4293    6598    6623    6630    6638    6653
                         6659
C$PNTS= 000016           1125#   6426    6427    6434    6436    6437    6438    6439    6440    6441    6442    6443    6444
                         6445    6446    6447    6448    6449    6450    6451
C$PNTX= 000015           1125#   2276    2277    2278    2279    2280    2281    2282    2283    2284    2285    2286
C$QIO = 000377           1125#
C$RDBU= 000007           1125#
C$REFG= 000047           1125#   6582    6585    6594    6596
C$RESE= 000033           1125#   6601
C$REVI= 000003           1125#   1168
C$RFLA= 000021           1125#
C$RPT = 000025           1125#   6509
C$SEFG= 000046           1125#
C$SPRI= 000041           1125#   2633    2643    4617    4661    4753    4783    6187    6621
C$SVEC= 000037           1125#   2598    6619
C$TPRI= 000013           1125#
DATBUF= 000022 G         1406#
DATCHK  002226           1235#   2778    2783*   3077*   3159*   3287*   3389*   4868
DATRAN  002516 G         1591#   2753*   2765*   2771    2784    4176*   4189*   4785    4875*   5422    5459    5617    5645
                         5662    5681
DBLTRF= 000052 G         1359#   5507*   5791*   6443
DBLTRR= 000054 G         1360#   5517*   5802*   6443
DBUS    003271           1880#   2279
DDRA    003304           1891#   2279
DDRB    003305           1892#   2280
DECMAL  035640           5531    5536    5549    5558    5693    5813    5818    6160#
DENFLG  002444           1557#   2844    2846*   2848*   3165*   3174*   3178*   3292*   3304*   3308*   3484*   3492*   3536*
                         3540*   3657*   3661*   3726*   3730*   3835*   3839*   3884*   3888*   3959*   3962*   3998*   4001*
                         6231    6411    6419*   6432    6458    6460*   6463*   6469*   6605*   6719*
DENSWT  002510 G         1588#   2962*   3082    3084*   3167    3171*   3295    3301*   3534    3551    3554*   3556*   3655
                         3703    3705*   3708*   3724    3749    3752*   3754*   3801    3803*   3806*   3833    3858    3860*
                         3867*   3882    3905    3907*   3910*   3957    3996    4020    4022*   4025*   6720*
DERREF= 000062 G         1363#   6081*   6445
DERRRV= 000064 G         1364#   6083*   6445
DEVCHK  015532           2584#   6641
DFPTBL  002170 G         1202#
DIAGMC= 000000           1125
DIAGRQ= 000032 G         1410#
DIAGTS= 000024 G         1407#   2602*
DISPLC  002316 G         1514#   2590*   2592    2593    2600    2601    2603*   2605    2606    2609    2613*   2615    2616
                         2836*   2838    2840*   2841*   2842    2872*   2874    2952*   2954    4168*   4170    4171*   4173
                         4177*   4179    4193*   4195    4294*   4296    4643*   4645    4646    4647    4744*   4746    4748
                         5451*   5453    5484    6235*   6423*   6425    6891*   6893
DONE    030754           1658    5446#
DROPIT  035024           5430    5587    5661    5721    5884    5909    5919    5964    5981#
DROPO = 000104 G         1372#   6449
```

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DROP1 = 000102 G          1371#   6449
DROP2 = 000100 G          1370#   6449
DROP3 = 000076 G          1369#   6449
DROP4 = 000074 G          1368#   6449
DROP5 = 000072 G          1367#   6449
DROP6 = 000070 G          1366#   6449
DROP7 = 000066 G          1365#   6122    6449
DRPFLG  002534 G          1598#   2966*   4634*   4776*   5471*   5613*   5983    5985*   7045*   7046    7047    7048*   7055
                          7079    7083*
DRPPCK  035472            6074    6117#
DRPUNT= 000126 G          1381#   5614*   5991*   6451
DRVTYP= 000026 G          1408#   2660
DSE   = 000013 G          1433#
DSEO  = 000020 G          1405#   2664    5468
DTCOMP  002512 G          1589#   4865    4867*   5487*
ECCCOR  003250            1863#   2282
ECCSTA  003251            1864#   2283    5505    5509    5515    5519    5789    5793    5800    5804
EF.CON= 000036 G          1330#   6594
EF.NEW= 000035 G          1330#
EF.PWR= 000034 G          1330#   6596
EF.RES= 000037 G          1330#   6582
EF.STA= 000040 G          1330#   6565
EICMMD  002454 G          1574#   4196*   4197*   4203
EMSG1   005335            2184#   6630
EMSG10  006304            1490    2194#
EMSG11  006412            1491    2195#
EMSG2   005426            1487    2185#
EMSG3   005545            2187#   6653
EMSG4   005644            2188#   6659
EMSG5   005747            1488    2189#
EMSG6   006071            2191#   6638
EMSG7   006163            1489    2192#
ENAON   003323            1906#   2285
EOT     032540            1661    5667#
EOTERR  034262            1679    5889#
EOTFLG  002540 G          1600#   2964*   4632*   4774*   5464    5472*   5611*   5673    5695*   5706*   5897*   5986    5988*
                          7028    7031    7081
ERAFLG  002514 G          1590#   4105*   4108*   5559    5568*   5577*   7090*
ERASED  002440            1555#   3897*   3902    3912*   5753*
ERCNHI  003303            1890#
ERCNLO  003302            1889#   2286
ERGGCR= 000037 G          1443#   3887    4040    4104
ERGPE = 000035 G          1442#   3885    4107
ERM001  013166 G          2296#   4652    4769
ERM002  013212 G          2297#   4701
ERM003  013253 G          2298#   5544    5574
ERM004  013322 G          2299#   5763
ERM005  013364 G          2300#   5500
ERM006  013462 G          2301#   5644
ERM007  013515 G          2302#   5657
ERM009  013552 G          2303#   5701
ERM010  013601 G          2304#   5717
ERM011  013634 G          2305#   5728
ERM012  013666 G          2306#   5735
ERM013  013715 G          2307#   5741
ERM014  013733 G          2308#   5747
```

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ERM015  013772 G    2309#  5757
ERM016  014005 G    2310#  5769
ERM017  014034 G    2311#  5782
ERM018  014050 G    2312#  5784
ERM019  014065 G    2313#  5826
ERM020  014106 G    2314#  5835
ERM021  014143 G    2315#  5844
ERM022  014165 G    2316#  5858
ERM023  014202 G    2317#  5893
ERM024  014231 G    2318#  5905
ERM025  014263 G    2319#  5915
ERM026  014276 G    2320#  5925
ERM027  014311 G    2321#  5948
ERM028  014324 G    2322#  5441  5975
ERM029  014351 G    2323#  5931
ERM030  014364 G    2324#  5946
ERM031  014375 G    2325#  5597
ERM032  014422 G    2326#  5426
ERM033  014467 G    2327#  6085
ERM034  014512 G    2328#  5582  5879
ERM035  014533 G    2329#  5424
ERM036  014604 G    2330#  5470
ERM037  014641 G    2331#  3904
ERRBUF  005234       2183#  4293
ERRFLG  002320 G     1515#  2527*  2625*  2631*  2641*  2658*  2662*  2666*  2746*  2875  6581*  6636  6642
                     6657
ERRMS1  004320 G     2117#  3904   4652   4769   5424   5426   5441   5470   5500   5544  5574   5582  5597
                     5644   5657   5701   5717   5728   5735   5741   5747   5757   5763  5769   5782  5784
                     5826   5835   5844   5858   5879   5893   5905   5915   5925
ERRMS2  004536 G     2131#  4701   5931   5946   5948   5975
ERRMS3  004736 G     2147#  6085
ERROR   034050       1678   5853#
ERROUT  017510       2871#  6644
EVL   = 000004 G     1330#
EXPECT  002472 G     1581#  2273   6070*  6089   6118   6127
EXREAD  035704       2254   6176#
EXTDSN  002524 G     1594#  2251   2253*  5499*  5543*  5573*  5581*  5643*  5656*  5716*  5734*  5779*  5825*
                     5834*  5843*  5857*  5878*  5904*  5914*  5924*
EX1ERR  002522 G     1593#  2245   4679*  4680*  4681*  4682*  4819*  4820*  4821*  4822*  4823*  4848*  4849*
                     4850*  4851*  4852*  5683   6906*  6907*  6908*  6909*  6910*
EXTSEN  012164       2259   2276#
E$END = 002100       1125#
E$LOAD= 000035       1125#  1168
FAILCD  003232       1849#  2276
FCNTBL  003036       1741#  3391   4055
FETBL   002264 G     1487#  2882   2884   2886
FIELD1  020452       1697   3148#
FIELD2  020770       1698   3277#
FILENM  002570       1612#  2244   2272   2968*  3075*  3158*  3286*  3299*  3317*  3321*  3326*  3388*  3501*
                     3733*  3950*  3988*  5634*  5637
FIRBYT  002572       1613#  2273   6072*  6073*  6089
FMTFCT  011344       2122   2136   2152   2234#
FMTGCR  040072       6436   6477#
FMTPE   040026       6434   6476#
FMT1    037674       6426   6474#
FMT10   041010       6444   6485#
```

