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.NLIST CND,MD,MEB,ME
.TITLE USER DOCUMENTATION
.SBTTL IDENTIFICATION

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IDENTIFICATION

PRODUCT CODE: AC-T824A MC
PRODUCT NAME: CNKTCAO KXT11-CA LSI-11 BUS DIAGNOSTIC
PRODUCT DATE: APRIL 9,1984
MAINTAINER: ISS DIAGNOSTIC SERVICES GROUP
AUTHOR: JACK RICHARDSON
MODIFIED BY: JAKI BERG 9-APR-1983

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***** MODIFICATION HISTORY *****

ORIGINAL RELEASE : REV 0 JACK RICHARDSON 5-JUL-83

CZKICA -> CNKICA JAMI BERG 9-APR 84
CHANGES WERE MADE TO CZKICA TO PRODUCE CNKICA FOR THE FALCON PLUS
PROJECT (SBC-11/21*). CHANGES, MARKED BY ";JB REV A 0" ARE:
- SET THE ODT BREAK VECTOR (LOCATION 140) TO THE STARTING ADDRESS OF
FALCON'S ODT ROM (170000-OCTAL).
- THE GENERAL OPERATING PRIORITY OF THE PROGRAM WAS LOWERED FROM LEVEL
7 TO LEVEL 6 TO ALLOW THE BREAK KEY TO INTERRUPT AND INVOKE ODT.
- VECTOR ADDRESSES ARE ACCEPTED ONLY ON BDAL <7:2>. LIMITING VECTOR
ADDRESS SPACE TO 374. THE INTERRUPT VECTOR ADDRESS 1770 WAS CHANGED
TO 370 TO ACCOMODATE THIS LIMITATION.

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1.0 GENERAL INFORMATION
1.1 PROGRAM ABSTRACT

THIS DIAGNOSTIC HAS BEEN WRITTEN FOR USE WITH THE DIAGNOSTIC RUNTIME SERVICES SOFTWARE (SUPERVISOR). THESE SERVICES PROVIDE THE INTERFACE TO THE OPERATOR AND TO THE SOFTWARE ENVIRONMENT. THIS PROGRAM CAN BE USED WITH XXDP+. FOR A COMPLETE DESCRIPTION OF THE RUNTIME SERVICES, REFER TO THE XXDP+ USER'S MANUAL. THERE IS A BRIEF DESCRIPTION OF THE RUNTIME SERVICES IN SECTION 2 OF THIS DOCUMENT.

1.2 SYSTEM REQUIREMENTS

1.3 RELATED DOCUMENTS AND STANDARDS

1.4 DIAGNOSTIC HIERARCHY PREREQUISITES

1.5 ASSUMPTIONS

2.0 OPERATING INSTRUCTIONS

THIS SECTION CONTAINS A BRIEF DESCRIPTION OF THE RUNTIME SERVICES. FOR DETAILED INFORMATION, REFER TO THE XXDP+ USER'S MANUAL (CHQUS).

STARTING THE XXDP+ SYSTEM

THE XXDP+ TEST SOFTWARE SYSTEM CONSISTS OF THE XXDP+ MONITOR WITH VARIOUS UTILITY SOFTWARE, THE KXT11-CA IOP TEST SOFTWARE, AND THE DIAGNOSTIC RUNTIME SERVICES (SUPERVISOR) ALL RESIDING ON A BOOTABLE MEDIUM. THE TEST SYSTEM REQUIRES DEDICATION OF THE ENTIRE HARDWARE SYSTEM, I.E., IT CANNOT SHARE WITH ANY OTHER OPERATING SYSTEM.

STARTING PROCEDURES:

1. SHUT OFF POWER TO THE SYSTEM; THIS INCLUDES ALL IOP AND ARBITER POWER.
2. FOR EACH KXT11-CA TO BE TESTED, PLACE THE BOOT/SELFTTEST SWITCH TO POSITION 10. THE BOOT/SELFTTEST SWITCH RESIDES ON EACH KXT11-CA MODULE. IF LESS THAN THE FULL COMPLEMENT OF KXT11-CA'S ARE TO BE TESTED WITH THIS SOFTWARE, IT IS SUFFICIENT TO CHANGE THE BOOT SWITCHES OF ONLY THE KXT11'S TO BE TESTED. IF THE THREE I/O PORTS ARE TO BE THOROUGHLY TESTED, THE DATA LOOPBACK CONNECTORS SHOULD BE INSTALLED AT THIS TIME.
3. RESTORE POWER TO THE SYSTEM.
4. PLACE THE XXDP+ STORAGE MEDIUM IN THE MAIN SYSTEM DEVICE.
5. BOOT THE SYSTEM.

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6. ENTER THE DATE AND ANSWER THE LSI AND SOHZ QUESTIONS.
7. TYPE "R CNKICA" TO LOAD THE KXT11-CA TEST SOFTWARE.
8. AFTER THE PROGRAM IS LOADED INTO ARBITER MEMORY, THE PROMPT "DS>" WILL APPEAR.
9. TYPE "START"
10. ANSWER THE QUESTION, "CHANGE HW(L)?" QUESTION WITH "Y".
11. ANSWER ALL THE HARDWARE QUESTIONS (SEE THE NEXT SECTION, 2.4, FOR VARIATIONS AND COMMANDS ASSOCIATED WITH THE DRS).
12. THE TEST SOFTWARE IS INVOKED IMMEDIATELY AFTER COMPLETING THE HARDWARE SPECIFICATION INPUT.

2.1 COMMANDS

THERE ARE ELEVEN LEGAL COMMANDS FOR THE DIAGNOSTIC RUNTIME SERVICES (SUPERVISOR). THIS SECTION LISTS THE COMMANDS AND GIVES A VERY BRIEF DESCRIPTION OF THEM. THE XXDP+ USER'S MANUAL HAS MORE DETAILS.

COMMAND	EFFECT
START	START THE DIAGNOSTIC FROM AN INITIAL STATE
RESTART	START THE DIAGNOSTIC WITHOUT INITIALIZING
CONTINUE	CONTINUE AT TEST THAT WAS INTERRUPTED (AFTER *C)
PROCEED	CONTINUE FROM AN ERROR HALT
EXIT	RETURN TO XXDP+ MONITOR (XXDP+ OPERATION ONLY!)
ADD	ACTIVATE A UNIT FOR TESTING (ALL UNITS ARE CONSIDERED TO BE ACTIVE AT START TIME)
DROP	DEACTIVATE A UNIT
PRINT	PRINT STATISTICAL INFORMATION (IF IMPLEMENTED BY THE DIAGNOSTIC - SECTION 4.0)
DISPLAY	TYPE A LIST OF ALL DEVICE INFORMATION
FLAGS	TYPE THE STATE OF ALL FLAGS (SEE SECTION 2.3)
ZFLAGS	CLEAR ALL FLAGS (SEE SECTION 2.3)

A COMMAND CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS. YOU MAY, FOR EXAMPLE, TYPE "STA" INSTEAD OF "START".

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2.3 SWITCHES

THERE ARE SEVERAL SWITCHES WHICH ARE USED TO MODIFY SUPERVISOR OPERATION. THESE SWITCHES ARE APPENDED TO THE LEGAL COMMANDS. ALL OF THE LEGAL SWITCHES ARE TABULATED BELOW WITH A BRIEF DESCRIPTION OF EACH. IN THE DESCRIPTIONS BELOW, A DECIMAL NUMBER IS DESIGNATED BY "DDDD".

SWITCH	EFFECT
/TESTS:LIST	EXECUTE ONLY THOSE TESTS SPECIFIED IN THE LIST. LIST IS A STRING OF TEST NUMBERS, FOR EXAMPLE - /TESTS:1:5:7-10. THIS LIST WILL CAUSE TESTS 1,5,7,8,9,10 TO BE RUN. ALL OTHER TESTS WILL NOT BE RUN.
/PASS:DDDD	EXECUTE DDDDD PASSES (DDDD = 1 TO 64000)
/FLAGS:FLGS	SET SPECIFIED FLAGS. FLAGS ARE DESCRIBED IN SECTION 2.3.
/EOP:DDDD	REPORT END OF PASS MESSAGE AFTER EVERY DDDDD PASSES ONLY. (DDDD = 1 TO 64000)
/UNITS:LIST	TEST/ADD/DROP ONLY THOSE UNITS SPECIFIED IN THE LIST. LIST EXAMPLE /UNITS:0:5:10-12 USE UNITS 0,5,10,11,12 (UNIT NUMBERS = 0-14)

EXAMPLE OF SWITCH USAGE:

START/TESTS:1 5/PASS:1000/EOP:100

THE EFFECT OF THIS COMMAND WILL BE: 1) TESTS 1 THROUGH 5 WILL BE EXECUTED, 2) ALL UNITS WILL TESTED 1000 TIMES, AND 3) THE END OF PASS MESSAGES WILL BE PRINTED AFTER EACH 100 PASSES ONLY. A SWITCH CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS. YOU MAY, FOR EXAMPLE, TYPE "/TES:1-5" INSTEAD OF "/TESTS:1-5".

BELOW IS A TABLE THAT SPECIFIES WHICH SWITCHES CAN BE USED BY EACH COMMAND.

	TESTS	PASS	FLAGS	EOP	UNITS
START	X	X	X	X	X
RESTART	X	X	X	X	X
CONTINUE		X	X	X	
PROCEED			X		
DROP					X
ADD					X
PRINT					
DISPLAY					X
FLAGS					
/FLAGS					
EXIT					

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2.3 FLAGS

FLAGS ARE USED TO SET UP CERTAIN OPERATIONAL PARAMETERS SUCH AS LOOPING ON ERROR. ALL FLAGS ARE CLEARED AT STARTUP AND REMAIN CLEARED UNTIL EXPLICITLY SET USING THE FLAG SWITCH. FLAGS ARE ALSO CLEARED AFTER A START COMMAND UNLESS SET USING THE FLAG SWITCH. THE ZFLAGS COMMAND MAY ALSO BE USED TO CLEAR ALL FLAGS. WITH THE EXCEPTION OF THE START AND ZFLAGS COMMANDS, NO COMMANDS AFFECT THE STATE OF THE FLAGS; THEY REMAIN SET OR CLEARED AS SPECIFIED BY THE LAST FLAG SWITCH.

FLAG	EFFECT
HOE	HALT ON ERROR - CONTROL IS RETURNED TO RUNTIME SERVICES COMMAND MODE
LOE	LOOP ON ERROR
IER*	INHIBIT ALL ERROR REPORTS
IBR*	INHIBIT ALL ERROR REPORTS EXCEPT FIRST LEVEL (FIRST LEVEL CONTAINS ERROR TYPE, NUMBER, PC, TEST AND UNIT)
IXR*	INHIBIT EXTENDED ERROR REPORTS (THOSE CALLED BY PRINTX MACRO'S)
PRI	DIRECT MESSAGES TO LINE PRINTER
PNT	PRINT TEST NUMBER AS TEST EXECUTES
BOE	"BELL" ON ERROR
UAM	UNATTENDED MODE (NO MANUAL INTERVENTION)
ISR	INHIBIT STATISTICAL REPORTS (DOES NOT APPLY TO DIAGNOSTICS WHICH DO NOT SUPPORT STATISTICAL REPORTING)
IDR	INHIBIT PROGRAM DROPPING OF UNITS
ADR	EXECUTE AUTODROP CODE
LOT	LOOP ON TEST
EVL	EXECUTE EVALUATION (ON DIAGNOSTICS WHICH HAVE EVALUATION SUPPORT)

*ERROR MESSAGES ARE DESCRIBED IN SECTION 3.1

SEE THE XXDP USER'S MANUAL FOR MORE DETAILS ON FLAGS. YOU MAY SPECIFY MORE THAN ONE FLAG WITH THE FLAG SWITCH. FOR EXAMPLE, TO CAUSE THE PROGRAM TO LOOP ON ERROR, INHIBIT ERROR REPORTS AND TYPE A "BELL" ON ERROR, YOU MAY USE THE FOLLOWING STRING:

#FLAGS:LOE:IER:BOE

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2.4 HARDWARE QUESTIONS

WHEN A DIAGNOSTIC IS STARTED, THE RUNTIME SERVICES WILL PROMPT THE USER FOR HARDWARE INFORMATION BY TYPING "CHANGE HW (L) ?" YOU MUST ANSWER "Y" AFTER A START COMMAND UNLESS THE HARDWARE INFORMATION HAS BEEN "PRELOADED" USING THE SETUP UTILITY (SEE CHAPTER 6 OF THE XXDP USER'S MANUAL, OR SECTION 2.5 BELOW). WHEN YOU ANSWER THIS QUESTION WITH A "Y", THE RUNTIME SERVICES WILL ASK FOR THE NUMBER OF UNITS (IN DECIMAL). YOU WILL THEN BE ASKED QUESTIONS FOR EACH UNIT.

WHEN YOU ANSWER THE HARDWARE QUESTIONS, YOU ARE BUILDING ENTRIES IN A TABLE THAT DESCRIBES THE DEVICES UNDER TEST. THE SIMPLEST WAY TO BUILD THIS TABLE IS TO ANSWER ALL QUESTIONS FOR EACH UNIT TO BE TESTED. THIS CAN BECOME TEDIOUS, HOWEVER, SINCE THE ANSWERS FOR EACH UNIT ARE REPETITIOUS.

TO ILLUSTRATE, YOU WISH TO TEST 4 KXT11-CA'S WITH THIS PROGRAM, AND THEIR SBC NUMBERS HAPPEN TO BE 2 THROUGH 5. THERE ARE 5 PARAMETERS THAT MAY VARY AMONG THE UNITS. THESE ARE THE BUS ADDRESS, THE THREE I/O PORT LOOPBACK CONNECTORS, AND WHETHER THE USER ROM TEST SHOULD OR SHOULDN'T BE INVOKED DURING TESTING. NOTE THAT A "UNIT" NUMBER IMPLIES A UNIT UNDER TEST AND DOES NOT HAVE TO HAVE A UNIT NUMBER CORRESPONDING TO A KXT11-CA SBC NUMBER.

UNITS (D) ? 4<CR>

UNIT 0

SBC ID SWITCH SETTING(D) ? 2<CR>

IS IOP'S LSI-11 BUS ADDRESS IN THE LOW ADDRESS RANGE(Y/N) Y ? Y<CR>

LOOP-BACK CONNECTOR ON SERIAL PORT #1 (L) N ? Y<CR>

CHANNEL A LOOP-BACK CONNECTOR ON SERIAL PORT #2 (L) N ? Y<CR>

CHANNEL B LOOP-BACK CONNECTOR ON SERIAL PORT #2 (L) N ? Y<CR>

LOOP-BACK CONNECTOR ON PARALLEL PORT (L) N ? Y<CR>

IS SLU2 SERIAL PORT CONFIGURED FOR DMA OPERATION(Y/N) N ?<CR>

TEST USER ROM (L) N ? Y<CR>

UNIT 1

SBC ID SWITCH SETTING(D) ? 2<CR>

IS IOP'S LSI-11 BUS ADDRESS IN THE LOW ADDRESS RANGE(Y/N) Y ? Y<CR>

LOOP-BACK CONNECTOR ON SERIAL PORT #1 (L) Y ? Y<CR>

CHANNEL A LOOP-BACK CONNECTOR ON SERIAL PORT #2 (L) N ? Y<CR>

CHANNEL B LOOP-BACK CONNECTOR ON SERIAL PORT #2 (L) N ? Y<CR>

LOOP-BACK CONNECTOR ON PARALLEL PORT (L) Y ? Y<CR>

IS SLU2 SERIAL PORT CONFIGURED FOR DMA OPERATION(Y/N) N ?<CR>

TEST USER ROM (L) Y ? Y<CR>

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UNIT 2
SBC ID SWITCH SETTING(D) ? 2<CR>
IS IOP'S LSI-11 BUS ADDRESS IN THE LOW ADDRESS RANGE(Y/N) Y ? Y<CR>
LOOP-BACK CONNECTOR ON SERIAL PORT #1 (L) Y ? <CR>
CHANNEL A LOOP-BACK CONNECTOR ON SERIAL PORT #2 (L) N ? Y<CR>
CHANNEL B LOOP-BACK CONNECTOR ON SERIAL PORT #2 (L) N ? Y<CR>
LOOP-BACK CONNECTOR ON PARALLEL PORT (L) Y ? <CR>
IS SLU2 SERIAL PORT CONFIGURED FOR DMA OPERATION(Y/N) N ? <CR>
TEST USER ROM (L) Y ? N<CR>

UNIT 3
SBC ID SWITCH SETTING(D) ? 2<CR>
IS IOP'S LSI-11 BUS ADDRESS IN THE LOW ADDRESS RANGE(Y/N) Y ? Y<CR>
LOOP-BACK CONNECTOR ON SERIAL PORT #1 (L) Y ? N <CR>
CHANNEL A LOOP-BACK CONNECTOR ON SERIAL PORT #2 (L) N ? Y<CR>
CHANNEL B LOOP-BACK CONNECTOR ON SERIAL PORT #2 (L) N ? Y<CR>
LOOP-BACK CONNECTOR ON PARALLEL PORT (L) Y ? N<CR>
IS SLU2 SERIAL PORT CONFIGURED FOR DMA OPERATION(Y/N) N ? <CR>
TEST USER ROM (L) N ? Y<CR>

NOTICE THAT THE DEFAULT VALUES CHANGE WHEN A NON-DEFAULT RESPONSE
IS GIVEN AS IN THE RESPONSES TO THE USER ROM QUESTION FOR UNITS 2 AND 3.
BE CAREFUL WHEN SPECIFYING MULTIPLE UNITS!

AS YOU CAN SEE FROM THE ABOVE EXAMPLE, THE HARDWARE PARAMETERS
DO NOT VARY SIGNIFICANTLY FROM UNIT TO UNIT. THE PROCEDURE SHOWN IS
NOT VERY EFFICIENT.

THE RUNTIME SERVICES WILL ACCEPT MULTIPLE UNIT SPECIFICATIONS, HOWEVER.
LET'S BUILD THE SAME TABLE USING THE MULTIPLE SPECIFICATION
FEATURE AND ACCOMPLISH THE SAME IN ONE SINGLE UNIT ENTRY.

0 UNITS (D) ? 4<CR>

UNIT 0
SBC ID SWITCH SETTING(D) ? 2<CR>
IS IOP'S LSI-11 BUS ADDRESS IN THE LOW ADDRESS RANGE(Y/N) Y ? Y...<CR>
LOOP-BACK CONNECTOR ON SERIAL PORT #1 (L) Y ? ...N<CR>
CHANNEL A LOOP-BACK CONNECTOR ON SERIAL PORT #2 (L) N ? ...N<CR>
CHANNEL B LOOP-BACK CONNECTOR ON SERIAL PORT #2 (L) N ? ...N<CR>
LOOP-BACK CONNECTOR ON PARALLEL PORT (L) Y ? ...N<CR>
IS SLU2 SERIAL PORT CONFIGURED FOR DMA OPERATION(Y/N) N ? ...N<CR>
TEST USER ROM (L) N ? Y...N,Y<CR>

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THE KEY TO REMEMBER HERE IS THAT EACH UNIT UNDER TEST MUST HAVE A CORRESPONDING RESPONSE ON EACH LINE. AS YOU CAN SEE FROM THIS EXAMPLE, NULL REPLIES (COMMAS ENCLOSED A NULL FIELD) TELL THE RUNTIME SERVICES TO REPEAT THE LAST REPLY.

THESE HARDWARE QUESTIONS MUST BE ANSWERED EACH TIME THE PROGRAM IS LOADED AND STARTED; HOWEVER, IF THE TEST CONFIGURATION RARELY OR NEVER DIFFERS FOR EACH STARTUP THE XXDP+ UTILITY "SETUP" MAY BE USED TO PERMANENTLY RETAIN THE ANSWERS TO THE HARDWARE QUESTIONS. THE USER WOULD THEN ANSWER "N" TO THE STARTUP QUESTION, "CHANGE HW?(L)". SETUP MAY BE USED TO REPLACE THE TEST PROGRAM ON THE XXDP+ MEDIUM, OR TO MAKE ADDITIONAL COPIES WITH DIFFERENT FILE NAMES AND HARDWARE CONFIGURATIONS.

TO RUN SETUP, USE THE XXDP+ "RUN" COMMAND. THE FIRST THING THAT SETUP WILL DO IS ASK FOR THE TYPE OF ENVIRONMENT YOU ARE GOING TO BE USING, XXDP+ OR ACT/SLIDE. FOR THIS TEST SOFTWARE, THE ANSWER WILL ALWAYS BE XXDP+. BELOW IS AN EXAMPLE OF STARTING SETUP:

```
.R SETUP
TARGET ENVIRONMENT:    XX(DP) OR AC(T)?  XX
*
```

SETUP IS NOW READY TO ACCEPT COMMANDS. THERE ARE ONLY THREE COMMANDS IN SETUP:

```
SETUP  BUILD TABLES FOR A SPECIFIED DIAGNOSTIC
LIST   PRINT A LIST OF DRS DIAGNOSTICS ON THE XXDP+ MEDIUM.
EXIT   RETURN CONTROL TO XXDP+
```

2.5 SETUP

THE SETUP COMMAND WILL CAUSE THE SPECIFIED DIAGNOSTIC TO BE LOADED INTO MEMORY. SETUP WILL THEN PROCESS THE TABLE BUILDING CODE IN THE TEST SOFTWARE MUCH THE SAME AS IF THE TEST SOFTWARE WERE LOADED AND STARTED. THE USER WILL GO THROUGH THE SAME PROCESS THAT WOULD OCCUR IF ACTUALLY RUNNING THE TEST SOFTWARE AND ISSUING A START COMMAND. THE FORMAT OF THE COMMAND IS:

```
SETUP  [DEVO:]OFILE=[DEVI:]IFILE
```

WHERE,

DEVO - DEVICE TO WHICH FILE IS TO BE WRITTEN; DEFAULT IS SYSTEM DEVICE; DEVICE MUST BE ON LINE.

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OFILE - NAME OF THE OUTPUT FILE FOR THE TEST SOFTWARE THAT HAS BEEN "SETUP" WITH .BIN OR .BIC EXTENSION.

DEVI - DEVICE FROM WHICH FILE IS TO BE READ; DEFAULT IS SYSTEM DEVICE; DEVICE MUST BE ON LINE.

IFILE - NAME OF THE FILE FOR THE TEST SOFTWARE THAT IS TO BE "SETUP".

THE OUTPUT FILE MAY BE GIVEN THE SAME NAME AS THE INPUT FILE; HOWEVER, A WARNING MESSAGE WILL BE OUTPUT. THIS IS TO AVOID ACCIDENTAL LOSS OF THE ORIGINAL FILE. FOR EXAMPLE:

DELETE IFILE? (Y/N/CR=Y)

IF "Y" OR NO ANSWER AT ALL IS TYPED, THE INPUT FILE "IFILE" WILL BE DELETED AFTER THE SETUP PROCESS, AND THE NEW FILE WILL THEN BE WRITTEN TO THE MEDIUM. IF "N" IS TYPED, SETUP RETURNS TO PROMPT MODE SO THAT A NEW COMMAND OR FILE NAME MAY BE SPECIFIED.

LIST

THE LIST COMMAND IS USED TO OBTAIN A LIST OF ALL DRS-COMPATIBLE TEST SOFTWARE ON THE MEDIUM. THE FORMAT OF THE COMMAND IS:

LIST [DEV;](FILE.EXT)

WHERE,

DEV - DEVICE TO SEARCH FOR DRS-COMPATIBLE FILES; DEFAULT IS THE SYSTEM DEVICE.

FILE.EXT - FILE(S) TO SEARCH; EXTENSION MUST BE BIN OR BIC; WILDCARD SPECIFICATIONS ARE ACCEPTED; DEFAULT IS "*.BI?".

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2.6 QUICK START UP PROCEDURE (XXDP*)

TO START UP THIS PROGRAM:

1. BOOT XXDP*
2. GIVE THE DATE AND ANSWER THE LSI AND 50HZ (IF THERE IS A CLOCK) QUESTIONS
3. TYPE "R NAME". WHERE NAME IS THE NAME OF THE BIN OR BIC FILE FOR THIS PROGRAM
4. TYPE "START"
5. ANSWER THE "CHANGE HW" QUESTION WITH "Y"
6. ANSWER ALL THE HARDWARE QUESTIONS

WHEN YOU FOLLOW THIS PROCEDURE YOU WILL BE USING ONLY THE DEFAULTS FOR FLAGS AND SOFTWARE PARAMETERS. THESE DEFAULTS ARE DESCRIBED IN SECTIONS 2.3 AND 2.4.

3.0 ERROR INFORMATION

3.1 TYPES OF ERROR MESSAGES

THERE ARE THREE LEVELS OF ERROR MESSAGES THAT MAY BE ISSUED BY A DIAGNOSTIC: GENERAL, BASIC AND EXTENDED. GENERAL ERROR MESSAGES ARE ALWAYS PRINTED UNLESS THE "IER" FLAG IS SET (SECTION 2.3). THE GENERAL ERROR MESSAGE IS OF THE FORM:

NAME TYPE NUMBER ON UNIT NUMBER TST NUMBER PC:XXXXXX
ERROR MESSAGE

IDENTIFICATION

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,WHERE; NAME = DIAGNOSTIC NAME
TYPE = ERROR TYPE (SYS FATAL, DEV FATAL, HARD OR SOFT)
NUMBER = ERROR NUMBER
UNIT NUMBER = 0 - N (N IS LAST UNIT IN PTABLE)
TST NUMBER = TEST AND SUBTEST WHERE ERROR OCCURRED
PC:XXXXXX = ADDRESS OF ERROR MESSAGE CALL

BASIC ERROR MESSAGES ARE MESSAGES THAT CONTAIN SOME ADDITIONAL INFORMATION ABOUT THE ERROR. THESE ARE ALWAYS PRINTED UNLESS THE "IER" OR "IBR" FLAGS ARE SET (SECTION 2.3). THESE MESSAGES ARE PRINTED AFTER THE ASSOCIATED GENERAL MESSAGE.

EXTENDED ERROR MESSAGES CONTAIN SUPPLEMENTARY ERROR INFORMATION SUCH AS REGISTER CONTENTS OR GOOD/BAD DATA. THESE ARE ALWAYS PRINTED UNLESS THE "IER", "IBR" OR "IXR" FLAGS ARE SET (SECTION 2.3). THESE MESSAGES ARE PRINTED AFTER THE ASSOCIATED GENERAL ERROR MESSAGE AND ANY ASSOCIATED BASIC ERROR MESSAGES.

3.2 SPECIFIC ERROR MESSAGES

4.0 PERFORMANCE AND PROGRESS REPORTS

AT THE END OF EACH PASS, THE PASS COUNT IS GIVEN ALONG WITH THE TOTAL NUMBER OF ERRORS REPORTED SINCE THE DIAGNOSTIC WAS STARTED. THE "EOP" SWITCH CAN BE USED TO CONTROL HOW OFTEN THE END OF PASS MESSAGE IS PRINTED. SECTION 2.2 DESCRIBES SWITCHES.

5.0 DEVICE INFORMATION TABLES

6.0 TEST SUMMARIES

IDENTIFICATION

```

541
542
543 002000      .MCALL  SVC
544            SVC
545            SVCINS=0
546            SVCGBL=0
547            SVCTAG=0
548            .TITLE PROGRAM HEADER AND TABLES
549            .SBTTL IDENTIFICATION
550
551
552
553
554
555
556
557            .SBTTL PROGRAM HEADER
558
559 002000      BGNMOD MDHEDR
560 002000      MDHEDR::
561
562            ;**
563            ; THE PROGRAM HEADER IS THE INTERFACE BETWEEN
564            ; THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
565            ;**
566 002000      POINTER BGNRPT,BGNAU,BGNDDU,BGNSETUP
567
568
569
570
571
572
573
574
575 002000      HEADER CNKTCA,A,0,120,0
576 002000      L$NAME:: ;DIAGNOSTIC NAME
577 002000      103      .ASCII /C/
578 002001      116      .ASCII /N/
579 002002      113      .ASCII /K/
580 002003      124      .ASCII /T/
581 002004      103      .ASCII /C/
582 002005      101      .ASCII /A/
583 002006      000      .BYTE 0
584 002007      000      .BYTE 0
585 002010      L$REV:: ;REVISION LEVEL
586 002010      101      .ASCII /A/
587 002011      L$DEPD:: ;0
588 002011      060      .ASCII /0/
589 002012      L$UNIT:: ;NUMBER OF UNITS
590 002012      000C16 .WORD T$PTHV
591 002014      L$TIML:: ;LONGEST TEST TIME
592 002014      000120 .WORD 120
593 002016      L$HPCP:: ;POINTER TO H.W. QUES.
594 002016      024502 .WORD L$HARD
595 002020      L$SPCP:: ;POINTER TO S.W. QUES.
596 002020      000000 .WORD 0
597 002022      L$HPTP:: ;PTR. TO DEF. H.W. PTABLE
598 002022      002162 .WORD L$HW
599 002024      L$SPTP:: ;PTR. TO S.W. PTABLE
600 002024      000000 .WORD 0
601 002026      L$LADP:: ;DIAG. END ADDRESS
602 002026      024716 .WORD L$LAST
603 002030      L$STA:: ;RESERVED FOR APT STATS
604 002030      000000 .WORD 0
605 002032      L$CO:: ;
606 002032      000000 .WORD 0
607 002034      L$DTYP:: ;DIAGNOSTIC TYPE
608 002034      000000 .WORD 0

```

PROGRAM HEADER

002036		L\$APT::		;APT EXPANSION
002036	000000		.WORD 0	
002040		L\$DTP::		;PTR. TO DISPATCH TABLE
002040	002124		.WORD L\$DISPATCH	
002042		L\$PRIO::		;DIAGNOSTIC RUN PRIORITY
002042	000000		.WORD 0	
002044		L\$ENVI::		;FLAGS DESCRIBE HOW IT WAS SETUP
002044	000000		.WORD 0	
002046		L\$EXP1::		;EXPANSION WORD
002046	000000		.WORD 0	
002050		L\$MREV::		;SVC REV AND EDIT #
002050	003		.BYTE C\$REVISION	
002051	003		.BYTE C\$EDIT	
002052		L\$EF::		;DIAG. EVENT FLAGS
002052	000000		.WORD 0	
002054	000000		.WORD 0	
002056		L\$SPC::		
002056	000000		.WORD 0	
002060		L\$DEVP::		; POINTER TO DEVICE TYPE LIST
002060	014422		.WORD L\$DVTYP	
002062		L\$REPP::		;PTR. TO REPORT CODE
002062	017402		.WORD L\$RPT	
002064		L\$EXP4::		
002064	000000		.WORD 0	
002066		L\$EXP5::		
002066	000000		.WORD 0	
002070		L\$AUT::		;PTR. TO ADD UNIT CODE
002070	020076		.WORD L\$AU	
002072		L\$DUT::		;PTR. TO DROP UNIT CODE
002072	020042		.WORD L\$DU	
002074		L\$LUN::		;LUN FOR EXERCISERS TO FILL
002074	000000		.WORD 0	
002076		L\$DESP::		;POINTER TO DIAG. DESCRIPTION
002076	014432		.WORD L\$DESC	
002100		L\$LOAD::		;GENERATE SPECIAL AUTOLOAD EMT
002100	104035		EMT E\$LOAD	
002102		L\$ETP::		;POINTER TO ERRtbl
002102	000000		.WORD 0	
002104		L\$ICP::		;PTR. TO INIT CODE
002104	017412		.WORD L\$INIT	
002106		L\$CCP::		;PTR. TO CLEAN-UP CODE
002106	020034		.WORD L\$CLEAN	
002110		L\$ACP::		;PTR. TO AUTO CODE
002110	017710		.WORD L\$AUTO	
002112		L\$PRT::		;PTR. TO PROTECT TABLE
002112	017404		.WORD L\$PROT	
002114		L\$TEST::		;TEST NUMBER
002114	000000		.WORD 0	
002116		L\$DLY::		;DELAY COUNT
002116	000000		.WORD 0	
002120		L\$HIME::		;PTR. TO HIGH MEM
002120	000000		.WORD 0	
586 002122		ENDMOD		
587				

