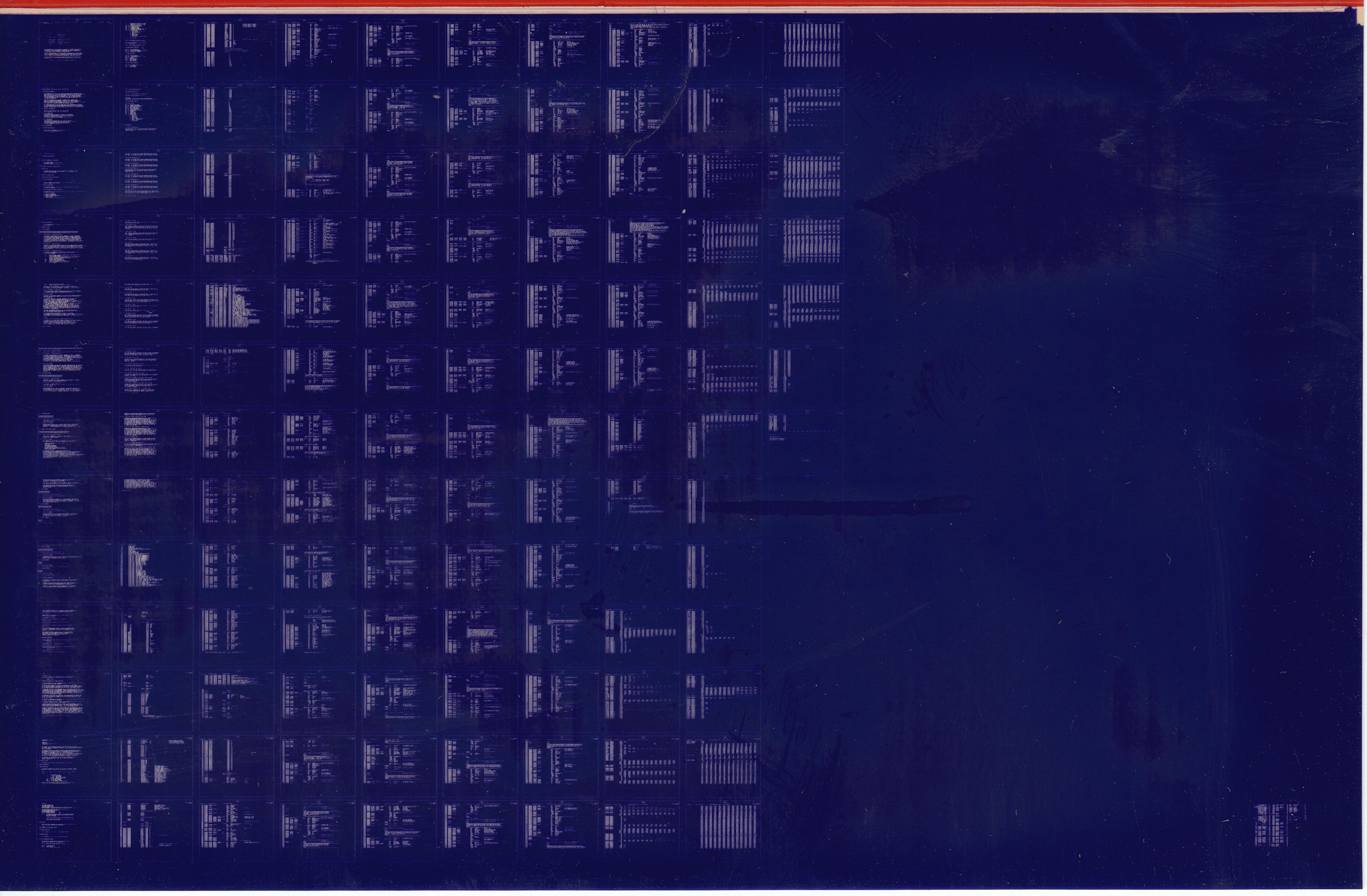
RLV11/RL01

DISKLESS
CVRLAA0

AH-B108A-MC

FICHE 1 OF 1

JUN 1978
digital
MADE IN USA



IDENTIFICATION

PRODUCT CODE: AC-B107A-MC

PRODUCT NAME: CVRLAAD RLV11 RL01 DSKLS
DATE CREATED: APRIL 1978
MAINTAINER: DIAGNOSTIC ENGINEERING
AUTHOR: W. HEAVEY

1.1 PROGRAM ABSTRACT FOR THE RLV11 RL01 DISKLESS TEST

1.1.1 STRUCTURE OF PROGRAM

THIS DIAGNOSTIC OCCUPIES 14.5K WORDS OF MEMORY AND IS COMPATIBLE WITH BOTH XXDP AND ACT. IT CAN BE RUN STANDALONE UNDER XXDP, AND CAN BE CHAINED UNDER XXDP, ACT AND APT IN ACT MODE (SEE "CREATE CORE IMAGE" COMMAND BELOW FOR DETAILS OF CHAINING PROCEDURE). IT IS A SINGLE PROGRAM FROM THE STANDPOINT OF THE DIAGNOSTIC USER, BUT WE HAVE INCORPORATED INTO IT A CONTROL MODULE WHICH WILL LATER BE RELEASED INDEPENDENTLY AS A DIAGNOSTIC SUPERVISOR.

WHEN THIS DIAGNOSTIC IS STARTED AT ADDRESS 200, CONTROL GOES FIRST TO THE SUPERVISOR PORTION, WHICH WILL ASK CERTAIN "HARD CORE" QUESTIONS ABOUT THE ENVIRONMENT. THEN IT WILL ENTER COMMAND MODE, INDICATED BY A PROMPT CHARACTER (DS-B>). AT COMMAND MODE THE OPERATOR MAY ENTER ANY OF SEVERAL COMMANDS AS DESCRIBED BELOW.

THE SUPERVISOR CODING FOLLOWS IMMEDIATELY THE DIAGNOSTIC TEST CODING, BUT THE SUPERVISOR LISTING HAS BEEN SUPPRESSED FOR GENERAL DISTRIBUTION. A LIMITED DISTRIBUTION HAS BEEN MADE TO FIELD SERVICE OF THE SUPERVISOR ASSEMBLY LISTING, AND IT MAY BE CONSULTED IN EVENT OF A SOFTWARE PROBLEM.

1.1.2 DIAGNOSTIC INFORMATION

THE RLV11 RL01 DISKLESS TEST IS A LSI-11(PDP-11) BASED PROGRAM THAT WILL TEST THE CONTROLLER.

RLV11 CONTROLLER

THE PROGRAM TESTS THE BASIC INTERFACE LOGIC,REGISTER MANIPULATION AND FUNCTIONALITY. THE RLV11 MAINTENANCE FUNCTION IS PERFORMED TO TEST THE CONTROLLER WRITE/READ DATA PATHS WITHOUT A DRIVE PRESENT.
THIS TEST WILL RUN WITH OR WITHOUT A DRIVE PRESENT.

RL11 CONTROLLER

THE MAINTENANCE FUNCTION DOES NOT EXIST ON THE RL11 CONTROLLER. THIS PROGRAM WILL ONLY TEST THE BASIC INTERFACE LOGIC,REGISTER MANIPULATION AND FUNCTIONALITY.
THE "NOP" COMMAND IS THE ONLY FUNCTION PERFORMED IN THIS DIAGNOSTIC FOR THE RL11.

1.2 SYSTEM REQUIREMENTS

1.2.1 HARDWARE REQUIREMENTS

PDP-11/LSI-11 PROCESSOR WITH 16K OR MORE OF CORE
CONSOLE DEVICE (LA30,LA36,VT50,ETC.)
RL11/RLV11 CONTROLLER(S) (1-8)

LINEPRINTER(OPTIONAL)

1.2.2 SOFTWARE REQUIREMENTS

1.3 RELATED DOCUMENTS AND STANDARDS

RL01 USERS MANUAL (EK-RL01-UG-PRE)
XXDP USERS MANUAL
DIAGNOSTIC SUPERVISOR PROGRAM LISTING

1.4 DIAGNOSTIC HIERARCHY PREREQUISITES

1.5 ASSUMPTIONS

THE HARDWARE OTHER THAN THE RL01 SUBSYSTEM IS ASSUMED TO WORK PROPERLY. FALSE ERRORS MAY BE REPORTED IF THE PROCESSOR, ETC., DO NOT FUNCTION PROPERLY.

2.0 OPERATING INSTRUCTIONS

2.1 LOADING AND STARTING PROCEDURES

2.1.1 LOADING PROCEDURES

FOLLOW STANDARD DEC PROCEDURES TO LOAD THE PROGRAM. (XXDP, ABSOLUTE LOADER, UPD1, UPD2)

2.1.2 STARTING PROCEDURES

THE PROGRAM STARTS AT LOCATION 200. USE STANDARD DEC PROCEDURES TO START THE PROGRAM.

2.1.3 STEPS FOR QUICK AND SIMPLE EXECUTION

THE DIAGNOSTIC CAN BE EXECUTED STANDALONE WITHOUT READING THE REMAINDER OF THIS DOCUMENT AS FOLLOWS:

A) LOAD THE DIAGNOSTIC
B) START AT ADDRESS 200
C) ANSWER THE HARDCORE QUESTIONS
D) RECEIVE PROMPT (DS-B>)
E) ENTER STA<CR>
F) ANSWER HARDWARE AND SOFTWARE QUESTIONS

H) TO END EXECUTION, ENTER CONTROL/C

2.2 SPECIAL ENVIRONMENTS

THE ENVIRONMENTS THIS PROGRAM WILL RUN IN ARE XXDP, XXDP CHAIN, ACT, SLIDE AND APT.

2.3 PROGRAM OPTIONS

2.3.1 START COMMAND

```
**************************************************************************
STA(RT)/TESTS:<TEST-LIST>/PASS:<PASS-CNT>/FLAGS:<FLAG-LIST>/EOP:<INCR>
**************************************************************************
```

2.3.1.1 TESTS SWITCH (/TESTS:<TEST-LIST>)

<TEST-LIST> IS A SEQUENCE OF DECIMAL NUMBERS (1:2 ETC.) OR RANGES OF DECIMAL NUMBERS (1-5:8-10 ETC.) SEPARATED BY COLONS, SPECIFYING WHICH TESTS IT IS DESIRED BE EXECUTED. THE TEST NUMBERS RANGE FROM 1 TO THE LARGEST TEST NUMBER IN THE DIAGNOSTIC. THEY MAY BE SPECIFIED IN ANY ORDER. TESTS WILL BE EXECUTED IN NUMERICAL ORDER REGARDLESS OF ORDER OF SPECIFICATION. THE DEFAULT IS TO EXECUTE ALL TESTS. ON THIS AND ALL SWITCHES, THE ANGLE BRACKETS <> ARE PUNCTUATION USED IN THE DEFINITION ONLY, AND ARE NOT TO BE TYPED BY THE OPERATOR. SEE EXAMPLE AT END OF 2.3.1.

2.3.1.2 PASS SWITCH (/PASS:<PASS-CNT>)

<PASS-CNT> IS A DECIMAL NUMBER INDICATING THE DESIRED NUMBER OF PASSES. A PASS IS DEFINED AS THE EXECUTION OF THE FULL DIAGNOSTIC (ALL SELECTED TESTS) AGAINST ALL UNITS SUBMITTED. THE DEFAULT IS NON-ENDING EXECUTION: IE, EXIT IS ACCOMPLISHED EITHER BY TYPING A CONTROL/C OR BY A HALT ON ERROR BEING ENCOUNTERED, IN WHICH CASE WE RETURN TO COMMAND MODE. SEE EXAMPLE AT END OF 2.3.1.

2.3.1.3 FLAGS SWITCH (/FLAGS:<FLAG-LIST>)

<FLAG-LIST> IS A SEQUENCE OF ELEMENTS OF THE FORM <FLAG>, <FLAG=1>, OR <FLAG=0>, SEPARATED BY COLONS, WHERE <FLAG> HAS ONE OF THE FOLLOWING VALUES:

HOE	HALT ON ERROR, CAUSING COMMAND MODE TO BE ENTERED WHEN AN ERROR IS ENCOUNTERED
LOE	LOOP ON ERROR, CAUSING THE DIAGNOSTIC TO LOOP CONTINUOUSLY WITHIN THE SMALLEST DEFINED BLOCK OF CODING (SEGMENT, SUBTEST, OR TEST) CONTAINING THE ERROR
IER	INHIBIT ERROR REPORTING
IBE	INHIBIT BASIC ERROR REPORTS
IXE	INHIBIT EXTENDED ERROR REPORTS
PRI	DIRECT ALL MESSAGES TO A LINE PRINTER
PNT	PRINT NUMBER OF TEST BEING EXECUTED
BOE	BELL ON ERROR

ISR INHIBIT STATISTICAL REPORTS
IDR INHIBIT DROPPING OF UNITS BY DIAGNOSTIC

THE FLAGS NAMED OR EQUATED TO 1 ARE SET, THOSE EQUATED TO 0 ARE CLEARED. A FLAG NOT SPECIFIED IS CLEARED. IF THE FLAGS SWITCH IS NOT GIVEN ALL FLAGS ARE CLEARED. SEE EXAMPLE AT END OF 2.3.1.

2.3.1.4 END OF PASS SWITCH (/EOP:<INCR>)

<INCR> IS A DECIMAL NUMBER INDICATING HOW OFTEN (IN TERMS OF PASSES) IT IS DESIRED THAT THE END OF PASS MESSAGE BE PRINTED. THE DEFAULT IS AT THE END OF EVERY PASS. SEE EXAMPLE AT END OF 2.3.1.

2.3.1.5 EFFECT OF COMMAND

THE EFFECT OF THE START COMMAND IS TO INITIATE THE HARDWARE PARAMETER DIALOGUE, THE SOFTWARE PARAMETER DIALOGUE, AND THEN THE DIAGNOSTIC TESTS THEMSELVES.

THE HARDWARE PARAMETER DIALOGUE COMMENCES WITH THE QUESTION "# UNITS?" TO WHICH THE OPERATOR REPLIES WITH A DECIMAL NUMBER N FROM 1 TO 64. THE TERM "UNIT" REFERS TO THE DEVICE TO WHICH THIS SERIES OF DIAGNOSTICS IS DEDICATED. FOLLOWING THIS ARE THE QUESTIONS WHEREBY THE P-TABLES THEMSELVES WILL BE BUILT. EACH P-TABLE IS A CORE-RESIDENT TABLE CONTAINING
ALL THE HARDWARE INFORMATION FOR ONE UNIT. THE OPERATOR MUST SUPPLY N (NUMBER OF UNITS) VALUES FOR EACH QUESTION. HE MAY DO THIS BY GIVING ONE ANSWER TO EACH QUESTION (IN WHICH CASE THE SERIES OF QUESTIONS WILL BE POSED N TIMES) OR BY GIVING N VALUES, SEPARATED BY COMMAS, TO EACH QUESTION (SERIES WILL BE POSED ONCE). EACH QUESTION IS FOLLOWED BY THE RESPONSE RADIX (D FOR DECIMAL, B FOR BINARY, O FOR OCTAL, L FOR YES/NO) IN PARENTHESES AND THE DEFAULT VALUE AFTER THE PARENTHESES.

FOLLOWING THE HARDWARE QUESTIONS ARE THE SOFTWARE QUESTIONS TO BUILD THE SOFTWARE TABLES, WHICH DEFINE THE MODE (QUICK VERIFY ETC.) THAT THE DIAGNOSTIC WILL EXECUTE IN.

AT THE POINT WHERE THE QUESTION "# UNITS?" IS ANSWERED, CORE STORAGE IS ALLOCATED FOR THE P-TABLES, AND IF THERE IS NOT ENOUGH TO ACCOMMODATE THEM THE MESSAGE "TOO MANY UNITS" IS ISSUED. IN THIS CASE THE DIAGNOSTIC MUST BE EXECUTED MORE THAN ONCE TO TEST ALL UNITS.

EXAMPLE:

STA/TESTS:1:2-4:6:8-10/PASS:3/FLAGS:IER:HOE=1:UAM:LOE

THIS COMMAND WILL CAUSE THREE PASSES TO BE MADE, EACH PASS CONSISTING OF TESTS 1,2,3,4,6,8,9, AND 10 EXECUTED AGAINST ALL UNITS. THERE IS NO DIFFERENCE BETWEEN SAYING <FLAG> AND SAYING <FLAG=1>. THE NOTATION <FLAG=0> IS MEANINGFUL ONLY ON A COMMAND OTHER THAN START TO CLEAR A FLAG THAT WAS PREVIOUSLY SET. NOTE THAT ON ALL COMMANDS ONLY THE FIRST THREE LETTERS ARE SCANNED.

2.3.2 RESTART COMMAND

RES(TART)/TESTS:<TEST-LIST>/PASS:<PASS-CNT>/FLAGS:<FLAG-LIST>/UNITS:<UNIT-LIST>
****

2.3.2.1 TESTS, PASS, AND FLAGS SWITCHES

<TEST-LIST>, <PASS-CNT>, AND <FLAG-LIST> ARE AS IN THE START COMMAND.

2.3.2.2 UNITS SWITCH (/UNITS:<UNIT-LIST>)

<UNIT-LIST> IS A SEQUENCE OF DECIMAL NUMBERS (1,2 ETC.) OR RANGES OF DECIMAL NUMBERS (1-5, 8-10 ETC.) SEPARATED BY COLONS, INDICATING WHICH UNITS IT IS DESIRED BE TESTED. THE NUMBERS MAY RANGE FROM 1 THRU N (N IS THE NUMBER OF UNITS SPECIFIED IN THE PREVIOUS START COMMAND). THE NUMBER INDICATES THE POSITION OF THE P-TABLE AS THE DATA WAS ENTERED DURING THE HARDWARE DIAGLOGUE. THE UNITS WHICH ARE SELECTED MUST NOT HAVE BEEN DROPPED BY THE DROP COMMAND. SEE THE DISCUSSION OF ADD AND DROP COMMANDS BELOW. DEFAULT IS TO TEST ALL UNITS WHICH HAVE NOT BEEN DROPPED BY A DROP COMMAND.

2.3.2.3 EFFECT OF COMMAND

THE RESTART COMMAND DIFFERS FROM THE START COMMAND IN THAT THE P-TABLES FROM THE PREVIOUS START COMMAND (THERE MUST HAVE BEEN ONE) ARE USED, INSTEAD OF NEW ONES BEING BUILT. THE UNITS SWITCH GIVES THE ABILITY TO SELECT A SUBSET OF THESE. THE SOFTWARE DIALOGUE MAY OPTIONALLY BE RE-EXECUTED (OPERATOR WILL BE ASKED). THE COMMAND CAN BE USED AFTER COMMAND MODE HAS BEEN REENTERED IN ANY OF THE THREE NORMAL WAYS: A) THE REQUESTED NUMBER OF PASSES HAVE BEEN MADE B) AN ERROR WAS ENCOUNTERED WITH THE HALT ON ERROR FLAG SET C) A CONTROL/C WAS ENTERED BY THE OPERATOR.

2.3.3 CONTINUE COMMAND

****
CON(TINUE)/PASS:<PASS-CNT/FLAGS:<FLAG-LIST>
****

2.3.3.1 PASS SWITCH (/PASS:<PASS-CNT>)

<PASS-CNT> IS SAME AS IN START COMMAND, BUT THE DEFAULT IS THE UNSATISFIED PASS-CNT FROM THE PREVIOUS START OR RESTART. IF NONE REMAINS, THE DEFAULT IS NON-ENDING EXECUTION.

2.3.3.2 FLAG SWITCH (/FLAGS:<FLAG-LIST>)

<FLAG-LIST> IS SAME AS IN START COMMAND, BUT UNSPECIFIED FLAGS RETAIN THEIR CURRENT VALUE.

2.3.3.3 EFFECT OF COMMAND

CONTINUE MUST FOLLOW A START OR RESTART, AND COMMAND MODE MUST HAVE BEEN ENTERED DUE TO A HALT ON ERROR OR A CONTROL/C. THE EFFECT OF THE COMMAND IS TO GO TO THE BEGINNING OF THE TEST THAT WAS BEING EXECUTED WHEN THE HALT OR CONTROL/C TOOK PLACE. SOFTWARE DIALOGUE MAY OPTIONALLY BE REEXECUTED. HARDWARE PARAMETERS MAY NOT BE CHANGED.

2.3.4 PROCEED COMMAND

```
****************************
PRO(CEED)/FLAGS:<FLAG-LIST>
****************************
```

2.3.4.1 FLAGS SWITCH (/FLAGS:<FLAG-LIST>)

<FLAG-LIST> IS AS IN THE START COMMAND, BUT UNSPECIFIED FLAGS RETAIN THEIR CURRENT VALUE.

2.3.4.2 EFFECT OF COMMAND

PROCEED MUST FOLLOW A START, RESTART, OR CONTINUE. COMMAND MODE MUST HAVE BEEN ENTERED VIA A HALT ON ERROR. THE EFFECT OF THE COMMAND IS TO BEGIN EXECUTION AT THE LOCATION FOLLOWING THE ERROR CALL. NEITHER HARDWARE NOR SOFTWARE PARAMETERS MAY BE ALTERED.

2.3.5 CREATE CORE IMAGE COMMAND

```
************************************************************
CCI/TESTS:<TEST-LIST>/PASS:<PASS-CNT>/FLAGS:<FLAG-LIST>
************************************************************
```

2.3.5.1 TESTS, PASS, AND FLAGS SWITCHES

<TEST-LIST>, <PASS-CNT>, <FLAG-LIST>, AND ARE AS IN THE START COMMAND, EXCEPT THAT THE UAM (UNATTENDED MODE) FLAG DEFAULTS TO THE SET POSITION.

2.3.5.2 EFFECT OF COMMAND

THE PURPOSE OF THIS COMMAND IS TO CREATE A BIC FILE SUITABLE FOR CHAIN MODE EXECUTION. THE XXDP PROCEDURE IS AS FOLLOWS:

```
INVOKE THE XXDP UTILITY UPD1 OR UPD2
LOAD XXN:FILE.BIN
START 200
<QUESTIONS AND ANSWERS>
GET PTAB END MESSAGE
LET MACHINE COME TO HALT
RESTART UTILITY USING RESTART ADDRESS
CHANGE HICORE ADDRESS TO PTAB END VALUE
DUMP XXN:FILE.BIC
```

THE OPERATOR DIALOGUE (HARDWARE AND SOFTWARE) WILL BE EXECUTED AS IN THE START COMMAND, BUT AT THE END OF THE QUESTIONS THE HALT STATE WILL BE ENTERED, AT WHICH TIME THE OPERATOR SHOULD DUMP THE PROGRAM TO THE XXDP LIBRARY USING A BIC EXTENSION TO INDICATE THAT THIS FILE IS CHAINABLE. HE SHOULD USE THE XXDP UTILITY "UPD1" OR "UPD2" TO DO THIS. IF THE P-TABLES EXTEND BEYOND 14.5K, A MESSAGE WILL BE ISSUED GIVING THE NEW UPPER CORE LIMIT, TO WHICH THE OPERATOR MUST ADJUST BEFORE DUMPING. HE MAY NOW DELETE THE NON-CHAINABLE BIN FILE IF DESIRED, SINCE THE BIC FILE HAS ALL THE CAPABILITIES OF IT.

WHEN THIS BIC FILE IS SUBSEQUENTLY EXECUTED IN CHAIN MODE,
THE OPERATOR DIALOGUES WILL BE BYPASSED. HOWEVER, IF IT IS EXECUTED
STANDALONE, THE DIALOGUE WILL BE REISSUED.

NOTE THAT IF THE MESSAGE "TOO MANY UNITS" IS ISSUED, TWO OR MORE
CORE IMAGES MUST BE CREATED (WITH DIFFERENT NAMES) TO TEST ALL UNITS.

NOTE THAT ALTHOUGH THE CHAINABLE IMAGE CAN BE EXECUTED ON A
16K MACHINE, THE ORIGINAL CCI CREATION MUST BE DONE ON A
LARGER MACHINE, THE EXACT SIZE BEING DEPENDENT ON WHICH UPDATE
UTILITY IS USED.

2.3.6 ADD COMMAND

****
ADD/UNITS:<UNIT-LIST>
****

2.3.6.1 UNITS SWITCH (/UNITS:<UNIT-LIST>

<UNIT-LIST> IS AS IN THE RESTART COMMAND.

2.3.6.2 EFFECT OF COMMAND

THE UNITS SPECIFIED ARE ADDED TO THE TEST SEQUENCE. EACH UNIT
MUST HAVE A P-TABLE IN MEMORY DUE TO AN EARLIER HARDWARE DIALOGUE.
THIS COMMAND MUST BE FOLLOWED BY A RESTART OR CONTINUE. THE UNITS
SWITCH MUST BE SPECIFIED. THE ADD COMMAND IS MEANINGFUL ONLY FOR UNITS
THAT WERE PREVIOUSLY DROPPED.

2.3.7 DROP COMMAND

****
DRO(P)/UNITS:<UNIT-LIST>
****

2.3.7.1 UNITS SWITCH (/UNITS:<UNIT-LIST>)

<UNIT-LIST> IS AS IN THE RESTART COMMAND.

2.3.7.2 EFFECT OF COMMAND

THE UNITS SPECIFIED WILL BE DROPPED FROM TESTING. THE UNITS WILL
BE RESELECTED ONLY BY THE EXECUTION OF AN ADD OR START COMMAND.
THE UNITS SWITCH MUST BE ENTERED. THIS COMMAND MUST BE
FOLLOWED BY A RESTART OR A CONTINUE COMMAND.

2.3.8 PRINT COMMAND

****
PRI(NT)
****

2.3.8.1 EFFECT OF COMMAND

ISR (INHIBIT STATISTICAL REPORTING) FLAG IS CLEARED.

2.3.9 DISPLAY COMMAND

****
DIS(PLAY)/UNITS:<UNIT-LIST>
****

2.3.9.1 UNITS SWITCH (/UNITS:<UNIT-LIST>)

<UNIT-LIST> IS AS IN THE RESTART COMMAND.

2.3.9.2 EFFECT OF COMMAND

THE HARDWARE P-TABLES FOR ALL UNITS UNDER TEST ARE PRINTED OUT IN THE FORMAT IN WHICH THEY WERE ENTERED. ANY UNITS THAT WERE DROPPED BY THE OPERATOR "DROP" COMMAND ARE SO DESIGNATED.

2.3.10 FLAGS COMMAND

****
FLA(GS)
****

2.3.10.1 EFFECT OF COMMAND

THE CURRENT SETTINGS OF ALL FLAGS ARE PRINTED.

2.3.11 ZFLAGS COMMAND

****
ZFL(AGS)
****

2.3.11.1 EFFECT OF COMMAND

ALL FLAGS ARE CLEARED.

2.3.12 CONTROL CHARACTERS

A CONTROL C (↑C) ENTERED VIA THE CONSOLE DEVICE DURING THE EXECUTION OF A DIAGNOSTIC CAUSES A RETURN TO THE DIAGNOSTIC SUPERVISOR COMMAND MODE.

A CONTROL Z (↑Z) ENTERED WITHIN ONE OF THE THREE OPERATOR DIALOGS (HARDCORE,HARDWARE, OR SOFTWARE QUESTIONS) CAUSES TO DEFAULT VALUES TO BE TAKEN FOR THE REMAINDER OF THAT DIALOGUE.

A CONTROL O (↑O) ENTERED DURING THE EXECUTION OF A DIAGNOSTIC CAUSES ALL CONSOLE OUTPUT TO BE SUPPRESSED FOR THE REMAINDER OF THE DIAGNOSTIC OR UNTIL ANOTHER CONTROL O IS TYPED.

THE FOLLOWING QUESTIONS WILL BE ASKED ON A START COMMAND. THE VALUE LOCATED TO THE LEFT OF THE QUESTION MARK IS THE DEFAULT VALUE THAT WILL BE TAKEN ON A CARRIAGE RETURN RESPONSE.

RL11 (L) Y?

ANSWER YES(Y) IF YOU HAVE AN RL11 CONTROLLER, NO(N) IF YOU HAVE AN RLV11 CONTROLLER.

BUS ADDRESS (O) 174400?

ANSWER WITH THE BUS ADDRESS OF THE CONTROLLER.

VECTOR (O) 330?

ANSWER WITH THE INTERRUPT VECTOR OF THE CONTROLLER.

BR LEVEL (O) 5?

ANSWER WITH THE INTERRUPT PRIORITY OF THE CONTROLLER.

DRIVE (O) 0?

SINCE THIS PROGRAM RUNS WITHOUT A DRIVE,THIS QUESTION DOES NOT APPLY. THE HARDWARE QUESTION ON DRIVE NUMBER IS ASKED TO MAINTAIN COMPATIBILITY WITH THE RL11 PROGRAMS FOR CHAIN MODE.

WHEN TESTING MULTIPLE CONTROLLERS(0 TO 7),THE OPERATOR CAN RESPOND TO DRIVE NUMBER BY TYPING A NUMBER(0-7) FOR EACH CONTROLLER. THEN WHEN AN ERROR IS PRINTED,THE DRIVE NUMBER IN THE ERROR PRINTOUT WILL REFER TO THE NUMBER ASSIGNED THE CONTROLLER.

2.3.14 SOFTWARE PARAMETERS

THE FOLLOWING QUESTIONS ARE ASKED ON A START, RESTART OR CONTINUE IF THE QUESTION:

CHANGE SW?

IS ANSWERED YES(Y). THE QUESTIONS ARE:

DROP ON ERROR LIMIT (L) Y?

TO ALLOW THE UNIT TO BE DROPPED ONCE A PREDETERMINED NUMBER OF ERRORS ARE ENCOUNTERED.

ANSWER Y OR N

ERROR LIMIT (D) 10?

NUMBER OF ERRORS ALLOWED BEFORE DROPPING UNIT.

AUTOSIZE (L) N?

TO CHECK TO SEE IF UNIT SPECIFIED ACTUALLY EXISTS BEFORE TESTING IT (VIA DRIVE READY), IF NOT UNIT WILL NOT BE TESTED.

ANSWER Y OR N

2.3.15 EXTENDED DISCUSSION OF P-TABLE DIALOGUE

THE FULL CAPABILITY OF THE HARDWARE DIALOGUE IS REVEALED BY THE FOLLOWING DISCUSSION OF WHAT HAPPENS INTERNALLY.

AS SOON AS THE QUESTION "# UNITS?" IS ANSWERED (WITH THE NUMBER N, SAY) SPACE IN CORE IS ALLOCATED FOR N P-TABLES. ALL OF THE P-TABLES ARE OF THE SAME FORMAT, AND THERE IS A ONE-TO ONE CORRESPONDENCE BETWEEN THE HARDWARE PARAMETER QUESTIONS AND THE SLOTS IN THE P-TABLE FORMAT.

ON THE FIRST TRIP THRU THE QUESTIONS, ALL OF THE SLOTS IN ALL OF THE P-TABLES ARE FILLED. IF THE OPERATOR TYPES IN LESS THAN N EXPLICIT VALUES IN RESPONSE TO A PARTICULAR QUESTION, THESE VALUES ARE PLACED IN THE P-TABLES (ONE VALUE GOING INTO THE PROPER SLOT OF EACH P-TABLE BEGINNING WITH THE FIRST P-TABLE) UNTIL THE STRING OF VALUES IS EXHAUSTED. THE LAST VALUE OF THE STRING BECOMES THE NEW DEFAULT AND IS USED THEN AND THERE TO FILL THAT SLOT IN THE REMAINING P-TABLES.

ON SUBSEQUENT TRIPS THRU THE QUESTIONS, THE SAME PROCESS IS CARRIED OUT, EXCEPT THAT THE EARLIEST P-TABLE NOT TO HAVE RECEIVED AN EXPLICIT VALUE IN ANY OF ITS SLOTS NOW ASSUMES THE ROLE THAT TABLE NUMBER ONE PLAYED IN THE FIRST TRIP.

THE SERIES OF QUESTIONS IS REISSUED UNTIL AT LEAST ONE QUESTION HAS RECEIVED N EXPLICIT VALUES FROM THE OPERATOR.

IN GIVING A STRING OF VALUES, COMMAS WITHOUT INTERVENING VALUES MAY BE USED TO INDICATE A REPETITION OF THE LAST NAMED VALUE.

A STRING OF VALUES MAY BE GIVEN AS A RANGE (6-10 FOR EXAMPLE). IF THE VALUES REPRESENT PURE NUMERICAL DATA, THIS SAMPLE RANGE TRANSLATES TO THE STRING 6,7,8,9,10 (AN INCREMENT OF 1). IF THE VALUES ARE ADDRESSES, THE SAMPLE RANGE TRANSLATES TO THE STRING 6,8,10 (AN INCREMENT OF 2).

NOW LET US SEE HOW WE COULD USE THESE CAPABILITIES TO CONSTRUCT A SET OF P-TABLES. ASSUME THAT WE HAVE 64 UNITS, AND THAT THERE ARE THREE HARDWARE PARAMETERS FOR EACH (THREE SLOTS IN THE P-TABLE, THREE HARDWARE QUESTIONS IN THE DIALOGUE). LET THE DESIRED VALUE FOR THE FIRST PARAMETER BE THE NUMBER 75 FOR ALL 64 TABLES. LET THE DESIRED VALUE FOR THE SECOND PARAMETER BE EQUAL TO THE UNIT NUMBER (1,2,3,...,64) EXCEPT FOR UNIT 50, WHICH SHOULD RECEIVE THE VALUE 49. LET THE DESIRED VALUE FOR THE THIRD PARAMETER BE THE NUMBER 76 FOR THE FIRST 20 UNITS AND THE NUMBER 77 FOR THE LAST 44 UNITS.

THE FOLLOWING DIALOGUE WOULD ACCOMPLISH THIS GOAL:

UNITS (D) ? 64

UNIT 1

```
<QUESTION 2> ? 1-20
<QUESTION 3> ? 76

UNIT 21
<QUESTION 1> ?
<QUESTION 2> ? 21-49,,51-64
<QUESTION 3> ? 77
```

THE FIRST TIME THE SERIES IS ASKED, SLOT ONE RECEIVES A 75 IN ALL 64 TABLES. SLOT TWO RECEIVES THE VALUES 1,2,3,....20 IN TABLES 1 THRU 20 AND A CONSTANT 20 IN TABLES 21 THRU 64. SLOT THREE RECEIVES A CONSTANT 76 IN ALL 64 TABLES.

THE SECOND TIME THRU THE SERIES, TABLES 21 THRU THE END ARE GOING TO BE AFFECTED (NOTE THAT THIS PIECE OF INFORMATION IS PRINTED OUT FOR THE THE OPERATOR IN THE FORM "UNIT XX" AT THE BEGINNING OF EACH SERIES). QUESTION 1 IS RESPONDED TO BY A <CR>, SO SLOT ONE STAYS AT CONSTANT 75 IN TABLES 21 THRU 64, SINCE NO NEW EXLICIT VALUES ARE TYPED IN. SLOT TWO GETS THE VALUES 21,22,23,...,49 IN TABLES 21 THRU 49, AND GETS A 49 IN SLOT 50, AND GETS THE VALUES 51,52,53,...,64 IN TABLES 51 THRU 64. SLOT THREE GETS THE VALUE 77 IN TABLES 21 THRU 64.

THE DIALOGUE IS TERMINATED WHEN THE SOFTWARE RECOGNIZES THAT 64 EXPLICIT VALUES HAVE BEEN GIVEN FOR AT LEAST ONE QUESTION (NAMELY QUESTION 2).

2.4 EXECUTION TIMES

ONE PASS OF THE PROGRAM TAKES APPROXIMATELY 45 SECONDS.

3.0 ERROR INFORMATION

3.1 ERROR REPORTING

ALL ERROR INFORMATION IS PRINTED ON THE CONSOLE DECIVE. ERROR REPORTS ARE AIMED AT BEING SELF EXPLANATORY. THE GENERAL FORMAT IS:

```
CVRL?  XXX    ERR  YYYYY   TST  ZZZ   SUB  PPP   PC:  RRRRRR
```

WHERE:

?	IS	PROGRAM LETTER
XXX	IS	SFT - SOFT ERROR
		HRD - HARD ERROR
		DV FAT - DEVICE FATAL ERROR
		SYS FAT - SYSTEM FATAL ERROR
YYYYY	IS	THE ERROR NUMBER
ZZZ	IS	THE TEST NUMBER
PPP	IS	THE SUBTEST NUMBER
RRRRRR	IS	THE PROGRAM LISTING LOCATION

ERRORS GIVE THE REGISTER CONTENTS BEFORE AND AFTER THE ERROR ALONG WITH A ONE LINE DESCRIPTION AND RELEVENT DATA.

EXAMPLE:

```
ONE LINE DESCRIPTION
(OPTIONAL SECOND LINE)
(OPTIONAL THIRD LINE)
BEFORE COMMAND: CS:XXXXXX BA:XXXXXX DA:XXXXXX MP:XXXXXX
TIME OF ERROR:  CS:XXXXXX BA:XXXXXX DA:XXXXXX MP:XXXXXX XXXXXX
```

REGISTER DESCRIPTIONS CAN BE FOUND IN SECTION 5.0.
CS:CONTROL AND STATUS REGISTER
BA:BUS ADDRESS REGISTER
DA:DISK ADDRESS REGISTER
MP:MULTIPURPOSE REGISTER

NOTE: TO PREVENT EXTENSIVE PRINTOUTS ON BUFFER FAILURES USE THE "FLAG:IXE" (INHIBIT EXTENDED ERROR REPORTS) SUPERVISOR COMMAND.

EXAMPLE: DS-B>STA/FLAG:IXE OR DS-B>RES/FLAG:IXE

USE OF THIS FLAG WILL PRINT ONLY THE FIRST FAILURE ENCOUNTERED IN THE BUFFER.

3.2 ERROR HALTS

ERROR HALTS ARE SUPPORTED PER DESCRIBED IN THE PREVIOUS SECTION WITH /FLAG:HOE. THERE ARE NO OTHER HALTS.

4.0 PERFORMANCE AND PROGRESS REPORTS

4.1 PERFORMANCE REPORTS

THIS PROGRAM WILL NOT GIVE ANY PERFORMANCE REPORTS.

4.2 PROGRESS REPORTS

THIS PROGRAM WILL NOT GIVE ANY PROGRESS REPORTS.

5.0 DEVICE INFORMATION TABLES

THE RL11/RLV11 CONTROLLER HAS THE FOLLOWING FOUR(4) REGISTERS FOR CONTROL OF THE SUBSYSTEM.

RLCS - CONTROL AND STATUS REGISTER (XXXXX0)

BIT 15 - COMPOSITE ERROR
BIT 14 - DRIVE ERROR
BIT 13 - NON EXISTENT MEMORY ERROR

```
        - DATA LATE (WITH BIT 10 CLEAR)
BIT 11  - HEADER CRC (WITH BIT 10 SET)
        - DATA CRC (WITH BIT 10 CLEAR)
BIT 10  - OPERATION INCOMPLETE
BIT  9/8 - DRIVE SELECT (0-3)
BIT  7  - CONTROLLER READY
BIT  6  - INTERRUPT ENABLE
BIT  5  - EXTENDED BUS ADDRESS (BIT 17)
BIT  4  - EXTENDED BUS ADDRESS (BIT 16)
BIT 3-1 - FUNCTION CODE
          0 - NOP (PDP-11) MAINT (LSI-11)
          1 - WRITE CHECK
          2 - GET DRIVE STATUS
          3 - SEEK
          4 - READ HEADER
          5 - WRITE DATA
          6 - READ DATA
          7 - READ WITHOUT HEADER COMPARE

BIT  0 - DRIVE READY


RLBA - BUS ADDRESS REGISTER (XXXXX2)
------------------------------------

BITS 15-1 BUS ADDRESS OF DATA TRANSFER
BIT 0 SHOULD BE 0

RLDA - DISK ADDRESS REGISTER (XXXXX4)
-------------------------------------

FOR READ/WRITE FUNCTIONS
------------------------

BIT 15 - MUST BE ZERO(0)
BIT 14-7 - CYLINDER ADDRESS FOR TRANSFER
BIT 6 - SURFACE FOR TRANSFER
BIT 5-0 - SECTOR FOR TRANSFER (0-47)

FOR SEEK FUNCTION
-----------------

BIT 15 - MUST BE ZERO(0)
BIT 14-7 - DIFFERENCE TO NEW CYLINDER
BIT 6-5 - MUST BE ZERO(0)
BIT 4 - SURFACE
BIT 3 - MUST BE ZERO
BIT 2 - SEEK DIRECTION( 1 - IN / 0 - OUT )
BIT 1 - MUST BE ZERO
BIT 0 - MUST BE ONE(1)

FOR GET STATUS FUNCTION
-----------------------

BIT 15-4 - IGNORED SHOULD BE ZERO
BIT 3 - DRIVE RESET
BIT 2 - MUST BE ZERO
BIT 1 - MUST BE ONE
```

RLMP - MULTIPURPOSE REGISTER

FOR READ/WRITE FUNCTION

BIT 15 - 0 - WORD COUNT(TWO'S COMPLEMENT)

FOR READ AFTER MAINTENANCE FUNCTION

BIT 15-0
FIRST RLMP: CRC OF STARTING DISK ADDRESS VALUE+3
SECOND RLMP: CRC OF CRC OF STARTING DISK ADDRESS VALUE+4

FOR GET STATUS FUNCTION

HAS DRIVE STATUS

BIT 15 - WRITE DATA ERROR
BIT 14 - CURRENT HEAD ERROR(CHE)
BIT 13 - WRITE LOCK STATUS(WL)
BIT 12 - SEEK TIME OUT(SKTO)
BIT 11 - SPIN ERROR(SPE)
BIT 10 - WRITE GATE ERROR(WGE)
BIT 9 - VOLUME CHECK(VC)
BIT 8 - DRIVE SELECT ERROR(DSE)
BIT 7 - RESERVED(0)
BIT 6 - SURFACE
BIT 5 - COVER OPEN
BIT 4 - HEADS HOME
BIT 3 - BRUSHES HOME
BIT 2-0 -STATE BITS
0 - LOAD STATE
1 - SPIN UP
2 - BRUSH CYCLE
3 - LOAD HEADS
4 - SEEK - TRACK COUNTING
5 - SEEK - LINEAR MODE
6 - UNLOAD HEADS
7 - SPIN DOWN

5.0 TEST SUMMARIES

TEST 1 - RLCS WRITE ADDRESSABILITY

THIS TEST WILL CHECK THAT THE CONTROL AND STATUS REGISTER CAN BE ACCESSED. IF THE REGISTER CANNOT BE ACCESSED THE PROCESSOR WILL TRAP TO LOCATION 4, WHICH IS SET UP TO HANDLE THE TRAP.

THIS TEST WILL CHECK THAT THE BUS ADDRESS REGISTER CAN BE ACCESSED. IF THE REGISTER CANNOT BE ACCESSED THE PROCESSOR WILL TRAP TO LOCATION 4, WHICH IS SET UP TO HANDLE THE TRAP.

TEST 3 - RLDA WRITE ADDRESSABILITY

THIS TEST WILL CHECK THAT THE DISK ADDRESS REGISTER CAN BE ACCESSED. IF THE REGISTER CANNOT BE ACCESSED THE PROCESSOR WILL TRAP TO LOCATION 4, WHICH IS SET UP TO HANDLE THE TRAP.

TEST 4 - RLMP WRITE ADDRESSABILITY

THIS TEST WILL CHECK THAT THE MULTIPURPOSE REGISTER CAN BE ACCESSED. IF THE REGISTER CANNOT BE ACCESSED THE PROCESSOR WILL TRAP TO LOCATION 4, WHICH IS SET UP TO HANDLE THE TRAP.

TEST 5 - RLCS READ ADDRESSABILITY

THIS TEST WILL CHECK THAT THE CONTROL AND STATUS REGISTER CAN BE ACCESSED. IF THE REGISTER CANNOT BE ACCESSED THE PROCESSOR WILL TRAP TO LOCATION 4, WHICH IS SET UP TO HANDLE THE TRAP.

TEST 6 - RLBA READ ADDRESSABILITY

THIS TEST WILL CHECK THAT THE BUS ADDRESS REGISTER CAN BE ACCESSED. IF THE REGISTER CANNOT BE ACCESSED THE PROCESSOR WILL TRAP TO LOCATION 4, WHICH IS SET UP TO HANDLE THE TRAP.

TEST 7 - RLDA READ ADDRESSABILITY

THIS TEST WILL CHECK THAT THE DISK ADDRESS REGISTER CAN BE ACCESSED. IF THE REGISTER CANNOT BE ACCESSED THE PROCESSOR WILL TRAP TO LOCATION 4, WHICH IS SET UP TO HANDLE THE TRAP.

TEST 8 - RLMP READ ADDRESSABILITY

THIS TEST WILL CHECK THAT THE MULTIPURPOSE REGISTER CAN BE ACCESSED. IF THE REGISTER CANNOT BE ACCESSED THE PROCESSOR WILL TRAP TO LOCATION 4, WHICH IS SET UP TO HANDLE THE TRAP.

TEST 9 - BUS RESET OF RLCS

THIS TEST WILL VERIFY THAT THE BUS RESET OF THE PROCESSOR WILL CLEAR ALL BITS OF THE RLCS WITH THE EXCEPTION OF BIT 7 (CONTROLLER READY), BIT 0 (DRIVE READY) AND BIT 15 (COMPOSITE ERROR) WHICH WILL BE SET IF BIT 14 (DRIVE ERROR) IS SET.

TEST 10 - BUS RESET OF RLBA

THIS TEST WILL VERIFY THAT THE BUS RESET OF THE PROCESSOR WILL

TEST 11 - BUS RESET OF RLDA

THIS TEST WILL VERIFY THAT THE BUS RESET OF THE PROCESSOR WILL CLEAR ALL BITS OF THE RLDA.

TEST 12 - READ WRITE OF RLCS

THIS TEST WILL ATTEMPT TO WRITE RLCS BITS 9-1 AND READ THEM BACK. WALKING AND GROWING 0'S AND 1'S ARE USED. BIT 7 (CONTROLLER READY) IS ALWAYS WRITTEN AS A 1 SO NOT TO INITIATE A FUNCTION. BITS 15, 14 AND 0 ARE TREATED AS DON'T CARE FOR THIS TEST.

TEST 13 - READ WRITE OF RLBA

THIS TEST WILL ATTEMPT TO WRITE RLBA BITS 15-0 AND READ THEM BACK. WALKING AND GROWING 0'S AND 1'S ARE USED. BIT 0 ON A RL11 SHOULD ALWAYS COME BACK AS A 0, WHILE ON AN RLV11 IT IS LOADABLE.