```
FMT11   041117          6445    6486#
FMT12   041226          6447    6487#
FMT13   041341          6448    6488#
FMT14   041454          6449    6489#
FMT15   041565          6450    6490#
FMT16   041676          6451    6491#
FMT17   041732          6446    6492#
FMT2    037744          6427    6475#
FMT3    040137          6437    6478#
FMT4    040250          6438    6479#
FMT5    040361          6439    6480#
FMT6    040470          6440    6481#
FMT7    040553          6441    6482#
FMT8    040575          6442    6483#
FMT9    040701          6443    6484#
FM.E    015145          2342    2354#
FM.NOP  014716          2334    2346#
FM.REW  014731          2335    2347#
FM.SL   015172          2343    2355#
FM.SP   015011          2338    2350#
FM.TM   015025          2339    2351#
FM.TS   015060          2340    2352#
FM.WC   015226          2344    2356#
FM.WCK  014767          2337    2349#
FM.WR   014746          2336    2348#
FM.WV   015106          2341    2353#
FORM01  006516          2124    2205#   2262    5680
FORM02  006576          2126    2206#   2264
FORM03  006653          2127    2207#   2266
FORM04  006733          2142    2208#
FORM05  007013          2209#   2245
FORM06  007066          2210#   2273    6089
FORM07  007202          2212#   2244    2272
FORM08  007157          2211#   5607    5990
FORM09  007243          2213#   2250    2269
FORM10  007314          2214#   6109
FORM11  007365          2215#   2276
FORM12  007463          2216#   2277
FORM13  007603          2217#   2278
FORM14  007723          2218#   2279
FORM15  010043          2219#   2280
FORM16  010163          2220#   2281
FORM17  010303          2221#   2282
FORM18  010423          2222#   2283
FORM19  010543          2223#   2284
FORM20  010663          2224#   2285
FORM21  010734          2225#   2257
FORM22  010773          2226#   5496    5564
FORM23  011022          2125    2143    2227#   2263
FORM24  011055          2228#   2265
FORM25  011101          2229#   6623
FORM26  011132          2230#   6598
FORM27  011154          2140    2231#
FORM28  011213          2232#   5679
FORM29  011266          2233#   2286
FPT     033054          1665    5714#
```

```
FPTOUT  033120          5715    5719    5722#
FUNCT   021454          1699    3379#
F$AU  = 000015          1125#   6780    6804
F$AUTO= 000020          1125#   6683    6685
F$BGN = 000040          1125#   1151    1259    1321    2117    2131    2147    6320    6373    6380    6471    6517    6670
                        6677    6683    6707    6723    6747    6755    6780    6788    6806    6868    6918    7110    7126
                        7133    7187    7198    7231    7261
F$CLEA= 000007          1125#   6707    6739
F$DU  = 000016          1125#   6747    6771
F$END = 000041          1125#   1151    1259    1321    2129    2145    2155    6320    6373    6471    6509    6670    6675
                        6685    6723    6739    6755    6771    6788    6804    6806    6868    6918    7110    7126    7133
                        7187    7211    7249    7261
F$HARD= 000004          1125#   7198    7211    7241
F$HW  = 000013          1125#   1202    1216
F$INIT= 000006          1125#   6517    6675
F$JMP = 000050          1125#   6471    6670    6723    6755    6788    7110
F$MOD = 000000          1125#   1151    1259    1321    6320    6373    6806    6868    7133    7187    7261
F$MSG = 000011          1125#   2117    2129    2131    2145    2147    2155
F$PROT= 000021          1125#   6677    6681
F$PWR = 000017          1125#
F$RPT = 000012          1125#   6380    6509
F$SEG = 000003          1125#
F$SOFT= 000005          1125#   7231    7241    7249
F$SRV = 000010          1125#
F$SUB = 000002          1125#
F$SW  = 000014          1125#   1224    1257
F$TEST= 000001          1125#   6918    7126
F.CP1   02443'          1822    4037#
F.CP2   024472          1823    4044#
F.END   024550          1825    4055#
F.ER    003150          1799#   3908
F.ER1   023532          1744    1800    3881#
F.ER2   023612          1802    3894#
F.ER3   023642          1803    3902#
F.LNG1  024156          1814    3986#
F.LNG2  024202          1815    3992#
F.LNG3  024276          1816    4006#
F.LNG4  024330          1817    4012#
F.LONG  003174          1815#   4018
F.NOP   021556          1741    3407#
F.RDF1  022020          1752    3507#
F.RDF2  022062          1756    3517#
F.RDR1  022010          1751    3505#
F.RDR2  022052          1755    3515#
F.RD1   022026          3506    3508#
F.RD2   022070          3516    3518#
F.REW   021606          1742    1745    1753    1760    1776    1790    1792    1794    1799    1801    1821    3431#   3648
                        3771    3947    3986    4052
F.SHRT  003164          1808#   3981
F.SH1   023722          1807    3946#
F.SH2   023752          1808    3953#
F.SH3   024046          1809    3967#
F.SH4   024100          1810    3973#
F.SL    003162          1807#   4023
F.SNS   021632          1743    1746    3437#
F.SP    003100          1767#   3706
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F.SPDN  022636            3684    3697    3703#
F.SPND  003112            1772#   3709
F.SPRV  003104            1769#   3698
F.SP1   022306            1767    3648#
F.SP2   022330            1768    3653#
F.SP3   022450            1769    3672#
F.SP4   022474            1770    3677#
F.SP5   022526            1771    3683#
F.SP6   022560            1772    3690#
F.TMPF  022304            3643#   3669*   3692    3694*
F.TMPR  022302            3642#   3668*   3678    3693*
F.TMP1  022300            3641#   3650*   3654    3662*   3663    3667*   3673    3683*   3686    3695*   3696    3772*   3782
                          3784*   3785    3788*   3798*   3842*   3846*   3847    3851    3856*   3863    3948*   3956    3969
                          3975    3976*   3977    3989*   3993    4008    4014    4015*   4016
F.TMS   003124            1783#   3804
F.TMS1  023066            1783    3771#
F.TMS2  023102            1784    3777#
F.TMS3  023110            1785    3780#
F.TMS4  023204            1786    3795#
F.TM1   022674            1777    3723#   3777
F.TM2   022770            1778    3740#
F.TM3   023014            1779    3747#
F.VC    003134            1790#   3861
F.VC1   023276            1791    3832#
F.VC2   023370            1793    3846#
F.VC3   023440            1795    3856#
F.WC    003070            1760#   3557
F.WCOM  021756            3489    3498#
F.WC1   022114            1761    3533#
F.WC2   022202            1762    3546#
F.WC3   022226            1763    3551#
F.WGCR  021730            1754    3491#
F.WPE   021672            1750    3483#
GCRBIT  002552 G          1605#   4459*   4466*   4468    4474*
GCRCNT  002576            1615#   4460*   4465*   4466
GCRFLG  002550 G          1604#   4406*   4424*   4457
GCRGEN  026342            4405    4455#
GCRLOP  002630            1628#   4462
GCRRPT  002574            1614#   4461*   4462    4464*   4473*
GENBUF  026160            4348    4396#
GENFLG  002426            1550#   4286*   4346    4349*   6608*   7038*
G$CNTO= 000200            1125#
G$DELM= 000372            1125#   2634    4045    4622    6191    6602
G$DISP= 000003            1125#
G$EXCP= 000400            1125#
G$HILI= 000002            1125#
G$LOLI= 000001            1125#
G$NO  = 000000            1125#   2754    2758    2762    2764    2804
G$OFFS= 000400            1125#   2754    2758    2762    2764    2770    2775    2776    2777    2778    2786    2792    2795
                          2804    7206    7207    7208    7209    7240    7242    7243    7244
G$OFSI= 000376            1125#   2754    2758    2762    2764    2770    2775    2776    2777    2778    2786    2792    2795
                          2804    7206    7207    7208    7209    7240    7242    7243    7244
G$PRMA= 000001            1125#   7206    7207
G$PRMD= 000002            1125#   2754    2758    2762    2764    2786    2795    2804    7208    7209    7242
G$PRML= 000000            1125#   2770    2775    2776    2777    2778    2792    7240    7243    7244
G$RADA= 000140            1125#
```