DISPATCH TABLE

```
599          .SBITL DISPATCH TABLE
600
601          ;**
602          ; THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST.
603          ; IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
604          ;
605          RGNMOD  DSPCODE
        DSPCODE.:
        DISPATCH 14
        .WORD    14
L$DISPATCH:;
        .WORD    T1
        .WORD    T2
        .WORD    T3
        .WORD    T4
        .WORD    T5
        .WORD    T6
        .WORD    T7
        .WORD    T8
        .WORD    T9
        .WORD    T10
        .WORD    T11
        .WORD    T12
        .WORD    T13
        .WORD    T14
607 002160  ENDMOD
```

DEFAULT HARDWARE P-TABLE.

```

615          .SBTTL  DEFAULT HARDWARE P-TABLE
616
617          ;**
618          ; THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
619          ; THE TEST-DEVICE PARAMETERS.  THE STRUCTURE OF THIS TABLE
620          ; IS IDENTICAL TO THE STRUCTURE OF THE HARDWARE P-TABLES,
621          ; AND IS USED AS A "TEMPLATE" FOR BUILDING THE P-TABLES.
622          ;--
623
624          002160          BGNHW  DFPTBL
        002160          000010          .WORD  L10000-L$HW/2
        002162
        002162          L$HW::
        002162          DFPTBL::
625
635          ;*
636          ; DUMMY HARDWARE P-TABLE.  THIS JUST LETS THE DRS KNOW WHAT FORMAT
637          ; WE WANT.
638          ;
639
640          002162          000000          .WORD  0          ; SBC ID SWITCH (2 TO 15.)
641          002164          000001          .WORD  1          ; BUS ADDRESS RANGE (LOW IS DEFAULT)
642
643          ; FLAG FOR LOOP-BACK CONNECTORS.
644          ; 0 = NOT INSTALLED; 1 = INSTALLED
645
646          002166          000000          .WORD  0          ; CONNECTOR FOR SLU1
647          002170          000000          .WORD  0          ; CONNECTOR FOR SLU2, CHANNEL A
648          002172          000000          .WORD  0          ; CONNECTOR FOR SLU2, CHANNEL B
649          002174          000000          .WORD  0          ; CONNECTOR FOR PARALLEL I/O
650          002176          000000          .WORD  0          ; SLU2 DMA CONFIGURATION
651          002200          000000          .WORD  0          ; FLAG FOR USER ROM TESTS (0 = DON'T TEST)
652
653          002202          ENDHW
        002202          L10000:

```

SOFTWARE P-TABLE

```
655          .SBTTL  SOFTWARE P-TABLE
656
657          ;++
658          ; THE SOFTWARE TABLE CONTAINS VARIOUS DATA USED BY THE
659          ; PROGRAM AS OPERATIONAL PARAMETERS.  THESE PARAMETERS ARE
660          ; SET UP AT ASSEMBLY TIME AND MAY BE VARIED BY THE OPERATOR
661          ; AT RUN TIME.
662          ;--
663
664 002202          BGNSW  SFPTBL
        002202 000000          .WORD  L10001-L$SW/2
        002204          L$SW::
        002204          SFPTBL::
665
666
667
674 002204          ENDSW
        002204          L10001:
```

SOFTWARE P-TABLE

```

676 .TITLE GLOBAL AREAS
677 .SBTTL IDENTIFICATION
683
684 .SBTTL GLOBAL EQUATES SECTION
685
686 ;**
687 ; THE GLOBAL EQUATES SECTION CONTAINS PROGRAM EQUATES THAT
688 ; ARE USED IN MORE THAN ONE TEST.
689 ;**
690 002204 BGNMOD GLBEQAT
      002204 GLBEQAT::
691 002204 EQUALS

;
; BIT DEFINITIONS
;
100000 BIT15== 100000
040000 BIT14== 40000
020000 BIT13== 20000
010000 BIT12== 10000
004000 BIT11== 4000
002000 BIT10== 2000
001000 BIT09== 1000
000400 BIT08== 400
000200 BIT07== 200
000100 BIT06== 100
000040 BIT05== 40
000020 BIT04== 20
000010 BIT03== 10
000004 BIT02== 4
000002 BIT01== 2
000001 BIT00== 1

;
001000 BIT9== BIT09
000400 BIT8== BIT08
000200 BIT7== BIT07
000100 BIT6== BIT06
000040 BIT5== BIT05
000020 BIT4== BIT04
000010 BIT3== BIT03
000004 BIT2== BIT02
000002 BIT1== BIT01
000001 BIT0== BIT00

;
; EVENT FLAG DEFINITIONS
; EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
;
; BIT POSITION IN SECOND STATUS WORD
000040 EF.START== 32. ; (100000) START COMMAND WAS ISSUED
000037 EF.RESTART== 31. ; (040000) RESTART COMMAND WAS ISSUED
000036 EF.CONTINUE== 30. ; (020000) CONTINUE COMMAND WAS ISSUED
000035 EF.NEW== 29. ; (010000) A NEW PASS HAS BEEN STARTED
000034 EF.PWR== 28. ; (004000) A POWER-FAIL/POWER-UP OCCURRED

;
; PRIORITY LEVEL DEFINITIONS
;
000340 PRI07== 340

```

GLOBAL EQUATES SECTION

```
000300      PRI06== 300
000240      PRI05== 240
000200      PRI04== 200
000140      PRI03== 140
000100      PRI02== 100
000040      PRI01== 40
000000      PRI00== 0
;
; OPERATOR FLAG BITS
;
000004      EVL== 4
000010      LOT== 10
000020      ADR== 20
000040      IDU== 40
000100      ISR== 100
000200      UAM== 200
000400      BOE== 400
001000      PNT== 1000
002000      PRI== 2000
004000      IXE== 4000
010000      IBE== 10000
020000      IER== 20000
040000      LOF== 40000
100000      HOE== 100000
```

692
707 002204

ENDMOD

GLOBAL DATA SECTION

```

709          .SBTTL  GLOBAL DATA SECTION
710
711          ; **
712          ; THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
713          ; IN MORE THAN ONE TEST.
714          ; **
715 002204      BGNMOD  GLBDAT
716 002204
717
718          ; **
719          ; TWO PORT RAM Q-BUS ADDRESS OFFSETS.
720          ;
721          ; --
722
723          DPR0==0
724          DPR1==2
725          DPR2==4
726          DPR3==6
727          DPR4==10
728          DPR5==12
729          DPR6==14
730          DPR7==16
731          DPR10==20
732          DPR11==22
733          DPR12==24
734          DPR13==26
735          DPR14==30
736          DPR15==32
737          DPR16==34
738          DPR17==36
739
740 002204 000000  SAVEC:  .WORD  0          ; TEMP SAVE FOR VECTOR CONTENTS
741 002206 000000  DROPUN: .WORD  0          ; IOP UNIT DROPPED FLAG (NON-0 = DROPPED)
742 002210 000000  UN:      .WORD  0          ; LOGICAL UNIT NUMBER
743 002212 000000  IOPN:  .WORD  0          ; SBC ID SWITCH FROM P-TABLE
744 002214 000000  IOPNN: .WORD  0          ; SBC ID SWITCH RIGHT JUSTIFIED
745 002216 000000  QBASE: .WORD  0          ; Q-BUS BASE ADDRESS FROM P-TABLE
746 002220 000000  QIRVEC: .WORD  0         ; VECTOR FOR QIR TEST
747 002222 000000  LOOPB1: .WORD  0         ; LOOPBACK CONN. FLAG FOR SLU1
748 002224 000000  LOOPB2: .WORD  0         ; LOOPBACK CONN. FLAG FOR SLU2 CHANNEL A
749 002226 000000  LOOPB3: .WORD  0         ; LOOPBACK CONN. FLAG FOR CHANNEL B
750 002230 000000  LOOPB4: .WORD  0         ; LOOPBACK CONN. FLAG FOR PL'L I/O
751 002232 000000  SL2DMA: .WORD  0         ; "1" SAYS SLU2 SETUP FOR DMA
752 002234 000000  ROMTST: .WORD  0         ; FLAG FOR USER ROM TESTS (NON-0 = TEST ROM)
753 002236 000000  DELCNT: .WORD  0         ; USED IN RDELAY SUBROUTINE.
754 002240 000000  INTFLG: .WORD  0         ; SOFTWARE FLAG FOR QIR TEST
755 002242 000000  HIMEM:  .WORD  0         ; BASE OF HIGHEST 4KW PAGE FROM L$HIME
756
757          ;
758          ; THE FOLLOWING ARE THE DATA TO INVOKE INDIVIDUAL ROM TESTS.
759          ; EACH XXDP+ TEST MUST WRITE ONE OF THESE WORDS INTO THE IOP'S TWO
760          ; PORT REGISTER FILE (TWO-PORT RAM, REGISTER 0). THE IOP BOOT
761          ; CODE WILL INTERPRET THE CONTENTS OF DPR0 AND INVOKE THE APPROPRIATE
762          ; IOP ROM TEST.
763          ;
764 002244 100001  CSR:    .WORD  100001      ; CSR TEST

```

K

GLOBAL DATA SECTION

765	002246	100002	RAM:	.WORD	100002	; 16KW RAM TEST
766	002250	100004	ROM:	.WORD	100004	; ROM TEST
767	002252	100010	CPU:	.WORD	100010	; IOP INSTRUCTION TEST
768	002254	100020	BVNT:	.WORD	100020	; BVNT INTERRUPT TEST
769	002256	100040	SLU1:	.WORD	100040	; SERIAL PORT #1 TEST (CONSOLE)
770	002260	100100	SLU2:	.WORD	100100	; SERIAL PORT #2 TEST (MODEM)
771	002262	100200	PLLI0:	.WORD	100200	; PARALLEL I/O TEST
772	002264	100400	DMA:	.WORD	100400	; DMA CONTROLLER TEST
773	002266	101000	QIR:	.WORD	101000	; Q BUS INTERRUPT TEST
774	002270	102000	DPR:	.WORD	102000	; TWO-PORT RAM TEST

GLOBAL DATA SECTION

```

819      ;
820      ; ADD THE NEXT FOUR ADDRESSES WHEN AND IF ADDITIONAL TESTS ARE INSERTED INTO
821      ; THE ROM-RESIDENT CODE.
822      ;
823      ; T14ADR:      RT14      ; POINTER TO TEST 14 STRINGS
824      ; T15ADR:      RT15      ; POINTER TO TEST 15 STRINGS
825      ; T16ADR:      RT16      ; POINTER TO TEST 16 STRINGS
826      ; T17ADR:      RT17      ; POINTER TO TEST 17 STRINGS
827      ;
828
829      ; **
830      ; HERE IS THE SECOND TABLE WHICH WAS MENTIONED ABOVE.
831      ; **
832
833 002320 004721      RT1:      ROM11      ; POINTER TO T1 STRING
834 002322 005524      ; T1E0      ; ERROR BIT:      0
835 002324 005570      ; T1E1      ;                1
836 002326 005634      ; T1E2      ;                2
837 002330 005700      ; T1E3      ;                3
838 002332 005746      ; T1E4      ;                4
839 002334 006016      ; T1E5      ;                5
840 002336 006064      ; T1E6      ;                6
841 002340 006132      ; T1E7      ;                7
842 002342 000000      ; .WORD 0      ; ADD UP TO 4 MORE ERROR BIT MESSAGE POINTERS.
843 002344 000000      ; .WORD 0
844 002346 000000      ; .WORD 0
845 002350 000000      ; .WORD 0
846
847 002352 004744      RT2:      ROMT2      ; POINTER TO T2 ASCII STRING
848 002354 006200      ; T2E0      ; ERROR BIT:      0
849 002356 006253      ; T2E1      ;                1
850 002360 006323      ; T2E2      ;                2
851 002362 006374      ; T2E3      ;                3
852 002364 006457      ; T2E4      ;                4
853 002366 006542      ; T2E5      ;                5
854 002370 006613      ; T2E6      ;                6
855 002372 006661      ; T2E7      ;                7
856 002374 006725      ; T2E8      ;                8
857 002376 007003      ; T2E9      ;                9
858 002400 000000      ; .WORD 0      ; ADD UP TO 2 MORE ERROR BIT MESSAGE POINTERS.
859 002402 000000      ; .WORD 0

```

GLOBAL DATA SECTION

861					
862	002404	004767	RT3:	ROMT3	; POINTER TO T3 ASCII STRING
863	002406	007061		T3E0	; ERROR BIT: 0
864	002410	007137		T3E1	:
865	002412	007215		T3E2	1
866	002414	007313		T3E3	2
867	002416	000000		.WORD	3
868	002420	000000		.WORD	; ADD UP TO 8 MORE ERROR BIT MESSAGE POINTERS.
869	002422	000000		.WORD	
870	002424	000000		.WORD	
871	002426	000000		.WORD	
872	002430	000000		.WORD	
873	002432	000000		.WORD	
874	002434	000000		.WORD	
875					
876	002436	005023	RT4:	ROMT4	; POINTER TO T4 ASCII STRING
877	002440	000000		.WORD	; ***T4 NOT INSTALLED AS YET***
878	002442	000000		.WORD	
879	002444	000000		.WORD	
880	002446	000000		.WORD	
881	002450	000000		.WORD	
882	002452	000000		.WORD	
883	002454	000000		.WORD	
884	002456	000000		.WORD	
885	002460	000000		.WORD	
886	002462	000000		.WORD	
887	002464	000000		.WORD	
888	002466	000000		.WORD	

GLOBAL DATA SECTION

```

890
891 002470 005062          RT5:  ROMT5          ; POINTER TO T5 ASCII STRING
892 002472 007411          T5E0          ; ERROR BIT: 0
893 002474 007471          T5E1          ;           1
894 002476 007544          T5E2          ;           2
895 002500 007607          T5E3          ;           3
896 002502 000000          .WORD 0      ; ADD UP TO 8 MORE ERROR BIT MESSAGE POINTERS
897 002504 000000          .WORD 0
898 002506 000000          .WORD 0
899 002510 000000          .WORD 0
900 002512 000000          .WORD 0
901 002514 000000          .WORD 0
902 002516 000000          .WORD 0
903 002520 000000          .WORD 0
904
905 002522 005117          RT6:  ROMT6          ; POINTER TO T6 ASCII STRING
906 002524 007647          T6E0          ; ERROR BIT: 0
907 002526 007745          T6E1          ;           1
908 002530 010025          T6E2          ;           2
909 002532 010074          T6E3          ;           3
910 002534 010154          T6E4          ;           4
911 002536 010223          T6E5          ;           5
912 002540 010266          T6E6          ;           6
913 002542 000000          .WORD 0      ; ADD UP TO 5 MORE ERROR BIT MESSAGE POINTERS.
914 002544 000000          .WORD 0
915 002546 000000          .WORD 0
916 002550 000000          .WORD 0
917 002552 000000          .WORD 0

```

GLOBAL DATA SECTION

```

919
920 002554 0000000      RT7:  ROMT7      ; POINTER TO T7 ASCII STRING
921 002556 010337      T7E0      ; ERROR BIT: 0
922 002560 010417      T7E1      ;           1
923 002562 010504      T7E2      ;           2
924 002564 010560      T7E3      ;           3
925 002566 010634      T7E4      ;           4
926 002570 010707      T7E5      ;           5
927 002572 010775      T7E6      ;           6
928 002574 011054      T7E7      ;           7
929 002576 011132      T7E8      ;           8
930 002600 011227      T7E9      ;           9
931 002602 011320      T7E10     ;          10
932 002604 011412      T7E11     ;          11
933
934 002606 005267      RT10: ROMT10     ; POINTER TO T10 ASCII STRING
935 002610 011477      T10E0     ; ERROR BIT: 0
936 002612 011560      T10E1     ;           1
937 002614 011621      T10E2     ;           2
938 002616 011657      T10E3     ;           3
939 002620 011714      T10E4     ;           4
940 002622 011767      T10E5     ;           5
941 002624 012037      T10E6     ;           6
942 002626 012116      T10E7     ;           7
943 002630 000000      .WORD 0
944 002632 000000      .WORD 0
945 002634 000000      .WORD 0
946 002636 000000      .WORD 0
; ADD UP TO 4 MORE ERROR BIT MESSAGE POINTERS.

```

GLOBAL DATA SECTION

948

```

949 002640 005317      RT11:  ROMT11
950 002642 012161      T11E0
951 002644 012260      T11E1
952 002646 012365      T11E2
953 002650 012437      T11E3
954 002652 012524      T11E4
955 002654 012573      T11E5
956 002656 000000      .WORD 0
957 002660 000000      .WORD 0
958 002662 000000      .WORD 0
959 002664 000000      .WORD 0
960 002666 000000      .WORD 0
961 002670 000000      .WORD 0

```

```

; POINTER TO T11 ASCII STRING
; ERROR BIT: 0
;           1
;           2
;           3
;           4
;           5
; ADD UP TO 6 MORE ERROR BIT MESSAGE POINTERS

```

962

```

963 002672 005462      RT12:  RUMT12
964 002674 012625      T12E0
965 002676 012721      T12E1
966 002700 012771      T12E2
967 002702 013052      T12E3
968 002704 013132      T12E4
969 002706 013205      T12E5
970 002710 013262      T12E6
971 002712 000000      .WORD 0
972 002714 000000      .WORD 0
973 002716 000000      .WORD 0
974 002720 000000      .WORD 0
975 002722 000000      .WORD 0

```

```

; POINTER TO T12 ASCII STRING
; ERROR BIT: 0
;           1
;           2
;           3
;           4
;           5
;           6
; ADD UP TO 5 MORE ERROR BIT MESSAGE POINTERS.

```

GLOBAL DATA SECTION

```

977
978 002724 005507          RT13:  ROMT13          ; POINTER TO T13 ASCII STRING
979 002726 013336          T13E0          ; ERROR BIT:      0
980 002730 013404          T13E1          ;                  1
981 002732 013460          T13E2          ;                  2
982 002734 013545          T13E3          ;                  3
983 002736 013653          T13E4          ;                  4
984 002740 013727          T13E5          ;                  5
985 002742 014005          T13E6          ;                  6
986 002744 014105          T13E7          ;                  7
987 002746 014161          T13E8          ;                  8
988 002750 014227          T13E9          ;                  9
989 002752 014277          T13E10         ;                 10
990 002754 014350          T13E11         ;                 11
991
992
993
994          ;
995          ; IF (UP TO) 4 MORE TESTS ARE ADDED TO THE ROM-RESIDENT CODE, PLACE THE
996          ; MESSAGE POINTERS HERE. USE IDENTICAL FORMAT AS FOR 1 THRU 13, ABOVE.
997          ; DON'T FORGET TO MODIFY THE TABLE IMMEDIATELY PRECEDING THIS ONE, ALSO.
998          ;
999 002756          ENDMOD
1000

```

GLOBAL TEXT SECTION

```

1002          .SBITL GLOBAL TEXT SECTION
1003
1004          ;**
1005          ; THE GLOBAL TEXT SECTION CONTAINS FORMAT STATEMENTS,
1006          ; MESSAGES, AND ASCII INFORMATION THAT ARE USED IN
1007          ; MORE THAN ONE TEST.
1008          ;**
1009
1010          ; **
1011          ;
1012          ;         GLOBAL MESSAGES -- ERROR AND OTHERWISE
1013          ;
1014          ; **
1015
1016 002756      114      123      111 NOIOP: .ASCIZ /LSI-11 BUS TIMEOUT - NO IOP PRESENT, OR KXT11 INTERFACE ERROR/
          002761      055      061      061
          002764      040      102      125
          002767      123      040      124
          002772      111      115      105
          002775      117      125      124
          003000      040      055      040
          003003      116      117      040
          003006      111      117      120
          003011      040      120      122
          003014      105      123      105
          003017      116      124      054
          003022      040      117      122
          003025      040      113      130
          003030      124      061      061
          003033      040      111      116
          003036      124      105      122
          003041      106      101      103
          003044      105      040      105
          003047      122      122      117
          003052      122      000
1017 003054      116      117      040 NORES: .ASCIZ /NO RESPONSE FROM ROM SELFTEST/
          003057      122      105      123
          003062      120      117      116
          003065      123      105      040
          003070      106      122      117
          003073      115      040      122
          003076      117      115      040
          003101      123      105      114
          003104      106      124      105
          003107      123      124      000
    
```

GLOBAL TEXT SECTION

1019	003112	105	122	122	ROMD: .ASCII /ERROR DETECTED BY TOP SELFTEST/
	003115	117	122	040	
	003120	104	105	124	
	003123	105	103	124	
	003126	105	104	040	
	003131	102	131	040	
	003134	111	117	120	
	003137	040	123	105	
	003142	114	106	124	
	003145	105	123	124	
	003150	000			
1020	003151	102	117	117	BADSW: .ASCII "BOOT/SELFTEST SWITCH NOT SETUP PROPERLY"
	003154	124	057	123	
	003157	105	114	106	
	003162	124	105	123	
	003165	124	040	123	
	003170	127	111	124	
	003173	103	110	040	
	003176	116	117	124	
	003201	040	123	105	
	003204	124	125	120	
	003207	040	120	122	
	003212	117	120	105	
	003215	122	114	131	
	003220	000			

GLOBAL TEXT SECTION

1022	003221	124	105	123	CMND: .ASCIZ /TEST COMMAND STATUS ERROR FROM IOP/
	003224	124	040	103	
	003227	117	115	115	
	003232	101	116	104	
	003235	040	123	124	
	003240	101	124	125	
	003243	123	040	105	
	003246	122	122	117	
	003251	122	040	106	
	003254	122	117	115	
	003257	040	111	117	
	003262	120	000		
1023	003264	124	120	122	NOTRDY: .ASCIZ /TPRO NOT = 000000; IOP IS NOT READY TO ACCEPT COMMANDS/
	003267	060	040	116	
	003272	117	124	040	
	003275	075	040	060	
	003300	060	060	060	
	003303	060	060	073	
	003306	040	111	117	
	003311	120	040	111	
	003314	123	040	116	
	003317	117	124	040	
	003322	122	105	101	
	003325	104	131	040	
	003330	124	117	040	
	003333	101	103	103	
	003336	105	120	124	
	003341	040	103	117	
	003344	115	115	101	
	003347	116	104	123	
	003352	000			

GLOBAL TEXT SECTION

1025	003353	120	117	123	NOTPR; .ASCIZ /POSSIBLE FATAL IOP ERROR DETECTED/
	003356	123	111	102	
	003361	114	105	040	
	003364	106	101	124	
	003367	101	114	040	
	003372	111	117	120	
	003375	040	105	122	
	003400	122	117	122	
	003403	040	104	105	
	003406	124	105	103	
	003411	124	105	104	
	003414	000			
1026	003415	123	102	103	CCPU; .ASCIZ /SBC ID SWITCH SETTING/
	003420	040	111	104	
	003423	040	123	127	
	003426	111	124	103	
	003431	110	040	123	
	003434	105	124	124	
	003437	111	116	107	
	003442	000			

GLOBAL TEXT SECTION

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1028 003443      111      123      040  BASE:  .ASCIZ  "IS IOP'S LSI-11 BUS ADDRESS IN THE LOW ADDRESS RANGE(Y/N)"
      003446      111      117      120
      003451      047      123      040
      003454      114      123      111
      003457      055      061      061
      003462      040      102      125
      003465      123      040      101
      003470      104      104      122
      003473      105      123      123
      003476      040      111      116
      003501      040      124      110
      003504      105      040      114
      003507      117      127      040
      003512      101      104      104
      003515      122      105      123
      003520      123      040      122
      003523      101      116      107
      003526      105      050      131
      003531      057      116      051
      003534      000
1029 003535      114      117      117  LOOP1:  .ASCIZ  "/LOOP-BACK CONNECTOR ON SERIAL PORT #1 (CONSOLE PORT)"
      003540      120      055      102
      003543      101      103      113
      003546      040      103      117
      003551      116      116      105
      003554      103      124      117
      003557      122      040      117
      003562      116      040      123
      003565      105      122      111
      003570      101      114      040
      003573      120      117      122
      003576      124      040      043
      003601      061      040      050
      003604      103      117      116
      003607      123      117      114
      003612      105      040      120
      003615      117      122      124
      003620      051      000

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GLOBAL TEXT SECTION

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1031 003622      103      110      101 LOOP2: .ASCII /CHANNEL A LOOP BACK CONNECTOR ON SERIAL PORT #2/
      003625      116      116      105
      003630      114      040      101
      003633      040      114      117
      003636      117      120      055
      003641      102      101      103
      003644      113      040      103
      003647      117      116      116
      003652      105      103      124
      003655      117      122      040
      003660      117      116      040
      003663      123      105      122
      003666      111      101      114
      003671      040      120      117
      003674      122      124      040
      003677      043      062      000
1032 003702      103      110      101 LOOP3: .ASCII /CHANNEL B LOOP-BACK CONNECTOR ON SERIAL PORT #2/
      003705      116      116      105
      003710      114      040      102
      003713      040      114      117
      003716      117      120      055
      003721      102      101      103
      003724      113      040      103
      003727      117      116      116
      003732      105      103      124
      003735      117      122      040
      003740      117      116      040
      003743      123      105      122
      003746      111      101      114
      003751      040      120      117
      003754      122      124      040
      003757      043      062      000

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GLOBAL TEXT SECTION

1034	003762	114	117	117	LOOP4: .ASCIZ /LOOP-BACK CONNECTOR ON PARALLEL PORT/
	003765	120	055	102	
	003770	101	103	113	
	003773	040	103	117	
	003776	116	116	105	
	004001	103	124	117	
	004004	122	040	117	
	004007	116	040	120	
	004012	101	122	101	
	004015	114	114	105	
	004020	114	040	120	
	004023	117	122	124	
	004026	000			
1035	004027	111	123	040	SLU2CF: .ASCIZ "IS SLU2 CHANNEL A SERIAL PORT CONFIGURED FOR DMA OPERATION(Y/N)"
	004032	123	114	125	
	004035	062	040	103	
	004040	110	101	116	
	004043	116	105	114	
	004046	040	101	040	
	004051	123	105	122	
	004054	111	101	114	
	004057	040	120	117	
	004062	122	124	040	
	004065	103	117	116	
	004070	106	111	107	
	004073	125	122	105	
	004076	104	040	106	
	004101	117	122	040	
	004104	104	115	101	
	004107	040	117	120	
	004112	105	122	101	
	004115	124	111	117	
	004120	116	050	131	
	004123	057	116	051	
	004126	000			

GLOBAL TEXT SECTION

1037	004127	124	105	123	URUM:	.ASCIZ	/TEST USER ROM/
	004132	124	040	125			
	004135	123	105	122			
	004140	040	122	117			
	004143	115	000				
1035							
1039	004145	103	123	122	CSRT:	.ASCIZ	/CSR/
	004150	000					

GLOBAL TEXT SECTION

1041	004151	061	066	113	RAMT:	.ASCIZ	/16KW LOCAL RAM/
	004154	127	040	114			
	004157	117	103	101			
	004162	114	040	122			
	004165	101	115	000			
1042	004170	122	117	115	ROMT:	.ASCIZ	/ROM/
	004173	000					

GLOBAL TEXT SECTION

1044	004174	102	105	126	BEVNT: ,ASCII7 /BEVNT/
	004177	116	124	000	
1045	004202	103	117	116	SLU1: ,ASCII7 /CONSOLE SERIAL PORT (SLU1)/
	004205	123	117	114	
	004210	105	040	123	
	004213	105	122	111	
	004216	101	114	040	
	004221	120	117	122	
	004224	124	040	050	
	004227	123	114	125	
	004232	061	051	000	
1046	004235	123	105	122	SLU2A: ,ASCII7 /SERIAL PORT (SLU2), CHANNEL A/
	004240	111	101	114	
	004243	040	120	117	
	004246	122	124	040	
	004251	050	123	114	
	004254	125	062	051	
	004257	054	040	103	
	004262	110	101	116	
	004265	116	105	114	
	004270	040	101	000	

GLOBAL TEXT SECTION

1048	004273	123	105	122	GROUP: ,ASCII /SERIAL PORT (GROUP), CHANNEL B'
	004276	111	101	114	
	004301	040	120	117	
	004304	122	124	040	
	004307	050	123	114	
	004312	125	062	051	
	004315	054	040	103	
	004320	110	101	116	
	004323	116	105	114	
	004326	040	102	000	
1049	004331	120	101	122	PLLP: ,ASCII "PARALLEL I/O PORT"
	004334	101	114	114	
	004337	105	114	040	
	004342	111	057	117	
	004345	040	120	117	
	004350	122	124	000	

GLOBAL TEXT SECTION

1051	004353	104	115	101	DMAL: .ASCIIZ /DMA CONTROLLER (LOCAL IOP ONLY)/
	004356	040	103	117	
	004361	116	124	122	
	004364	117	114	114	
	004367	105	122	040	
	004372	050	114	117	
	004375	103	101	114	
	004400	040	111	117	
	004403	120	040	117	
	004406	116	114	131	
	004411	051	000		
1052	004413	104	115	101	DMAT: .ASCIIZ /DMA CONTROLLER (LSI-11 BUS DMA)/
	004416	040	103	117	
	004421	116	124	122	
	004424	117	114	114	
	004427	105	122	040	
	004432	050	114	123	
	004435	111	055	061	
	004440	061	040	102	
	004443	125	123	040	
	004446	104	115	101	
	004451	051	000		

GLOBAL TEXT SECTION

1054	004453	114	123	111	QIRT: .ASCIZ /LSI 11 BUS INTERRUPT/
	004456	055	061	061	
	004461	040	102	125	
	004464	123	040	111	
	004467	116	124	105	
	004472	122	122	125	
	004475	120	124	000	
1055	004500	116	117	040	QIRT1: .ASCIZ /NO IOP INTERRUPT FROM FIRST OF 2 ATTEMPTS/
	004503	111	117	120	
	004506	040	111	116	
	004511	124	105	122	
	004514	122	125	120	
	004517	124	040	106	
	004522	122	117	115	
	004525	040	106	111	
	004530	122	123	124	
	004533	040	117	106	
	004536	040	062	040	
	004541	101	124	124	
	004544	105	115	120	
	004547	124	123	000	

GLOBAL TEXT SECTION

1057	004552	116	117	040	QIRT2: .ASCIZ /NO IOP INTERRUPT FROM SECOND OF 2 ATTEMPTS./
	004555	111	117	120	
	004560	040	111	116	
	004563	124	105	122	
	004566	122	125	120	
	004571	124	040	106	
	004574	122	117	115	
	004577	040	123	105	
	004602	103	117	116	
	004605	104	040	117	
	004610	106	040	062	
	004613	040	101	124	
	004616	124	105	115	
	004621	120	124	123	
	004624	056	000		
1058	004626	124	127	117	DPRT: .ASCIZ /TWO-PORT RAM/
	004631	055	120	117	
	004634	122	124	040	
	004637	122	101	115	
	004642	000			

GLOBAL TEXT SECTION

1060	004643	107	120	125	CPUT: .ASCIZ /CPU INSTRUCTION/
	004646	040	111	116	
	004651	123	124	122	
	004654	125	103	124	
	004657	111	117	116	
	004662	000			
1061	004663	126	105	122	TST1: .ASCIZ /VERIFY THE IOP IS ADDRESSABLE/
	004666	111	106	131	
	004671	040	124	110	
	004674	105	040	111	
	004677	117	120	040	
	004702	111	123	040	
	004705	101	104	104	
	004710	122	105	123	
	004713	123	101	102	
	004716	114	105	000	