TEST 14 - READ WRITE OF RLDA

THIS TEST WILL ATTEMPT TO WRITE RLDA BITS 15-0 AND READ THEM BACK. WALKING AND GROWING 0'S AND 1'S ARE USED.

TEST 15 - BIS OF RLCS

THIS TEST WILL USE THE 11 INSTRUCTION "BIS" TO SHOW THAT A READ-MODIFY-WRITE SEQUENCE OF THE RLCS WORKS. BITS 9-1 ARE USED, BIT SETTING IN WALKING AND GROWING 0'S AND 1'S. BIT 7 (CONTROLLER READY) IS ALWAYS SET. BITS 15, 14 AND 0 ARE DON'T CARES.

TEST 16 - BIC OF RLCS

THIS TEST WILL USE THE 11 INSTRUCTION "BIC" TO SHOW THAT A READ-MODIFY-WRITE SEQUENCE OF THE RLCS WORKS. BITS 9-1 ARE USED, BIT CLEARING IN WALKING AND GROWING 0'S AND 1'S. BIT 7 (CONTROLLER READY) IS ALWAYS SET. BITS 15, 14 AND 0 ARE DON'T CARES.

TEST 17 - BIS OF RLBA

THIS TEST WILL USE THE 11 INSTRUCTION "BIS" TO SHOW THAT A READ-MODIFY-WRITE SEQUENCE OF THE RLBA WORKS. BITS 15-0 ARE BIT SET USING GROWING AND WALKING 0'S AND 1'S. BIT 0 CANNOT SET ON A RL11, BUT CAN ON A RLV11.

TEST 18 - BIC OF RLBA

READ-MODIFY-WRITE SEQUENCE OF THE RLBA WORKS. BITS 15-0 ARE BIT CLEARED USING GROWING AND WALKING 0'S AND 1'S.

TEST 19 - BIS OF RLDA

THIS TEST WILL USE THE 11 INSTRUCTION "BIS" TO SHOW THAT A READ-MODIFY-WRITE SEQUENCE OF THE RLDA WORKS. BITS 15-0 ARE BIT SET USING GROWING AND WALKING 0'S AND 1'S.

TEST 20 - BIC OF RLDA

THIS TEST WILL USE THE 11 INSTRUCTION "BIC" TO SHOW THAT A READ-MODIFY-WRITE SEQUENCE OF THE RLDA WORKS. BITS 15-0 ARE BIT CLEARED USING GROWING AND WALKING 0'S AND 1'S.

TEST 21 - BUS RESET OF RLCS

THIS TEST WILL VERIFY THAT THE BUS RESET OF THE PROCESSOR WILL CLEAR ALL BITS OF THE RLCS WITH THE EXCEPTION OF BIT 7 (CONTROLLER READY), BIT 0 (DRIVE READY) AND BIT 15 (COMPOSITE ERROR) WHICH WILL BE SET IF BIT 14 (DRIVE ERROR) IS SET.

TEST 22 - BUS RESET OF RLBA

THIS TEST WILL VERIFY THAT THE BUS RESET OF THE PROCESSOR WILL CLEAR ALL BITS OF THE RLBA.

TEST 23 - BUS RESET OF RLDA

THIS TEST WILL VERIFY THAT THE BUS RESET OF THE PROCESSOR WILL CLEAR ALL BITS OF THE RLDA.

TEST 24 - UNIQUENESS OF RLCS

THIS TEST WILL VERIFY THAT WHEN THE RLCS (XXXXX0) IS ADDRESSED ONLY THAT REGISTER IS EFFECTED. BOTH THE RLBA AND THE RLDA ARE SET UP WITH KNOWN DATA, THE RLDA IS WRITTEN, THEN THE RLBA AND RLDA ARE VERIFIED THAT THEY DID NOT CHANGE.

TEST 25 - UNIQUENESS OF RLBA

THIS TEST WILL VERIFY THAT WHEN THE RLBA (XXXXX2) IS ADDRESSED ONLY THAT REGISTER IS EFFECTED. BOTH THE RLCS AND RLDA ARE WRITTEN WITH KNOWN DATA, THE RLBA IS WRITTEN, THEN THE RLCS AND RLDA ARE VERIFIED THAT THEY DID NOT CHANGE.

TEST 26 - UNIQUENESS OF RLDA

THIS TEST WILL VERIFY THAT WHEN THE RLDA (XXXXX4) IS ADDRESSED ONLY THAT REGISTER IS EFFECTED. BOTH THE RLCS AND RLBA ARE

AND RLBA ARE VERIFIED THAT THEY DID NOT CHANGE.

TEST 27 - UNIQUENESS OF RLMP

THIS TEST WILL VERIFY THAT WHEN THE RLMP (XXXXX6) IS ADDRESSED ONLY THAT REGISTER IS EFFECTED. THE RLCS, RLBA AND RLDA ARE WRITTEN WITH KNOW DATA. THE RLMP IS WRITTEN, THEN THE RLCS, RLBA AND RLDA ARE VERIFIED THAT THEY DID NOT CHANGE.

TEST 28 - NOOP FUNCTION (RL11 ONLY)

THIS TEST WILL VERIFY THE OPERATION OF THE NOOP (0) FUNCTION ON PDP-11'S ONLY, SINCE ON AN LSI-11 IT IS A MAINTENANCE FUNCTION. THE ABILITY OF CONTROLLER READY TO RESET AND NO ERRORS ARE CHECKED.

TEST 29 - TEST NOOP DOES NOTHING (RL11 ONLY)

THIS TEST WILL CHECK THAT THE NOOP FUNCTION WILL NOT DISTRUB ANY REGISTERS OF THE CONTROLLER.

TEST 30 - TEST OF INTERRUPT (RL11 ONLY)

THIS TEST WILL CAUSE AN INTERRUPT FROM THE CONTROLLER USING NOOP (RL11 ONLY) TO CHECK THE INTERRUPT LOGIC AND VECTOR.

TEST 31 - TEST PRIORITY BR LEVEL (RL11 ONLY)

THIS TEST WILL CHECK THAT THE PROPER PRIORITY IS ON THE BOARD. WE VERIFY THAT ABOVE THE LEVEL THE BOARD WILL NOT INTERRUPT AND BELOW IT, IT WILL.

TEST 32 - RLV11 MAINT. FORCED OPI TEST,LESS THAN 510 WORDS

PERFORM RLV11 MAINTENANCE FUNCTION 0 WITH LESS THAN 510 WORDS TO FORCE OPI ERROR. THE TEST SHOULD FORCE COMPOSITE ERROR (BIT 15),HEADER NOT FOUND(BIT 12) AND OPI(BIT 10). DRIVE ERROR IS IGNORED.

TEST 33 - RLV11 MAINT. FORCED OPI TEST,MORE THAN 511 WORDS

PERFORM RLV11 MAINTENANCE FUNCTION 0 WITH MORE THAN 511 WORDS TO FORCE OPI ERROR. THE TEST SHOULD FORCE COMPOSITE ERROR (BIT 15),HEADER NOT FOUND(BIT 12) AND OPI(BIT 10). DRIVE ERROR IS IGNORED.

TEST 34 - RLV11 MAINT. FORCED OPI TEST - INTERRUPT MODE

PERFORM TEST OF INTERRUPT BY ISSUING RLV11 MAINTENANCE FUNCTION 0 WITH MORE THAN 511 WORDS TO FORCE OPI ERROR. CHECK INTERRUPT OPERATION AND REPORT IF ERROR FOUND.

TEST 35 - RLV11 OPI TIMEOUT TEST

PERFORM RLV11 MAINTENANCE FUNCTION 0 WITH INTERRUPT MODE.
FORCE OPI TIMEOUT BY SETTING WORD COUNT TO -512 WORDS.
MEASURE OPI TIMEOUT AND COMPARE TO MIN. AND MAX. LIMITS.

TEST 36 - TEST RLV11 MAINT. FUNCTION -FLAG MODE

PERFORM RLV11 MAINTENANCE FUNCTION 0 (FLAG MODE) AND CHECK
DA AND BA REGISTERS FOR PROPER INCREMENT. CHECK
THE SERIAL WRITE/READ DATA PATHS BY READING OUT OF THE FIFO
VIA THE MP REGISTER THE CRC OF THE DA+3 AND THE CRC OF THE
CRC OF THE DA+4 AND COMPARING TO EXPECTED RESULTS. CHECK
THE TRANSFER OF 255 WORDS FROM BUF1 MEMORY THROUGH THE FIFO
INTO BUF2 MEMORY FOR PROPER DATA. CHECK THE PREVIOUSLY
WRITTEN DATA IN THE LAST WORD+1 OF BUF2 FOR A VALUE=123456
TO INSURE THAT THE DATA TRANSFER IN MAINTENANCE MODE WAS
NOT MORE THAN 255 WORDS.

TEST 37 - TEST RLV11 MAINT. FUNCTION -INTERRUPT MODE

PERFORM RLV11 MAINTENANCE FUNCTION 0 (INT. MODE) AND CHECK
DA AND BA REGISTERS FOR PROPER INCREMENT. CHECK
THE SERIAL WRITE/READ DATA PATHS BY READING OUT OF THE FIFO
VIA THE MP REGISTER THE CRC OF THE DA+3 AND THE CRC OF THE
CRC OF THE DA+4 AND COMPARING TO EXPECTED RESULTS. CHECK
THE TRANSFER OF 255 WORDS FROM BUF1 MEMORY THROUGH THE FIFO
INTO BUF2 MEMORY FOR PROPER DATA. CHECK THE PREVIOUSLY
WRITTEN DATA IN THE LAST WORD+1 OF BUF2 FOR A VALUE=123456
TO INSURE THAT THE DATA TRANSFER IN MAINTENANCE MODE WAS
NOT MORE THAN 255 WORDS.

TEST 38 - RLV11 FIFO ADDRESS TEST

TEST THAT FIFO OPERATES CORRECTLY. STORE ADDRESS PATTERN
IN BUF1 (0-255) WHICH CONTAINS A UNIQUE PATTERN IN EACH
LOCATION. PERFORM MAINTENANCE FUNCTION AND TEST BUF2 FOR
PROPER FIFO ADDRESSING.

TEST 39 - RLV11 FIFO ADDRESS COMPLEMENT TEST

TEST THAT FIFO ADDRESSES CORRECTLY. STORE THE ADDRESS COMPLEMENT
OF 0-255 INTO BUF1. PERFORM MAINTENANCE FUNCTION AND CHECK
BUF2 FOR PROPER FIFO ADDRESSING.

TEST 40 - TEST RLV11 MAINT. WITH COMPLEMENT DATA -INTERRUPT MODE

PERFORM RLV11 MAINT. FUNCTION WITH COMPLEMENT DATA IN BUF1.
CHECK DA AND BA REGISTERS FOR PROPER INCREMENT. CHECK
THE SERIAL WRITE/READ DATA PATHS BY READING OUT OF THE FIFO
VIA THE MP REGISTER THE CRC OF THE DA+3 AND THE CRC OF THE
CRC OF THE DA+4 AND COMPARING TO EXPECTED RESULTS. CHECK
THE TRANSFER OF 255 WORDS FROM BUF1 MEMORY THROUGH THE FIFO
INTO BUF2 MEMORY FOR PROPER DATA. CHECK THE PREVIOUSLY
WRITTEN DATA IN THE LAST WORD+1 OF BUF2 FOR A VALUE=123456
TO INSURE THAT THE DATA TRANSFER IN MAINTENANCE MODE WAS
NOT MORE THAN 255 WORDS.

TEST 41 - TEST RLV11 MAINT. WITH RANDOM DATA -INTERRUPT MODE

THE RANDOM PATTERN IS THE SAME FOR EACH CONTROLLER UNDER TEST.
THE RANDOM PATTERN WILL CHANGE AT END OF PASS.
THE RANDOM PATTERN WILL INIT AT START OR RESTART.
CHECK DA AND BA REGISTERS FOR PROPER INCREMENT. CHECK
THE SERIAL WRITE/READ DATA PATHS BY READING OUT OF THE FIFO
VIA THE MP REGISTER THE CRC OF THE DA+3 AND THE CRC OF THE
CRC OF THE DA+4 AND COMPARING TO EXPECTED RESULTS. CHECK
THE TRANSFER OF 255 WORDS FROM BUF1 MEMORY THROUGH THE FIFO
INTO BUF2 MEMORY FOR PROPER DATA. CHECK THE PREVIOUSLY
WRITTEN DATA IN THE LAST WORD+1 OF BUF2 FOR A VALUE=123456
TO INSURE THAT THE DATA TRANSFER IN MAINTENANCE MODE WAS
NOT MORE THAN 255 WORDS.

7.0 PROGRAM LISTING

```
                                .ENABLE AMA
                                .ENABLE ABS
                                .NLIST  ME,CND,MD

000000                          SVC
                000000          SVCINS=0
                000000          SVCTAG=0
                002000          .=2000


002000                                  POINTER BGNSFT,BGNSW,BGNDU,BGNAU

002000                          BGNMOD  MDHEDR

002000                                  HEADER  CVRLA,A,0,,,20.,RL01
002000          103                     .ASCII  @C@
002001          126                     .ASCII  @V@
002002          122                     .ASCII  @R@
002003          114                     .ASCII  @L@
002004          101                     .ASCII  @A@
002005          000                     .BYTE   0
002006          000                     .BYTE   0
002007          000                     .BYTE   0
002010          101                     .ASCII  @A@
002011          060                     .ASCII  @0@
002012  000000                          .WORD   0
002014  000024                          .WORD   20.
002016  027552                          .WORD   L$HARD
002020  027676                          .WORD   L$SOFT
002022  013314                          .WORD   L$HW
002024  013330                          .WORD   L$SW
002026  030114                          .WORD   L$LAST
002030  000000                          .WORD   0
002032  000000                          .WORD   0
002034  000000                          .WORD   0
002036  000000                          .WORD   0
002040  013340                          .WORD   L$DISPATCH
002042  000000                          .WORD   0
002044  000000                          .WORD   0
002046  000000                          .WORD   0
002050          002                     .BYTE   C$REVISION
002051          000                     .BYTE   C$EDIT
002052  000000                          .WORD
002054  000000                          .WORD
002056  000000                          .WORD   0
002060  000000                          .WORD   0
002062  000000                          .WORD   0
002064  002114                          .WORD   L$DVTYP
002066  000000                          .WORD   0
002070  002112                          .WORD   L$DR
002072  002112                          .WORD   L$DRST
002074  014212                          .WORD   L$AU
002076  014206                          .WORD   L$DU
```

```
                                        .WORD   14
002102  000000                          .WORD   0
002104  013462                          .WORD   LSINIT
002106  014144                          .WORD   LSCLEAN

002110                                  ENDMOD


002110                                  DEVREG
002110  000000                          .WORD   0
002112  000001                          .BLKW

002114                                  DEVTYP  <RL01>
002114  046122  030460      000         .ASCIZ  @RL01@
        002122                          .EVEN

                                .SBTTL  GLOBAL EQUATES
002122                          BGNMOD  GLBEQAT

002122                                  EQUALS

                                ;
                                ; BIT DIFINITIONS
                                ;
                                BIT15== 100000
                                BIT14== 40000
                                BIT13== 20000
                                BIT12== 10000
                                BIT11== 4000
                                BIT10== 2000
                                BIT09== 1000
                                BIT08== 400
                                BIT07== 200
                                BIT06== 100
                                BIT05== 40
                                BIT04== 20
                                BIT03== 10
                                BIT02== 4
                                BIT01== 2
                                BIT00== 1
                                ;
                                BIT9==  BIT09
                                BIT8==  BIT08
                                BIT7==  BIT07
                                BIT6==  BIT06
                                BIT5==  BIT05
                                BIT4==  BIT04
                                BIT3==  BIT03
                                BIT2==  BIT02
                                BIT1==  BIT01
                                BIT0==  BIT00
                                ;
                                ; EVENT FLAG DEFINITIONS
                                ;   EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
                                ;   EF16:EF01 AVAILABLE FOR PROGRAM USE
                                ;
```

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```
113  000040  EF.START==     32.     ;START COMMAND WAS ISSUED
114  000037  EF.RESTART==   31.     ;RESTART COMMAND WAS ISSUED
115  000036  EF.CONTINUE==  30.     ;CONTINUE COMMAND WAS ISSUED
116  000035  EF.NEW==       29.     ;A NEW PASS HAS BEEN STARTED
117  000034  EF.PWR==       28.     ;A POWER-FAIL/POWER-UP OCCURRED
118                          ;
119  000020  EF16==  16.
120  000017  EF15==  15.
121  000016  EF14==  14.
122  000015  EF13==  13.
123  000014  EF12==  12.
124  000013  EF11==  11.
125  000012  EF10==  10.
126  000011  EF09==  9.
127  000010  EF08==  8.
128  000007  EF07==  7
129  000006  EF06==  6
130  000005  EF05==  5
131  000004  EF04==  4
132  000003  EF03==  3
133  000002  EF02==  2
134  000001  EF01==  1
135                          ;
136                          ; PRIORITY LEVEL DEFINITIONS
137                          ;
138  000340  PRI07== 340
139  000300  PRI06== 300
140  000240  PRI05== 240
141  000200  PRI04== 200
142  000140  PRI03== 140
143  000100  PRI02== 100
144  000040  PRI01== 40
145  000000  PRI00== 0
146  000001  DRDY=BIT0              ;DRIVE READY (RLCS)
147  000100  INTEN=BIT6             ;INTERRUPT ENABLE (RLCS)
148  100000  ERR=BIT15              ;RL11 ERROR (RLCS)
149  040000  DERR=BIT14             ;RL01 DRIVE ERROR (RLCS)
150  002000  OPI=BIT10              ;OPERATION INCOMPLETE (RLCS)
151  000200  CRDY=BIT7              ;CONTROLLER READY (RLCS)
152  000040  BA17=BIT5              ;EXTENDED ADDRESS BIT 17 (RLCS)
153  000020  BA16=BIT4              ;EXTENDED ADDRESS BIT 16 (RLCS)
154  020000  NXM=BIT13              ;NON-EXISTANT MEMORY (RLCS)
155  000000  DS0=0                  ;DRIVE SELECT 0 (RLCS)
156  000400  DS1=BIT8               ;DRIVE SELECT 1 (RLCS)
157  001000  DS2=BIT9               ;DRIVE SELECT 2 (RLCS)
158  001400  DS3=BIT8!BIT9          ;DRIVE SELECT 3 (RLCS)
159  000000  NOOP0=0                ;FUNCTION-NOOP(0)-RL11
160  000016  NOOP7=BIT1!BIT2!BIT3   ;FUNCTION-NOOP(7)-RL11
161  000000  MAINT=0                ;MAINTENANCE FUNCTION-RLV11
162  000002  WRCHK=BIT1              ;WRITE CHECK FUNCTION
163  000004  GSTAT=BIT2             ;GET STATUS FUNCTION
164  000006  SEEK=BIT2!BIT1         ;SEEK FUNCTION
165  000010  RDHDR=BIT3             ;READ HEADER FUNCTION
166  000012  WRITE=BIT3!BIT1        ;WRITE DATA FUNCTION
167  000014  READ=BIT3!BIT2         ;READ DATA FUNCTION
168  000202  GODRVR=BIT1!BIT7       ;CRDY AND DRDY
```

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```
                        000010          DRST=BIT3               ;DRIVE RESET (RLDA)
                        000002          GSBIT=BIT1              ;GET STATUS BIT (RLDA)
                        000001          MK=BIT0                 ;MARKER BIT (RLDA)
                        000004          SIGN=BIT2               ;SIGN BIT (RLDA)
                        000100          RHHS=BIT6               ;HEAD SELECT IN READ HEADER
                        000100          STHS=BIT6               ;HEAD SELECT IN STATUS BACK
                        000020          DAHS=BIT4               ;HEAD SELECT IN SEEK

                                        ;OFFSET FOR HARDWARE P-TABLE

                        000000          CSR=0
                        000002          VECT=2
                        000004          PRIOR=4
                        000006          DRBT=6
                        000010          CNT=10

                                        ;OFFSET FOR SOFTWARE P-TABLE

                        000000          DLT=0
                        000002          ELT=2
                        000004          SIZE=4

002122                                  ENDMOD

                                        .SBTTL  GLOBAL DATA

002122                                  BGNMOD  GLBDAT

                                        .SBTTL  GLOBAL DATA

002122  000000          UUT:    .WORD   0
002124  000000          UNITST: .WORD   0
002126  000000          RLCS:   .WORD   0
002130  000000          RLBA:   .WORD   0
002132  000000          RLDA:   .WORD   0
002134  000000          RLMP:   .WORD   0
002136  000000          BCSR:   .WORD   0
002140  000000          BPRIOR: .WORD   0
002142  000000          BVEC:   .WORD   0
002144  000000          DRIVE:  .WORD   0               ;DRIVE UNDER TEST
002146  000000          B.CS:   .WORD   0
002150  000000          B.BA:   .WORD   0
002152  000000          B.DA:   .WORD   0
002154  000000          B.MP:   .WORD   0
002156  000000          DERFLG: .WORD
002160  000000          E.CS:   .WORD   0
002162  000000          E.BA:   .WORD   0
002164  000000          E.DA:   .WORD   0
002166  000000          E.MP:   .WORD   0
002170  000000          E.MP1:  .WORD   0
002172  000000          PFLG:   .WORD   0               ;PROCESSOR TYPE  0=UNIBUS  1=Q-BUS
002174  000000          TRPFLG: .WORD   0
002176  000000          INTFLG: .WORD   0               ;INTERRUPT OCCURANCE FLAG
002200  000000          LDCSR:  .WORD   0               ;LOCATION TO FORM RLCS
002202  120001          XPOLY:  .WORD   120001
002204  000004          ERRVEC: .WORD   4
```

```
                        GLOBAL DATA

002206  000000  BCCFBK: .WORD   0               ;LOCATION USED BY "SIMBCC"
002210  000000  CALBCC: .WORD   0               ;LOCATION USED BY "SIMBCC"
002212  000000  TEMP2:  .WORD   0               ;LOCATION USED BY "SIMBCC"
002214  000000  TEMP3:  .WORD   0               ;LOCATION USED BY "SIMBCC"
002216  000000  TEMP4:  .WORD   0               ;LOCATION USED BY "SIMBCC"
002220  000000  TEMP5:  .WORD   0
002222  000000  TEMP1:  .WORD   0
002224  000000  TMP0:   .WORD   0
002226  000000  TMP1:   .WORD   0
002230  000000  TMP2:   .WORD   0
002232  000000  CHECK:  .WORD   0
002234  000000  GDDAT:  .WORD   0
002236  000000  BDDAT:  .WORD   0
002240  000000  GCRCPT: .WORD   0
002242  000000  GDCRCA: .WORD   0
002244  000000  GDCRCB: .WORD   0
002246  000000  GDDATP: .WORD   0
002250  000000  GDATMP: .WORD   0
002252  000000  MATFLG: .WORD   0
002254  000000  ERRLMT: .WORD   0
002256  000000  WHY:    .WORD   0               ;REASON FOR DROP IN AUTOSIZE
002260  000000  T.CNTLR:       .WORD   0
002262  000000  TMPFNC: .WORD   0
002264  000233  OPIMN:  .WORD   155.
002266  001212  OPIMX:  .WORD   650.
002270  176543  HINUM:  .WORD   176543
002272  123456  LONUM:  .WORD   123456
002274  000000  TEMLO:  .WORD   0
002276  000000  TEMHI:  .WORD   0
002300  000000  PATSAV: .WORD   0
002302  000000  SAVCNT: .WORD   0

                        .SBTTL  PATTERNS FOR REGISTER R/W
                        ;
                        ;PATTERNS USED FOR LOADING/READING REGISTERS

002304  000000  BEGPAT: 0                       ;GROWING 1
002306  000001          1
002310  000003          3
002312  000007          7
002314  000017          17
002316  000037          37
002320  000077          77
002322  000177          177
002324  000377          377
002326  000777          777
002330  001777          1777
002332  003777          3777
002334  007777          7777
002336  017777          17777
002340  037777          37777
002342  077777          77777
002344  177777          177777
002346  177776          177776          ;GROWING 0
002350  177774          177774
002352  177770          177770
```

```
                                177760
                                177740
                                177700
                                177600
                                177400
                                177000
                                176000
                                174000
                                170000
                                160000
                                140000
                                100000

                                000000
                                1                       ;WALKING 1
                                2
                                4
                                10
                                20
                                40
                                100
                                200
                                400
                                1000
                                2000
                                4000
                                10000
                                20000
                                40000
                                100000
                                177777                  ;WALKING 0
                                177776
                                177775
                                177773
                                177767
                                177757
                                177737
                                177677
                                177577
                                177377
                                176777
                                175777
                                173777
                                167777
                                157777
                                137777
                                077777
                                177777
ENDPAT:                         000000

                        .SBTTL  PATTERNS FOR MAINT. CRC TEST OF SERIAL DATA PATH
PATCRC:                 155552
                        133330
                        066663
                        125247
```

```
337  002524  052522                    052522
338  002526  177774                    177774
339  002530  000374                    000374
340  002532  022217                    022217
341  002534  044441                    044441
342  002536  166663                    166663
343  002540  144441                    144441
344  002542  033330                    033330
345  002544  011106                    011106
346  002546  070704                    070704
347  002550  107065                    107065
348  002552  111106                    111106
349  002554  167353                    167353
350  002556  156732                    156732
351  002560  146311                    146311
352  002562  135670                    135670
353  002564  114626                    114626
354  002566  104205                    104205
355  002570  073564                    073564
356  002572  063143                    063143
357  002574  042101                    042101
358  002576  031460                    031460
359  002600  021037                    021037
360  002602  010416                    010416
361  002604  000000            CRCEND: 000000
362
363                          ;DATA PATTERNS FOR MAINTENANCE TEST
364  002606  155555            PATDAT: 155555
365  002610  133333                    133333
366  002612  066666                    066666
367  002614  125252                    125252
368  002616  052525                    052525
369  002620  177777                    177777
370  002622  000000                    000000
371  002624  107070                    107070
372  002626  070707                    070707
373  002630  144444                    144444
374  002632  033333                    033333
375  002634  011111                    011111
376  002636  022222                    022222
377  002640  044444                    044444
378  002642  111111                    111111
379  002644  166666                    166666
380  002646  010421                    010421
381  002650  021042                    021042
382  002652  031463                    031463
383  002654  042104                    042104
384  002656  063146                    063146
385  002660  073567                    073567
386  002662  104210                    104210
387  002664  114631                    114631
388  002666  135673                    135673
389  002670  146314                    146314
390  002672  156735                    156735
391  002674  167356                    167356
392  002676  000000            ENDDAT: 000000
```

```
                                        ;PATTERNS FOR TEST OF RLCS
002700  000000                  CSPAT:  .WORD   0               ;SHIFTING 1
002702  000002                          .WORD   BIT1
002704  000004                          .WORD   BIT2
002706  000010                          .WORD   BIT3
002710  000020                          .WORD   BIT4
002712  000040                          .WORD   BIT5
002714  000100                          .WORD   BIT6
002716  000400                          .WORD   BIT8
002720  001000                          .WORD   BIT9
002722  001576                          .WORD   1576            ;GROWING 0
002724  001574                          .WORD   1574
002726  001570                          .WORD   1570
002730  001560                          .WORD   1560
002732  001540                          .WORD   1540
002734  001500                          .WORD   1500
002736  001400                          .WORD   1400
002740  001576                          .WORD   1576            ;SHIFT 0
002742  001574                          .WORD   1574
002744  001566                          .WORD   1566
002746  001556                          .WORD   1556
002750  001536                          .WORD   1536
002752  001436                          .WORD   1436
002754  001136                          .WORD   1136
002756  000076                          .WORD   76
002760  000006                          .WORD   6               ;GROWING 1
002762  000016                          .WORD   16
002764  000036                          .WORD   36
002766  000076                          .WORD   76
002770  000176                          .WORD   176             ;
002772  000576                          .WORD   576
002774  001576                          .WORD   1576
002776  000000                  CSEND:  .WORD   0
003000  000240                  HDRBUF: .BLKW   160.

                                        .SBTTL  BUFFERS FOR RLV11 MAINTENANCE FUNCTION
003500  000400                  BUF1:   .BLKW   256.
004500  000400                  BUF2:   .BLKW   256.
005500                          ENDMOD

005500                          BGNMOD  GLBTXT
                                .SBTTL  GLOBAL TEXT

005500  047516  041440  047117  NORES:  .ASCIZ  /NO CONTROLLER/
005516  047516  042040  044522  NODRY:  .ASCIZ  /NO DRIVE CONNECTED/
005541     040  051104  000126  DEMES:  .ASCIZ  / DRV/
005546  047040  046530     000  NXMMES: .ASCIZ  / NXM/
005553     040  050117  000111  OPIMES: .ASCIZ  / OPI/
005560  044040  051103  000103  HCRCMES:.ASCIZ  / HCRC/
005566  044040  043116     000  HNFMES: .ASCIZ  / HNF/
005573     040  041504  000113  DCKMES: .ASCIZ  / DCK/
005600  042040  052114     000  DLTMES: .ASCIZ  / DLT/
005605     105  050130  042047  EXPMES: .ASCIZ  /EXP'D: COMP HNF OPI  REC'D: /
```