```
G$RADB= 000000           1125#
G$RADD= 000040           1125#  2754   2762   2764   2786   2795   7208   7209   7242
G$RADL= 000120           1125#  2770   2775   2776   2777   2778   2792   7240   7243   7244
G$RADO= 000020           1125#  2758   2804   7206   7207
G$XFER= 000004           1125#  7241
G$YES = 000010           1125#  2770   2775   2776   2777   2778   2786   2792   2795   7206   7207   7208   7209
                         7240   7242   7243   7244
HEDER   011404           2128   2144   2237#
HEDER3  011640           2154   2262#
HELP  = 000000           1102#  1112   1116   1142   1160   1174   1188   1210   1250   1264#  1311   1457   1990
                         2001   2079   2085   2093   2156   2162   2168   2399   2405   2410   2416   2421   2427
                         2435   2442   2892   6315   6326#  6382   6495   6519   6687   6709   6725   6749   6757
                         6782   6790   6813#  6870   6877   6920   7112   7128   7140#  7200   7213   7233   7252
HERTZ   002364 G         1533#  6264   6613*
HOE   = 100000 G         1330#
HOURS   002322 G         1516#  2125   2143   2263   6275*  6604*
HRDCNT  002476 G         1583#  2974*  7065*
IBE   = 010000 G         1330#
ICCODE  002526 G         1595#  2138   2245   4678*  4818*  4839   4841   4847*  5780   5944   6912*
IDU   = 000040 G         1330#
IER   = 020000 G         1330#
ILLINT  033324           1671   5761#
INOOP   033122           1663   5724#
INPATT  004245           2072#  2801
INSERV  036156           2586   6244#
INSTA   003307           1894#  2282
INTCDE= 000012 G         1402#  4845   4848   4859*  5497   5540   5551   6197
INTCLK  036262           6262#  6619
INTCOD  003231           1848#  2276
INTLZE  002326 G         1518#  3021   3026*  3035*  3070   3072*  3149   3151*  3277   3279*  3381   3383*  6607*
                         6721*
INTRAD= 000050 G         1417#
INTRDA= 000052 G         1418#  2623   2886   5433*  5434   5966*  5967
INTROK  002504 G         1586#  4843*  4860*  4873   4880*
INTRPT  002374 G         1537#  2620*  2636   2646*  2649*  4616*  4618   4660*  4752*  4754   4782*  6186*  6188
                         6196*  6259*
INTTBL  001662           1657#  4719   4835   4858   6914
INTVEC  002376 G         1538#  2586*  2598   2599*
IRETRY  003670           1675   5823#
IREWND  033052           1664   5711#
ISR   = 000100 G         1330#
ISSCMD  025146           4167#  7034
IXE   = 004000 G         1330#
I$AU  = 000041           1125#  6780#  6804#
I$AUTO= 000041           1125#  6683#  6685#
I$CLN = 000041           1125#  6707#  6723   6739#
I$DU  = 000041           1125#  6747#  6771#
I$HRD = 000041           7198#  7211#
I$INIT= 000041           1125#  6517#  6670   6675#
I$MOD = 000041           1125#  1151#  1259#  1321#  6320#  6373#  6806#  6868#  7133#  7187#  7261#
I$MSG = 000041           1125#  2117#  2129#  2131#  2145#  2147#  2155#
I$PROT= 000040           1125#  6677#
I$PTAB= 000041           1125#
I$PWR = 000041           1125#
I$RPT = 000041           1125#  6380#  6509#
I$SEG = 000041           1125#  6918
```

```
I$SETU= 000041           1125#
I$SFT = 000041           7231#   7249#
I$SRV = 000041           1125#
I$SUB = 000041           1125#   6918
I$TST = 000041           1125#   6918#   7110    7126#
J$JMP = 000167           1125#   6471    6755    6788
LCLOCK  002362 G         1532#   6263*   6266    6269    6272*
LEOT    033000           1662    5640    5699#
LNGDAT  002446           1558#   3994*   4309
LOE   = 040000 G         1330#
LONREC  033374           1673    5773#
LOT   = 000010 G         1330#
L$ACP   002110 G         1168#
L$APT   002036 G         1168#
L$AU    043040 G         1168    6780#
L$AUT   002070 G         1168#
L$AUTO  042756 G         1168    6683#
L$CCP   002106 G         1168#
L$CLEA  042760 G         1168    6707#
L$CO    002032 G         1168#
L$DEPO  002011 G         1168#
L$DESC  002134 G         1168    1172#
L$DESP  002076 G         1168#
L$DEVP  002060 G         1168#
L$DISP  002164 G         1168    1186#
L$DLY   002116 G         1168#   2634    4045    4622    6191    6602
L$DTP   002040 G         1168#
L$DTYP  002034 G         1168#
L$DU    043032 G         1168    6747#
L$DUT   002072 G         1168#
L$DVTY  002122 G         1168    1170#
L$EF    002052 G         1168#
L$ENVI  002044 G         1168#
L$ETP   002102 G         1168#
L$EXP1  002046 G         1168#
L$EXP4  002064 G         1168#
L$EXP5  002066 G         1168#
L$HARD  044060 G         1168    7198#
L$HIME  002120 G         1168#
L$HPCP  002016 G         1168#
L$HPTP  002022 G         1168#
L$HW    002170 G         1168    1202#
L$ICP   002104 G         1168#
L$INIT  042044 G         1168    6517#
L$LADP  002026 G         1168#
L$LAST  044170 G         1168    7260#
L$LOAD  002100 G         1168#
L$LUN   002074 G         1168#   4651*   4700*   4718*   4768*   4829*   4831*   4837    4854*   5596*   6084*   6898*
L$MREV  002050 G         1168#
L$NAME  002000 G         1168#
L$PRIO  002042 G         1168#
L$PROT  042750 G         1168    6677#
L$PRT   002112 G         1168#
L$REPP  002062 G         1168#
L$REV   002010 G         1168#
L$RPT   036454 G         1168    6380#
```

```
L$SOFT  044126 G  1168    7231#
L$SPC   002056 G  1168#
L$SPCP  002020 G  1168#
L$SPTP  002024 G  1168#
L$STA   002030 G  1168#
L$SW    002204 G  1168    1224#
L$TEST  002114 G  1168#
L$TIML  002014 G  1168#
L$UNIT  002012 G  1168#   2496    6592
L10000  002202    1202    1216#
L10001  002262    1224    1257#
L10002  004534    2129#
L10003  004734    2145#
L10004  005006    2155#
L10005  042042    6471    6509#
L10006  042746    6670    6675#
L10010  042756    6685#
L10011  043030    6723    6739#
L10012  043036    6755    6771#
L10013  043044    6788    6804#
L10014  044054    7110    7126#
L10015  044124    7198    7211#
L10016  044164    7231    7249#
MASBUS  002532 G  1597#   4662    4663    4687    4784    5937    6244*   6246*   6248*   6250*   6252*   6254*   6256*
                  6258*
MBFALT  034540    1685    5934#
MBTERM  030602    1657    5418#
MEDIAE= 000050 G  1358#   5563*   6442
MESADR  014670    2122    2136    2151    2152    2334#
MESNUM  002442    1556#   2121    2135    3390*   3410*   3438*   3485*   3533*   3649*   3723*   3780*   3832*   3881*
                  3953*   4038*
MINSIZ  002262 G  1486#   6628
MINUTE  002324 G  1517#   2125    2143    2263    6271*   6273    6276*   6606*
MSG1    003506 G  2025#   7206
MSG10   003701 G  2052#   2775    7243
MSG11   003726 G  2063#   2792
MSG12   003753 G  2064#   2777
MSG13   003763 G  2065#   2795
MSG14   004024 G  2066#   2786
MSG15   004051 G  2067#   2764
MSG17   004112 G  2068#   2778
MSG19   004127 G  2069#   2754
MSG2    003521 G  2026#   7207
MSG20   004173 G  2070#   2762
MSG21   004227 G  2071#   2758
MSG3    003540 G  2027#   7208
MSG4    003547 G  2028#   7209
MSG5    003556 G  2039#   7240
MSG6    003574 G  2040#   7242
MSG7    003624 G  2050#   2776    7244
MSG8    004315 G  2073#   2804
MSG9    003651 G  2051#   2770
MTA0    003310    1895#   2277
MTA1    003311    1896#   2278
MTA2    003312    1897#   2279
MTA3    003313    1898#   2280
```

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MTA4    003314          1899#   2281
MTA5    003315          1900#   2282
NDTFC0= 000040 G        1413#   2618    4181
NDTFC1= 000042 G        1414#
NDTFC2= 000044 G        1415#
NDTFC3= 000046 G        1416#
NDTICD= 000036 G        1412#   2651    2656    2884    4676    4678    4712    4803    4816    4819    6905
NONEX   033232          1669    5745#
NOOP  = 000003 G        1429#   3409
NOTAVL  033152          1667    5732#
NOTRDY  033124          1666    5726#
NRECRE= 000022 G        1347#   5847*   5439
NRECRR= 000024 G        1348#   5849*   6439
NRECWR= 000020 G        1346#   5580*   5877*   6439
OFFLNE  033204          1668    5739#
OKAY    002554 G        1606#   6057*   6067*   6094    6102    6104*
ONEFIL= 000001             8    1098    1099    1106#   1146    1260    1261    1274    6322    6323    6336    6808    6809
                        6823    7135    7136    7150
ONLINE  033352          1672    5767#
OTHRFO= 000132 G        1383#   5511*   6446
OTHRRV= 000134 G        1384#   5521*   6446
OTHWRT= 000130 G        1382#   5561*   6446
O$APTS= 000000          1125#   1168
O$AU  = 000001          1125#   1158#   1168
O$BGNR= 000001          1125#   1158#   1168
O$BGNS= 000001          1125#   1158#   1168
O$DU  = 000001          1125#   1158#   1168
O$ERRT= 000000          1125#   1168
O$GNSW= 000001          1125#   1158#   1168
O$POIN= 000001          1125#   1158#   1168
O$SETU= 000000          1125#   1168    7260
PARMAX  002614 G        1622#   5602
PATCH   024534          4049#
PATCNT  002536 G        1599#   4407*   4412*   4421
PATEGT  003466          1920    1977#   4358    4362
PATFIV  003420          1917    1954#
PATFOR  003410          1916    1949#
PATGEN  003324 G        1912#   4408
PATLOP  002350 G        1527#   2797*   2800*   2811*   3157*   3285*   4421
PATNIN  003476          1921    1983#   4456    4475
PATONE  003360          1913    1934#
PATSIX  003430          1918    1959#   2802
PATSVN  003464          1919    1974#   4425*
PATTHE  003400          1915    1944#
PATTRN  002222          1233#   2250    2269    2786    2787    2798    2809    3155*   3283*   3297*   3334*   3335    3337*
                        3339    3341*   3343    3345*   3498*   3954*   4346    4349    4398    4400    4403    4413
PATTWO  003370          1914    1939#
PATZER  003350          1912    1929#
PCKDRP  035560          6123    6129    6137#   6147
PDCNHI  003301          1888#
PDCNLO  003300          1887#   2286
PICK0 = 000124 G        1380#   6450
PICK1 = 000122 G        1379#   6450
PICK2 = 000120 G        1378#   6450
PICK3 = 000116 G        1377#   6450
PICK4 = 000114 G        1376#   6450
```