GLOBAL TEXT SECTION

1063	004721	111	057	117	ROMT1: .ASCIZ "I/O REGISTER CHECK"
	004724	040	122	105	
	004727	107	111	123	
	004732	124	105	122	
	004735	040	103	110	
	004740	105	103	113	
	004743	000			
1064	004744	115	101	124	ROMT2: .ASCIZ "/NATIVE OR USER RAM/"
	004747	111	126	105	
	004752	040	117	122	
	004755	040	125	123	
	004760	105	122	040	
	004763	122	101	115	
	004766	000			

GLOBAL TEXT SECTION

1066	004767	116	101	124	ROMT3: .ASCIIZ /NATIVE OR USER ROM CHECKSUM/
	004772	111	126	105	
	004775	040	117	122	
	005000	040	125	123	
	005003	105	122	040	
	005006	122	117	115	
	005011	040	103	110	
	005014	105	103	113	
	005017	123	125	115	
	005022	000			
1067	005023	124	061	061	ROMT4: .ASCIIZ /T11 CPU INSTRUCTIONS AND TRAPS/
	005026	040	103	120	
	005031	125	040	111	
	005034	116	123	124	
	005037	122	125	103	
	005042	124	111	117	
	005045	116	123	040	
	005050	101	116	104	
	005053	040	124	122	
	005056	101	120	123	
	005061	000			

GLOBAL TEXT SECTION

1069	005062	111	111	116	ROMT5: .ASCII /LINE CLOCK (BEVNT) INTERRUPT/
	005067	105	040	103	
	005070	114	117	103	
	005073	113	040	050	
	005075	102	105	126	
	005101	116	124	051	
	005104	040	111	116	
	005107	124	105	122	
	005112	122	125	120	
	005115	124	000		
1070	005117	103	117	116	ROMT6: .ASCII /CONSOLE SERIAL PORT DC319/
	005122	123	117	114	
	005125	105	040	123	
	005130	105	122	111	
	005133	101	114	040	
	005136	120	117	122	
	005141	124	040	104	
	005144	103	053	061	
	005147	071	000		

GLOBAL TEXT SECTION

1072	005151	123	105	103	ROMT7A: .ASCIZ /SECOND SERIAL PORT NEC7201 (CHANNEL A)/
	005154	117	116	104	
	005157	040	123	105	
	005162	122	111	101	
	005165	114	040	120	
	005170	117	122	124	
	005173	040	116	105	
	005176	103	067	062	
	005201	060	061	040	
	005204	050	103	110	
	005207	101	116	116	
	005212	105	114	040	
	005215	101	051	000	
1073	005220	123	105	103	ROMT7B: .ASCIZ /SECOND SERIAL PORT NEC7201 (CHANNEL B)/
	005223	117	116	104	
	005226	040	123	105	
	005231	122	111	101	
	005234	114	040	120	
	005237	117	122	124	
	005242	040	116	105	
	005245	103	067	062	
	005250	060	061	040	
	005253	050	103	110	
	005256	101	116	116	
	005261	105	114	040	
	005264	102	051	000	

GLOBAL TEXT SECTION

1075	005267	120	101	122	ROMT10: .ASCIIZ "PARALLEL I/O PORT /8036"
	005272	101	114	114	
	005275	105	114	040	
	005300	111	057	117	
	005303	040	120	117	
	005306	122	124	040	
	005311	132	070	060	
	005314	063	066	000	
1076	005317	104	115	101	ROMT11: .ASCIIZ /DMA CONTROLLER AMZ8016/
	005322	040	103	117	
	005325	116	124	122	
	005330	117	114	114	
	005333	105	122	040	
	005336	101	115	132	
	005341	070	060	061	
	005344	066	000		

GLOBAL TEXT SECTION

1078	005346	104	115	101	ROM11A: .ASCIZ /DMA CONTROLLER AMZ8016 (LOCAL IOP ONLY)/
	005351	040	103	117	
	005354	116	124	122	
	005357	117	114	114	
	005362	105	122	040	
	005365	101	115	132	
	005370	070	060	061	
	005373	066	040	050	
	005376	114	117	103	
	005401	101	114	040	
	005404	111	117	120	
	005407	040	117	116	
	005412	114	131	051	
	005415	000			
1079	005416	104	115	101	ROM11B: .ASCIZ /DMA CONTROLLER AMZ8016 (LSI-11 BUS)/
	005421	040	103	117	
	005424	116	124	122	
	005427	117	114	114	
	005432	105	122	040	
	005435	101	115	132	
	005440	070	060	061	
	005443	066	040	050	
	005446	114	123	111	
	005451	055	061	061	
	005454	040	102	125	
	005457	123	051	000	

GLOBAL TEXT SECTION

1081	005462	114	123	111	ROMT12: .ASCIZ /LSI-11 BUS INTERRUPT/
	005465	055	061	061	
	005470	040	102	125	
	005473	123	040	111	
	005476	116	124	105	
	005501	122	122	125	
	005504	120	124	000	
1082	005507	124	127	117	ROMT13: .ASCIZ /TWO-PORT RAM/
	005512	055	120	117	
	005515	122	124	040	
	005520	122	101	115	
	005523	000			

GLOBAL TEXT SECTION

1084	005524	105	122	122	TIE0: .ASCIZ /ERROR #0 - BUS ERROR AT CSR ADDRESS/
	005527	117	122	040	
	005532	043	060	040	
	005535	055	040	102	
	005540	125	123	040	
	005543	105	122	122	
	005546	117	122	040	
	005551	101	124	040	
	005554	103	123	122	
	005557	040	101	104	
	005562	104	122	105	
	005565	123	123	000	
1085	005570	105	122	122	TIE1: .ASCIZ /ERROR #1 - BUS ERROR AT QIR ADDRESS/
	005573	117	122	040	
	005576	043	061	040	
	005601	055	040	102	
	005604	125	123	040	
	005607	105	122	122	
	005612	117	122	040	
	005615	101	124	040	
	005620	121	111	122	
	005623	040	101	104	
	005626	104	122	105	
	005631	123	123	000	

GLOBAL TEXT SECTION

1087	005634	105	122	122	T1E2: .ASCIZ /ERROR #2 - BUS ERROR AT TPR ADDRESS/
	005637	117	122	040	
	005642	043	062	040	
	005645	055	040	102	
	005650	125	123	040	
	005653	105	122	122	
	005656	117	122	040	
	005661	101	124	040	
	005664	124	120	122	
	005667	040	101	104	
	005672	104	122	105	
	005675	123	123	000	
1088	005700	105	122	122	T1E3: .ASCIZ /ERROR #3 - BUS ERROR AT DC319 ADDRESS/
	005703	117	122	040	
	005706	043	063	040	
	005711	055	040	102	
	005714	125	123	040	
	005717	105	122	122	
	005722	117	122	040	
	005725	101	124	040	
	005730	104	102	063	
	005733	061	071	040	
	005736	101	104	104	
	005741	122	105	123	
	005744	123	000		

GLOBAL TEXT SECTION

1090	005746	105	122	122	TIE4: .ASCIIZ /ERROR #4 BUS ERROR AT NEC7201 ADDRESS/
	005751	117	122	040	
	005754	043	064	040	
	005757	055	040	102	
	005762	125	123	040	
	005765	105	122	122	
	005770	117	122	040	
	005773	101	124	040	
	005776	116	105	103	
	006001	067	062	060	
	006004	061	040	101	
	006007	104	104	122	
	006012	105	123	123	
	006015	000			
1091	006016	105	122	122	TIE5: .ASCIIZ /ERROR #5 - BUS ERROR AT I8254 ADDRESS/
	006021	117	122	040	
	006024	043	065	040	
	006027	055	040	102	
	006032	125	123	040	
	006035	105	122	122	
	006040	117	122	040	
	006043	101	124	040	
	006046	111	070	062	
	006051	065	064	040	
	006054	101	104	104	
	006057	122	105	123	
	006062	123	000		

GLOBAL TEXT SECTION

1093	006064	105	122	122	T1E6: .ASCIZ /ERROR #6 BUS ERROR AT Z8036 ADDRESS/
	006067	117	122	040	
	006072	043	066	040	
	006075	055	040	102	
	006100	125	123	040	
	006103	105	122	122	
	006106	117	122	040	
	006111	101	124	040	
	006114	132	070	060	
	006117	063	066	040	
	006122	101	104	104	
	006125	122	105	123	
	006130	123	000		
1094	006132	105	122	122	T1E7: .ASCIZ /ERROR #7 BUS ERROR AT Z8016 ADDRESS/
	006135	117	122	040	
	006140	043	067	040	
	006143	055	040	102	
	006146	125	123	040	
	006151	105	122	122	
	006154	117	122	040	
	006157	101	124	040	
	006162	132	070	060	
	006165	061	066	040	
	006170	101	104	104	
	006173	122	105	123	
	006176	123	000		

GLOBAL TEXT SECTION

1096	006200	105	122	122	T2E0: .ASCIZ /ERROR #0 - BUS ERROR AT NATIVE RAM ADDRESS/
	006203	117	122	040	
	006206	043	060	040	
	006211	055	040	102	
	006214	125	123	040	
	006217	105	122	122	
	006222	117	122	040	
	006225	101	124	040	
	006230	116	101	124	
	006233	111	126	105	
	006236	040	122	101	
	006241	115	040	101	
	006244	104	104	122	
	006247	105	123	123	
	006252	000			
1097	006253	105	122	122	T2E1: .ASCIZ /ERROR #1 - WRITE-READ ERROR, NATIVE RAM/
	006256	117	122	040	
	006261	043	061	040	
	006264	055	040	127	
	006267	122	111	124	
	006272	105	055	122	
	006275	105	101	104	
	006300	040	105	122	
	006303	122	117	122	
	006306	054	040	116	
	006311	101	124	111	
	006314	126	105	040	
	006317	122	101	115	
	006322	000			

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GLOBAL TEXT SECTION

1099	006323	105	122	122	T2E2: .ASCIZ /ERROR #2 - READ-MODIFY-WRITE, NATIVE RAM/
	006326	117	122	040	
	006331	043	062	040	
	006334	055	040	122	
	006337	105	101	104	
	006342	055	115	117	
	006345	104	111	106	
	006350	131	055	127	
	006353	122	111	124	
	006356	105	054	040	
	006361	116	101	124	
	006364	111	126	105	
	006367	040	122	101	
	006372	115	000		
1100	006374	105	122	122	T2E3: .ASCIZ /ERROR #3 - READ-MODIFY-WRITE (LO BYTE), NATIVE RAM/
	006377	117	122	040	
	006402	043	063	040	
	006405	055	040	122	
	006410	105	101	104	
	006413	055	115	117	
	006416	104	111	106	
	006421	131	055	127	
	006424	122	111	124	
	006427	105	040	050	
	006432	114	117	040	
	006435	102	131	124	
	006440	105	051	054	
	006443	040	116	101	
	006446	124	111	126	
	006451	105	040	122	
	006454	101	115	000	

GLOBAL TEXT SECTION

1102	006457	105	122	122	T2E4: .ASCIZ /ERROR #4 - READ MODIFY-WRITE (HI BYTE), NATIVE RAM/
	006462	117	122	040	
	006465	043	064	040	
	006470	055	040	122	
	006473	105	101	104	
	006476	055	115	117	
	006501	104	111	106	
	006504	131	055	127	
	006507	122	111	124	
	006512	105	040	050	
	006515	110	111	040	
	006520	102	131	124	
	006523	105	051	054	
	006526	040	116	101	
	006531	124	111	126	
	006534	105	040	122	
	006537	101	115	000	
1103	006542	105	122	122	T2E5: .ASCIZ /ERROR #5 - BUS ERROR AT USER RAM ADDRESS/
	006545	117	122	040	
	006550	043	065	040	
	006553	055	040	102	
	006556	125	123	040	
	006561	105	122	122	
	006564	117	122	040	
	006567	101	124	040	
	006572	125	123	105	
	006575	122	040	122	
	006600	101	115	040	
	006603	101	104	104	
	006606	122	105	123	
	006611	123	000		

GLOBAL TEXT SECTION

1105	006613	105	122	122	T2E6:	.ASCIZ	/ERROR #6 - WRITE-READ ERROR, USER RAM/
	006616	117	122	040			
	006621	043	066	040			
	006624	055	040	127			
	006627	122	111	124			
	006632	105	055	122			
	006635	105	101	104			
	006640	040	105	122			
	006643	122	117	122			
	006646	054	040	125			
	006651	123	105	122			
	006654	040	122	101			
	006657	115	000				
1106	006661	105	122	122	T2E7:	.ASCIZ	/ERROR #7 - READ-MOD-WRITE, USER RAM/
	006664	117	122	040			
	006667	043	067	040			
	006672	055	040	122			
	006675	105	101	104			
	006700	055	115	117			
	006703	104	055	127			
	006706	122	111	124			
	006711	105	054	040			
	006714	125	123	105			
	006717	122	040	122			
	006722	101	115	000			

GLOBAL TEXT SECTION

1108	006725	105	122	122	T2E8:	.ASCIZ	/ERROR #8 - READ-MOD-WRITE (LO BYTE), USER RAM/
	006730	117	122	040			
	006733	043	070	040			
	006736	055	040	122			
	006741	105	101	104			
	006744	055	115	117			
	006747	104	055	127			
	006752	122	111	124			
	006755	105	040	050			
	006760	114	117	040			
	006763	102	131	124			
	006766	105	051	054			
	006771	040	125	123			
	006774	105	122	040			
	006777	122	101	115			
	007002	000					
1109	007003	105	122	122	T2E9:	.ASCIZ	/ERROR #9 - READ-MOD-WRITE (HI BYTE), USER RAM/
	007006	117	122	040			
	007011	043	070	040			
	007014	055	040	122			
	007017	105	101	104			
	007022	055	115	117			
	007025	104	055	127			
	007030	122	111	124			
	007033	105	040	050			
	007036	110	111	040			
	007041	102	131	124			
	007044	105	051	054			
	007047	040	125	123			
	007052	105	122	040			
	007055	122	101	115			
	007060	000					

GLOBAL TEXT SECTION

1111	007061	105	122	122	T3E0:	.ASCIZ	/ERROR #0 - LO BYTE CHECKSUM ERROR, NATIVE ROM/
	007064	117	122	040			
	007067	043	060	040			
	007072	055	040	114			
	007075	117	040	102			
	007100	131	124	105			
	007103	040	103	110			
	007106	105	103	113			
	007111	123	125	115			
	007114	040	105	122			
	007117	122	117	122			
	007122	054	040	116			
	007125	101	124	111			
	007130	126	105	040			
	007133	122	117	115			
	007136	000					
1112	007137	105	122	122	T3E1:	.ASCIZ	/ERROR #1 - HI BYTE CHECKSUM ERROR, NATIVE ROM/
	007142	117	122	040			
	007145	043	061	040			
	007150	055	040	110			
	007153	111	040	102			
	007156	131	124	105			
	007161	040	103	110			
	007164	105	103	113			
	007167	123	125	115			
	007172	040	105	122			
	007175	122	117	122			
	007200	054	040	116			
	007203	101	124	111			
	007206	126	105	040			
	007211	122	117	115			
	007214	000					

GLOBAL TEXT SECTION

1114	007215	105	122	122	T3E2: .ASCII /ERROR #2 - USER ROM LO BYTE CHECKSUM ERROR OR ROM NOT PRESENT/
	007220	117	122	040	
	007223	043	062	040	
	007226	055	040	125	
	007231	123	105	122	
	007234	040	122	117	
	007237	115	040	114	
	007242	117	040	102	
	007245	131	124	105	
	007250	040	103	110	
	007253	105	103	113	
	007256	123	125	115	
	007261	040	105	122	
	007264	122	117	122	
	007267	040	117	122	
	007272	040	122	117	
	007275	115	040	116	
	007300	117	124	040	
	007303	120	122	105	
	007306	123	105	116	
	007311	124	000		
1115	007313	105	122	122	T3E3: .ASCII /ERROR #3 - USER ROM HI BYTE CHECKSUM ERROR OR ROM NOT PRESENT/
	007316	117	122	040	
	007321	043	063	040	
	007324	055	040	125	
	007327	123	105	122	
	007332	040	122	117	
	007335	115	040	110	
	007340	111	040	102	
	007343	131	124	105	
	007346	040	103	110	
	007351	105	103	113	
	007354	123	125	115	
	007357	040	105	122	
	007362	122	117	122	
	007365	040	117	122	
	007370	040	122	117	
	007373	115	040	116	
	007376	117	124	040	
	007401	120	122	105	
	007404	123	105	116	
	007407	124	000		

GLOBAL TEXT SECTION

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1117 007411 052 052 040 T5E0: .ASCIIZ /** ROM IN VECTOR SPACE - SELFTEST #5 SKIPPED **/
      007414 122 117 115
      007417 040 111 116
      007422 040 126 105
      007425 103 124 117
      007430 122 040 123
      007433 120 101 103
      007436 105 040 055
      007441 040 123 105
      007444 114 106 124
      007447 105 123 124
      007452 040 043 065
      007455 040 123 113
      007460 111 120 120
      007463 105 104 040
      007466 052 052 000
1118 007471 105 122 122 T5E1: .ASCIIZ /ERROR #1 - CLOCK INTERRUPT LEVEL INCORRECT/
      007474 117 122 040
      007477 043 061 040
      007502 055 040 103
      007505 114 117 103
      007510 113 040 111
      007513 116 124 105
      007516 122 122 125
      007521 120 124 040
      007524 114 105 126
      007527 105 114 040
      007532 111 116 103
      007535 117 122 122
      007540 105 103 124
      007543 000

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GLOBAL TEXT SECTION

1120	007544	105	122	122	T5E2:	.ASCIZ	/ERROR #2 - CLOCK DOESN'T INTERRUPT/
	007547	117	122	040			
	007552	043	062	040			
	007555	055	040	103			
	007560	114	117	103			
	007563	113	040	104			
	007566	117	105	123			
	007571	116	047	124			
	007574	040	111	116			
	007577	124	105	122			
	007602	122	125	120			
	007605	124	000				
1121	007607	105	122	122	T5E3:	.ASCIZ	/ERROR #3 - CAN'T SHUT CLOCK OFF/
	007612	117	122	040			
	007615	043	063	040			
	007620	055	040	103			
	007623	101	116	047			
	007626	124	040	123			
	007631	110	125	124			
	007634	040	103	114			
	007637	117	103	113			
	007642	040	117	106			
	007645	106	000				

GLOBAL TEXT SECTION

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1123 007647 052 052 040 T6E0: .ASCIZ /* * SELF TEST 06 INTERRUPTS NOT TESTED ROM IN VECTOR SPACE * */
      007652 123 105 114
      007655 106 124 105
      007660 123 124 040
      007663 043 066 040
      007666 111 116 124
      007671 105 122 122
      007674 125 120 124
      007677 123 040 116
      007702 117 124 040
      007705 124 105 123
      007710 124 105 104
      007713 040 055 040
      007716 122 117 115
      007721 040 111 116
      007724 040 126 105
      007727 103 124 117
      007732 122 040 123
      007735 120 101 103
      007740 105 040 052
      007743 052 000
1124 007745 105 122 122 T6E1: .ASCIZ /ERROR 01 - XMTR INTERRUPT NOT MASKED AT LEVEL 4/
      007750 117 122 040
      007753 043 061 040
      007756 055 040 130
      007761 115 124 122
      007764 040 111 116
      007767 124 105 122
      007772 122 125 120
      007775 124 040 116
      010000 117 124 040
      010003 115 101 123
      010006 113 105 104
      010011 040 101 124
      010014 040 114 105
      010017 126 105 114
      010022 040 064 000

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GLOBAL TEXT SECTION

1126	010025	105	122	122	T6E3:	.ASCIIZ	/ERROR #2	XMR INTERRUPT NOT RECEIVED/
	010030	117	122	040				
	010033	043	062	040				
	010036	055	040	130				
	010041	115	124	122				
	010044	040	111	116				
	010047	124	105	122				
	010052	122	125	120				
	010055	124	040	116				
	010060	117	124	040				
	010063	122	105	103				
	010066	105	111	126				
	010071	105	104	000				
1127	010074	105	122	122	T6E3:	.ASCIIZ	/ERROR #3	RCVR INTERRUPT NOT MASKED AT LEVEL 4/
	010077	117	122	040				
	010102	043	063	040				
	010105	055	040	122				
	010110	103	126	122				
	010113	040	111	116				
	010116	124	105	122				
	010121	122	125	120				
	010124	124	040	116				
	010127	117	124	040				
	010132	115	101	123				
	010135	113	105	104				
	010140	040	101	124				
	010143	040	114	105				
	010146	126	105	114				
	010151	040	064	000				

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GLOBAL TEXT SECTION

1129	010154	105	122	122	T6E4: .ASCIZ /ERROR #4 - RCVR INTERRUPT NOT RECEIVED/
	010157	117	122	040	
	010162	043	064	040	
	010165	055	040	122	
	010170	103	126	122	
	010173	040	111	116	
	010176	124	105	122	
	010201	122	125	120	
	010204	124	040	116	
	010207	117	124	040	
	010212	122	105	103	
	010215	105	111	126	
	010220	105	104	000	
1130	010223	105	122	122	T6E5: .ASCIZ /ERROR #5 - RECEIVED DATA INCORRECT/
	010226	117	122	040	
	010231	043	065	040	
	010234	055	040	122	
	010237	105	103	105	
	010242	111	126	105	
	010245	104	040	104	
	010250	101	124	101	
	010253	040	111	116	
	010256	103	117	122	
	010261	122	105	103	
	010264	124	000		

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GLOBAL TEXT SECTION

1132	010266	105	122	122	T6E6: .ASCIZ /ERROR #6 - NO RCVR DONE -- LOOPBACK OPEN/
	010271	117	122	040	
	010274	043	066	040	
	010277	055	040	116	
	010302	117	040	122	
	010305	103	126	122	
	010310	040	104	117	
	010313	116	105	040	
	010316	055	055	040	
	010321	114	117	117	
	010324	120	102	101	
	010327	103	113	040	
	010332	117	120	105	
	010335	116	000		
1133	010337	052	052	040	T7E0: .ASCIZ /** ROM IN VECTOR SPACE - SELFTEST #7 SKIPPED **/
	010342	122	117	115	
	010345	040	111	116	
	010350	040	126	105	
	010353	103	124	117	
	010356	122	040	123	
	010361	120	101	103	
	010364	105	040	055	
	010367	040	123	105	
	010372	114	106	124	
	010375	105	123	124	
	010400	040	043	067	
	010403	040	123	113	
	010406	111	120	120	
	010411	105	104	040	
	010414	052	052	000	

GLOBAL TEXT SECTION

1135	010417	105	122	122	T7E1: .ASCIZ /ERROR #1 - T8254 TIMER #2 (800 HZ) DOESN'T INTERRUPT/
	010422	117	122	040	
	010425	043	061	040	
	010430	055	040	111	
	010433	070	062	065	
	010436	064	040	124	
	010441	111	115	105	
	010444	122	040	043	
	010447	062	040	050	
	010452	070	060	060	
	010455	040	110	132	
	010460	051	040	104	
	010463	117	105	123	
	010466	116	047	124	
	010471	040	111	116	
	010474	124	105	122	
	010477	122	125	120	
	010502	124	000		
1136	010504	105	122	122	T7E2: .ASCIZ /ERROR #2 - ASYNC MODE, DATA XFER INCOMPLETE/
	010507	117	122	040	
	010512	043	062	040	
	010515	055	040	101	
	010520	123	131	116	
	010523	103	040	115	
	010526	117	104	105	
	010531	054	040	104	
	010534	101	124	101	
	010537	040	130	106	
	010542	105	122	040	
	010545	111	116	103	
	010550	117	115	120	
	010553	114	105	124	
	010556	105	000		

GLOBAL TEXT SECTION

1138	010560	105	122	122	T7E3: .ASCIZ /ERROR #3 - SYNC MODE, EOF-SDLC NOT RECEIVED/
	010563	117	122	040	
	010566	043	063	040	
	010571	055	040	123	
	010574	131	116	103	
	010577	040	115	117	
	010602	104	105	054	
	010605	040	105	117	
	010610	106	055	123	
	010613	104	114	103	
	010616	040	116	117	
	010621	124	040	122	
	010624	105	103	105	
	010627	111	126	105	
	010632	104	000		
1139	010634	105	122	122	T7E4: .ASCIZ /ERROR #4 - SYNC MODE, DATA XFER INCOMPLETE/
	010637	117	122	040	
	010642	043	064	040	
	010645	055	040	123	
	010650	131	116	103	
	010653	040	115	117	
	010656	104	105	054	
	010661	040	104	101	
	010664	124	101	040	
	010667	130	106	105	
	010672	122	040	111	
	010675	116	103	117	
	010700	115	120	114	
	010703	105	124	105	
	010706	000			

GLOBAL TEXT SECTION

1141	010707	105	122	122	T7E5: .ASCIZ "ERROR #5 SYNC/ASync MODES - RECEIVED DATA INCORRECT"
	010712	117	122	040	
	010715	043	065	040	
	010720	055	040	123	
	010723	131	116	103	
	010726	057	101	123	
	010731	131	116	103	
	010734	040	115	117	
	010737	104	105	123	
	010742	040	055	040	
	010745	122	105	103	
	010750	105	111	126	
	010753	105	104	040	
	010756	104	101	124	
	010761	101	040	111	
	010764	116	103	117	
	010767	122	122	105	
	010772	103	124	000	
1142	010775	105	122	122	T7E6: .ASCIZ /ERROR #6 - DMA MODE - DATA TRANSFER INCOMPLETE/
	011000	117	122	040	
	011003	043	066	040	
	011006	055	040	104	
	011011	115	101	040	
	011014	115	117	104	
	011017	105	040	055	
	011022	040	104	101	
	011025	124	101	040	
	011030	124	122	101	
	011033	116	123	106	
	011036	105	122	040	
	011041	111	116	103	
	011044	117	115	120	
	011047	114	105	124	
	011052	105	000		

GLOBAL TEXT SECTION

1144	011054	105	122	122	T7E7:	.ASCIZ	/ERROR #7 - DMA MODE - RECEIVED DATA INCORRECT/
	011057	117	122	040			
	011062	043	067	040			
	011065	055	040	104			
	011070	115	101	040			
	011073	115	117	104			
	011076	105	040	055			
	011101	040	122	105			
	011104	103	105	111			
	011107	126	105	104			
	011112	040	104	101			
	011115	124	101	040			
	011120	111	116	103			
	011123	117	122	122			
	011126	105	103	124			
	011131	000					
1145	011132	105	122	122	T7E8:	.ASCIZ	/ERROR #8 - STATUS WRONG OR NO INTERRUPT WITH REQ-TO-SEND SET/
	011135	117	122	040			
	011140	043	070	040			
	011143	055	040	123			
	011146	124	101	124			
	011151	125	123	040			
	011154	127	122	117			
	011157	116	107	040			
	011162	117	122	040			
	011165	116	117	040			
	011170	111	116	124			
	011173	105	122	122			
	011176	125	120	124			
	011201	040	127	111			
	011204	124	110	040			
	011207	122	105	121			
	011212	055	124	117			
	011215	055	123	105			
	011220	116	104	040			
	011223	123	105	124			
	011226	000					

GLOBAL TEXT SECTION

1147	011227	105	122	122	T7E9: .ASCIZ "ERROR #9 - STATUS WRONG OR NO INTERRUPT WITH TI108/2 SET"
	011232	117	122	040	
	011235	043	071	040	
	011240	055	040	123	
	011243	124	101	124	
	011246	125	123	040	
	011251	127	122	117	
	011254	116	107	040	
	011257	117	122	040	
	011262	116	117	040	
	011265	111	116	124	
	011270	105	122	122	
	011273	125	120	124	
	011276	040	127	111	
	011301	124	110	040	
	011304	124	124	061	
	011307	060	070	057	
	011312	062	040	123	
	011315	105	124	000	
1148	011320	105	122	122	T7E10: .ASCIZ "ERROR #10 - STATUS WRONG OR NO INT. WITH TERM-IN-SERV SET"
	011323	117	122	040	
	011326	043	061	060	
	011331	040	055	040	
	011334	123	124	101	
	011337	124	125	123	
	011342	040	127	122	
	011345	117	116	107	
	011350	040	117	122	
	011353	040	116	117	
	011356	040	111	116	
	011361	124	056	040	
	011364	127	111	124	
	011367	110	040	124	
	011372	105	122	115	
	011375	055	111	116	
	011400	055	123	105	
	011403	122	126	040	
	011406	123	105	124	
	011411	000			

GLOBAL TEXT SECTION

1150	011412	105	122	122	T7E11: .ASCIZ /ERROR #11 - STATUS WRONG WITH ALL OPTIONS DESELECTED/
	011415	117	122	040	
	011420	043	061	061	
	011423	040	055	040	
	011426	123	124	101	
	011431	124	125	123	
	011434	040	127	122	
	011437	117	116	107	
	011442	040	127	111	
	011445	124	110	040	
	011450	101	114	114	
	011453	040	117	120	
	011456	124	111	117	
	011461	116	123	040	
	011464	104	105	123	
	011467	105	114	105	
	011472	103	124	105	
	011475	104	000		
1151	011477	052	052	040	T10E0: .ASCIZ /** ROM IN VECTOR SPACE - SELFTEST #10 SKIPPED **/
	011502	122	117	115	
	011505	040	111	116	
	011510	040	126	105	
	011513	103	124	117	
	011516	122	040	123	
	011521	120	101	103	
	011524	105	040	055	
	011527	040	123	105	
	011532	114	106	124	
	011535	105	123	124	
	011540	040	043	061	
	011543	060	040	123	
	011546	113	111	120	
	011551	120	105	104	
	011554	040	052	052	
	011557	000			

GLOBAL TEXT SECTION

1153	011560	105	122	122	T10E1: .ASCII7 /ERROR #1 - RESET STATE INCORRECT/
	011563	117	122	040	
	011566	043	061	040	
	011571	055	040	122	
	011574	105	123	105	
	011577	124	040	123	
	011602	124	101	124	
	011605	105	040	111	
	011610	116	103	117	
	011613	122	122	105	
	011616	103	124	000	
1154	011621	105	122	122	T10E2: .ASCII7 /ERROR #2 - TIMER DIDN'T START/
	011624	117	122	040	
	011627	043	062	040	
	011632	055	040	124	
	011635	111	115	105	
	011640	122	040	104	
	011643	111	104	116	
	011646	047	124	040	
	011651	123	124	101	
	011654	122	124	000	

GLOBAL TEXT SECTION

1156	011657	105	122	122	T10E3: .ASCIZ /ERROR #3 - TIMER NEVER STOPS/
	011662	117	122	040	
	011665	043	063	040	
	011670	055	040	124	
	011673	111	115	105	
	011676	122	040	116	
	011701	105	126	105	
	011704	122	040	123	
	011707	124	117	120	
	011712	123	000		
1157	011714	105	122	122	T10E4: .ASCIZ /ERROR #4 - INTERRUPT NOT MASKED AT LEVEL 4/
	011717	117	122	040	
	011722	043	064	040	
	011725	055	040	111	
	011730	116	124	105	
	011733	122	122	125	
	011736	120	124	040	
	011741	116	117	124	
	011744	040	115	101	
	011747	123	113	105	
	011752	104	040	101	
	011755	124	040	114	
	011760	105	126	105	
	011763	114	040	064	
	011766	000			