F03


```
005642  047516  042440  050130  NONMES: .ASCIZ  /NO EXPECTED ERRORS FOUND/
005673     015  000012          MSCRLF: .ASCIZ  <15><12>
005676  000015                  LF:     .ASCIZ  <15>
005700  041440  046517  000120  COMP:   .ASCIZ  / COMP/
005706  047506  041522  042105  OPIERR: .ASCIZ  /FORCED OPI(GET STATUS) CAUSED OTHER ERRORS/
005761     116  047517  020120  NOPMES: .ASCIZ  /NOOP OPERATION-FLAG MODE/
006012  047516  050117  047440  NOPINT: .ASCIZ  /NOOP OPERATION-INTR. MODE/
006044  040515  047111  042524  MATMES: .ASCIZ  /MAINTENANCE OPERATION-FLAG MODE/
006104  040515  047111  042524  MATINT: .ASCIZ  /MAINTENANCE OPERATION-INTERRUPT MODE/
006151     103  035123  000040  ARLCS:  .ASCIZ  /CS: /
006156  041040  035101  000040  ARLBA:  .ASCIZ  / BA: /
006164  042040  035101  000040  ARLDA:  .ASCIZ  / DA: /
006172  046440  035120  000040  ARLMP:  .ASCIZ  / MP: /
006200  042502  047506  042522  BEREG:  .ASCIZ  /BEFORE COMMAND: /
006221     124  046511  020105  AFREG:  .ASCIZ  /TIME OF ERROR:  /
006242  047503  052116  047522  CRTIM:  .ASCIZ  /CONTROLLER TIMED OUT/
006267     104  044522  042526  DRTIM:  .ASCIZ  /DRIVE READY TIMED OUT/
006315     103  047101  047040  EM1:    .ASCIZ  /CAN NOT ADDRESS RLCS/
006342  040503  020116  047516  EM2:    .ASCIZ  /CAN NOT ADDRESS RLBA/
006367     103  047101  047040  EM3:    .ASCIZ  /CAN NOT ADDRESS RLDA/
006414  040503  020116  047516  EM4:    .ASCIZ  /CAN NOT ADDRESS RLMP/
006441     122  041514  020123  EM5:    .ASCIZ  %RLCS READ/WRITE ERROR (BIT 0 DON'T CARE)%
006512  046122  040502  051040  EM6:    .ASCIZ  %RLBA READ/WRITE ERROR%
006540  046122  040504  051040  EM7:    .ASCIZ  %RLDA READ/WRITE ERROR%
006566  046122  040502  042440  EM10:   .ASCIZ  /RLBA ERROR AFTER MAINT. FUNCTION/
006627     117  044520  053440  EM11:   .ASCIZ  /OPI WOULD NOT GENERATE INTERRUPT/
006670  046122  040504  042440  EM12:   .ASCIZ  /RLDA ERROR AFTER MAINT. FUNCTION/
006731     116  020117  047111  EM13:   .ASCIZ  /NO INTERRUPT FROM NOOP(0)/
006763     116  047517  024120  EM14:   .ASCIZ  /NOOP(0) MODIFIED RLMP/
007011     116  047517  024120  EM15:   .ASCIZ  /NOOP(0) MODIFIED RLBA/
007037     116  047517  024120  EM16:   .ASCIZ  /NOOP(0) MODIFIED RLDA/
007065     111  052116  051105  EM17:   .ASCIZ  /INTERRUPT PRIORITY FAILURE/
007120  046122  050115  020072  EM20:   .ASCIZ  /RLMP: CRC OF DA+3 ERROR (SERIAL DATA PATH)/
007173     122  046514  035120  EM21:   .ASCIZ  /RLMP: CRC OF CRC OF DA+4 ERROR (SERIAL DATA PATH)/
007255     115  044501  052116  EM22:   .ASCIZ  %MAINT. FIL/EMPTY FIFO DMA DATA TRANSFER COMPARE ERROR%
007344  040515  047111  042524  EM23:   .ASCIZ  /MAINTENANCE LAST WORD+1 FAILURE/
007404  047516  044440  052116  EM24:   .ASCIZ  /NO INTERRUPT FROM MAINT. FUNCTION/
007446  040515  047111  042524  EM25:   .ASCIZ  /MAINTENANCE FIFO ADDRESS ERROR/
007505     115  044501  052116  EM26:   .ASCIZ  /MAINTENANCE FIFO ADDRESS COMPLEMENT ERROR/
007557     115  044501  052116  EM27:   .ASCIZ  /MAINT. FORCED OPI ERROR,LESS THAN 510 WORDS/
007633     115  044501  052116  EM30:   .ASCIZ  /MAINT. FORCED OPI ERROR,MORE THAN 511 WORDS/
007707     117  044520  052040  EM31:   .ASCIZ  /OPI TIMING ERROR/
007730  051127  052111  047111  EM44:   .ASCIZ  /WRITING RLMP MODIFIED RLCS/
007763     127  044522  044524  EM45:   .ASCIZ  /WRITING RLMP MODIFIED RLBA/
010016  051127  052111  047111  EM46:   .ASCIZ  /WRITING RLMP MODIFIED RLDA/
010051     102  052111  051440  EM61:   .ASCIZ  /BIT SET INSTRUCTION ON RLCS YIELDED WRONG RESULT/
010132  044502  020124  046103  EM62:   .ASCIZ  /BIT CLEAR INSTRUCTION ON RLCS YIELDED WRONG RESULT/
010215     102  052111  051440  EM63:   .ASCIZ  /BIT SET INSTRUCTION ON RLBA YIELDED WRONG RESULT/
010276  044502  020124  046103  EM64:   .ASCIZ  /BIT CLEAR INSTRUCTION ON RLBA YIELDED WRONG RESULT/
010361     102  052111  051440  EM65:   .ASCIZ  /BIT SET INSTRUCTION ON RLDA YIELDED WRONG RESULT/
010442  044502  020124  046103  EM66:   .ASCIZ  /BIT CLEAR INSTRUCTION ON RLDA YIELDED WRONG RESULT/
010525     102  051525  051040  EM67:   .ASCIZ  /BUS RESET DID NOT CLEAR RLCS/
010562  052502  020123  042522  EM70:   .ASCIZ  /BUS RESET DID NOT CLEAR RLBA/
010617     102  051525  051040  EM71:   .ASCIZ  /BUS RESET DID NOT CLEAR RLDA/
010654  051127  052111  047111  EM72:   .ASCIZ  /WRITING RLCS MODIFIED RLBA/
010707     127  044522  044524  EM73:   .ASCIZ  /WRITING RLCS MODIFIED RLDA/
```

```
        010742  051127  052111  047111  EM74:   .ASCIZ  /WRITING RLBA MODIFED RLCS/
        010774  051127  052111  047111  EM75:   .ASCIZ  /WRITING RLBA MODIFED RLDA/
        011026  051127  052111  047111  EM76:   .ASCIZ  /WRITING RLDA MODIFIED RLCS/
        011061     127  044522  044524  EM77:   .ASCIZ  /WRITING RLDA MODIFIED RLBA/
        011114  046122  051503  041440  EM101:  .ASCIZ  /RLCS CONTAINED FOLLOWING ERROR(S):  /
        011161  000170                   EM102:  .BLKB   120.

                011352                   .EVEN

   (0)  011352                           ENDMOD
   440
   441                                   .SBTTL  GLOBAL ERRORS
   442
   443  011352                           BGNMOD  GLBERR
   444
   445  011352                           BGNMSG  ERR0
   446
   447  011352  004737  012042                   JSR     PC,LINE1
   448  011356  004737  012076                   JSR     PC,LINE2
   449
   450  011362  004537  014216                   JSR     R5,CKERLT       ;CHECK ERROR LIMIT
   451  011366                                   ENDMSG
   452  011366                           L10000:
   453  011366  104023                           EMT     C$MSG
   454
   455  011370                           BGNMSG  ERR1
   456
   457  011370  004737  012042                   JSR     PC,LINE1
   458
   459  011374  004537  014216                   JSR     R5,CKERLT       ;CHECK ERROR LIMIT
   460  011400                                   ENDMSG
   461  011400                           L10001:
   462  011400  104023                           EMT     C$MSG
```

```
463
464  011402                                  BGNMSG  ERR2
465
466  011402  004737  012042                          JSR     PC,LINE1
467  011406                                          PRINTB  #FRMT4,GDDAT,BDDAT
468  011406  013746  002236                          MOV     BDDAT,-(SP)
469  011412  013746  002234                          MOV     GDDAT,-(SP)
470  011416  012746  012534                          MOV     #FRMT4,-(SP)
471  011422  012746  000003                          MOV     #3,-(SP)
472  011426  010600                                  MOV     SP,R0
473  011430  104014                                  EMT     C$PNTB
474  011432  062706  000010                          ADD     #10,SP
475  011436  004537  014216                          JSR     R5,CKERLT
476  011442                                          ENDMSG
477  011442                                  L10002:
478  011442  104023                                  EMT     C$MSG
479
480
481  011444                                  BGNMSG  ERR3
482  011444  004737  012042                          JSR     PC,LINE1
483  011450  004737  012076                          JSR     PC,LINE2
484  011454                                          PRINTB  #FRMT99
485  011454  012746  012655                          MOV     #FRMT99,-(SP)
486  011460  012746  00000:                          MOV     #1,-(SP)
487  011464  010600                                  MOV     SP,R0
488  011466  104014                                  EMT     C$PNTB
489  011470  062706  000004                          ADD     #4,SP
490  011474                                          PRINTB  #FRMT14,E.BA,E.DA,TMPO,GDDAT,BDDAT
491  011474  013746  002236                          MOV     BDDAT,-(SP)
492  011500  013746  002234                          MOV     GDDAT,-(SP)
493  011504  013746  002224                          MOV     TMPO,-(SP)
494  011510  013746  002164                          MOV     E.DA,-(SP)
495  011514  013746  002162                          MOV     E.BA,-(SP)
496  011520  012746  013217                          MOV     #FRMT14,-(SP)
497  011524  012746  000006                          MOV     #6,-(SP)
498  011530  010600                                  MOV     SP,R0
499  011532  104014                                  EMT     C$PNTB
500  011534  062706  000016                          ADD     #16,SP
501  011540  004537  014216                          JSR     R5,CKERLT
502  011544                                          ENDMSG
503  011544                                  L10003:
504  011544  104023                                  EMT     C$MSG
505
506
507
508  011546                                  BGNMSG  ERR4
509
510  011546  004737  012042                          JSR     PC,LINE1
511  011552  004737  012076                          JSR     PC,LINE2
512  011556                                          PRINTB  #FRMT4,GDDAT,BDDAT
513  011556  013746  002236                          MOV     BDDAT,-(SP)
514  011562  013746  002234                          MOV     GDDAT,-(SP)
515  011566  012746  012534                          MOV     #FRMT4,-(SP)
516  011572  012746  000003                          MOV     #3,-(SP)
517  011576  010600                                  MOV     SP,R0
518  011600  104014                                  EMT     C$PNTB
```

```
519  011602  062706  000010                ADD     #10,SP
520
521  011606  004537  014216                JSR     R5,CKERLT       ;CHECK ERROR LIMIT
522  011612                                ENDMSG
523  011612                          L10004:
524  011612  104023                        EMT     C$MSG
525
526  011614                          BGNMSG  ERR5
527
528  011614  004737  012042                JSR     PC,LINE1
529
530  011620  004537  014216                JSR     R5,CKERLT       ;CHECK ERROR LIMIT
531  011624                                ENDMSG
532  011624                          L10005:
533  011624  104023                        EMT     C$MSG
534
535  011626                          BGNMSG  ERR6
536
537  011626  004737  012042                JSR     PC,LINE1
538  011632  004737  012314                JSR     PC,LINE3
539  011636  004737  012076                JSR     PC,LINE2
540
541
542  011642                          1$:     PRINTB  #FRMT99
543  011642  012746  012655                MOV     #FRMT99,-(SP)
544  011646  012746  000001                MOV     #1,-(SP)
545  011652  010600                        MOV     SP,R0
546  011654  104014                        EMT     C$PNTB
547  011656  062706  000004                ADD     #4,SP
548  011662  004537  014216                JSR     R5,CKERLT       ;CHECK ERROR LIMIT
549  011666                                ENDMSG
550  011666                          L10006:
551  011666  104023                        EMT     C$MSG
552
553  011670                          BGNMSG  ERR7
554
555  011670  004737  012042                JSR     PC,LINE1
556  011674                                PRINTB  #FRMT6,BDDAT
557  011674  013746  002236                MOV     BDDAT,-(SP)
558  011700  012746  012731                MOV     #FRMT6,-(SP)
559  011704  012746  000002                MOV     #2,-(SP)
560  011710  010600                        MOV     SP,R0
561  011712  104014                        EMT     C$PNTB
562  011714  062706  000006                ADD     #6,SP
563
564  011720  004537  014216                JSR     R5,CKERLT
565                                        ENDMSG
566  011724                          L10007:
567  011724
568  011724  104023                        EMT     C$MSG
569
570  011726                          BGNMSG  ERR10
571  011726  004737  012042                JSR     PC,LINE1
572  011732  004737  012076                JSR     PC,LINE2
573  011736  004737  012366                JSR     PC,LINE4
574  011742                                PRINTB  #FRMT99
```

```
                                GLOBAL ERRORS

                                        MOV     #FRMT99,-(SP)
                                        MOV     #1,-(SP)
                                        MOV     SP,R0
                                        EMT     C$PNTB
                                        ADD     #4,SP
                                        JSR     R5,CKERLT
                                        ENDMSG
                                L10010:
                                        EMT     C$MSG

                                BGNMSG  ERR11
                                        JSR     PC,LINE1
                                        JSR     PC,LINE2
                                        PRINTB  #FRMT10,OPIMN,OPIMX,BDDAT
                                        MOV     BDDAT,-(SP)
                                        MOV     OPIMX,-(SP)
                                        MOV     OPIMN,-(SP)
                                        MOV     #FRMT10,-(SP)
                                        MOV     #4,-(SP)
                                        MOV     SP,R0
                                        EMT     C$PNTB
                                        ADD     #12,SP
                                        JSR     R5,CKERLT
                                        ENDMSG
                                L10011:
                                        EMT     C$MSG


012042                          LINE1:  PRINTB  #FRMT1,RLCS,<B,DRIVE+1>
012042  005046                          CLR     -(SP)
012044  153716  002145                  BISB    DRIVE+1,(SP)
012050  013746  002126                  MOV     RLCS,-(SP)
012054  012746  012414                  MOV     #FRMT1,-(SP)
012060  012746  000003                  MOV     #3,-(SP)
012064  010600                          MOV     SP,R0
012066  104014                          EMT     C$PNTB
012070  062706  000010                  ADD     #10,SP
012074  000207                          RTS     PC

012076                          LINE2:  PRINTB  #FRMT2,#BEREG,#ARLCS,B.CS,#ARLBA,B.BA
012076  013746  002150                  MOV     B.BA,-(SP)
012102  012746  006156                  MOV     #ARLBA,-(SP)
012106  013746  002146                  MOV     B.CS,-(SP)
012112  012746  006151                  MOV     #ARLCS,-(SP)
012116  012746  006200                  MOV     #BEREG,-(SP)
012122  012746  012454                  MOV     #FRMT2,-(SP)
012126  012746  000006                  MOV     #6,-(SP)
012132  010600                          MOV     SP,R0
012134  104014                          EMT     C$PNTB
012136  062706  000016                  ADD     #16,SP
012142                                  PRINTB  #FRMT2A,#ARLDA,B.DA,#ARLMP,B.MP
012142  013746  002154                  MOV     B.MP,-(SP)
012146  012746  006172                  MOV     #ARLMP,-(SP)
012152  013746  002152                  MOV     B.DA,-(SP)
012156  012746  006164                  MOV     #ARLDA,-(SP)
012162  012746  012473                  MOV     #FRMT2A,-(SP)
```

```
631  012166  012746  000005          MOV     #5,-(SP)
632  012172  010600                  MOV     SP,R0
633  012174  104014                  EMT     C$PNTB
634  012176  062706  000014          ADD     #14,SP
635  012202                          PRINTB  #FRMT2,#AFREG,#ARLCS,E.CS,#ARLBA,E.BA
636  012202  013746  002162          MOV     E.BA,-(SP)
637  012206  012746  006156          MOV     #ARLBA,-(SP)
638  012212  013746  002160          MOV     E.CS,-(SP)
639  012216  012746  006151          MOV     #ARLCS,-(SP)
640  012222  012746  006221          MOV     #AFREG,-(SP)
641  012226  012746  012454          MOV     #FRMT2,-(SP)
642  012232  012746  000006          MOV     #6,-(SP)
643  012236  010600                  MOV     SP,R0
644  012240  104014                  EMT     C$PNTB
645  012242  062706  000016          ADD     #16,SP
646  012246                          PRINTB  #FRMT2B,#ARLDA,E.DA,#ARLMP,E.MP,E.MP1
647  012246  013746  002170          MOV     E.MP1,-(SP)
648  012252  013746  002166          MOV     E.MP,-(SP)
649  012256  012746  006172          MOV     #ARLMP,-(SP)
650  012262  013746  002164          MOV     E.DA,-(SP)
651  012266  012746  006164          MOV     #ARLDA,-(SP)
652  012272  012746  012506          MOV     #FRMT2B,-(SP)
653  012276  012746  000006          MOV     #6,-(SP)
654  012302  010600                  MOV     SP,R0
655  012304  104014                  EMT     C$PNTB
656  012306  062706  000016          ADD     #16,SP
657  012312  000207                  RTS     PC
658
659  012314                  LINE3:  PRINTB  #FRMT3,#EM101
660  012314  012746  011114          MOV     #EM101,-(SP)
661  012320  012746  012527          MOV     #FRMT3,-(SP)
662  012324  012746  000002          MOV     #2,-(SP)
663  012330  010600                  MOV     SP,R0
664  012332  104014                  EMT     C$PNTB
665  012334  062706  000006          ADD     #6,SP
666  012340                          PRINTB  #FRMT3,#EM102
667  012340  012746  011161          MOV     #EM102,-(SP)
668  012344  012746  012527          MOV     #FRMT3,-(SP)
669  012350  012746  000002          MOV     #2,-(SP)
670  012354  010600                  MOV     SP,R0
671  012356  104014                  EMT     C$PNTB
672  012360  062706  000006          ADD     #6,SP
673  012364  000207                  RTS     PC
674
675  012366                  LINE4:  PRINTB  #FRMT3,#EM102
676  012366  012746  011161          MOV     #EM102,-(SP)
677  012372  012746  012527          MOV     #FRMT3,-(SP)
678  012376  012746  000002          MOV     #2,-(SP)
679  012402  010600                  MOV     SP,R0
680  012404  104014                  EMT     C$PNTB
681  012406  062706  000006          ADD     #6,SP
682  012412  000207                  RTS     PC
683
684
     012414  040445  047503  052116  FRMT1:  .ASCIZ  /%ACONTROLLER: %06%A  DRIVE: %01/
     012454  047045  052045  052045  FRMT2:  .ASCIZ  /%N%T%T%06%T%06/
```

```
012473  045   022524  033117  FRMT2A: .ASCIZ  /%T%O6%T%O6/
012506  052045  047445  022466  FRMT2B: .ASCIZ  /%T%O6%T%O6%A %O6/
012527  045   022516  000124  FRMT3:  .ASCIZ  /%N%T/
012534  047045  040445  054105  FRMT4:  .ASCIZ  /%N%AEXP'D: %O6%A REC'D: %O6%N/
012572  047045  042045  022463  FRMT9B: .ASCIZ  /%N%D3%A WORDS BAD OUT OF 255 WORDS TRANSFERRED%N%N/
012655  045   000116          FRMT99: .ASCIZ  /%N/
012660  047045  040445  040514  FRMT5:  .ASCIZ  /%N%ALAST: %O6%A PRES: %O6%A EXP'D: %O6%N/
012731  045   022516  040501  FRMT6:  .ASCIZ  /%N%AAT PROCESSOR LEVEL %O6%N/
012766  047045  040445  040522  FRMT10: .ASCIZ  /%N%ARANGE %D3%A - %D3%A  MILLISECONDS WAS %D6%N/
013046  040445  051105  047522  FRMT11: .ASCIZ  /%AERROR LIMIT EXCEEDED-DROPPED%N/
013107  045   022516  042101  FRMT12: .ASCIZ  /%N%ADRIVE DID NOT RECOVER FROM POWER FAILURE%N/
013166  047045  052045  040445  FRMT13: .ASCIZ  /%N%T%A - WILL NOT TEST%N/
013217  045   041101  035101  FRMT14: .ASCIZ  /%ABA: %O6%A DA: %O6%A ADDR: %O6%A EXP'D: %O6%A REC'D %O6%N/

                              .EVEN


685
686
687  013312                   ENDMOD
688
689  013312                   BGNMOD  HPTCODE
690
691  013312                   BGNHW
692  013312  000005           .WORD   L10012-L$HW/2
693  013314  174400           .WORD   174400          ;CSR
694  013316  000330           .WORD   330             ;VECTOR
695  013320  000240           .WORD   240             ;PRIORITY
696  013322  000000           .WORD   0               ;DRIVE (BITS 8,9,10)
697  013324  000001           .WORD   1               ;RL11 = 1, RLV11 = 0
698
699  013326                   ENDHW
700  013326                   L10012:
701
702  013326                   ENDMOD
703
704  013326                   BGNMOD  SPTCODE
705
706  013326                   BGNSW
707  013326  000003           .WORD   L10013-L$SW/2
708
709  013330  000000           DROP:   .WORD   0
710  013332  000012           MERLMT: .WORD   10.
711  013334  000000           T.SIZE: .WORD   0
712
713  013336                   ENDSW
714  013336                   L10013:
715
716  013336                   ENDMOD
717
718  013336                   BGNMOD  DSPCODE
719
720  013336                   DISPATCH        41
721  013336  000051           .WORD   41
722  013340  016432           .WORD   T1
```

```
723  013342  016530                          .WORD   T2
724  013344  016626                          .WORD   T3
725  013346  016724                          .WORD   T4
726  013350  017022                          .WORD   T5
727  013352  017116                          .WORD   T6
728  013354  017212                          .WORD   T7
729  013356  017306                          .WORD   T8
730  013360  017402                          .WORD   T9
731  013362  017512                          .WORD   T10
732  013364  017564                          .WORD   T11
733  013366  017622                          .WORD   T12
734  013370  017742                          .WORD   T13
735  013372  020044                          .WORD   T14
736  013374  020132                          .WORD   T15
737  013376  020256                          .WORD   T16
738  013400  020402                          .WORD   T17
739  013402  020506                          .WORD   T18
740  013404  020606                          .WORD   T19
741  013406  020676                          .WORD   T20
742  013410  020776                          .WORD   T21
743  013412  021106                          .WORD   T22
744  013414  021160                          .WORD   T23
745  013416  021216                          .WORD   T24
746  013420  021342                          .WORD   T25
747  013422  021502                          .WORD   T26
748  013424  021642                          .WORD   T27
749  013426  022046                          .WORD   T28
750  013430  022076                          .WORD   T29
751  013432  022302                          .WORD   T30
752  013434  022366                          .WORD   T31
753  013436  022532                          .WORD   T32
754  013440  022642                          .WORD   T33
755  013442  022752                          .WORD   T34
756  013444  023106                          .WORD   T35
757  013446  023436                          .WORD   T36
758  013450  024250                          .WORD   T37
759  013452  025126                          .WORD   T38
760  013454  025474                          .WORD   T39
761  013456  026046                          .WORD   T40
762  013460  026724                          .WORD   T41
763
764  013462                                  ENDMOD
765
766                              .SBTTL  INITIALIZATION CODE
767  013462                      BGNMOD  INITCODE
768
769  013462                              BGNINIT
770
771  013462                              BRESET
772  013462  104033                      EMT     C$RESET
773  013464                              READEF  #EF.PWR                 ;POWER UP?????
774  013464  012700  000034              MOV     #EF.PWR,R0
775  013470  104050                      EMT     C$REFG
776  013472                              BCOMPLETE       CONT            ;BRANCH
777  013472  103501                      BCS     CONT
778  013474                      NOPWR:  READEF  #EF.RESTART             ;RESTART?
```

```
 779  013474  012700  000037                    MOV     #EF.RESTART,R0
 780  013500  104050                            EMT     CSREFG
 781  013502                                    BCOMPLETE START
 782  013502  103411                            BCS     START
 783  013504                                    READEF  #EF.START               ;START?
 784  013504  012700  000040                    MOV     #EF.START,R0
 785  013510  104050                            EMT     CSREFG
 786  013512                                    BCOMPLETE       START
 787  013512  103405                            BCS     START
 788  013514                                    READEF  #EF.NEW                 ;NEW PASS????
 789  013514  012700  000035                    MOV     #EF.NEW,R0
 790  013520  104050                            EMT     CSREFG
 791  013522                                    BCOMPLETE       START1          ;YES,THEN RE INIT
 792  013522  103411                            BCS     START1
 793  013524  000425                            BR      CONTINUE
 794  013526  012737  176543  002270  START:    MOV     #176543,HINUM           ;RANDOM GEN. PRIME
 795  013534  012737  123456  002272            MOV     #123456,LONUM           ;RANDOM GEN. PRIME
 796  013542  005037  002254                    CLR     ERRLMT                  ;CLEAR ERROR LIMIT
 797  013546  013737  002012  002122  START1:   MOV     LSUNIT,UUT
 798  013554  012737  177777  002124            MOV     #-1,UNITST
 799  013562  013737  002272  002274            MOV     LONUM,TEMLO
 800  013570  013737  002270  002276            MOV     HINUM,TEMHI             ;NEW PRIMES AT END OF PASS
 801  013576  000404                            BR      NXT
 802
 803  013600                            CONTINUE:       READEF  #EF.CONTINUE    ;CONTINUE????
 804  013600  012700  000036                    MOV     #EF.CONTINUE,R0
 805  013604  104050                            EMT     CSREFG
 806  013606                                    BCOMPLETE       CONT
 807  013606  103433                            BCS     CONT
 808
 809  013610  005737  002122            NXT:    TST     UUT                     ;DONE ALL UUT'S
 810  013614  001006                            BNE     1$                      ;NO
 811  013616  012737  177777  002124            MOV     #-1,UNITST
 812  013624  013737  002012  002122            MOV     LSUNIT,UUT
 813
 814  013632  005237  002124            1$:     INC     UNITST
 815  013636  005337  002122                    DEC     UUT
 816  013642                            REST:   GPHARD  UNITST,R0
 817  013642  013700  002124                    MOV     UNITST,R0
 818  013646  104042                            EMT     CSGPHRD
 819  013650                                    BNCOMPLETE      NXT
 820  013650  103357                            BCC     NXT
 821  013652  012037  002136            1$:     MOV     (R0)+,BCSR
 822  013656  012037  002142                    MOV     (R0)+,BVEC
 823  013662  012037  002140                    MOV     (R0)+,BPRIOR
 824  013666  012037  002144                    MOV     (R0)+,DRIVE
 825  013672  012037  002260                    MOV     (R0)+,T.CNTLR   ;GET CONTROLLER TYPE
 826
 827  013676  013737  002274  002272  CONT:     MOV     TEMLO,LONUM             ;RESTORE RANDOM FOR NEXT UUT
 828  013704  013737  002276  002270            MOV     TEMHI,HINUM             ;RESTORE PRIME FOR NEXT UUT
 829  013712  013700  002136                    MOV     BCSR,R0
 830  013716  010037  002126                    MOV     R0,RLCS
 831  013722  062700  000002                    ADD     #2,R0
 832  013726  010037  002130                    MOV     R0,RLBA
 833  013732  062700  000002                    ADD     #2,R0
 834  013736  010037  002132                    MOV     R0,RLDA
```

```
 835  013742  062700  000002                ADD     #2,R0
 836  013746  010037  002134                MOV     R0,RLMP
 837  013752  005737  013334                TST     T.SIZE          ;DO WE WANT TO CHECK UNITS??
 838  013756  001450                        BEQ     END             ;NO
 839
 840  013760  005037  002174                CLR     TRPFLG          ;CLR OUT TRAP FLAG
 841  013764                                SETVEC  ERRVEC,#TRPHAN,#340 ;SETUP VECTOR TO CATCH NON-EXIST
 842  013764  012746  000340                MOV     #340,-(SP)
 843  013770  012746  016264                MOV     #TRPHAN,-(SP)
 844  013774  013746  002204                MOV     ERRVEC,-(SP)
 845  014000  012746  000003                MOV     #3,-(SP)
 846  014004  104037                        EMT     C$$VEC
 847  014006  062706  000010                ADD     #10,SP
 848  014012  005777  166110                TST     @RLCS           ;ACCESS CONTROLLER
 849  014016                                CLRVEC  ERRVEC          ;RELEASE VECTOR
 850  014016  013700  002204                MOV     ERRVEC,R0
 851  014022  104036                        EMT     C$CVEC
 852  014024  005737  002174                TST     TRPFLG          ;DID IT TRAP
 853  014030  001423                        BEQ     END
 854  014032  012737  005500  002256        MOV     #NORES,WHY      ;SETUP ERR MESS
 855  014040                        8$:     PRINTB  #FRMT13,WHY
 856  014040  013746  002256                MOV     WHY,-(SP)
 857  014044  012746  013166                MOV     #FRMT13,-(SP)
 858  014050  012746  000002                MOV     #2,-(SP)
 859  014054  010600                        MOV     SP,R0
 860  014056  104014                        EMT     C$PNTB
 861  014060  062706  000006                ADD     #6,SP
 862  014064  004737  012042        6$:     JSR     PC,LINE1        ;GIVE DRIVE INFO
 863  014070                                DODU    UNITST          ;TELL SUPERVISOR TO DROP IT
 864  014070  013700  002124                MOV     UNITST,R0
 865  014074  104053                        EMT     C$DODU
 866  014076                                DOCLN                   ;FORCE AN ABORT
 867  014076  104044                        EMT     C$DCLN
 868  014100                        END:    SETVEC  BVEC,#INTSRV,#340
 869  014100  012746  000340                MOV     #340,-(SP)
 870  014104  012746  016272                MOV     #INTSRV,-(SP)
 871  014110  013746  002142                MOV     BVEC,-(SP)
 872  014114  012746  000003                MOV     #3,-(SP)
 873  014120  104037                        EMT     C$$VEC
 874  014122  062706  000010                ADD     #10,SP
 875  014126  005037  002172                CLR     PFLG            ;CLR PROCESSOR FLAG
 876  014132                                READBUS                 ;Q-BUS
 877  014132  104007                        EMT     C$RDBU
 878  014134                                BNCOMPLETE      1$
 879  014134  103002                        BCC     1$
 880  014136  005237  002172                INC     PFLG            ;NO, Q-BUS THEN
 881  014142                        1$:
 882  014142                                ENDINIT
 883  014142                        L10014:
 884  014142  104011                        EMT     C$INIT
 885
 886  014144                                ENDMOD
 887
 888  014144                        BGNMOD  CLNCODE
 889
 890  014144                                BGNCLN
```

```
                                                        SETPRI  #PRIOO
014144                                                  MOV     #PRIOO,RO
014144  012700  000000                                  EMT     C$SPRI
014150  104041
014152  032777  000200  165746                  1$:     BIT     #CRDY,@RLCS
014160  001774                                          BEQ     1$
                                                        SETPRI  #PRIO7
014162                                                  MOV     #PRIO7,RO
014162  012700  000340                                  EMT     C$SPRI
014166  104041                                          BIC     #INTEN,@RLCS
014170  042777  000100  165730
                                                        CLRVEC  BVEC
014176                                                  MOV     BVEC,RO
014176  013700  002142                                  EMT     C$CVEC
014202  104036
014204                                          2$:
014204                                                  ENDCLN
014204                                          L10015:
014204  104012                                          EMT     C$CLEAN

014206                                                  ENDMOD


014206                                          BGNMOD  DRPCODE

014206                                                  BGNDU

014206  000240                                          NOP

014210                                                  ENDDU
014210                                          L10016:
014210  104055                                          EMT     C$DU

014212                                          ENDMOD

014212                                          BGNMOD  ADDCODE

014212                                                  BGNAU

014212  000240                                          NOP

014214                                                  ENDAU
014214                                          L10017:
014214  104054                                          EMT     C$AU

014216                                          ENDMOD


                                                .SBTTL  GLOBAL SUBROUTINES

014216                                          BGNMOD  GLBSUB

014216                                          CKERLT: INLOOP
014216  104020                                          EMT     C$INLP
```

```
                        BCOMPLETE       99$
                        BCS     99$
                        TST     DROP
                        BEQ     99$
                        INC     ERRLMT
                        CMP     ERRLMT,MERLMT
                        BLT     99$

                        PRINTF  #FRMT11
                        MOV     #FRMT11,-(SP)
                        MOV     #1,-(SP)
                        MOV     SP,R0
                        EMT     C$PNTF
                        ADD     #4,SP
                        JSR     PC,LINE1
                        DODU    UNITST                  ;DROP THE UNIT
                        MOV     UNITST,R0
                        EMT     C$DODU
                        DOCLN
                        EMT     C$DCLN
                99$:
                        RTS     R5


                .SBTTL  ROUTINE TO CHECK FOR CONTROLLER ERRORS

                ;*****************************************************************
                ;*THIS ROUTINE WILL CHECK RLCS FOR ERRORS AND PRINT THEM
                ;*ACCORDINGLY.  IT WILL MERGE THE ERROR PRINTOUT WITH THE TEST
                ;*ERROR MESSAGE.
                ;*
                ;*EXAMPLE:   RLCS CONTAINED FOLLOWING ERROR(S):
                ;*                  DRV   OPI   HCRC   HNF
                ;*      MAINTENANCE OPERATION-INTERRUPT MODE
                ;*
                ;*
                ;*
                ;*ROUTINE USES R0,R1 AND PICKS HEADER FROM R3
                ;*
                ;*      CALL    JSR     R5,CHERR
                ;*
                ;*
                ;*

014302 005037 002156            CHERR:  CLR     DERFLG          ;CLEAR OUT DRIVE ERROR FLAG
014306 032737 176000 002160             BIT     #176000,E.CS    ;ANY ERRORS SET
014314 001001                           BNE     199$            ;IF YES, INVESTIGATE
014316 000205                           RTS     R5              ;NO, EXIT
014320 023727 002262 000004     199$:   CMP     TMPFNC,#GSTAT   ;FUNCTION-NOP, RESET, GETSTATUS
014326 002401                           BLT     98$             ;YES, GO CHECK IF ONLY DRIVE ERROR
014330 000414                           BR      1$              ;YES SERVICE ERROR
014332 023727 002262 000002     98$:    CMP     TMPFNC,#WRCHK
014340 001410                           BEQ     1$
014342 013700 002160                    MOV     E.CS,R0         ;GET E.CS
014346 042700 001777                    BIC     #1777,R0        ;
```

```
1003  014352  022700  140000            CMP     #140000,R0      ;DRIVE ERROR ALONE?
1004  014356  001001                    BNE     1$              ;NO, GO SERVICE
1005  014360  000205            2$:     RTS     R5              ;YES, EXIT
1006
1007  014362  012701  011161    1$:     MOV     #EM102,R1       ;GET START OF STRING
1008  014366  005737  002160            TST     E.CS            ;IS COMPOSITE ERROR SET?(BETTER BE)
1009  014372  100003                    BPL     99$             ;IT'S NOT SOMETHING IS WRONG
1010  014374  004537  015204            JSR     R5,FIX          ;YES, PUT "COMP" IN STRING
1011  014400  005700                    COMP                    ;"COMP"
1012  014402  032737  040000  002160  99$:     BIT     #DERR,E.CS      ;DRIVE ERROR SET?
1013  014410  001405                    BEQ     3$              ;NO, CONTINUE
1014  014412  005237  002156            INC     DERFLG          ;SET DRV ERROR FLAG
1015  014416  004537  015204            JSR     R5,FIX          ;YES, PUT "DRV" INTO STRING
1016  014422  005541                    DEMES                   ;"DRV"
1017  014424  032737  020000  002160  3$:      BIT     #NXM,E.CS       ;NON-EXISTENT MEMORY ERROR?
1018  014432  001403                    BEQ     4$              ;NO, CONTINUE
1019  014434  004537  015204            JSR     R5,FIX          ;YES, PUT "NXM" INTO STRING
1020  014440  005546                    NXMMES                  ;"NXM"
1021  014442  032737  002000  002160  4$:      BIT     #OPI,E.CS       ;IS OPI SET?
1022  014450  001422                    BEQ     6$              ;NO, GO CHECK BITS 11 & 12
1023  014452  004537  015204            JSR     R5,FIX          ;PUT "OPI" INTO STRING
1024  014456  005553                    OPIMES                  ;"OPI"
1025  014460  032737  004000  002160    BIT     #BIT11,E.CS     ;HEADERCRC ERROR?
1026  014466  001403                    BEQ     5$              ;NO, GO CHECK HEADER NOT FOUND
1027  014470  004537  015204            JSR     R5,FIX          ;GO PUT "HCRC" IN STRING
1028  014474  005560                    HCRCMES                 ;"HCRC"
1029  014476  032737  010000  002160  5$:      BIT     #BIT12,E.CS     ;HEADER NOT FOUND?
1030  014504  001422                    BEQ     8$              ;NO, GO PUT "CRLF" IN STRING
1031  014506  004537  015204            JSR     R5,FIX          ;PUT "HNF" IN STRING
1032  014512  005566                    HNFMES                  ;"HNF"
1033  014514  000416                    BR      8$              ;PUT "CRLF" IN STRING
1034  014516  032737  004000  002160  6$:      BIT     #BIT11,E.CS     ;DATA CRC ERROR?
1035  014524  001403                    BEQ     7$              ;NO, GO CHECK DATA LATE
1036  014526  004537  015204            JSR     R5,FIX          ;PUT "DCK" IN STRING
1037  014532  005573                    DCKMES                  ;"DCK"
1038  014534  032737  010000  002160  7$:      BIT     #BIT12,E.CS     ;DATA LATE ERROR?
1039  014542  001403                    BEQ     8$              ;NO, GO PUT IN "CRLF"
1040  014544  004537  015204            JSR     R5,FIX          ;PUT "DLT" IN STRING
1041  014550  005600                    DLTMES                  ;"DLT"
1042  014552  004537  015204    8$:     JSR     R5,FIX
1043  014556  005673                    MSCRLF
1044  014560  004537  015204            JSR     R5,FIX
1045  014564  000000            RESTMS: .WORD   0               ;HEADER FROM TEST
1046  014566  105011                    CLRB    (R1)            ;PUT TERMINATOR IN
1047
1048  014570                            ERRDF   300.,LF,ERR6
1049  014570  104462                    TRAP    T$ERCODE
1050  014572  000454                    .WORD   300
1051  014574  005676                    .WORD   LF
1052  014576  011626                    .WORD   ERR6
1053
1054  014600  000205                    RTS     R5              ;EXIT ROUTINE
1055
1056                            ;*********************************************************************
1057                            ;* ROUTINE TO LOAD RLCS WITH FUNCTION TO BE PERFORMED FOR RL11
1058                            ;*       CALL:   JSR     R5,LDFUNC
```

```
1059                                    ;*              .WORD           ;BITS TO BE LOADED, FUNCTION
1060                                    ;*                              ;AND INTR ENABLE ONLY
1061                                    ;*
1062                                    ;
1063
1064  014602  012537  002200           LDFUNC: MOV     (R5)+,LDCSR     ;GET BITS TO LOAD
1065  014606  005737  002156                   TST     DERFLG
1066  014612  001424                           BEQ     98$
1067  014614  013746  002146                   MOV     B.CS,-(SP)
1068  014620  012777  000013  165304           MOV     #13,@RLDA
1069  014626  012737  000004  002146           MOV     #GS↑AT,B.CS
1070  014634  053737  002144  002146           BIS     DRIVE,B.CS
1071  014642  013777  002146  165256           MOV     B.CS,@RLCS
1072  014650  012637  002146                   MOV     (SP)+,B.CS
1073  014654  032777  000200  165244   99$:    BIT     #200,@RLCS
1074  014662  001774                           BEQ     99$
1075  014664  010346                   98$:    MOV     R3,-(SP)        ;SAVE R3
1076  014666  042737  177661  002200           BIC     #↑177661,LDCSR  ;CLEAR ALL BUT FUNC & INTR EN
1077  014674  013737  002200  015020           MOV     LDCSR,FNDFNC    ;SAVE FUNCTION
1078  014702  042737  000100  015020           BIC     #INTEN,FNDFNC   ;ONLY FUNCTION
1079  014710  013737  015020  002262           MOV     FNDFNC,TMPFNC
1080  014716  012703  015022                   MOV     #HDRLST↑,R3     ;GET HEADER LIST
1081  014722  006237  015020                   ASR     FNDFNC          ;ALIGN TO RIGHT
1082  014726  001404                           BEQ     2$
1083  014730  022323                   1$:     CMP     (R3)+,(R3)+     ;BUMP R3 BY 4
1084  014732  005337  015020                   DEC     FNDFNC          ;FOUND IT
1085  014736  001374                           BNE     1$              ;NO,KEEP LOOKING
1086  014740  032737  000100  002200   2$:     BIT     #INTEN,LDCSR    ;YES,DO WE WANT FLAG OR INTR
1087  014746  001401                           BEQ     3$              ;FLAG BRANCH
1088  014750  005723                           TST     (R3)+           ;INTR POINT TO THAT ONE
1089  014752  011303                   3$:     MOV     (R3),R3         ;SET HEADER
1090  014754  010337  014564                   MOV     R3,RESTMS       ;SET UP HEADER
1091  014760  053737  002144  002200           BIS     DRIVE,LDCSR     ;SELECT DRIVE
1092  014766  052737  000200  002200   4$:     BIS     #200,LDCSR      ;CONTROLLER READY
1093  014774  013777  002200  165124           MOV     LDCSR,@RLCS
1094  015002  004537  015362                   JSR     R5,BEFORE
1095  015006  042777  000200  165112   5$:     BIC     #200,@RLCS
1096  015014  012603                           MOV     (SP)+,R3        ;RESTORE R3
1097  015016  000205                           RTS     R5              ;EXIT
1098
1099  015020  000000           FNDFNC: .WORD   0
1100
1101  015022  005761           HDRLST: NOPMES
1102  015024  006012                   NOPINT
1103
1104
1105                                    ;*****************************************************************
1106                                    ;THIS ROUTINE WILL CHECK RLV11 CSR FOR COMP,HNF AND OPI ERRORS
1107                                    ;IN THE MAINTENANCE FORCED OPI TESTS. IT WILL MERGE THE ERROR PRINTOUT
1108                                    ;WITH THE TEST ERROR MESSAGE. DRIVE ERRORS WILL BE IGNORED.
1109                                    ;
1110                                    ;       CALL    JSR     R5,CHKOPI
1111                                    ;
1112  015026  010146           CHKOPI: MOV     R1,-(SP)
1113  015030  012701  112000           MOV     #112000,R1      ;EXPECTED RESULTS
1114  015034  005037  002252           CLR     MATFLG          ;CLEAR ERROR FOUND FLAG
```

```
1115  015040  043701  002160            BIC     E.CS,R1         ;CHECK COMP,HNF,OPI
1116  015044  005701                    TST     R1
1117  015046  001001                    BNE     1$              ;EXPECTED ERRORS NOT SET
1118  015050  000453                    BR      6$              ;ALL EXPECTED ERRORS SET,EXIT
1119  015052  012701  011161      1$:   MOV     #EM102,R1       ;GET START OF TEXT STRING
1120  015056  004537  015204            JSR     R5,FIX          ;STORE MESSAGE
1121  015062  005605                    EXPMES                  ;EXPECTED
1122  015064  032737  100000  002160    BIT     #BIT15,E.CS     ;IS COMP SET?
1123  015072  001405                    BEQ     2$              ;NO,CONTINUE ERROR SEARCH
1124  015074  005237  002252            INC     MATFLG          ;YES,SET ERROR FOUND
1125  015100  004537  015204            JSR     R5,FIX          ;STORE COMP MESSAGE
1126  015104  005700                    COMP
1127  015106  032737  010000  002160  2$:BIT     #BIT12,E.CS     ;IS HNF SET?
1128  015114  001405                    BEQ     3$              ;NO,CONTINUE ERROR SEARCH
1129  015116  005237  002252            INC     MATFLG          ;YES,SET ERROR FOUND
1130  015122  004537  015204            JSR     R5,FIX          ;STORE HNF MESSAGE
1131  015126  005566                    HNFMES
1132  015130  032737  002000  002160  3$:BIT     #BIT10,E.CS     ;IS OPI SET?
1133  015136  001405                    BEQ     4$              ;NO,COMPLETE MESSAGE
1134  015140  005237  002252            INC     MATFLG          ;YES,SET ERROR FOUND
1135  015144  004537  015204            JSR     R5,FIX          ;STORE OPI MESSAGE
1136  015150  005553                    OPIMES
1137  015152  005737  002252      4$:   TST     MATFLG          ;CHECK IF EXPECTED ERRORS FOUND
1138  015156  001003                    BNE     5$
1139  015160  004537  015204            JSR     R5,FIX          ;STORE MESSAGE
1140  015164  005642                    NONMES                  ;NO EXPECTED ERRORS FOUND
1141  015166  004537  015204      5$:   JSR     R5,FIX
1142  015172  005673                    MSCRLF
1143  015174  105011                    CLRB    (R1)            ;STORE MESSAGE TERMINATOR
1144  015176  005725                    TST     (R5)+           ;RETURN TO PRINT ERROR
1145  015200  012601      6$:   MOV     (SP)+,R1
1146  015202  000205                    RTS     R5
1147                        ;*****************************************************************
1148                        ;*ROUTINE TO MOVE ASCII STRINGS
1149                        ;*USES REGISTERS R1 - WHERE STRING IS BEING BUILT
1150                        ;*
1151                        ;*      CALL    JSR     R5,FIX
1152                        ;*              .WORD           ;ADDRESS OF STRING TO MOVE
1153
1154  015204  012500      FIX:  MOV     (R5)+,R0        ;GET ADDRESS AND MOVE RETURN
1155  015206  112021      1$:   MOVB    (R0)+,(R1)+     ;GET BYTE AND UPDATE
1156  015210  001376            BNE     1$              ;WATCH 0 BYTE TERMINATOR
1157  015212  105741            TSTB    -(R1)           ;BACK UP OVER ZERO BYTE
1158  015214  000205            RTS     R5              ;EXIT
1159
1160
1161                        ;*****************************************************************
1162                        ;RLV11 MAINTENANCE SUBROUTINE FOR CRC CALCULATIONS
1163                        ;ROUTINE TO RETRIEVE PATTERN AND CALCULATE CRC OF PATTERN+3
1164                        ;AND CRC OF CRC OF PATTERN+4.
1165                        ;CRC OF PATTERN+3 WILL BE STORED IN "GDCRCA".
1166                        ;CRC OF CRC OF PATTERN+4 WILL BE STORED IN "GDCRCB".
1167                        ;PATTERN WILL BE STORED IN "GDDATA".
1168                        ;
1169                        ;       CALL    JSR     R5,CALCRC
1170                        ;               .WORD           ;PATTERN IN DA
```

```
1171
1172  015216  012537  002240          CALCRC: MOV     (R5)+,GCRCPT    ;STORE PATTERN
1173  015222  013737  002240  002222          MOV     GCRCPT,TEMP1
1174  015230  113737  002222  002220          MOVB    TEMP1,TEMP5
1175  015236  062737  000003  002220          ADD     #3.,TEMP5       ;ADD 3 TO PATTERN
1176  015244  113737  002220  002222          MOVB    TEMP5,TEMP1
1177  015252  013737  002222  015266          MOV     TEMP1,1$
1178  015260  004537  016112                  JSR     R5,SIMBCC       ;CALCULATE EXPECTED CRC
1179  015264  000020                          16.                     ;DATA BITS
1180  015266  000000                  1$:     .WORD   0               ;INITIAL PATTERN+3
1181  015270  000000                          .WORD   0
1182  015272  013737  002210  002242          MOV     CALBCC,GDCRCA   ;SAVE CRC OF PATTERN+3
1183  015300  005237  002220                  INC     TEMP5           ;VALUE=PATTERN+4
1184  015304  113737  002220  002222          MOVB    TEMP5,TEMP1
1185  015312  013737  002222  015326          MOV     TEMP1,2$
1186  015320  004537  016112                  JSR     R5,SIMBCC       ;CALCULATE EXPECTED CRC
1187  015324  000020                          16.                     ;DATA BITS
1188  015326  000000                  2$:     .WORD   0               ;INITIAL PATTERN+4
1189  015330  000000                          .WORD   0               ;STARTING CRC=0
1190  015332  013737  002210  015346          MOV     CALBCC,3$       ;STORE CRC FOR NEXT CALL
1191  015340  004537  016112                  JSR     R5,SIMBCC       ;CAL. CRC OF CRC OF DA+4
1192  015344  000020                          16.                     ;DATA BITS
1193  015346  000000                  3$:     .WORD   0               ;CRC OF DA+4
1194  015350  000000                          .WORD   0               ;STARTING CRC=0
1195  015352  013737  002210  002244          MOV     CALBCC,GDCRCB   ;SAVE CRC OF CRC OF DA+4
1196  015360  000205                          RTS     R5
1197
1198                                  ;LOAD REGISTERS BEFORE FUNCTION
1199                                  ;CALL:  JSR     R5,BEFORE
1200
1201  015362  017737  164540  002146  BEFORE: MOV     @RLCS,B.CS      ;READ CS
1202  015370  017737  164534  002150          MOV     @RLBA,B.BA      ;READ BA
1203  015376  017737  164530  002152          MOV     @RLDA,B.DA      ;READ DA
1204  015404  017737  164524  002154          MOV     @RLMP,B.MP      ;READ MP
1205  015412  000205                          RTS     R5
1206
1207
1208                                  ;LOAD REGISTERS AT ERROR
1209                                  ;CALL:  JSR     R5,AFTER
1210
1211  015414  017737  164506  002160  AFTER:  MOV     @RLCS,E.CS      ;READ CS
1212  015422  017737  164502  002162          MOV     @RLBA,E.BA      ;READ BA
1213  015430  017737  164476  002164          MOV     @RLDA,E.DA      ;READ DA
1214  015436  017737  164472  002166          MOV     @RLMP,E.MP      ;READ MP
1215  015444  017737  164464  002170          MOV     @RLMP,E.MP1     ;READ MP
1216  015452  000205                          RTS     R5
1217
1218                                  ;ROUTINE TO SETUP BUFFERS FOR RLV11 MAINTENANCE FUNCTION
1219                                  ;BUF1 IS SET WITH 256 WORDS OF PATTERN
1220                                  ;BUF2 IS CLEARED BEFORE MAINTENANCE FUNCTION
1221                                  ;       CALL    JSR     R5,SETPAT
1222                                  ;               .WORD           ;PATTERN FOR BUFFER
1223                                  ;
1224  015454  010146                  SETPAT: MOV     R1,-(SP)
1225  015456  010246                          MOV     R2,-(SP)
1226  015460  012537  002246                  MOV     (R5)+,GDDATP
```

```
1227  015464  012701  003500          MOV     #BUF1,R1        ;FIRST BUFFER START
1228  015470  012702  000400          MOV     #256.,R2
1229  015474  013721  002246  1$:     MOV     GDDATP,(R1)+
1230  015500  005302                  DEC     R2
1231  015502  001374                  BNE     1$              ;STORE PATTERN IN 256 WORDS
1232  015504  012701  004500          MOV     #BUF2,R1        ;START OF SECOND BUFFER
1233  015510  012702  000377          MOV     #255.,R2
1234  015514  005021          2$:     CLR     (R1)+
1235  015516  005302                  DEC     R2
1236  015520  001375                  BNE     2$              ;CLEAR 255 WORDS OF SECOND BUFFER
1237  015522  012721  123456          MOV     #123456,(R1)+   ;STORE IN LAST BUFFER WORD
1238  015526  012602                  MOV     (SP)+,R2
1239  015530  012601                  MOV     (SP)+,R1
1240  015532  000205                  RTS     R5
1241
1242                                  ;ROUTINE TO LOAD RLCS WITH RLV11 MAINT. FUNCTION
1243                                  ;EITHER FLAG DRIVEN OR INTERRUPT MODE.
1244                                  ;       CALL    JSR     R5,LDFUN
1245  015534  000000                  .WORD                   ;MAINT!INTEN
1246  015536  000000                  .WORD                   ;WORD COUNT COMP.
1247  015540  000000                  .WORD                   ;MAINTENANCE MESSAGE
1248                                  ;
1249  015542  012537  002200  LDFUN:  MOV     (R5)+,LDCSR     ;GET FUNCTION
1250  015546  012577  164362          MOV     (R5)+,@RLMP     ;LOAD WORD COUNT
1251  015552  012537  014564          MOV     (R5)+,RESTMS    ;GET MESSAGE
1252  015556  005037  002262          CLR     TMPFNC          ;CLEAR FUNCTION STORAGE
1253  015562  012777  003500  164340  MOV     #BUF1,@RLBA     ;SET BA REGISTER
1254  015570  013777  002240  164334  MOV     GCRCPT,@RLDA    ;LOAD DA REGISTER
1255  015576  042737  177661  002200  BIC     #177661,LDCSR   ;CLEAR ALL BUT FUNC.+INT.
1256  015604  053737  002144  002200  BIS     DRIVE,LDCSR     ;SELECT DRIVE
1257  015612  052737  000200  002200  BIS     #200,LDCSR      ;CONTROLLER READY
1258  015620  013777  002200  164300  MOV     LDCSR,@RLCS     ;LOAD CS REGISTER
1259  015626  004537  015362          JSR     R5,BEFORE       ;STORE REGISTERS BEFORE OPERATION
1260  015632  042777  000200  164266  BIC     #200,@RLCS      ;CLEAR CONTROLLER READY
1261  015640  000205                  RTS     R5              ;RETURN
1262
1263
1264                                  ;ROUTINE TO SETUP COMPLEMENT BUFFERS FOR RLV11 MAINTENANCE FUNCTION
1265                                  ;BUF1 IS SET WITH PATTERN
1266                                  ;BUF1+1 IS SET WITH COMPLEMENT OF PATTERN
1267                                  ;       CALL    JSR     R5,SETCMP
1268                                  ;       .WORD                   ;PATTERN FOR BUFFER
1269                                  ;
1270  015642  010146  SETCMP: MOV     R1,-(SP)
1271  015644  010246          MOV     R2,-(SP)
1272  015646  012537  002246          MOV     (R5)+,GDDATP
1273  015652  012701  003500          MOV     #BUF1,R1        ;FIRST BUFFER START
1274  015656  012702  000400          MOV     #256.,R2        ;BUFFER COUNT
1275  015662  013737  002246  002250  MOV     GDDATP,GDATMP   ;STORE DATA PATTERN FOR BUF FILL
1276  015670  013721  002250  1$:     MOV     GDATMP,(R1)+
1277  015674  005137  002250          COM     GDATMP          ;STORE COMP. IN NEXT BUF LOCATION
1278  015700  005302                  DEC     R2
1279  015702  001372                  BNE     1$              ;CHECK FOR BUFFER END
1280  015704  012701  004500          MOV     #BUF2,R1        ;SETUP TO CLEAR BUF2
1281  015710  012702  000377          MOV     #255.,R2
1282  015714  005021          2$:     CLR     (R1)+
```

```
                        DEC     R2
                        BNE     2$              ;CHECK FOR BUF2 END
1285  015722  012721    MOV     #123456,(R1)+   ;STORE IN LAST BUFFER WORD
1286  015726  012602    MOV     (SP)+,R2
1287  015730  012601    MOV     (SP)+,R1
1288  015732  000205    RTS     R5
1289
1290
1291                    ;ROUTINE TO SETUP BUFFER WITH RANDOM NUMBERS FOR RLV11 MAINT. FUNCTION
1292                    ;SAME PATTERN IS USED FOR EACH CONTROLLER
1293                    ;END OF PASS WILL CHANGE RANDOM PATTERN PRIMES
1294                    ;       CALL    JSR     R5,SETRAN
1295                    ;
1296  015734  010146    SETRAN: MOV     R1,-(SP)
1297  015736  010246            MOV     R2,-(SP)
1298  015740  012701  003500    MOV     #BUF1,R1        ;FIRST BUFFER START
1299  015744  012702  000400    MOV     #256.,R2        ;BUFFER COUNT
1300  015750  004537  016014    1$:     JSR     R5,RAND         ;GET RANDOM NUMBER
1301  015754  013721  002272    MOV     LONUM,(R1)+     ;STORE IN BUFFER
1302  015760  005302            DEC     R2              ;CHECK FOR BUFFER END
1303  015762  001372            BNE     1$
1304  015764  012701  004500    MOV     #BUF2,R1        ;SETUP TO CLEAR BUF2
1305  015770  012702  000377    MOV     #255.,R2
1306  015774  005021    2$:     CLR     (R1)+
1307  015776  005302            DEC     R2
1308  016000  001375            BNE     2$              ;CHECK FOR BUFFER END
1309  016002  012721  123456    MOV     #123456,(R1)+   ;STORE IN LAST BUFFER WORD
1310  016006  012602            MOV     (SP)+,R2
1311  016010  012601            MOV     (SP)+,R1
1312  016012  000205            RTS     R5
1313
1314
1315                    ;THIS ROUTINE IS A DOUBLE PRECISION PSEUDO RANDOM NUMBER GENERATOR
1316                    ;WITH A RANGE OF 0 TO 2(+33)-1.
1317                    ;CALL:
1318                    ;       JSR     R5,RAND         ;CALL THE ROUTINE
1319                    ;       RETURN                  ;RETURN HERE THE RANDOM NUMBER
1320                    ;                               ;WILL BE IN HINUM,LONUM
1321  016014  010146    RAND:   MOV     R1,-(SP)        ;PUSH R1 ON STACK
1322  016016  010246            MOV     R2,-(SP)        ;PUSH R2 ON STACK
1323  016020  010346            MOV     R3,-(SP)        ;PUSH R3 ON STACK
1324  016022  013703  002272    MOV     LONUM,R3        ;SET R3 WITH LOW
1325  016026  013701  002270    MOV     HINUM,R1        ;SET R1 WITH HIGH
1326  016032  012702  177771    MOV     #-7,R2          ;SET SHIFT COUNTER
1327  016036  006303    1$:     ASL     R3              ;SHIFT R3 LEFT AND
1328  016040  006101            ROL     R1              ;ROTATE CARRY INTO R1 AND
1329  016042  005202            INC     R2              ;CHECK FOR DONE
1330  016044  001374            BNE     1$              ;CONTINUE SHIFT LOOP
1331  016046  063703  002272    ADD     LONUM,R3        ;ADD NUMBER TO MAKE X 129
1332  016052  005501            ADC     R1              ;PROPOGATE CARRY
1333  016054  063701  002270    ADD     HINUM,R1        ;ADD NUMBER TO MAKE X 129
1334  016060  062703  001057    ADD     #1057,R3        ;ADD LOW CONSTANT
1335  016064  005501            ADC     R1              ;PROPOGATE CARRY
1336  016066  062701  047401    ADD     #47401,R1       ;ADD HIGH CONSTANT
1337  016072  010337  002272    MOV     R3,LONUM        ;SAVE R3
1338  016076  010137  002270    MOV     R1,HINUM        ;SAVE R1
```

```
                        ROUTINE TO CHECK FOR CONTROLLER ERRORS

1339  016102  012603              MOV     (SP)+,R3        ;POP STACK INTO R3
1340  016104  012602              MOV     (SP)+,R2        ;POP STACK INTO R2
1341  016106  012601              MOV     (SP)+,R1        ;POP STACK INTO R1
1342  016110  000205              RTS     R5              ;RETURN
1343
1344
1345                        .SBTTL  ROUTINE TO CALCULATE CRC
1346
1347                        ;ROUTINE WILL CALCULATE A CRC-16 CRC ON A WORD OF
1348                        ;1-16 BITS IN LENGTH, RESULT IS RETURNED IN "CALBCC"
1349                        ;
1350                        ;       CALL:   JSR     R5,SIMBCC
1351                        ;               .WORD           ;NUMBER OF BITS (1-16)
1352                        ;               .WORD           ;DATA FOR CRC CALCULATION
1353                        ;               .WORD           ;PREVIOUS OR STARTING CRC
1354                        ;                               (SHOULD BE ZEROED FOR START)
1355                        ;       ROUTINE USES R0,R1,R2
1356
1357  016112  010046        SIMBCC: MOV     R0,-(SP)        ;SAVE R0
1358  016114  010146              MOV     R1,-(SP)        ;SAVE R1
1359  016116  010246              MOV     R2,-(SP)        ;SAVE R2
1360  016120  012537  002212      MOV     (R5)+,TEMP2     ;GET NUMBER OF BITS
1361  016124  012537  002214      MOV     (R5)+,TEMP3     ;GET DATA FOR CRC CALCULATION
1362  016130  012537  002216      MOV     (R5)+,TEMP4     ;GET STARTING CRC
1363  016134  005037  002206  1$: CLR     BCCFBK          ;
1364  016140  013700  002216      MOV     TEMP4,R0        ;GET PRESENT CRC
1365  016144  006037  002214      ROR     TEMP3           ;ROTATE NEW DATA
1366  016150  005500              ADC     R0              ;MERGE NEW WITH OLD
1367  016152  032700  000001      BIT     #1,R0           ;BIT 0 SET
1368  016156  001402              BEQ     2$              ;IF NOT CONTINUE
1369  016160  005137  002206      COM     BCCFBK          ;
1370  016164  013700  002202  2$: MOV     XPOLY,R0        ;GET CRC POLYNOMIAL (CRC-16)
1371  016170  005100              COM     R0              ;COMPLIMENT POLYNOMIAL
1372  016172  040037  002206      BIC     R0,BCCFBK
1373  016176  000241              CLC                     ;CLEAR CARRY
1374  016200  006037  002216      ROR     TEMP4
1375  016204  013700  002206      MOV     BCCFBK,R0
1376  016210  013701  002216      MOV     TEMP4,R1
1377  016214  010102              MOV     R1,R2
1378  016216  040100              BIC     R1,R0
1379  016220  043702  002206      BIC     BCCFBK,R2
1380  016224  050200              BIS     R2,R0
1381  016226  043737  002202  002216  BIC     XPOLY,TEMP4
1382  016234  050037  002216      BIS     R0,TEMP4
1383  016240  005337  002212      DEC     TEMP2
1384  016244  001333              BNE     1$
1385  016246  013737  002216  002210  MOV     TEMP4,CALBCC
1386  016254  012602              MOV     (SP)+,R2
1387  016256  012601              MOV     (SP)+,R1
1388  016260  012600              MOV     (SP)+,R0
1389  016262  000205              RTS     R5              ;RETURN
1390
1391
1392
1393                        ;ROUTINE TO SET FLAG IF TRAP OCCURRED
1394                        ;"TRPHAN" IS IN LOCATION 4.
```

```
1395
1396
1397  016264  005237  002174          TRPHAN: INC     TRPFLG          ;INDICATE TRAP
1398  016270  000002                          RTI                     ;RETURN
1399
1400  016272                          BGNSRV
1401
1402  016272  005237  002176          INTSRV: INC     INTFLG          ;INDICATE INTERRUPT
1403
1404  016276                          ENDSRV
1405  016276                          L10020:
1406  016276  000002                          RTI
1407
1408                                  ;ROUTINE USED IN TIMING OPI
1409  016300  005237  002176          TIMSRV: INC     INTFLG
1410  016304                                  ABORTWAIT
1411  016304  104021                          EMT     C$ABRT
1412  016306  000002                          RTI
1413
1414
1415                                  ;ROUTINE TO WAIT FOR DRIVE READY
1416  016310  010146                  WTDRDY: MOV     R1,-(SP)        ;SAVE R1
1417  016312  012701  003720                  MOV     #2000.,R1       ;TIME OUT OF 200 MILLISECONDS
1418  016316  032777  000001  163602  1$:     BIT     #DRDY,@RLCS     ;DRIVE READY?
1419  016324  001011                          BNE     2$              ;YES, EXIT
1420
1421  016326                                  WAITUS  #1              ;WAIT A WHILE
1422  016326  012700  000001                  MOV     #1,R0
1423  016332  104027                          EMT     C$WTU
1424  016334  005301                          DEC     R1              ;CHECK IF TIME UP
1425  016336  001367                          BNE     1$              ;NO, GO CHECK DRIVE READY
1426
1427  016340                                  ERRDF   200.,DRTIM,ERR5 ;DRIVE READY DID NOT SET
1428  016340  104462                          TRAP    T$ERCODE
1429  016342  000310                          .WORD   200
1430  016344  006267                          .WORD   DRTIM
1431  016346  011614                          .WORD   ERR5
1432
1433  016350  012601                  2$:     MOV     (SP)+,R1        ;RESTORE
1434  016352  000205                          RTS     R5              ;EXIT
1435
1436                                  ;ROUTINE TO WAIT FOR CONTROLLER READY
1437  016354  010146                  WTCRDY: MOV     R1,-(SP)        ;SAVE R1
1438  016356  012701  017500                  MOV     #8000.,R1       ;WAIT 800 MILLISECONDS
1439  016362  032777  000200  163536  1$:     BIT     #CRDY,@RLCS     ;CONTROLLER READY
1440  016370  001014                          BNE     2$              ;YES, EXIT
1441  016372                                  WAITUS  #1              ;WAIT A WHILE
1442  016372  012700  000001                  MOV     #1,R0
1443  016376  104027                          EMT     C$WTU
1444  016400  005301                          DEC     R1              ;CHECK IF TIME UP
1445  016402  001367                          BNE     1$              ;NO GO BACK
1446
1447  016404  004537  015414                  JSR     R5,AFTER        ;GET REGISTERS
1448
1449  016410                                  ERRDF   100.,CRTIM,ERR6 ;CONTROLLER TIMED OUT
1450  016410  104462                          TRAP    T$ERCODE
```

```
                        .WORD   100
                        .WORD   CRTIM
                        .WORD   ERR6

                        BR      3$                      ;EXIT

                2$:     JSR     R5,AFTER                ;GET REGISTERS
                3$:     MOV     (SP)+,R1
                        RTS     R5                      ;EXIT


                        ENDMOD


                        .SBTTL  **TEST 1** - RLCS WRITE ADDRESSABILITY

                        BGNTST                          ;****START OF TEST****
                        STARS
                        ;;*************************************************************
                        ;TEST TO SEE IF WE CAN ADDRESS THE CONTROL
                        ;AND STATUS REGISTER.  IF WE TRAP WE WILL REPORT
                        ;THE ERROR AND ABORT.  AFTER THIS TEST WE ONLY KNOW
                        ;THAT WE CAN ADDRESS THE REGISTER.
                        STARS
                        ;;*************************************************************

                1$:     CLR     TRPFLG                  ;CLEAR TRAP OCCURANCE
                2$:     SETVEC  ERRVEC,#TRPHAN,#340     ;SET TO CATCH TRAP
                        MOV     #340,-(SP)
                        MOV     #TRPHAN,-(SP)
                        MOV     ERRVEC,-(SP)
                        MOV     #3,-(SP)
                        EMT     C$SVEC
                        ADD     #10,SP

                        MOV     #177777,@RLCS           ;ADDRESS RLCS
                        CLRVEC  ERRVEC                  ;RELEASE TRAP VECTOR
                        MOV     ERRVEC,R0
                        EMT     C$CVEC
                        TST     TRPFLG                  ;TRAP OCCURRED???
                        BEQ     3$                      ;NO, OKAY PROCEED
                        MOV     RLCS,GDDAT              ;SET UP ERROR DATA

                        ERRSF   0.,EM1,ERR1             ;BUS TIMEOUT IN ADDRESSING RLCS
                        TRAP    T$ERCODE
                        .WORD   0
                        .WORD   EM1
                        .WORD   ERR1
                3$:     CKLOOP                          ;CHECK IF /FL:LOE IS SET
                        EMT     C$CLP1

                ENDTST                                  ;****END OF TEST****
                L10021:
                        EMT     C$ETST
```

```
                                .SBTTL  **TEST 2** - RLBA WRITE ADDRESSABILITY

016530                          BGNTST                          ;****START OF TEST****

016530                          STARS
                                ;;*********************************************************************
                                ;TEST TO SEE IF WE CAN ADDRESS THE BUS ADDRESS
                                ;REGISTER.  IF WE TRAP WE WILL REPORT THE ERROR
                                ;AND ABORT.  AFTER THIS TEST WE ONLY KNOW THAT
                                ;WE CAN ADDRESS THE REGISTER.
016530                          STARS
                                ;;*********************************************************************

016530  005037  002174          1$:     CLR     TRPFLG          ;CLEAR TRAP OCCURANCE
016534                          2$:     SETVEC  ERRVEC,#TRPHAN,#340  ;SET TO CATCH TRAP
016534  012746  000340                  MOV     #340,-(SP)
016540  012746  016264                  MOV     #TRPHAN,-(SP)
016544  013746  002204                  MOV     ERRVEC,-(SP)
016550  012746  000003                  MOV     #3,-(SP)
016554  104037                          EMT     C$SVEC
016556  062706  000010                  ADD     #10,SP

016562  012777  177777  163340          MOV     #177777,@RLBA   ;ADDRESS RLBA
016570                          CLRVEC  ERRVEC                  ;RELEASE TRAP VECTOR
016570  013700  002204                  MOV     ERRVEC,R0
016574  104036                          EMT     C$CVEC
016576  005737  002174                  TST     TRPFLG          ;TRAP OCCURRED???
016602  001407                          BEQ     3$              ;NO, CONTINUE
016604  013737  002130  002234          MOV     RLBA,GDDAT      ;SETUP ERROR DATA

016612                          ERRSF   1,,EM2,ERR1     ;BUS TIMEOUT IN ADDRESSING RLBA
016612  104461                  TRAP    T$ERCODE
016614  000001                  .WORD   1
016616  006342                  .WORD   EM2
016620  011370                  .WORD   ERR1
016622                          3$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
016622  104006                  EMT     C$CLP1
016624                          ENDTST                          ;****END OF TEST****
016624                          L10022:
016624  104001                  EMT     C$ETST


                                .SBTTL  **TEST 3** - RLDA WRITE ADDRESSABILITY

016626                          BGNTST                          ;****START OF TEST****
016626                          STARS
                                ;;*********************************************************************
                                ;TEST TO SEE IF WE CAN ADDRESS THE DISK ADDRESS
                                ;REGISTER IF WE TRAP WE WILL REPORT THE ERROR
                                ;AND ABORT.  AFTER THIS TEST WE ONLY KNOW THAT
                                ;WE CAN ADDRESS THE REGISTER.
016626                          STARS
                                ;;*********************************************************************
```

```
1563
1564
1565  016626  005037  002174          1$:     CLR     TRPFLG          ;CLEAR TRAP OCCURANCE
1566  016632                          2$:     SETVEC  ERRVEC,#TRPHAN,#340  ;SET TO CATCH TRAP
1567  016632  012746  000340                  MOV     #340,-(SP)
1568  016636  012746  016264                  MOV     #TRPHAN,-(SP)
1569  016642  013746  002204                  MOV     ERRVEC,-(SP)
1570  016646  012746  000003                  MOV     #3,-(SP)
1571  016652  104037                          EMT     C$$VEC
1572  016654  062706  000010                  ADD     #10,SP
1573
1574  016660  012777  177777  163244          MOV     #177777,@RLDA   ;ADDRESS RLDA
1575  016666                                  CLRVEC  ERRVEC          ;RELEASE TRAP VECTOR
1576  016666  013700  002204                  MOV     ERRVEC,R0
1577  016672  104036                          EMT     C$CVEC
1578  016674  005737  002174                  TST     TRPFLG          ;TRAP OCCURRED???
1579  016700  001407                          BEQ     3$              ;NO, CONTINUE
1580
1581  016702  013737  002132  002234          MOV     RLDA,GDDAT      ;SETUP ERROR INFO
1582  016710                                  ERRSF   2.,EM3,ERR1     ;BUS TIMEOUT IN ADDRESSING RLDA
1583  016710  104461                          TRAP    T$ERCODE
1584  016712  000002                          .WORD   2
1585  016714  006367                          .WORD   EM3
1586  016716  011370                          .WORD   ERR1
1587  016720                          3$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
1588  016720  104006                          EMT     C$CLP1
1589  016722                          ENDTST                          ;****END OF TEST****
1590  016722                          L10023:
1591  016722  104001                          EMT     C$ETST
1592
1593
1594                                  .SBTTL  **TEST 4** - RLMP WRITE ADDRESSABILITY
1595
1596  016724                          BGNTST                          ;****START OF TEST****
1597  016724                          STARS
1598                                  ;;**********************************************************************
1599                                  ;TEST TO SEE IF WE CAN ADDRESS THE MULTIPURPOSE
1600                                  ;REGISTER.  IF WE TRAP WE WILL REPORT THE ERROR AND
1601                                  ;ABORT.  AFTER THIS TEST WE ONLY KNOW THAT WE CAN
1602                                  ;ADDRESS THE REGISTER.
1603  016724                          STARS
1604                                  ;;**********************************************************************
1605
1606
1607  016724  005037  002174          1$:     CLR     TRPFLG          ;CLEAR TRAP OCCURANCE
1608  016730                          2$:     SETVEC  ERRVEC,#TRPHAN,#340  ;SET UP TO CATCH TRAP
1609  016730  012746  000340                  MOV     #340,-(SP)
1610  016734  012746  016264                  MOV     #TRPHAN,-(SP)
1611  016740  013746  002204                  MOV     ERRVEC,-(SP)
1612  016744  012746  000003                  MOV     #3,-(SP)
1613  016750  104037                          EMT     C$$VEC
1614  016752  062706  000010                  ADD     #10,SP
1615
1616  016756  012777  177777  163150          MOV     #177777,@RLMP   ;ADDRESS RLMP
1617  016764                                  CLRVEC  ERRVEC          ;RELEASE TRAP VECTOR
1618  016764  013700  002204                  MOV     ERRVEC,R0
```

```
1619  016770  104036                        EMT     C$CVEC
1620  016772  005737  002174                TST     TRPFLG          ;TRAP OCCURRED???
1621  016776  001407                        BEQ     3$              ;NO, CONTINUE
1622  017000  013737  002134  002234        MOV     RLMP,GDDAT      ;SET UP ERROR INFO
1623
1624  017006                                ERRSF   3.,EM4,ERR1     ;BUS TIMEOUT IN ADDRESSING RLMP
1625  017006  104461                        TRAP    T$ERCODE
1626  017010  000003                        .WORD   3
1627  017012  006414                        .WORD   EM4
1628  017014  011370                        .WORD   ERR1
1629  017016                        3$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
1630  017016  104006                        EMT     C$CLP1
1631  017020                        ENDTST                          ;****END OF TEST****
1632  017020                        L10024:
1633  017020  104001                        EMT     C$ETST
1634
1635                                .SBTTL  **TEST 5** - RLCS READ ADDRESSABILITY
1636
1637  017022                        BGNTST                          ;****START OF TEST****
1638  017022                        STARS
1639                                ;;*********************************************************************
1640                                ;TEST TO SEE IF WE CAN ADDRESS THE CONTROL
1641                                ;AND STATUS REGISTER.  IF WE TRAP WE WILL REPORT
1642                                ;THE ERROR AND ABORT.  AFTER THIS TEST WE ONLY KNOW
1643                                ;THAT WE CAN ADDRESS THE REGISTER.
1644  017022                        STARS
1645                                ;;*********************************************************************
1646
1647
1648  017022  005037  002174        1$:     CLR     TRPFLG          ;CLEAR TRAP OCCURANCE
1649  017026                        2$:     SETVEC  ERRVEC,#TRPHAN,#340  ;SET TO CATCH TRAP
1650  017026  012746  000340                MOV     #340,-(SP)
1651  017032  012746  016264                MOV     #TRPHAN,-(SP)
1652  017036  013746  002204                MOV     ERRVEC,-(SP)
1653  017042  012746  000003                MOV     #3,-(SP)
1654  017046  104037                        EMT     C$SVEC
1655  017050  062706  000010                ADD     #10,SP
1656
1657  017054  005777  163046                TST     @RLCS           ;ADDRESS RLCS
1658  017060                                CLRVEC  ERRVEC          ;RELEASE TRAP VECTOR
1659  017060  013700  002204                MOV     ERRVEC,R0
1660  017064  104036                        EMT     C$CVEC
1661  017066  005737  002174                TST     TRPFLG          ;TRAP OCCURRED???
1662  017072  001407                        BEQ     3$              ;NO, OKAY PROCEED
1663  017074  013737  002126  002234        MOV     RLCS,GDDAT      ;SET UP ERROR DATA
1664
1665  017102                                ERRSF   100.,EM1,ERR1   ;BUS TIMEOUT IN ADDRESSING RLCS
1666  017102  104461                        TRAP    T$ERCODE
1667  017104  000144                        .WORD   100
1668  017106  006315                        .WORD   EM1
1669  017110  011370                        .WORD   ERR1
1670  017112                        3$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
1671  017112  104006                        EMT     C$CLP1
1672  017114                        ENDTST                          ;****END OF TEST****
1673  017114                        L10025:
1674  017114  104001                        EMT     C$ETST
```

```
1675
1676
1677                                    .SBTTL  **TEST 6** - RLBA READ ADDRESSABILITY
1678
1679  017116                            BGNTST                          ;****START OF TEST****
1680
1681
1682  017116                            STARS
1683                                    ;;**********************************************************************
1684                                    ;TEST TO SEE IF WE CAN ADDRESS THE BUS ADDRESS
1685                                    ;REGISTER.  IF WE TRAP WE WILL REPORT THE ERROR
1686                                    ;AND ABORT.  AFTER THIS TEST WE ONLY KNOW THAT
1687                                    ;WE CAN ADDRESS THE REGISTER.
1688  017116                            STARS
1689                                    ;;**********************************************************************
1690
1691  017116  005037  002174            1$:     CLR     TRPFLG                  ;CLEAR TRAP OCCURANCE
1692  017122                            2$:     SETVEC  ERRVEC,#TRPHAN,#340     ;SET TO CATCH TRAP
1693  017122  012746  000340                    MOV     #340,-(SP)
1694  017126  012746  016264                    MOV     #TRPHAN,-(SP)
1695  017132  013746  002204                    MOV     ERRVEC,-(SP)
1696  017136  012746  000003                    MOV     #3,-(SP)
1697  017142  104037                            EMT     C$$VEC
1698  017144  062706  000010                    ADD     #10,SP
1699
1700  017150  005777  162754                    TST     @RLBA                   ;ADDRESS RLBA
1701  017154                                    CLRVEC  ERRVEC                  ;RELEASE TRAP VECTOR
1702  017154  013700  002204                    MOV     ERRVEC,R0
1703  017160  104036                            EMT     C$CVEC
1704  017162  005737  002174                    TST     TRPFLG                  ;TRAP OCCURRED???
1705  017166  001407                            BEQ     3$                      ;NO, CONTINUE
1706  017170  013737  002130  002234            MOV     RLBA,GDDAT              ;SETUP ERROR DATA
1707
1708  017176                                    ERRSF   101.,EM2,ERR1           ;BUS TIMEOUT IN ADDRESSING RLBA
1709  017176  104461                            TRAP    T$ERCODE
1710  017200  000145                            .WORD   101
1711  017202  006342                            .WORD   EM2
1712  017204  011370                            .WORD   ERR1
1713  017206                            3$:     CKLOOP                          ;CHECK IF /FL:LOE IS SET
1714  017206  104006                            EMT     C$CLP1
1715  017210                            ENDTST                                  ;****END OF TEST****
1716  017210                            L10026:
1717  017210  104001                            EMT     C$ETST
1718
1719
1720                                    .SBTTL  **TEST 7** - RLDA READ ADDRESSABILITY
1721
1722  017212                            BGNTST                                  ;****START OF TEST****
1723  017212                            STARS
1724                                    ;;**********************************************************************
1725                                    ;TEST TO SEE IF WE CAN ADDRESS THE DISK ADDRESS
1726                                    ;REGISTER IF WE TRAP WE WILL REPORT THE ERROR
1727                                    ;AND ABORT.  AFTER THIS TEST WE ONLY KNOW THAT
1728                                    ;WE CAN ADDRESS THE REGISTER.
1729  017212                            STARS
1730                                    ;;**********************************************************************
```

```
                                        1$:     CLR     TRPFLG          ;CLEAR TRAP OCCURANCE
                                        2$:     SETVEC  ERRVEC,#TRPHAN,#340  ;SET TO CATCH TRAP
017216  012746  000340                        MOV     #340,-(SP)
017222  012746  016264                        MOV     #TRPHAN,-(SP)
017226  013746  002204                        MOV     ERRVEC,-(SP)
017232  012746  000003                        MOV     #3,-(SP)
017236  104037                              EMT     C$$VEC
017240  062706  000010                        ADD     #10,SP

017244  005777  162662                        TST     @RLDA           ;ADDRESS RLDA
017250                                        CLRVEC  ERRVEC          ;RELEASE TRAP VECTOR
017250  013700  002204                        MOV     ERRVEC,R0
017254  104036                              EMT     C$CVEC
017256  005737  002174                        TST     TRPFLG          ;TRAP OCCURRED???
017262  001407                              BEQ     3$              ;NO, CONTINUE

017264  013737  002132  002234                MOV     RLDA,GDDAT      ;SETUP ERROR INFO
017272                                        ERRSF   102.,EM3,ERR1   ;BUS TIMEOUT IN ADDRESSING RLDA
017272  104461                              TRAP    T$ERCODE
017274  000146                              .WORD   102
017276  006367                              .WORD   EM3
017300  011370                              .WORD   ERR1
017302                                  3$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
017302  104006                              EMT     C$CLP1
017304                                  ENDTST                          ;****END OF TEST****
017304                                  L10027:
017304  104001                              EMT     C$ETST


                                        .SBTTL  **TEST 8** - RLMP READ ADDRESSABILITY

017306                                  BGNTST                          ;****START OF TEST****
017306                                  STARS
                                        ;;**************************************************************
                                        ;TEST TO SEE IF WE CAN ADDRESS THE MULTIPURPOSE
                                        ;REGISTER.  IF WE TRAP WE WILL REPORT THE ERROR AND
                                        ;ABORT.  AFTER THIS TEST WE ONLY KNOW THAT WE CAN
                                        ;ADDRESS THE REGISTER.
017306                                  STARS
                                        ;;**************************************************************


017306  005037  002174                  1$:     CLR     TRPFLG          ;CLEAR TRAP OCCURANCE
017312                                  2$:     SETVEC  ERRVEC,#TRPHAN,#340  ;SET UP TO CATCH TRAP
017312  012746  000340                        MOV     #340,-(SP)
017316  012746  016264                        MOV     #TRPHAN,-(SP)
017322  013746  002204                        MOV     ERRVEC,-(SP)
017326  012746  000003                        MOV     #3,-(SP)
017332  104037                              EMT     C$$VEC
017334  062706  000010                        ADD     #10,SP

017340  005777  162570                        TST     @RLMP           ;ADDRESS RLMP
017344                                        CLRVEC  ERRVEC          ;RELEASE TRAP VECTOR
017344  013700  002204                        MOV     ERRVEC,R0
```

```
CVRLAA.P11    14-APR-78 15:04          **TEST 8** - RLMP READ ADDRESSABILITY

                                       EMT     C$CVEC
                                       TST     TRPFLG          ;TRAP OCCURRED???
                                       BEQ     3$              ;NO, CONTINUE
                                       MOV     RLMP,GDDAT      ;SET UP ERROR INFO

                                       ERRSF   103.,EM4,ERR1   ;BUS TIMEOUT IN ADDRESSING RLMP
                                       TRAP    T$ERCODE
                                       .WORD   103
                                       .WORD   EM4
                                       .WORD   ERR1
                                3$:    CKLOOP                  ;CHECK IF /FL:LOE IS SET
                                       EMT     C$CLP1
                                ENDTST                         ;****END OF TEST****
                                L10030:
                                       EMT     C$ETST

                                .SBTTL  **TEST 9** - BUS RESET OF RLCS

                                BGNTST                         ;****START OF TEST****

                                STARS
                                ;;*************************************************************
                                ;TEST THAT A BUS RESET WILL CLEAR THE PROPER BITS
                                ;OF THE CONTROL AND STATUS REGISTER.  THOSE BITS ARE
                                ;BITS 6-1,8,9,10,11,12,13,15.  BIT 15 WILL CLEAR ONLY
                                ;IF BIT 14 (DRIVE ERROR IS NOT SET).  BIT 0 (DRIVE READY)
                                ;IS A DON'T CARE.  IF AT THE START UP THIS TEST BIT
                                ;14 (DRIVE ERROR) IS SET WE WILL INSIST IF IS THERE AFTER
                                ;THE "RESET" ALONG WITH BIT 15 (COMPOSITE ERROR).  BITS
                                ;15-10 ARE NOT WRITEABLE.
                                STARS
                                ;;*************************************************************


                                       SETPRI  #PRI07          ;PRIORITY TO SEVEN
                                       MOV     #PRI07,R0
                                       EMT     C$SPRI
                                       MOV     #377,@RLCS      ;LOAD ALL RLCS LOADABLE BITS
                                       MOV     #CRDY,GDDAT     ;SETUP EXPECTED
                                       BIT     #DERR,@RLCS     ;DRIVE ERR SET?
                                       BEQ     1$              ;IF NOT DON'T EXPECT IT
                                       BIS     #DERR!ERR,GDDAT ;IT'S SET, INIT BETTER NOT CLR
                                1$:    MOV     #100,R0         ;SET UP A WAIT LOOP
                                       BRESET                  ;BUS RESET
                                       EMT     C$RESET
                                2$:    DEC     R0              ;WAIT IN CASE OF DRIVE ERROR
                                       BNE     2$              ;
                                       MOV     @RLCS,BDDAT     ;READ RLCS
                                       BIC     #DRDY,BDDAT     ;CLEAR OUT DRDY - DON'T CARE
                                       CMP     BDDAT,GDDAT     ;DID INIT WORK
                                       BEQ     3$              ;YES, BRANCH

                                       ERRDF   113.,EM67,ERR2  ;WRONG DATA IN RLCS
                                       TRAP    T$ERCODE
                                       .WORD   113
                                       .WORD   EM67
```

```
1843  017506  011402                    .WORD   ERR2
1844  017510                    3$:
1845  017510                    ENDTST                          ;****END OF TEST****
1846  017510                    L10031:
1847  017510  104001                    EMT     C$ETST
1848
1849
1850                            .SBTTL  **TEST 10** - BUS RESET OF RLBA
1851
1852  017512                    BGNTST                          ;****START OF TEST****
1853
1854  017512                    STARS
1855                            ;;*****************************************************************
1856                            ;TEST THAT A BUS RESET WILL CLEAR THE ENTIRE
1857                            ;BUS ADDRESS REGISTER.  THE BUS ADDRESS IS LOADED WITH 177776
1858                            ;AND IS EXPECTED TO BE ZERO AFTER THE RESET
1859  017512                    STARS
1860                            ;;*****************************************************************
1861
1862
1863  017512  012777  177776  162410        MOV     #-2,@RLBA       ;SET BA TO ALL 1'S
1864  017520  005737  002260                TST     T.CNTLR         ;RL11??
1865  017524  001403                        BEQ     2$              ;NO
1866  017526  052777  000001  162374        BIS     #1,@RLBA
1867  017534  005037  002234        2$:     CLR     GDDAT           ;CLEAR EXPECTED DATA
1868  017540                                BRESET                  ;ISSUE BUS INIT
1869  017540  104033                        EMT     C$RESET
1870  017542  017737  162362  002236        MOV     @RLBA,BDDAT     ;READ RLBA
1871  017550  001404                        BEQ     1$              ;IF CLEAR BRANCH
1872
1873  017552                                ERRDF   114.,EM70,ERR2  ;WRONG DATA IN RLBA
1874  017552  104462                        TRAP    T$ERCODE
1875  017554  000162                        .WORD   114
1876  017556  010562                        .WORD   EM70
1877  017560  011402                        .WORD   ERR2
1878  017562                    1$:
1879
1880  017562                    ENDTST                          ;****END OF TEST****
1881  017562                    L10032:
1882  017562  104001                    EMT     C$ETST
1883
1884
1885                            .SBTTL  **TEST 11** - BUS RESET OF RLDA
1886
1887  017564                    BGNTST                          ;****START OF TEST****
1888
1889  017564                    STARS
1890                            ;;*****************************************************************
1891                            ;TEST THAT A BUS RESET WILL CLEAR THE ENTIRE
1892                            ;DISK ADDRESS REGISTER.  THE DISK ADDRESS IS LOADED WITH 177777
1893                            ;AND IS EXPECTED TO BE ZERO AFTER THE RESET.
1894  017564                    STARS
1895                            ;;*****************************************************************
1896
1897
1898  017564  012777  177777  162340        MOV     #-1,@RLDA       ;SET DA TO ALL 1'S
```

```
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 1899  017572  005037  002234                CLR     GDDAT           ;CLEAR EXPECTED
 1900  017576                                BRESET                  ;ISSUE BUS INIT
 1901  017576  104033                        EMT     C$RESET
 1902  017600  017737  162326  002236        MOV     @RLDA,BDDAT     ;READ RLDA
 1903  017606  001404                        BEQ     1$              ;IF CLEAR BRANCH
 1904
 1905  017610                                ERRDF   115.,EM71,ERR2  ;WRONG DATA IN RLDA
 1906  017610  104462                        TRAP    T$ERCODE
 1907  017612  000163                        .WORD   115
 1908  017614  010617                        .WORD   EM71
 1909  017616  011402                        .WORD   ERR2
 1910  017620                        1$:
 1911
 1912  017620                        ENDTST                          ;****END OF TEST****
 1913  017620                        L10033:
 1914  017620  104001                        EMT     C$ETST
 1915
 1916
 1917                                .SBTTL  **TEST 12** - READ WRITE OF RLCS
 1918
 1919  017622                        BGNTST                          ;****START OF TEST****
 1920
 1921
 1922
 1923  017622                        STARS
 1924                                ;;*************************************************************
 1925                                ;TEST THAT WE CAN WRITE/READ BITS 8,9 AND BITS 6-1
 1926                                ;OF THE CONTROL AND STATUS REGISTER.  BITS 15-10 AND 0
 1927                                ;ARE DON'T CARE BITS AT THIS TIME AND BIT 7
 1928                                ;(CONTROLLER READY) IS ALWAYS WRITTEN TO A ONE.
 1929  017622                        STARS
 1930                                ;;*************************************************************
 1931
 1932
 1933  017622  012703  002700                MOV     #CSPAT,R3       ;SET UP TABLE POINTER OF PATTERNS
 1934
 1935  017626                        BGNSEG                          ;****START OF SEGMENT****
 1936  017626  104004                        EMT     C$BSEG
 1937
 1938  017630                        CSTEST:
 1939  017630  011337  002234                MOV     (R3),GDDAT      ;GET PATTERN INTO GDDAT
 1940  017634  052737  000200  002234        BIS     #200,GDDAT      ;INSURE GO IS SET
 1941  017642  013777  002234  162256        MOV     GDDAT,@RLCS     ;LOAD RLCS (CONTROL AND STATUS)
 1942  017650  032777  040000  162250        BIT     #DERR,@RLCS     ;IF DRIVE ERROR PRESENT
 1943  017656  001403                        BEQ     99$             ;THEN EXPECT DRIVE AND
 1944  017660  052737  140000  002234        BIS     #ERR!DERR,GDDAT ;COMPOSITE ERROR
 1945  017666  017737  162234  002236  99$:  MOV     @RLCS,BDDAT     ;READ RLCS BACK
 1946  017674  042737  000001  002236        BIC     #DRDY,BDDAT     ;IGNORE DRIVE READY
 1947  017702  023737  002234  002236        CMP     GDDAT,BDDAT     ;DID WE READ WHAT WE LOADED
 1948  017710  001404                        BEQ     1$              ;YES, THEN BRANCH
 1949
 1950  017712                                ERRDF   4.,EM5,ERR2     ;WRONG DATA IN RLCS
 1951  017712  104462                        TRAP    T$ERCODE
 1952  017714  000004                        .WORD   4
 1953  017716  006441                        .WORD   EM5
 1954  017720  011402                        .WORD   ERR2
```

```
                                **TEST 12** - READ WRITE OF RLCS

017722                  1$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
017722  104010                  EMT     C$ESCAPE
017724  000012                  .WORD   10000$-.


017726  005723                  TST     (R3)+           ;BUMP FOR NEXT PATTERN
017730  020327  002776          CMP     R3,#CSEND       ;CHECK FOR END
017734  001335                  BNE     CS1TEST         ;NOT END, LOAD NEXT PATTERN

017736                  ENDSEG                          ;****END OF SEGMENT****
017736                  10000$:
017736  104005                  EMT     C$ESEG
017740                  ENDTST                          ;****END OF TEST****
017740                  L10034:
017740  104001                  EMT     C$ETST


                                .SBTTL  **TEST 13** - READ WRITE OF RLBA

017742                  BGNTST                          ;****START OF TEST****

017742                  STARS
                        ;;*************************************************************
                        ;TEST THAT WE CAN WRITE/READ BITS IS THRU 1 OF THE
                        ;BUS ADDRESS REGISTER.  FOUR PATTERNS ARE USED: GROWING 1, SHIFTING 1,
                        ;GROWING 0 AND SHIFTING 0.  BIT 0 IS ALSO LOADED BUT
                        ;SHOULD ALWAYS COME BACK AS 0
017742                  STARS
                        ;;*************************************************************

017742  012703  002304          MOV     #BEGPAT,R3      ;GET START OF PATTERN LIST
017746                  BGNSEG                          ;****START OF SEGMENT****
017746  104004                  EMT     C$BSEG
017750                  BATEST:
017750  011337  002234          MOV     (R3),GDDAT      ;GET PATTERN TO SEND
017754  005737  002260          TST     T.CNTLR         ;RL11??
017760  001403                  BEQ     2$              ;NO.
017762  042737  000001  002234  2$:     BIC     #BIT0,GDDAT     ;KEEP RLBA EVEN (UNIBUS)
017770  013777  002234  162132          MOV     GDDAT,@RLBA     ;LOAD PATTERN TO BUS ADDRESS
017776  017737  162126  002236          MOV     @RLBA,BDDAT     ;READ IT BACK
020004  023737  002234  002236          CMP     GDDAT,BDDAT     ;IS IT CORRECT?
020012  001404                  BEQ     1$              ;IF SO, BRANCH

020014                          ERRDF   5.,EM6,ERR2     ;DATA WRONG IN RLBA
020014  104462                  TRAP    T$ERCODE
020016  000005                  .WORD   5
020020  006512                  .WORD   EM6
020022  011402                  .WORD   ERR2
020024                  1$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
020024  104010                  EMT     C$ESCAPE
020026  000012                  .WORD   10000$-.
```

```
                                        TST     (R3)+           ;BUMP FOR NEXT PATTERN
                                        CMP     R3,#ENDPAT      ;CHECK FOR END
                                        BNE     BA1TEST         ;NOT END, BRANCH FOR NEXT

                                ENDSEG                          ;****END OF SEGMENT****
                                10000$:
                                        EMT     C$ESEG
                                ENDTST                          ;****END OF TEST****
                                L10035:
                                        EMT     C$ETST

                                .SBTTL  **TEST 14** - READ WRITE OF RLDA

                                BGNTST                          ;****START OF TEST****

                                STARS
                                ;;*****************************************************************
                                ;TEST THAT WE CAN WRITE/READ THE DISK ADDRESS REGISTER
                                ;ALL BIT POSITIONS ARE WRITTEN USING FOUR PATTERNS:
                                ;GROWING 1, SHIFTING 1, GROWING 0 AND SHIFTING 0
                                STARS
                                ;;*****************************************************************

                                        MOV     #BEGPAT,R3      ;SET UP POINTER TO PATTERN LIST
                                BGNSEG                          ;****START OF SEGMENT****
                                        EMT     C$BSEG
                                DATEST:
                                        MOV     (R3),GDDAT      ;GET PATTERN
                                        MOV     GDDAT,@RLDA     ;LOAD PATTERN IN DA

                                        MOV     @RLDA,BDDAT     ;READ PATTERN BACK
                                        CMP     GDDAT,BDDAT     ;IS IT CORRECT?
                                        BEQ     1$              ;BRANCH IF CORRECT

                                        ERRDF   6.,EM7,ERR2     ;WRONG DATA IN RLDA
                                        TRAP    T$ERCODE
                                        .WORD   6
                                        .WORD   EM7
                                        .WORD   ERR2
                                1$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
                                        EMT     C$ESCAPE
                                        .WORD   10000$-.

                                        TST     (R3)+           ;BUMP POINTER
                                        CMP     R3,#ENDPAT      ;AT END OF PATTERNS?
                                        BNE     DATEST          ;NO, BRANCH BACK

                                ENDSEG                          ;****END OF SEGMENT****
                                10000$:
                                        EMT     C$ESEG
                                ENDTST                          ;****END OF TEST****
```

```
2063   020130
2064   020130  104001                  L10036:
                                               EMT     C$ETST
2065
2066
2067                                   .SBTTL  **TEST 15** - BIS OF RLCS
2068
2069   020132                          BGNTST                          ;****START OF TEST****
2070   020132                          STARS
2071                                   ;;*************************************************************
2072                                   ;TEST THAT WE CAN USE THE "BIS" INSTRUCTION ON THE CONTROL
2073                                   ;AND STATUS REGISTER.  BITS 8,9 AND 6-1 ARE TESTED TO
2074                                   ;SET INDIVIDUALLY AS WELL AS COLLECTIVELY WITHOUT DESTROYING
2075                                   ;ANY PREVIOUS DATA PATTERN
2076   020132                          STARS
2077                                   ;;*************************************************************
2078
2079
2080   020132  012703  002700                  MOV     #CSPAT,R3       ;GET BEGINNING OF LIST
2081   020136                          BGNSEG                          ;****START OF SEGMENT****
2082   020136  104004                          EMT     C$BSEG
2083   020140                          1$:
2084   020140  012777  000200  161760          MOV     #CRDY,@RLCS     ;INSURE GO IS THERE
2085   020146  011337  002234                 MOV     (R3),GDDAT      ;SET UP EXPECTED RLCS
2086   020152  052737  000200  002234          BIS     #CRDY,GDDAT     ;IN GDDAT
2087   020160  051377  161742                 BIS     (R3),@RLCS      ;BIT SET PATTERN IN RLCS
2088   020164  032777  040000  161734          BIT     #DERR,@RLCS     ;IF ERROR BIT SET THEN
2089   020172  001403                          BEQ     99$             ;EXPECT IT ON THE READ
2090   020174  052737  140000  002234          BIS     #ERR!DERR,GDDAT ;BACK
2091   020202  017737  161720  002236  99$:    MOV     @RLCS,BDDAT     ;READ RLCS TO CHECK "BIS"
2092   020210  042737  000001  002236          BIC     #DRDY,BDDAT     ;CLEAR OUT DRIVE READY
2093   020216  023737  002236  002234          CMP     BDDAT,GDDAT     ;DID BIS WORK?
2094   020224  001404                          BEQ     2$              ;BRANCH IF OKAY
2095
2096   020226                                  ERRDF   7.,EM61,ERR2    ;WRONG DATA IN RLCS
2097   020226  104462                          TRAP    T$ERCODE
2098   020230  000007                          .WORD   7
2099   020232  010051                          .WORD   EM61
2100   020234  011402                          .WORD   ERR2
2101   020236                          2$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
2102   020236  104010                          EMT     C$ESCAPE
2103   020240  000012                          .WORD   10000$-.
2104                                                                   ;BIT OR CLEARED OTHER BIT
2105
2106   020242  005723                          TST     (R3)+           ;GET NEXT PATTERN
2107   020244  022703  002776                 CMP     #CSEND,R3       ;AT END OF LIST
2108   020250  001333                          BNE     1$              ;NO GO BACK FOR TEST OF
2109                                                                   ;NEXT PATTERN
2110   020252                          ENDSEG                          ;****END OF SEGMENT****
2111   020252                          10000$:
2112   020252  104005                          EMT     C$ESEG
2113   020254                          ENDTST                          ;****END OF TEST****
2114   020254                          L10037:
2115   020254  104001                          EMT     C$ETST
2116
2117
2118                                   .SBTTL  **TEST 16** - BIC OF RLCS
```

```
2119
2120  020256                                  BGNTST                          ;****START OF TEST****
2121
2122  020256                                  STARS
2123                                          ;;*************************************************************************
2124                                          ;TEST THAT THE "BIC" INSTRUCTION WILL WORK ON THE
2125                                          ;CONTROL AND STATUS REGISTER.  BITS 8-9 AND 6-1 ARE
2126                                          ;TESTED.
2127  020256                                  STARS
2128                                          ;;*************************************************************************
2129
2130
2131  020256  012703  002700                          MOV     #CSPAT,R3       ;GET BEGINNING OF PATTERNS
2132  020262                                  BGNSEG                          ;****START OF SEGMENT****
2133  020262  104004                                  EMT     CSBSEG
2134  020264                                  1$:
2135  020264  012777  001776  161634                  MOV     #1776,@RLCS     ;SET ALL SETTABLE BITS
2136  020272  012737  001776  002234                  MOV     #1776,GDDAT     ;SET UP EXPECT DATA IN
2137  020300  041337  002234                          BIC     (R3),GDDAT      ;GDDAT
2138  020304  041377  161616                          BIC     (R3),@RLCS      ;CLEAR BITS IN RLCS VIA "BIC"
2139  020310  032777  040000  161610                  BIT     #DERR,@RLCS     ;IF DRIVE ERROR BIT SET
2140  020316  001403                                  BEQ     99$             ;EXPECT IT SET WHEN WE
2141  020320  052737  140000  002234                  BIS     #ERR!DERR,GDDAT ;READ IT BACK
2142  020326  017737  161574  002236  99$:           MOV     @RLCS,BDDAT     ;MOVE RLCS TO BDDAT FOR COMPARE
2143  020334  042737  000001  002236                  BIC     #DRDY,BDDAT     ;CLEAR DRIVE READY
2144  020342  023737  002236  002234                  CMP     BDDAT,GDDAT     ;DID "BIC" WORK PROPERLY
2145  020350  001404                                  BEQ     2$              ;BRANCH IF OKAY
2146
2147  020352                                          ERRDF   8.,EM62,ERR2    ;WRONG DATA IN RLCS
2148  020352  104462                                  TRAP    T$ERCODE
2149  020354  000010                                  .WORD   8
2150  020356  010132                                  .WORD   EM62
2151  020360  011402                                  .WORD   ERR2
2152  020362                                  2$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
2153  020362  104010                                  EMT     CSESCAPE
2154  020364  000012                                  .WORD   10000$-.
2155
2156  020366  005723                                  TST     (R3)+           ;GET NEXT PATTERN
2157  020370  020327  002776                          CMP     R3,#CSEND       ;AT END OF LIST
2158  020374  001333                                  BNE     1$              ;NO, GO BACK WITH NEXT PATTERN
2159  020376                                  ENDSEG                          ;****END OF SEGMENT****
2160  020376                                  10000$:
2161  020376  104005                                  EMT     CSESEG
2162  020400                                  ENDTST                          ;****END OF TEST****
2163  020400                                  L10040:
2164  020400  104001                                  EMT     CSETST
2165
2166
2167                                          .SBTTL  **TEST 17** - BIS OF RLBA
2168
2169  020402                                  BGNTST                          ;****START OF TEST****
2170
2171  020402                                  STARS
2172                                          ;;*************************************************************************
2173                                          ;TEST THAT THE "BIS" INSTRUCTION WILL WORK ON THE BUS
2174                                          ;ADDRESS REGISTER.  BITS 15-0 ARE LOADED, ONLY BITS 15-1
```