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PICK5 = 000112 G        1375#   6450
PICK6 = 000110 G        1374#   6450
PICK7 = 000106 G        1373#   6124    6450
PNT   = 001000 G        1330#
PRDD    003266          1877#   2284
PRI   = 002000 G        1330#
PRIRTY  002366 G        1534#   2598    2643    4661    4783    6612*   6614*   6615*   6616*   6617*   6618*   6619    6620*
                        6621    6625*
PRI00 = 000000 G        1330#   2633    4617    4753    6187
PRI01 = 000040 G        1330#
PRI02 = 000100 G        1330#
PRI03 = 000140 G        1330#
PRI04 = 000200 G        1330#
PRI05 = 000240 G        1330#
PRI06 = 000300 G        1330#
PRI07 = 000340 G        1330#
PSTAT   003265          1876#   2283
PTBLAD  002330 G        1519#   2497*   2498    4685    5952    6412    6640    7007
RALNTH  002224          1234#   2792    2793    2796*   3069*   3156*   3284*   3386*   4273
RAMT    003237          1854#   2277
RANB    002632          1629#   6310
RANB2   002636          1631#   4359*   4360    6310*
RANDOM  005010          2180#   2791
RANGEN  026120          4279    4357#   4402
RANS    002634          1630#   6311
RANSET  036436          6310#   6634    7037
RANS2   002640          1632#   4280*   4281    4283    4359    4360*   4361    6311*
RCMLP   003236          1853#   2280
RDATA   003246          1861#   2284
RDON    003240          1855#   2278
READOP  033732          1676    5832#
RECORD  002566          1611#   2244    2272    2967*   3076*   3088*   3162*   3169*   3187*   3290*   3298*   3387*   3500*
                        3732*   3949*   3987*   5635    5639*   5641*   7024*   7026*   7075*   7077*
RECTBL  002564 G        1610#   4275    7009*   7091*
REDBUF  002332 G        1520#   2529*   2530*   4325    4327    4338    4340    6061
REDEXT= 000073 G        1453#
REDFWD= 000071 G        1452#   1708    1713    1725    1733    3087    3507    3517    3690    3895    3974    4013    4089
REDREV= 000077 G        1454#   1707    1712    1724    1732    3505    3515    3677    3968    4007    4069    4085    4087
                        4323    5491    5503    5526    5647    5785    5808    5845    5863    6079    7022    7073
REND    003243          1858#   2281
REPCMD  002310 G        1500#   2758    2759    2760    2762    2764    2766
REPITN  002602 G        1617#   2961*   3030*   3080*   3089*   3163*   3184*   3291*   3316*   3322*   3327*   3329*   3408*
                        3432*   3442*   3488*   3495*   3509*   3519*   3542*   3546*   3558*   3653*   3673*   3679*   3686*
                        3691*   3731*   3741*   3748*   3782*   3796*   3840*   3851*   3863*   3889*   3894*   3955*   3967*
                        3973*   3992*   4006*   4012*   4039*   7011    7019    7024
REP1    002234          1238#
REP2    002240          1240#
REP3    002244          1242#
REP4    002250          1244#
REP5    002254          1246#
REP6    002260          1248#   2751
RETCT   003316          1901#   2283
RETCT1  003317          1902#   2283
RETRCD  002462 G        1577#   2960*   3028*   3079*   3090*   3161*   3183*   3289*   3313*   3394*   4075    4080    4085
                        4102    4110    4130    5491    5845    7066
RETRY   002216          1231#   2777    2782*   2982    3073*   3153*   328'*   3384*   5619    5827    5836    5859
```

```
REWIND= 000007 G   1431#  2242   2959   3078   3160   3288   3433   4609   7035
RHADD = 000000 G   1338#  2126   2264   2590   2872   2952   4168   4294   4643   4744   5451   6427   6891
                   6903*  6904*
RHADDR  002356 G   1530#  2124   2140   2142   2262   2601*  2688   2882   2884   2886   4647*  4663*  4749*
                   4784*  4787   5680   6902*
RHADD1  002400     1539#  2592*  6244
RHADD2  002402     1540#  6246
RHADD3  002404     1541#  6248
RHADD4  002406     1542#  6250
RHADD5  002410     1543#  6252
RHADD6  002412     1544#  6254
RHADD7  002414     1545#  6256
RHADD8  002416     1546#  6258
RHTREB  032114     5457   5595#
RHVEC = 000002 G   1339#  2594   2598
RILL    003241     1856#  2279
RMK2    003242     1857#  2280
RPATH   003234     1851#  2278
RPFAIL  003233     1850#  2277
RPOSTN  003245     1860#  2283
RPSTA   003244     1859#  2282
RPTFLG  002622     1625#  6420*  6468*  6722*  7046*  7047*  7049   7054*  7105*
RSTAT   003235     1852#  2279
RTIER   003263     1874#  2284
RTRY01  024564     1834   4066#
RTRY02  024642     1835   4080#
RTRY03  024652     1836   4085#
RTRY04  02470      1837   4092#
RTRY05  025030     1838   4116#
RTRY06  025064     1839   4124#
RTYFLG  002604 G   1618#  2955   2970   4121*  4135*  4277   5449*  5481*  5488   5490*  5538   5542*  5569*
                   5583*  5621   5624*  5688*  5694*  5776*  5829*  5838*  5850*  5880*  5886*  5899*  7059*
                   7061
RTYSEQ  003212     1833#  2972
RWDCNT  002610 G   1620#  7040*  7041   7043*
RWDFLG  002612 G   1621#  4614*  7005   7039*
R10     002424     1549#  2492   2493*  2511   2513*  2515*  2531*  4603*  4620*  4623   4730*  6058*  6075*
                   6107   6109
R8      002420     1547#  4684*  4692*  4725*  4726*  4727
R9      002422     1548#  6059*  6076   6078*  6087   6090*
SENFLG  002606     1619#  2237*  2255   5501   5787   5798   6194*  6199*  6201*
SENSE = 000011 G   1432#  2628   3439
SEQDEF  017720     2951#  7010   7063
SEQSEL  002754 G   1695#  2977
SERIAL= 000030 G   1409#  2670*  2671   2679
SERLNB  005126     2181#  2688
SERNUM  002300 G   1495#  2669   2688
SERRFO= 000014 G   1344#  5495*  5649*  5796*  5865*  6438
SERRRV= 000016 G   1345#  5493*  5651*  5664*  5807*  5867*  6438
SERURT= 000012 G   1343#  2836   5869*  6438
SETDBF  025410     4191   4270#
SFFLET= 000047 G   1447#
SFPTBL  002204 G   1224#
SHIFTL  036406     2608   4728   4796   5462   5609   5669   5703   5895   5981   6145   6298#  6895   7016
SHIFTR  036360     4673   4794   5939   6139   6283#
SHTREC  033374     1674   5772#
```