GLOBAL TEXT SECTION

1159	011767	105	122	122	T10E5: .ASCIZ /ERROR #5 - TIMER INTERRUPT NOT RECEIVED/
	011772	117	122	040	
	011775	043	065	040	
	012000	055	040	124	
	012003	111	115	105	
	012006	122	040	111	
	012011	116	124	105	
	012014	122	122	125	
	012017	120	124	040	
	012022	116	117	124	
	012025	040	122	105	
	012030	103	105	111	
	012033	126	105	104	
	012036	000			
1160	012037	105	122	122	T10E6: .ASCIZ /ERRCR #6 - LOOP TIME-OUT, DATA XFER INCOMPLETE/
	012042	117	122	040	
	012045	043	066	040	
	012050	055	040	114	
	012053	117	117	120	
	012056	040	124	111	
	012061	115	105	055	
	012064	117	125	124	
	012067	054	040	104	
	012072	101	124	101	
	012075	040	130	106	
	012100	105	122	040	
	012103	111	116	103	
	012106	117	115	120	
	012111	114	105	124	
	012114	105	000		

GLOBAL TEXT SECTION

1162	012116	105	122	122	T10E7: .ASCIIZ /ERROR 07 - RECEIVED DATA INCORRECT/
	012121	117	122	040	
	012124	043	067	040	
	012127	055	040	122	
	012132	105	103	105	
	012135	111	126	105	
	012140	104	040	104	
	012143	101	124	101	
	012146	040	111	116	
	012151	103	117	122	
	012154	122	105	103	
	012157	124	000		
1163	012161	052	052	040	T11E0: .ASCIIZ /** SELFTEST 011 INTERRUPTS NOT TESTED - ROM IN VECTOR SPACE /**
	012164	123	105	114	
	012167	106	124	105	
	012172	123	124	040	
	012175	043	061	061	
	012200	040	111	116	
	012203	124	105	122	
	012206	122	125	120	
	012211	124	123	040	
	012214	116	117	124	
	012217	040	124	105	
	012222	123	124	105	
	012225	104	040	055	
	012230	040	122	117	
	012233	115	040	111	
	012236	116	040	126	
	012241	105	103	124	
	012244	117	122	040	
	012247	123	120	101	
	012252	103	105	040	
	012255	052	052	000	

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SEG 0080

GLOBAL TEXT SECTION

1165	012260	052	052	040	T11E1: .ASCIZ /** SELFTEST 011 151 11 BUS ACCESS NOT TESTED NO ADDRESS DEFINED **/
	012263	123	105	114	
	012266	106	124	105	
	012271	103	124	040	
	012274	043	061	061	
	012277	040	114	123	
	012302	111	055	061	
	012305	061	040	102	
	012310	125	123	040	
	012313	101	103	103	
	012316	105	123	123	
	012321	040	116	117	
	012324	124	040	124	
	012327	105	123	124	
	012332	105	104	040	
	012335	055	040	116	
	012340	117	040	101	
	012343	104	104	122	
	012346	105	123	123	
	012351	040	104	105	
	012354	106	111	116	
	012357	105	104	040	
	012362	052	052	000	
1166	012365	105	122	122	T11E2: .ASCIZ /ERROR 02 - CHANNEL INTERRUPT NOT RECEIVED/
	012370	117	122	040	
	012373	043	062	040	
	012376	055	040	103	
	012401	110	101	116	
	012404	116	105	114	
	012407	040	111	116	
	012412	124	105	122	
	012415	122	125	120	
	012420	124	040	116	
	012423	117	124	040	
	012426	122	105	103	
	012431	105	111	126	
	012434	105	104	000	

07

SEQ 0081

GLOBAL TEXT SECTION

1168	012437	105	122	122	T11E3: .ASCIZ /ERROR #3 - DMA CHANNEL HUNG (TC,EOP BITS BOTH CLEAR)/
	012442	117	122	040	
	012445	043	063	040	
	012450	055	040	104	
	012453	115	101	040	
	012456	103	110	101	
	012461	116	116	105	
	012464	114	040	110	
	012467	125	116	107	
	012472	040	050	124	
	012475	103	054	105	
	012500	117	120	040	
	012503	102	111	124	
	012506	123	040	102	
	012511	117	124	110	
	012514	040	103	114	
	012517	105	101	122	
	012522	051	000		
1169	012524	105	122	122	T11E4: .ASCIZ /ERROR #4 - DMA ABORTED (EOP * 1 = NXM)/
	012527	117	122	040	
	012532	043	064	040	
	012535	055	040	104	
	012540	115	101	040	
	012543	101	102	117	
	012546	122	124	105	
	012551	104	040	050	
	012554	105	117	120	
	012557	040	075	040	
	012562	061	040	075	
	012565	040	116	130	
	012570	115	051	000	

GLOBAL TEXT SECTION

1171	012573	105	122	122	T11E5: .ASCIZ /ERROR #5 - DMA DATA ERROR/
	012576	117	122	040	
	012601	043	065	040	
	012604	055	040	104	
	012607	115	101	040	
	012612	104	101	124	
	012615	101	040	105	
	012620	122	122	117	
	012623	122	000		
1172	012625	052	052	040	T12E0: .ASCIZ /** LSI-11 BUS ADDRESS NOT DEFINED - SELFTEST #12 SKIPPED **/
	012630	114	123	111	
	012633	055	061	061	
	012636	040	102	125	
	012641	123	040	101	
	012644	104	104	122	
	012647	105	123	123	
	012652	040	116	117	
	012655	124	040	104	
	012660	105	106	111	
	012663	116	105	104	
	012666	040	055	040	
	012671	123	105	114	
	012674	106	124	105	
	012677	123	124	040	
	012702	043	061	062	
	012705	040	123	113	
	012710	111	120	120	
	012713	105	104	040	
	012716	052	052	000	

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GLOBAL TEXT SECTION

1174	012721	105	122	122	T12E1: .ASCIZ /ERROR #1 - BREQ (CSR<14>) NEVER GOT SET/
	012724	117	122	040	
	012727	043	061	040	
	012732	055	040	102	
	012735	122	105	121	
	012740	040	050	103	
	012743	123	122	074	
	012746	061	064	076	
	012751	051	040	116	
	012754	105	126	105	
	012757	122	040	107	
	012762	117	124	040	
	012765	123	105	124	
	012770	000			
1175	012771	052	052	040	T12E2: .ASCIZ /** SELFTEST #12 SKIPPED - ROM IN VECTOR SPACE **/
	012774	123	105	114	
	012777	106	124	105	
	013002	123	124	040	
	013005	043	061	062	
	013010	040	123	113	
	013013	111	120	120	
	013016	105	104	040	
	013021	055	040	122	
	013024	117	115	040	
	013027	111	116	040	
	013032	126	105	103	
	013035	124	117	122	
	013040	040	123	120	
	013043	101	103	105	
	013046	040	052	052	
	013051	000			

GLOBAL TEXT SECTION

1177	013052	105	122	122	T12E3: .ASCIZ /ERROR #3 - INTERRUPT-ON-BIACK NOT MASKED AT PR5/
	013055	117	122	040	
	013060	043	063	040	
	013063	055	040	111	
	013066	116	124	105	
	013071	122	122	125	
	013074	120	124	055	
	013077	117	116	055	
	013102	102	111	101	
	013105	103	113	040	
	013110	116	117	124	
	013113	040	115	101	
	013116	123	113	105	
	013121	104	040	101	
	013124	124	040	120	
	013127	122	065	000	
1178	013132	105	122	122	T12E4: .ASCIZ /ERROR #4 - INTERRUPT-ON-BIACK NOT RECEIVED/
	013135	117	122	040	
	013140	043	064	040	
	013143	055	040	111	
	013146	116	124	105	
	013151	122	122	125	
	013154	120	124	055	
	013157	117	116	055	
	013162	102	111	101	
	013165	103	113	040	
	013170	116	117	124	
	013173	040	122	105	
	013176	103	105	111	
	013201	126	105	104	
	013204	000			

GLOBAL TEXT SECTION

1180	013205	105	122	122	T12E5: .ASCIZ /ERROR #5 - BIACK DIDN'T CLEAR BREQ (CSR<14>)/
	013210	117	122	040	
	013213	043	065	040	
	013216	055	040	102	
	013221	111	101	103	
	013224	113	040	104	
	013227	111	104	116	
	013232	047	124	040	
	013235	103	114	105	
	013240	101	122	040	
	013243	102	122	105	
	013246	121	040	050	
	013251	103	123	122	
	013254	074	061	064	
	013257	076	051	000	
1181	013262	105	122	122	T12E6: .ASCIZ /ERROR #6 - BRESET TRAP THRU 24 DIDN'T OCCUR/
	013265	117	122	040	
	013270	043	066	040	
	013273	055	040	102	
	013276	122	105	123	
	013301	105	124	040	
	013304	124	122	101	
	013307	120	040	124	
	013312	110	122	125	
	013315	040	062	064	
	013320	040	104	111	
	013323	104	116	047	
	013326	124	040	117	
	013331	103	103	125	
	013334	122	000		

GLOBAL TEXT SECTION

1183	013336	105	122	122	T13E0: .ASCIZ /ERROR #0 - LOCAL TPR WRITE-READ ERROR/
	013341	117	122	040	
	013344	043	060	040	
	013347	055	040	114	
	013352	117	103	101	
	013355	114	040	124	
	013360	120	122	040	
	013363	127	122	111	
	013366	124	105	055	
	013371	122	105	101	
	013374	104	040	105	
	013377	122	122	117	
	013402	122	000		
1184	013404	105	122	122	T13E1: .ASCIZ /ERROR #1 - BUS ERROR ON LSI-11 BUS TPR READ/
	013407	117	122	040	
	013412	043	061	040	
	013415	055	040	102	
	013420	125	123	040	
	013423	105	122	122	
	013426	117	122	040	
	013431	117	116	040	
	013434	114	123	111	
	013437	055	061	061	
	013442	040	102	125	
	013445	123	040	124	
	013450	120	122	040	
	013453	122	105	101	
	013456	104	000		

GLOBAL TEXT SECTION

1186	013460	105	122	122	T13E2: .ASCIZ /ERROR #2 - NON-ZERO DATA RETURNED ON LSI-11 BUS READ/
	013463	117	122	040	
	013466	043	062	040	
	013471	055	040	116	
	013474	117	116	055	
	013477	132	105	122	
	013502	117	040	104	
	013505	101	124	101	
	013510	040	122	105	
	013513	124	125	122	
	013516	116	105	104	
	013521	040	117	116	
	013524	040	114	123	
	013527	111	055	061	
	013532	061	040	102	
	013535	125	123	040	
	013540	122	105	101	
	013543	104	000		
1187	013545	052	052	040	T13E3: .ASCIZ "*** TEST #13 BUS WRITES/INTERRUPTS NOT TESTED - ROM IN VECTOR SPACE **
	013550	124	105	123	
	013553	124	040	043	
	013556	061	063	040	
	013561	102	125	123	
	013564	040	127	122	
	013567	111	124	105	
	013572	123	057	111	
	013575	116	124	105	
	013600	122	122	125	
	013603	120	124	123	
	013606	040	116	117	
	013611	124	040	124	
	013614	105	123	124	
	013617	105	104	040	
	013622	055	040	122	
	013625	117	115	040	
	013630	111	116	040	
	013633	126	105	103	
	013636	124	117	122	
	013641	040	123	120	
	013644	101	103	105	
	013647	040	052	052	
	013652	000			

GLOBAL TEXT SECTION

1189	013653	105	122	122	T13E4: .ASCIZ /ERROR #4 BUS ERROR ON WRTE TO TPR WORD 0/
	013656	117	122	040	
	013661	043	064	040	
	013664	055	040	102	
	013667	125	123	040	
	013672	105	122	122	
	013675	117	122	040	
	013700	117	116	040	
	013703	127	122	111	
	013706	124	105	040	
	013711	124	117	040	
	013714	124	120	122	
	013717	040	127	117	
	013722	122	104	040	
	013725	060	000		
1190	013727	105	122	122	T13E5: .ASCIZ /ERROR #5 - TPR COMMAND INTERRUPT DIDN'T OCCUR/
	013732	117	122	040	
	013735	043	065	040	
	013740	055	040	124	
	013743	120	122	040	
	013746	103	117	115	
	013751	115	101	116	
	013754	104	040	111	
	013757	116	124	105	
	013762	122	122	125	
	013765	120	124	040	
	013770	104	111	104	
	013773	116	047	124	
	013776	040	117	103	
	014001	103	125	122	
	014004	000			

GLOBAL TEXT SECTION

1192	014005	105	122	122	T13E6: .ASCIIZ "ERROR #6 - LSI 11 BUS WRITE AND/OR INTERRUPTS WITH TPR DISABLED"
	014010	117	122	040	
	014013	043	066	040	
	014016	055	040	114	
	014021	123	111	055	
	014024	061	061	040	
	014027	102	125	123	
	014032	040	127	122	
	014035	111	124	105	
	014040	040	101	116	
	014043	104	057	117	
	014046	122	040	111	
	014051	116	124	105	
	014054	122	122	125	
	014057	120	124	123	
	014062	040	127	111	
	014065	124	110	040	
	014070	124	120	122	
	014073	040	104	111	
	014076	123	101	102	
	014101	114	105	104	
	014104	000			
1193	014105	105	122	122	T13E7: .ASCIIZ /ERROR #7 - LSI-11 BUS WRITE DIDN'T TIME OUT/
	014110	117	122	040	
	014113	043	067	040	
	014116	055	040	114	
	014121	123	111	055	
	014124	061	061	040	
	014127	102	125	123	
	014132	040	127	122	
	014135	111	124	105	
	014140	040	104	111	
	014143	104	116	047	
	014146	124	040	124	
	014151	111	115	105	
	014154	040	117	125	
	014157	124	000		

GLOBAL TEXT SECTION

1195	014161	105	122	122	T13E8: .ASCIZ /ERROR #8 - LSI-11 BUS WRITE TIMED OUT/
	014164	117	122	040	
	014167	043	070	040	
	014172	055	040	114	
	014175	123	111	055	
	014200	061	061	040	
	014203	102	125	123	
	014206	040	127	122	
	014211	111	124	105	
	014214	040	124	111	
	014217	115	105	104	
	014222	040	117	125	
	014225	124	000		
1196	014227	105	122	122	T13E9: .ASCIZ /ERROR #9 - TPR INTERRUPT 4 NOT RECEIVED/
	014232	117	122	040	
	014235	043	071	040	
	014240	055	040	124	
	014243	120	122	040	
	014246	111	116	124	
	014251	105	122	122	
	014254	125	120	124	
	014257	040	064	040	
	014262	116	117	124	
	014265	040	122	105	
	014270	103	105	111	
	014273	126	105	104	
	014276	000			

GLOBAL TEXT SECTION

1198	014277	105	122	122	T13E10: .ASCIZ /ERROR #10 - TPR INTERRUPT 8 NOT RECEIVED/
	014302	117	122	040	
	014305	043	061	060	
	014310	040	055	040	
	014313	124	120	122	
	014316	040	111	116	
	014321	124	105	122	
	014324	122	125	120	
	014327	124	040	070	
	014332	040	116	117	
	014335	124	040	122	
	014340	105	103	105	
	014343	111	126	105	
	014346	104	000		
1199	014350	105	122	122	T13E11: .ASCIZ /ERROR #11 - TPR INTERRUPT 12 NOT RECEIVED/
	014353	117	122	040	
	014356	043	061	061	
	014361	040	055	040	
	014364	124	120	122	
	014367	040	111	116	
	014372	124	105	122	
	014375	122	125	120	
	014400	124	040	061	
	014403	062	040	116	
	014406	117	124	040	
	014411	122	105	103	
	014414	105	111	126	
	014417	105	104	000	

GLOBAL TEXT SECTION

1201
1202
1203
1204
1205

014422			
014422			
014422	113	130	124
014425	061	061	103
014430	101	000	

```

; NAMES OF DEVICES SUPPORTED BY PROGRAM
;
;   DEVTYPE <KXT11CA>
L$DVTYP::
;   .ASCIZ 'KXT11CA'

; .EVEN

```

1206
1210
1213
1214
1215

014432			
014432			
014432	103	116	113
014435	124	103	101
014440	040	113	130
014443	124	061	061
014446	055	103	101
014451	040	114	123
014454	111	055	061
014457	061	040	102
014462	125	123	040
014465	104	111	101
014470	107	116	117
014473	123	124	111
014476	103	000	

```

; TEST DESCRIPTION
;
;   DESCRIPT <CNKTCA KXT11-CA LSI-11 BUS DIAGNOSTIC>
L$DESC::
;   .ASCIZ 'CNKTCA KXT11-CA LSI-11 BUS DIAGNOSTIC'

; .EVEN

```

1216
1223

GLOBAL TEXT SECTION

```

1225
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1227
1228
1229 014500 045 116 045 NUREG: .ASCIZ /#N#ANXM ADDRESS IS #06#N#
      014503 101 116 130
      014506 115 040 101
      014511 104 104 122
      014514 105 123 123
      014517 040 111 123
      014522 040 045 117
      014525 066 045 116
      014530 000
1230 014531 045 116 045 ROMSG: .ASCIZ /#N#T#A ERROR(S);#N#N#
      014534 124 045 101
      014537 040 105 122
      014542 122 117 122
      014545 050 123 051
      014550 072 045 116
      014553 045 116 000
1231 014556 045 101 040 ROMETX: .ASCIZ /#A #T#N#
      014561 040 040 045
      014564 124 045 116
      014567 000
1232 014570 045 116 045 TESTID: .ASCIZ /#N#ATHE #T#A TEST DID NOT COMPLETE ON IOP #Z2#N#N#
      014573 101 124 110
      014576 105 040 045
      014601 124 045 101
      014604 040 124 105
      014607 123 124 040
      014612 104 111 104
      014615 040 116 117
      014620 124 040 103
      014623 117 115 120
      014626 114 105 124
      014631 105 040 117
      014634 116 040 111
      014637 117 120 040
      014642 043 045 132
      014645 062 045 116
      014650 045 116 000

```

GLOBAL TEXT SECTION

1234	014653	045	124	045	TESTERR; .ASCIIZ /#T#A TEST FAILED ON IOP #72#N/
	014656	101	040	124	
	014661	105	123	124	
	014664	040	106	101	
	014667	111	114	105	
	014672	104	040	117	
	014675	116	040	111	
	014700	117	120	040	
	014703	043	045	132	
	014706	062	045	116	
	014711	000			
1235	014712	045	116	045	NOINFO; .ASCIIZ /#N#A <NO FURTHER ERROR INFORMATION AVAILABLE>#N/
	014715	101	011	074	
	014720	116	117	040	
	014723	106	125	122	
	014726	124	110	105	
	014731	122	040	105	
	014734	122	122	117	
	014737	122	040	111	
	014742	116	106	117	
	014745	122	115	101	
	014750	124	111	117	
	014753	116	040	101	
	014756	126	101	111	
	014761	114	101	102	
	014764	114	105	076	
	014767	045	116	000	

GLOBAL TEXT SECTION

1237	014772	045	116	045	DROP: .ASCIZ /#N#A KXT11-CA #Z2#A DROPPED FROM TESTING,#N/
	014775	101	011	113	
	015000	130	124	061	
	015003	061	055	103	
	015006	101	040	043	
	015011	045	132	062	
	015014	045	101	040	
	015017	104	122	117	
	015022	120	120	105	
	015025	104	040	106	
	015030	122	117	115	
	015033	040	124	105	
	015036	123	124	111	
	015041	116	107	056	
	015044	045	116	000	
1238	015047	045	116	045	SWITCH: .ASCIZ "#N#ABOOT/SELFTTEST SWITCH ON IOP #Z2#A NOT SET FOR XXDP.#N"
	015052	101	102	117	
	015055	117	124	057	
	015060	123	105	114	
	015063	106	124	105	
	015066	123	124	040	
	015071	123	127	111	
	015074	124	103	110	
	015077	040	117	116	
	015102	040	111	117	
	015105	120	040	043	
	015110	045	132	062	
	015113	045	101	040	
	015116	116	117	124	
	015121	040	123	105	
	015124	124	040	106	
	015127	117	122	040	
	015132	130	130	104	
	015135	120	053	045	
	015140	116	000		

GLOBAL TEXT SECTION

1240	015142	045	116	045	CMNDR: .ASCIZ /*N*ACOMMAND STATUS ERROR FROM IOP /*Z2*A AFTER LAST COMMAND*/
	015145	101	103	117	
	015150	115	115	101	
	015153	116	104	040	
	015156	123	124	101	
	015161	124	125	123	
	015164	040	105	122	
	015167	122	117	122	
	015172	040	106	122	
	015175	117	115	040	
	015200	111	117	120	
	015203	040	043	045	
	015206	132	062	045	
	015211	101	040	101	
	015214	106	124	105	
	015217	122	040	114	
	015222	101	123	124	
	015225	040	103	117	
	015230	115	115	101	
	015233	116	104	045	
	015236	116	000		
1241	015240	045	116	045	NOTST: .ASCIZ /*N*AIOP /*Z2*A *T*/
	015243	101	111	117	
	015246	120	040	043	
	015251	045	132	062	
	015254	045	101	040	
	015257	045	124	045	
	015262	116	000		

GLOBAL TEXT SECTION

1243	015264	045	101	123	SETSW: .ASCIZ /#ASET SWITCH TO POSITION 10./
	015267	105	124	040	
	015272	123	127	111	
	015275	124	103	110	
	015300	040	124	117	
	015303	040	120	117	
	015306	123	111	124	
	015311	111	117	116	
	015314	040	061	060	
	015317	056	000		
1244	015321	045	116	045	NOTCLR: .ASCIZ /#N#A1OP #Z2#A NOT READY TO ACCEPT COMMANDS#N/
	015324	101	111	117	
	015327	120	040	043	
	015332	045	132	062	
	015335	045	101	040	
	015340	116	117	124	
	015343	040	122	105	
	015346	101	104	131	
	015351	040	124	117	
	015354	040	101	103	
	015357	103	105	120	
	015362	124	040	103	
	015365	117	115	115	
	015370	101	116	104	
	015373	123	045	116	
	015376	000			

GLOBAL TEXT SECTION

1246	015377	045	116	045	TPR:	.ASCIZ	/*N*ATWO-PORT RAM ON IOP #Z2*A IS DISABLED./
	015402	101	124	127			
	015405	117	055	120			
	015410	117	122	124			
	015413	040	122	101			
	015416	115	040	117			
	015421	116	040	111			
	015424	117	120	040			
	015427	043	045	132			
	015432	062	045	101			
	015435	040	111	123			
	015440	040	104	111			
	015443	123	101	102			
	015446	114	105	104			
	015451	056	000				
1247	015453	045	116	045	TPR1:	.ASCIZ	/*N*ACHECK LEDS ON IOP #Z2*A FOR ERROR CODE.*N/
	015456	101	103	110			
	015461	105	103	113			
	015464	040	114	105			
	015467	104	123	040			
	015472	117	116	040			
	015475	111	117	120			
	015500	040	043	045			
	015503	132	062	045			
	015506	101	040	106			
	015511	117	122	040			
	015514	105	122	122			
	015517	117	122	040			
	015522	103	117	104			
	015525	105	056	045			
	015530	116	000				

GLOBAL TEXT SECTION

1249	015532	045	116	045	SLOT: .ASCIZ /%N%AENSURE BACKPLANE DMA GRANT CONTINUITY/%N/
	015535	101	105	116	
	015540	123	125	122	
	015543	105	040	102	
	015546	101	103	113	
	015551	120	114	101	
	015554	116	105	040	
	015557	104	115	101	
	015562	040	107	122	
	015565	101	116	124	
	015570	040	103	117	
	015573	116	124	111	
	015576	116	125	111	
	015601	124	131	045	
	015604	116	000		
1250	015606	045	116	045	INTACK: .ASCIZ /%N%AENSURE BACKPLANE INTERRUPT ACKNOWLEDGE CONTINUITY/%N/
	015611	101	105	116	
	015614	123	125	122	
	015617	105	040	102	
	015622	101	103	113	
	015625	120	114	101	
	015630	116	105	040	
	015633	111	116	124	
	015636	105	122	122	
	015641	125	120	124	
	015644	040	101	103	
	015647	113	116	117	
	015652	127	114	105	
	015655	104	107	105	
	015660	040	103	117	
	015663	116	124	111	
	015666	116	125	111	
	015671	124	131	045	
	015674	116	000		

GLOBAL TEXT SECTION

1252	015676	045	116	045	INITNG: .ASCIZ /*N*A	...REINITIALIZING TOP /*Z2*A. PLEASE WAIT/*N/*N/
	015701	101	011	056		
	015704	056	056	056		
	015707	122	105	111		
	015712	116	111	124		
	015715	111	101	114		
	015720	111	132	111		
	015723	116	107	040		
	015726	111	117	120		
	015731	040	043	045		
	015734	132	062	045		
	015737	101	056	040		
	015742	040	120	114		
	015745	105	101	123		
	015750	105	040	127		
	015753	101	111	124		
	015756	045	116	045		
	015761	116	000			
1253	015763	045	101	011	INITOK: .ASCIZ /*A	INITIALIZATION COMPLETE... STARTING TESTS./*N/*N/
	015766	111	116	111		
	015771	124	111	101		
	015774	114	111	132		
	015777	101	124	111		
	016002	117	116	040		
	016005	103	117	115		
	016010	120	114	105		
	016013	124	105	056		
	016016	056	056	040		
	016021	123	124	101		
	016024	122	124	111		
	016027	116	107	040		
	016032	124	105	123		
	016035	124	123	056		
	016040	045	110	045		
	016043	116	000			
1254	016045	045	101	040	TSTNO: .ASCIZ /*A *T*A . IOP /*Z2/	
	016050	045	124	045		
	016053	101	040	055		
	016056	040	111	117		
	016061	120	040	043		
	016064	045	132	062		
	016067	000				
1255					.EVEN	
1256						
1267						
1268						

GLOBAL ERROR REPORT SECTION

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1301
1302
1303
1304

016070
016070
016070 013704 002214
016074
016074 010446
016076 010246
016100 012746 014653
016104 012746 000003
016110 010600
016112 104414
016114 062706 000010
016120 032703 007777
016124 001507
016126 010304
016130 042704 007777
016134 012702 177772
016140 006104
016142 005202
016144 001375
016146 022704 000022
016152 001010
016154
016154 012746 015532
016160 012746 000001
016164 010600
016166 104415
016170 062706 000004
016174 022704 000024
016200 001010
016202
016202 012746 015606
016206 012746 000001
016212 010600
016214 104415
016216 062706 000004

```

.SBTTL GLOBAL ERROR REPORT SECTION

; **
; THE GLOBAL ERROR REPORT SECTION CONTAINS MESSAGE PRINTING AREAS
; USED BY MORE THAN ONE TEST TO OUTPUT ADDITIONAL ERROR INFORMATION. PRINTB
; (BASIC) AND PRINTX (EXTENDED) CALLS ARE USED TO CALL PRINT SERVICES.
; **

RTERR:; BGNMSG RTERR
MOV IOPNN,R4 ; GET SBC ID SWITCH NUMBER
PRINTB #TSTERR,R2,R4 ; PRINT TEST IDENTIFICATION
MOV R4,-(SP)
MOV R2,-(SP)
MOV #TSTERR,-(SP)
MOV #3,-(SP)
MOV SP,R0
TRAP C#PNTB
ADD #10,SP
BIT #7777,R3 ; CHECK FOR EXTENDED INFO
BEQ 7$ ; BRANCH, IF NO EXTENDED INFO
MOV R3,R4 ; SAVE ROM TEST # AND ERROR BITS
BIC #7777,R4 ; STRIP OFF THE TEST #
MOV #6,R2 ; SETUP COUNTER FOR TEST NUMBER
1$: ROL R4 ; PUT TEST NUMBER IN BITS 3 - 0
INC R2
BNE 1$ ; BRANCH, IF NOT DONE SHIFTING

2$: CMP #22,R4 ; IS THE FAILING TEST "TEST #11"?
BNE 3$ ; BRANCH, IF NOT TEST 11 (DMA TEST)
PRINTX #SLOT ; PRINT DMA CONTINUITY MESSAGE
MOV #SLOT,-(SP)
MOV #1,-(SP)
MOV SP,R0
TRAP C#PNTX
ADD #4,SP

3$: CMP #24,R4 ; IS THE FAILING TEST "TEST #12"?
BNE 4$ ; BRANCH, IF NOT TEST 12 (QIR TEST)
PRINTX #INTACK ; PRINT INTERRUPT ACK CONTINUITY MESSAGE
MOV #INTACK,-(SP)
MOV #1,-(SP)
MOV SP,R0
TRAP C#PNTX
ADD #4,SP
    
```

GLOBAL ERROR REPORT SECTION

```

1306 016222 062704 002270      4$:  ADD    #T1ADR-2,R4      ; COMPUTE TEST # ASCII STRING ADDRESS
1307 016226 017405 000000      MOV    @R4,R5           ; GET STRING ADDRESS AND PUT IN R5
1308 016232                                PRINTX #ROMSG,R5       ; PRINT "ERROR(S):" MESSAGE
      016232 010546      MOV    R5,(SP)
      016234 012746 014531      MOV    #ROMSG,-(SP)
      016240 012746 000002      MOV    #2,-(SP)
      016244 010600      MOV    SP,R0
      016246 104415      TRAP   C$PNTX
      016250 062706 000006      ADD    #6,SP
1309 016254 011405      MOV    (R4),R5         ; SETUP R5 FOR LATER USE
1310 016256 010304      MOV    R3,R4          ; GET TEST # AND ERROR BITS AGAIN
1311 016260 042704 170000      BIC    #170000,R4     ; STRIP OFF ERROR BITS
1312 016264 012703 000001      MOV    #1,R3         ; SETUP FOR BIT TESTING
1313 016270 012702 000001      MOV    #1,R2         ; SETUP BIT POSITION COUNTER
1314
1315 016274 030304      5$:  BIT    R3,R4         ; CHECK FOR AN ERROR BIT SET
1316 016276 001414      BEQ    6$            ; BP, IF NONE IN THIS POSITION
1317 016300 010201      MOV    R2,R1         ; PUT BIT POSITION COUNT IN R1
1318 016302 006301      ASL    R1            ; MAKE IT WORD ADDRESSABLE
1319 016304 060501      ADD    R5,R1         ; INDEX TO ERROR BIT MESSAGE ADDRESS
1320 016306                                PRINTX #ROMETX,(R1)   ; PRINT ERROR NUMBER AND I.D.
      016306 011146      MOV    (R1),-(SP)
      016310 012746 014556      MOV    #ROMETX,-(SP)
      016314 012746 000002      MOV    #2,-(SP)
      016320 010600      MOV    SP,R0
      016322 104415      TRAP   C$PNTX
      016324 062706 000006      ADD    #6,SP
1321
1322 016330 006303      6$:  ASL    R3            ; SHIFT TO NEXT POSITION..AND
1323 016332 005202      INC    R2            ; INCREMENT BIT POSITION COUNT
1324 016334 020227 000015      CMP    R2,#13       ; CHECK FOR ALL BITS CHECKED.
1325 016340 001355      BNE    5$            ; BRANCH, IF NOT ALL 12 BITS CHECKED
1326 016342 000410      BR     8$            ; EXIT THE PRINT ROUTINE
1327
1328 016344                                7$:  PRINTX #NOINFO      ; PRINT NO MORE INFO AVAILABLE
      016344 012746 014712      MOV    #NOINFO,-(SP)
      016350 012746 000001      MOV    #1,-(SP)
      016354 010600      MOV    SP,R0
      016356 104415      TRAP   C$PNTX
      016360 062706 000004      ADD    #4,SP
1329 016364                                8$:  ENDMSG
      016364                                L10002: TRAP   C$MSG
      016364 104423