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CVRLAA.P11    14-APR-78 15:04          **TEST 17** - BIS OF RLBA

                                       ;ARE EXPECTED BACK.  FOUR PATTERNS ARE USED: GROWING 1, SHIFTING 1,
                                       ;GROWING 0, AND SHIFTING 0.
020402                                 STARS
                                       ;;*****************************************************************

                                                 MOV     #BEGPAT,R3      ;GET START OF LIST
020402  012703  002304                 BGNSEG                          ;****START OF SEGMENT****
020406
020406  104004                         1$:     EMT     C$BSEG
020410
020410  005077  161514                         CLR     @RLBA           ;CLEAR "BA"
020414  011337  002234                         MOV     (R3),GDDAT      ;SET EXPECTED
020420  005737  002260                         TST     T.CNTLR         ;RL11
020424  001403                               BEQ     3$              ;NO
020426  042737  000001  002234               BIC     #1,GDDAT        ;BIT 0 CAN'T SET IN RLBA (UNIBUS)
020434  051377  161470                 3$:     BIS     (R3),@RLBA      ;BIS RLBA WITH PATTERN
020440  017737  161464  002236               MOV     @RLBA,BDDAT     ;READ "BA"
020446  023737  002236  002234               CMP     BDDAT,GDDAT     ;DID RLBA LOAD PROPERLY?
020454  001404                               BEQ     2$              ;BRANCH IF YES

020456                                       ERRDF   9.,EM63,ERR2    ;WRONG DATA IN RLBA
020456  104462                               TRAP    T$ERCODE
020460  000011                               .WORD   9
020462  010215                               .WORD   EM63
020464  011402                               .WORD   ERR2
020466                                 2$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
020466  104010                               EMT     C$ESCAPE
020470  000012                               .WORD   10000$-.