```
SNGTRF= 000056 G  1361#  5513*  5795*  6444
SNGTRR= 000060 G  1362#  5523*  5806*  6444
SPFWEI= 000031 G  1440#
SPFWFL= 000025 G  1438#  1726  1734  3324  3747
SPFWRC= 000021 G  1436#  3685  3852  3864  4073
SPLEOT= 000045 G  1446#
SPRVEI= 000033 G  1441#
SPRVFL= 000027 G  1439#  1723  1731  3319  3740
SPRVRC= 000023 G  1437#  3672  3797  4071  4095  4127
SPUNIT= 000010 G  1342#  4651  4718  4768  4831  4854  5596  6084  6426  6898
STAEOP  002212    1229#  2775  2780*  7100
STAEOT  002214    1230#  2776  2781*  7084  7098
STAFLG  002464 G  1578#  4743*  6415  6452  6718*  7058*  7086*  7088*  7102*
START1  002276 G  1494#  2686  6579*  6587*
STORE   002520 G  1592#  6137*  6142*  6143*  6144*
STRST   002334 G  1521#  6580*  6603*  6632  7001
STRTBL  002336 G  1522#  6234  6412*  6640*  7007*
STTBLH  002342 G  1524#  2506  2839
SVCGBL= 000000    1125#  1134#  1168  1170  1172  1186  1202  1224  2117  2131  2147  6380  6517
                  6677  6683  6707  6747  6780  7198  7231  7260#
SVCINS= 177777    1125#  1131#  1168  1170  1172  1186  1202  1224  2122  2124  2125  2126  2127
                  2129  2136  2140  2142  2143  2145  2152  2155  2244  2245  2250  2257  2262
                  2263  2264  2265  2266  2269  2272  2273  2276  2277  2278  2279  2280  2281
                  2282  2283  2284  2285  2286  2499  2500  2598  2633  2634  2635  2643  2688
                  2744  2745  2754  2758  2762  2764  2770  2775  2776  2777  2778  2786  2791
                  2792  2795  2801  2804  2882  2884  2886  3904  4045  4046  4293  4617  4621
                  4622  4652  4661  4701  4753  4757  4769  4783  5424  5426  5441  5470  5496
                  5500  5544  5564  5574  5582  5597  5607  5644  5657  5679  5680  5701  5717
                  5728  5735  5741  5747  5757  5763  5769  5782  5784  5826  5835  5844  5858
                  5879  5893  5905  5915  5925  5931  5946  5948  5975  5990  6085  6089  6109
                  6187  6191  6426  6427  6434  6436  6437  6438  6439  6440  6441  6442  6443
                  6444  6445  6446  6447  6448  6449  6450  6451  6471  6509  6582  6583  6585
                  6586  6590  6594  6595  6596  6597  6598  6601  6602  6609  6610  6619  6621
                  6623  6626  6630  6631  6638  6639  6645  6653  6654  6659  6660  6670  6675
                  6685  6723  6739  6755  6771  6788  6804  7051  7057  7067  7087  7103  7110
                  7126  7198  7206  7207  7208  7209  7211  7231  7240  7241  7242  7243  7244
                  7249  7260
SVCSUB= 177777    1125#  1133#
SVCTAG= 177777    1125#  1135#  1216  1257  2129  2145  2155  2754  2758  2762  2764  2770  2775
                  2776  2777  2778  2786  2792  2795  2804  6509  6675  6685  6739  6771  6804
                  7126  7211  7249
SVCTST= 177777    1125#  1132#  6918
S$LSYM= 010000    1125#  1216#  1257#  2129#  2145#  2155#  2754#  2758#  2762#  2764#  2770#  2775#  2776#
                  2777#  2778#  2786#  2792#  2795#  2804#  6509#  6675#  6685#  6739#  6771#  6804#  7126#
                  7211#  7249#
TAMT    003264    1875#  2282
TAPMON  002506 G  1587#  4669*  4671*  4672  4703  4720
TBLCNT  002344 G  1525#  2495*  2516*  2525  2690  2850  2957  4684  4725  4736  5956  6417  6651
                  7041  7092
TBLDIS  036076    2591  2604  2614  2837  2873  2953  4169  4172  4178  4194  4295  4644  4745
                  5452  6222#  6424  6892
TBLNTH  002346 G  1526#  2507*  2508  2509*  2510  4689  4690  5958  5959  6227  6228  6233
TBLNUM  002352 G  1528#  2585*  2587  2689*  2690  2835*  2849*  2850  4275  4642*  4686*  4691*  473E*
                  5429  5461  5586  5598  5660  5668  5702  5720  5883  5894  5908  5918  6224
                  6413  6418*  6462*  6467*  7008*  7015  7089*  7091  7092
TIMER   002544 G  1602#  4760*  4761  4763*
```

```
TIMOUT  002542 G   1601#  2238   4650*  4653*  4699*  4702*  4767*  4770*  5974*  5976*
TM      032320     1659   5628#
TMFALB  034540     1683   5935#
TMFALT  034416     1681   5912#
TMNUM = 000004 G   1340#  2603   4171   4648   4705   4750   4800   5961   6178   6427   6894   6899
TMOUT   034462     5913   5917   5920#
TM78N   002370 G   1535#  2124   2140   2142   2262   2606*  2650   2688   2882   2884   2886   *648*  4674*
                   4675   4705   4750*  4799*  5680   5941*  6899*
TRECNT  002642 G   1640#  5601*  5602   5615*
TUFALB  034516     1684   5929#
TUFALT  034464     1682   5922#
TUNUM = 000006 G   1341#  2613   4177   4193   4649   4707   4751   4813   6182   6427   6900
TUSEL0  003273     1882#  2280
TUSEL1  003274     1883#  2281
TUX     003320     1903#  2284
TU78N   002372 G   1536#  2124   2142   2262   2616*  2654   2688   2882   2884   4649*  4676*  4677*  4679
                   4683*  4707   4751*  4810*  5680   6900*
T$ARGC= 000001     1168#  2122#  2124#  2125#  2126#  2127#  2136#  2140#  2142#  2143#  2152#  2244#  2245#
                   2250#  2257#  2262#  2263#  2264#  2265#  2266#  2269#  2272#  2273#  2276#  2277#  2278#
                   2279#  2280#  2281#  2282#  2283#  2284#  2285#  2286#  2688#  2791#  2801#  2882#  2884#
                   2886#  4293#  5496#  5564#  5607#  5679#  5680#  5990#  6089#  6109#  6426#  6427#  6434#
                   6436#  6437#  6438#  6439#  6440#  6441#  6442#  6443#  6444#  6445#  6446#  6447#  6448#
                   6449#  6450#  6451#  6598#  6623#  6630#  6638#  6653#  6659#
T$CODE= 004130     2754#  2758#  2762#  2764#  2770#  2775#  2776#  2777#  2778#  2786#  2792#  2795#  2804#
                   7206#  7207#  7208#  7209#  7240#  7241#  7242#  7243#  7244#
T$ERRN= 000042     1125#  3904#  4652#  4701#  4769#  5424#  5426#  5441#  5470#  5500#  5544#  5574#  5582#
                   5597#  5644#  5657#  5701#  5717#  5728#  5735#  5741#  5747#  5757#  5763#  5769#  5782#
                   5784#  5826#  5835#  5844#  5858#  5879#  5893#  5905#  5915#  5925#  5931#  5946#  5948#
                   5975#  6085#
T$EXCP= 000000     2754#  2758#  2762#  2764#  2786#  2795#  2804#  7206#  7207#  7208#  7209#  7242#
T$FLAG= 000040     6471#  6670#  6723#  6755#  6788#  7110#
T$GMAN= 000000     1125#  2754#  2758#  2762#  2764#  2786#  2795#  2804#
T$HILI= 000004     2754#  2758#  2762#  2764#  2786#  2795#  2804#  7206#  7207#  7208#  7209#  7242#
T$LAST= 000001     1125#  7260#
T$LOLI= 000001     2754#  2758#  2762#  2764#  2786#  2795#  2804#  7206#  7207#  7208#  7209#  7242#
T$LSYM= 010000     1125#  1216   1257   2129   2145   2155   6509   6675   6685   6739   6771   6804   7126
                   7211   7249
T$LTNO= 000001     7260#
T$NEST= 177777     1125#  1151#  1202#  1216#  1224#  1257#  1259#  1321#  2117#  2129#  2131#  2145#  2147#
                   2155#  6320#  6373#  6380#  6509#  6517#  6675#  6677#  6681#  6683#  6685#  6707#  6739#
                   6747#  6771#  6780#  6804#  6806#  6868#  6918#  7126#  7133#  7187#  7198#  7211#  7231#
                   7241   7249#  7261#
T$NS0 = 000000     1151#  1259   1321#  6320   6373#  6806   6868#  7133   7187#  7261
T$NS1 = 000005     1202#  1216   1224#  1257   2117#  2129   2131#  2145   2147#  2155   6380#  6509   6517#
                   6675   6677#  6681   6683#  6685   6707#  6739   6747#  6771   6780#  6804   6918#  7126
                   7198#  7211   7231#  7241   7249
T$PTNU= 000000     1125#
T$SAVL= 177777     1125#
T$SEGL= 177777     1125#
T$SUBN= 000000     1125#  6918#
T$TAGL= 177777     1125#
T$TAGN= 010017     1125#  1202#  1224#  2117#  2131#  2147#  6380#  6517#  6677#  6683#  6707#  6747#  6780#
                   6918#  7198#  7231#
T$TEMP= 000000     1186#  1216#  1257#  1259#  2129#  2145#  2155#  2754#  2758#  2762#  2764#  2770#  2775#
                   2776#  2777#  2778#  2786#  2792#  2795#  2804#  6320#  6471#  6509#  6670#  6675#  6681#
                   6685#  6723#  6739#  6755#  6771#  6788#  6804#  6806#  7110#  7126#  7133#  7206#  7207#
```