```

GLOBAL ERROR REPORT SECTION

1331					
1332	016366				
	016366				
1333	016366				
	016366	010146			
	016370	012746	014500		
	016374	012746	000002		
	016400	010600			
	016402	104414			
	016404	062706	000006		
1334	016410				
	016410				
	016410	104423			
1335					
1336	016412				
	016412				
1337	016412	013704	002214		
1338	016416				
	016416	010446			
	016420	010246			
	016422	012746	014570		
	016426	012746	000003		
	016432	010600			
	016434	104414			
	016436	062706	000010		
1339	016442				
	016442				
	016442	104423			
1340					
1341	016444				
	016444				
1342	016444	013704	002214		
1343	016450				
	016450	010446			
	016452	010246			
	016454	012746	014653		
	016460	012746	000003		
	016464	010600			
	016466	104414			
	016470	062706	000010		
1344	016474				
	016474	010346			
	016476	012746	014556		
	016502	012746	000002		
	016506	010600			
	016510	104415			
	016512	062706	000006		
1345	016516				
	016516				
	016516	104423			

```

BGNMSG  NXM
NXM::
PRINTB  #NOREG,R1
MOV     R1,-(SP)
MOV     #NOREG,-(SP)
MOV     #2,-(SP)
MOV     SP,R0
TRAP   C$PNTB
ADD     #6,SP
ENDMSG

L10003:
TRAP   C$MSG

BGNMSG  NPES
NRES::
MOV     IOPNN,R4
PRINTB  #TESTID,R2,R4
MOV     R4,-(SP)
MOV     R2,-(SP)
MOV     #TESTID,-(SP)
MOV     #3,-(SP)
MOV     SP,R0
TRAP   C$PNTB
ADD     #10,SP
ENDMSG

L10004:
TRAP   C$MSG

BGNMSG  GENMSG
GENMSG::
MOV     IOPNN,R4
PRINTB  #TSTERR,R2,R4
MOV     R4,-(SP)
MOV     R2,-(SP)
MOV     #TSTERR,-(SP)
MOV     #3,-(SP)
MOV     SP,R0
TRAP   C$PNTB
ADD     #10,SP
PRINTX  #ROMETX,R3
MOV     R3,-(SP)
MOV     #ROMETX,-(SP)
MOV     #2,-(SP)
MOV     SP,R0
TRAP   C$PNTX
ADD     #6,SP
ENDMSG

L10005:
TRAP   C$MSG

```

GLOBAL ERROR REPORT SECTION

1347	016520				BGNMSG	SOFT	
	016520				SOFT::		
1348	016520	013704	002214		MOV	IOPNN,R4	; GET CURRENT IOP NUMBER
1349	016524				PRINTB	#SWITCH,R4	
	016524	010446			MOV	R4,-(SP)	
	016526	012746	015047		MOV	#SWITCH,-(SP)	
	016532	012746	000002		MOV	#2,-(SP)	
	016536	010600			MOV	SP,R0	
	016540	104414			TRAP	C#PNTB	
	016542	062706	000006		ADD	#6,SP	
1350	016546				PRINTX	#SETSW	
	016546	012746	015264		MOV	#SETSW,-(SP)	
	016552	012746	000001		MOV	#1,-(SP)	
	016556	010600			MOV	SP,R0	
	016560	104415			TRAP	C#PNTX	
	016562	062706	000004		ADD	#4,SP	
1351	016566				ENDMSG		
	016566				L10006:		
	016566	104423			TRAP	C#MSG	
1352							
1353	016570				BGNMSG	CMDERR	
	016570				CMDERR::		
1354	016570	013704	002214		MOV	IOPNN,R4	; GET CURRENT IOP NUMBER
1355	016574				PRINTB	#CMNDR,R4	
	016574	010446			MOV	R4,-(SP)	
	016576	012746	015142		MOV	#CMNDR,-(SP)	
	016602	012746	000002		MOV	#2,-(SP)	
	016606	010600			MOV	SP,R0	
	016610	104414			TRAP	C#PNTB	
	016612	062706	000006		ADD	#6,SP	
1356	016616				ENDMSG		
	016616				L10007:		
	016616	104423			TRAP	C#MSG	
1357							
1358	016620				BGNMSG	NONO	
	016620				NONO::		
1359	016620	013704	002214		MOV	IOPNN,R4	; GET CURRENT IOP NUMBER
1360	016624				PRINTB	#NOTCLR,R4	
	016624	010446			MOV	R4,-(SP)	
	016626	012746	015321		MOV	#NOTCLR,-(SP)	
	016632	012746	000002		MOV	#2,-(SP)	
	016636	010600			MOV	SP,R0	
	016640	104414			TRAP	C#PNTB	
	016642	062706	000006		ADD	#6,SP	
1361	016646				ENDMSG		
	016646				L10010:		
	016646	104423			TRAP	C#MSG	

GLOBAL ERROR REPORT SECTION

```

1363
1364 016650
1365 016650 013704 002214
1366 016654 010446 015377
1367 016654 012746 000002
1368 016656 012746 000002
1369 016662 010600
1370 016666 010414
1371 016670 062706 000006
1372 016672 010446 015457
1373 016676 012746 000002
1374 016700 010600
1375 016710 104415
1376 016712 062706 000006
1377 016714 104423
1378 016720
1379 016720
1380 016722 013704 002214
1381 016726 010246
1382 016730 010446 015240
1383 016732 012746 000003
1384 016736 010600
1385 016742 010414
1386 016744 104414
1387 016746 062706 000010
1388 016752 000205

```

```

BGNMSG TPRDIS
TPRDIS:
MOV IOPNN,R4 ; GET CURRENT IOP NUMBER
PRINTB @TPR,R4 ; PRINT TWO-PORT RAM DISABLED
MOV R4,-(SP)
MOV @TPR,-(SP)
MOV @2,-(SP)
MOV SP,R0
TRAP C#PNTB
ADD @6,SP
PRINTX @TPR1,R4 ; PRINT CHECK THE LEDS
MOV R4,-(SP)
MOV @TPR1,-(SP)
MOV @2,-(SP)
MOV SP,R0
TRAP C#PNTX
ADD @6,SP
ENDMSG
L10011:
TRAP C#MSG
...
SUBROUTINE TO PRINT MESSAGES FOR TESTS THAT ARE SKIPPED.
THESE MESSAGES ARE NOT ERROR MESSAGES; FOR INFO ONLY.
CALL:
MOV @MSGADDRESS,R2
JSR R5,SKIPED
...
SKIPED:
MOV IOPNN,R4 ; GET CURRENT IOP NUMBER
PRINTB @NOTST,R4,R2
MOV R2,-(SP)
MOV R4,-(SP)
MOV @NOTST,-(SP)
MOV @3,-(SP)
MOV SP,R0
TRAP C#PNTB
ADD @10,SP
RTS R5 ; RETURN

```

GLOBAL SUBROUTINES SECTION

```

1401          .SBTL  GLOBAL SUBROUTINES SECTION
1402
1403          ;**
1404          ; THE GLOBAL SUBROUTINES SECTION CONTAINS THE SUBROUTINES
1405          ; THAT ARE USED IN MORE THAN ONE TEST.
1406          ;
1407
1408          ;**
1409          ;
1410          ; FUNCTIONAL DESCRIPTION:
1411          ;
1412          ;   SUBROUTINE TO DELAY IN MILLISECONDS.
1413          ;
1414          ;   CALL:
1415          ;
1416          ;   JSR      R5,RDELAY          ; DELAY IN MILLISECONDS
1417          ;   N.
1418          ;**
1419
1420 016754 010146  RDELAY: MOV      R1,-(SP)          ; SAVE REGS 1 & 2 ON STACK
1421 016756 010246          MOV      R2,-(SP)
1422 016760 012502          MOV      (R5)+,R2          ; GET MILLISECOND ARGUMENT
1423 016762 012737 000144 002236 1$: MOV      #100.,DELCNT          ; SETUP COUNT FOR 1 MS LOOP
1424
1425 016770 013701 002236 2$: MOV      DELCNT,R1          ; SETUP R1 FOR 1 MS LOOP
1426 016774          BREAK          ; ALLOWS <CTRL-C> RECOGNITION
1427 016774 104422          TRAP     C#BRK
1428 017000 005301 3$: DEC      R1          ; START OF 1 MS LOOP
1429 017002 005302          BNE     3$          ; BRANCH, IF < 1 MS
1430 017004 001371          DEC      R2          ; DECREMENT MULTIPLIER (WHICH YOU WANT)
1431 017006 012602          BNE     2$          ; DO ANOTHER MS, IF BRANCH
1432 017010 012601          MOV      (SP)+,R2          ; RESTORE R1 AND R2
1433 017012 000205          MOV      (SP)+,R1
1434          RTS      R5          ; RETURN

```

GLOBAL SUBROUTINES SECTION

```

1435
1436
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1441
1442 017014 013701 002216 CKTPRO: MOV QBASE,R1 ; GET LSI-11 BASE BUS ADDRESS
1443 017020 004537 016754 JSR R5,RDELAY ; DELAY A BIT BEFORE READING TPRO
1444 017024 000372 250. ; ABOUT 250 MILLISECONDS
1445 017026 016102 000000 MOV DPRO(R1),R2 ; READ TPRO
1446 017032 001416 BEQ 1$ ; BR, IF IOP IS ALL SET FOR TESTING.
1447 017034 004537 017210 JSR R5,REINIT ; RE-INITIALIZE THE CURRENT IOP
1448 017040 000413 BR 1$ ; SUCCESS RETURN
1449
1450 017042 ERRDF 3,NOTRDY,NONO ; PRINT DEVICE FATAL
017042 104455 TRAP C#ERRDF
017044 000003 .WORD 3
017046 003264 .WORD NOTRDY
017050 016620 .WORD NONO
1451 017052 DODU LUN ; DROP THE UNIT FROM TESTING
017052 013700 002210 MOV LUN,R0
017056 104451 TRAP C#DODU
1452 017060 012737 177777 002206 MOV 0-1,DROPUN ; SET THE DROPPED UNIT FLAG AND GET OUT
1453 017066 DOCLN ; ABORT THE DIAGNOSTIC FOR THIS UNIT
017066 104444 TRAP C#DCLN
1454
1455 017070 016102 000002 1$: MOV DPR1(R1),R2 ; READ BOOT COMMAND STATUS REGISTER
1456 017074 042702 177770 BIC 0-10,R2 ; CLEAR ALL BUT BITS 2-0.
1457 017100 022702 000002 CMP 0002,R2 ; CHECK BOOT SWITCH..IF SET FOR XXDP.,
1458 ; ..COMMAND REGISTER SHOULD = 000002
1459 017104 001434 BEQ 3$ ; BR, IF THE SWITCH IS CORRECT
1460 017106 004537 017210 JSR R5,REINIT ; RE-INITIALIZE THE CURRENT IOP
1461 017112 000431 BR 3$ ; SUCCESS RETURN

```

GLOBAL SUBROUTINES SECTION

```

1463
1464 017114 016102 000002      MOV     DPR1(R1),R2      ; READ BOOT COMMAND STATUS REGISTER
1465 017120 001413             BEQ     2$              ; BR, IF TPR IS DISABLED (ERROR)
1466 017122             ERRSOFT 1,BADSW,SOFT ; SOFT ERROR, PRINT IT, AND THEN
      017122 104457             TRAP   C$ERSOFT
      017124 000001             .WORD 1
      017126 003151             .WORD BADSW
      017130 016520             .WORD SOFT
1467 017132             DODU    LUN                ; DROP THIS UNIT
      017132 013700 002210      MOV     LUN,R0
      017136 104451             TRAP   C$DODU
1468 017140 012737 177777 002206  MOV     *-1,DROPUN      ; SET DROPPED UNIT FLAG
1469 017146             DOCLN  ; ABORT THE DIAGNOSTIC FOR THIS UNIT
      017146 104444             TRAP   C$DCLN
1470
1471 017150             2$:    ERRDF  4,NOTPR,TPRDIS ; FATAL ERROR. TPR IS DISABLED
      017150 104455             TRAP   C$ERDF
      017152 000004             .WORD 4
      017154 003353             .WORD NOTPR
      017156 016650             .WORD TPRDIS
1472 017160             DODU    LUN                ; DROP THIS UNIT
      017160 013700 002210      MOV     LUN,R0
      017164 104451             TRAP   C$DODU
1473 017166 012737 177777 002206  MOV     *-1,DROPUN      ; SET DROPPED UNIT FLAG
1474 017174             DOCLN  ; ABORT THE DIAGNOSTIC FOR THIS UNIT
      017174 104444             TRAP   C$DCLN
1475
1476 017176 005061 000004      3$:    CLR     DPR2(R1)    ; CLEAR SELFTEST ERROR REGISTER
1477 017202 005061 000006      CLR     DPR3(R1)    ; CLEAR SELFTEST EXTENDED ERROR REGISTER
1478 017206 000205      4$:    RTS     R5      ; EXIT

```

GLOBAL SUBROUTINES SECTION

```

1480
1481
1482      : **
1483      :
1484      : SUBROUTINE REINIT
1485      :
1486      : CALLED WHENEVER TPRO OR TPR1 ARE NOT SETUP PROPERLY.
1487      :
1488      : CALL: JSR R5,REINIT
1489      :
1490      : RETURN: RETURN+4 IF ERROR IN INITIALIZING
1491      :         RETURN+2 IF SUCCESSFUL INITIALIZATION
1492      : --
1493 REINIT: MOV IOPNN,R4 ; GET CURRENT IOP NUMBER
1494         MOV QBASE,R1 ; GET Q-BUS BASE ADDRESS
1495         PRINTF @INITNG,R4 ; PRINT "...RE-INITIALIZING"
1496         MOV R4,-(SP)
1497         MOV @INITNG,-(SP)
1498         MOV @2,-(SP)
1499         MOV SP,R0
1500         TRAP C$PNTF
1501         ADD @6,SP
1502
1503         MOV @10,DPR3(R1) ; SETUP SOFTWARE BOOTSELECT CODE
1504         MOV @4,DPRO(R1) ; SEND INITIALIZE COMMAND
1505         JSR R5,RODELAY ; DELAY ABOUT 5 SECONDS
1506         MOV 6000,
1507         MOV DPRO(R1),R2 ; READ TPRO
1508         BEQ 2$ ; TPRO SHOULD NOW BE ALL 0'S
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GLOBAL SUBROUTINES SECTION

```

1513
1514      ;**
1515      ;
1516      ;       SUBROUTINE TO APPEND TEST TITLES TO TEST NUMBER IF
1517      ;       OPERATOR HAS SET THE "PNT" FLAG AT START TIME.
1518      ;
1519      ;       CALL:  MOV     #STRING,R2       ; TEST TITLE ADDRESS
1520      ;              JSR     R5,PNTFLG
1521      ;
1522      ;--
1523
1524      PNTFLG: RFLAGS  R4                ; READ DRS FLAGS
1525              TRAP   C$RFLA
1526              MOV    R0,R4
1527              BIT    @BIT9,R4          ; CHECK DRS BIT 9 FLAG (PNT)
1528              BEQ    1$                ; RETURN, IF PNT NOT SET
1529              MOV    IOPNN,R4          ; GET CURRENT IOP NUMBER
1530              PRINTF @TSTNO,R2,R4      ; PRINT TITLE, IOP # AFTER TEST NUMBER
1531              MOV    R4,-(SP)
1532              MOV    R2,-(SP)
1533              MOV    @TSTNO,-(SP)
1534              MOV    @3,-(SP)
1535              MOV    SP,R0
1536              TRAP  C$PNTF
1537              ADD   @10,SP
1538              RTS   R5                ; RETURN TO TEST
1539
1540      1$:

```

GLOBAL SUBROUTINES SECTION

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017402
017402

017402
017402
017402 104425

.TITLE MISCELLANEOUS SECTIONS
.SBTTL IDENTIFICATION
.SBTTL REPORT CODING SECTION
; **
; THE REPORT CODING SECTION CONTAINS THE
; "PRINTS" CALLS THAT GENERATE STATISTICAL REPORTS.
; **
BGNRPT
L\$RPT::

.EVEN
ENDRPT
L10012:
TRAP C\$RPT

PROTECTION TABLE

1645
1646
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017404
017404
017404 177777
017406 177777
017410 177777
017412

```
.SBITL PROTECTION TABLE  
; **  
; THIS TABLE IS USED BY THE RUNTIME SERVICES  
; TO PROTECT THE LOAD MEDIA.  
; **  
          BGNPROT  
L$PROT::  
          -1          ;OFFSET INTO P-TABLE FOR CSR ADDRESS  
          -1          ;OFFSET INTO P-TABLE FOR MASSBUS ADDRESS  
          -1          ;OFFSET INTO P-TABLE FOR DRIVE NUMBER  
          ENDPROT
```


INITIALIZE SECTION

```

1674          .SBTTL  INITIALIZE SECTION
1675
1676          ;**
1677          ; THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
1678          ; AT THE BEGINNING OF EACH PASS.
1679          ;
1680
1681          BGNINIT
1682          L$INIT::
1706
1707          017412          SETVEC  #140,#170000,#340          ;ODT ROM ADDRESS
1707          017412 012746 000340          MOV          #340,-(SP)
1707          017416 012746 170000          MOV          #170000,-(SP)
1707          017422 012746 000140          MOV          #140,-(SP)
1707          017426 012746 000003          MOV          #3,-(SP)
1707          017432 104437          TRAP         C$SVEC
1707          017434 062706 000010          ADD          #10,SP
1708
1709          017440          READEF  #EF,CONTINUE          ; CHECK FOR CONTINUED
1709          017440 012700 000036          MOV          #EF,CONTINUE,RO
1709          017444 104447          TRAP         C$REFG
1710          017446          BCOMPLETE          END          ; BRANCH, IF CONTINUED.
1710          017446 103517          BCS          END
1711
1712          017450 005037 002206          CLR          DROPUN          ; CLEAR THE DROPPED IOP FLAG
1713          017454          READEF  #EF,PWR          ; CHECK FOR POWER FAIL RESTART
1713          017454 012700 000034          MOV          #EF,PWR,RO
1713          017460 104447          TRAP         C$REFG
1714          017462          BCOMPLETE          ABORT          ; ABORT - NO SENSE TRYING TO GO ON.
1714          017462 103510          BCS          ABORT
1715          017464          READEF  #EF,NEW          ; CHECK FOR THIS PASS BEING A FIRST
1715          017464 012700 000035          MOV          #EF,NEW,RO
1715          017470 104447          TRAP         C$REFG
1716          017472          BNCOMPLETE          NEXT          ; BRANCH, IF NOT FIRST PASS
1716          017472 103011          BCC          NEXT
1717          017474 013737 002120 002242          MOV          L$HIME,HIMEM          ; GET HIGHEST 4KW PAGE FROM DRS.
1718          017502 162737 000577 002242          SUB          #577,HIMEM          ; ADJUST IT TO = START OF PAGE BEFORE..
1719          ; ...THE I/O PAGE.
1720          017510 012737 177777 002210          MOV          #-1,LUN          ; SETUP UNIT NUMBER FOR #0 MINUS 1
1721
1722          017516 005237 002210          NEXT:  INC          LUN          ; INCREMENT IOP CPU NUMBER
1723          017522 023737 002210 002012          CMP          LUN,L$UNIT          ; CHECK CURRENT AS LAST UNIT + 1
1724          017530 001465          BEQ          ABORT          ; BRANCH, IF DONE ALL IOPS.
1725          017532          GPHARD  LUN,R1          ; GET HW P-TABLE ADDRESS
1725          017532 013700 002210          MOV          LUN,RO
1725          017536 104442          TRAP         C$GPHRD
1725          017540 010001          MOV          RO,R1
1726          017542          BNCOMPLETE          NEXT          ; BRANCH, IF NO PTABLE FOR THIS LUN
1726          017542 103365          BCC          NEXT
    
```

INITIALIZE SECTION

```

1728 017544 012137 002212      MOV      (R1)+,IOPN      ; GET IOP CPU NUMBER
1729 017550 001455              BEQ      ABORT          ; BRANCH, IF THIS IS UNIT 0.
1730 017552 013737 002212 002214  MOV      IOPN,IOPNN     ; SAVE FOR PRINTOUTS
1731 017560 012702 177773      MOV      #-5,R2        ; SETUP SHIFT COUNTER
1732
1733 017564 006237 002214      1$:     ASR      IOPNN     ; SHIFT 5 RIGHT FOR PRINTOUTS
1734 017570 005202              INC      R2
1735 017572 001374              BNE     1$             ; BRANCH, IF NOT DONE SHIFTING
1736 017574 023727 002212 000340  CMP      IOPN,#340     ; SEE IF IOP NO. IS GREATER THAN 7
1737 017602 003004              BGT     2$             ; BRANCH IF NO. IS 8 OR MORE
1738 017604 012737 160000 002216  MOV      #160000,QBASE ; SET BASE ADDRESS FOR UNITS 0-7
1739 017612 000406              BR      3$             ; THEN ADD IN IOP NUMBER
1740
1741 017614 012737 175400 002216 2$:     MOV      #175400,QBASE ; SET BASE ADDRESS TO UNITS 8-15
1742 017622 042737 000400 002212  BIC     #400,IOPN     ; CLEAR BIT 8 OF NUMBER INPUT
1743
1744 017630 063737 002212 002216 3$:     ADD      IOPN,QBASE    ; COMBINE IOP # AND BASE ADDRESS
1745 017636 005721              TST     (R1)+         ; CHECK IF HIGH OR LOW RANGE WANTED
1746 017640 001003              BNE     4$             ; BRANCH, IF LOW RANGE WANTED
1747 017642 062737 002000 002216  ADD     #BIT10,QBASE  ; ADD IN 2000 TO GET HIGH RANGE
1748
1749 017650 012137 002222      4$:     MOV      (R1)+,LOOPB1  ; GET LOOP CONN FLAG FOR SLU1
1750 017654 012137 002224      MOV      (R1)+,LOOPB2 ; GET LOOP CONN FLAG FOR SLU2 CHANNEL A
1751 017660 012137 002226      MOV      (R1)+,LOOPB3 ; GET LOOP CONN FLAG FOR CHANNEL B
1752 017664 012137 002230      MOV      (R1)+,LOOPB4 ; GET LOOP CONN FLAG FOR PARALLEL I/O
1753 017670 012137 002232      MOV      (R1)+,SL2DMA ; GET SLU2 DMA CONFIGURATION
1754 017674 011137 002234      MOV      (R1),ROMTST  ; GET FLAG FOR USER ROM TEST
1755 017700              EXIT     INIT         ; EXIT THE INIT CODE
      017700 104432      TRAP    C$EXIT
      017702 000004      .WORD  L10014-.
1756
1757 017704              ABORT:  DOCLN         ; EXECUTE CLEANUP CODE
      017704 104444      TRAP    C$DCLN
1758 017706              END:
1759
1771
1772 017706              ENDINIT
      017706              L10014:
      017706 104411      TRAP    C$INIT

```

AUTODROP SECTION

```

1774          .SBTTL  AUTODROP SECTION
1775
1776          ;**
1777          ; THIS CODE IS EXECUTED IMMEDIATELY AFTER THE INITIALIZE CODE IF
1778          ; THE "ADR" FLAG WAS SET.  THE UNIT(S) UNDER TEST ARE CHECKED TO
1779          ; SEE IF THEY WILL RESPOND.  THOSE THAT DON'T ARE IMMEDIATELY
1780          ; DROPPED FROM TESTING.
1781          ;--
1782
1783 017710      BGNAUTO
1784 017710      L$AUTO::
1785
1786          ; THIS SECTION IS NOT USED.  RUN XXDP, TEST 1 TO CHECK FOR RESPONSE.
1787
1788          PRINTF  #NOSEC
1789          MOV      #NOSEC, -(SP)
1790          MOV      #1, -(SP)
1791          MOV      SP, R0
1792          TRAP    C$PNTF
1793          ADD     #4, SP
1794
1795          ENDAUTO
1796
1797          L10015: TRAP    C$AUTO
1798
1799          NOSEC: .ASCIZ  /*NWA"ADR" SWITCH NOT SUPPORTED.  RUN TEST 1 FOR RESPONSE CHECK.*/
1800
1801          017710  012746  017732
1802          017714  012746  000001
1803          017720  010600
1804          017722  104417
1805          017724  062706  000004
1806
1807          017730
1808          017730
1809          017730  104461
1810
1811          017732  045  116  045
1812          017735  101  042  101
1813          017740  104  122  042
1814          017743  040  123  127
1815          017746  111  124  103
1816          017751  110  040  116
1817          017754  117  124  040
1818          017757  123  125  120
1819          017762  120  117  122
1820          017765  124  105  104
1821          017770  056  040  040
1822          017773  122  125  116
1823          017776  040  124  105
1824          020001  123  124  040
1825          020004  061  040  106
1826          020007  117  122  040
1827          020012  122  105  123
1828          020015  120  117  116
1829          020020  123  105  040
1830          020023  103  110  105
1831          020026  103  113  056
1832          020031  045  116  000

```

CLEANUP CODING SECTION

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 1806 020034
 020034
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 1817 020034
 020034 104432
 020036 000002
 1818
 1830
 1831
 1832
 1833 020040
 020040
 020040 104412

```
.SBTTL CLEANUP CODING SECTION
;+
; THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
; AFTER THE HARDWARE TESTS HAVE BEEN PERFORMED.
;-
      BGNCLN
L$CLEAN::

      EXIT   CLN
      TRAP   C$EXIT
      .WORD  L10016-.

      .EVEN

      ENDCLN
L10016: TRAP   C$CLEAN
```

DROP UNIT SECTION

```

1835          .SBTTL DROP UNIT SECTION
1836
1837          ;**
1838          ; THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
1839          ; TO NO LONGER BE TESTED.
1840          ;**
1841
1842 020042          BGNDU
1843 020042          L$DU::
1844 020042 013701 002214          MOV      IOPNN,R1          ; GET IOP NUMBER
1845 020046          PRINTF #DROP,R1          ; PRINT IOP #N DROPPED
1846          020046 010146          MOV      R1,-(SP)
1847          020050 012746 014772          MOV      #DROP,-(SP)
1848          020054 012746 000002          MOV      #2,-(SP)
1849          020060 010600          MOV      SP,R0
1850          020062 104417          TRAP    C$PNTF
1851          020064 062706 000006          ADD     #6,SP
1852
1853          1846
1854 1847 020070          EXIT     DU
1855          020070 000167          .WORD  J$JMP
1856          020072 000000          .WORD  L10017-2-.
1857
1858          1848
1859          1860
1860          1861          .EVEN
1861          1862
1862 1863 020074          ENDDU
1863          020074          L10017:
1864          020074 104453          TRAP    C$DU

```

ADD UNIT SECTION

1865
 1866
 1867
 1868
 1869
 1870
 1871
 1872
 1873 020076
 020076
 1874
 1883
 1884 020076
 020076 000167
 020100 000000
 1885
 1897
 1898
 1899
 1900 020101
 020101
 020102 104452
 1901

ASBITU ADD UNIT SECTION

```

***
; THE ADD UNIT SECTION CONTAINS ANY CODE THE PROGRAMMER WISHES
; TO BE EXECUTED IN CONJUNCTION WITH THE ADDING OF A UNIT BACK
; TO THE TEST CYCLE.
;

```

```

          .BGN AU
L$AU:
          .EXIT AU
          .WORD J$JMP
          .WORD L10020 2 .

          .EVEN

          .END AU
L10020:
          TRAP C$AU

```

ADD UNIT SECTION

```

1903 .TITLE HARDWARE TESTS
1904 .SBTTL IDENTIFICATION
1910
1911
1912 .SBTTL TEST 1: VERIFY THAT THE IOP(S) IS ADDRESSABLE
1913
1914
1915 ;
1916 ; THE CURRENT IOP IS CHECKED FOR BEING PRESENT ON THE Q BUS BY REFERENCING
1917 ; ITS I/O PAGE ADDRESS. THE I/O ADDRESS IS THE LSI-11 BUS BASE ADDRESS PLUS
1918 ; THE IOP NUMBER. AN NXM WILL OCCUR IF THE IOP IS NOT PRESENT.
1919 ;
1920
1921 NXMVEC=4
1922 020104 BGNTST
1923 020104 012702 004663 MOV #TST1,R2 ; GET TITLE ADDRESS
1924 020110 004537 017336 JSR R5,PNTFLG ; SEE IF PNT FLAG IS SET
1925 ;1$: SETVEC #NXMVEC,#3,#, #PRI07 ; SETUP NXM VECTOR
1926 020114 1$: SETVEC #NXMVEC,#3,#, #PRI06 ; SETUP NXM VECTOR
    020114 012746 000300 MOV #PRI06,-(SP)
    020120 012746 020170 MOV #3,-(SP)
    020124 012746 000004 MOV #NXMVEC,-(SP)
    020130 012746 000003 MOV #3,-(SP)
    020134 104437 TRAP C#SVEC
    020136 062706 000010 ADD #10,SP
1927 020142 012702 177760 MOV # -20,R2 ; SETUP TPR REGISTER COUNTER
1928 020146 013701 002216 MOV QBASE,R1 ; IOP BASE ADDRESS TO R1
1929
1930 020152 2$: SETPRI #PRI00 ; LOWER PRIORITY FOR NXM
    020152 012700 000000 MOV #PRI00,R0
    020156 104441 TRAP C#SPRI
1931 020160 005721 TST (R1)+ ; REFERENCE AN IOP REGISTER
1932 020162 005202 INC R2 ; INCR. COUNTER...NO NXM AS YET
1933 020164 001372 BNE 2$ ; BRANCH, IF NOT DONE
1934 020166 000414 BR 4$ ; ALL REGISTERS ARE THERE.
1935
1936 ; A NXM INTERRUPT WILL END UP HERE FROM THE TRAP TO 4.
1937
1938 020170 022626 3$: CMP (SP)+,(SP)+ ; FIX THE STACK, SINCE NO RTI ISSUED
1939 020172 ERDF 1,NOIOP,NXM ; FATAL DEVICE ERROR
    020172 104455 TRAP C#ERDF
    020174 000001 .WORD 1
    020176 002756 .WORD NOIOP
    020200 016366 .WORD NXM
1940 020202 DODU LUN ; DROP THIS IOP
    020202 013700 002210 MOV LUN,R0
    020206 104451 TRAP C#DODU
1941 020210 012737 177777 002206 MOV # -1,DROPUN ; SET DROPPED UNIT FLAG
1942 020216 DOCLN
    020216 104444 TRAP C#DCLN

```

18 REV A-0
18 REV A-0

TEST 1: VERIFY THAT THE IOP(S) IS ADDRESSABLE

```

1944
1945
1946
1947
1948 020220 004537 017210      4$:   JSR     R5,REINIT      ; INITIALIZE THE CURRENT IOP
1949 020224 000240              NOP                          ; NORMALLY A SUCCESS RETURN...WE DON'T
1950
1951 020226 004537 017014              JSR     R5,CKTPRO       ; CARE IN THIS CASE.
1952
1953 020232              5$:   CKL OOP          ; NOW SEE IF THE IOP IS READY
      020232 104406      TRAP   C$CLP1          ; CHECK FOR LOOP ON TEST
1954 020234              CLRVEC  0NXMVEC          ; CLEAR AND RESTORE NXM VECTOR
      020234 012700 000004      MOV    0NXMVEC,RO
      020240 104436      TRAP   C$CVEC
1955 020242              ENDTST          ; DONE
      020242
1956 020242 104401      L10021: TRAP   C$ETST

```


TEST 1: VERIFY THAT THE IOP(S) IS ADDRESSABLE

```

1958
1959
1960          .SBTTL TEST 2: INVOKE ROM - RESIDENT TEST OF THE KXT11'S CSR REGS.
1961
1962          ;**
1963          ;
1964          ;           IOP SELFTEST #1.
1965          ;
1966          ; THE ROM TEST VERIFIES THAT THE INTERNAL KXT11 CSRA,B & C REGISTERS
1967          ; RESPOND.
1968          ;
1969          ;--
1970
1971 020244          BGNTST
1972 020244 012702 004721      MOV     #ROMT1,R2          ; GET TITLE ADDRESS
1973 020250 004537 017336      JSR     R5,PNTFLG        ; SEE IF PNT FLAG IS SET
1974 020254 005737 002206      TST     DROPUN          ; CHECK THIS UNIT FOR BEING DROPPED
1975 020260 001401          BEQ     1$              ; BRANCH, IF NOT DROPPED
1976 020262          DOCLN          ; THIS ONE IS DROPPED. FORGET IT.
      020262 104444          TRAP    C$DCLN
1977
1978 020264 004537 017014      1$:    JSR     R5,CKTPRO        ; SEE IF THE CURRENT IOP IS READY
1979 020270 013701 002216      MOV     QBASE,R1        ; R1 - IOP BASE ADDRESS
1980 020274 013761 002244 000000  MOV     CSR,DPRO(R1)     ; SEND COMMAND TO DPRO
1981
1982 020302 012704 140000      MOV     #140000,R4      ; R4 WILL BE USED AS A COUNTER
1983 020306 005761 000000      2$:    TST     DPRO(R1)    ; TEST THE IOP'S DPRO REG.
1984 020312 001423          BEQ     4$              ; BRANCH, IF THE TEST HAS COMPLETED
1985 020314 004537 016754      JSR     R5,RDELAY       ; DELAY ABOUT 1 MS
1986 020320 000001          1
1987 020322 005204          INC     R4              ; ERROR, IF R4 WRAPS TO 0
1988 020324 001370          BNE     2$              ; ERROR, IF NO BRANCH
1989 020326 012702 004145      MOV     #CSRT,R2        ; SETUP FOR ERROR REPORTING
1990 020332          ERROF          ; FATAL ERROR, NO RESPONSE FROM TEST.
      020332 104455          TRAP    C$EROF
      020334 000002          .WORD  2
      020336 003054          .WORD  NORES
      020340 016412          .WORD  NRES
1991 020342          CKLOOP          ; CHECK FOR LOOP ON TEST
      020342 104406          TRAP    C$CLP1
1992 020344          DODU          ; DROP THIS IOP
      020344 013700 002210      MOV     LUN,RO
      020350 104451          TRAP    C$DODU
1993 020352 012737 177777 002206  MOV     #-1,DROPUN      ; SET DROPPED UNIT FLAG.
1994 020360          DOCLN          ; ABORT THE DIAGNOSTIC FOR THIS UNIT
      020360 104444          TRAP    C$DCLN

```

TEST 2: INVOKE ROM - RESIDENT TEST OF THE KXT11'S CSR REGS.