020472  005723                               TST     (R3)+           ;GET NEXT PATTERN
020474  020327  002512                       CMP     R3,#ENDPAT      ;DID WE COMPLETE LIST
020500  001343                               BNE     1$              ;NO, GO BACK FOR NEXT.
020502                                 ENDSEG                        ;****END OF SEGMENT****
020502                                 10000$:
020502  104005                               EMT     C$ESEG
020504                                 ENDTST                        ;****END OF TEST****
020504                                 L10041:
020504  104001                               EMT     C$ETST


                                       .SBTTL  **TEST 18** - BIC OF RLBA

020506                                 BGNTST                        ;****START OF TEST****

020506                                 STARS
                                       ;;*****************************************************************
                                       ;TEST THAT THE "BIC" INSTRUCTION WILL WORK ON THE BUS
                                       ;ADDRESS REGISTER.  BITS 15-1 ARE TESTED WITH 4 PATTERNS
                                       ;GROWING 1, SHIFTING 1, GROWING 0 AND SHIFTING 0.
020506                                 STARS
                                       ;;*****************************************************************


020506  012703  002304                         MOV     #BEGPAT,R3      ;GET START OF LIST
020512                                 BGNSEG                          ;****START OF SEGMENT****
020512  104004                               EMT     C$BSEG
```

```
                                        **TEST 18** - BIC OF RLBA

                                        1$:
020514                                          MOV     #-2,@RLBA       ;SET RLBA TO ALL 1'S (BIT 0=0)
020514  012777  177776  161406                MOV     #-2,GDDAT       ;SET UP EXPECTED RESULTS
020522  012737  177776  002234                BIC     (R3),GDDAT      ;IN GDDAT
020530  041337  002234                        BIC     (R3),@RLBA      ;BIC RLBA
020534  041377  161370                        MOV     @RLBA,BDDAT     ;READ RLBA
020540  017737  161364  002236                CMP     BDDAT,GDDAT     ;BIC WORK OKAY?
020546  023737  002236  002234                BEQ     2$              ;IF YES BRANCH
020554  001404
                                                ERRDF   10.,EM64,ERR2   ;WRONG DATA IN RLBA
020556                                          TRAP    T$ERCODE
020556  104462                                  .WORD   10
020560  000012                                  .WORD   EM64
020562  010276                                  .WORD   ERR2
020564  011402                          2$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
020566                                          EMT     C$ESCAPE
020566  104010                                  .WORD   10000$-.
020570  000012

020572  005723                                  TST     (R3)+           ;GET NEXT PATTERN
020574  020327  002512                          CMP     R3,#ENDPAT      ;HAVE WE COMPLETED LIST
020600  001345                                  BNE     1$              ;NO, GO BACK FOR NEXT
020602                                  ENDSEG                          ;****END OF SEGMENT****
020602                                  10000$:
020602  104005                                  EMT     C$ESEG
020604                                  ENDTST                          ;****END OF TEST****
020604                                  L10042:
020604  104001                                  EMT     C$ETST


                                        .SBTTL  **TEST 19** - BIS OF RLDA

020606                                  BGNTST                          ;****START OF TEST****

020606                                  STARS
                                        ;;*****************************************************************
                                        ;TEST THAT THE "BIS" INSTRUCTION WILL WORK ON THE DISK ADDRESS
                                        ;REGISTER.  BITS 15-0 ARE TESTED WITH 4 PATTERNS, GROWING 1,
                                        ;SHIFTING 1, GROWING 0, AND SHIFTING 0.
020606                                  STARS
                                        ;;*****************************************************************


020606  012703  002304                  BGNSEG  MOV     #BEGPAT,R3      ;GET START OF LIST
020612                                                                  ;****START OF SEGMENT****
020612  104004                                  EMT     C$BSEG
020614                                  1$:
020614  005077  161312                          CLR     @RLDA           ;CLEAR "DA"
020620  011337  002234                          MOV     (R3),GDDAT      ;SET EXPECTED
020624  051377  161302                          BIS     (R3),@RLDA      ;BIS RLDA
020630  017737  161276  002236                MOV     @RLDA,BDDAT     ;READ RLDA
020636  023737  002236  002234                CMP     BDDAT,GDDAT     ;IS RLDA CORRECT
020644  001404                                  BEQ     2$              ;IF OKAY BRANCH

020646                                          ERRDF   11.,EM65,ERR2   ;WRONG DATA IN RLDA
020646  104462                                  TRAP    T$ERCODE
020650  000013                                  .WORD   11
```

```
2287  020652  010361                        .WORD   EM65
2288  020654  011402                        .WORD   ERR2
2289  020656                        2$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
2290  020656  104010                        EMT     C$ESCAPE
2291  020660  000012                        .WORD   10000$-.
2292
2293  020662  005723                        TST     (R3)+           ;GET NEXT PATTERN
2294  020664  020327  002512                CMP     R3,#ENDPAT      ;HAVE WE FINISHED?
2295  020670  001351                        BNE     1$              ;NO GO BACK
2296  020672                        ENDSEG                          ;****END OF SEGMENT****
2297  020672                        10000$:
2298  020672  104005                        EMT     C$ESEG
2299  020674                        ENDTST                          ;****END OF TEST****
2300  020674                        L10043:
2301  020674  104001                        EMT     C$ETST
2302
2303
2304                                .SBTTL  **TEST 20** - BIC OF RLDA
2305
2306  020676                        BGNTST                          ;****START OF TEST****
2307
2308  020676                        STARS
2309                                ;;*********************************************************************
2310                                ;TEST THAT THE "BIC" INSTRUCTION WORKS ON THE DISK
2311                                ;ADDRESS REGISTER.  ALL BITS ARE TESTED WITH FOUR
2312                                ;PATTERNS: GROWING 1, SHIFTING 1, GROWING 0 AND SHIFTING 0
2313  020676                        STARS
2314                                ;;*********************************************************************
2315
2316
2317  020676  012703  002304                MOV     #BEGPAT,R3      ;GET START OF LIST
2318  020702                        BGNSEG                          ;****START OF SEGMENT****
2319  020702  104004                        EMT     C$BSEG
2320  020704                        1$:
2321  020704  012777  177777  161220        MOV     #-1,@RLDA       ;SET RLDA TO ALL 1'S
2322  020712  012737  177777  002234        MOV     #-1,GDDAT       ;SET EXPECTED DATA
2323  020720  041337  002234                BIC     (R3),GDDAT      ;SET EXPECTED DATA
2324  020724  041377  161202                BIC     (R3),@RLDA      ;"BIC" RLDA
2325  020730  017737  161176  002236        MOV     @RLDA,BDDAT     ;READ RLDA
2326  020736  023737  002234  002236        CMP     GDDAT,BDDAT     ;DID "BIC" WORK?
2327  020744  001404                        BEQ     2$              ;IF IT DID BRANCH
2328
2329  020746                                ERRDF   12.,EM66,ERR2   ;WRONG DATA IN RLDA
2330  020746  104462                        TRAP    T$ERCODE
2331  020750  000014                        .WORD   12
2332  020752  010442                        .WORD   EM66
2333  020754  011402                        .WORD   ERR2
2334  020756                        2$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
2335  020756  104010                        EMT     C$ESCAPE
2336  020760  000012                        .WORD   10000$-.
2337
2338  020762  005723                        TST     (R3)+           ;GET NEXT PATTERN
2339  020764  020327  002512                CMP     R3,#ENDPAT      ;DONE?
2340  020770  001345                        BNE     1$              ;NO GO BACK
2341  020772                        ENDSEG                          ;****END OF SEGMENT****
2342  020772                        10000$:
```

```
                        **TEST 20** - BIC OF RLDA

                                EMT     C$ESEG
                        ENDTST                          ;****END OF TEST****
                        L10044:
                                EMT     C$ETST


                        .SBTTL  **TEST 21** - BUS RESET OF RLCS

                        BGNTST                          ;****START OF TEST****

                        STARS
                        ;;*************************************************************
                        ;TEST THAT A BUS RESET WILL CLEAR THE PROPER BITS
                        ;OF THE CONTROL AND STATUS REGISTER.  THOSE BITS ARE
                        ;BITS 6-1,8,9,10,11,12,13,15.  BIT 15 WILL CLEAR ONLY
                        ;IF BIT 14 (DRIVE ERROR IS NOT SET).  BIT 0 (DRIVE READY)
                        ;IS A DON'T CARE.  IF AT THE START UP THIS TEST BIT
                        ;14 (DRIVE ERROR) IS SET WE WILL INSIST IF IS THERE AFTER
                        ;THE "RESET" ALONG WITH BIT 15 (COMPOSITE ERROR).  BITS
                        ;15-10 ARE NOT WRITEABLE.
                        STARS
                        ;;*************************************************************

                                SETPRI  #PRI07          ;PRIORITY TO SEVEN
                                MOV     #PRI07,R0
                                EMT     C$SPRI
                                MOV     #377,@RLCS      ;LOAD ALL RLCS LOADABLE BITS
                                MOV     #CRDY,GDDAT     ;SETUP EXPECTED
                                BIT     #DERR,@RLCS     ;DRIVE ERR SET?
                                BEQ     1$              ;IF NOT DON'T EXPECT IT
                                BIS     #DERR!ERR,GDDAT ;IT'S SET, INIT BETTER NOT CLR
                        1$:     MOV     #100,R0         ;SET UP A WAIT LOOP
                                BRESET                  ;BUS RESET
                                EMT     C$RESET
                        2$:     DEC     R0              ;WAIT IN CASE OF DRIVE ERROR
                                BNE     2$              ;
                                MOV     @RLCS,BDDAT     ;READ RLCS
                                BIC     #DRDY,BDDAT     ;CLEAR OUT DRDY - DON'T CARE
                                CMP     BDDAT,GDDAT     ;DID INIT WORK
                                BEQ     3$              ;YES, BRANCH

                                ERRDF   13.,EM67,ERR2   ;WRONG DATA IN RLCS
                                TRAP    T$ERCODE
                                .WORD   13
                                .WORD   EM67
                                .WORD   ERR2
                        3$:
                        ENDTST                          ;****END OF TEST****
                        L10045:
                                EMT     C$ETST


                        .SBTTL  **TEST 22** - BUS RESET OF RLBA

                        BGNTST                          ;****START OF TEST****
```

```
CVRLAA.P11    14-APR-78 15:04          **TEST 22** - BUS RESET OF RLBA


                                       STARS
021106                                 ;;*****************************************************************
                                       ;TEST THAT A BUS RESET WILL CLEAR THE ENTIRE
                                       ;BUS ADDRESS REGISTER.  THE BUS ADDRESS IS LOADED WITH 177776
                                       ;AND IS EXPECTED TO BE ZERO AFTER THE RESET
021106                                 STARS
                                       ;;*****************************************************************


021106  012777  177776  161014           MOV     #-2,@RLBA       ;SET BA TO ALL 1'S
021114  005737  002260                   TST     T.CNTLR         ;RL11??
021120  001403                           BEQ     2$              ;NO
021122  052777  000001  161000           BIS     #1,@RLBA
021130  005037  002234           2$:     CLR     GDDAT           ;CLEAR EXPECTED DATA
021134                                   BRESET                  ;ISSUE BUS INIT
021134  104033                           EMT     C$RESET
021136  017737  160766  002236           MOV     @RLBA,BDDAT     ;READ RLBA
021144  001404                           BEQ     1$              ;IF CLEAR BRANCH

021146                                   ERRDF   14.,EM70,ERR2   ;WRONG DATA IN RLBA
021146  104462                           TRAP    T$ERCODE
021150  000016                           .WORD   14
021152  010562                           .WORD   EM70
021154  011402                           .WORD   ERR2
021156                           1$:

021156                                 ENDTST                    ;****END OF TEST****
021156                                 L10046:
021156  104001                           EMT     C$ETST


                                       .SBTTL  **TEST 23** - BUS RESET OF RLDA

021160                                 BGNTST                    ;****START OF TEST****

021160                                 STARS
                                       ;;*****************************************************************
                                       ;TEST THAT A BUS RESET WILL CLEAR THE ENTIRE
                                       ;DISK ADDRESS REGISTER.  THE DISK ADDRESS IS LOADED WITH 177777
                                       ;AND IS EXPECTED TO BE ZERO AFTER THE RESET.
021160                                 STARS
                                       ;;*****************************************************************


021160  012777  177777  160744           MOV     #-1,@RLDA       ;SET DA TO ALL 1'S
021166  005037  002234                   CLR     GDDAT           ;CLEAR EXPECTED
021172                                   BRESET                  ;ISSUE BUS INIT
021172  104033                           EMT     C$RESET
021174  017737  160732  002236           MOV     @RLDA,BDDAT     ;READ RLDA
021202  001404                           BEQ     1$              ;IF CLEAR BRANCH

021204                                   ERRDF   15.,EM71,ERR2   ;WRONG DATA IN RLDA
021204  104462                           TRAP    T$ERCODE
021206  000017                           .WORD   15
021210  010617                           .WORD   EM71
```

```
2455  021212  011402                        .WORD   ERR2
2456  021214                          1$:
2457
2458  021214                          ENDTST                          ;****END OF TEST****
2459  021214                          L10047:
2460  021214  104001                        EMT     C$ETST
2461
2462
2463                                  .SBTTL  **TEST 24** - UNIQUENESS OF RLCS
2464
2465  021216                          BGNTST                          ;****START OF TEST****
2466
2467  021216                          STARS
2468                                  ;;*************************************************************************
2469                                  ;TEST THE UNIQUENESS OF THE CONTROL AND STATUS
2470                                  ;REGISTER.  THE RLBA AND RLDA ARE PRELOADED WITH
2471                                  ;177776 AND 177777 RESPECTIVELY.  THE RLCS IS THEN
2472                                  ;LOADED TO INSURE THAT NEITHER THE RLBA OR RLDA
2473                                  ;ARE MODIFIED BY THE WRITING OF THE RLCS.
2474  021216                          STARS
2475                                  ;;*************************************************************************
2476
2477
2478  021216  012737  000201  002200          MOV     #DRDY!CRDY,LDCSR        ;SET DRIVE AND CONTROLLER READY
2479  021224  012777  177776  160676          MOV     #-2,@RLBA               ;SET RLBA TO ALL 1'S
2480  021232  012777  177777  160672          MOV     #-1,@RLDA               ;SET RLDA TO ALL 1'S
2481  021240  013777  002200  160660          MOV     LDCSR,@RLCS             ;WRITE RLCS
2482
2483                                  ;CHECK THAT RLBA REMAINED UNEFFECTED
2484
2485  021246  022777  177776  160654          CMP     #-2,@RLBA       ;RLBA OKAY?
2486  021254  001412                          BEQ     1$              ;YES, GO CHECK DA
2487
2488  021256  012737  177776  002234          MOV     #-2,GDDAT       ;SET UP EXPECTED
2489  021264  017737  160640  002236          MOV     @RLBA,BDDAT     ;READ RLBA
2490
2491  021272                                  ERRDF   16.,EM72,ERR2   ;CS MODIFIED BA
2492  021272  104462                          TRAP    T$ERCODE
2493  021274  000020                          .WORD   16
2494  021276  010654                          .WORD   EM72
2495  021300  011402                          .WORD   ERR2
2496  021302                          1$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
2497  021302  104006                          EMT     C$CLP1
2498
2499  021304  022777  177777  160620          CMP     #-1,@RLDA       ;RLDA OKAY?
2500  021312  001412                          BEQ     2$              ;YES, CONTINUE
2501
2502  021314  012737  177777  002234          MOV     #-1,GDDAT       ;SET UP EXPECTED
2503  021322  017737  160604  002236          MOV     @RLDA,BDDAT     ;READ DA
2504
2505  021330                                  ERRDF   17.,EM73,ERR2   ;CS MODIFIED DA
2506  021330  104462                          TRAP    T$ERCODE
2507  021332  000021                          .WORD   17
2508  021334  010707                          .WORD   EM73
2509  021336  011402                          .WORD   ERR2
2510  021340                          2$:
```

```
2511
2512
2513  021340                          ENDTST                          ;****END OF TEST****
2514  021340                          L10050:
2515  021340  104001                         EMT     C$ETST
2516
2517
2518                                  .SBTTL  **TEST 25** - UNIQUENESS OF RLBA
2519
2520  021342                          BGNTST                          ;****START OF TEST****
2521  021342                          STARS
2522                                  ;;*********************************************************************
2523                                  ;TEST THE UNIQUENESS OF THE BUS ADDRESS REGISTER.  THE
2524                                  ;RLCS AND RLDA ARE LOADED WITH XXX20X AND 177777
2525                                  ;RESPECTIVELY.  THE RLBA IS THEN WRITTEN TO INSURE
2526                                  ;THAT NEITHER THE RLCS OR RLDA ARE MODIFIED
2527                                  ;BY WRITING THE RLBA.
2528  021342                          STARS
2529                                  ;;*********************************************************************
2530
2531
2532  021342  012737  000200  002234          MOV     #CRDY,@DDAT     ;CONTROLLER READY
2533  021350  032777  040000  160550          BIT     #DERR,@RLCS     ;IF DRIVE ERROR IS
2534  021356  001403                          BEQ     99$             ;SET THEN EXPECT IT
2535  021360  052737  140000  002234          BIS     #ERR!DERR,@DDAT ;SET WHEN WE READ IT.
2536  021366  013777  002234  160532  99$:    MOV     @DDAT,@RLCS     ;LOAD RLCS
2537  021374  012777  177777  160530          MOV     #-1,@RLDA       ;LOAD RLDA
2538  021402  005077  160522                  CLR     @RLBA           ;CLEAR RLBA
2539
2540                                  ;CHECK IF RLCS IS OKAY
2541
2542  021406  017737  160514  002236          MOV     @RLCS,@BDDAT    ;READ RLCS
2543  021414  042737  000001  002236          BIC     #DRDY,@BDDAT    ;IGNORE DRIVE READY
2544  021422  023737  002236  002234          CMP     @BDDAT,@DDAT    ;CS OK?
2545  021430  001404                          BEQ     1$              ;YES, GO CHECK DA
2546
2547  021432                                  ERRDF   18.,EM74,ERR2   ;BA MODIFIED CS
2548  021432  104462                          TRAP    T$ERCODE
2549  021434  000022                          .WORD   18
2550  021436  010742                          .WORD   EM74
2551  021440  011402                          .WORD   ERR2
2552  021442                          1$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
2553  021442  104006                          EMT     C$CLP1
2554
2555  021444  022777  177777  160460          CMP     #-1,@RLDA       ;IS RLDA OKAY?
2556
2557  021452  001412                          BEQ     2$              ;IF OKAY BRANCH
2558
2559  021454  012737  177777  002234          MOV     #-1,@DDAT       ;SET UP EXPECTED
2560  021462  017737  160444  002236          MOV     @RLDA,@BDDAT    ;READ RLDA
2561
2562  021470                                  ERRDF   19.,EM75,ERR2   ;BA MODIFIED DA
2563  021470  104462                          TRAP    T$ERCODE
2564  021472  000023                          .WORD   19
2565  021474  010774                          .WORD   EM75
2566  021476  011402                          .WORD   ERR2
```

```
2567  021500
2568  021500
2569  021500
2570  021500  104001                  2$:
                                       ENDTST                          ;****END OF TEST****
                                       L10051:
                                               EMT     C$ETST
2571
2572
2573                                   .SBTTL  **TEST 26** - UNIQUENESS OF RLDA
2574
2575  021502                           BGNTST                          ;****START OF TEST****
2576
2577
2578  021502                           STARS
2579                                   ;;*************************************************************************
2580                                   ;TEST THE UNIQUENESS OF THE DISK ADDRESS REGISTER.  THE RLCS
2581                                   ;AND RLBA ARE LOADED WITH XXX20X AND 177776
2582                                   ;RESPECTIVELY.  THE RLDA IS THEN WRITTEN TO INSURE
2583                                   ;THAT NEITHER THE RLCS OR THE RLBA ARE MODIFIED
2584                                   ;BY WRITING THE RLDA.
2585  021502                           STARS
2586                                   ;;*************************************************************************
2587
2588
2589  021502  012737  000200  002234           MOV     #CRDY,GDDAT     ;CONTROLLER READY
2590  021510  032777  040000  160410           BIT     #DERR,@RLCS     ;IF DRIVE ERROR SET
2591  021516  001403                           BEQ     99$             ;THEN EXPECT IT LATER
2592  021520  052737  140000  002234           BIS     #ERR!DERR,GDDAT
2593  021526  013777  002234  160372  99$:     MOV     GDDAT,@RLCS     ;LOAD CS
2594  021534  012777  177776  160366           MOV     #-2,@RLBA       ;LOAD BA WITH ALL 1'S
2595  021542  005077  160364                   CLR     @RLDA           ;CLEAR RLDA
2596
2597                                   ;CHECK IF RLCS IS OKAY
2598
2599  021546  017737  160354  002236           MOV     @RLCS,BDDAT     ;READ RLCS
2600  021554  042737  000001  002236           BIC     #DRDY,BDDAT     ;IGNORE DRIVE READY
2601  021562  023737  002234  002236           CMP     GDDAT,BDDAT     ;RLCS OKAY?
2602  021570  001404                           BEQ     1$              ;YES, THEN BRANCH
2603
2604  021572                                   ERRDF   20.,EM76,ERR2   ;DA MODIFIED CS
2605  021572  104462                           TRAP    T$ERCODE
2606  021574  000024                           .WORD   20
2607  021576  011026                           .WORD   EM76
2608  021600  011402                           .WORD   ERR2
2609  021602                           1$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
2610  021602  104006                           EMT     C$CLP1
2611
2612  021604  022777  177776  160316           CMP     #-2,@RLBA       ;IS RLBA OKAY?
2613  021612  001412                           BEQ     2$              ;BRANCH IF OKAY
2614
2615  021614  012737  177776  002234           MOV     #-2,GDDAT       ;SET UP EXPECTED
2616  021622  017737  160302  002236           MOV     @RLBA,BDDAT     ;READ RLBA
2617
2618  021630                                   ERRDF   21.,EM77,ERR2   ;DA MODIFIED BA
2619  021630  104462                           TRAP    T$ERCODE
2620  021632  000025                           .WORD   21
2621  021634  011061                           .WORD   EM77
2622  021636  011402                           .WORD   ERR2
```

```
2623  021640                        2$:
2624
2625
2626  021640                        ENDTST                          ;****END OF TEST****
2627  021640                        L10052:
2628  021640  104001                        EMT     C$ETST
2629
2630                                .SBTTL  **TEST 27** - UNIQUENESS OF RLMP
2631
2632  021642                        BGNTST                          ;****START OF TEST****
2633
2634
2635  021642                        STARS
2636                                ;;*************************************************************
2637                                ;TEST THE UNIQUENESS OF THE MULTI-PURPOSE REGISTER
2638                                ;WE WILL WRITE THE RLCS, RLBA, AND THE RLDA, THEN THE
2639                                ;RLMP IS WRITTEN. WE THEN GO BACK AN VERIFY THE CONTENTS
2640                                ;OF THE RLCS, RLBA, RLDA.
2641  021642                        STARS
2642                                ;;*************************************************************
2643
2644
2645  021642  012737  000200  002234        MOV     #CRDY,GDDAT     ;CONTROLLER READY
2646  021650  032777  040000  160250        BIT     #DERR,@RLCS     ;IF DRIVE ERROR SET
2647  021656  001403                        BEQ     99$             ;THE EXPECT IT LATER
2648  021660  052737  140000  002234        BIS     #ERR!DERR,GDDAT
2649  021666  013777  002234  160232  99$:  MOV     GDDAT,@RLCS     ;LOAD CS
2650  021674  012777  177776  160226        MOV     #-2,@RLBA       ;LOAD BA WITH ALL 1'S
2651  021702  012777  177777  160222        MOV     #-1,@RLDA       ;LOAD RLDA
2652  021710  005077  160220               CLR     @RLMP           ;WRITE RLMP
2653
2654                                ;CHECK IF RLCS IS OKAY
2655
2656  021714  017737  160206  002236        MOV     @RLCS,BDDAT     ;READ RLCS
2657  021722  042737  000001  002236        BIC     #DRDY,BDDAT     ;IGNORE DRIVE READY
2658  021730  023737  002234  002236        CMP     GDDAT,BDDAT     ;RLCS OKAY?
2659  021736  001404                        BEQ     1$              ;YES, THEN BRANCH
2660
2661  021740                                ERRDF   22.,EM44,ERR2   ;MP MODIFIED CS
2662  021740  104462                        TRAP    T$ERCODE
2663  021742  000026                        .WORD   22
2664  021744  007730                        .WORD   EM44
2665  021746  011402                        .WORD   ERR2
2666  021750                        1$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
2667  021750  104006                        EMT     C$CLP1
2668
2669  021752  022777  177776  160150        CMP     #-2,@RLBA       ;IS RLBA OKAY?
2670  021760  001412                        BEQ     2$              ;BRANCH IF OKAY
2671
2672  021762  012737  177776  002234        MOV     #-2,GDDAT       ;SET UP EXPECTED
2673  021770  017737  160134  002236        MOV     @RLBA,BDDAT     ;READ RLBA
2674
2675  021776                                ERRDF   23.,EM45,ERR2   ;MP MODIFIED BA
2676  021776  104462                        TRAP    T$ERCODE
2677  022000  000027                        .WORD   23
2678  022002  007763                        .WORD   EM45
```

```
2679  022004  011402                          .WORD   ERR2
2680  022006                          2$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
2681  022006  104006                          EMT     C$CLP1
2682  022010  022777  177777  160114          CMP     #-1,@RLDA       ;DISK ADDRESS OKAY
2683  022016  001412                          BEQ     3$              ;YES, CONTINUE
2684
2685  022020  017737  160106  002236          MOV     @RLDA,BDDAT     ;SET UP BAD
2686  022026  012737  177777  002234          MOV     #-1,GDDAT       ;SET UP EXPECTED
2687
2688  022034                                  ERRDF   24.,EM46,ERR2   ;MP MODIFIED DA
2689  022034  104462                          TRAP    T$ERCODE
2690  022036  000030                          .WORD   24
2691  022040  010016                          .WORD   EM46
2692  022042  011402                          .WORD   ERR2
2693
2694  022044                          3$:
2695
2696
2697  022044                          ENDTST                          ;****END OF TEST****
2698  022044                          L10053:
2699  022044  104001                          EMT     C$ETST
2700
2701                                  .SBTTL  **TEST 28** - NOOP FUNCTION(RL11 ONLY)
2702
2703  022046                          BGNTST                          ;****START OF TEST****
2704
2705
2706
2707  022046                          STARS
2708                                  ;;*********************************************************************
2709                                  ;TEST THAT NOOP WILL FUNCTION.  WE WILL ISSUE THE
2710                                  ;NOOP AND WAIT FOR CONTROLLER READY TO SET.  A
2711                                  ;TIMEOUT OF 200 MILLISECS IS ALLOWED.  DRIVE 0 IS ALWAYS
2712                                  ;SELECTED SINCE THE DRIVE IS NOT NECESSARY.
2713  022046                          STARS
2714                                  ;;*********************************************************************
2715
2716
2717  022046  005737  002260                  TST     T.CNTLR         ;RLV11??
2718  022052  001410                          BEQ     99$             ;YES SKIP TEST
2719
2720
2721  022054  004537  014602                  JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
2722  022060  000000                          NOOP0                   ;NOOP(0) FUNCTION
2723  022062  004537  016354                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
2724  022066                          2$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
2725  022066  104006                          EMT     C$CLP1
2726
2727  022070  004537  014302                  JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
2728
2729  022074                          99$:
2730  022074                          ENDTST                          ;****END OF TEST****
2731  022074                          L10054:
2732  022074  104001                          EMT     C$ETST
2733
2734
```

```
CVRLAA.P11    14-APR-78 15:04          **TEST 29** - TEST NOOP DOES NOTHING (RL11 ONLY)

                                       .SBTTL  **TEST 29** - TEST NOOP DOES NOTHING (RL11 ONLY)

022076                                 BGNTST                          ;****START OF TEST****

022076                                 STARS
                                       ;;*****************************************************************
                                       ;TEST THAT ISSUING A NOOP FUNCTION DOES NOTHING.  THIS IS DONE BY WRITING
                                       ;THE RLBA, AND RLDA, READING THE RLMP AND MAKING SURE NOTHING CHANGES.
022076                                 STARS
                                       ;;*****************************************************************

022076  005737  002260                         TST     T.CNTLR         ;RLV11??
022102  001476                                 BEQ     3$

022104  012777  000001  160020                 MOV     #1,@RLDA        ;LOAD DISK ADDRESS
022112  012777  000002  160010                 MOV     #2,@RLBA        ;LOAD BUS ADDRESS
022120  005077  160010                         CLR     @RLMP
022124  017737  160004  002234                 MOV     @RLMP,GDDAT     ;READ RLMP

022132  004537  014602                         JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
022136  000000                               NOOPD
022140  004537  016354                         JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
022144                                       CKLOOP                  ;CHECK IF /FL:LOE IS SET
022144  104006                               EMT     C$CLP1

022146  004537  014302                         JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
022152                                       ESCAPE  TST             ;IF /FL:LOE SET LOOP, ELSE EXIT TST
022152  104010                               EMT     C$ESCAPE
022154  000124                               .WORD   L10055-.

022156  017737  157752  002236                 MOV     @RLMP,BDDAT     ;READ RLMP
022164  023737  002234  002236                 CMP     GDDAT,BDDAT     ;RLMP OK?
022172  001404                                 BEQ     1$

022174                                       ERRDF   25.,EM14,ERR2
022174  104462                               TRAP    T$ERCODE
022176  000031                               .WORD   25
022200  006763                               .WORD   EM14
022202  011402                               .WORD   ERR2

022204                                 1$:   CKLOOP                  ;CHECK IF /FL:LOE IS SET
022204  104006                               EMT     C$CLP1

022206  012737  000002  002234                 MOV     #2,GDDAT        ;SET UP EXP'D BA
022214  017737  157710  002236                 MOV     @RLBA,BDDAT     ;READ BA
022222  023737  002234  002236                 CMP     GDDAT,BDDAT     ;BA OK?
022230  001404                                 BEQ     2$              ;YES

022232                                       ERRDF   26.,EM15,ERR2
022232  104462                               TRAP    T$ERCODE
022234  000032                               .WORD   26
022236  007011                               .WORD   EM15
022240  011402                               .WORD   ERR2

022242                                 2$:   CKLOOP                  ;CHECK IF /FL:LOE IS SET
022242  104006                               EMT     C$CLP1
```

```
2791
2792  022244  012737  000001  002234          MOV     #1,GDDAT        ;SET UP EXP'D DA
2793  022252  017737  157654  002236          MOV     @RLDA,BDDAT     ;READ DA
2794  022260  023737  002234  002236          CMP     GDDAT,BDDAT     ;DA OKAY
2795  022266  001404                          BEQ     3$
2796
2797  022270                                  ERRDF   27.,EM16,ERR2
2798  022270  104462                          TRAP    T$ERCODE
2799  022272  000033                          .WORD   27
2800  022274  007037                          .WORD   EM16
2801  022276  011402                          .WORD   ERR2
2802
2803  022300                          3$:
2804
2805  022300                          ENDTST                          ;****END OF TEST****
2806  022300                          L10055:
2807  022300  104001                          EMT     C$ETST
2808
2809
2810                                  .SBTTL  **TEST 30** - TEST OF INTERRUPT (RL11 ONLY)
2811
2812  022302                          BGNTST                          ;****START OF TEST****
2813
2814  022302                          STARS
2815                                  ;;**************************************************************
2816                                  ;CHECK THE INTERRUPT WITH A NOOP.  WE WILL SET UP THE
2817                                  ;INTERRUPT VECTOR, LOWER THE PSW TO ZERO AND ISSUE
2818                                  ;A NOOP.  THE INTERRUPT SERVICE ROUTINE WILL SET A
2819                                  ;FLAG UPON INTERRUPT AND RETURN IN LINE.  WE WAIT 200 MILLISECONDS
2820                                  ;LOOKING FOR THAT FLAG TO BE SET BEFORE CALLING IT
2821                                  ;AN ERROR.  IF THE INTERRUPT SENDS US TO ANOTHER
2822                                  ;VECTOR ADDRESS THEN THE ERROR HANDLER WILL REPORT
2823                                  ;"TRAP TO XXXX FROM YYYY" AND RETURN  TO DIAG SUP MONITOR.  IF THE
2824                                  ;INTERRUPT GOES TO ABOVE 1000 WHO KNOWS WHAT WILL HAPPEN.
2825  022302                          STARS
2826                                  ;;**************************************************************
2827
2828
2829  022302  005737  002260                  TST     T.CNTLR
2830  022306  001426                          BEQ     99$
2831
2832  022310  005037  002176                  CLR     INTFLG          ;CLEAR INTERRUPT OCCRUANCE FLAG
2833  022314                                  SETPRI  #PRI00          ;SET PSW TO 0
2834  022314  012700  000000                  MOV     #PRI00,R0
2835  022320  104041                          EMT     C$SPRI
2836  022322  004537  014602                  JSR     R5,LDFUNC       ;ISSUE FUNCTION OF FOLLOWING WORD
2837  022326  000100                          NOOP0!INTEN             ;NOOP AND INTERRUPT ENABLE
2838  022330  004537  016354                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY HIGH
2839  022334  005737  002176                  TST     INTFLG          ;DID INTERRUPT OCCUR
2840  022340  001004                          BNE     2$              ;IF SO BRANCH
2841  022342                                  ERRDF   28.,EM13,ERR0
2842  022342  104462                          TRAP    T$ERCODE
2843  022344  000034                          .WORD   28
2844  022346  006731                          .WORD   EM13
2845  022350  011352                          .WORD   ERR0
2846  022352  005037  002176          2$:     CLR     INTFLG
```

```
2847  022356                                  CKLOOP                          ;CHECK IF /FL:LOE IS SET
2848  022356  104006                         EMT     C$CLP1
2849  022360  004537  014302                 JSR     R5,CHERR                ;CHECK CONTROLLER FOR ERRORS
2850
2851
2852  022364                          99$:
2853  022364                          ENDTST                                  ;****END OF TEST****
2854  022364                          L10056:
2855  022364  104001                         EMT     C$ETST
2856
2857
2858                                  .SBTTL  **TEST 31** - TEST PRIORITY BR LEVEL (RL11 ONLY)
2859
2860  022366                          BGNTST                                  ;****START OF TEST****
2861
2862  022366                          STARS
2863                                  ;;*************************************************************************
2864                                  ;TEST THAT PRIORITY GIVEN IS ACTUAL PRIORITY OF CONTROLLER.  WE KNOW
2865                                  ;THE BOARD WILL INTERRUPT.  WE WILL START TRYING TO INTERRUPT AT 7
2866                                  ;AND WORK DOWN TIL IT DOES INTERRUPT.
2867  022366                          STARS
2868                                  ;;*************************************************************************
2869
2870  022366  005737  002260                 TST     T.CNTLR                 ;RLV11??
2871  022372  001456                         BEQ     6$                      ;YES, SKIP TEST
2872
2873  022374  012737  000340  002236         MOV     #340,BDDAT              ;SET UP INITIAL OF 7
2874  022402  013737  002140  002234         MOV     3PRIOR,GDDAT            ;GET GIVEN PRIORITY
2875
2876  022410                          BGNSEG                                  ;****START OF SEGMENT****
2877  022410  104004                         EMT     C$BSEG
2878
2879  022412  005037  002176          5$:    CLR     INTFLG                  ;CLEAR INTERRUPT OCCURRANCE
2880  022416                                  SETPRI  BDDAT                   ;SET PRIORITY
2881  022416  013700  002236                 MOV     BDDAT,R0
2882  022422  104041                         EMT     C$SPRI
2883
2884  022424  004537  014602                 JSR     R5,LDFUNC               ;ISSUE FUNCTION OF FOLLOWING WORD
2885  022430  000100                         NOOPO!INTEN
2886
2887  022432  004537  016354                 JSR     R5,WTCRDY               ;WAIT FOR CONTROLLER READY HIGH
2888  022436                                  ESCAPE  TST                     ;IF /FL:LOE SET LOOP, ELSE EXIT TST
2889  022436  104010                         EMT     C$ESCAPE
2890  022440  000070                         .WORD   L10057-.
2891
2892  022442  004537  014302                 JSR     R5,CHERR                ;CHECK CONTROLLER FOR ERRORS
2893  022446                                  ESCAPE  TST                     ;IF /FL:LOE SET LOOP, ELSE EXIT TST
2894  022446  104010                         EMT     C$ESCAPE
2895  022450  000060                         .WORD   L10057-.
2896
2897  022452  023737  002236  002234         CMP     BDDAT,GDDAT             ;SHOULD IT INTERRUPT
2898  022460  002012                         BGE     1$                      ;NO, BRANCH
2899
2900  022462  005737  002176                 TST     INTFLG                  ;DID INTERRUPT OCCUR
2901  022466  001004                         BNE     2$                      ;YES, OK
2902
```

```
CVRLAA.P11    14-APR-78 15:04          **TEST 31** - TEST PRIORITY BR LEVEL (RL11 ONLY)

 2903  022470                         3$:     ERRDF   29.,EM17,ERR7
 2904  022470  104462                         TRAP    TSERCODE
 2905  022472  000035                         .WORD   29
 2906  022474  007065                         .WORD   EM17
 2907  022476  011670                         .WORD   ERR7
 2908
 2909  022500                         2$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
 2910  022500  104010                         EMT     CSESCAPE
 2911  022502  000014                         .WORD   10000$-.
 2912  022504  000405                         BR      4$
 2913  022506  005737  002176         1$:     TST     INTFLG          ;DID INTERRUPT OCCUR
 2914  022512  001772                         BEQ     2$              ;NO, OK
 2915  022514  000765                         BR      3$              ;YES, ERROR
 2916
 2917  022516                         ENDSEG                          ;****END OF SEGMENT****
 2918  022516                         10000$:
 2919  022516  104005                         EMT     CSESEG
 2920  022520  162737  000040  002236 4$:     SUB     #40,BDDAT       ;NEXT LEVEL
 2921  022526  100331                         BPL     5$
 2922
 2923  022530                         6$:
 2924  022530                         ENDTST                          ;****END OF TEST****
 2925  022530                         L10057:
 2926  022530  104001                         EMT     CSETST
 2927
 2928
 2929                                 .SBTTL  **TEST 32** - RLV11 MAINT. FORCED OPI TEST,LESS THAN 510 WORDS
 2930
 2931  022532                         BGNTST                          ;****START OF TEST****
 2932
 2933  022532                         STARS
 2934                                 ;;*********************************************************************
 2935                                 ;PERFORM RLV11 MAINTENANCE FUNCTION 0 WITH LESS THAN 510 WORDS
 2936                                 ;TO FORCE OPI ERROR. THE TEST SHOULD FORCE COMPOSITE ERROR(BIT 15),
 2937                                 ;HEADER NOT FOUND(BIT12) AND OPI(BIT 10). DRIVE ERROR IS IGNORED.
 2938  022532                         STARS
 2939                                 ;;*********************************************************************
 2940  022532  005737  002260                 TST     T.CNTLR         ;RLV11?
 2941  022536  001040                         BNE     10$             ;NO,EXIT TEST
 2942  022540  012703  002514         1$:     MOV     #PATCRC,R3      ;GET CRC PATTERN TABLE
 2943  022544  012704  002606                 MOV     #PATDAT,R4      ;GET DATA PATTERN TABLE
 2944  022550  011337  022564                 MOV     (R3),2$         ;STORE CRC PATTERN
 2945  022554  011437  022572                 MOV     (R4),3$         ;STORE DATA PATTERN
 2946  022560  004537  015216                 JSR     R5,CALCRC       ;CALCULATE CRC BEFORE TEST
 2947  022564  000000         2$:     .WORD   0
 2948  022566  004537  015454                 JSR     R5,SETPAT       ;SETUP PATTERN BEFORE TEST
 2949  022572  000000         3$:     .WORD   0
 2950  022574                                 BGNSEG
 2951  022574  104004                         EMT     CSBSEG
 2952  022576  004537  015542                 JSR     R5,LDFUN        ;PERFORM MAINT FUNCTION
 2953  022602  000000                         MAINT
 2954  022604  177271                         -507                    ;LESS THAN 510 WORDS
 2955  022606  006044                         MATMES                  ;MAINT. MESSAGE
 2956  022610  004537  016354                 JSR     R5,WTCRDY
 2957  022614                                 CKLOOP                  ;LOOP SWITCH
 2958  022614  104006                         EMT     CSCLP1
```

```
                        **TEST 32** - RLV11 MAINT. FORCED OPI TEST,LESS THAN 510 WORDS

                                JSR     R5,CHKOPI       ;CHECK FOR EXPECTED ERRORS
                                BR      4$              ;EXPECTED ERRORS FOUND,EXIT TEST
                                ERRDF   30.,EM27,ERR10
                                TRAP    T$ERCODE
                                .WORD   30
                                .WORD   EM27
                                .WORD   ERR10
                        4$:     CKLOOP
                                EMT     C$CLP1
                                ENDSEG
                        10000$:
                                EMT     C$ESEG
                        10$:

                        ENDTST
                        L10060:
                                EMT     C$ETST

                        .SBTTL  **TEST 33** - RLV11 MAINT. FORCED OPI TEST,MORE THAN 511 WORDS

                        BGNTST                          ;****START OF TEST****

                        STARS
                        ;;*************************************************************
                        ;PERFORM RLV11 MAINTENANCE FUNCTION 0 WITH MORE THAN 511 WORDS
                        ;TO FORCE OPI ERROR. THE TEST SHOULD FORCE COMPOSITE ERROR(BIT 15),
                        ;HEADER NOT FOUND(BIT12) AND OPI(BIT 10). DRIVE ERROR IS IGNORED.
                        STARS
                        ;;*************************************************************
                                TST     T.CNTLR         ;RLV11?
                                BNE     10$             ;NO,EXIT TEST
                        1$:     MOV     #PATCRC,R3      ;GET CRC PATTERN TABLE
                                MOV     #PATDAT,R4      ;GET DATA PATTERN TABLE
                                MOV     (R3),2$         ;STORE CRC PATTERN
                                MOV     (R4),3$         ;STORE DATA PATTERN
                                JSR     R5,CALCRC       ;CALCULATE CRC BEFORE TEST
                        2$:     .WORD   0
                                JSR     R5,SETPAT       ;SETUP PATTERN BEFORE TEST
                        3$:     .WORD   0
                                BGNSEG
                                EMT     C$BSEG
                                JSR     R5,LDFUN        ;PERFORM MAINT FUNCTION
                                MAINT
                                -512                    ;MORE THAN 511 WORDS
                                MAINES                  ;MAINT. MESSAGE
                                JSR     R5,WTCRDY
                                CKLOOP                  ;LOOP SWITCH
                                EMT     C$CLP1
                                JSR     R5,CHKOPI       ;CHECK FOR EXPECTED ERRORS
                                BR      4$              ;EXPECTED ERRORS FOUND,EXIT TEST
                                ERRDF   31.,EM30,ERR10
                                TRAP    T$ERCODE
                                .WORD   31
                                .WORD   EM30
                                .WORD   ERR10
                        4$:     CKLOOP
```

```
                                        EMT     C$CLP1
                                        ENDSEG
                                100000$:
                                        EMT     C$ESEG
                                10$:

                                ENDTST
                                L10061:
                                        EMT     C$ETST

                                .SBTTL  **TEST 34** - RLV11 MAINT. FORCED OPI TEST - INTERRUPT MODE

                                BGNTST                          ;****START OF TEST****

                                STARS
                                ;;*************************************************************
                                ;PERFORM TEST OF INTERRUPT BY ISSUING RLV11 MAINTENANCE FUNCTION 0
                                ;WITH MORE THAN 511 WORDS TO FORCE OPI ERROR. CHECK INTERRUPT
                                ;OPERATION AND REPORT IF ERROR OCCURS.
                                STARS
                                ;;*************************************************************

                                        TST     T.CNTLR         ;RLV11?
                                        BNE     10$             ;NO,EXIT TEST
                                1$:     MOV     #PATCRC,R3      ;GET CRC PATTERN TABLE
                                        MOV     #PATDAT,R4      ;GET DATA PATTERN TABLE
                                        MOV     (R3),2$         ;STORE CRC PATTERN
                                        MOV     (R4),3$         ;STORE DATA PATTERN
                                        JSR     R5,CALCRC       ;CALCULATE CRC
                                2$:     .WORD   0
                                        JSR     R5,SETPAT       ;SETUP PATTERN
                                3$:     .WORD   0
                                        BGNSEG
                                        EMT     C$BSEG
                                        SETPRI  #PRI00          ;SET PRIORITY TO ZERO
                                        MOV     #PRI00,R0
                                        EMT     C$SPRI
                                        CLR     INTFLG          ;CLEAR INT. FLAG
                                        JSR     R5,LDFUN
                                        MAINT!INTEN             ;MAINT FUNCTION,INT DRIVEN
                                        -512                    ;MORE THAN 511 TO FORCE OPI ERROR
                                        MAINT
                                        JSR     R5,WTCRDY       ;WAIT FOR READY
                                        CKLOOP
                                        EMT     C$CLP1
                                        SETPRI  #PRI07
                                        MOV     #PRI07,R0
                                        EMT     C$SPRI
                                        TST     INTFLG          ;CHECK IF INTERRUPT OCCURRED
                                        BNE     4$
                                        ERRDF   32.,EM24,ERR0
                                        TRAP    T$ERCODE
                                        .WORD   32
                                        .WORD   EM24
                                        .WORD   ERR0
                                4$:     CLR     INTFLG          ;CLEAR INT. FLAG
```

```
                                        CKLOOP
                                        EMT     C$CLP1
                                        ENDSEG
                                10000$:
                                        EMT     C$ESEG
                                10$:

                                ENDTST
                                L10062:
                                        EMT     C$ETST


                                .SBTTL  **TEST 35** - RLV11 OPI TIMEOUT TEST

                                BGNTST                          ;START OF TEST

                                STARS
                                ;;*************************************************************
                                ;PERFORM RLV11 MAINTENANCE FUNCTION (0) WITH INTERRUPT MODE. FORCE
                                ;OPI TIMEOUT BY SETTING WORD COUNT TO -512 WORDS. MEASURE OPI TIMEOUT
                                ;AND COMPARE TO MIN. AND MAX. LIMITS.
                                STARS
                                ;;*************************************************************

023106  005737  002260                  TST     T.CNTLR         ;RLV11?
023112  001402                          BEQ     1$              ;YES,PERFORM TEST
023114  000137  023434                  JMP     10$             ;RL11,EXIT TEST
023120  012703  002514          1$:     MOV     #PATCRC,R3      ;GET CRC PATTERN TABLE
023124  012704  002606                  MOV     #PATDAT,R4      ;GET DATA PATTERN TABLE
023130  011337  023144                  MOV     (R3),2$         ;STORE CRC PATTERN
023134  011437  023152                  MOV     (R4),3$         ;STORE DATA PATTERN
023140  004537  015216                  JSR     R5,CALCRC       ;CALCULATE CRC BEFORE TEST
023144  000000                  2$:     .WORD   0
023146  004537  015454                  JSR     R5,SETPAT       ;SETUP PATTERN BEFORE TEST
023152  000000                  3$:     .WORD   0
023154                                  BGNSEG
023154  104004                          EMT     C$BSEG
023156                                  CLRVEC  BVEC            ;CLEAR PRESENT INT. VECTOR
023156  013700  002142                  MOV     BVEC,R0
023162  104036                          EMT     C$CVEC
023164                                  SETVEC  BVEC,#TIMSRV,#340
023164  012746  000340                  MOV     #340,-(SP)
023170  012746  016300                  MOV     #TIMSRV,-(SP)
023174  013746  002142                  MOV     BVEC,-(SP)
023200  012746  000003                  MOV     #3,-(SP)
023204  104037                          EMT     C$$VEC
023206  062706  000010                  ADD     #10,SP
023212                                  SETPRI  #PR100          ;SETUP FOR WAIT ABORT
023212  012700  000000                  MOV     #PR100,R0
023216  104041                          EMT     C$SPRI
023220  005037  002176                  CLR     INTFLG          ;CLEAR INTERRUPT FLAG
023224  013700  002266                  MOV     OPIMX,R0        ;OPI LIMIT SETUP
023230  006300                          ASL     R0
023232  006300                          ASL     R0
023234  006300                          ASL     R0
023236  063700  002266                  ADD     OPIMX,R0
```

CVRLAA.P11 14-APR-78 15:04 **TEST 35** - RLV11 OPI TIMEOUT TEST

```
3127  023242  063700  002266            ADD     OPIMX,R0
3128  023246  004537  015542            JSR     R5,LDFUN        ;PERFORM MAINT. FUNCTION
3129  023252  000100                    MAINT!INTEN             ;MAINT FUNCTION WITH INT.MODE
3130  023254  177266                    -512                    ;WORD COUNT
3131  023256  006104                    MATINT                  ;MAINT MESSAGE
3132  023260                            WAITUS  R0              ;WAIT MAX. MILLISECONDS
3133  023260  104027                    EMT     C$WTU
3134  023262  005737  002176            TST     INTFLG          ;CHECK INT. FLG
3135  023266  001004                    BNE     4$
3136  023270                            ERRDF   33.,EM24,ERR0   ;ERROR ON INTERRUPT
3137  023270  104462                    TRAP    T$ERCODE
3138  023272  000041                    .WORD   33
3139  023274  007404                    .WORD   EM24
3140  023276  011352                    .WORD   ERR0
3141  023300  005037  002176    4$:     CLR     INTFLG
3142  023304                            CKLOOP
3143  023304  104006                    EMT     C$CLP1
3144  023306                            GETTIM  BDDAT           ;GET TIME EXPIRED
3145  023306  104052                    EMT     C$GTIM
3146  023310  010037  002236            MOV     R0,BDDAT
3147  023314  005000                    CLR     R0              ;DIVIDE
3148  023316  162737  000012  002236    5$:     SUB     #10.,BDDAT      ;ANSWER
3149  023324  100402                    BMI     6$              ;BY 10 TO GET
3150  023326  005200                    INC     R0              ;RIGHT ANSWER
3151  023330  000772                    BR      5$
3152  023332  010037  002236    6$:     MOV     R0,BDDAT        ;STORE DIVIDED RESULT
3153
3154                            ;CHECK THAT OPI IS WITHIN LIMITS
3155
3156  023336                    7$:     SETPRI  #PRI07
3157  023336  012700  000340            MOV     #PRI07,R0
3158  023342  104041                    EMT     C$SPRI
3159  023344  023737  002266  002236    CMP     OPIMX,BDDAT     ;IS OPI WITHIN LIMITS
3160  023352  002404                    BLT     8$              ;NO,REPORT ERROR
3161  023354  023737  002264  002236    CMP     OPIMN,BDDAT     ;WITHIN LIMITS?
3162  023362  003404                    BLE     9$              ;YES
3163  023364                    8$:     ERRDF   34.,EM31,ERR11  ;OPI TIMING INCORRECT
3164  023364  104462                    TRAP    T$ERCODE
3165  023366  000042                    .WORD   34
3166  023370  007707                    .WORD   EM31
3167  023372  011770                    .WORD   ERR11
3168  023374                    9$:     CKLOOP
3169  023374  104006                    EMT     C$CLP1
3170  023376                            CLRVEC  BVEC            ;CLEAR PRESENT VECTOR AND RESET OLD
3171  023376  013700  002142            MOV     BVEC,R0
3172  023402  104036                    EMT     C$CVEC
3173  023404                            SETVEC  BVEC,#INTSRV,#340
3174  023404  012746  000340            MOV     #340,-(SP)
3175  023410  012746  016272            MOV     #INTSRV,-(SP)
3176  023414  013746  002142            MOV     BVEC,-(SP)
3177  023420  012746  000003            MOV     #3,-(SP)
3178  023424  104037                    EMT     C$SVEC
3179  023426  062706  000010            ADD     #10,SP
3180  023432                            ENDSEG
3181  023432                    10000$:
3182  023432  104005                    EMT     C$ESEG
```