```
                    7208#  7209#  7211#  7240#  7242#  7243#  7244#  7249#  7261#
T$TEST= 000001      1125#  6918#  7260
T$TSTM= 177777      1125#  2122   2124   2125   2126   2127   2129   2136   2140   2142   2143   2145   2152
                    2155   2244   2245   2250   2257   2262   2263   2264   2265   2266   2269   2272   2273
                    2276   2277   2278   2279   2280   2281   2282   2283   2284   2285   2286   2499   2598
                    2633   2635   2643   2688   2744   2754   2758   2762   2764   2770   2775   2776   2777
                    2778   2786   2791   2792   2795   2801   2804   2882   2884   2886   3904   4046   4293
                    4617   4621   4652   4661   4701   4753   4757   4769   4783   5424   5426   5441   5470
                    5496   5500   5544   5564   5574   5582   5597   5607   5644   5657   5679   5680   5701
                    5717   5728   5735   5741   5747   5757   5763   5769   5782   5784   5826   5835   5844
                    5858   5879   5893   5905   5915   5925   5931   5946   5948   5975   5990   6085   6089
                    6109   6187   6426   6427   6434   6436   6437   6438   6439   6440   6441   6442   6443
                    6444   6445   6446   6447   6448   6449   6450   6451   6509   6582   6585   6590   6594
                    6596   6598   6601   6609   6619   6621   6623   6626   6630   6631   6638   6639   6645
                    6653   6654   6659   6660   6670   6675   6685   6723   6739   6771   6804   7051   7057
                    7067   7087   7103   7110   7126
T$TSTS= 000001      1125#  6918#
T$$AU = 010013      6780#  6788   6804
T$$AUT= 010010      6683#  6685
T$$CLE= 010011      6707#  6723   6739
T$$DU = 010012      6747#  6755   6771
T$$HAR= 010015      7198#  7211
T$$HW = 010000      1202#  1216
T$$INI= 010006      6517#  6670   6675
T$$MSG= 010004      2117#  2129   2131#  2145   2147#  2155
T$$PRO= 010007      6677#
T$$RPT= 010005      6380#  6471   6509
T$$SOF= 010016      7231#  7249
T$$SW = 010001      1224#  1257
T$$TES= 010014      6918#  7110   7126
T1      043226 G    1186   6918#
UAM   = 000200 G    1330#
UNITFL  002530 G    1596#  4774   4776   7027*
UNLOAD= 000005 G    1430#
UNRDAB  033774      1677   5841#
UNSLCT= 000010 G    1401#  2126   2264   2609*  2629   2650*  4173*  4202*  4667   4675*  4790   4798*  5940*
                    6178*
UNTAPE  020302      1696   3069#
USEPAT  002306 G    1499#  2804   2805
VISIT   002470 G    1580#  4066   4068*  4076*  4092   4094*  4111*  4124   4126*  4129*  5623*  5873*  5898*
VRMADD  002354 G    1529#  2497   2510*  2529   4311   4321   4345   4397   6060   6073   6626*  6627
WCKFWD= 000051 G    1448#  3559   4313
WCKREV= 000057      1449#  3547   4319
WMCERR  003306      1893#  2281
WMCSTA  003272      1881#  2277
WRDCNT= 000002 G    1398#  2265   4306*  6179*  6180*
WRTCNT  002556 G    1607#  4097   4100*  4112*  5566*  5579*  5686*
WRTDAT  003275      1884#  2278
WRTGCR= 000063 G    1451#  1711   1729   3493   3539   3660   3838   3963   4002   4102   4130
WRTPE = 000061 G    1450#  1706   1721   3486   3537   3658   3781   3836   3960   3999   4116
WRTYCT  002560 G    1608#  4097   4101*  5553   5565*  5578*  5589*  5685*
WTMFLG  002502 G    1585#  4802*  4811   4825   4876*  4881*
WTMGCR= 000017 G    1435#  1730   3314   3727
WTMPE = 000015 G    1434#  1722   3729
WTUFLG  002500 G    1584#  4815*  4827   4877*  4882*
XFRCTL  003321      1904#  2284
```

```
XRETRY  003322          1905#   2285
X$ALWA= 000000          1125#
X$FALS= 000040          1125#
X$OFFS= 000400          1125#   7241
X$TRUE= 000020          1125#   7241
.     = 044170          1148#   2075#   2235#   2332#   2357#   2634    4045    4622    6191    6471    6507#   6602    6670
                        6723    6755    6788    7110    7241
```

```
BCOMPL   2745    6595
BGNAU    6780
BGNAUT   6683
BGNCLN   6707
BGNDU    6747
BGNHRD   7198
BGNHW    1202
BGNINI   6517
BGNMOD   1151    1321    6373    6868    7187
BGNMSG   2117    2131    2147
BGNPRO   6677
BGNRPT   6380
BGNSFT   7231
BGNSW    1224
BGNTST   6918
BNCOMP   2500    6583    6586    6597    6610
BREAK    2635    4046    4621    4757    7067
BRESET   6601
CALL     2382#   3648    3771    3777    3947    3986    4052    7030
CLOCK    6609
DELAY    2634    4045    4622    6191    6602
DESCRI   1172
DEVTYP   1170
DISPAT   1186
DOCLN    6631    6639    6645    6654    6660
DORPT    7051    7057    7087    7103
ENDAU    6804
ENDAUT   6685
ENDCLN   6739
ENDDU    6771
ENDHRD   7211
ENDHW    1216
ENDINI   6675
ENDMOD   1259    6320    6806    7133    7261
ENDMSG   2129    2145    2155
ENDPRO   6681
ENDRPT   6509
ENDSFT   7249
ENDSW    1257
ENDTST   7126
EQUALS   1330
ERRDF    3904    4652    4701    4769    5424    5426    5441    5470    5597    5644    5657    5701    5717    5728    5735
         5741    5747    5757    5763    5769    5782    5784    5905    5915    5925    5931    5946    5948    5975    6085
ERRHRD   5582    5844    5879
ERRSOF   5500    5544    5574    5826    5835    5858    5893
EXIT     6471    6670    6723    6755    6788    7110
GMANID   2754    2758    2762    2764    2786    2795    2804
GMANIL   2770    2775    2776    2777    2778    2792
GPHARD   2499    6590
GPRMA    7206    7207
GPRMD    2754#   2758#   2762#   2764#   2786#   2795#   2804#   7208    7209    7242
GPRML    2770#   2775#   2776#   2777#   2778#   2792#   7240    7243    7244
HEADER   1168
LASTAD   7260
MANUAL   2744
MEMORY   6626
```