```

1996
1997
1998
1999
2000
2001 020362 016102 000002      4$:  MOV     DPR1(R1),R2      ; READ BOOT COMMAND STATUS REGISTER
2002 020366 100005              BPL     5$                ; BR, IF NO COMMAND STATUS ERROR
2003 020370              ERRHRD  3,CMND,CMDERR      ; ERROR.  BOOT CODE DIDN'T LIKE THE COMMAND
      020370 104456              TRAP   C$ERHRD
      020372 000003              .WORD  3
      020374 003221              .WORD  CMND
      020376 016570              .WORD  CMDERR
2004 020400 000420              BR     6$                ; EXIT TEST
2005
2006 020402 016102 000004      5$:  MOV     DPR2(R1),R2      ; READ IOP DPR2
2007 020406 033702 002244      BIT     CSR,R2           ; CHECK FOR ERROR IN CSR TEST
2008 020412 001413              BEQ    6$                ; BRANCH, IF SUCCESSFUL TEST
2009 020414 043761 002244 000004 BIC     CSR,DPR2(R1)      ; CLEAR THE ERROR BIT FOR THIS TIME.
2010 020422 016103 000006      MOV     DPR3(R1),R3      ; READ DPR3 FOR EXTENDED INFO
2011 020426 012702 004145      MOV     $CSRT,R2         ; ERROR MESSAGE POINTER
2012 020432              ERRHRD  4,ROMD,RTERR      ; CSR TEST FAILED
      020432 104456              TRAP   C$ERHRD
      020434 000004              .WORD  4
      020436 003112              .WORD  ROMD
      020440 016070              .WORD  RTERR
2013
2014 020442              6$:  CKLOOP
      020442 104406              TRAP   C$CLP1           ; CHECK FOR LOOP ON TEST
2015
2016 020444              ENDTST
      020444              L10022:
      020444 104401              TRAP   C$ETST

```

TEST 2: INVOKE ROM - RESIDENT TEST OF THE KXT11'S CSR REGS.

```

2018
2019
2020          .SBTTL  TEST 3: INVOKE ROM TEST OF THE IOP 16KW LOCAL RAM
2021
2022          ;**
2023          ;
2024          ;           IOP SELFTEST #2.
2025          ;
2026          ; THE 16KW RAM IN THE IOP WILL BE TESTED.
2027          ;
2028
2029 020446          BGNTST
2030
2031 020446 012702 004744      MOV      #ROMT2,R2          ; GET TITLE ADDRESS
2032 020452 004537 017336      JSR      R5,PNTFLG        ; SEE IF PNT FLAG IS SET
2033 020456 005737 002206      TST      DROPUN          ; CHECK THIS UNIT FOR BEING DROPPED
2034 020462 001401              BEQ      1$                ; BRANCH, IF NOT DROPPED
2035 020464              DOCLN          ; ABORT THE DIAGNOSTIC FOR THIS UNIT
          020464 104444      TRAP     C$DCLN
2036
2037 020466 004537 017014      1$:     JSR      R5,CKTPRO        ; SEE IF THE CURRENT IOP IS READY
2038 020472 013701 002216      MOV      QBASE,R1         ; R1 = IOP BASE ADDRESS
2039 020476 013761 002246 000000  MOV      RAM,DPRO(R1)     ; SEND COMMAND TO DPRO
2040
2041 020504 012704 140000      MOV      #140000,R4       ; R4 WILL BE USED AS A COUNTER
2042 020510 005761 000000      2$:     TST      DPRO(R1)     ; TEST THE IOP'S DPRO REG.
2043 020514 001423              BEQ      4$                ; BRANCH, IF THE TEST HAS COMPLETED
2044 020516 004537 016754      JSR      R5,RDELAY        ; DELAY ABOUT 1 MS
2045 020522 000001              1
2046 020524 005204              INC      R4                ; ERROR, IF R4 WRAPS TO 0
2047 020526 001370              BNE     2$                ; ERROR, IF NO BRANCH
2048 020530 012702 004151      MOV      #RAMT,R2         ; SETUP FOR ERROR REPORTING
2049 020534          ERRDF          ; FATAL ERROR. NO RESPONSE FROM TEST.
          020534 104455      TRAP     C$ERDF
          020536 000005      .WORD   5
          020540 003054      .WORD   NORES
          020542 016412      .WORD   NRES
2050 020544          CKLOOP          ; CHECK FOR LOOP ON TEST
          020544 104406      TRAP     C$CLP1
2051 020546          DODU           ; DROP THIS UNIT
          020546 013700 002210      MOV      LUN,R0
          020552 104451      TRAP     C$DODU
2052 020554 012737 177777 002206  MOV      #-1,DROPUN       ; SET DROPPED UNIT FLAG.
2053 020562          DOCLN          ; ABORT THE DIAGNOSTIC FOR THIS UNIT
          020562 104444      TRAP     C$DCLN

```

TEST 3: INVOKE ROM TEST OF THE IOP 16KW LOCAL RAM

```

2055
2056
2057 ; TO HERE IF TEST COMPLETED, AND CHECK DPR2 FOR SUCCESS/FAILURE.
2058 ;
2059
2060 020564 016102 000002 4$: MOV DPR1(R1),R2 ; READ BOOT COMMAND STATUS REGISTER
2061 020570 100005 BPL 5$ ; BR, IF NO COMMAND STATUS ERROR
2062 020572 ERRHRD 6,CMND,CMDERR ; ERROR. BOOT CODE DIDN'T LIKE THE COMMAND
      020572 104456 TRAP C$FRHRD
      020574 000006 .WORD 6
      020576 003221 .WORD CMND
      020600 016570 .WORD CMDERR
2063 020602 000421 BR 6$ ; EXIT TEST
2064
2065 020604 016102 000004 5$: MOV DPR2(R1),R2 ; READ IOP DPR2
2066 020610 033702 002246 BIT RAM,R2 ; CHECK FOR ERROR IN RAM TEST
2067 020614 001422 BEQ 6$ ; BRANCH, IF SUCCESSFUL TEST
2068 020616 043761 002246 000004 BIC RAM,DPR2(R1) ; CLEAR THE ERROR BIT FOR THIS TIME.
2069 020624 016103 000006 MOV DPR3(R1),R3 ; READ DPR3 FOR EXTENDED INFO
2070 020630 012702 004151 MOV #RAMT,R2 ; ERROR MESSAGE POINTER
2071 020634 ERROF 7,ROMD,RTERR ; RAM TEST FAILED
      020634 104455 TRAP C$ERDF
      020636 000007 .WORD 7
      020640 003112 .WORD ROMD
      020642 016070 .WORD RTERR
2072 020644 DODU LUN ; DROP THIS UNIT 'CAUSE OF FATAL ERROR
      020644 013700 002210 MOV LUN,R0
      020650 104451 TRAP C$DODU
2073 020652 012737 177777 002206 MOV #-1,DROPUN ; SET DROPPED UNIT FLAG
2074 020660 DOCLN ; ABORT THE DIAGNOSTIC FOR THIS UNIT
      020660 104444 TRAP C$DCLN
2075
2076 020662 6$: CKLOOP ; CHECK FOR LOOP ON TEST
      020662 104406 TRAP C$CLP1
2077
2078 020664 ENDTST
      020664 L10023: TRAP C$ETST
      020664 104401

```

TEST 3: INVOKE ROM TEST OF THE IOP 16KW LOCAL RAM

```

2080
2081
2082          .SBTTL  TEST 4: INVOKE THE BOOT/SELFTEST CHECKSUM TEST
2083
2084          ;**
2085          ;
2086          ;           IOP SELFTEST #3.
2087          ;
2088          ; THE ROM TEST OF THE BOOT/SELFTEST ROM WILL BE INVOKED.  THE USER ROM
2089          ; WILL BE TESTED HERE IF SO INDICATED BY THE OPERATOR.
2090          ;
2091          ;**
2092
2093          BGNTST
2094
2095          020666      012702      004767      MOV      #ROMT3,R2      ; GET TITLE ADDRESS
2096          020672      004537      017336      JSR      R5,PNTFLG     ; SEE IF PNT FLAG IS SET
2097          020676      005737      002206      TST      DROPUN       ; CHECK THIS UNIT FOR BEING DROPPED
2098          020702      001401              BEQ      1$           ; BRANCH, IF NOT DROPPED
2099          020704              104444      DOCLN    C$DCLN       ; ABORT THE DIAGNOSTIC FOR THIS UNIT
2100
2101          020706      004537      017014      1$:      JSR      R5,CKTPRO     ; SEE IF THE CURRENT IOP IS READY
2102          020712      013701      002216      MOV      QBASE,R1     ; R1 = IOP BASE ADDRESS
2103          020716      005737      002234      TST      ROMTST       ; CHECK IF USER ROM IS TO BE TESTED
2104          020722      001403              BEQ      2$           ; BRANCH, IF NOT
2105          020724      012761      177777      000006      MOV      #-1,DPR3(R1) ; DPR 3 MUST BE NON-0 FOR USER ROM...
2106
2107          020732      013761      002250      000000      2$:      MOV      ROM,DPRO(R1)  ; SEND COMMAND TO DPRO
2108          020740      012704      140000      MOV      #140000,R4   ; R4 WILL BE USED AS A COUNTER
2109          020744      005761      000000      3$:      TST      DPRO(R1)    ; TEST THE IOP'S DPR0 REG.
2110          020750      001423              BEQ      5$           ; BRANCH, IF THE TEST HAS COMPLETED
2111          020752      004537      016754      JSR      R5,RDELAY    ; DELAY ABOUT 1 MS
2112          020756      000001              1
2113          020760      005204              INC      R4           ; ERROR, IF R4 WRAPS TO 0
2114          020762      001370              BNE      3$           ; ERROR, IF NO BRANCH
2115          020764      012702      004170      MOV      #ROMT,R2     ; SETUP FOR ERROR REPORTING
2116          020770              104455      ERWDF   10,NORES,NRES ; FATAL ERROR. NO RESPONSE FROM TEST.
2117          020770              000012      TRAP    C$ERDF
2118          020772              003054      .WORD  10
2119          020774              016412      .WORD  NORES
2120          020776              CKLOOP
2121          021000              104406      TRAP    C$CLP1       ; CHECK FOR LOOP ON TEST
2122
2123          021002              DODU     LUN           ; DROP THIS UNIT
2124          021002      013700      002210      MOV      LUN,R0
2125          021006      104451      TRAP    C$DODU
2126
2127          021010      012737      177777      002206      MOV      #-1,DROPUN   ; SET DROPPED UNIT FLAG.
2128          021016              104444      DOCLN    C$DCLN       ; ABORT THE DIAGNOSTIC FOR THIS UNIT
2129          021016

```

TEST 4: INVOKE THE BOOT/SELFTEST CHECKSUM TEST

```

2122
2123
2124 ; TO HERE IF TEST COMPLETED, AND CHECK DPR2 FOR SUCCESS/FAILURE.
2125 ;
2126
2127 021020 016102 000002 5$: MOV DPR1(R1),R2 ; READ BOOT COMMAND STATUS REGISTER
2128 021024 100005 BPL 6$ ; BR, IF NO COMMAND STATUS ERROR
2129 021026 ERRHRD 11,CMND,CMDERR ; ERROR, BOOT CODE DIDN'T LIKE THE COMMAND
      021026 104456 TRAP C$ERHRD
      021030 000013 .WORD 11
      021032 003221 .WORD CMND
      021034 016570 .WORD CMDERR
2130 021036 000427 BR 7$ ; EXIT TEST
2131
2132 021040 016102 000004 6$: MOV DPR2(R1),R2 ; READ IOP DPR2
2133 021044 033702 002250 BIT ROM,R2 ; CHECK FOR ERROR IN ROM TEST
2134 021050 001422 BEQ 7$ ; BRANCH, IF SUCCESSFUL TEST
2135 021052 043761 002250 000004 BIC ROM,DPR2(R1) ; CLEAR THE ERROR BIT FOR THIS TIME.
2136 021060 016103 000006 MOV DPR3(R1),R3 ; READ DPR3 FOR EXTENDED INFO
2137 021064 012702 004170 MOV $ROMT,R2 ; ERROR MESSAGE POINTER
2138 021070 ERRDF 12,ROMD,RTERR ; ROM TEST FAILED
      021070 104455 TRAP C$ERDF
      021072 000014 .WORD 12
      021074 003112 .WORD ROMD
      021076 016070 .WORD RTERR
2139 021100 DODU LUN ; FATAL ERROR. DROP THIS UNIT
      021100 013700 002210 MOV LUN,R0
      021104 104451 TRAP C$DODU
2140 021106 012737 177777 002206 MOV $-1,DROPUN ; SET DROPPED UNIT FLAG
2141 021114 DOCLN ; ABORT THE DIAGNOSTIC FOR THIS UNIT
      021114 104444 TRAP C$DCLN
2142
2143 021116 7$: CKLOOP ; CHECK FOR LOOP ON TEST
      021116 104406 TRAP C$CLP1
2144
2145 021120 ENDTST
      021120 L10024:
      021120 104401 TRAP C$ETST

```

TEST 4: INVOKE THE BOOT/SELFTEST CHECKSUM TEST

```

2147
2148 .SBITL TEST 5: IOP CPU INSTRUCTION TEST
2149
2150 ;++
2151 ;
2152 ; IOP SELFTEST #4.
2153 ;
2154 ; INVOKE THE IOP T11 INSTRUCTION TEST.
2155 ;
2156 ;--
2157
2158 021122 BGNTST
2159
2160 021122 012702 005023 MOV #ROMT4,R2 ; GET TITLE ADDRESS
2161 021126 004537 017336 JSR R5,PNTFLG ; SEE IF PNT FLAG IS SET
2162 021132 005737 002206 TST DROPUN ; CHECK THIS UNIT FOR BEING DROPPED
2163 021136 001401 BEQ 1$ ; BRANCH, IF NOT DROPPED
2164 021140 DOCLN TRAP C$DCLN ; ABORT THE DIAGNOSTIC FOR THIS UNIT
2165
2166 021142 004537 017014 1$: JSR R5,CKTPRO ; SEE IF THE CURRENT IOP IS READY
2167 021146 013701 002216 MOV QBASE,R1 ; R1 = IOP BASE ADDRESS
2168 021152 013761 002252 000000 MOV CPU,DPRO(R1) ; SEND COMMAND TO DPRO
2169
2170 021160 012704 140000 MOV #140000,R4 ; R4 WILL BE USED AS A COUNTER
2171 021164 005761 000000 2$: TST DPRO(R1) ; TEST THE IOP'S DPRO REG.
2172 021170 001423 BEQ 4$ ; BRANCH, IF THE TEST HAS COMPLETED
2173 021172 004537 016754 JSR R5,RDELAY ; DELAY ABOUT 1 MS
2174 021176 000001 1
2175 021200 005204 INC R4 ; ERROR, IF R4 WRAPS TO 0
2176 021202 001370 BNE 2$ ; ERROR, IF NO BRANCH
2177 021204 012702 004643 MOV #CPU4,R2 ; SETUP FOR ERROR REPORTING.
2178 021210 ERDF 13,NORES,NRES ; FATAL ERROR. NO RESPONSE FROM TEST.
2179 021210 104455 TRAP C$ERDF
2180 021212 000015 .WORD 13
2181 021214 003054 .WORD NORES
2182 021216 016412 .WORD NRES
2183 021220 CKLOOP ; CHECK FOR LOOP ON TEST
2184 021220 104406 TRAP C$CLP1
2185 021222 DODU LUN ; DROP THIS UNIT
2186 021222 013700 002210 MOV LUN,R0
2187 021226 104451 TRAP C$DODU
2188 021230 012737 177777 002206 MOV #-1,DROPUN ; SET DROPPED UNIT FLAG.
2189 021236 DOCLN TRAP C$DCLN ; ABORT THE DIAGNOSTIC FOR THIS UNIT
2190 021236 104444

```

TEST 5: IOP CPU INSTRUCTION TEST

```

2184
2185
2186 ; TO HERE IF TEST COMPLETED, AND CHECK DPR2 FOR SUCCESS/FAILURE.
2187 ;
2188
2189 021240 016102 000002 4$: MOV DPR1(R1),R2 ; READ BOOT COMMAND STATUS REGISTER
2190 021244 100005 BPL 5$ ; BR, IF NO COMMAND STATUS ERROR
2191 021246 ERRHRD 14,CMND,CMDERR ; ERROR. BOOT CODE DIDN'T LIKE THE COMMAND
      021246 104456 TRAP C$ERHRD
      021250 000016 .WORD 14
      021252 003221 .WORD CMND
      021254 016570 .WORD CMDERR
2192 021256 000427 BR 6$ ; EXIT TEST
2193
2194 021260 016102 000004 5$: MOV DPR2(R1),R2 ; READ IOP DPR2
2195 021264 033702 002252 BIT CPU,R2 ; CHECK FOR ERROR IN CPU TEST
2196 021270 001422 BEQ 6$ ; BRANCH, IF SUCCESSFUL TEST
2197 021272 043761 002252 000004 BIC CPU,DPR2(R1) ; CLEAR THE ERROR BIT FOR THIS TIME.
2198 021300 016103 000006 MOV DPR3(R1),R3 ; READ DPR3 FOR EXTENDED INFO
2199 021304 012702 004643 MOV #CPU1,R2 ; ERROR MESSAGE POINTER
2200 021310 ERRDF 15,ROMD,RTERR ; CPU TEST FAILED
      021310 104455 TRAP C$ERDF
      021312 000017 .WORD 15
      021314 003112 .WORD ROMD
      021316 016070 .WORD RTERR
2201 021320 DODU LUN ; FATAL ERROR. DROP THIS UNIT
      021320 013700 002210 MOV LUN,R0
      021324 104451 TRAP C$DODU
2202 021326 012737 177777 002206 MOV #1,DROPUN ; SET DROPPED UNIT FLAG
2203 021334 DOCLN ; ABORT THE DIAGNOSTIC FOR THIS UNIT
      021334 104444 TRAP C$DCLN
2204
2205 021336 6$: CKLOOP ; CHECK FOR LOOP ON TEST
      021336 104406 TRAP C$CLP1
2206
2207 021340 ENDTST
      021340 L10025:
      021340 104401 TRAP C$ETST
2208

```


TEST 5: IOP CPU INSTRUCTION TEST

```

2210
2211
2212          .SBTTL TEST 6: INVOKE THE LINE CLOCK INTERRUPT TEST
2213
2214          ;++
2215          ;
2216          ;           IOP SELFTEST #5.
2217          ;
2218          ; THE LINE CLOCK (BEVNT) INTERRUPT TEST IS INVOKED IN THE IOP ROM
2219          ;
2220          ;--
2221
2222          021342          BGNTST
2223
2224          021342  012702  005062          MOV      #ROMT5,R2          ; GET TITLE ADDRESS
2225          021346  004537  017336          JSR      R5,PNTFLG        ; SEE IF PNT FLAG IS SET
2226          021352  005737  002206          TST     DROPUN          ; CHECK THIS UNIT FOR BEING DROPPED
2227          021356  001401          BEQ     1$              ; BRANCH, IF NOT DROPPED
2228          021360          DOCLN          TRAP   C$DCLN          ; ABORT THE DIAGNOSTIC FOR THIS UNIT
2229          021360  104444
2230          021362  004537  017014          1$:     JSR      R5,CKTPRO        ; SEE IF THE CURRENT IOP IS READY
2231          021366  013701  002216          MOV     QBASE,R1        ; R1 = IOP BASE ADDRESS
2232          021372  013761  002254  000000    MOV     BVNT,DPRO(R1)    ; SEND COMMAND TO DPRO
2233
2234          021400  012704  140000          MOV     #140000,R4      ; R4 WILL BE USED AS A COUNTER
2235          021404  005761  000000          2$:     TST     DPRO(R1)        ; TEST THE IOP'S DPRO REG.
2236          021410  001423          BEQ     4$              ; BRANCH, IF THE TEST HAS COMPLETED
2237          021412  004537  016754          JSR     R5,RDELAY       ; DELAY ABOUT 1 MS
2238          021416  000001          1
2239          021420  005204          INC     R4              ; ERROR, IF R4 WRAPS TO 0
2240          021422  001370          BNE     2$              ; ERROR, IF NO BRANCH
2241          021424  012702  004174          MOV     #BEVNT,R2      ; SETUP FOR ERROR REPORTING.
2242          021430          ERDF   16,NRES,NRES    ; FATAL ERROR, NO RESPONSE FROM TEST.
2243          021430  104455          TRAP   C$ERDF
2244          021432  000020          .WORD  16
2245          021434  003054          .WORD  NRES
2246          021436  016412          .WORD  NRES
2247          021440          CKLOOP          ; CHECK FOR LOOP ON TEST
2248          021440  104406          TRAP   C$CLP1
2249          021442          DODU   LUN            ; DROP THIS UNIT
2250          021442  013700  002210          MOV     LUN,R0
2251          021446  104451          TRAP   C$DODU
2252          021450  012737  177777  002206    MOV     #-1,DROPUN     ; SET DROPPED UNIT FLAG.
2253          021456          DOCLN          ; ABORT THE DIAGNOSTIC FOR THIS UNIT
2254          021456  104444          TRAP   C$DCLN

```

TEST 6: INVOKE THE LINE CLOCK INTERRUPT TEST

```

2248
2249
2250
2251
2252
2253 021460 016102 000002      4$:  MOV    DPR1(R1),R2      ; READ BOOT COMMAND STATUS REGISTER
2254 021464 100005              BPL    5$                ; BR, IF NO COMMAND STATUS ERROR
2255 021466      104456      ERRHRD 17,CMDN,CMDERR    ; ERROR. BOOT CODE DIDN'T LIKE THE COMMAND
      021466      104456      TRAP   C$ERRHRD
      021470      000021      .WORD 17
      021472      003221      .WORD  CMDN
      021474      016570      .WORD  CMDERR
2256 021476 000431              BR     7$                ; EXIT TEST
2257
2258 021500 016102 000004      5$:  MOV    DPR2(R1),R2      ; READ TOP DPR2
2259 021504 033702 002254      BIT    BVNT,R2          ; CHECK FOR ERROR IN CLOCK TEST
2260 021510 001424              BEQ    7$                ; BRANCH, IF SUCCESSFUL TEST
2261 021512 043761 002254 000004 BIC    BVNT,DPR2(R1)    ; CLEAR THE ERROR BIT FOR THIS TIME.
2262 021520 016103 000006      MOV    DPR3(R1),R3      ; READ DPR3 FOR EXTENDED INFO
2263 021524 032703 000001      BIT    #BIT0,R3        ; CHECK FOR ENTIRE TEST SKIPPED
2264 021530 001406              BEQ    6$                ; BR, IF TEST WASN'T SKIPPED
2265 021532 012702 007411      MOV    #T5E0,R2        ; SETUP MESSAGE ADDRESS FOR PRINTOUT
2266 021536 004537 016722      JSR    R5,SKIPPED      ; PRINT THIS TEST SKIPPED
2267 021542              EXIT   TST              ; EXIT THIS TEST
      021542      104432      TRAP   C$EXIT
      021544      000020      .WORD  L10026-.
2268
2269 021546 012702 004174      6$:  MOV    #BEVNT,R2        ; ERROR MESSAGE POINTER
2270 021552      104456      ERRHRD 20,ROMD,RTERR   ; CLOCK TEST FAILED
      021552      104456      TRAP   C$ERRHRD
      021554      000024      .WORD  20
      021556      003112      .WORD  ROMD
      021560      016070      .WORD  RTERR
2271
2272 021562      104406      7$:  CKLOOP TRAP   C$CLP1      ; CHECK FOR LOOP ON TEST
2273
2274 021564              ENDTST
      021564
      021564      104401      L10026: TRAP   C$ETST

```

TEST 6: INVOKE THE LINE CLOCK INTERRUPT TEST

```

2276
2277
2278
2279
2280
2281
2282
2283
2284
2285
2286
2287 021566          BGNTST
2288
2289 021566 012702 005117      MOV     @ROMT6,R2          ; GET TITLE ADDRESS
2290 021572 004537 017336      JSR     R5,PNTFLG        ; SEE IF PNT FLAG IS SET
2291 021576 005737 002206      TST     DROPUN          ; CHECK THIS UNIT FOR BEING DROPPED
2292 021602 001401              BEQ     1#              ; BRANCH, IF NOT DROPPED
2293 021604              DDCLN          ; ABORT THE DIAGNOSTIC FOR THIS UNIT
2294 021604 104444              TRAP   C#DCLN
2295 021606 004537 017014      1#; JSR     R5,CKTPRO        ; SEE IF THE CURRENT IOP IS READY
2296 021612 005737 002222      TST     LOOPB1          ; CHECK FOR LOOPBACK CONNECTOR INSTALLED
2297 021616 001500              BEQ     7#              ; BRANCH, IF NO CONNECTOR INSTALLED
2298 021620 013701 002216      MOV     @BASE,R1        ; R1 = IOP BASE ADDRESS
2299 021624 013761 002256 000000  MOV     SLU1,DPRO(R1)    ; SEND COMMAND TO DPRO
2300
2301 021632 012704 140000      MOV     @140000,R4       ; R4 WILL BE USED AS A COUNTER
2302 021636 005761 000000      2#; TST     DPRO(R1)       ; TEST THE IOP'S DPRO REG.
2303 021642 001423              BEQ     4#              ; BRANCH, IF THE TEST HAS COMPLETED
2304 021644 004537 016754      JSR     R5,RDELAY        ; DELAY ABOUT 1 MS
2305 021650 000001              1
2306 021652 005204              INC     R4              ; ERROR, IF R4 WRAPS TO 0
2307 021654 001370              BNE    2#              ; ERROR, IF NO BRANCH
2308 021656 012702 004202      MOV     @SLU1,R2        ; SETUP FOR ERROR REPORTING.
2309 021662              ERDF   21,NORES,NRES   ; FATAL ERROR, NO RESPONSE FROM TEST.
2310 021662 104455              TRAP  C#ERDF
2311 021664 000025              .WORD 21
2312 021666 003054              .WORD NORES
2313 021670 016412              .WORD NRES
2314 021672              CKLOOP          ; CHECK FOR LOOP ON TEST
2315 021672 104406              TRAP  C#CLP1
2316 021674              DODU   LUN          ; DROP THIS UNIT
2317 021674 013700 002210      MOV     LUN,R0
2318 021700 104451              TRAP  C#DODU
2319 021702 012737 177777 002206  MOV     @-1,DROPUN      ; SET DROPPED UNIT FLAG.
2320 021710              DDCLN          ; ABORT THE DIAGNOSTIC FOR THIS UNIT
2321 021710 104444              TRAP  C#DCLN

```

SRITL TEST 7: INVOKE SERIAL PORT #1 TEST

```

1#;
;
; IOP SELFTEST #6.
;
; INVOKL THE ROM TEST OF THE CONSOLE SERIAL PORT UC319 (SLU1).
;
1#;

```

TEST 7: INVOKE SERIAL PORT #1 TEST

```

2315
2316
2317
2318
2319
2320 021712 016102 000002      4$:  MOV     DPR1(R1),R2      ; READ BOOT COMMAND STATUS REGISTER
2321 021716 100005              RPL     5$                ; BR, IF NO COMMAND STATUS ERROR
2322 021720              ERRHRD  22,CMND,CMDERR ; ERROR. BOOT CODE DIDN'T LIKE THE COMMAND
      021720 104456              TRAP   C$ERRHRD
      021722 000026              .WORD  22
      021724 003221              .WORD  CMND
      021726 016570              .WORD  CMDERR
2323 021730 000433              BR     7$                ; EXIT TEST
2324
2325 021752 016102 000004      5$:  MOV     DPR2(R1),R2      ; READ IOP DPR2
2326 021736 033702 002256      BIT     SLU1,R2           ; CHECK FOR ERROR IN SLU1 TEST
2327 021742 001426              BEQ    7$                ; BRANCH, IF SUCCESSFUL TEST
2328 021744 043761 002256 000004 BIC     SLU1,DPR2(R1)     ; CLEAR THE ERROR BIT FOR THIS TIME.
2329 021752 016103 000006      MOV     DPR3(R1),R3      ; READ DPR3 FOR EXTENDED INFO
2330 021756 032703 000001      BIT     0BIT0,R5         ; CHECK IF INTERRUPTS WERE TESTED
2331 021762 001404              BEQ    6$                ; BR, IF INTERRUPTS WERE TESTED
2332 021764 012702 007411      MOV     0T5E0,R2         ; SETUP MESSAGE ADDRESS FOR PRINTOUT
2333 021770 004537 016722      JSR    R5,SKIPPED        ; PRINT A PORTION OF SELFTEST NOT RUN
2334
2335 021774 042703 000001      6$:  BIC     0BIT0,R3         ; CLEAR BIT 0 FOR NEXT TEST
2336 022000 005703              TST    R5                ; SEE IF ANY LEGITIMATE ERRORS
2337 022002 001406              BEQ    7$                ; BRANCH, IF NO ERRORS
2338 022004 012702 004202      MOV     0SLU1T,R2        ; ERROR MESSAGE POINTER
2339 022010              ERRHRD  23,ROMD,RTERR   ; SLU1 TEST FAILED
      022010 104456              TRAP   C$ERRHRD
      022012 000027              .WORD  23
      022014 003112              .WORD  ROMD
      022016 016070              .WORD  RTERR
2340
2341 022020              7$:  CKLOOP              ; CHECK FOR LOOP ON TEST
      022020 104406              TRAP   C$CLP1
2342
2343 022022              ENDTST
      022022              L10027:
      022022 104401              TRAP   C$ETST

```

TEST 7: INVOKE SERIAL PORT #1 TEST