```
3183  023434                        10$:
3184
3185  023434                        ENDTST
3186  023434                        L10063:
3187  023434  104001                        EMT     C$ETST
3188
3189
3190                                .SBTTL  **TEST 36** - TEST RLV11 MAINT. FUNCTION - FLAG MODE
3191
3192  023436                        BGNTST                          ;****START OF TEST****
3193
3194  023436                        STARS
3195                                ;;*********************************************************************
3196                                ;PERFORM RLV11 MAINTENANCE FUNCTION 0 IN FLAG MODE AND CHECK
3197                                ;FOR PROPER INCREMENT OF THE DA AND BA REGISTERS. CHECK THE SERIAL
3198                                ;WRITE/READ DATA PATHS BY READING OUT OF THE FIFO VIA THE MP REGISTER
3199                                ;THE CRC OF DA+3 AND THE CRC OF CRC OF DA+4 AND COMPARING WITH EXPECTED
3200                                ;RESULTS. CHECK THE TRANSFER OF 255 WORDS FROM BUF1 MEMORY THROUGH THE
3201                                ;FIFO INTO BUF2 MEMORY FOR PROPER DATA.
3202                                ;CHECK THE PREVIOUSLY WRITTEN DATA IN THE LAST WORD+1 OF BUF2 FOR
3203                                ;A VALUE:123456 TO INSURE THAT THE TRANSFER WAS NOT MORE THAN 255 WORDS.
3204  023436                        STARS
3205                                ;;*********************************************************************
3206  023436  005737  002260               TST     T.CNTLR         ;RLV11?
3207  023442  001402                       BEQ     100$            ;YES,RLV11
3208  023444  000137  024246               JMP     10$             ;NO,SKIP TEST
3209  023450  012703  002514       100$:   MOV     #PATCRC,R3      ;GET CRC PATTERN TABLE
3210  023454  012737  002606  002300       MOV     #PATDAT,PATSAV  ;GET DATA PATTERN TABLE
3211  023462  011337  023500       101$:   MOV     (R3),102$       ;STORE CRC PATTERN FOR CALCULATION
3212  023466  017737  156606  023510       MOV     @PATSAV,103$    ;STORE DATA PAT. FOR BUFFER FILL
3213  023474  004537  015216               JSR     R5,CALCRC       ;CALCULATE CRC BEFORE TEST
3214  023500  000000       102$:   .WORD   0                       ;PATTERN FOR CRC TEST
3215  023502                        BGNSEG
3216  023502  104004                EMT     C$BSEG
3217  023504  004537  015454               JSR     R5,SETPAT       ;SETUP PATTERN IN BUFFER
3218  023510  000000       103$:   .WORD   0                       ;BUFFER PATTERN
3219  023512  004537  015542               JSR     R5,LDFUN        ;PERFORM MAINT. FUNCTION
3220  023516  000000                       MAINT                   ;MAINT FUNCTION FLAG DRIVEN
3221  023520  177001                       -511.                   ;.ORD COUNT
3222  023522  006044                       MATMES                  ;MESSAGE
3223  023524  004537  016354               JSR     R5,WTCRDY       ;WAIT FOR READY
3224  023530                        CKLOOP
3225  023530  104006                EMT     C$CLP1
3226  023532  004537  014302               JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
3227  023536                        CKLOOP
3228  023536  104006                EMT     C$CLP1
3229  023540  012737  005476  002234       MOV     #BUF1+1776,GDDAT
3230  023546  013737  002162  002236       MOV     E.BA,BDDAT
3231  023554  023737  002234  002236       CMP     GDDAT,BDDAT     ;TEST BA REGISTER
3232  023562  001404                       BEQ     1$
3233  023564                               ERRDF   35.,EM10,ERR4   ;DATA WRONG IN BA REGISTER
3234  023564  104462                       TRAP    T$ERCODE
3235  023566  000043                       .WORD   35
3236  023570  006566                       .WORD   EM10
3237  023572  011546                       .WORD   ERR4
3238  023574                        1$:     CKLOOP                  ;CHECK FOR LOOP MODE
```

```
3239  023574  104006                          EMT     C$CLP1
3240  023576  013737  002152  002234          MOV     B.DA,GDDAT      ;GET BEFORE DA REGISTER
3241  023604  013737  002164  002236          MOV     E.DA,BDDAT
3242  023612  005037  002222                  CLR     TEMP1
3243  023616  113737  002152  002222          MOVB    B.DA,TEMP1
3244  023624  062737  000006  002222          ADD     #6,TEMP1        ;+6 TO DA LOW BYTE
3245  023632  113737  002222  002234          MOVB    TEMP1,GDDAT     ;STORE LOW BYTE OF DA
3246  023640  023737  002234  002236          CMP     GDDAT,BDDAT
3247  023646  001404                          BEQ     2$
3248  023650                                  ERRDF   36.,EM12,ERR4
3249  023650  104462                          TRAP    T$ERCODE
3250  023652  000044                          .WORD   36
3251  023654  006670                          .WORD   EM12
3252  023656  011546                          .WORD   ERR4
3253  023660                          2$:     CKLOOP
3254  023660  104006                          EMT     C$CLP1
3255  023662  013737  002242  002234          MOV     GDCRCA,GDDAT    ;GET CRC OF DA+3 VALUE
3256  023670  013737  002166  002236          MOV     E.MP,BDDAT      ;GET CONTROLLER CRC OF DA+3
3257  023676  023737  002234  002236          CMP     GDDAT,BDDAT
3258  023704  001404                          BEQ     3$
3259  023706                                  ERRDF   37.,EM20,ERR4
3260  023706  104462                          TRAP    T$ERCODE
3261  023710  000045                          .WORD   37
3262  023712  007120                          .WORD   EM20
3263  023714  011546                          .WORD   ERR4
3264  023716                          3$:     CKLOOP
3265  023716  104006                          EMT     C$CLP1
3266  023720  013737  002244  002234          MOV     GDCRCB,GDDAT
3267  023726  013737  002170  002236          MOV     E.MP1,BDDAT
3268  023734  023737  002234  002236          CMP     GDDAT,BDDAT
3269  023742  001404                          BEQ     4$
3270  023744                                  ERRDF   38.,EM21,ERR4
3271  023744  104462                          TRAP    T$ERCODE
3272  023746  000046                          .WORD   38
3273  023750  007173                          .WORD   EM21
3274  023752  011546                          .WORD   ERR4
3275  023754                          4$:     CKLOOP
3276  023754  104006                          EMT     C$CLP1
3277  023756  005037  002302                  CLR     SAVCNT          ;CLEAR BAD WORD COUNTER
3278  023762  005037  002232                  CLR     CHECK           ;CLEAR PRINT HEADER INDICATOR
3279  023766  012704  003500                  MOV     #BUF1,R4        ;GOOD DATA STORED IN BUF1
3280  023772  012702  004500                  MOV     #BUF2,R2        ;DATA BUFFER WRITTEN INTO BY MAINT.
3281  023776  012701  000377                  MOV     #255.,R1
3282  024002  011437  002234          5$:     MOV     (R4),GDDAT      ;EXPECTED DATA
3283  024006  011237  002236                  MOV     (R2),BDDAT      ;GET DATA FROM BUFFER
3284  024012  023737  002234  002236          CMP     GDDAT,BDDAT
3285  024020  001440                          BEQ     7$              ;DATA COMPARE
3286  024022  010237  002224                  MOV     R2,TMP0         ;DATA ERR-GET ADDRESS
3287  024026  005237  002302                  INC     SAVCNT          ;INC BAD WORD COUNTER
3288  024032  005737  002232                  TST     CHECK           ;CHECK IF FIRST TIME
3289  024036  001007                          BNE     6$
3290  024040                                  ERRDF   39.,EM22,ERR3
3291  024040  104462                          TRAP    T$ERCODE
3292  024042  000047                          .WORD   39
3293  024044  007255                          .WORD   EM22
3294  024046  011444                          .WORD   ERR3
```

```
3295  024050  005237  002232                    INC     CHECK           ;PRINT HEADER ONCE
3296  024054  000422                            BR      7$
3297  024056                            6$:     PRINTX  #FRMT14,E.BA,E.DA,TMP0,GDDAT,BDDAT
3298  024056  013746  002236                    MOV     BDDAT,-(SP)
3299  024062  013746  002234                    MOV     GDDAT,-(SP)
3300  024066  013746  002224                    MOV     TMP0,-(SP)
3301  024072  013746  002164                    MOV     E.DA,-(SP)
3302  024076  013746  002162                    MOV     E.BA,-(SP)
3303  024102  012746  013217                    MOV     #FRMT14,-(SP)
3304  024106  012746  000006                    MOV     #6,-(SP)
3305  024112  010600                            MOV     SP,R0
3306  024114  104015                            EMT     C$PNTX
3307  024116  062706  000016                    ADD     #16,SP
3308  024122                            7$:     CKLOOP
3309  024122  104006                            EMT     C$CLP1
3310  024124  005722                            TST     (R2)+           ;INCREMENT BUFFER
3311  024126  005724                            TST     (R4)+           ;INCREMENT BUFFER
3312  024130  005301                            DEC     R1              ;FINISHED BUFFER?
3313  024132  001323                            BNE     5$              ;RETURN FOR NEXT COMPARE
3314  024134  005737  002232                    TST     CHECK           ;CHECK FOR ERROR HEADER FLAG
3315  024140  001412                            BEQ     77$
3316  024142                                    PRINTB  #FRMT98,SAVCNT  ;PRINT BAD WORD COUNT
3317  024142  013746  002302                    MOV     SAVCNT,-(SP)
3318  024146  012746  012572                    MOV     #FRMT98,-(SP)
3319  024152  012746  000002                    MOV     #2,-(SP)
3320  024156  010600                            MOV     SP,R0
3321  024160  104014                            EMT     C$PNTB
3322  024162  062706  000006                    ADD     #6,SP
3323  024166  012737  123456  002234    77$:    MOV     #123456,GDDAT   ;EXPECTED DATA IN LAST WORD+1
3324  024174  011237  002236                    MOV     (R2),BDDAT      ;GET LAST WORD+1 FROM BUF2
3325  024200  023737  002234  002236            CMP     GDDAT,BDDAT
3326  024206  001404                            BEQ     8$
3327  024210                                    ERRDF   40.,EM23,ERR4
3328  024210  104462                            TRAP    T$ERCODE
3329  024212  000050                            .WORD   40
3330  024214  007344                            .WORD   EM23
3331  024216  011546                            .WORD   ERR4
3332  024220                            8$:     CKLOOP
3333  024220  104006                            EMT     C$CLP1
3334  024222                                    ENDSEG
3335  024222                            10000$:
3336  024222  104005                            EMT     C$ESEG
3337  024224  005723                            TST     (R3)+           ;INC CRC PATTERN
3338  024226  062737  000002  002300            ADD     #2,PATSAV       ;UPDATE PATTERN TABLE
3339  024234  020327  002604                    CMP     R3,#CRCEND      ;CHECK FOR END
3340  024240  001402                            BEQ     10$             ;END OF TEST
3341  024242  000137  023462                    JMP     101$            ;CONTINUE TEST
3342
3343  024246                            10$:
3344
3345  024246                            ENDTST
3346  024246                            L10064:
3347  024246  104001                            EMT     C$ETST
3348
3349
3350                                    .SBTTL  **TEST 37** - TEST RLV11 MAINT. FUNCTION -INTERRUPT MODE
```

```
                                BGNTST                          ;****START OF TEST****

                                STARS
                                ;;*****************************************************************
                                ;PERFORM RLV11 MAINTENANCE FUNCTION 0 (INT. MODE) AND CHECK
                                ;FOR PROPER INCREMENT OF THE DA AND BA REGISTERS, CHECK THE SERIAL
                                ;WRITE/READ DATA PATHS BY READING OUT OF THE FIFO VIA THE MP REGISTER
                                ;THE CRC OF DA+3 AND THE CRC OF CRC OF DA+4 AND COMPARING WITH EXPECTED
                                ;RESULTS, CHECK THE TRANSFER OF 255 WORDS FROM BUF1 MEMORY THROUGH THE
                                ;FIFO INTO BUF2 MEMORY FOR PROPER DATA.
                                ;CHECK THE PREVIOUSLY WRITTEN DATA IN THE LAST WORD+1 OF BUF2 FOR
                                ;VALUE:123456 TO INSURE THAT THE TRANSFER WAS NOT MORE THAN 255 WORDS.
                                STARS
                                ;;*****************************************************************
024250  005737  002260                TST     T.CNTLR         ;RLV11?
024254  001402                        BEQ     100$            ;YES,RLV11
024256  000137  025124                JMP     10$             ;NO,SKIP TEST
024262  012703  002514        100$:   MOV     #PATCRC,R3      ;GET CRC PATTERN
024266  012737  002606  002300        MOV     #PATDAT,PATSAV  ;GET DATA PATTERN
024274  011337  024312        101$:   MOV     (R3),102$
024300  017737  155774  024322        MOV     @PATSAV,103$
024306  004537  015216                JSR     R5,CALCRC       ;CALCULATE CRC BEFORE TEST
024312  000000                102$:   .WORD   0               ;PATTERN FOR CRC TEST
024314                                BGNSEG
024314  104004                        EMT     C$BSEG
024316  004537  015454                JSR     R5,SETPAT       ;SETUP PATTERN IN BUFFER
024322  000000                103$:   .WORD   0               ;BUFFER PATTERN
024324                                SETPRI  #PRI00          ;SET PRIORITY TO ZERO
024324  012700  000000                MOV     #PRI00,R0
024330  104041                        EMT     C$SPRI
024332  005037  002176                CLR     INTFLG          ;CLEAR INT. FLAG
024336  004537  015542                JSR     R5,LDFUN        ;PERFORM MAINT. FUNCTION
024342  000100                        MAINT!INTEN             ;MAINT FUNCTION INT. DRIVEN
024344  177001                        -511.                   ;WORD COUNT
024346  006104                        MATINT                  ;MESSAGE
024350  004537  016354                JSR     R5,WTCRDY       ;WAIT FOR READY
024354                                CKLOOP
024354  104006                        EMT     C$CLP1
024356                                SETPRI  #PRI07
024356  012700  000340                MOV     #PRI07,R0
024362  104041                        EMT     C$SPRI
024364  005737  002176                TST     INTFLG
024370  001004                        BNE     104$
024372                                ERRDF   41.,EM24,ERR0
024372  104462                        TRAP    T$ERCODE
024374  000051                        .WORD   41
024376  007404                        .WORD   EM24
024400  011352                        .WORD   ERR0
024402  005037  002176        104$:   CLR     INTFLG          ;CLEAR INT. FLAG
024406                                CKLOOP
024406  104006                        EMT     C$CLP1
024410  004537  014302                JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
024414                                CKLOOP
024414  104006                        EMT     C$CLP1
024416  012737  005476  002234        MOV     #BUF1+1776,GDDAT
```

```
3407  024424  013737  002162  002236          MOV     E.BA,BDDAT
3408  024432  023737  002234  002236          CMP     GDDAT,BDDAT     ;TEST BA REGISTER
3409  024440  001404                          BEQ     1$
3410  024442                                  ERRDF   42.,EM10,ERR4   ;DATA WRONG IN BA REGISTER
3411  024442  104462                          TRAP    T$ERCODE
3412  024444  000052                          .WORD   42
3413  024446  006566                          .WORD   EM10
3414  024450  011546                          .WORD   ERR4
3415  024452                          1$:     CKLOOP                  ;CHECK FOR LOOP MODE
3416  024452  104006                          EMT     C$CLP1
3417  024454  013737  002152  002234          MOV     B.DA,GDDAT      ;GET BEFORE DA REGISTER
3418  024462  013737  002164  002236          MOV     E.DA,BDDAT
3419  024470  005037  002222                  CLR     TEMP1
3420  024474  113737  002152  002222          MOVB    B.DA,TEMP1
3421  024502  062737  000006  002222          ADD     #6,TEMP1        ;+6 TO DA LOW BYTE
3422  024510  113737  002222  002234          MOVB    TEMP1,GDDAT     ;STORE LOW BYTE OF DA
3423  024516  023737  002234  002236          CMP     GDDAT,BDDAT
3424  024524  001404                          BEQ     2$
3425  024526                                  ERRDF   43.,EM12,ERR4
3426  024526  104462                          TRAP    T$ERCODE
3427  024530  000053                          .WORD   43
3428  024532  006670                          .WORD   EM12
3429  024534  011546                          .WORD   ERR4
3430  024536                          2$:     CKLOOP
3431  024536  104006                          EMT     C$CLP1
3432  024540  013737  002242  002234          MOV     GDCRCA,GDDAT    ;GET CRC OF DA+3 VALUE
3433  024546  013737  002166  002236          MOV     E.MP,BDDAT      ;GET CONTROLLER CRC OF DA+3
3434  024554  023737  002234  002236          CMP     GDDAT,BDDAT
3435  024562  001404                          BEQ     3$
3436  024564                                  ERRDF   44.,EM20,ERR4
3437  024564  104462                          TRAP    T$ERCODE
3438  024566  000054                          .WORD   44
3439  024570  007120                          .WORD   EM20
3440  024572  011546                          .WORD   ERR4
3441  024574                          3$:     CKLOOP
3442  024574  104006                          EMT     C$CLP1
3443  024576  013737  002244  002234          MOV     GDCRCB,GDDAT
3444  024604  013737  002170  002236          MOV     E.MP1,BDDAT
3445  024612  023737  002234  002236          CMP     GDDAT,BDDAT
3446  024620  001404                          BEQ     4$
3447  024622                                  ERRDF   45.,EM21,ERR4
3448  024622  104462                          TRAP    T$ERCODE
3449  024624  000055                          .WORD   45
3450  024626  007173                          .WORD   EM21
3451  024630  011546                          .WORD   ERR4
3452  024632                          4$:     CKLOOP
3453  024632  104006                          EMT     C$CLP1
3454  024634  005037  002302                  CLR     SAVCNT          ;CLEAR BAD WORD COUNTER
3455  024640  005037  002232                  CLR     CHECK           ;CLEAR PRINT HEADER INDICATOR
3456  024644  012704  003500                  MOV     #BUF1,R4        ;GOOD DATA BUFFER
3457  024650  012702  004500                  MOV     #BUF2,R2        ;DATA BUFFER WRITTEN INTO BY MAINT.
3458  024654  012701  000377                  MOV     #255.,R1
3459  024660  011437  002234          5$:     MOV     (R4),GDDAT      ;EXPECTED DATA
3460  024664  011237  002236                  MOV     (R2),BDDAT      ;GET DATA FROM BUFFER
3461  024670  023737  002234  002236          CMP     GDDAT,BDDAT
3462  024676  001440                          BEQ     7$              ;DATA COMPARE
```

```
3463  024700  010237  002224                MOV     R2,TMPO          ;DATA ERR-GET ADDRESS
3464  024704  005237  002302                INC     SAVCNT           ;INC. BAD WORD COUNT
3465  024710  005737  002232                TST     CHECK            ;CHECK IF FIRST TIME
3466  024714  001007                        BNE     6$
3467  024716                                ERRDF   46.,EM22,ERR3
3468  024716  104462                        TRAP    T$ERCODE
3469  024720  000056                        .WORD   46
3470  024722  007255                        .WORD   EM22
3471  024724  011444                        .WORD   ERR3
3472  024726  005237  002232                INC     CHECK            ;PRINT HEADER ONCE
3473  024732  000422                        BR      7$
3474  024734                        6$:     PRINTX  #FRMT14,E.BA,E.DA,TMPO,GDDAT,BDDAT
3475  024734  013746  002236                MOV     BDDAT,-(SP)
3476  024740  013746  002234                MOV     GDDAT,-(SP)
3477  024744  013746  002224                MOV     TMPO,-(SP)
3478  024750  013746  002164                MOV     E.DA,-(SP)
3479  024754  013746  002162                MOV     E.BA,-(SP)
3480  024760  012746  013217                MOV     #FRMT14,-(SP)
3481  024764  012746  000006                MOV     #6,-(SP)
3482  024770  010600                        MOV     SP,R0
3483  024772  104015                        EMT     C$PNTX
3484  024774  062706  000016                ADD     #16,SP
3485  025000                        7$:     CKLOOP
3486  025000  104006                        EMT     C$CLP1
3487  025002  005722                        TST     (R2)+            ;INCREMENT BUFFER
3488  025004  005724                        TST     (R4)+            ;INCREMENT BUFFER
3489  025006  005301                        DEC     R1               ;FINISHED BUFFER?
3490  025010  001323                        BNE     5$               ;RETURN FOR NEXT COMPARE
3491  025012  005737  002232                TST     CHECK            ;CHECK ERROR HEADER FLAG
3492  025016  001412                        BEQ     77$
3493  025020                                PRINTB  #FRMT98,SAVCNT   ;PRINT BAD WORD COUNT
3494  025020  013746  002302                MOV     SAVCNT,-(SP)
3495  025024  012746  012572                MOV     #FRMT98,-(SP)
3496  025030  012746  000002                MOV     #2,-(SP)
3497  025034  010600                        MOV     SP,R0
3498  025036  104014                        EMT     C$PNTB
3499  025040  062706  000006                ADD     #6,SP
3500  025044  012737  123456  002234  77$:  MOV     #123456,GDDAT    ;EXPECTED DATA IN LAST WORD+1
3501  025052  011237  002236                MOV     (R2),BDDAT       ;GET LAST WORD+1 FROM BUF2
3502  025056  023737  002234  002236        CMP     GDDAT,BDDAT
3503  025064  001404                        BEQ     8$
3504  025066                                ERRDF   47.,EM23,ERR4
3505  025066  104462                        TRAP    T$ERCODE
3506  025070  000057                        .WORD   47
3507  025072  007344                        .WORD   EM23
3508  025074  011546                        .WORD   ERR4
3509  025076                        8$:     CKLOOP
3510  025076  104006                        EMT     C$CLP1
3511  025100                                ENDSEG
3512  025100                        10000$:
3513  025100  104005                        EMT     C$ESEG
3514  025102  005723                        TST     (R3)+            ;INC. CRC PATTERN
3515  025104  062737  000002  002300        ADD     #2,PATSAV        ;UPDATE PATTERN TABLE
3516  025112  020327  002604                CMP     R3,#CRCEND       ;CHECK FOR END
3517  025116  001402                        BEQ     10$              ;END OF TEST
3518  025120  000137  024274                JMP     101$             ;CONTINUE TEST
```

```
                                        10$:

                                        ENDTST
                                        L10065:
025124 104001                                   EMT     C$ETST

                                        .SBTTL  **TEST 38** - RLV11 FIFO ADDRESS TEST

025126                                  BGNTST

025126                                  STARS
                                        ;;**********************************************************************
                                        ;TEST THAT FIFO OPERATES CORRECTLY.STORE ADDRESS PATTERN
                                        ;IN BUF1 (0-255) THAT CONTAINS A UNIQUE PATTERN IN EACH LOCATION.
                                        ;PERFORM MAINTENANCE FUNCTION AND TEST BUF2 FOR PROPER FIFO
                                        ;ADDRESSING.
025126                                  STARS
                                        ;;**********************************************************************
025126 005737 002260                            TST     T.CNTLR         ;RL11 OR RLV11
025132 001402                                   BEQ     1$              ;RLV11;PERFORM TEST
025134 000137 025472                            JMP     10$             ;RL11;SKIP TEST
025140 005001                           1$:     CLR     R1
025142 012702 000400                            MOV     #256.,R2
025146 012703 003500                            MOV     #BUF1,R3        ;SETUP TO STORE PATTERN IN BUF1
025152 010123                           2$:     MOV     R1,(R3)+
025154 005201                                   INC     R1              ;INC. PATTERN
025156 005302                                   DEC     R2
025160 001374                                   BNE     2$
025162 012702 000400                            MOV     #256.,R2        ;SETUP TO CLEAR BUF2
025166 012703 004500                            MOV     #BUF2,R3
025172 005023                           3$:     CLR     (R3)+
025174 005302                                   DEC     R2
025176 001375                                   BNE     3$
025200 005037 002176                            CLR     INTFLG          ;CLEAR INT. FLAG
025204                                          SETPRI  #PRI00
025204 012700 000000                            MOV     #PRI00,R0
025210 104041                                   EMT     C$SPRI
025212 004537 015542                            JSR     R5,LDFUN        ;LOAD FUNCTION
025216 000100                                   MAINT!INTEN             ;MAINT. WITH INTERRUPT
025220 177001                                   -511.                   ;WORD COUNT
025222 006104                                   MATINT                  ;MAINT. MESSAGE
025224 004537 016354                            JSR     R5,WTCRDY       ;WAIT FOR READY
025230                                          CKLOOP
025230 104006                                   EMT     C$CLP1
025232                                          SETPRI  #PRI07
025232 012700 000340                            MOV     #PRI07,R0
025236 104041                                   EMT     C$SPRI
025240 005737 002176                            TST     INTFLG          ;CHECK FOR INTERRUPT
025244 001004                                   BNE     4$
025246                                          ERRDF   48.,EM24,ERR0
025246 104462                                   TRAP    T$ERCODE
025250 000060                                   .WORD   48
025252 007404                                   .WORD   EM24
025254 011352                                   .WORD   ERR0
025256 005037 002176                    4$:     CLR     INTFLG
```

```
3575  025262                          CKLOOP
3576  025262  104006                  EMT     C$CLP1
3577  025264  005037  002302          CLR     SAVCNT          ;CLEAR BAD WORD COUNTER
3578  025270  005037  002232          CLR     CHECK           ;CLEAR ERROR HEADER FLAG
3579  025274  005001                  CLR     R1
3580  025276  012702  000377          MOV     #255.,R2
3581  025302  012703  004500          MOV     #BUF2,R3
3582  025306  010137  002234  5$:     MOV     R1,GDDAT        ;EXPECTED DATA
3583  025312  011337  002236          MOV     (R3),BDDAT      ;DATA IN BUFFER
3584  025316  023737  002234  002236  CMP     GDDAT,BDDAT
3585  025324  001440                  BEQ     7$
3586  025326  010337  002224          MOV     R3,TMP0         ;GET ADDRESS FOR PRINTOUT
3587  025332  005237  002302          INC     SAVCNT          ;INC. BAD WORD COUNTER
3588  025336  005737  002232          TST     CHECK           ;CHECK ERROR HEADER FLAG
3589  025342  001007                  BNE     6$
3590  025344                          ERRDF   49.,EM25,ERR3
3591  025344  104462                  TRAP    T$ERCODE
3592  025346  000061                  .WORD   49
3593  025350  007446                  .WORD   EM25
3594  025352  011444                  .WORD   ERR3
3595  025354  005237  002232          INC     CHECK
3596  025360  000422                  BR      7$
3597  025362                  6$:     PRINTX  #FRMT14,E.BA,E.DA,TMP0,GDDAT,BDDAT
3598  025362  013746  002236          MOV     BDDAT,-(SP)
3599  025366  013746  002234          MOV     GDDAT,-(SP)
3600  025372  013746  002224          MOV     TMP0,-(SP)
3601  025376  013746  002164          MOV     E.DA,-(SP)
3602  025402  013746  002162          MOV     E.BA,-(SP)
3603  025406  012746  013217          MOV     #FRMT14,-(SP)
3604  025412  012746  000006          MOV     #6,-(SP)
3605  025416  010600                  MOV     SP,R0
3606  025420  104015                  EMT     C$PNTX
3607  025422  062706  000016          ADD     #16,SP
3608  025426                  7$:     CKLOOP
3609  025426  104006                  EMT     C$CLP1
3610  025430  005723                  TST     (R3)+
3611  025432  005201                  INC     R1              ;UPDATE PATTERN EXPECTED
3612  025434  005302                  DEC     R2
3613  025436  001323                  BNE     5$
3614  025440  005737  002232          TST     CHECK           ;CHECK ERROR FLAG
3615  025444  001412                  BEQ     10$
3616  025446                          PRINTB  #FRMT98,SAVCNT  ;PRINT NUMBER OF BAD WORDS
3617  025446  013746  002302          MOV     SAVCNT,-(SP)
3618  025452  012746  012572          MOV     #FRMT98,-(SP)
3619  025456  012746  000002          MOV     #2,-(SP)
3620  025462  010600                  MOV     SP,R0
3621  025464  104014                  EMT     C$PNTB
3622  025466  062706  000006          ADD     #6,SP
3623
3624  025472                  10$:
3625
3626  025472                  ENDTST
3627  025472                  L10066:
3628  025472  104001                  EMT     C$ETST
3629
3630                          .SBTTL  **TEST 39** - RLV11 FIFO ADDRESS COMPLEMENT TEST
```

```
                                        BGNTST
                                        STARS
                                        ;;*****************************************************************
                                        ;TEST THAT FIFO OPERATES CORRECTLY. STORE ADDRESS COMPLEMENT PAT.
                                        ;IN BUF1 (0-255) THAT CONTAINS A UNIQUE PATTERN IN EACH LOCATION.
                                        ;PERFORM MAINTENANCE FUNCTION AND TEST BUF2 FOR PROPER FIFO
                                        ;ADDRESSING.
                                        STARS
                                        ;;*****************************************************************
025474  005737  002260                  TST     T.CNTLR         ;RL11 OR RLV11
025500  001402                          BEQ     1$              ;RLV11;PERFORM TEST
025502  000137  026044                  JMP     10$             ;RL11;SKIP TEST
025506  012701  177777          1$:     MOV     #177777,R1
025512  012702  000400                  MOV     #256.,R2
025516  012703  003500                  MOV     #BUF1,R3        ;SETUP TO STORE PATTERN IN BUF1
025522  010123          2$:     MOV     R1,(R3)+
025524  005301                          DEC     R1              ;NEXT COMP. PATTERN
025526  005302                          DEC     R2
025530  001374                          BNE     2$
025532  012702  000400                  MOV     #256.,R2        ;SETUP TO CLEAR BUF2
025536  012703  004500                  MOV     #BUF2,R3
025542  005023          3$:     CLR     (R3)+
025544  005302                          DEC     R2
025546  001375                          BNE     3$
025550  005037  002176                  CLR     INTFLG          ;CLEAR INT. FLAG
025554                                  SETPRI  #PRI00
025554  012700  000000                  MOV     #PRI00,R0
025560  104041                          EMT     C$SPRI
025562  004537  015542                  JSR     R5,LDFUN        ;LOAD FUNCTION
025566  000100                          MAINT!INTEN             ;MAINT. WITH INTERRUPT
025570  177001                          -511.                   ;WORD COUNT
025572  006104                          MATINT                  ;MAINT. MESSAGE
025574  004537  016354                  JSR     R5,WTCRDY       ;WAIT FOR READY
025600                                  CKLOOP
025600  104006                          EMT     C$CLP1
025602                                  SETPRI  #PRI07
025602  012700  000340                  MOV     #PRI07,R0
025606  104041                          EMT     C$SPRI
025610  005737  002176                  TST     INTFLG          ;CHECK FOR INTERRUPT
025614  001004                          BNE     4$
025616                                  ERRDF   50.,EM24,ERR0
025616  104462                          TRAP    T$ERCODE
025620  000062                          .WORD   50
025622  007404                          .WORD   EM24
025624  011352                          .WORD   ERR0
025626  005037  002176          4$:     CLR     INTFLG
025632                                  CKLOOP
025632  104006                          EMT     C$CLP1
025634  005037  002302                  CLR     SAVCNT          ;CLEAR BAD WORD COUNTER
025640  005037  002232                  CLR     CHECK           ;CLEAR ERROR HEADER FLAG
025644  012701  177777                  MOV     #177777,R1
025650  012702  000377                  MOV     #255.,R2
025654  012703  004500                  MOV     #BUF2,R3
025660  010137  002234          5$:     MOV     R1,GDDAT        ;EXPECTED DATA
```

```
3687  025664  011337  002236          MOV     (R3),BDDAT      ;DATA IN BUFFER
3688  025670  023737  002234  002236  CMP     GDDAT,BDDAT
3689  025676  001440                  BEQ     7$
3690  025700  010337  002224          MOV     R3,TMP0         ;GET ADDRESS FOR PRINTOUT
3691  025704  005237  002302          INC     SAVCNT          ;INC. BAD WORD COUNTER
3692  025710  005737  002232          TST     CHECK           ;CHECK ERROR HEADER FLAG
3693  025714  001007                  BNE     6$
3694  025716                          ERRDF   51.,EM26,ERR3
3695  025716  104462                  TRAP    T$ERCODE
3696  025720  000063                  .WORD   51
3697  025722  007505                  .WORD   EM26
3698  025724  011444                  .WORD   ERR3
3699  025726  005237  002232          INC     CHECK
3700  025732  000422                  BR      7$
3701  025734                  6$:     PRINTX  #FRMT14,E.BA,E.DA,TMP0,GDDAT,BDDAT
3702  025734  013746  002236          MOV     BDDAT,-(SP)
3703  025740  013746  002234          MOV     GDDAT,-(SP)
3704  025744  013746  002224          MOV     TMP0,-(SP)
3705  025750  013746  002164          MOV     E.DA,-(SP)
3706  025754  013746  002162          MOV     E.BA,-(SP)
3707  025760  012746  013217          MOV     #FRMT14,-(SP)
3708  025764  012746  000006          MOV     #6,-(SP)
3709  025770  010600                  MOV     SP,R0
3710  025772  104015                  EMT     C$PNTX
3711  025774  062706  000016          ADD     #16,SP
3712  026000                  7$:     CKLOOP
3713  026000  104006                  EMT     C$CLP1
3714  026002  005723                  TST     (R3)+
3715  026004  005301                  DEC     R1              ;GET NEXT PATTERN
3716  026006  005302                  DEC     R2
3717  026010  001323                  BNE     5$
3718  026012  005737  002232          TST     CHECK           ;CHECK ERROR FLAG
3719  026016  001412                  BEQ     10$
3720  026020                          PRINTB  #FRMT98,SAVCNT  ;PRINT NO. OF BAD WORDS
3721  026020  013746  002302          MOV     SAVCNT,-(SP)
3722  026024  012746  012572          MOV     #FRMT98,-(SP)
3723  026030  012746  000002          MOV     #2,-(SP)
3724  026034  010600                  MOV     SP,R0
3725  026036  104014                  EMT     C$PNTB
3726  026040  062706  000006          ADD     #6,SP
3727
3728  026044                  10$:
3729  026044                  ENDTST
3730  026044                  L10067:
3731  026044  104001                  EMT     C$ETST
3732
3733
3734                          .SBTTL  **TEST 40** - TEST RLV11 MAINT. WITH COMPLEMENT DATA -INT. MODE
3735
3736  026046                  BGNTST                          ;****START OF TEST****
3737
3738  026046                  STARS
3739                          ;;*********************************************************************
3740                          ;PERFORM RLV11 MAINT. FUNCTION WITH COMPLEMENT DATA PATTERNS IN BUF1
3741                          ;CHECK FOR PROPER INCREMENT OF THE DA AND BA REGISTERS. CHECK THE SERIAL
3742                          ;WRITE/READ DATA PATHS BY READING OUT OF THE FIFO VIA THE MP REGISTER
```

```
                                        ;THE CRC OF DA+3 AND THE CRC OF CRC OF DA+4 AND COMPARING WITH EXPECTED
                                        ;RESULTS. CHECK THE TRANSFER OF 255 WORDS FROM BUF1 MEMORY THROUGH THE
                                        ;FIFO INTO BUF2 MEMORY FOR PROPER DATA.
                                        ;CHECK THE PREVIOUSLY WRITTEN DATA IN THE LAST WORD+1 OF BUF2 FOR
                                        ;VALUE:123456 TO INSURE THAT THE TRANSFER WAS NOT MORE THAN 255 WORDS.
026046                                  STARS
                                        ;;**********************************************************************
026046  005737  002260                  TST     T.CNTLR         ;RLV11?
026052  001402                          BEQ     100$            ;YES,RLV11
026054  000137  026722                  JMP     10$             ;NO,SKIP TEST
026060  012703  002514          100$:   MOV     #PATCRC,R3      ;GET CRC PATTERN
026064  012737  002606  002300          MOV     #PATDAT,PATSAV  ;GET DATA PATTERN
026072  011337  026110          101$:   MOV     (R3),102$
026076  017737  154176  026120          MOV     @PATSAV,103$
026104  004537  015216                  JSR     R5,CALCRC       ;CALCULATE CRC BEFORE TEST
026110  000000                  102$:   .WORD   0               ;PATTERN FOR CRC TEST
026112                                  BGNSEG
026112  104004                          EMT     C$BSEG
026114  004537  015642                  JSR     R5,SETCMP       ;SETUP PATTERN IN BUFFER
026120  000000                  103$:   .WORD   0               ;BUFFER PATTERN
026122                                  SETPRI  #PRI00          ;SET PRIORITY TO ZERO
026122  012700  000000                  MOV     #PRI00,R0
026126  104041                          EMT     C$SPRI
026130  005037  002176                  CLR     INTFLG          ;CLEAR INT. FLAG
026134  004537  015542                  JSR     R5,LDFUN        ;PERFORM MAINT. FUNCTION
026140  000100                          MAINT!INTEN             ;MAINT FUNCTION INT. DRIVEN
026142  177001                          -511.                   ;WORD COUNT
026144  006104                          MAINT                   ;MESSAGE
026146  004537  016354                  JSR     R5,WTCRDY       ;WAIT FOR READY
026152                                  CKLOOP
026152  104006                          EMT     C$CLP1
026154                                  SETPRI  #PRI07
026154  012700  000340                  MOV     #PRI07,R0
026160  104041                          EMT     C$SPRI
026162  005737  002176                  TST     INTFLG
026166  001004                          BNE     104$
026170                                  ERRDF   52.,EM24,ERR0
026170  104462                          TRAP    T$ERCODE
026172  000064                          .WORD   52
026174  007404                          .WORD   EM24
026176  011352                          .WORD   ERR0
026200  005037  002176          104$:   CLR     INTFLG          ;CLEAR INT. FLAG
026204                                  CKLOOP
026204  104006                          EMT     C$CLP1
026206  004537  014302                  JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
026212                                  CKLOOP
026212  104006                          EMT     C$CLP1
026214  012737  005476  002234          MOV     #BUF1+1776,GDDAT
026222  013737  002162  002236          MOV     E.BA,BDDAT
026230  023737  002234  002236          CMP     GDDAT,BDDAT     ;TEST BA REGISTER
026236  001404                          BEQ     1$
026240                                  ERRDF   53.,EM10,ERR4   ;DATA WRONG IN BA REGISTER
026240  104462                          TRAP    T$ERCODE
026242  000065                          .WORD   53
026244  006566                          .WORD   EM10
026246  011546                          .WORD   ERR4
```

```
3799  026250
3800  026250  104006                  1$:   CKLOOP                ;CHECK FOR LOOP MODE
3801  026252  013737  002152  002234        EMT     C$CLP1
3802  026260  013737  002164  002236        MOV     B.DA,GDDAT    ;GET BEFORE DA REGISTER
3803  026266  005037  002222              MOV     E.DA,BDDAT
3804  026272  113737  002152  002222        CLR     TEMP1
3805  026300  062737  000006  002222        MOVB    B.DA,TEMP1
3806  026306  113737  002222  002234        ADD     #6,TEMP1      ;+6 TO DA LOW BYTE
3807  026314  023737  002234  002236        MOVB    TEMP1,GDDAT   ;STORE LOW BYTE OF DA
3808  026322  001404                        CMP     GDDAT,BDDAT
3809  026324                              BEQ     2$
3810  026324  104462                      ERRDF   54.,EM12,ERR4
3811  026326  000066                      TRAP    T$ERCODE
3812  026330  006670                      .WORD   54
3813  026332  011546                      .WORD   EM12
3814  026334                              .WORD   ERR4
3815  026334  104006                2$:   CKLOOP
3816  026336  013737  002242  002234        EMT     C$CLP1
3817  026344  013737  002166  002236        MOV     GDCRCA,GDDAT  ;GET CRC OF DA+3 VALUE
3818  026352  023737  002234  002236        MOV     E.MP,BDDAT    ;GET CONTROLLER CRC OF DA+3
3819  026360  001404                        CMP     GDDAT,BDDAT
3820  026362                              BEQ     3$
3821  026362  104462                      ERRDF   55.,EM20,ERR4
3822  026364  000067                      TRAP    T$ERCODE
3823  026366  007120                      .WORD   55
3824  026370  011546                      .WORD   EM20
3825  026372                              .WORD   ERR4
3826  026372  104006                3$:   CKLOOP
3827  026374  013737  002244  002234        EMT     C$CLP1
3828  026402  013737  002170  002236        MOV     GDCRCB,GDDAT
3829  026410  023737  002234  002236        MOV     E.MP1,BDDAT
3830  026416  001404                        CMP     GDDAT,BDDAT
3831  026420                              BEQ     4$
3832  026420  104462                      ERRDF   56.,EM21,ERR4
3833  026422  000070                      TRAP    T$ERCODE
3834  026424  007173                      .WORD   56
3835  026426  011546                      .WORD   EM21
3836  026430                              .WORD   ERR4
3837  026430  104006                4$:   CKLOOP
3838  026432  005037  002302              EMT     C$CLP1
3839  026436  005037  002232              CLR     SAVCNT        ;CLEAR BAD WORD COUNTER
3840  026442  012704  003500              CLR     CHECK         ;CLEAR PRINT HEADER INDICATOR
3841  026446  012702  004500              MOV     #BUF1,R4      ;GOOD DATA BUFFER
3842  026452  012701  000377              MOV     #BUF2,R2      ;DATA BUFFER WRITTEN INTO BY MAINT.
3843  026456  011437  002234        5$:   MOV     #255.,R1
3844  026462  011237  002236              MOV     (R4),GDDAT    ;EXPECTED DATA
3845  026466  023737  002234  002236        MOV     (R2),BDDAT    ;GET DATA FROM BUFFER
3846  026474  001440                        CMP     GDDAT,BDDAT
3847  026476  010237  002224              BEQ     7$            ;DATA COMPARE
3848  026502  005237  002302              MOV     R2,TMP0       ;DATA ERR-GET ADDRESS
3849  026506  005737  002232              INC     SAVCNT        ;INC. BAD WORD COUNTER
3850  026512  001007                      TST     CHECK         ;CHECK IF FIRST TIME
3851  026514                              BNE     6$
3852  026514  104462                      ERRDF   57.,EM22,ERR3
3853  026516  000071                      TRAP    T$ERCODE
3854  026520  007255                      .WORD   57
                                          .WORD   EM22
```

```
 3855  026522  011444                        .WORD   ERR3
 3856  026524  005237  002232                INC     CHECK           ;PRINT HEADER ONCE
 3857  026530  000422                        BR      7$
 3858  026532                        6$:     PRINTX  #FRMT14,E.BA,E.DA,TMPO,GDDAT,BDDAT
 3859  026532  013746  002236                MOV     BDDAT,-(SP)
 3860  026536  013746  002234                MOV     GDDAT,-(SP)
 3861  026542  013746  002224                MOV     TMPO,-(SP)
 3862  026546  013746  002164                MOV     E.DA,-(SP)
 3863  026552  013746  002162                MOV     E.BA,-(SP)
 3864  026556  012746  013217                MOV     #FRMT14,-(SP)
 3865  026562  012746  000006                MOV     #6,-(SP)
 3866  026566  010600                        MOV     SP,R0
 3867  026570  104015                        EMT     C$PNTX
 3868  026572  062706  000016                ADD     #16,SP
 3869  026576                        7$:     CKLOOP
 3870  026576  104006                        EMT     C$CLP1
 3871  026600  005722                        TST     (R2)+           ;INCREMENT BUFFER
 3872  026602  005724                        TST     (R4)+           ;INCREMENT BUFFER
 3873  026604  005301                        DEC     R1              ;FINISHED BUFFER?
 3874  026606  001323                        BNE     5$              ;RETURN FOR NEXT COMPARE
 3875  026610  005737  002232                TST     CHECK           ;CHECK ERROR FLAG
 3876  026614  001412                        BEQ     77$
 3877  026616                                PRINTB  #FRMT98,SAVCNT  ;PRINT NO OF BAD WORDS
 3878  026616  013746  002302                MOV     SAVCNT,-(SP)
 3879  026622  012746  012572                MOV     #FRMT98,-(SP)
 3880  026626  012746  000002                MOV     #2,-(SP)
 3881  026632  010600                        MOV     SP,R0
 3882  026634  104014                        EMT     C$PNTB
 3883  026636  062706  000006                ADD     #6,SP
 3884  026642  012737  123456  002234  77$:  MOV     #123456,GDDAT   ;EXPECTED DATA IN LAST WORD+1
 3885  026650  011237  002236                MOV     (R2),BDDAT      ;GET LAST WORD+1 FROM BUF2
 3886  026654  023737  002234  002236        CMP     GDDAT,BDDAT
 3887  026662  001404                        BEQ     8$
 3888  026664                                ERRDF   58.,EM23,ERR4
 3889  026664  104462                        TRAP    T$ERCODE
 3890  026666  000072                        .WORD   58
 3891  026670  007344                        .WORD   EM23
 3892  026672  011546                        .WORD   ERR4
 3893  026674                        8$:     CKLOOP
 3894  026674  104006                        EMT     C$CLP1
 3895  026676                                ENDSEG
 3896  026676                        10000$:
 3897  026676  104005                        EMT     C$ESEG
 3898  026700  005723                        TST     (R3)+           ;INC. CRC PATTERN
 3899  026702  062737  000002  002300        ADD     #2,PATSAV       ;UPDATE PATTERN TABLE
 3900  026710  020327  002604                CMP     R3,#CRCEND      ;CHECK FOR END
 3901  026714  001402                        BEQ     10$             ;END OF TEST
 3902  026716  000137  026072                JMP     101$            ;CONTINUE TEST
 3903
 3904  026722                        10$:
 3905  026722                        ENDTST
 3906  026722                        L10070:
 3907  026722  104001                        EMT     C$ETST
 3908
 3909                                .SBTTL  **TEST 41** - TEST RLV11 MAINT. WITH RANDOM DATA -INT. MODE
 3910
```