```
MSBYTE  1168#
MSCHEC  6471#  6670#  6723#  6755#  6788#  7110#
MSCNTO  2754#  2758#  2762#  2764#  2770#  2775#  2776#  2777#  2778#  2786#  2792#  2795#  2804#  7206#  7207#
        7208#  7209#  7240#  7242#  7243#  7244#
MSCOUN  2122#  2124#  2125#  2126#  2127#  2136#  2140#  2142#  2143#  2152#  2244#  2245#  2250#  2257#  2262#
        2263#  2264#  2265#  2266#  2269#  2272#  2273#  2276#  2277#  2278#  2279#  2280#  2281#  2282#  2283#
        2284#  2285#  2286#  2688#  2791#  2801#  2882#  2884#  2886#  4293#  5496#  5564#  5607#  5679#  5680#
        5990#  6089#  6109#  6426#  6427#  6434#  6436#  6437#  6438#  6439#  6440#  6441#  6442#  6443#  6444#
        6445#  6446#  6447#  6448#  6449#  6450#  6451#  6598#  6623#  6630#  6638#  6653#  6659#
MSDATA  1168#  1170#  1172#
MSDECR  1216#  1257#  1259#  2129#  2145#  2155#  6320#  6509#  6675#  6681#  6685#  6739#  6771#  6804#  6806#
        7126#  7133#  7211#  7249#  7261#
MSDEFA  2754#  2758#  2762#  2764#  2770#  2775#  2776#  2777#  2778#  2786#  2792#  2795#  2804#  7206#  7207#
        7208#  7209#  7240#  7242#  7243#  7244#
MSENDE  1216#  1257#  1259#  2129#  2145#  2155#  6320#  6509#  6675#  6685#  6739#  6771#  6804#  6806#  7126#
        7133#  7211#  7249#  7261#
MSERRI  3904#  4652#  4701#  4769#  5424#  5426#  5441#  5470#  5500#  5544#  5574#  5582#  5597#  5644#  5657#
        5701#  5717#  5728#  5735#  5741#  5747#  5757#  5763#  5769#  5782#  5784#  5826#  5835#  5844#  5858#
        5879#  5893#  5905#  5915#  5925#  5931#  5946#  5948#  5975#  6085#
MSEXCP  2754#  2758#  2762#  2764#  2786#  2795#  2804#  7206#  7207#  7208#  7209#  7242#
MSEXIT  6471#  6670#  6723#  6755#  6788#  7110#
MSEXSE  6471#  6670#  6723#  6755#  6788#  7110#
MSEXTJ  6471#  6670#  6723#  6755#  6788#  7110#
MSGEN   1168#  1170#  1172#  1186#  1202#  1216#  1224#  1257#  2117#  2129#  2131#  2145#  2147#  2155#  2754#
        2758#  2762#  2764#  2770#  2775#  2776#  2777#  2778#  2786#  2792#  2795#  2804#  6380#  6509#  6517#
        6675#  6677#  6683#  6685#  6707#  6739#  6747#  6771#  6780#  6804#  6918#  7126#  7198#  7211#  7231#
        7249#  7260#
MSGENB  2754#  2758#  2762#  2764#  2770#  2775#  2776#  2777#  2778#  2786#  2792#  2795#  2804#
MSGETS  1216#  1257#  1259#  2129#  2145#  2155#  6320#  6509#  6675#  6681#  6685#  6739#  6771#  6804#  6806#
        7126#  7133#  7211#  7241#  7249#  7261#
MSGETT  6471#  6670#  6723#  6755#  6788#  7110#  7241#
MSGNGB  1151#  1168#  1170#  1172#  1186#  1202#  1224#  1321#  2117#  2131#  2147#  6373#  6380#  6517#  6677#
        6683#  6707#  6747#  6780#  6868#  7187#  7198#  7231#  7260#
MSGNIN  1168#  1170#  1172#  1186#  1202#  1224#  2122#  2124#  2125#  2126#  2127#  2129#  2136#  2140#  2142#
        2143#  2145#  2152#  2155#  2244#  2245#  2250#  2257#  2262#  2263#  2264#  2265#  2266#  2269#  2272#
        2273#  2276#  2277#  2278#  2279#  2280#  2281#  2282#  2283#  2284#  2285#  2286#  2499#  2500#  2598#
        2633#  2634#  2635#  2643#  2688#  2744#  2745#  2754#  2758#  2762#  2764#  2770#  2775#  2776#  2777#
        2778#  2786#  2791#  2792#  2795#  2801#  2804#  2882#  2884#  2886#  3904#  4045#  4046#  4293#  4617#
        4621#  4622#  4652#  4661#  4701#  4753#  4757#  4769#  4783#  5424#  5426#  5441#  5470#  5496#  5500#
        5544#  5564#  5574#  5582#  5597#  5607#  5644#  5657#  5679#  5680#  5701#  5717#  5728#  5735#  5741#
        5747#  5757#  5763#  5769#  5782#  5784#  5826#  5835#  5844#  5858#  5879#  5893#  5905#  5915#  5925#
        5931#  5946#  5948#  5975#  5990#  6085#  6089#  6109#  6187#  6191#  6426#  6427#  6434#  6436#  6437#
        6438#  6439#  6440#  6441#  6442#  6443#  6444#  6445#  6446#  6447#  6448#  6449#  6450#  6451#  6471#
        6509#  6582#  6583#  6585#  6586#  6590#  6594#  6595#  6596#  6597#  6598#  6601#  6602#  6609#  6610#
        6619#  6621#  6623#  6626#  6630#  6631#  6638#  6639#  6645#  6653#  6654#  6659#  6660#  6670#  6675#
        6685#  6723#  6739#  6755#  6771#  6788#  6804#  7051#  7057#  7067#  7087#  7103#  7110#  7126#  7198#
        7206#  7207#  7208#  7209#  7211#  7231#  7240#  7241#  7242#  7243#  7244#  7249#  7260#
MSGNLS  2754#  2758#  2762#  2764#  2770#  2775#  2776#  2777#  2778#  2786#  2792#  2795#  2804#
MSGNTA  1216#  1257#  2129#  2145#  2155#  6509#  6675#  6685#  6739#  6771#  6804#  7126#  7211#  7249#
MSGNTE  6918#
MSHAPT  1168#
MSHNAP  1168#
MSINCR  1151#  1202#  1224#  1321#  2117#  2122#  2124#  2125#  2126#  2127#  2129#  2131#  2136#  2140#  2142#
        2143#  2145#  2147#  2152#  2155#  2244#  2245#  2250#  2257#  2262#  2263#  2264#  2265#  2266#  2269#
        2272#  2273#  2276#  2277#  2278#  2279#  2280#  2281#  2282#  2283#  2284#  2285#  2286#  2499#  2598#
        2633#  2635#  2643#  2688#  2744#  2754#  2758#  2762#  2764#  2770#  2775#  2776#  2777#  2778#  2786#
```