```

2345
2346          .SBTTL TEST 8: INVOKE ROM TEST OF SERIAL PORT #2 (CHANNEL A) NEC7201
2347
2348          ;---
2349          ;
2350          ;           IOP SELFTEST #7.
2351          ;
2352          ; INVOKE THE NEC7201 (SERIAL PORT #2), CHANNEL A SELFTEST
2353          ;
2354          ;---
2355
2356 022024          BGNTST
2357
2358 022024 012702 005151      MOV     #ROMT7A,R2          ; GET TITLE ADDRESS
2359 022030 004537 017336      JSR     R5,PNTFLG         ; SEE IF PNT FLAG IS SET
2360 022034 005737 002206      TST     DROPUN          ; CHECK THIS UNIT FOR BEING DROPPED
2361 022040 001401              BEQ     1$                ; BRANCH, IF NOT DROPPED
2362 022042          DOCLN          TRAP    C$DCLN          ; ABORT THE DIAGNOSTIC FOR THIS UNIT
2363          022042 104444
2364 022044 004537 017014      1$:    JSR     R5,CKTPRO         ; SEE IF THE CURRENT IOP IS READY
2365 022050 005737 002224      TST     LOOPB2          ; CHECK IF LOOPBACK CONNECTOR INSTALLED
2366 022054 001511              BEQ     8$                ; BRANCH, IF NO CONNECTOR INSTALLED
2367
2368 022056 013701 002216      MOV     QBASE,R1         ; R1 = IOP BASE ADDRESS
2369 022062 012761 000001 000006  MOV     #1,DPR3(R1)      ; SET TEST FLAG FOR CHANNEL A
2370 022070 013761 002260 000000  MOV     SLU2,DPRO(R1)    ; SEND COMMAND TO DPRO
2371
2372 022076 012704 140000      MOV     #140000,R4       ; R4 WILL BE USED AS A COUNTER
2373 022102 005761 000000      2$:    TST     DPRO(R1)     ; TEST THE IOP'S DPRO REG.
2374 022106 001423              BEQ     4$                ; BRANCH, IF THE TEST HAS COMPLETED
2375 022110 004537 016754      JSR     R5,RDELAY        ; DELAY ABOUT 1 MS
2376 022114 000001              1
2377 022116 005204              INC     R4                ; ERROR, IF R4 WRAPS TO 0
2378 022120 001370              BNE     2$                ; ERROR, IF NO BRANCH
2379 022122 012702 004235      MOV     #SLU2A,R2        ; SETUP FOR ERROR REPORTING.
2380 022126          ERRDF          TRAP    C$ERDF          ; FATAL ERROR. NO RESPONSE FROM TEST.
2381          022126 104455          .WORD  24
2382          022130 000030          .WORD  NORES
2383          022132 003054          .WORD  NORES
2384          022134 016412          .WORD  NRES
2381 022136          CKLOOP          ; CHECK FOR LOOP ON TEST
2382          022136 104406          TRAP    C$CLP1
2383          022140          DODU          ; DROP THIS UNIT
2384          022140 013700 002210      MOV     LUN,RO
2385          022144 104451          TRAP    C$DODU
2386 022146 012737 177777 002206  MOV     #-1,DROPUN       ; SET DROPPED UNIT FLAG.
2387 022154          DOCLN          ; ABORT THE DIAGNOSTIC FOR THIS UNIT
2388          022154 104444          TRAP    C$DCLN

```

TEST 8: INVOKE ROM TEST OF SERIAL PORT #2 (CHANNEL A) - NEC720

```

2386
2387
2388 ; TO HERE IF TEST COMPLETED, AND CHECK DPR2 FOR SUCCESS/FAILURE.
2389 ;
2390
2391 022156 016102 000002 4$: MOV DPR1(R1),R2 ; READ BOOT COMMAND STATUS REGISTER
2392 022162 100005 BPL 5$ ; BR, IF NO COMMAND STATUS ERROR
2393 022164 ERRHRD 25,CMND,CMDERR ; ERROR. BOOT CODE DIDN'T LIKE THE COMMAND
022164 104456 TRAP C$ERHRD
022166 000031 .WORD 25
022170 003221 .WORD CMND
022172 016570 .WORD CMDERR
2394 022174 000441 BR 8$ ; EXIT TEST
2395
2396 022176 016102 000004 5$: MOV DPR2(R1),R2 ; READ IOP DPR2
2397 022202 033702 002260 BIT SLU2,R2 ; CHECK FOR ERROR IN SLU2 TEST
2398 022206 001434 BEQ 8$ ; BRANCH, IF SUCCESSFUL TEST
2399 022210 043761 002260 000004 BIC SLU2,DPR2(R1) ; CLEAR THE ERROR BIT FOR THIS TIME.
2400 022216 016103 000006 MOV DPR3(R1),R3 ; READ DPR3 FOR EXTENDED INFO
2401 022222 005737 002232 TST SL2DMA ; CHECK SLU2 SETUP FOR DMA OPERATION
2402 022226 001002 BNE 6$ ; BRANCH, IF DMA JUMPER IS IN
2403 022230 042703 000300 BIC #300,R3 ; JUMPER IS OUT. FORCE ERRORS 6,7 CLEAR.
2404
2405 022234 032703 000001 6$: BIT #BIT0,R3 ; CHECK FOR ENTIRE TEST SKIPPED
2406 022240 001406 BEQ 7$ ; BR, IF TEST WASN'T SKIPPED
2407 022242 012702 010337 MOV #T7E0,R2 ; SETUP MESSAGE ADDRESS FOR PRINTOUT
2408 022246 004537 016722 JSR R5,SKIPED ; PRINT THIS TEST SKIPPED
2409 022252 EXIT TST ; EXIT THIS TEST
022252 104432 TRAP C$EXIT
022254 000026 .WORD L10030-.
2410
2411 022256 032703 007777 7$: BIT #7777,R3 ; CHECK FOR LEGITIMATE ERRORS
2412 022262 001406 BEQ 8$ ; BRANCH IF NO LEGITIMATE ERRORS
2413 022264 012702 004235 MOV #SLU2A,R2 ; ERROR MESSAGE POINTER
2414 022270 ERRHRD 26,ROMD,RTERR ; SLU2 CHANNEL A FAILED
022270 104456 TRAP C$ERHRD
022272 000032 .WORD 26
022274 003112 .WORD ROMD
022276 016070 .WORD RTERR
2415
2416 022300 8$: CKLOOP ; CHECK FOR LOOP ON TEST
022300 104406 TRAP C$CLP1
2417
2418 022302 ENDTST
022302 L10030: TRAP C$ETST
022302 104401

```

TEST 8: INVOKE ROM TEST OF SERIAL PORT #2 (CHANNEL A) - NEC720

```

2420
2421          .SBTTL TEST 9: INVOKE ROM TEST OF SERIAL PORT #2 (CHANNEL B) - NEC7201
2422
2423          ;++
2424          ;
2425          ;           IOP SELFTEST #7.
2426          ;
2427          ; INVOKE THE NEC7201 (SERIAL PORT #2), CHANNEL B SELFTEST
2428          ;
2429          ;--
2430
2431 022304          BGNTST
2432
2433 022304 012702 005220          MOV      #ROMT7B,R2          ; GET TITLE ADDRESS
2434 022310 004537 017336          JSR      R5,PNTFLG          ; SEE IF PNT FLAG IS SET
2435 022314 005737 002206          TST     DROPUN          ; CHECK THIS UNIT FOR BEING DROPPED
2436 022320 001401          BEQ     1$          ; BRANCH, IF NOT DROPPED
2437 022322          DOCLN          ; ABORT THE DIAGNOSTIC FOR THIS UNIT
          022322 104444          TRAP    C$DCLN
2438
2439 022324 004537 017014          1$:     JSR      R5,CKTPRO          ; SEE IF THE CURRENT IOP IS READY
2440 022330 005737 002226          TST     LOOPB3          ; CHECK IF LOOPBACK CONNECTOR INSTALLED
2441 022334 001501          BEQ     7$          ; BRANCH, IF NO CONNECTOR INSTALLED
2442
2443 022336 013701 002216          MOV     QBASE,R1          ; R1 = IOP BASE ADDRESS
2444 022342 012761 000002 000006          MOV     #2,DPR3(R1)          ; SET TEST FLAG FOR CHANNEL B
2445 022350 013761 002260 000000          MOV     SLU2,DPRO(R1)          ; SEND COMMAND TO DPRO
2446
2447 022356 012704 140000          MOV     #140000,R4          ; R4 WILL BE USED AS A COUNTER
2448 022362 005761 000000          2$:     TST     DPRO(R1)          ; TEST THE IOP'S DPRO REG.
2449 022366 001423          BEQ     4$          ; BRANCH, IF THE TEST HAS COMPLETED
2450 022370 004537 016754          JSR     R5,RDELAY          ; DELAY ABOUT 1 MS
2451 022374 000001          INC     R4
2452 022376 005204          BNE     2$          ; ERROR, IF R4 WRAPS TO 0
2453 022400 001370          MOV     #SLU2B,R2          ; ERROR, IF NO BRANCH
2454 022402 012702 004273          MOV     #27,NORES,NRES          ; SETUP FOR ERROR REPORTING.
2455 022406          ERRDF          ; FATAL ERROR. NO RESPONSE FROM TEST.
          022406 104455          TRAP    C$ERDF
          022410 000033          .WORD  27
          022412 003054          .WORD  NORES
          022414 016412          .WORD  NRES
2456 022416          CKLOOP          ; CHECK FOR LOOP ON TEST
          022416 104406          TRAP    C$CLP1
2457 022420          DODU          ; DROP THIS UNIT
          022420 013700 002210          MOV     LUN,R0
          022424 104451          TRAP    C$DODU
2458 022426 012737 177777 002206          MOV     #-1,DROPUN          ; SET DROPPED UNIT FLAG.
2459 022434          DOCLN          ; ABORT THE DIAGNOSTIC FOR THIS UNIT
          022434 104444          TRAP    C$DCLN

```

TEST 9: INVOKE ROM TEST OF SERIAL PORT #2 (CHANNEL B) - NEC720

```

2461
2462
2463 ; TO HERE IF TEST COMPLETED, AND CHECK DPR2 FOR SUCCESS/FAILURE.
2464 ;
2465
2466 022436 016102 000002 4$: MOV DPR1(R1),R2 ; READ BOOT COMMAND STATUS REGISTER
2467 022442 100005 BPL 5$ ; BR, IF NO COMMAND STATUS ERROR
2468 022444 ERRHRD 30,CMND,CMDERR ; ERROR, BOOT CODE DIDN'T LIKE THE COMMAND
      022444 104456 TRAP C$ERRHRD
      022446 000036 .WORD 30
      022450 003221 .WORD CMND
      022452 016570 .WORD CMDERR
2469 022454 000431 BR 7$ ; EXIT TEST
2470
2471 022456 016102 000004 5$: MOV DPR2(R1),R2 ; READ IOP DPR2
2472 022462 033702 002260 BIT SLU2,R2 ; CHECK FOR ERROR IN SLU2 TEST
2473 022466 001424 BEQ 7$ ; BRANCH, IF SUCCESSFUL TEST
2474 022470 043761 002260 000004 BIC SLU2,DPR2(R1) ; CLEAR THE ERROR BIT FOR THIS TIME.
2475 022476 016103 000006 MOV DPR3(R1),R3 ; READ DPR3 FOR EXTENDED INFO
2476 022502 032703 000001 BIT #BIT0,R3 ; CHECK FOR ENTIRE TEST SKIPPED
2477 022506 001406 BEQ 6$ ; BR, IF TEST WASN'T SKIPPED
2478 022510 012702 010337 MOV #T7E0,R2 ; SETUP MESSAGE ADDRESS FOR PRINTOUT
2479 022514 004537 016722 JSR R5,SKIPED ; PRINT THIS TEST SKIPPED
2480 022520 EXIT TST ; EXIT THIS TEST
      022520 104432 TRAP C$EXIT
      022522 000020 .WORD L10031-.
2481
2482 022524 012702 004273 6$: MOV #SLU2B,R2 ; ERROR MESSAGE POINTER
2483 022530 ERRHRD 31,ROMD,RTERR ; SLU2 CHANNEL B FAILED
      022530 104456 TRAP C$ERRHRD
      022532 000037 .WORD 31
      022534 003112 .WORD ROMD
      022536 016070 .WORD RTERR
2484
2485 022540 7$: CKLOOP ; CHECK FOR LOOP ON TEST
      022540 104406 TRAP C$CLP1
2486
2487 022542 ENDTST
      022542 L10031: TRAP C$ETST
      022542 104401

```


TEST 9: INVOKE ROM TEST OF SERIAL PORT #0 (CHANNEL B) - NEC720

```

2489
2490          .SBTTL TEST 10: INVOKE TEST OF THE PARALLEL I/O PORT, Z8036
2491
2492          ;**
2493          ;
2494          ;           IOP SELFTEST #10.
2495          ;
2496          ; INVOKE THE ROM TEST OF THE Z8036 (PARALLEL I/O).
2497          ;
2498          ;--
2499
2500 022544          BGNST
2501
2502 022544 012702 005267      MOV     #ROMT10,R2      ; GET TITLE ADDRESS
2503 022550 004537 017336      JSR     R5,PNTFLG      ; SEE IF PNT FLAG IS SET
2504 022554 005737 002206      TST     DROPUN        ; CHECK THIS UNIT FOR BEING DROPPED
2505 022560 001401              BEQ     1$              ; BRANCH, IF NOT DROPPED
2506 022562 022562 104444      DOCLN   C$DCLN        ; ABORT THE DIAGNOSTIC FOR THIS UNIT
2507
2508 022564 004537 017014      1$:    JSR     R5,CKTPRO  ; SEE IF THE CURRENT IOP IS READY
2509 022570 005737 002230      TST     LOOPB4        ; CHECK LOOPBACK CONNECTOR INSTALLED
2510 022574 001476              BEQ     7$              ; BRANCH IF NO CONNECTOR INSTALLED
2511
2512 022576 013701 002216      MOV     QBASE,R1      ; R1 = IOP BASE ADDRESS
2513 022602 013761 002262 000000  MOV     PLLIO,DPRO(R1) ; SEND COMMAND TO DPRO
2514
2515 022610 012704 140000      MOV     #140000,R4    ; R4 WILL BE USED AS A COUNTER
2516 022614 005761 000000      2$:    TST     DPRO(R1)  ; TEST THE IOP'S DPRO REG.
2517 022620 001423              BEQ     4$              ; BRANCH, IF THE TEST HAS COMPLETED
2518 022622 004537 016754      JSR     R5,RDELAY     ; DELAY ABOUT 1 MS
2519 022626 000001              1
2520 022630 005204              INC     R4              ; ERROR, IF R4 WRAPS TO 0
2521 022632 001370              BNE     2$              ; ERROR, IF NO BRANCH
2522 022634 012702 004331      MOV     #PLL,P,R2     ; SETUP FOR ERROR REPORTING.
2523 022640 022640 104455      ERDF   32,NORES,NRES ; FATAL ERROR, NO RESPONSE FROM TEST.
2524 022650 022640 000040      TRAP   C$ERDF
2525 022652 022644 003054      .WORD  32
2526 022654 022646 016412      .WORD  NORES
2527 022656 022650 104406      .WORD  NRES
2528 022658 022650 104406      CKLOOP ; CHECK FOR LOOP ON TEST
2529 022652 022650 104406      TRAP   C$CLP1
2530 022654 013700 002210      DODU   LUN            ; DROP THIS UNIT
2531 022656 104451              MOV     LUN,R0
2532 022658 012737 177777 002206  TRAP   C$DODU
2533 022660 022666 104444      MOV     #-1,DROPUN   ; SET DROPPED UNIT FLAG
2534 022662 022666 104444      DOCLN   C$DCLN        ; ABORT THE DIAGNOSTIC FOR THIS UNIT
2535 022664 022666 104444      TRAP   C$DCLN

```

TEST 10: INVOKE TEST OF THE PARALLEL I/O PORT, Z8036

```

2529
2530
2531      ; TO HERE IF TEST COMPLETED, AND CHECK DPR2 FOR SUCCESS/FAILURE.
2532      ;
2533
2534 022670 016102 000002      4$:      MOV      DPR1(R1),R2      ; READ BOOT COMMAND STATUS REGISTER
2535 022674 100005      BPL      5$      ; BR, IF NO COMMAND STATUS ERROR
2536 022676      ERRHRD 33,CMND,CMDERR      ; ERROR. BOOT CODE DIDN'T LIKE THE COMMAND
      022676 104456      TRAP    C$ERRHD
      022700 000041      .WORD  33
      022702 003221      .WORD  CMND
      022704 016570      .WORD  CMDERR
2537 022706 000431      BR      7$      ; EXIT TEST
2538
2539 022710 016102 000004      5$:      MOV      DPR2(R1),R2      ; READ IOP DPR2
2540 022714 033702 002262      BIT      PLLIO,R2      ; CHECK FOR ERROR IN PARALLEL I/O TEST
2541 022720 001424      BEQ      7$      ; BRANCH, IF SUCCESSFUL TEST
2542 022722 043761 002262 000004      BIC      PLLIO,DPR2(R1)      ; CLEAR THE ERROR BIT FOR THIS TIME.
2543 022730 016103 000006      MOV      DPR3(R1),R3      ; READ DPR3 FOR EXTENDED INFO
2544 022734 032703 000001      BIT      #BIT0,R3      ; CHECK FOR ENTIRE TEST SKIPPED
2545 022740 001406      BEQ      6$      ; BR, IF TEST WASN'T SKIPPED
2546 022742 012702 011477      MOV      #T10E0,R2      ; SETUP MESSAGE ADDRESS FOR PRINTOUT
2547 022746 004537 016722      JSR      R5,SKIPED      ; PRINT THIS TEST SKIPPED
2548 022752      EXIT    TST      ; EXIT THIS TEST
      022752 104432      TRAP    C$EXIT
      022754 000020      .WORD  L10032-.
2549
2550 022756 012702 004331      6$:      MOV      #PLLP,R2      ; ERROR MESSAGE POINTER
2551 022762      ERRHRD 34,ROMD,RTERR      ; PARALLEL I/O TEST FAILED
      022762 104456      TRAP    C$ERRHD
      022764 000042      .WORD  34
      022766 003112      .WORD  ROMD
      022770 016070      .WORD  RTERR
2552
2553 022772      CKLOOP      ; CHECK FOR LOOP ON TEST
      022772 104406      TRAP    C$CLP1
2554
2555 022774      ENDTST
      022774      L10032:
      022774 104401      TRAP    C$ETST

```

TEST 10: INVOKE TEST OF THE PARALLEL I/O PORT, Z8036

```

2557
2558
2559
2560
2561
2562
2563
2564
2565
2566
2567
2568
2569 022776
2570
2571 022776 012702 005346
2572 023002 004537 017336
2573 023006 005737 002206
2574 023012 001401
2575 023014
    023014 104444
2576
2577 023016 004537 017014
2578 023022 013701 002216
2579 023026 005061 000006
2580 023032 013761 002264 000000
2581
2582 023040 012704 140000
2583 023044 005761 000000
2584 023050 001423
2585 023052 004537 016754
2586 023056 000001
2587 023060 005204
2588 023062 001370
2589 023064 012702 004353
2590 023070
    023070 104455
    023072 000043
    023074 003054
    023076 016412
2591 023100
    023100 104406
2592 023102
    023102 013700 002210
    023106 104451
2593 023110 012737 177777 002206
2594 023116
    023116 104444

```

```

.SBTTL TEST 11: INVOKE THE DMA CONTROLLER TEST OF THE AMZ8016 (LOCAL SIDE)
;
;
; IOP SELFTEST #11.
;
; THE ROM TEST OF THE IOP'S AMZ8016 DMA CONTROLLER CHIP IS INVOKED.
;
; DMA TRANSFERS WILL BE DONE ON THE LOCAL SIDE ONLY. NEXT TEST DOES LSI-11.
;
;
BGNTST
MOV #ROM11A,R2 ; GET TITLE ADDRESS
JSR R5,PNTFLG ; SEE IF PNT FLAG IS SET
TST DROPUN ; CHECK THIS UNIT FOR BEING DROPPED
BEQ 1$ ; BRANCH, IF NOT DROPPED
DOCLN ; ABORT THE DIAGNOSTIC FOR THIS UNIT
TRAP C$DCLN

1$: JSR R5,CKTPRO ; SEE IF THE CURRENT IOP IS READY
MOV QBASE,R1 ; R1 = IOP BASE ADDRESS
CLR DPR3(R1) ; CLEAR TPR3 SO ONLY LOCAL DMA'S DONE.
MOV DMA,DPRO(R1) ; SEND COMMAND TO DPRO

2$: MOV #140000,R4 ; R4 WILL BE USED AS A COUNTER
TST DPRO(R1) ; TEST THE IOP'S DPRO REG.
BEQ 4$ ; BRANCH, IF THE TEST HAS COMPLETED
JSR R5,RDELAY ; DELAY ABOUT 1 MS
1
INC R4 ; ERROR, IF R4 WRAPS TO 0
BNE 2$ ; ERROR, IF NO BRANCH
MOV #DMAL,R2 ; SETUP FOR ERROR REPORTING.
ERRDF 35,NORES,NRES ; FATAL ERROR. NO RESPONSE FROM TEST.
TRAP C$ERDF
.WORD 35
.WORD NORES
.WORD NRES

CHKLOOP ; CHECK FOR LOOP ON TEST
TRAP C$CLP1
DODU LUN ; DROP THIS UNIT
MOV LUN,R0
TRAP C$DODU
MOV #-1,DROPUN ; SET DROPPED UNIT FLAG.
DOCLN ; ABORT THE DIAGNOSTIC FOR THIS UNIT
TRAP C$DCLN

```

TEST 11: INVOKE THE DMA CONTROLLER TEST OF THE AMZ8016 (LOCAL

```

2596
2597
2598
2599
2600
2601 023120 016102 000002      4$:  MOV    DPR1(R1),R2      ; READ BOOT COMMAND STATUS REGISTER
2602 023124 100005              BPL    5$                ; BR, IF NO COMMAND STATUS ERROR
2603 023126 104456              ERRHRD 36,CMND,CMDERR    ; ERROR, BOOT CODE DIDN'T LIKE THE COMMAND
      023126 104456              TRAP  C$ERHRD
      023130 000044              .WORD 36
      023132 003221              .WORD CMND
      023134 016570              .WORD CMDERR
2604 023136 000436              BR     8$                ; EXIT TEST
2605
2606 023140 016102 000004      5$:  MOV    DPR2(R1),R2      ; READ IOP DPR2
2607 023144 033702 002264      BIT    DMA,R2            ; CHECK FOR ERROR IN DMA TEST
2608 023150 001431              BEQ    8$                ; BRANCH, IF SUCCESSFUL TEST
2609 023152 043761 002264 000004 BIC    DMA,DPR2(R1)      ; CLEAR THE ERROR BIT FOR THIS TIME.
2610 023160 016103 000006      MOV    DPR3(R1),R3      ; READ DPR3 FOR EXTENDED INFO
2611 023164 032703 000001      BIT    #BIT0,R3         ; CHECK IF INTERRUPTS WERE TESTED
2612 023170 001406              BEQ    6$                ; BR, IF INTERRUPTS WERE TESTED
2613 023172 013702 012161      MOV    T11E0,R2         ; SETUP MESSAGE ADDRESS
2614 023176 004537 016722      JSR    R5,SKIPPED       ; PRINT A PORTION OF SELFTEST NOT RUN
2615 023202 042703 000001      BIC    #BIT0,R3         ; CLEAR IT SO NEXT TEST NOT CONFUSED
2616 023206 042703 000002      6$:  BIC    #BIT1,R3         ; THE BIT 1 ERROR DOESN'T APPLY HERE
2617
2618 023212 032703 007777      7$:  BIT    #7777,R3        ; SEE IF ANY LEGITIMATE ERRORS EXIST
2619 023216 001406              BEQ    8$                ; BRANCH, IF NO ERRORS
2620 023220 012702 004353      MOV    #DMAL,R2         ; ERROR MESSAGE POINTER
2621 023224 104456              ERRHRD 37,ROMD,RTERR    ; DMA TEST FAILED
      023224 104456              TRAP  C$ERHRD
      023226 000045              .WORD 37
      023230 003112              .WORD ROMD
      023232 016070              .WORD RTERR
2622
2623 023234 104406              8$:  CKLOOP TRAP  C$CLP1    ; CHECK FOR LOOP ON TEST
2624
2625 023236              L10033:  ENDTST
      023236              TRAP  C$ETST
      023236 104401

```

TEST 11: INVOKE THE DMA CONTROLLER TEST OF THE AMZ8016 (LOCAL

```

2627
2628
2629          .SBTTL TEST 12: INVOKE THE DMA CONTROLLER TEST OF THE AMZ8016 (LSI-11 SIDE)
2630
2631          ;**
2632          ;
2633          ;           IOP SELFTEST #11.
2634          ;
2635          ; THE ROM TEST OF THE IOP'S AMZ8016 DMA CONTROLLER CHIP IS INVOKED.
2636          ;
2637          ; TESTS OF DMA TRANSFERS TO AND FROM THE LSI-11 BUS ARE DONE.
2638          ;
2639          ;--
2640          BGNTST
2641
2642          023240 012702 005416          MOV      #ROM11B,R2          ; GET TITLE ADDRESS
2643          023244 004537 017336          JSR      R5,PNTFLG          ; SEE IF PNT FLAG IS SET
2644          023250 005737 002206          TST     DROPUN             ; CHECK THIS UNIT FOR BEING DROPPED
2645          023254 001401                    BEQ      1$                 ; BRANCH, IF NOT DROPPED
2646          023256          104444          DOCLN   C$DCLN             ; ABORT THE DIAGNOSTIC FOR THIS UNIT
2647
2648          023260 004537 017014          1$:     JSR      R5,CKTPRO          ; SEE IF THE CURRENT IOP IS READY
2649          023264 013701 002216          MOV     QBASE,R1           ; R1 = IOP BASE ADDRESS
2650          023270 013761 002242 000006  MOV     HIMEM,DPR3(R1)      ; SEND BASE OF HI 4KW PAGE (PAR FORMAT)
2651          023276 013761 002264 000000  MOV     DMA,DPRO(R1)        ; SEND COMMAND TO DPRO
2652
2653          023304 012704 140000          MOV     #140000,R4          ; R4 WILL BE USED AS A COUNTER
2654          023310 005761 000000          2$:     TST     DPRO(R1)        ; TEST THE IOP'S DPRO REG.
2655          023314 001423                    BEQ     4$                 ; BRANCH, IF THE TEST HAS COMPLETED
2656          023316 004537 016754          JSR     R5,RDELAY           ; DELAY ABOUT 1 MS
2657          023322 000001                    1
2658          023324 005204                    INC     R4                 ; ERROR, IF R4 WRAPS TO 0
2659          023326 001370                    BNE     2$                 ; ERROR, IF NO BRANCH
2660          023330 012702 004413          MOV     #DMA1,R2           ; SETUP FOR ERROR REPORTING.
2661          023334          104455          ERRDF   40,NORES,NRES      ; FATAL ERROR, NO RESPONSE FROM TEST.
2662          023336 000050          TRAP   C$ERDF
2663          023340 003054          .WORD  40
2664          023342 016412          .WORD  NORES
2665          023344          CKLOOP          .WORD  NRES
2666          023344          104406          TRAP   C$CLP1             ; CHECK FOR LOOP ON TEST
2667          023346          DODU          TRAP   LUN                 ; DROP THIS UNIT
2668          023346 013700 002210          MOV     LUN,R0
2669          023352 104451          TRAP   C$DODU
2670          023354 012737 177777 002206  MOV     #-1,DROPUN         ; SET DROPPED UNIT FLAG.
2671          023362          104444          DOCLN   C$DCLN             ; ABORT THE DIAGNOSTIC FOR THIS UNIT

```

TEST 12: INVOKE THE DMA CONTROLLER TEST OF THE AMZ8016 (LSI-11)

```

2667
2668
2669 ; TO HERE IF TEST COMPLETED, AND CHECK DPR2 FOR SUCCESS/FAILURE.
2670 ;
2671
2672 023364 016102 000002 4$: MOV DPR1(R1),R2 ; READ BOOT COMMAND STATUS REGISTER
2673 023370 100005 BPL 5$ ; BR, IF NO COMMAND STATUS ERROR
2674 023372 ERRHRD 41,CMND,CMDERR ; ERROR. BOOT CODE DIDN'T LIKE THE COMMAND
      023372 104456 TRAP C$ERRHD
      023374 000051 .WORD 41
      023376 003221 .WORD CMND
      023400 016570 .WORD CMDERR
2675 023402 000445 BR 8$ ; EXIT TEST
2676
2677 023404 016102 000004 5$: MOV DPR2(R1),R2 ; READ IOP DPR2
2678 023410 033702 002264 BIT DMA,R2 ; CHECK FOR ERROR IN DMA TEST
2679 023414 001440 BEQ 8$ ; BRANCH, IF SUCCESSFUL TEST
2680 023416 043761 002264 000004 BIC DMA,DPR2(R1) ; CLEAR THE ERROR BIT FOR THIS TIME.
2681 023424 016103 000006 MOV DPR3(R1),R3 ; READ DPR3 FOR EXTENDED INFO
2682 023430 032703 000001 BIT #BIT0,R3 ; CHECK IF INTERRUPTS WERE TESTED
2683 023434 001406 BEQ 6$ ; BR, IF INTERRUPTS WERE TESTED
2684 023436 013702 012161 MOV T11E0,R2 ; SETUP MESSAGE ADDRESS
2685 023442 004537 016722 JSR R5,SKIPPED ; PRINT A PORTION OF SELFTEST NOT RUN
2686 023446 042703 000001 BIC #BIT0,R3 ; CLEAR IT SO NEXT TEST NOT CONFUSED
2687
2688 023452 032703 000002 6$: BIT #BIT1,R3 ; CHECK IF BUS TESTS WERE RUN
2689 023456 001406 BEQ 7$ ; BR, IF BUS TESTS WERE RUN
2690 023460 012702 012260 MOV #T11E1,R2 ; SETUP MESSAGE ADDRESS
2691 023464 004537 016722 JSR R5,SKIPPED ; PRINT BUS TESTS NOT DONE
2692 023470 042703 000002 BIC #BIT1,R3 ; CLEAR IT SO NEXT TEST NOT CONFUSED
2693
2694 023474 032703 007777 7$: BIT #7777,R3 ; SEE IF ANY LEGITIMATE ERRORS EXIST
2695 023500 001406 BEQ 8$ ; BRANCH, IF NO ERRORS
2696 023502 012702 004413 MOV #DMAT,R2 ; ERROR MESSAGE POINTER
2697 023506 ERRHRD 42,ROMD,RTERR ; DMA TEST FAILED
      023506 104456 TRAP C$ERRHD
      023510 000052 .WORD 42
      023512 003112 .WORD ROMD
      023514 016070 .WORD RTERR
2698
2699 023516 8$: CKLOOP ; CHECK FOR LOOP ON TEST
      023516 104406 TRAP C$CLP1
2700
2701 023520 ENDTST
      023520 L10034:
      023520 104401 TRAP C$ETST

```

TEST 12: INVOKE THE DMA CONTROLLER TEST OF THE AMZ8016 (LSI-11)