```
3911  026724                          BGNTST                          ;****START OF TEST****
3912
3913  026724                          STARS
3914                                  ;;*****************************************************************
3915                                  ;PERFORM RLV11 MAINT. FUNCTION WITH RANDOM DATA PATTERNS IN BUF1
3916                                  ;RANDOM PATTERN IS THE SAME FOR EACH CONTROLLER UNDER TEST.
3917                                  ;RANDOM PATTERN WILL CHANGE AT END OF PASS.
3918                                  ;RANDOM PATTERN WILL INIT AT START OR RESTART.
3919                                  ;CHECK FOR PROPER INCREMENT OF THE DA AND BA REGISTERS. CHECK THE SERIAL
3920                                  ;WRITE/READ DATA PATHS BY READING OUT OF THE FIFO VIA THE MP REGISTER
3921                                  ;THE CRC OF DA+3 AND THE CRC OF CRC OF DA+4 AND COMPARING WITH EXPECTED
3922                                  ;RESULTS. CHECK THE TRANSFER OF 255 WORDS FROM BUF1 MEMORY THROUGH THE
3923                                  ;FIFO INTO BUF2 MEMORY FOR PROPER DATA.
3924                                  ;CHECK THE PREVIOUSLY WRITTEN DATA IN THE LAST WORD+1 OF BUF2 FOR
3925                                  ;VALUE:123456 TO INSURE THAT THE TRANSFER WAS NOT MORE THAN 255 WORDS.
3926  026724                          STARS
3927                                  ;;*****************************************************************
3928  026724  005737  002260                TST     T.CNTLR                 ;RLV11?
3929  026730  001402                        BEQ     101$                    ;YES,RLV11
3930  026732  000137  027544                JMP     10$                     ;NO,SKIP TEST
3931  026736  013737  002274  026756  101$: MOV     TEMLO,102$              ;STARTING RANDOM PATTERN
3932  026744  013737  002274  002272        MOV     TEMLO,LONUM             ;RESET RANDOM START
3933  026752  004537  015216                JSR     R5,CALCRC               ;CALCULATE CRC BEFORE TEST
3934  026756  000000                102$:   .WORD   0                       ;PATTERN FOR CRC TEST
3935  026760  004537  015734                JSR     R5,SETRAN               ;SETUP RANDOM PATTERN IN BUFFER
3936  026764                                BGNSEG
3937  026764  104004                        EMT     C$BSEG
3938  026766                                SETPRI  #PRI00                  ;SET PRIORITY TO ZERO
3939  026766  012700  000000                MOV     #PRI00,R0
3940  026772  104041                        EMT     C$SPRI
3941  026774  005037  002176                CLR     INTFLG                  ;CLEAR INT. FLAG
3942  027000  004537  015542                JSR     R5,LDFUN                ;PERFORM MAINT. FUNCTION
3943  027004  000100                        MAINT!INTEN                     ;MAINT FUNCTION INT. DRIVEN
3944  027006  177001                        -511.                           ;WORD COUNT
3945  027010  006104                        MATINT                          ;MESSAGE
3946  027012  004537  016354                JSR     R5,WTCRDY               ;WAIT FOR READY
3947  027016                                CKLOOP
3948  027016  104006                        EMT     C$CLP1
3949  027020                                SETPRI  #PRI07
3950  027020  012700  000340                MOV     #PRI07,R0
3951  027024  104041                        EMT     C$SPRI
3952  027026  005737  002176                TST     INTFLG
3953  027032  001004                        BNE     104$
3954  027034                                ERRDF   59.,EM24,ERR0
3955  027034  104462                        TRAP    T$ERCODE
3956  027036  000073                        .WORD   59
3957  027040  007404                        .WORD   EM24
3958  027042  011352                        .WORD   ERR0
3959  027044  005037  002176          104$: CLR     INTFLG                  ;CLEAR INT. FLAG
3960  027050                                CKLOOP
3961  027050  104006                        EMT     C$CLP1
3962  027052  004537  014302                JSR     R5,CHERR                ;CHECK CONTROLLER FOR ERRORS
3963  027056                                CKLOOP
3964  027056  104006                        EMT     C$CLP1
3965  027060  012737  005476  002234        MOV     #BUF1+1776,GDDAT
3966  027066  013737  002162  002236        MOV     E.BA,BDDAT
```

```
 3967  027074  023737  002234  002236          CMP     GDDAT,BDDAT     ;TEST BA REGISTER
 3968  027102  001404                          BEQ     1$
 3969  027104                                  ERRDF   60.,EM10,ERR4   ;DATA WRONG IN BA REGISTER
 3970  027104  104462                          TRAP    T$ERCODE
 3971  027106  000074                          .WORD   60
 3972  027110  006566                          .WORD   EM10
 3973  027112  011546                          .WORD   ERR4
 3974  027114                          1$:     CKLOOP                  ;CHECK FOR LOOP MODE
 3975  027114  104006                          EMT     C$CLP1
 3976  027116  013737  002152  002234          MOV     B.DA,GDDAT      ;GET BEFORE DA REGISTER
 3977  027124  013737  002164  002236          MOV     E.DA,BDDAT
 3978  027132  005037  002222                  CLR     TEMP1
 3979  027136  113737  002152  002222          MOVB    B.DA,TEMP1
 3980  027144  062737  000006  002222          ADD     #6,TEMP1        ;+6 TO DA LOW BYTE
 3981  027152  113737  002222  002234          MOVB    TEMP1,GDDAT     ;STORE LOW BYTE OF DA
 3982  027160  023737  002234  002236          CMP     GDDAT,BDDAT
 3983  027166  001404                          BEQ     2$
 3984  027170                                  ERRDF   61.,EM12,ERR4
 3985  027170  104462                          TRAP    T$ERCODE
 3986  027172  000075                          .WORD   61
 3987  027174  006670                          .WORD   EM12
 3988  027176  011546                          .WORD   ERR4
 3989  027200                          2$:     CKLOOP
 3990  027200  104006                          EMT     C$CLP1
 3991  027202  013737  002242  002234          MOV     GDCRCA,GDDAT    ;GET CRC OF DA+3 VALUE
 3992  027210  013737  002166  002236          MOV     E.MP,BDDAT      ;GET CONTROLLER CRC OF DA+3
 3993  027216  023737  002234  002236          CMP     GDDAT,BDDAT
 3994  027224  001404                          BEQ     3$
 3995  027226                                  ERRDF   62.,EM20,ERR4
 3996  027226  104462                          TRAP    T$ERCODE
 3997  027230  000076                          .WORD   62
 3998  027232  007120                          .WORD   EM20
 3999  027234  011546                          .WORD   ERR4
 4000  027236                          3$:     CKLOOP
 4001  027236  104006                          EMT     C$CLP1
 4002  027240  013737  002244  002234          MOV     GDCRCB,GDDAT
 4003  027246  013737  002170  002236          MOV     E.MP1,BDDAT
 4004  027254  023737  002234  002236          CMP     GDDAT,BDDAT
 4005  027262  001404                          BEQ     4$
 4006  027264                                  ERRDF   63.,EM21,ERR4
 4007  027264  104462                          TRAP    T$ERCODE
 4008  027266  000077                          .WORD   63
 4009  027270  007173                          .WORD   EM21
 4010  027272  011546                          .WORD   ERR4
 4011  027274                          4$:     CKLOOP
 4012  027274  104006                          EMT     C$CLP1
 4013  027276  005037  002302                  CLR     SAVCNT          ;CLEAR BAD WORD COUNTER
 4014  027302  005037  002232                  CLR     CHECK           ;CLEAR PRINT HEADER INDICATOR
 4015  027306  012703  003500                  MOV     #BUF1,R3        ;BUFFER WITH RANDOM NUMBERS
 4016  027312  012702  004500                  MOV     #BUF2,R2        ;DATA BUFFER WRITTEN INTO BY MAINT.
 4017  027316  012701  000377                  MOV     #255.,R1
 4018  027322  011337  002234          5$:     MOV     (R3),GDDAT      ;EXPECTED DATA
 4019  027326  011237  002236                  MOV     (R2),BDDAT      ;GET DATA FROM BUFFER
 4020  027332  023737  002234  002236          CMP     GDDAT,BDDAT
 4021  027340  001440                          BEQ     7$              ;DATA COMPARE
 4022  027342  010237  002224                  MOV     R2,TMP0         ;DATA ERR-GET ADDRESS
```

```
4023  027346  005237  002302          INC     SAVCNT          ;INC BAD WORD COUNT
4024  027352  005737  002232          TST     CHECK           ;CHECK IF FIRST TIME
4025  027356  001007                  BNE     6$
4026  027360                          ERRDF   64.,EM22,ERR3
4027  027360  104462                  TRAP    T$ERCODE
4028  027362  000100                  .WORD   64
4029  027364  007255                  .WORD   EM22
4030  027366  011444                  .WORD   ERR3
4031  027370  005237  002232          INC     CHECK           ;PRINT HEADER ONCE
4032  027374  000422                  BR      7$
4033  027376                  6$:     PRINTX  #FRMT14,E.BA,E.DA,TMP0,GDDAT,BDDAT
4034  027376  013746  002236          MOV     BDDAT,-(SP)
4035  027402  013746  002234          MOV     GDDAT,-(SP)
4036  027406  013746  002224          MOV     TMP0,-(SP)
4037  027412  013746  002164          MOV     E.DA,-(SP)
4038  027416  013746  002162          MOV     E.BA,-(SP)
4039  027422  012746  013217          MOV     #FRMT14,-(SP)
4040  027426  012746  000006          MOV     #6,-(SP)
4041  027432  010600                  MOV     SP,R0
4042  027434  104015                  EMT     C$PNTX
4043  027436  062706  000016          ADD     #16,SP
4044  027442                  7$:     CKLOOP
4045  027442  104006                  EMT     C$CLP1
4046  027444  005722                  TST     (R2)+           ;INCREMENT BUFFER
4047  027446  005723                  TST     (R3)+           ;INCREMENT GOOD BUFFER
4048  027450  005301                  DEC     R1              ;FINISHED BUFFER?
4049  027452  001323                  BNE     5$              ;RETURN FOR NEXT COMPARE
4050  027454  005737  002232          TST     CHECK           ;CHECK ERROR FLAG
4051  027460  001412                  BEQ     77$
4052  027462                          PRINTB  #FRMT98,SAVCNT  ;PRINT NO. OF BAD WORDS
4053  027462  013746  002302          MOV     SAVCNT,-(SP)
4054  027466  012746  012572          MOV     #FRMT98,-(SP)
4055  027472  012746  000002          MOV     #2,-(SP)
4056  027476  010600                  MOV     SP,R0
4057  027500  104014                  EMT     C$PNTB
4058  027502  062706  000006          ADD     #6,SP
4059  027506  012737  123456  002234  77$:    MOV     #123456,GDDAT   ;EXPECTED DATA IN LAST WORD+1
4060  027514  011237  002236          MOV     (R2),BDDAT      ;GET LAST WORD+1 FROM BUF2
4061  027520  023737  002234  002236  CMP     GDDAT,BDDAT
4062  027526  001404                  BEQ     8$
4063  027530                          ERRDF   65.,EM23,ERR4
4064  027530  104462                  TRAP    T$ERCODE
4065  027532  000101                  .WORD   65
4066  027534  007344                  .WORD   EM23
4067  027536  011546                  .WORD   ERR4
4068  027540                  8$:     CKLOOP
4069  027540  104006                  EMT     C$CLP1
4070  027542                          ENDSEG
4071  027542                  10000$:
4072  027542  104005                  EMT     C$ESEG
4073
4074  027544  000240          10$:    NOP                     ;NOP IS NEEDED TO INSURE THAT "LASTAD"
4075                                                          ;WILL HAVE BIT 7 CLEARED FOR APT
4076                                                          ;COMPATIBILITY.
4077  027546                  ENDTST
4078  027546                  L10071:
```

```
 4079  027546  104001                    EMT     CSETST
 4080
 4081  027550                            BGNMOD  HRDPRM
 4082
 4083  027550                                    BGNHRD
 4084  027550  000025                            .WORD L10072-L$HARD/2
 4085
 4086  027552                                    GPRML   CNTMSG,CNT,1,YES
 4087  027552  004130                            .WORD   T$CODE
 4088  027554  027640                            .WORD   CNTMSG
 4089  027556  000001                            .WORD   1
 4090  027560                                    GPRMA   CSRMSG,CSR,0,160000,177776,YES
 4091  027560  000031                            .WORD   T$CODE
 4092  027562  027624                            .WORD   CSRMSG
 4093  027564  160000                            .WORD   T$LOLIM
 4094  027566  177776                            .WORD   T$HILIM
 4095  027570                                    GPRMA   VECMSG,VECT,0,0,776,YES
 4096  027570  001031                            .WORD   T$CODE
 4097  027572  027656                            .WORD   VECMSG
 4098  027574  000000                            .WORD   T$LOLIM
 4099  027576  000776                            .WORD   T$HILIM
 4100  027600                                    GPRMD   BRMSG,PRIOR,0,340,0,7,YES
 4101  027600  002032                            .WORD   T$CODE
 4102  027602  027645                            .WORD   BRMSG
 4103  027604  000340                            .WORD   340
 4104  027606  000000                            .WORD   T$LOLIM
 4105  027610  000007                            .WORD   T$HILIM
 4106  027612                                    GPRMD   DRMSG,DRBT,0,03400,0,7,YES
 4107  027612  003032                            .WORD   T$CODE
 4108  027614  027665                            .WORD   DRMSG
 4109  027616  003400                            .WORD   03400
 4110  027620  000000                            .WORD   T$LOLIM
 4111  027622  000007                            .WORD   T$HILIM
 4112
 4113  027624                                    ENDHRD
 4114                                            .EVEN
 4115  027624                            L10072:
 4116
 4117  027624  052502  020123  042101  CSRMSG: .ASCIZ  /BUS ADDRESS/
 4118  027632  051104  051505  000123
 4119  027640  046122  030461     000  CNTMSG: .ASCIZ  /RL11/
 4120  027645     102  020122  042514  BRMSG:  .ASCIZ  /BR LEVEL/
 4121  027652  042526  000114
 4122  027656  042526  052103  051117  VECMSG: .ASCIZ  /VECTOR/
 4123  027664     000
 4124  027665     104  044522  042526  DRMSG:  .ASCIZ  /DRIVE/
 4125  027672     000
 4126        027674                    .EVEN
 4127
 4128  027674                                    ENDMOD
 4129
 4130
 4131
 4132  027674                            BGNMOD  SFTPRM
 4133
 4134  027674                                    BGNSFT
```

```
4135  027674  000014                          .WORD L10073-L$SOFT/2
4136  027676                                  GPRML   DMSG,DLT,1,YES
4137  027676  000130                          .WORD   TSCODE
4138  027700  027726                          .WORD   DMSG
4139  027702  000001                          .WORD   1
4140  027704                                  XFERF   1$
4141  027704  006044                          .WORD   TSCODE
4142  027706                                  GPRMD   EMSG,ELT,0,177777,0,177777,YES
4143  027706  001032                          .WORD   TSCODE
4144  027710  027763                          .WORD   EMSG
4145  027712  177777                          .WORD   177777
4146  027714  000000                          .WORD   TSLOLIM
4147  027716  177777                          .WORD   TSHILIM
4148  027720                          1$:     GPRML   SMSG,SIZE,1,YES
4149  027720  002130                          .WORD   TSCODE
4150  027722  027752                          .WORD   SMSG
4151  027724  000001                          .WORD   1
4152  027726                                  ENDSFT
4153                                          .EVEN
4154  027726                          L10073:
4155
4156
      027726  051104  050117  047440  DMSG:   .ASCIZ  /DROP ON ERROR LIMIT/
      027752  052501  047524  044523  SMSG:   .ASCIZ  /AUTOSIZE/
      027763     105  051122  051117  EMSG:   .ASCIZ  /ERROR LIMIT/

4157          030000                    .EVEN
4158
4159  030000                                  ENDMOD
4160
4161          030114                    .=30114
4162                                    ;AREA RESERVED AS PATCH AREA FOR DIAGNOSTIC
4163                                    ;.=30114 WAS SELECTED TO PROVIDE AN ACT MAILBOX ADDRESS
4164                                    ;IN THE SUPERVISOR WITH THE PARITY BIT CLEARED.
4165  030114                            LASTAD
4166                                          .EVEN
4167  030114                            L$LAST::
4168
4169                                    ;FOR LSI-11 APT COMPATIBILITY MAKE SURE THAT THE "LASTAD" ADDRESS
4170                                    ;HAS A CLEAR BIT 7. WHEN APT TRANSMITS THE MAILBOX ADDRESS TO
4171                                    ;THE LSI-11,THE LSI ODT WILL CLEAR BIT 7 CREATING AN INVALID
4172                                    ;MAILBOX ADDRESS IF THAT BIT WAS SET.
4173
```

```
 4174
 4175  060710  000000                .SBTTL  DIAGNOSTIC SUPERVISOR -- LOW CORE SET UP
       060712  000000                .WORD   0               ;SPACE FOR USER POOL POINTER
       060714  000000                .WORD   0               ;SIZE
       060716  000000                .WORD   0               ;CHECKSUM (NOT CURRENTLY USED)
               060722                .WORD   0               ;SIZE OF H.W. PTAB. ALLOCATION
               000200               END.SUPV=.+2
                                    .END 200
```

```
ABOFLA  030440 G        4175#*
ABOPAS  030356 G        4175#*
ABO.FM  032720          4175#
ADDCOD  014212 G         929#
AFREG   006221           439#   640
AFSI    030146 G        4175#
AFTER   015414          1211#  1447   1457
ALLOC   051060          4175#
APT.ER  032050          4175#
ARLBA   006156           439#   616    637
ARLCS   006151           439#   618    639
ARLDA   006164           439#   629    651
ARLMP   006172           439#   627    649
ASAAV   034716          4175#
ASAAW   034732          4175#
ASAAX   034744          4175#
ASAAY   034752          4175#
ASAAZ   034766          4175#
ASABA   034776          4175#
BATEST  017750          1989#  2011
BA16  = 000020           153#
BA17  = 000040           152#
BCCFBK  002206           225#  1363*  1369*  1372*  1375   1379
BCSR    002136           205#   821*   829
BDDAT   002236           237#   468    491    513    557    589  1834*  1835*  1836  1870*  1902*  1945*  1946*
                        1947   1995*  1996   2041*  2042   2091*  2092*  2093   2142*  2143*  2144   2191*  2192
                        2236*  2237   2280*  2281   2325*  2326   2380*  2381*  2382   2416*  2448*  2489*  2503*
                        2542*  2543*  2544   2560*  2599*  2600*  2601   2616*  2656*  2657*  2658   2673*  2685*
                        2765*  2766   2779*  2780   2793*  2794   2873*  2881   2897   2920*  3146*  3148*  3152*
                        3159   3161   3230*  3231   3241*  3246   3256*  3257   3267*  3268   3283*  3284   3298
                        3324*  3325   3407*  3408   3418*  3423   3433*  3434   3444*  3445   3460*  3461   3475
                        3501*  3502   3583*  3584   3598   3687*  3688   3702   3791*  3792   3802*  3807   3817*
                        3818   3828*  3829   3844*  3845   3859   3885*  3886   3966*  3967   3977*  3982   3992*
                        3993   4003*  4004   4019*  4020   4034   4060*  4061
BEFORE  015362          1094   1201#  1259
BEGPAT  002304           261#  1986   2034   2181   2228   2273   2317
BEREG   006200           439#   619
BGN.SU= 030114          4175#
BINMSG  047370          4175#
BIT0  = 000001 G         107#   146    171    1993
BIT00 = 000001 G          96#   107
BIT01 = 000002 G          95#   106
BIT02 = 000004 G          94#   105
BIT03 = 000010 G          93#   104
BIT04 = 000020 G          92#   103
BIT05 = 000040 G          91#   102
BIT06 = 000100 G          90#   101
BIT07 = 000200 G          89#   100
BIT08 = 000400 G          88#    99
BIT09 = 001000 G          87#    98
BIT1  = 000002 G         106#   160    162    164    166    168    170    398
BIT10 = 002000 G          86#   150   1132
BIT11 = 004000 G          85#  1025   1034
BIT12 = 010000 G          84#  1029   1038   1127
BIT13 = 020000 G          83#   154
BIT14 = 040000 G          82#   149
```

```
BIT15 = 100000 G          81#   148   1122
BIT2  = 000004 G         105#   160    163   164   167   172   399
BIT3  = 000010 G         104#   160    165   166   167   169   400
BIT4  = 000020 G         103#   153    175   401
BIT5  = 000040 G         102#   152    402
BIT6  = 000100 G         101#   147    173   174   403
BIT7  = 000200 G         100#   151    168
BIT8  = 000400 G          99#   156    158   404
BIT9  = 001000 G          98#   157    158   405
BLD.HW  035602           4175#
BLOCK   053214           4175#
BPRIOR  002140            206#   823*   2874
BRMSG   027645           4102   4120#
BUF1    003500            432#  1227   1253   1273   1298   3229   3279   3406   3456   3543   3647   3790   3840
                         3965  4015
BUF2    004500            433#  1232   1280   1304   3280   3457   3549   3581   3653   3685   3841   4016
BVEC    002142            207#   822*   871    905   3109   3114   3171   3176
B$AAB   037204           4175#
B$AAF   037116           4175#
B.BA    002150            210#   615   1202*
B.CS    002146            209#   617   1067   1069*  1070*  1071   1072*  1201*
B.DA    002152            211#   628   1203*  3240   3243   3417   3420   3801   3804   3976   3979
B.MP    002154            212#   626   1204*
CALBCC  002210            226#  1182   1190   1195   1385*
CALCRC  015216           1172#  2946   2994   3043   3102   3213   3373   3757   3933
CALLPC= 000022           4175#*
CALLPS= 000024           4175#*
CALLSP= 000026           4175#*
CALLTC= 000030           4175#*
CAL.CL  055602           4175#*
CAL.TI  055640 G         4175#
CHECK   002232            235#  3278*  3288   3295*  3314   3455*  3465   3472*  3491   3578*  3588   3595*  3614
                         3682*  3692   3699*  3718   3839*  3849   3856*  3875   4014*  4024   4031*  4050
CHERR   014302            992#  2727   2760   2849   2892   3226   3403   3787   3962
CHKLUP  037220           4175#
CHKOPI  015026           1112#  2959   3007
CHKSTR  051422           4175#
CHKTTY  047510           4175#
CHK.MA  035360           4175#
CHK.PC  042510           4175#*
CHK.SW  031550           4175#
CHRCNT  050742           4175#*
CH.FLA  035066           4175#*
CH.PAS  035104           4175#
CKERLT  014216             450    459    475    501    521    530    548    564    580    597    945#
CLEAR.  036502           4175#
CLKACC  030354 G         4175#*
CLKBFR  055604           4175#*
CLKCNT  030352 G         4175#*
CLKJUM  056210 G         4175#
CLKRES  057212 G         4175#
CLKSER  057346 G         4175#
CLKSON  030412 G         4175#*
CLK.SE  035162           4175#
CLNCOD  014144 G          889#
CLR.MA  035436           4175#
```

```
CNT    = 000010          183#    4087
CNTMSG  027640          4088    4119#
CNVT    053660          4175#
COMMAN  030164 G        4175#*
COMMTA  053474          4175#
COMP    005700           439#    1011    1126
CONT    013676           777     807     827#
CONTCL  057272 G        4175#
CONTIN  013600           793     803#
CRCEND  002604           361#    3339    3516    3900
CRDY   = 000200           151#     896    1439    1825    2084    2086    2371    2478    2532    2589    2645
CRLF    047572          4175#
CRTIM   006242           439#    1452
CSEND   002776           428#    1961    2107    2157
CSPAT   002700           397#    1933    2080    2131
CSR    = 000000           179#    4091
CSRMSG  027624          4092    4117#
CSTEST  017630          1938#    1962
CURR.S  030122 G        4175#*
CURR.T  030124 G        4175#*
C$AAD   042462          4175#
C$AAE   042474          4175#
C$AAK   043472          4175#
C$AAL   043636          4175#
C$ABRT= 000021             8#    1411
C$ADR  = 000020            8#    1049    1428    1450    1498    1541    1583    1625    1666    1709    1751    1793    1840
                        1874    1906    1951    2000    2046    2097    2148    2196    2241    2285    2330    2386    2420
                        2452    2492    2506    2548    2563    2605    2619    2662    2676    2689    2770    2784    2798
                        2842    2904    2962    3010    3066    3137    3164    3234    3249    3260    3271    3291    3328
                        3396    3411    3426    3437    3448    3468    3505    3570    3591    3674    3695    3780    3795
                        3810    3821    3832    3852    3889    3955    3970    3985    3996    4007    4027    4064
C$AU   = 000054             8#     936
C$BRK  = 000022             8#
C$BSEG= 000004              8#    1936    1988    2036    2082    2133    2183    2230    2275    2319    2877    2951    2999
                        3048    3107    3216    3376    3760    3937
C$BSUB= 000002              8#
C$BUFF= 000030              8#
C$CEFG= 000046              8#
C$CLEA= 000012              8#     910
C$CLP1= 000006              8#    1503    1546    1588    1630    1671    1714    1756    1798    2497    2553    2610    2667
                        2681    2725    2758    2776    2790    2848    2958    2967    3006    3015    3059    3072    3143
                        3169    3225    3228    3239    3254    3265    3276    3309    3333    3389    3402    3405    3416
                        3431    3442    3453    3486    3510    3563    3576    3609    3667    3680    3713    3773    3786
                        3789    3800    3815    3826    3837    3870    3894    3948    3961    3964    3975    3990    4001
                        4012    4045    4069
C$CVEC= 000036              8#     851     906    1492    1535    1577    1619    1660    1703    1745    1787    3110    3172
C$DCLN= 000044              8#     867     966
C$DODU= 000053              8#     865     964
C$DRPT= 000024              8#
C$DU   = 000055             8#     924
C$EDIT= 000000              8#      45
C$ERDF= 000002              8#    1049    1428    1450    1840    1874    1906    1951    2000    2046    2097    2148    2196
                        2241    2285    2330    2386    2420    2452    2492    2506    2548    2563    2605    2619    2662
                        2676    2689    2770    2784    2798    2842    2904    2962    3010    3066    3137    3164    3234
                        3249    3260    3271    3291    3328    3396    3411    3426    3437    3448    3468    3505    3570
                        3591    3674    3695    3780    3795    3810    3821    3832    3852    3889    3955    3970    3985
```

```
                    3996    4007    4027    4064
CSERHR= 000003         8#
CSERSF= 000001         8#  1498    1541    1583    1625    1666    1709    1751    1793
CSERSO= 000004         8#
CSESCA= 000010         8#  1956    2005    2051    2102    2153    2201    2246    2290    2335    2762    2889    2894
                    2910
CSESEG= 000005         8#  1966    2015    2061    2112    2161    2209    2254    2298    2343    2919    2970    3018
                    3075    3182    3336    3513    3897    4072
CSESUB= 000003         8#
CSETST= 000001         8#  1506    1549    1591    1633    1674    1717    1759    1801    1847    1882    1914    1969
                    2018    2064    2115    2164    2212    2257    2301    2346    2393    2428    2460    2515    2570
                    2628    2699    2732    2807    2855    2926    2975    3023    3080    3187    3347    3524    3628
                    3731    3907    4079
CSEXIT= 000032         8#
CSGMAN= 000043         8#
CSGPHR= 000042         8#   818
CSGPRI= 000040         8#
CSGTIM= 000052         8#  3145
CSINIT= 000011         8#   884
CSINLP= 000020         8#   946
CSKWOF= 000035         8#
CSKWON= 000034         8#
CSLOOP= 000100         8#
CSMANI= 000051         8#
CSMSG = 000023         8#   453     462     478     504     524     533     551     568     583     600
CSPNTB= 000014         8#   473     488     499     518     546     561     578     595     610     623     633     644
                     655    664     671     680     860    3321    3498    3621    3725    3882    4057
CSPNTF= 000017         8#   959
CSPNTS= 000016         8#
CSPNTX= 000015         8#  3306    3483    3606    3710    3867    4042
CSPOIN= 000040         8#  1049    1428    1450    1498    1541    1583    1625    1666    1709    1751    1793    1840
                    1874    1906    1951    2000    2046    2097    2148    2196    2241    2285    2330    2386    2420
                    2452    2492    2506    2548    2563    2605    2619    2662    2676    2689    2770    2784    2798
                    2842    2904    2962    3010    3066    3137    3164    3234    3249    3260    3271    3291    3328
                    3396    3411    3426    3437    3448    3468    3505    3570    3591    3674    3695    3780    3795
                    3810    3821    3832    3852    3889    3955    3970    3985    3996    4007    4027    4064
CSQIO = 000377         8#
CSRDBU= 000007         8#   877
CSREFG= 000050         8#   775     780     785     790     805
CSREQT= 000045         8#
CSRESE= 000033         8#   772    1831    1869    1901    2377    2415    2447
CSREVI= 000002         8#    44
CSRPT = 000025         8#
CSSEFG= 000047         8#
CSSPRI= 000041         8#   894     901    1823    2369    2835    2882    3051    3062    3120    3158    3381    3392
                    3556    3566    3660    3670    3765    3776    3940    3951
CSSVEC= 000037         8#   846     873    1486    1529    1571    1613    1654    1697    1739    1781    3116    3178
CSTPRI= 000013         8#
CSUNBU= 000031         8#
CSWTM = 000026         8#
CSWTU = 000027         8#  1423    1443    3133
DAHS  = 000020      175#
DATEST  020052     2037#  2057
DCKMES  005573      439#  1037
DECMSG  047404     4175#
DEMES   005541      439#  1016
```

```
DERFLG  002156          213#   992*  1014*  1065
DERR   = 040000          149#  1012   1826   1828   1942   1944   2088   2090   2139   2141   2372   2374   2533
                        2535   2590   2592   2646   2648
DEV.CO  030126 G        4175#*
DIAG.T  030446 G        4175#*
DLT    = 000000          187#  4137
DLTMES  005600          439#  1041
DMSG    027726         4138   4156#
DPDVD   060056 G        4175#
DPMUL   057744 G        4175#
DRBT   = 000006          182#  4107
DRDY   = 000001          146#  1418   1835   1946   2092   2143   2381   2478   2543   2600   2657
DRIVE   002144          208#   605    824*  1070   1091   1256
DRMSG   027665         4108   4124#
DROP    013330          709#   949
DRPCOD  014206 G        917#
DRST   = 000010          169#
DRTIM   006267          439#  1430
DSPCOD  013336 G        719#
DS0    = 000000          155#
DS1    = 000400          156#
DS2    = 001000          157#
DS3    = 001400          158#
DUNIT.  030362 G        4175#*
DVC.FT  043442          4175#
D$AAG   044346          4175#
D$AAH   044364          4175#
D$AAI   047132          4175#
D$AAJ   047136          4175#
D$AAK   047154          4175#
D$AAL   047172          4175#
D$AAM   047202          4175#
EF.CON= 000036 G         115#   804
EF.NEW= 000035 G         116#   789
EF.PWR= 000034 G         117#   774
EF.RES= 000037 G         114#   779
EF.S.A= 000040 G         113#   784
EF01   = 000001 G        134#
EF02   = 000002 G        133#
EF03   = 000003 G        132#
EF04   = 000004 G        131#
EF05   = 000005 G        130#
EF06   = 000006 G        129#
EF07   = 000007 G        128#
EF08   = 000010 G        127#
EF09   = 000011 G        126#
EF10   = 000012 G        125#
EF11   = 000013 G        124#
EF12   = 000014 G        123#
EF13   = 000015 G        122#
EF14   = 000016 G        121#
EF15   = 000017 G        120#
EF16   = 000020 G        119#
ELT    = 000002          188#   4143
EMSG    027763         4144   4156#
EMT.TR  030444 G        4175#*
```

```
EM1      006315              439#   1500   1668
EM10     006566              439#   3236   3413    3797    3972
EM101    011114              439#    660
EM102    011161              439#    667    676    1007    1119
EM11     006627              439#
EM12     006670              439#   3251   3428    3812    3987
EM13     006731              439#   2844
EM14     006763              439#   2772
EM15     007011              439#   2786
EM16     007037              439#   2800
EM17     007065              439#   2906
EM2      006342              439#   1543   1711
EM20     007120              439#   3262   3439    3823    3998
EM21     007173              439#   3273   3450    3834    4009
EM22     007255              439#   3293   3470    3854    4029
EM23     007344              439#   3330   3507    3891    4066
EM24     007404              439#   3068   3139    3398    3572    3676    3782    3957
EM25     007446              439#   3593
EM26     007505              439#   3697
EM27     007557              439#   2964
EM3      006367              439#   1585   1753
EM30     007633              439#   3012
EM31     007707              439#   3166
EM4      006414              439#   1627   1795
EM44     007730              439#   2664
EM45     007763              439#   2678
EM46     010016              439#   2691
EM5      006441              439#   1953
EM6      006512              439#   2002
EM61     010051              439#   2099
EM62     010132              439#   2150
EM63     010215              439#   2198
EM64     010276              439#   2243
EM65     010361              439#   2287
EM66     010442              439#   2332
EM67     010525              439#   1842   2388
EM7      006540              439#   2048
EM70     010562              439#   1876   2422
EM71     010617              439#   1908   2454
EM72     010654              439#   2494
EM73     010707              439#   2508
EM74     010742              439#   2550
EM75     010774              439#   2565
EM76     011026              439#   2607
EM77     011061              439#   2621
END      014100              838     853    868#
ENDDAT   002676              392#
ENDPAT   002512              329#   2010   2056    2205    2250    2294    2339
END.OF   036470             4175#
END.SU=  060722             4175#*
ENVIRO   030166 G           4175#*
EOP.CH   057370 G           4175#
EOP.FM   032734             4175#
EOP.IN   035100             4175#*
ERR    = 100000              148#   1828   1944    2090    2141    2374    2535    2592    2648
ERRFOR   043714             4175#
```

CVRLAA.SUP 11-APR-78 09:27 CROSS REFERENCE TABLE -- USER SYMBOLS

```
ERRHAN  042514          4175#
ERRLMT  002254           244#   796*   951*   952
ERRVEC  002204           224#   844    850   1484   1491   1527   1534   1569   1576   1611   1618   1652   1659
                        1695   1702   1737   1744   1779   1786
ERR.HR  043452          4175#
ERR.NU  030116 G        4175#*
ERR.SF  043456          4175#
ERR0    011352 G         446#  2845   3069   3140   3399   3573   3677   3783   3958
ERR1    011370 G         456#  1501   1544   1586   1628   1669   1712   1754   1796
ERR1FO  044000          4175#
ERR10   011726 G         571#  2965   3013
ERR11   011770 G         586#  3167
ERR2    011402 G         465#  1843   1877   1909   1954   2003   2049   2100   2151   2199   2244   2288   2333
                        2389   2423   2455   2495   2509   2551   2566   2608   2622   2665   2679   2692   2773
                        2787   2801
ERR3    011444 G         482#  3294   3471   3594   3698   3855   4030
ERR4    011546 G         509#  3237   3252   3263   3274   3331   3414   3429   3440   3451   3508   3798   3813
                        3824   3835   3892   3973   3988   3999   4010   4067
ERR5    011614 G         527#  1431
ERR6    011626 G         536#  1052   1453
ERR7    011670 G         554#  2907
ESC.PC  042506          4175#*
EV.COU  030120 G        4175#*
EXPMES  005605           439#  1121
E.BA    002162           215#   495    636   1212*  3230   3302   3407   3479   3602   3706   3791   3863   3966
                        4038
E.CS    002160           214#   638    993   1001   1008   1012   1017   1021   1025   1029   1034   1038   1115
                        1122   1127   1132   1211*
E.DA    002164           216#   494    650   1213*  3241   3301   3418   3478   3601   3705   3802   3862   3977
                        4037
E.MP    002166           217#   648   1214*  3256   3433   3817   3992
E.MP1   002170           218#   647   1215*  3267   3444   3828   4003
FILL    050240          4175#
FILL.C  000204 G        4175#
FIX     015204          1010   1015   1019   1023   1027   1031   1036   1040   1042   1044   1120   1125   1130
                        1135   1139   1141   1154#
FLAGS   030160 G        4175#*
FLAGS1  030162 G        4175#
FLAGTA  053412          4175#
FLAG.I  035146          4175#
FLA.SE  053360          4175#
FLG.MA  035106          4175#
FNDFNC  015020          1077*  1078*   1079   1081*  1084*  1099#
FORM.T  044010          4175#*
FREE    051316          4175#
FRMT1   012414           607    684#
FRMT10  012766           592    684#
FRMT11  013046           684#   956
FRMT12  013107           684#
FRMT13  013166           684#   857
FRMT14  013217           496    684#  3303   3480   3603   3707   3864   4039
FRMT2   012454           620    641    684#
FRMT2A  012473           630    684#
FRMT2B  012506           652    684#
FRMT3   012527           661    668    677    684#
FRMT4   012534           470    515    684#
```

E09


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FRMT5   012660          684#
FRMT6   012731          558     684#
FRMT98  012572          684#    3318    3495    3618    3722    3879    4054
FRMT99  012655          485     543     575     684#
FSAU    = 000015          8#    931     935
FSBGN   = 000040          8#     17      63      76     192     196     435     437     440     444     446     456     465
                        482     509     527     536     554     571     586     688     690     703     705     717     719
                        765     768     770     887     889     891     913     917     919     927     929     931     939
                        944    1401    1464    1470    1505    1512    1548    1555    1590    1597    1632    1638    1673
                       1680    1716    1723    1758    1765    1800    1806    1846    1853    1881    1888    1913    1920
                       1936    1956    1968    1975    1988    2005    2017    2024    2036    2051    2063    2070    2082
                       2102    2114    2121    2133    2153    2163    2170    2183    2201    2211    2218    2230    2246
                       2256    2263    2275    2290    2300    2307    2319    2335    2345    2352    2392    2399    2427
                       2434    2459    2466    2514    2521    2569    2576    2627    2633    2698    2704    2731    2738
                       2762    2806    2813    2854    2861    2877    2889    2894    2910    2925    2932    2951    2974
                       2980    2999    3022    3028    3048    3079    3086    3107    3186    3193    3216    3346    3353
                       3376    3523    3529    3627    3633    3730    3737    3760    3906    3912    3937    4078    4082
                       4084    4129    4133    4135    4160
FSCLEA= 000007            8#    891     909
FSDU    = 000016          8#    919     923
FSEND   = 000041          8#     17      63      76     192     196     435     437     440     444     454     463     479
                        505     525     534     552     569     584     601     688     690     703     705     717     719
                        765     768     885     887     889     911     913     917     925     927     929     937     939
                        944    1407    1464    1470    1505    1507    1512    1548    1550    1555    1590    1592    1597
                       1632    1634    1638    1673    1675    1680    1716    1718    1723    1758    1760    1765    1800
                       1802    1806    1846    1848    1853    1881    1883    1888    1913    1915    1920    1956    1967
                       1968    1970    1975    2005    2016    2017    2019    2024    2051    2062    2063    2065    2070
                       2102    2113    2114    2116    2121    2153    2162    2163    2165    2170    2201    2210    2211
                       2213    2218    2246    2255    2256    2258    2263    2290    2299    2300    2302    2307    2335
                       2344    2345    2347    2352    2392    2394    2399    2427    2429    2434    2459    2461    2466
                       2514    2516    2521    2569    2571    2576    2627    2629    2633    2698    2700    2704    2731
                       2733    2738    2762    2806    2808    2813    2854    2856    2861    2889    2894    2910    2920
                       2925    2927    2932    2971    2974    2976    2980    3019    3022    3024    3028    3076    3079
                       3081    3086    3183    3186    3188    3193    3337    3346    3348    3353    3514    3523    3525
                       3529    3627    3629    3633    3730    3732    3737    3898    3906    3908    3912    4073    4078
                       4080    4082    4116    4129    4133    4155    4160
FSHARD= 000004            8#    4084    4114    4141
FSHW    = 000013          8#    692     700
FSINIT= 000006            8#    770     883
FSJMP   = 000050          8#
FSMOD   = 000000          8#     17      63      76     192     196     435     437     440     444     688     690     703
                        705     717     719     765     768     887     889     913     917     927     929     939     944
                       1464    4082    4129    4133    4160
FSMSG   = 000011          8#    446     452     456     461     465     477     482     503     509     523     527     532
                        536     550     554     567     571     582     586     599
FSPWR   = 000017          8#
FSRPT   = 000012          8#
FSSEG   = 000003          8#    1936    1965    1988    2014    2036    2060    2082    2111    2133    2160    2183    2208
                       2230    2253    2275    2297    2319    2342    2877    2918    2951    2969    2999    3017    3048
                       3074    3107    3181    3216    3335    3376    3512    3760    3896    3937    4071
FSSOFT= 000005            8#    4135    4141    4153
FSSRV   = 000010          8#    1401    1405
FSSUB   = 000002          8#
FSSW    = 000014          8#    707     714
FSTEST= 000001            8#    1470    1505    1512    1548    1555    1590    1597    1632    1638    1673    1680    1716
                       1723    1758    1765    1800    1806    1846    1853    1881    1888    1913    1920    1968    1975
```

F09


```
                    2017    2024    2063    2070    2114    2121    2163    2170    2211    2218    2256    2263    2300
                    2307    2345    2352    2392    2399    2427    2434    2459    2466    2514    2521    2569    2576
                    2627    2633    2698    2704    2731    2738    2806    2813    2854    2861    2925    2932    2974
                    2980    3022    3028    3079    3086    3186    3193    3346    3353    3523    3529    3627    3633
                    3730    3737    3906    3912    4078
GARBAG  050744      4175#
GCRCPT  002240       238#   1172*   1173    1254
GDATMP  002250       242#   1275*   1276    1277*
GDCRCA  002242       239#   1182*   3255    3432    3816    3991
GDCRCB  002244       240#   1195*   3266    3443    3827    4002
GDDAT   002234       236#    469     492     514    1495*   1538*   1581*   1622*   1663*   1706*   1749*   1790*   1825*
                    1828*   1836    1867*   1899*   1939*   1940*   1941    1944*   1947    1990*   1993*   1994    1996
                    2038*   2039    2042    2085*   2086*   2090*   2093    2136*   2137*   2141*   2144    2186*   2189*
                    2192    2233*   2234*   2237    2278*   2281    2322*   2323*   2326    2371*   2374*   2382    2413*
                    2445*   2488*   2502*   2532*   2535*   2536    2544    2559*   2589*   2592*   2593    2601    2615*
                    2645*   2648*   2649    2658    2672*   2686*   2752*   2766    2778*   2780    2792*   2794    2874*
                    2897    3229*   3231    3240*   3245*   3246    3255*   3257    3266*   3268    3282*   3284    3299
                    3323*   3325    3406*   3408    3417*   3422*   3423    3432*   3434    3443*   3445    3459*   3461
                    3476    3500*   3502    3582*   3584    3599    3686*   3688    3703    3790*   3792    3801*   3806*
                    3807    3816*   3818    3827*   3829    3843*   3845    3860    3884*   3886    3965*   3967    3976*
                    3981*   3982    3991*   3993    4002*   4004    4018*   4020    4035    4059*   4061
GDDATP  002246       241#   1226*   1229    1272*   1275
GETCHR  047450      4175#
GETCHN  053034      4175#
GETPAR  044526      4175#
GETSWI  052030      4175#
GET.TW  051600      4175#
GLBDAT  002122  G    196#
GLBEQA  002122  G     76#
GLBERR  011352  G    444#
GLBSUB  014216  G    944#
GLBTXT  005500  G    437#
GODRVR= 000202       168#
GSBIT = 000002       170#
GSTAT = 000004       163#    996     1069
G$EXCP= 000400         8#
G$HILI= 000002         8#
G$LOLI= 000001         8#
G$NO  = 000000         8#
G$OFFS= 000400         8#    4087    4091    4096    4101    4107    4137    4143    4149
G$OFSI= 000376         8#    4087    4091    4096    4101    4107    4137    4143    4149
G$PRMA= 000001         8#    4091    4096
G$PRMD= 000002         8#    4101    4107    4143
G$PRML= 000000         8#    4087    4137    4149
G$RADA= 000140         8#
G$RADB= 000000         8#
G$RADD= 000040         8#
G$RADF= 000200         8#
G$RADL= 000120         8#    4087    4137    4149
G$RADO= 000020         8#    4091    4096    4101    4107    4143
G$RADT= 000100         8#
G$XFER= 000004         8#    4141
G$YES = 000010         8#    4087    4091    4096    4101    4107    4137    4143    4149
HCORED  034656      4175#
HCOREQ  034566      4175#
HCORET  030402  G   4175#*
```

CVRLAA.SUP 11-APR-78 09:27 CROSS REFERENCE TABLE -- USER SYMBOLS

```
HCRCME  005560            439#  1028
HC.ADR  030152 G         4175#
HC.DEF  030144 G         4175#
HC.DIA  030142 G         4175#
HDRBUF  003000            429#
HDRLST  015022           1080  1101#
HERTZ.  034526           4175#
HINUM   002270            250#   794#   800   828#  1325  1333  1338#
HNFMES  005566            439#  1032  1131
HOLDSP= 000020           4175#
HPTCOD  013312 G          690#
HRDPRM  027550 G         4082#
HW.ADR  030150 G         4175#
H$AAB   054206           4175#
ININIT  030372 G         4175#*
INITCO  013462 G          768#
INITIA  047420           4175#
INIT.M  035504           4175#
INIT.R  030206 G         4175#
INPUTA  050346           4175#
INTEN = 000100            147#   902  1078  1086  2837  2885  3054  3129  3384  3558  3662  3768  3943
INTFLG  002176            221#  1402# 1409# 2832# 2839  2846# 2879# 2900  2913  3052# 3063  3070# 3121#
                         3134   3141# 3382# 3393  3400# 3553# 3567  3574# 3657# 3671  3678# 3766# 3777
                         3784# 3941# 3952  3959#
INTFOR  043644           4175#
INTSRV  016272            870  1402#  3175
INVAL.  034452           4175#
INVINT  043502           4175#
INV.SW  031504           4175#
IN.SUF  036454           4175#
I$AU  = 000041              8#   931#  937#
I$CLN = 000041              8#   891#  911#
I$DU  = 000041              8#   919#  925#
I$HRD = 000041           4084#  4116#
I$INIT= 000041              8#   770#  885#
I$MOD = 000041              8#    17#   63#   76#  192#  196#  435#  437#  440#  444#  688#  690#  703#
                          705#   717#  719#  765#  768#  887#  889#  913#  917#  927#  929#  939#  944#
                         1464#  4082# 4129# 4133# 4160#
I$MSG = 000041              8#   446#  454#  456#  463#  465#  479#  482#  505#  509#  525#  527#  534#
                          536#   552#  554#  569#  571#  584#  586#  601#
I$PWR = 000041              8#
I$RPT = 000041              8#
I$SEG = 000041              8#  1470  1512  1555  1597  1638  1680  1723  1765  1806  1853  1888  1920
                         1936#  1956  1967# 1975  1988# 2005  2016# 2024  2036# 2051  2062# 2070  2082#
                         2102   2113# 2121  2133# 2153  2162# 2170  2183# 2201  2210# 2218  2230# 2246
                         2255#  2263  2275# 2290  2299# 2307  2319# 2335  2344# 2352  2399  2434  2466
                         2521   2576  2633  2704  2738  2813  2861  2877# 2910  2920# 2932  2951# 2971#
                         2980   2999# 3019# 3028  3048# 3076# 3086  3107# 3183# 3193  3216# 3337# 3353
                         3376#  3514# 3529  3633  3737  3760# 3898# 3912  3937# 4073#
I$SFT = 000041           4135#  4155#
I$SRV = 000041              8#  1401# 1407#
I$SUB = 000041              8#  1470  1512  1555  1597  1638  1680  1723  1765  1806  1853  1888  1920
                         1975   2024  2070  2121  2170  2218  2263  2307  2352  2399  2434  2466  2521
                         2576   2633  2704  2738  2813  2861  2932  2980  3028  3086  3193  3353  3529
                         3633   3737  3912
I$TST = 000041              8#  1470# 1505# 1507# 1512# 1548# 1550# 1555# 1590# 1592# 1597# 1632# 1634#
```