```
          2791#  2792#  2795#  2801#  2804#  2882#  2884#  2886#  3904#  4046#  4293#  4617#  4621#  4652#  4661#
          4701#  4753#  4757#  4769#  4783#  5424#  5426#  5441#  5470#  5496#  5500#  5544#  5564#  5574#  5582#
          5597#  5607#  5644#  5657#  5679#  5680#  5701#  5717#  5728#  5735#  5741#  5747#  5757#  5763#  5769#
          5782#  5784#  5826#  5835#  5844#  5858#  5879#  5893#  5905#  5915#  5925#  5931#  5946#  5948#  5975#
          5990#  6085#  6089#  6109#  6187#  6373#  6380#  6426#  6427#  6434#  6436#  6437#  6438#  6439#  6440#
          6441#  6442#  6443#  6444#  6445#  6446#  6447#  6448#  6449#  6450#  6451#  6509#  6517#  6582#  6585#
          6590#  6594#  6596#  6598#  6601#  6609#  6619#  6621#  6623#  6626#  6630#  6631#  6638#  6639#  6645#
          6653#  6654#  6659#  6660#  6670#  6675#  6677#  6683#  6685#  6707#  6723#  6739#  6747#  6771#  6780#
          6804#  6868#  6918#  7051#  7057#  7067#  7087#  7103#  7110#  7126#  7187#  7198#  7231#
MSLDRO    2499#  2633#  2643#  4617#  4661#  4753#  4783#  6187#  6582#  6585#  6590#  6594#  6596#  6609#  6621#
MSMCHI    1125#
MSMCLO    1125#
MSPOP     1216#  1257#  1259#  2129#  2145#  2155#  6320#  6509#  6675#  6681#  6685#  6739#  6771#  6804#  6806#
          7126#  7133#  7211#  7249#  7261#
MSPRIN    2122#  2124#  2125#  2126#  2127#  2136#  2140#  2142#  2143#  2152#  2244#  2245#  2250#  2257#  2262#
          2263#  2264#  2265#  2266#  2269#  2272#  2273#  2276#  2277#  2278#  2279#  2280#  2281#  2282#  2283#
          2284#  2285#  2286#  2688#  2791#  2801#  2882#  2884#  2886#  4293#  5496#  5564#  5607#  5679#  5680#
          5990#  6089#  6109#  6426#  6427#  6434#  6436#  6437#  6438#  6439#  6440#  6441#  6442#  6443#  6444#
          6445#  6446#  6447#  6448#  6449#  6450#  6451#  6598#  6623#  6630#  6638#  6653#  6659#
MSPUSH    1151#  1202#  1224#  1321#  2117#  2131#  2147#  6373#  6380#  6517#  6677#  6683#  6707#  6747#  6780#
          6868#  6918#  7187#  7198#  7231#
MSPUT     2122#  2124#  2125#  2126#  2127#  2136#  2140#  2142#  2143#  2152#  2244#  2245#  2250#  2257#  2262#
          2263#  2264#  2265#  2266#  2269#  2272#  2273#  2276#  2277#  2278#  2279#  2280#  2281#  2282#  2283#
          2284#  2285#  2286#  2598#  2688#  2791#  2801#  2882#  2884#  2886#  4293#  5496#  5564#  5607#  5679#
          5680#  5990#  6089#  6109#  6426#  6427#  6434#  6436#  6437#  6438#  6439#  6440#  6441#  6442#  6443#
          6444#  6445#  6446#  6447#  6448#  6449#  6450#  6451#  6598#  6619#  6623#  6630#  6638#  6653#  6659#
MSPUT1    2122#  2124#  2125#  2126#  2127#  2136#  2140#  2142#  2143#  2152#  2244#  2245#  2250#  2257#  2262#
          2263#  2264#  2265#  2266#  2269#  2272#  2273#  2276#  2277#  2278#  2279#  2280#  2281#  2282#  2283#
          2284#  2285#  2286#  2598#  2688#  2791#  2801#  2882#  2884#  2886#  4293#  5496#  5564#  5607#  5679#
          5680#  5990#  6089#  6109#  6426#  6427#  6434#  6436#  6437#  6438#  6439#  6440#  6441#  6442#  6443#
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MSRADI    2754#  2758#  2762#  2764#  2770#  2775#  2776#  2777#  2778#  2786#  2792#  2795#  2804#  7206#  7207#
          7208#  7209#  7240#  7242#  7243#  7244#
MSRNRO    2499#  6590#  6609#  6626#
MSSETS    1151#  1202#  1224#  1321#  2117#  2131#  2147#  6373#  6380#  6517#  6677#  6683#  6707#  6747#  6780#
          6868#  6918#  7187#  7198#  7231#
MSSVC     2122#  2124#  2125#  2126#  2127#  2129#  2136#  2140#  2142#  2143#  2145#  2152#  2155#  2244#  2245#
          2250#  2257#  2262#  2263#  2264#  2265#  2266#  2269#  2272#  2273#  2276#  2277#  2278#  2279#  2280#
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          2762#  2764#  2770#  2775#  2776#  2777#  2778#  2786#  2791#  2792#  2795#  2801#  2804#  2882#  2884#
          2886#  3904   4046#  4293#  4617#  4621#  4652   4661#  4701   4753#  4757#  4769   4783#  5424   5426
          5441   5470   5496#  5500   5544   5564#  5574   5582   5597   5607#  5644   5657   5679#  5680#  5701
          5717   5728   5735   5741   5747   5757   5763   5769   5782   5784   5826   5835   5844   5858   5879
          5893   5905   5915   5925   5931   5946   5948   5975   5990#  6085   6089#  6109#  6187#  6426#  6427#
          6434#  6436#  6437#  6438#  6439#  6440#  6441#  6442#  6443#  6444#  6445#  6446#  6447#  6448#  6449#
          6450#  6451#  6471#  6509#  6582#  6585#  6590#  6594#  6596#  6598#  6601#  6609#  6619#  6621#  6623#
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          6755#  6771#  6788#  6804#  7051#  7057#  7067#  7087#  7103#  7110#  7126#
MSTLAB    2122#  2124#  2125#  2126#  2127#  2129#  2136#  2140#  2142#  2143#  2145#  2152#  2155#  2244#  2245#
          2250#  2257#  2262#  2263#  2264#  2265#  2266#  2269#  2272#  2273#  2276#  2277#  2278#  2279#  2280#
          2281#  2282#  2283#  2284#  2285#  2286#  2499#  2598#  2633#  2635#  2643#  2688#  2744#  2754#  2758#
          2762#  2764#  2770#  2775#  2776#  2777#  2778#  2786#  2791#  2792#  2795#  2801#  2804#  2882#  2884#
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```

```
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          6804#  7051#  7057#  7067#  7087#  7103#  7110#  7126#
MSTSTL    2122#  2124#  2125#  2126#  2127#  2129#  2136#  2140#  2142#  2143#  2145#  2152#  2155#  2244#  2245#
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          2281#  2282#  2283#  2284#  2285#  2286#  2499#  2598#  2633#  2635#  2643#  2688#  2744#  2754#  2758#
          2762#  2764#  2770#  2775#  2776#  2777#  2778#  2786#  2791#  2792#  2795#  2801#  2804#  2882#  2884#
          2886#  3904#  4046#  4293#  4617#  4621#  4652#  4661#  4701#  4753#  4757#  4769#  4783#  5424#  5426#
          5441#  5470#  5496#  5500#  5544#  5564#  5574#  5582#  5597#  5607#  5644#  5657#  5679#  5680#  5701#
          5717#  5728#  5735#  5741#  5747#  5757#  5763#  5769#  5782#  5784#  5826#  5835#  5844#  5858#  5879#
          5893#  5905#  5915#  5925#  5931#  5946#  5948#  5975#  5990#  6085#  6089#  6109#  6187#  6426#  6427#
          6434#  6436#  6437#  6438#  6439#  6440#  6441#  6442#  6443#  6444#  6445#  6446#  6447#  6448#  6449#
          6450#  6451#  6509#  6582#  6585#  6590#  6594#  6596#  6598#  6601#  6609#  6619#  6621#  6623#  6626#
          6630#  6631#  6638#  6639#  6645#  6653#  6654#  6659#  6660#  6670#  6675#  6685#  6723#  6739#  6771#
          6804#  7051#  7057#  7067#  7087#  7103#  7110#  7126#
MSWORD    1168#  1186#  2754#  2758#  2762#  2764#  2770#  2775#  2776#  2777#  2778#  2786#  2792#  2795#  2804#
          3904#  4652#  4701#  4769#  5424#  5426#  5441#  5470#  5500#  5544#  5574#  5582#  5597#  5644#  5657#
          5701#  5717#  5728#  5735#  5741#  5747#  5757#  5763#  5769#  5782#  5784#  5826#  5835#  5844#  5858#
          5879#  5893#  5905#  5915#  5925#  5931#  5946#  5948#  5975#  6085#  6471#  6670#  6723#  6755#  6788#
          7110#  7206#  7207#  7208#  7209#  7240#  7241#  7242#  7243#  7244#  7260
MSXFER    7241#
POINTE    1158
POP       2123   2137   2153   2394#  2531   2694   2812   2852   2887   2993   3395   4204   4350   4364   4426
          4477   4883   5442   5590   5625   5696   5819   5977   6110   6130   6202   6236   6289   6305   6469
          6915   7106
PRINTB    2122   2124   2125   2126   2127   2136   2140   2142   2143   2152   2244   2245   2250   2257   2262
          2263   2264   2265   2266   2269   2272   2273   5496   5564   5607   5679   5680   5990   6089   6109
PRINTF    2688   2791   2801   2882   2884   2886   4293   6598   6623   6630   6638   6653   6659
PRINTS    6426   6427   6434   6436   6437   6438   6439   6440   6441   6442   6443   6444   6445   6446   6447
          6448   6449   6450   6451
PRINTX    2276   2277   2278   2279   2280   2281   2282   2283   2284   2285   2286
PUSH      2120   2134   2150   2388#  2492   2584   2743   2834   2871   2951   3380   4167   4270   4357   4396
          4455   4602   5418   5446   5595   5667   5773   5935   6056   6117   6176   6222   6283   6298   6411
          6890   6999
READEF    6582   6585   6594   6596
RETURN    2376#  3412   3435   3443   3503   3511   3521   3544   3549   3560   3651   3665   3670   3675   3681
          3688   3699   3707   3710   3736   3743   3756   3773   3778   3791   3808   3844   3854   3869   3891
          3898   3913   3951   3965   3971   3982   3990   4004   4010   4027   4042   4053   4057   6916
SETPRI    2633   2643   4617   4661   4753   4783   6187   6621
SETVEC    2598   6619
SVC       1124#  1125
XFER      6471#  6670#  6723#  6755#  6788#  7110#
XFERT     7241

. ABS.  044170     000

 ERRORS DETECTED:  0

 CZTMJA,CZTMJA/CRF/EQ:ONEFILE=SVC33/ML,ZTMJA1.P11,ZTMJA2.P11,ZTMJA3.P11,ZTMJA4.P11,ZTMJA5.P11,ZTMJA6.P11
 RUN-TIME: 47 49 4 SECONDS
 RUN-TIME RATIO: 498/100=4.9
 CORE USED:  19K  (38 PAGES)
```