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                        1638#   1673#   1675#   1680#   1716#   1718#   1723#   1758#   1760#   1765#   1800#   1802#   1806#
                        1846#   1848#   1853#   1881#   1883#   1888#   1913#   1915#   1920#   1968#   1970#   1975#   2017#
                        2019#   2024#   2063#   2065#   2070#   2114#   2116#   2121#   2163#   2165#   2170#   2211#   2213#
                        2218#   2256#   2258#   2263#   2300#   2302#   2307#   2345#   2347#   2352#   2392#   2394#   2399#
                        2427#   2429#   2434#   2459#   2461#   2466#   2514#   2516#   2521#   2569#   2571#   2576#   2627#
                        2629#   2633#   2698#   2700#   2704#   2731#   2733#   2738#   2762    2806#   2808#   2813#   2854#
                        2856#   2861#   2889    2894    2925#   2927#   2932#   2974#   2976#   2980#   3022#   3024#   3028#
                        3079#   3081#   3086#   3186#   3188#   3193#   3346#   3348#   3353#   3523#   3525#   3529#   3627#
                        3629#   3633#   3730#   3732#   3737#   3906#   3908#   3912#   4078#   4080#
J$JMP = 000167            8#
KBPTR   030224 G        4175#*
KBUF    030226 G        4175#*
LDCSR   002200           222#   1064#   1076#   1077    1086    1091#   1092#   1093    1249#   1255#   1256#   1257#   1258
                        2478#   2481
LDFUN   015542           1249#   2952    3000    3053    3128    3219    3383    3557    3661    3767    3942
LDFUNC  014602           1064#   2721    2754    2836    2884
LF      005676            439#   1051
LINE.F  030442 G        4175#*
LINE1   012042            447     457     466     482     510     528     537     555     571     586     603#    862     961
LINE2   012076            448     483     511     539     572     587     614#
LINE3   012314            538     659#
LINE4   012366            573     675#
LOAD.F  035102          4175#*
LOGMSG  047412          4175#
LONUM   002272            251#    795#    799     827#    1301    1324    1331    1337#   3932#
LPBFR   030222 G        4175#*
LPCNTR  030220 G        4175#*
LPT.AD  034544          4175#
LPT.RE  034540          4175#
LSI.RE  034534          4175#
LUP     055506          4175#
LUP.AD  042512          4175#*
LSAPT   002036 G          39#
LSAU    014212 G          55      931#
LSAUT   002074 G          55#
LSCCP   002106 G          60#
LSCLEA  014144 G          60      891#
LSCO    002032 G          37#
LSDEPO  002011 G          28#
LSDESC  002102 G          58#
LSDEVP  002064 G          51#
LSDISP  013340 G          40      722#
LSDR    002112 G          53       68#
LSDRCT  002070 G          53#
LSDRS   002072 G          54#
LSDRST  002112 G          54       68#
LSDTP   002040 G          40#
LSDU    014206 G          56      919#
LSDUT   002076 G          56#
LSDVTY  002114 G          51       71#
LSEF    002056 G          48#
LSEFLG  002034 G          38#
LSEXP1  002042 G          41#
LSEXP2  002044 G          42#
LSEXP3  002046 G          43#
LSHARD  027552 G          31    4084    4085#
```

```
LSHPCP  002016 G            31#
LSHPTP  002022 G            33#
LSHW    013314 G            33      692     693#
LSICP   002104 G            59#
LSINIT  013462 G            59      770#
LSLADP  002026 G            35#
LSLAST  030114 G            35     4167#
LSMREV  002050 G            44#
LSNAME  002000 G            19#
LSREPP  002066 G            52#
LSREV   002010 G            27#
LSSOFT  027676 G            32     4135    4136#
LSSPC   002062 G            50#
LSSPCP  002020 G            32#
LSSPTP  002024 G            34#
LSSTA   002030 G            36#
LSSW    013330 G            34      707     708#
LSTIML  002014 G            30#
LSTIMU  002054 G            47#
LSTIM1  002052 G            46#
LSTSTI  002100 G            57#
LSUNIT  002012 G            29#     797     812
L.CLK.  034512             4175#
L10000  011366              452#
L10001  011400              461#
L10002  011442              477#
L10003  011544              503#
L10004  011612              523#
L10005  011624              532#
L10006  011666              550#
L10007  011724              567#
L10010  011766              582#
L10011  012040              599#
L10012  013326              692     700#
L10013  013336              707     714#
L10014  014142              883#
L10015  014204              909#
L10016  014210              923#
L10017  014214              935#
L10020  016276             1405#
L10021  016526             1505#
L10022  016624             1548#
L10023  016722             1590#
L10024  017020             1632#
L10025  017114             1673#
L10026  017210             1716#
L10027  017304             1758#
L10030  017400             1800#
L10031  017510             1846#
L10032  017562             1881#
L10033  017620             1913#
L10034  017740             1968#
L10035  020042             2017#
L10036  020130             2063#
L10037  020254             2114#
L10040  020400             2163#
```

```
L10041  020504            2211#
L10042  020604            2256#
L10043  020674            2300#
L10044  020774            2345#
L10045  021104            2392#
L10046  021156            2427#
L10047  021214            2459#
L10050  021340            2514#
L10051  021500            2569#
L10052  021640            2627#
L10053  022044            2698#
L10054  022074            2731#
L10055  022300            2763    2806#
L10056  022364            2854#
L10057  022530            2890    2895    2925#
L10060  022640            2974#
L10061  022750            3022#
L10062  023104            3079#
L10063  023434            3186#
L10064  024246            3346#
L10065  025124            3523#
L10066  025472            3627#
L10067  026044            3730#
L10070  026722            3906#
L10071  027546            4078#
L10072  027624            4084    4115#
L10073  027726            4135    4154#
MAINT =  000000             161#  2953    3001    3054    3129    3220    3384    3558    3662    3768    3943
MAJ.IN  030176 G          4175#*
MAJ.LO  055606            4175#*
MAJ.US  030200 G          4175#*
MAN.TI  001244            4175#
MAP16   060314 G          4175#
MASK.B  037216            4175#
MASK.W  037214            4175#
MATFLG  002252             243#  1114*   1124*   1129*   1134*   1137
MATINT  006104             439#  3056    3131    3386    3560    3664    3770    3945
MATMES  006044             439#  2955    3003    3222
MDHEDR  002000 G            17#
MEM.SI  034554            4175#
MERLMT  013332             710#   952
MIN.IN  030172 G          4175#*
MIN.US  030174 G          4175#*
MK      =  000001           171#
MODR    057656 G          4175#
MSCRLF  005673             439#  1043    1142
MSG.AD  030140 G          4175#
MSG.TY  030114 G          4175#*
MUL     057612 G          4175#
NEWPRI  057336 G          4175#
NEXTAR  053576            4175#
NODRY   005516             439#
NONMES  005642             439#  1140
NOOPO =  000000             159#  2722    2755    2837    2885
NOOP7 =  000016             160#
NOPINT  006012             439#  1102
```

```
NOPMES  005761            439#  1101
NOPWR   013474            778#
NORES   005500            439#   854
NO.CLK  034502           4175#
NO.FLA  053372           4175#
NO.LPT  050710           4175#
NO.PTA  034706           4175#
NR    = 000000             67#
NUMBIN  044034           4175#
NUM.LA  044202           4175#
NUM.NO  030156 G         4175#
NUM.UN  030564           4175#
NUNITS  037172           4175#
NXM   = 020000            154#  1017
NXMMES  005546            439#  1020
NXT     013610            801    809#   820
NXTFOR  053652           4175#
OCTMSG  047376           4175#
OPI   = 002000            150#  1021
OPIERR  005706            439#
OPIMES  005553            439#  1024   1136
OPIMN   002264            248#   591   3161
OPIMX   002266            249#   590   3122   3126   3127   3159
O$APTS= 000000              8#    36
O$AU  = 000001              8#    14#    55
O$BGNR= 000000              8#    52
O$BGNS= 000001              8#    14#    32
O$DU  = 000001              8#    14#    56
O$GNSW= 000001              8#    14#    34
O$POIN= 000001              8#    14#    61
O.ODT = ****** U         4175
PARSES  053106           4175#
PAR.LA  047074           4175#
PASS.C  030130 G         4175#*
PATCRC  002514            333#  2942   2990   3039   3098   3209   3369   3753
PATDAT  002606            364#  2943   2991   3040   3099   3210   3370   3754
PATSAV  002300            254#  3210*  3212   3338*  3370*  3372   3515*  3754*  3756  3899*
PFLG    002172            219#   875*   880*
PRINTC  050720           4175#
PRINTF  054226           4175#
PRIOR = 000004            181#  4101
PRIO0 = 000000 G          145#   893   2834   3050   3119   3380   3555   3659   3764  3939
PRIO1 = 000040 G          144#
PRIO2 = 000100 G          143#
PRIO3 = 000140 G          142#
PRIO4 = 000200 G          141#
PRIO5 = 000240 G          140#
PRIO6 = 000300 G          139#
PRIO7 = 000340 G          138#   900   1822   2368   3061   3157   3391   3565   3669  3775  3950
PRNTST  050610           4175#
PRO.CM  035060           4175#*
PTAB.S  030400 G         4175#*
PUTCHR  047424           4175#
PWR.FA  060550 G         4175#
PWR.FL  030204 G         4175#*
PWR.MS  060676           4175#
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CVRLAA.SUP 11-APR-78 09:27 CROSS REFERENCE TABLE -- USER SYMBOLS

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PWR.SA  060672          4175#*
PWR.UP  060674          4175#*
P.CLK.  034520          4175#
RAND    016014          1300    1321#
RDHDR = 000010           165#
READ  = 000014           167#
READ.P  055610 G        4175#
REGBAC  060300 G        4175#
REGSAV  060264 G        4175#
REQN.P  030170 G        4175#*
REQN.T  035062          4175#*
REST    013642           816#
RESTMS  014564          1045#   1090*   1251*
RE.SET  031652          4175#
RHHS  = 000100           173#
RLBA    002130           202#    832*    1202    1212    1253*   1532*   1538    1700    1706    1863*   1866*   1870    1994*
                        1995    2185*   2190*   2191    2232*   2235*   2236    2409*   2412*   2416    2479*   2485    2489
                        2538*   2594*   2612    2616    2650*   2669    2673    2750*   2779
RLCS    002126           201#    606     830*    848     896     902*    1071*   1073    1093*   1095*   1201    1211    1258*
                        1260*   1418    1439    1489*   1495    1657    1663    1824*   1826    1834    1941*   1942    1945
                        2084*   2087*   2088    2091    2135*   2138*   2139    2142    2370*   2372    2380    2481*   2533
                        2536*   2542    2590    2593*   2599    2646    2649*   2656
RLDA    002132           203#    834*    1068*   1203    1213    1254*   1574*   1581    1742    1749    1898*   1902    2039*
                        2041    2277*   2279*   2280    2321*   2324*   2325    2444*   2448    2480*   2499    2503    2537*
                        2555    2560    2595*   2651*   2682    2685    2749*   2793
RLMP    002134           204#    836*    1204    1214    1215    1250*   1616*   1622    1784    1790    2652*   2751*   2752
                        2765
RSTACK  057540 G        4175#
SAVCNT  002302           255#    3277*   3287*   3317    3454*   3464*   3494    3577*   3587*   3617    3681*   3691*   3721
                        3838*   3848*   3878    4013*   4023*   4053
SAVEDO= 032050          4175#
SEARCH  051546          4175#
SEEK  = 000006           164#
SEGSTA  030414 G        4175#*
SETCMP  015642          1270#   3761
SETPAT  015454          1224#   2948    2996    3045    3104    3217    3377
SETRAN  015734          1296#   3935
SET.MA  035272          4175#
SFTPRM  027674 G        4133#
SHIFT   060376 G        4175#
SIGN  = 000004           172#
SIMBCC  016112          1178    1186    1191    1357#
SIZE  = 000004           189#   4149
SMSG    027752          4150    4156#
SPEC.U  035006          4175#*
SPTCOD  013326 G         705#
SPV.SE  000400          4175#
START   013526           762     787     794#
STARTC  057266 G        4175#
START1  013546           792     797#
STHS  = 000100           174#
STRCHR  050300          4175#
STRT.T  035064          4175#*
ST.SET  031716          4175#
SUNIT.  035070          4175#*
SUPERV  032752          4175#
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CVRLAA.SUP 11-APR-78 09:27 CROSS REFERENCE TABLE -- USER SYMBOLS

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SUPFLA  030360 G        4175#*
SUPV.T  030532 G        4175#*
SUP.PR  031470          4175#
SVCCNT= 177777             8#    17    63    76   192   196   435   437   440   444   446   452   456
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                          571   582   586   599   688   690   692   700   703   705   707   714   717
                          719   765   768   770   883   887   889   891   909   913   917   919   923
                          927   929   931   935   939   944  1401  1405  1464  1470  1505  1512  1548
                         1555  1590  1597  1632  1638  1673  1680  1716  1723  1758  1765  1800  1806
                         1846  1853  1881  1888  1913  1920  1936  1965  1968  1975  1988  2014  2017
                         2024  2036  2060  2063  2070  2082  2111  2114  2121  2133  2160  2163  2170
                         2183  2208  2211  2218  2230  2253  2256  2263  2275  2297  2300  2307  2319
                         2342  2345  2352  2392  2399  2427  2434  2459  2466  2514  2521  2569  2576
                         2627  2633  2698  2704  2731  2738  2806  2813  2854  2861  2877  2918  2925
                         2932  2951  2969  2974  2980  2999  3017  3022  3028  3048  3074  3079  3086
                         3107  3181  3186  3193  3216  3335  3346  3353  3376  3512  3523  3529  3627
                         3633  3730  3737  3760  3896  3906  3912  3937  4071  4078  4082  4084  4114
                         4129  4133  4135  4153  4160
SVCGBL= 000000             8#    17    19    27    28    29    30    31    32    33    34    35    36
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                           52    53    54    55    56    57    58    59    60    68    71    76   196
                          437   444   446   456   465   482   509   527   536   554   571   586   690
                          693   705   708   719   722   768   770   889   891   917   919   929   931
                          944  4082  4085  4133  4136  4167#  4168
SVCHAN  037406          4175#
SVCINS= 000000             8#    19    20    21    22    23    24    25    26    27    28    29    30
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                           44    45    46    47    48    49    50    51    52    53    54    55    56
                           57    58    59    60    61    67    68    69    71    72    73   453   454
                          462   463   468   469   470   471   472   473   474   475   478   479   485
                          486   487   488   489   490   491   492   493   494   495   496   497   498
                          499   500   501   504   505   513   514   515   516   517   518   519   520
                          524   525   533   534   543   544   545   546   547   548   551   552   557
                          558   559   560   561   562   563   568   569   575   576   577   578   579
                          580   583   584   589   590   591   592   593   594   595   596   597   600
                          601   604   605   606   607   608   609   610   611   612   615   616   617
                          618   619   620   621   622   623   624   625   626   627   628   629   630
                          631   632   633   634   635   636   637   638   639   640   641   642   643
                          644   645   646   647   648   649   650   651   652   653   654   655   656
                          657   660   661   662   663   664   665   666   667   668   669   670   671
                          672   673   676   677   678   679   680   681   682   692   693   707   708
                          721   722   723   724   725   726   727   728   729   730   731   732   733
                          734   735   736   737   738   739   740   741   742   743   744   745   746
                          747   748   749   750   751   752   753   754   755   756   757   758   759
                          760   761   762   763   772   773   774   775   776   777   778   779   780
                          781   782   783   784   785   786   787   788   789   790   791   792   793
                          804   805   806   807   808   817   818   819   820   821   842   843   844
                          845   846   847   848   850   851   852   856   857   858   859   860   861
                          862   864   865   866   867   868   869   870   871   872   873   874   875
                          877   878   879   880   884   885   893   894   895   900   901   902   905
                          906   907   910   911   924   925   936   937   946   947   948   949   956
                          957   958   959   960   961   963   964   965   966   967  1049  1050  1051
                         1052  1053  1406  1407  1411  1412  1422  1423  1424  1428  1429  1430  1431
                         1432  1442  1443  1444  1450  1451  1452  1453  1454  1482  1483  1484  1485
                         1486  1487  1488  1491  1492  1493  1498  1499  1500  1501  1502  1503  1504
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1656  1659  1660  1661  1666  1667  1668  1669  1670  1671  1672  1674  1675
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1901  1902  1906  1907  1908  1909  1910  1914  1915  1936  1937  1951  1952
1953  1954  1955  1956  1957  1958  1966  1967  1969  1970  1988  1989  2000
2001  2002  2003  2004  2005  2006  2007  2015  2016  2018  2019  2036  2037
2046  2047  2048  2049  2050  2051  2052  2053  2061  2062  2064  2065  2082
2083  2097  2098  2099  2100  2101  2102  2103  2104  2112  2113  2115  2116
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2762  2763  2764  2770  2771  2772  2773  2774  2776  2777  2784  2785  2786
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3010  3011  3012  3013  3014  3015  3016  3018  3019  3023  3024  3048  3049
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3167  3168  3169  3170  3171  3172  3173  3174  3175  3176  3177  3178  3179
3180  3182  3183  3187  3188  3216  3217  3225  3226  3228  3229  3234  3235
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3261  3262  3263  3264  3265  3266  3271  3272  3273  3274  3275  3276  3277
3291  3292  3293  3294  3295  3298  3299  3300  3301  3302  3303  3304  3305
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3381  3382  3389  3390  3391  3392  3393  3396  3397  3398  3399  3400  3402
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3429  3430  3431  3432  3437  3438  3439  3440  3441  3442  3443  3448  3449
3450  3451  3452  3453  3454  3468  3469  3470  3471  3472  3475  3476  3477
3478  3479  3480  3481  3482  3483  3484  3485  3486  3487  3494  3495  3496
3497  3498  3499  3500  3505  3506  3507  3508  3509  3510  3511  3513  3514
3524  3525  3555  3556  3557  3563  3564  3565  3566  3567  3570  3571  3572
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                3722    3723    3724    3725    3726    3727    3731    3732    3760    3761    3764    3765    3766
                3773    3774    3775    3776    3777    3780    3781    3782    3783    3784    3786    3787    3789
                3790    3795    3796    3797    3798    3799    3800    3801    3810    3811    3812    3813    3814
                3815    3816    3821    3822    3823    3824    3825    3826    3827    3832    3833    3834    3835
                3836    3837    3838    3839    3853    3854    3855    3856    3859    3860    3861    3862    3863
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                3883    3884    3889    3890    3891    3892    3893    3894    3895    3897    3898    3907    3908
                3937    3938    3939    3940    3941    3948    3949    3950    3951    3952    3955    3956    3957
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                3985    3986    3987    3988    3989    3990    3991    3996    3997    3998    3999    4000    4001
                4002    4007    4008    4009    4010    4011    4012    4013    4027    4028    4029    4030    4031
                4034    4035    4036    4037    4038    4039    4040    4041    4042    4043    4044    4045    4046
                4053    4054    4055    4056    4057    4058    4059    4064    4065    4066    4067    4068    4069
                4070    4072    4073    4079    4080    4084    4085    4087    4088    4089    4090    4091    4092
                4093    4094    4095    4096    4097    4098    4099    4100    4101    4102    4103    4104    4105
                4106    4107    4108    4109    4110    4111    4112    4114    4115    4135    4136    4137    4138
                4139    4140    4141    4142    4143    4144    4145    4146    4147    4148    4149    4150    4151
                4152    4153    4154    4166    4167
SVCSTK= 177777    8#      17      63      76     192     196     435     437     440     444     446     452     456
                 461     465     477     482     503     509     523     527     532     536     550     554     567
                 571     582     586     599     688     690     692     700     703     705     707     714     717
                 719     765     768     770     883     887     889     891     909     913     917     919     923
                 927     929     931     935     939     944    1401    1405    1464    1470    1505    1512    1548
                1555    1590    1597    1632    1638    1673    1680    1716    1723    1758    1765    1800    1806
                1846    1853    1881    1888    1913    1920    1936    1957    1965    1968    1975    1988    2006
                2014    2017    2024    2036    2052    2060    2063    2070    2082    2103    2111    2114    2121
                2133    2154    2160    2163    2170    2183    2202    2208    2211    2218    2230    2247    2253
                2256    2263    2275    2291    2297    2300    2307    2319    2336    2342    2345    2352    2392
                2399    2427    2434    2459    2466    2514    2521    2569    2576    2627    2633    2698    2704
                2731    2738    2806    2813    2854    2861    2877    2911    2918    2925    2932    2951    2969
                2974    2980    2999    3017    3022    3028    3048    3074    3079    3086    3107    3181    3186
                3193    3216    3335    3346    3353    3376    3512    3523    3529    3627    3633    3730    3737
                3760    3896    3906    3912    3937    4071    4078    4082    4084    4114    4129    4133    4135
                4141    4153    4160
SVCSUB= 177777    8#
SVCTAG= 000000    8#      9#     452     453     461     462     477     478     503     504     523     524     532
                 533     550     551     567     568     582     583     599     600     700     701     714     715
                 883     884     909     910     923     924     935     936    1405    1406    1471    1472    1477
                1478    1505    1506    1515    1516    1521    1522    1548    1549    1556    1557    1562    1563
                1590    1591    1598    1599    1604    1605    1632    1633    1639    1640    1645    1646    1673
                1674    1683    1684    1689    1690    1716    1717    1724    1725    1730    1731    1758    1759
                1766    1767    1772    1773    1800    1801    1808    1809    1818    1819    1846    1847    1855
                1856    1860    1861    1881    1882    1890    1891    1895    1896    1913    1914    1924    1925
                1930    1931    1965    1966    1968    1969    1977    1978    1983    1984    2014    2015    2017
                2018    2026    2027    2031    2032    2060    2061    2063    2064    2071    2072    2077    2078
                2111    2112    2114    2115    2123    2124    2128    2129    2160    2161    2163    2164    2172
                2173    2178    2179    2208    2209    2211    2212    2220    2221    2225    2226    2253    2254
                2256    2257    2265    2266    2270    2271    2297    2298    2300    2301    2309    2310    2314
                2315    2342    2343    2345    2346    2354    2355    2364    2365    2392    2393    2401    2402
                2406    2407    2427    2428    2436    2437    2441    2442    2459    2460    2468    2469    2475
                2476    2514    2515    2522    2523    2529    2530    2569    2570    2579    2580    2586    2587
                2627    2628    2636    2637    2642    2643    2698    2699    2708    2709    2714    2715    2731
                2732    2740    2741    2744    2745    2806    2807    2815    2816    2826    2827    2854    2855
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                        3035    3036    3074    3075    3079    3080    3088    3089    3093    3094    3181    3182    3186
                        3187    3195    3196    3205    3206    3335    3336    3346    3347    3355    3356    3365    3366
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                        3642    3730    3731    3739    3740    3749    3750    3896    3897    3906    3907    3914    3915
                        3927    3928    4071    4072    4078    4079    4115    4116    4154    4155
SVCTST= 177777            8#    1470    1512    1555    1597    1638    1680    1723    1765    1806    1853    1888    1920
                        1975    2024    2070    2121    2170    2218    2263    2307    2352    2399    2434    2466    2521
                        2576    2633    2704    2738    2813    2861    2932    2980    3028    3086    3193    3353    3529
                        3633    3737    3912
SWCHAN  034700          4175#
SWITCH  053552          4175#
SW.ADR  030154 G        4175#
SW.PTA  034664          4175#
SYS.FT  043432          4175#
S$LSYM= 010000            8#     453#    462#    478#    504#    524#    533#    551#    568#    583#    600#    701#    715#
                         884#     910#    924#    936#   1406#   1506#   1549#   1591#   1633#   1674#   1717#   1759#   1801#
                        1847#   1882#   1914#   1936#   1969#   1988#   2018#   2036#   2064#   2082#   2115#   2133#   2164#
                        2183#   2212#   2230#   2257#   2275#   2301#   2319#   2346#   2393#   2428#   2460#   2515#   2570#
                        2628#   2699#   2732#   2807#   2855#   2877#   2926#   2951#   2975#   2999#   3023#   3048#   3080#
                        3107#   3187#   3216#   3347#   3376#   3524#   3628#   3731#   3760#   3907#   3937#   4079#   4116#
                        4155#
TEMHI   002276          253#    800#    828
TEMLO   002274          252#    799#    827    3931    3932
TEMP1   002222          231#   1173#   1174    1176*   1177    1184*   1185    3242*   3243*   3244*   3245    3419*   3420*
                       3421*   3422    3803*   3804*   3805*   3806    3978*   3979*   3980*   3981
TEMP2   002212          227#   1360*   1383*
TEMP3   002214          228#   1361*   1365*
TEMP4   002216          229#   1362*   1364    1374*   1376    1381*   1382*   1385
TEMP5   002220          230#   1174*   1175*   1176    1183*   1184
TERMI   055576          4175#
TERMLI  053400          4175#
TERMTA  047362          4175#
TEST.M  035020          4175#*
TIMFLG  030350 G        4175#*
TIMSRV  016300          1409#   3113
TIM.CO  030202 G        4175#*
TIM.OP  044006          4175#*
TMPFNC  002262           247#    996     999    1079*   1252*
TMPD    002224           232#    493    3286*   3300    3463*   3477    3586*   3600    3690*   3704    3847*   3861    4022*
                        4036
TMP1    002226           233#
TMP2    002230           234#
TOO.MA  047342          4175#
TRPFLG  002174           220#    840*    852    1397*   1480*   1493    1523*   1536    1565*   1578    1607*   1620    1648*
                        1661   1691*   1704    1733*   1746    1775*   1788
TRPHAN  016264           843    1397#   1483    1526    1568    1610    1651    1694    1736    1778
TST.AB  037330          4175#
TST.TO  031532          4175#
TYPEC   047736          4175#
TYPEPC  043632          4175#
TYPFLA  053254          4175#
TYPLIN  047634          4175#
TYPNUM  047216          4175#
TYPSTR  047654          4175#
```

```
TYP.ER  043462  4175#
TY.UNI  036474  4175#
T$ARGC= 000002    19#   20#   21#   22#   23#   24#  468#  474  485#  489  491#  500  513#
                 519   543#  547   557#  562   575#  579   589#  596   604#  611   615#  624
                 626#  634   636#  645   647#  656   660#  665   667#  672   676#  681   856#
                 861   956#  960  3298#  3307  3317#  3322  3475#  3484  3494#  3499  3598#  3607
                3617#  3622  3702#  3711  3721#  3726  3859#  3868  3878#  3883  4034#  4043  4053#
                4058
T$CODE= 002130  4087#  4091#  4096#  4101#  4107#  4137#  4141#  4143#  4149#
T$ERCO= 000062  1049#  1428#  1450#  1498#  1541#  1583#  1625#  1666#  1709#  1751#  1793#  1840#  1874#
                1906#  1951#  2000#  2046#  2097#  2148#  2196#  2241#  2285#  2330#  2386#  2420#  2452#
                2492#  2506#  2548#  2563#  2605#  2619#  2662#  2676#  2689#  2770#  2784#  2798#  2842#
                2904#  2962#  3010#  3066#  3137#  3164#  3234#  3249#  3260#  3271#  3291#  3328#  3396#
                3411#  3426#  3437#  3448#  3468#  3505#  3570#  3591#  3674#  3695#  3780#  3795#  3810#
                3821#  3832#  3852#  3889#  3955#  3970#  3985#  3996#  4007#  4027#  4064#
T$ERRN= 000101     8#  1050#  1429#  1451#  1499#  1542#  1584#  1626#  1667#  1710#  1752#  1794#  1841#
                1875#  1907#  1952#  2001#  2047#  2098#  2149#  2197#  2242#  2286#  2331#  2387#  2421#
                2453#  2493#  2507#  2549#  2564#  2606#  2620#  2663#  2677#  2690#  2771#  2785#  2799#
                2843#  2905#  2963#  3011#  3067#  3138#  3165#  3235#  3250#  3261#  3272#  3292#  3329#
                3397#  3412#  3427#  3438#  3449#  3469#  3506#  3571#  3592#  3675#  3696#  3781#  3796#
                3811#  3822#  3833#  3853#  3890#  3956#  3971#  3986#  3997#  4008#  4028#  4065#
T$EXCP= 000000  4091#  4095   4096#  4100   4101#  4106   4107#  4112   4143#  4148
T$FLAG= 000040  1956#  2005#  2051#  2102#  2153#  2201#  2246#  2290#  2335#  2762#  2889#  2894#  2910#
T$HILI= 177777  4091#  4094   4096#  4099   4101#  4105   4107#  4111   4143#  4147
T$LOLI= 000000  4091#  4093   4096#  4098   4101#  4104   4107#  4110   4143#  4146
T$LSYM= 010000     8#   453    462    478    504    524    533    551    568    583    600    701    715
                 884    910    924    936   1406   1506   1549   1591   1633   1674   1717   1759   1801
                1847   1882   1914   1969   2018   2064   2115   2164   2212   2257   2301   2346   2393
                2428   2460   2515   2570   2628   2699   2732   2807   2855   2926   2975   3023   3080
                3187   3347   3524   3628   3731   3907   4079   4116   4155
T$MCAL= 177777     1#     8
T$NEST= 177777     8#   17#   63#   76#  192#  196#  435#  437#  440#  444#  446#  452#  456#
                 461#  465#  477#  482#  503#  509#  523#  527#  532#  536#  550#  554#  567#
                 571#  582#  586#  599#  688#  690#  692#  700#  703#  705#  707#  714#  717#
                 719#  765#  768#  770#  883#  887#  889#  891#  909#  913#  917#  919#  923#
                 927#  929#  931#  935#  939#  944#  1401#  1405#  1464#  1470#  1505#  1512#  1548#
                1555#  1590#  1597#  1632#  1638#  1673#  1680#  1716#  1723#  1758#  1765#  1800#  1806#
                1846#  1853#  1881#  1888#  1913#  1920#  1936#  1965#  1968#  1975#  1988#  2014#  2017#
                2024#  2036#  2060#  2063#  2070#  2082#  2111#  2114#  2121#  2133#  2160#  2163#  2170#
                2183#  2208#  2211#  2218#  2230#  2253#  2256#  2263#  2275#  2297#  2300#  2307#  2319#
                2342#  2345#  2352#  2392#  2399#  2427#  2434#  2459#  2466#  2514#  2521#  2569#  2576#
                2627#  2633#  2698#  2704#  2731#  2738#  2806#  2813#  2854#  2861#  2877#  2918#  2925#
                2932#  2951#  2969#  2974#  2980#  2999#  3017#  3022#  3028#  3048#  3074#  3079#  3086#
                3107#  3181#  3186#  3193#  3216#  3335#  3346#  3353#  3376#  3512#  3523#  3529#  3627#
                3633#  3730#  3737#  3760#  3896#  3906#  3912#  3937#  4071#  4078#  4082#  4084#  4114#
                4129#  4133#  4135#  4141   4153#  4160#
T$NSK0= 000000    17#   63    76#   192   196#  435   437#  440   444#  688   690#  703   705#
                 717   719#  765   768#  887   889#  913   917#  927   929#  939   944#  1464
                1470#  1505   1512#  1548   1555#  1590   1597#  1632   1638#  1673   1680#  1716   1723#
                1758   1765#  1800   1806#  1846   1853#  1881   1888#  1913   1920#  1968   1975#  2017
                2024#  2063   2070#  2114   2121#  2163   2170#  2211   2218#  2256   2263#  2300   2307#
                2345   2352#  2392   2399#  2427   2434#  2459   2466#  2514   2521#  2569   2576#  2627
                2633#  2698   2704#  2731   2738#  2806   2813#  2854   2861#  2925   2932#  2974   2980#
                3022   3028#  3079   3086#  3186   3193#  3346   3353#  3523   3529#  3627   3633#  3730
                3737#  3906   3912#  4078   4082#  4129   4133#  4160
T$NSK1= 000005   446#   452   456#   461   465#   477   482#   503   509#   523   527#   532   536#
```

```
                    550     554#    567     571#    582     586#    599     692#    700     707#    714     770#    883
                    891#    909     919#    923     931#    935     1401#   1405    1936#   1965    1988#   2014    2036#
                   2060    2082#   2111    2133#   2160    2183#   2208    2230#   2253    2275#   2297    2319#   2342
                   2877#   2918    2951#   2969    2999#   3017    3048#   3074    3107#   3181    3216#   3335    3376#
                   3512    3760#   3896    3937#   4071    4084#   4114    4135#   4141    4153
TSSAVL= 177777        8#
TSSEGL= 177777        8#   1936#   1957    1965#   1967    1988#   2006    2014#   2016    2036#   2052    2060#   2062
                   2082#   2103    2111#   2113    2133#   2154    2160#   2162    2183#   2202    2208#   2210    2230#
                   2247    2253#   2255    2275#   2291    2297#   2299    2319#   2336    2342#   2344    2877#   2911
                   2918#   2920    2951#   2969#   2971    2999#   3017#   3019    3048#   3074#   3076    3107#   3181#
                   3183    3216#   3335#   3337    3376#   3512#   3514    3760#   3896#   3898    3937#   4071#   4073
TSSEKO= 010000     1936#   1957    1965    1988#   2006    2014    2036#   2052    2060    2082#   2103    2111    2133#
                   2154    2160    2183#   2202    2208    2230#   2247    2253    2275#   2291    2297    2319#   2336
                   2342    2877#   2911    2918    2951#   2969    2999#   3017    3048#   3074    3107#   3181    3216#
                   3335    3376#   3512    3760#   3896    3937#   4071
TSSUBN= 000000        8#   1470#   1512#   1555#   1597#   1638#   1680#   1723#   1765#   1806#   1853#   1888#   1920#
                   1975#   2024#   2070#   2121#   2170#   2218#   2263#   2307#   2352#   2399#   2434#   2466#   2521#
                   2576#   2633#   2704#   2738#   2813#   2861#   2932#   2980#   3028#   3086#   3193#   3353#   3529#
                   3633#   3737#   3912#
TSTAGL= 177777        8#
TSTAGN= 010074        8#    446#    456#    465#    482#    509#    527#    536#    554#    571#    586#    692#    707#
                    770#    891#    919#    931#   1401#   1470#   1512#   1555#   1597#   1638#   1680#   1723#   1765#
                   1806#   1853#   1888#   1920#   1975#   2024#   2070#   2121#   2170#   2218#   2263#   2307#   2352#
                   2399#   2434#   2466#   2521#   2576#   2633#   2704#   2738#   2813#   2861#   2932#   2980#   3028#
                   3086#   3193#   3353#   3529#   3633#   3737#   3912#   4084#   4135#
TSTEMP= 000000       63#    192#    435#    440#    452#    461#    477#    503#    523#    532#    550#    567#    582#
                    599#    688#    700#    703#    714#    717#    722#    723#    724#    725#    726#    727#    728#
                    729#    730#    731#    732#    733#    734#    735#    736#    737#    738#    739#    740#    741#
                    742#    743#    744#    745#    746#    747#    748#    749#    750#    751#    752#    753#    754#
                    755#    756#    757#    758#    759#    760#    761#    762#    763#    765#    883#    887#    909#
                    913#    923#    927#    935#    939#   1405#   1464#   1471#   1477#   1505#   1515#   1521#   1548#
                   1556#   1562#   1590#   1598#   1604#   1632#   1639#   1645#   1673#   1683#   1689#   1716#   1724#
                   1730#   1758#   1766#   1772#   1800#   1808#   1818#   1846#   1855#   1860#   1881#   1890#   1895#
                   1913#   1924#   1930#   1956#   1957#   1965#   1968#   1977#   1983#   2005#   2006#   2014#   2017#
                   2026#   2031#   2051#   2052#   2060#   2063#   2071#   2077#   2102#   2103#   2111#   2114#   2123#
                   2128#   2153#   2154#   2160#   2163#   2172#   2178#   2201#   2202#   2208#   2211#   2220#   2225#
                   2246#   2247#   2253#   2256#   2265#   2270#   2290#   2291#   2297#   2300#   2309#   2314#   2335#
                   2336#   2342#   2345#   2354#   2364#   2392#   2401#   2406#   2427#   2436#   2441#   2459#   2468#
                   2475#   2514#   2522#   2529#   2569#   2579#   2586#   2627#   2636#   2642#   2698#   2708#   2714#
                   2731#   2740#   2744#   2762#   2763    2806#   2815#   2826#   2854#   2863#   2868#   2889#   2890
                   2894#   2895    2910#   2911#   2918#   2925#   2934#   2939#   2969#   2974#   2982#   2987#   3017#
                   3022#   3030#   3035#   3074#   3079#   3088#   3093#   3181#   3186#   3195#   3205#   3335#   3346#
                   3355#   3365#   3512#   3523#   3531#   3537#   3627#   3635#   3641#   3730#   3739#   3749#   3896#
                   3906#   3914#   3927#   4071#   4078#   4087#   4091#   4096#   4101#   4107#   4114#   4129#   4137#
                   4143#   4149#   4153#   4160#
TSTEST= 000051        8#   1470#   1512#   1555#   1597#   1638#   1680#   1723#   1765#   1806#   1853#   1888#   1920#
                   1975#   2024#   2070#   2121#   2170#   2218#   2263#   2307#   2352#   2399#   2434#   2466#   2521#
                   2576#   2633#   2704#   2738#   2813#   2861#   2932#   2980#   3028#   3086#   3193#   3353#   3529#
                   3633#   3737#   3912#
TSTSTM= 177777        8#    453     462     473     478     488     499     504     518     524     533     546     551
                    561     568     578     583     595     600     610     623     633     644     655     664     671
                    680     772     775     780     785     790     805     818     846     851     860     865     867
                    873     877     884     894     901     906     910     924     936     946     959     964     966
                   1049    1411    1423    1428    1443    1450    1486    1492    1498    1503    1506    1529    1535
                   1541    1546    1549    1571    1577    1583    1588    1591    1613    1619    1625    1630    1633
                   1654    1660    1666    1671    1674    1697    1703    1709    1714    1717    1739    1745    1751
```

F10


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                    1756    1759    1781    1787    1793    1798    1801    1823    1831    1840    1847    1869    1874
                    1882    1901    1906    1914    1936    1951    1956    1966    1969    1988    2000    2005    2015
                    2018    2036    2046    2051    2061    2064    2082    2097    2102    2112    2115    2133    2148
                    2153    2161    2164    2183    2196    2201    2209    2212    2230    2241    2246    2254    2257
                    2275    2285    2290    2298    2301    2319    2330    2335    2343    2346    2369    2377    2386
                    2393    2415    2420    2428    2447    2452    2460    2492    2497    2506    2515    2548    2553
                    2563    2570    2605    2610    2619    2628    2662    2667    2676    2681    2689    2699    2725
                    2732    2758    2762    2770    2776    2784    2790    2798    2807    2835    2842    2848    2855
                    2877    2882    2889    2894    2904    2910    2919    2926    2951    2958    2962    2967    2970
                    2975    2999    3006    3010    3015    3018    3023    3048    3051    3059    3062    3066    3072
                    3075    3080    3107    3110    3116    3120    3133    3137    3143    3145    3158    3164    3169
                    3172    3178    3182    3187    3216    3225    3228    3234    3239    3249    3254    3260    3265
                    3271    3276    3291    3306    3309    3321    3328    3333    3336    3347    3376    3381    3389
                    3392    3396    3402    3405    3411    3416    3426    3431    3437    3442    3448    3453    3468
                    3483    3486    3498    3505    3510    3513    3524    3556    3563    3566    3570    3576    3591
                    3606    3609    3621    3628    3660    3667    3670    3674    3680    3695    3710    3713    3725
                    373!    3760    3765    3773    3776    3780    3786    3789    3795    3800    3810    3815    3821
                    38[illegible]   3832    3837    3852    3867    3870    3882    3889    3894    3897    3907    3937    3940
                    39[illegible]   3951    3955    3961    3964    3970    3975    3985    3990    3996    4001    4007    4012
                    40[illegible]   4042    4045    4057    4064    4069    4072    4079
T$TSTS= 000001          8#  1470#   1512#   1555#   1597#   1638#   1680#   1723#   1765#   1806#   1853#   1888#   1920#
                    1975#   2024#   2070#   2121#   2170#   2218#   2263#   2307#   2352#   2399#   2434#   2466#   2521#
                    2576#   2633#   2704#   2738#   2813#   2861#   2932#   2980#   3028#   3086#   3193#   3353#   3529#
                    3633#   3737#   3912#
T$$AU  = 010017     931#    935
T$$CLE= 010015      891#    909
T$$DU  = 010016     919#    923
T$$HAR= 010072     4084#   4115
T$$HW  = 010012     692#    700
T$$INI= 010014      770#    883
T$$MSG= 010011      446#    452     456#    461     465#    477     482#    503     509#    523     527#    532     536#
                    550     554#    567     571#    582     586#    599
T$$SEG= 010000     1936#   1956    1965#   1988#   2005    2014#   2036#   2051    2060#   2082#   2102    2111#   2133#
                    2153    2160#   2183#   2201    2208#   2230#   2246    2253#   2275#   2290    2297#   2319#   2335
                    2342#   2877#   2910    2918#   2951#   2969#   2999#   3017#   3048#   3074#   3107#   3181#   3216#
                    3335#   3376#   3512#   3760#   3896#   3937#   4071#
T$$SOF= 010073     4135#   4154
T$$SRV= 010020     1401#   1405
T$$SW  = 010013      707#    714
T$$TES= 010071     1470#   1505    1512#   1548    1555#   1590    1597#   1632    1638#   1673    1680#   1716    1723#
                    1758    1765#   1800    1806#   1846    1853#   1881    1888#   1913    1920#   1968    1975#   2017
                    2024#   2063    2070#   2114    2121#   2163    2170#   2211    2218#   2256    2263#   2300    2307#
                    2345    2352#   2392    2399#   2427    2434#   2459    2466#   2514    2521#   2569    2576#   2627
                    2633#   2698    2704#   2731    2738#   2762    2806    2813#   2854    2861#   2889    2894    2925
                    2932#   2974    2980#   3022    3028#   3079    3086#   3186    3193#   3346    3353#   3523    3529#
                    3627    3633#   3730    3737#   3906    3912#   4078
T.CNTL  002260       246#    825*   1864    1991    2187    2410    2717    2746    2829    2870    2940    2988    3037
                    3095    3206    3366    3538    3642    3750    3928
T.SIZE  013334       711#    837
T1      016432 G     722    1470#
T10     017512 G     731    1853#
T11     017564 G     732    1888#
T12     017622 G     733    1920#
T13     017742 G     734    1975#
T14     020044 G     735    2024#
T15     020132 G     736    2070#
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T16      020256 G            737     2121#
T17      020402 G            738     2170#
T18      020506 G            739     2218#
T19      020606 G            740     2263#
T2       016530 G            723     1512#
T20      020676 G            741     2307#
T21      020776 G            742     2352#
T22      021106 G            743     2399#
T23      021160 G            744     2434#
T24      021216 G            745     2466#
T25      021342 G            746     2521#
T26      021502 G            747     2576#
T27      021642 G            748     2633#
T28      022046 G            749     2704#
T29      022076 G            750     2738#
T3       016626 G            724     1555#
T30      022302 G            751     2813#
T31      022366 G            752     2861#
T32      022532 G            753     2932#
T33      022642 G            754     2980#
T34      022752 G            755     3028#
T35      023106 G            756     3086#
T36      023436 G            757     3193#
T37      024250 G            758     3353#
T38      025126 G            759     3529#
T39      025474 G            760     3633#
T4       016724 G            725     1597#
T40      026046 G            761     3737#
T41      026724 G            762     3912#
T5       017022 G            726     1638#
T6       017116 G            727     1680#
T7       017212 G            728     1723#
T8       017306 G            729     1765#
T9       017402 G            730     1806#
UNITST   002124              200#     798*    811*    814*    817     864     963
UNIT.D   030132 G          4175#*
UNI.MA   035010            4175#*
USER.P   030374 G          4175#*
USER.T   030376 G          4175#*
UUT      002122             199#     797*    809     812*    815*
VALID.   030634            4175#
VAL.LA   031454            4175#
VAL.SW   035120            4175#
VECMSG   027656            4097    4122#
VECT   = 000002             180#    4096
WHY      002256             245#     854*    856
WIDTH    044402            4175#
WRCHK  = 000002             162#     999
WRITE  = 000012             166#
WTCRDY   016354            1437#    2723    2756    2838    2887    2956    3004    3057    3223    3387    3561    3665    3771
                           3946
WTDRDY   016310            1416#
XEQDIA   057424 G          4175#
XEQSUB   057412 G          4175#
XEQ.CL   037134            4175#
XEQ.CM   034444            4175#
```

H10

CVRLAA.SUP 11-APR-78 09:27 CROSS REFERENCE TABLE -- USER SYMBOLS

```
XEQ.IN  036616            4175#
XEQ.LA  032706            4175#
XEQ.OP  036710            4175#
XEQ.PR  032110            4175#
XEQ.TE  036754            4175#
XPOLY   002202             223#   1370    1381
XTIME   056276 G          4175#
XTIMEN  057122            4175#
XTIMST  056320            4175#*
XXDP.D  034464            4175#
XSALWA= 000000               8#
XSFALS= 000040               8#   4141
XSOFFS= 000400               8#   4141
XSTRUE= 000020               8#
$BREG   035160            4175#*
$ENDAD  057376 G          4175#
$SAV2   060442 G          4175#
$SAV3   060456 G          4175#
$SAV4   060474 G          4175#
$SAV5   060514 G          4175#
.     = 060720              10#     68#     72#    429#    432#    433#    439#   1957    2006    2052    2103    2154    2202
                          2247    2291    2336    2763    2890    2895    2911   4136#    4141    4157#   4161#   4175#

. ABS.  060720     000

 ERRORS DETECTED:  0

 DSKZ:CVRLAA,DSKZ:CVRLAA/CRF:SYM/SOL=DSKZ:CVRLAA.SML,DSKM:CVRLAA.P11,DSKZ:CVRLAA.SUP
 RUN-TIME:  50 54 4 SECONDS
 RUN-TIME RATIO:  1395/109=12.7
 CORE USED:  18K  (35 PAGES)
```