```

2703
2704
2705          .SBTTL TEST 13: LSI-11 BUS INTERRUPT TEST
2706
2707          ;**
2708          ;
2709          ;           IOP SELFTEST #12.
2710          ;
2711          ;           INVOKE THE LSI-11 BUS INTERRUPT TEST
2712          ;
2713          ;--
2714
2715          BGNTST
2716
2717 023522      012702      005462      MOV          $ROM12,R2          ; GET TITLE ADDRESS
2718 023526      004537      017336      JSR          R5,PNTFLG          ; SEE IF PNT FLAG IS SET
2719 023532      005737      002206      TST          DROPUN            ; CHECK THIS UNIT FOR BEING DROPPED
2720 023536      001401                        BEQ          1$                 ; BRANCH, IF NOT DROPPED
2721 023540                        DOCLN          C$DCLN            ; ABORT THE DIAGNOSTIC FOR THIS UNIT
2722          023540      104444
2723 023542      004537      017014      1$: JSR          R5,CKTPRO          ; SEE IF THE CURRENT IOP IS READY
2724
2725 023546      013701      002216      2$: MOV          QBASE,R1          ; R1 = IOP BASE ADDRESS
2726          ; MOV          $1770,QIRVEC          ; ADDRESS 1770 IS THE INTERRUPT VECTOR ;JB REV A-0
2727 023552      012737      000370      002220      MOV          $370,QIRVEC          ; ADDRESS 370 IS THE INTERRUPT VECTOR ;JB REV A-0
2728 023560      005037      002240      CLR          INTFLG            ; SOFTWARE FLAG INDICATES INT. OCCURED
2729          ; SETVEC          QIRVEC,$QIRSRV,$PRI07          ; SETUP THE VECTOR; TEMP PRIORITY OF 7 ;JB REV A-0
2730 023564          SETVEC          QIRVEC,$QIRSRV,$PRI06          ; SETUP THE VECTOR; TEMP PRIORITY OF 6 ;JB REV A-0
2731          023564      012746      000300      MOV          $PRI06,-(SP)
2732          023570      012746      024272      MOV          $QIRSRV,-(SP)
2733          023574      013746      002220      MOV          QIRVEC,-(SP)
2734          023600      012746      000003      MOV          $3,-(SP)
2735          023604      104437      TRAP          C$SVEC
2736          023606      062706      000010      ADD          $10,SP
2737          ; SETPRI          $PRI07          ; RAISE CPU SO IOP CAN'T INTERRUPT YET. ;JB REV A-0
2738          023612      012700      000300      SETPRI          $PRI06          ; RAISE CPU SO IOP CAN'T INTERRUPT YET. ;JB REV A-0
2739          023616      104441      MOV          $PRI06,R0
2740          023620      013761      002220      000006      TRAP          C$SPRI
2741          023626      013761      002266      000000      MOV          QIRVEC,DPR3(R1)          ; TELL IOP WHICH VECTOR WE WANT
2742          023634          SETPRI          $PRI00          ; SEND QIR TEST COMMAND TO DPRO
2743          023634      012700      000000      MOV          $PRI00,R0          ; LOWER PRIORITY SO IOP CAN INTERRUPT
2744          023640      104441      TRAP          C$SPRI
2745
2746 023642      004537      016754      JSR          R5,RDELAY          ; DELAY, AND THEN CHECK INT. OCCURED
2747 023646      000002          2          ; 2 MILLISECONDS
2748 023650      005737      002240      TST          INTFLG            ; IOP INTERRUPTED, IF INTFLG SET
2749 023654      001060          BNE          6$                 ; BR, IF OK
2750 023656      016102      000002      MOV          DPR1(R1),R2          ; READ BOOT COMMAND STATUS REGISTER
2751 023662      100006          BPL          3$                 ; BR, IF NO COMMAND STATUS ERROR
2752 023664          ERRHRD          43,CMDERR,CMDERR          ; ERROR. BOOT CODE DIDN'T LIKE THE COMMAND
2753          023664      104456      TRAP          C$ERRHRD
2754          023666      000053          .WORD          43
2755          023670      003221          .WORD          CMND
2756          023672      016570          .WORD          CMDFER
2757 2744 023674          EXIT          TST          ; EXIT TEST

```

0112

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SEQ 0144

TEST 13: TEST 11 BUS INTERRUPT TEST

023674 104452
023676 000404

TRAP CSXIT
.WORD 110035 .

TEST 13: LSI 11 BUS INTERRUPT TEST

```

2746
2747 023700 016103 000004      3$:  MOV    DPR2(R1),R2      ; READ IOP TPR2
2748 023704 033702 002266      BIT    QIR,R2           ; CHECK FOR A SELF TEST ERROR
2749 023710 001424              BEQ    5$               ; BR, IF NO ERROR
2750 023712 016103 000006      MOV    DPR3(R1),R3     ; READ SELF TEST EXTENDED ERROR REGISTER
2751 023716 032703 000001      BIT    @BIT0,R3        ; CHECK FOR ENTIRE TEST SKIPPED
2752 023722 001406              BEQ    4$               ; BR, IF TEST WASN'T SKIPPED
2753 023724 012702 012625      MOV    @T12E0,R2       ; SETUP MESSAGE ADDRESS FOR PRINTOUT
2754 023730 004537 016722      JSR    R5,SKIPED       ; PRINT THIS TEST SKIPPED
2755 023734              EXIT    TST             ; EXIT THIS TEST
      023734      104432      TRAP   C$EXIT
      023736      000344      .WORD L10035 .

2756
2757 023740 032703 000004      4$:  BIT    @BIT2,R3        ; NOW CHECK FOR ROM IN VECTOR SPACE
2758 023744 001406              BEQ    5$               ; BR, IF RAM AND NOT ROM IN VECTOR SPACE
2759 023746 012702 012771      MOV    @T12E2,R2       ; SETUP MESSAGE ADDRESS FOR PRINTOUT
2760 023752 004537 016722      JSR    R5,SKIPED       ; PRINT THIS TEST SKIPPED
2761 023756              EXIT    TST             ; EXIT THIS TEST
      023756      104432      TRAP   C$EXIT
      023760      000322      .WORD L10035 .

2762
2763              5$:  SETPRI @PRI07           ; RESTORE PRIORITY TO 7
2764 023762              5$:  SETPRI @PRI06           ; RESTORE PRIORITY TO 6
      023762      012700 000300      MOV    @PRI06,R0
      023766      104441      TRAP   C$SPRI
2765 023770 012702 004453      MOV    @QIRT,R2        ; ERROR MESSAGE POINTER
2766 023774 012703 004500      MOV    @QIRT1,R3       ; ERROR MESSAGE POINTER
2767 024000      ERRHRD 44,ROMD,GENMSG ; ERROR, NO INTERRUPT FROM IOP
      024000      104456      TRAP   C$ERHRD
      024002      000054      .WORD 44
      024004      003112      .WORD ROMD
      024006      016444      .WORD GENMSG

2768 024010      CKLOOP              ; CHECK FOR LOOP ON TEST
      024010      104406      TRAP   C$CLP1
2769 024012              EXIT    TST             ; EXIT THIS TEST
      024012      104432      TRAP   C$EXIT
      024014      000266      .WORD L10035 .

```

DIP

SEQ 0146

TEST 13: ISI-11 BUS INTERRUPT TEST

```

2771
2772
2773 024016      ;6$:  SETPRI  0PRI07      ; SET CPU TEMORARILY TO 7      ;JB REV A-0
      024016 012700 000300      6$:  SETPRI  0PRI06      ; SET CPU TEMORARILY TO 6      ;JB REV A-0
      024022 104441
2774 024024 005037 002240      TRAP    C$SPRI
      024030      CLR     INTFLG      ; CLEAR THE SOFTWARE INT. FLAG
2775 024030 013700 002220      CLAVEC  QIRVEC      ; CLEAR THE VECTOR JUST USED
      024034 104436      MOV     QIRVEC,R0
2776 024036 062737 000004 002220      TRAP    C$CVEC
      024044      ADD     04,QIRVEC      ; ADVANCE TO THE NEXT (01774)
2777      SETVEC  QIRVEC,0QIRSRV,0PRI07 ; SETUP VECTOR FOR NEXT TEST      ;JB REV A-0
2778 024044      SETVEC  QIRVEC,0QIRSRV,0PRI06 ; SETUP VECTOR FOR NEXT TEST      ;JB REV A-0
      024044 012746 000300      MOV     0PRI06,-(SP)
      024050 012746 024272      MOV     0QIRSRV,-(SP)
      024054 013746 002220      MOV     QIRVEC,-(SP)
      024060 012746 000003      MOV     03,-(SP)
      024064 104437      TRAP    C$SVEC
      024066 062706 000010      ADD     010,SP
2779 024072      SETPRI  0PRI00      ; LOWER PRIORITY TO 0
      024072 012700 000000      MOV     0PRI00,R0
      024076 104441      TRAP    C$SPRI
2780
2781 024100 012704 140000      MOV     0140000,R4      ; R4 WILL BE USED AS A COUNTER
2782 024104 005737 002240      7$:  TST     INTFLG      ; IOP INTERRUPTED, IF INTFLG SET
2783 024110 001023      BNE     8$              ; BR. IF OK
2784 024112 004537 016754      JSR     R5,RDELAY      ; DELAY, AND THEN TEST THAT INT. OCCURED
2785 024116 000001      1      ; 1 MILLISECOND
2786 024120 005204      INC     R4              ; WAIT FOR INTERRUPT FROM IOP
2787 024122 001370      BNE     7$              ; WAIT. ERROR IF R4 WRAPS TO 0
2788
2789      ;
2790 024124      SETPRI  0PRI07      ; RESTORE PRIORITY TO 7      ;JB REV A-0
      024124 012700 000300      SETPRI  0PRI06      ; RESTORE PRIORITY TO 6      ;JB REV A-0
      024130 104441      MOV     0PRI06,R0
2791 024132 012702 004453      TRAP    C$SPRI
      024136 012703 004552      MOV     0QIRT,R2      ; ERROR MESSAGE POINTER
2792      MOV     0QIRT,R3      ; ERROR MESSAGE POINTER
2793 024142      ERRHRD 45,ROMD,GENMSG ; ERROR. NO INTERRUPT FROM IOP...
      024142 104456      TRAP    C$ERHRD
      024144 000055      .WORD  45
      024146 003112      .WORD  ROMD
      024150 016444      .WORD  GENMSG
2794 024152      CKLOOP
      024152 104406      TRAP    C$CLP1      ; CHECK FOR LOOP ON TEST
2795 024154      EXIT    TST          ; EXIT THIS TEST
      024154 104432      TRAP    C$EXIT
      024156 000124      .WORD  L10035-.

```

TEST 13: LSI-11 BUS INTERRUPT TEST

```

2797
2798 024160 000005      8$:  RESET                      ; ISSUE A BUS RESET AS PART OF..
2799                                     ; ..THE IOP SELFTEST CODE.
2800 024162 004537 016754      JSR    R5,RDELAY          ; WAIT FOR THE RESET TO COMPLETE
2801 024166 000062          50.                                     ; 50 MILLISECONDS
2802 024170 005761 000000      TST    DPRO(R1)          ; TEST THE IOP'S DPRO REGISTER
2803 024174 001413          BEQ    9$                 ; BR MEANS TEST COMPLETED
2804 024176 012702 004453      MOV    @QIRT,R2          ; QIRT TEST MESSAGE ADDRESS
2805
2806 024202          ERRDF  46,NORES,NRES          ; FATAL ERROR. NO RESPONSE FROM TEST
      024202 104455      TRAP  C$ERDF
      024204 000056      .WORD 46
      024206 003054      .WORD NORES
      024210 016412      .WORD NRES
2807 024212          CKLOOP                          ; CHECK FOR LOOP ON TEST
      024212 104406      TRAP  C$CLP1
2808 024214 012737 177777 002206  MOV    @-1,DROPUN        ; SET DROPPED UNIT FLAG
2809 024222          DOCLN                          ; ABORT THE DIAGNOSTIC FOR THIS UNIT
      024222 104444      TRAP  C$DCLN
2810
2811 024224 016102 000004      9$:  MOV    DPR2(R1),R2        ; READ IOP DPR2
2812 024230 033702 002266      BIT    QIR,R2           ; CHECK FOR ERROR IN QIR TEST
2813 024234 001413          BEQ    10$                ; BR, IF NO ERROR
2814 024236 043761 002266 000004  BIC    QIR,DPR2(R1)      ; CLEAR THE ERROR BIT FOR THIS TIME.
2815 024244 016103 000006      MOV    DPR3(R1),R3        ; READ DPR3 FOR EXTENDED INFO
2816 024250 012702 004453      MOV    @QIRT,R2          ; ERROR MESSAGE POINTER
2817 024254          ERRHRD 47,ROMD,RTERR          ; QIR TEST FAILED
      024254 104456      TRAP  C$ERHRD
      024256 000057      .WORD 47
      024260 003112      .WORD ROMD
      024262 016070      .WORD RTERR
2818
2819 024264          10$:  CKLOOP                          ; CHECK FOR LOOP ON TEST
      024264 104406      TRAP  C$CLP1
2820 024266          EXIT                               ; EXIT THIS TEST
      024266 104432      TRAP  C$EXIT
      024270 000012      .WORD L10035-.
2821
2822
2823
2824      ;++
2825      ;
2826      ; IOP INTERRUPT SERVICE ROUTINE FOR TEST 12.
2827      ;--
2828 024272          BGNSRV  QIRSRV
      024272          QIRSRV::
2829
2830 024272 012737 177777 002240  MOV    @-1,INTFLG        ; SET FLAG TO INDICATE INT. OCCURED
2831 024300          ENDSRV                          ; EXIT SERVICE ROUTINE
      024300          L10036:
      024300 000002      RTI
2832
2833          L10035:
      024302          ENDTST
      024302 104401      TRAP  C$ETST

```

TEST 13: LSI-11 BUS INTERRUPT TEST

```

2835
2836
2837 .SBTTL TEST 14: INVOKE THE TWO-PORT RAM TEST
2838
2839 ;++
2840 ;
2841 ; IOP SELFTEST #13.
2842 ;
2843 ; THE ROM TEST OF THE IOP'S TWO-PORT RAM IS INVOKED. THE TWO-PORT RAM
2844 ; IS ALSO CONSIDERED AS THE LSI-11 BUS INTERFACE.
2845 ;
2846 ; THE PROTOCOL BETWEEN THIS PROGRAM AND THE IOP BREAKS DOWN FOR THIS
2847 ; PARTICULAR TEST, BECAUSE THE IOP TEST OF THE TWO-PORT RAM MUST
2848 ; DISABLE THE DPR IN ORDER TO TEST IT. THEREFORE, THE STANDARD COMMUNI-
2849 ; CATION METHOD ISN'T POSSIBLE. THIS TEST SIMPLY INITIATES IOP TEST
2850 ; #13 AND THEN DELAYS ABOUT 1 SECOND; AFTER WHICH, WE MUST ASSUME THAT
2851 ; THE TEST HAS COMPLETED AND THE DPR HAS BEEN RE-ENABLED. DPR2 IS THEN
2852 ; CHECKED FOR ERROR BITS.
2853 ;
2854 ;--
2855
2856 024304 BGNTST
2857
2858 024304 012702 005507 MOV #ROM113,R2 ; GET TITLE ADDRESS
2859 024310 004537 017336 JSR R5,PNTFLG ; SEE IF PNT FLAG IS SET
2860 024314 005737 002206 TST DROPUN ; CHECK THIS UNIT FOR BEING DROPPED
2861 024320 001401 BEQ 1$ ; BRANCH, IF NOT DROPPED
2862 024322 DOCLN ; ABORT THE DIAGNOSTIC FOR THIS UNIT
2863 024322 104444 TRAP C$DCLN
2864 024324 004537 017014 1$; JSR R5,CKYPRO ; SEE IF THE CURRENT IOP IS READY
2865 024330 013701 002216 MOV QBASE,R1 ; R1 = IOP BASE ADDRESS
2866 024334 013761 002270 000000 MOV DPR,DPRO(R1) ; SEND COMMAND TO DPRO
2867 024342 004537 016754 JSR R5,RDELAY ; DELAY BEFORE CHECKING FOR ERROR.
2868 024346 011610 5000. ; ABOUT 5 SECONDS.
2869
2870 024350 016102 000002 MOV DPR1(R1),R2 ; READ BOOT COMMAND STATUS REGISTER
2871 024354 100005 BPL 2$ ; BR, IF NO COMMAND STATUS ERROR
2872 024356 ERRHRD 50,CMND,CMDERR ; ERROR. BOOT CODE DIDN'T LIKE THE COMMAND
2873 024356 104456 TRAP C$ERHRD
2874 024360 000062 .WORD 50
2875 024362 003221 .WORD CMND
2876 024364 016570 .WORD CMDERR
2877 024366 000442 BR 4$ ; EXIT TEST

```

TEST 14: INVOKE THE TWO-PORT RAM TEST

```

2875
2876 024370 016102 000004      2$:  MOV    DPR2(R1),R2      ; READ IOP DPR2
2877 024374 033702 002270      BIT    DPR,R2          ; CHECK FOR ERROR IN DPR TEST
2878 024400 001435                BEQ    4$              ; BRANCH, IF SUCCESSFUL TEST
2879 024402 043761 002270 000004 BIC    DPR,DPR2(R1)    ; CLEAR THE ERROR BIT FOR THIS TIME.
2880 024410 016103 000006      MOV    DPR3(R1),R3     ; READ DPR3 FOR EXTENDED INFO
2881 024414 032703 000010      BIT    #BIT3,R3       ; CHECK IF BUS WRITES/INTERRUPTS RUN
2882 024420 001410                BEQ    3$              ; BR, IF THE TESTS WERE RUN
2883 024422 012702 013545      MOV    #T13E3,R2      ; SETUP MESSAGE ADDRESS
2884 024426 004537 016722      JSR    R5,SKIPPED     ; PRINT THAT THE TESTS WERE NOT RUN
2885 024432 042703 000010      BIC    #BIT3,R3       ; CLEAR THE BIT SO NEXT TEST NOT CONFUSED
2886 024436 005703                TST    R3              ; CHECK IF LEGITIMATE ERRORS EXIST
2887 024440 001415                BEQ    4$              ; BRANCH, IF NO ERRORS
2888
2889 024442 012702 004626      3$:  MOV    #DPRT,R2      ; ERROR MESSAGE POINTER
2890 024446                ERRDF  51,ROMD,RTERR  ; DPR TEST FAILED
      024446 104455                TRAP  C$ERDF
      024450 000063                .WORD 51
      024452 003112                .WORD ROMD
      024454 016070                .WORD RTERR
2891 024456                DODU   LUN            ; FATAL ERROR. DROP THIS UNIT
      024456 013700 002210      MOV    LUN,R0
      024462 104451                TRAP  C$DODU
2892 024464 012737 177777 002206 MOV    #-1,DROPUN     ; SET DROPPED UNIT FLAG
2893 024472                DOCLN
      024472 104444                TRAP  C$DCLN
2894
2895 024474                4$:  CKLOOP
      024474 104406                TRAP  C$CLP1      ; CHECK FOR LOOP ON TEST
2896
2897 024476                ENDTST
      024476                L10037:
      024476 104401                TRAP  C$ETST

```

TEST 14: INVOKE THE TWO-PORT RAM TEST

```

2899
2900      .TITLE PARAMETER CODING
2901      .SBTTL IDENTIFICATION
2902
2903      .SBTTL HARDWARE PARAMETER CODING SECTION
2904
2905      ;**
2906      ; THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
2907      ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES. THE
2908      ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
2909      ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES. THE
2910      ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
2911      ; WITH THE OPERATOR.
2912      ;--
2913
2914      BGNHRD
2915      .WORD L10040-L$HARD/2
2916      L$HARD::
2917
2918      GPRMD  CCPU,0,D,740,2,15.,NO      ; GET SBC ID SWITCH
2919      .WORD  T$CODE
2920      .WORD  CCPU
2921      .WORD  740
2922      .WORD  T$LQIM
2923      .WORD  T$HILIM
2924
2925      GPRML  BASE,2,-1,YES      ; GET LSI-11 BUS BASE ADDR. RANGE
2926      .WORD  T$CODE
2927      .WORD  BASE
2928      .WORD  -1
2929
2930      GPRML  LOOP1,4,-1,YES      ; ASK IF LOOPBACK..
2931      .WORD  T$CODE
2932      .WORD  LOOP1
2933      .WORD  -1
2934
2935
2936
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2998
2999
3000

```

HARDWARE PARAMETER CODING SECTION

2929

2930 024552
024552 006130
024554 004027
024556 177777

GPRML SLU2CF,14,-1,YES
.WORD T\$CODE
.WORD SLU2CF
.WORD -1

; IS SLU2 SET FOR DMA?

2931

2932 024560
024560 007130
024562 004127
024564 177777

GPRML UROM,16,-1,YES
.WORD T\$CODE
.WORD UROM
.WORD -1

; ASK IF USER ROM IS TO...

2933

2934 024566
024566 001004
2935 024570

EXIT HRD
.WORD T\$CODE
ENDHRD
.EVEN

; ...BE TESTED.

024570

L10040:

2936

SOFTWARE PARAMETER CODING SECTION

```
2938      .SBTTL  SOFTWARE PARAMETER CODING SECTION
2939
2940      ;**
2941      ; THE SOFTWARE PARAMETER CODING SECTION CONTAINS MACROS
2942      ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
2943      ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
2944      ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
2945      ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
2946      ; WITH THE OPERATOR.
2947      ;**
2948
2949 024570      BGNSFT
2950      024570 000000      .WORD L10041-L$SOFT/2
2951      024572      L$SOFT::
2952
2953      ENDSFT
2954      .EVEN
2955      L10041:
2956
2957      $PATCH::
2958      .BLKW 50
2959
2960      LASTAD
2961      .EVEN
2962      .WORD T$FREE
2963      .WORD T$SIZE
2964      L$LAST::
```


SOFTWARE PARAMETER CODING SECTION

```

2958
2959
2960 ; **
2961 ; HARD-CODED HARDWARE P-TABLES
2962 ;
2963 ; THERE ARE 14 HARDWARE P-TABLES HERE; HOWEVER, KEEP IN MIND THAT
2964 ; THE MAXIMUM LEGAL NUMBER OF KXT11-CA IOP'S ON ANY ONE SYSTEM IS
2965 ; 14(D), AND THE LEGAL UNIT NUMBERS ARE 2 THROUGH 15(D). IOP UNITS
2966 ; 0 AND 1 ARE RESERVED FOR THE NON-MULTIPROCESSING ARBITER OR DMA
2967 ; DEVICE AND THE HOST MULTIPROCESSOR ARBITER, RESPECTIVELY, AND SHOULD
2968 ; NOT BE USED. IOPS 0 AND 1 AUTOMATICALLY DISCONNECT THE IOP FROM
2969 ; THE LSI-11 BUS.
2970 ; --
2971 024716 BGNSETUP 14.
2972
2973 ; UNIT 0
2974
2975 024716 BGNPTAB
024716 024746 .WORD L10043
024720 000010 .WORD L10044-./2-1
024722 L10042:
2976 024722 000000 .WORD 0
2977 024724 000001 .WORD 1 ; BUS ADDRESS RANGE (LOW IS DEFAULT)
2978 024726 000000 .WORD 0 ; LOOP-BACK DEFAULT IS NO (SLU1)
2979 024730 000000 .WORD 0 ; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
2980 024732 000000 .WORD 0 ; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
2981 024734 000000 .WORD 0 ; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
2982 024736 000000 .WORD 0 ; SLU2 DMA OPERATION DEFAULT IS NO
2983 024740 000000 .WORD 0 ; TEST USER ROM DEFAULT IS NO
2984 024742 ENDPTAB
024742 L10044:
2985
2986 ; UNIT 1
2987
2988 024742 BGNPTAB
024742 024772 .WORD L10045
024744 000010 .WORD L10046-./2-1
024746 L10043:
2989 024746 000000 .WORD 0
2990 024750 000001 .WORD 1 ; BUS ADDRESS RANGE (LOW IS DEFAULT)
2991 024752 000000 .WORD 0 ; LOOP-BACK DEFAULT IS NO (SLU1)
2992 024754 000000 .WORD 0 ; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
2993 024756 000000 .WORD 0 ; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
2994 024760 000000 .WORD 0 ; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
2995 024762 000000 .WORD 0 ; SLU2 DMA OPERATION DEFAULT IS NO
2996 024764 000000 .WORD 0 ; TEST USER ROM DEFAULT IS NO
2997 024766 ENDPTAB
024766 L10046:

```

SOFTWARE PARAMETER CODING SECTION

```

2999
3000           ; UNIT 2
3001
3002 024766   BGNPTAB
      024766   025016   .WORD   L10047
      024770   000010   .WORD   L10050-./2-1
      024772
L10045:      .WORD   0
3003 024772   000000   .WORD   1
3004 024774   000001   ; BUS ADDRESS RANGE (LOW IS DEFAULT)
3005 024776   000000   ; LOOP-BACK DEFAULT IS NO (SLU1)
3006 025000   000000   ; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
3007 025002   000000   ; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
3008 025004   000000   ; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
3009 025006   000000   ; SLU2 DMA OPERATION DEFAULT IS NO
3010 025010   000000   ; TEST USER ROM DEFAULT IS NO
3011 025012   .WORD   0
      025012   ENDPTAB
L10050:
3012
3013           ; UNIT 3
3014
3015 025012   BGNPTAB
      025012   025042   .WORD   L10051
      025014   000010   .WORD   L10052-./2-1
      025016
L10047:      .WORD   0
3016 025016   000000   .WORD   1
3017 025020   000001   ; BUS ADDRESS RANGE (LOW IS DEFAULT)
3018 025022   000000   ; LOOP-BACK DEFAULT IS NO (SLU1)
3019 025024   000000   ; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
3020 025026   000000   ; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
3021 025030   000000   ; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
3022 025032   000000   ; SLU2 DMA OPERATION DEFAULT IS NO
3023 025034   000000   ; TEST USER ROM DEFAULT IS NO
3024 025036   .WORD   0
      025036   ENDPTAB
L10052:

```

SOFTWARE PARAMETER CODING SECTION

```

3026
3027
3028
3029 025036      BGNPTAB
      025036 025066 .WORD L10053
      025040 000010 .WORD L10054-./2-1
      025042      L10051:
3030 025042 000000 .WORD 0
3031 025044 000001 .WORD 1 ; BUS ADDRESS RANGE (LOW IS DEFAULT)
3032 025046 000000 .WORD 0 ; LOOP-BACK DEFAULT IS NO (SLU1)
3033 025050 000000 .WORD 0 ; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
3034 025052 000000 .WORD 0 ; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
3035 025054 000000 .WORD 0 ; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
3036 025056 000000 .WORD 0 ; SLU2 DMA OPERATION DEFAULT IS NO
3037 025060 000000 .WORD 0 ; TEST USER ROM DEFAULT IS NO
3038 025062      ENDPTAB
      025062      L10054:
3039
3040
3041
3042 025062      BGNPTAB
      025062 025112 .WORD L10055
      025064 000010 .WORD L10056-./2-1
      025066      L10053:
3043 025066 000000 .WORD 0
3044 025070 000001 .WORD 1 ; BUS ADDRESS RANGE (LOW IS DEFAULT)
3045 025072 000000 .WORD 0 ; LOOP-BACK DEFAULT IS NO (SLU1)
3046 025074 000000 .WORD 0 ; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
3047 025076 000000 .WORD 0 ; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
3048 025100 000000 .WORD 0 ; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
3049 025102 000000 .WORD 0 ; SLU2 DMA OPERATION DEFAULT IS NO
3050 025104 000000 .WORD 0 ; TEST USER ROM DEFAULT IS NO
3051 025106      ENDPTAB
      025106      L10056:

```

SOFTWARE PARAMETER CODING SECTION

```

3053
3054
3055
3056 025106          BGNPTAB
      025106 025136  .WORD  L10057
      025110 000010  .WORD  L10060-./2-1
      025112          L10055:
3057 025112 000000  .WORD  0
3058 025114 000001  .WORD  1
3059 025116 000000  .WORD  0
3060 025120 000000  .WORD  0
3061 025122 000000  .WORD  0
3062 025124 000000  .WORD  0
3063 025126 000000  .WORD  0
3064 025130 000000  .WORD  0
3065 025132          ENDPTAB
      025132          L10060:
3066
3067
3068
3069 025132          BGNPTAB
      025132 025162  .WORD  L10061
      025134 000010  .WORD  L10062-./2-1
      025136          L10057:
3070 025136 000000  .WORD  0
3071 025140 000001  .WORD  1
3072 025142 000000  .WORD  0
3073 025144 000000  .WORD  0
3074 025146 000000  .WORD  0
3075 025150 000000  .WORD  0
3076 025152 000000  .WORD  0
3077 025154 000000  .WORD  0
3078 025156          ENDPTAB
      025156          L10062:
; UNIT 6
; BUS ADDRESS RANGE (LOW IS DEFAULT)
; LOOP-BACK DEFAULT IS NO (SLU1)
; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
; SLU2 DMA OPERATION DEFAULT IS NO
; TEST USER ROM DEFAULT IS NO

; UNIT 7
; BUS ADDRESS RANGE (LOW IS DEFAULT)
; LOOP-BACK DEFAULT IS NO (SLU1)
; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
; SLU2 DMA OPERATION DEFAULT IS NO
; TEST USER ROM DEFAULT IS NO

```

SOFTWARE PARAMETER CODING SECTION

```

3080
3081
3082
3083 025156
      025156 025206
      025160 000010
      025162
3084 025162 000000
3085 025164 000001
3086 025166 000000
3087 025170 000000
3088 025172 000000
3089 025174 000000
3090 025176 000000
3091 025200 000000
3092 025202
      025202
3093
3094
3095
3096 025202
      025202 025232
      025204 000010
      025206
3097 025206 000000
3098 025210 000001
3099 025212 000000
3100 025214 000000
3101 025216 000000
3102 025220 000000
3103 025222 000000
3104 025224 000000
3105 025226
      025226

```

```

; UNIT 8
BGNPTAB
;WORD L10063
;WORD L10064 /2 1
L10061:
;WORD 0
;WORD 1
;WORD 0
;WORD 0
;WORD 0
;WORD 0
;WORD 0
;WORD 0
;WORD 0
;WORD 0
;WORD 0
;WORD 0
ENDPTAB
L10064:
; UNIT 9
BGNPTAB
;WORD L10063
;WORD L10066 /2 1
L10063:
;WORD 0
;WORD 1
;WORD 0
;WORD 0
;WORD 0
;WORD 0
;WORD 0
;WORD 0
;WORD 0
;WORD 0
;WORD 0
;WORD 0
ENDPTAB
L10066:
; BUS ADDRESS RANGE (LOW IS DEFAULT)
; LOOP-BACK DEFAULT IS NO (SLU1)
; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
; SLU2 DMA OPERATION DEFAULT IS NO
; TEST USER ROM DEFAULT IS NO

```

SOFTWARE PARAMETER CODING SECTION

```

3107
3108
3109
3110 025226
      025226 025256
      025230 000010
      025232
3111 025232 000000
3112 025234 000001
3113 025236 000000
3114 025240 000000
3115 025242 000000
3116 025244 000000
3117 025246 000000
3118 025250 000000
3119 025252
      025252
3120
3121
3122
3123 025252
      025252 025302
      025254 000010
      025256
3124 025256 000000
3125 025260 000001
3126 025262 000000
3127 025264 000000
3128 025266 000000
3129 025270 000000
3130 025272 000000
3131 025274 000000
3132 025276
      025276

```

```

; UNIT 10
BGNPTAB
.LWORD L10067
.LWORD L10070 ,/2-1
L10065:
.LWORD 0
.LWORD 1
.LWORD 0
.LWORD 0
.LWORD 0
.LWORD 0
.LWORD 0
.LWORD 0
.LWORD 0
.LWORD 0
ENDPTAB
L10070:
; UNIT 11
BGNPTAB
.LWORD L10071
.LWORD L10072 ,/2-1
L10067:
.LWORD 0
.LWORD 1
.LWORD 0
.LWORD 0
.LWORD 0
.LWORD 0
.LWORD 0
.LWORD 0
.LWORD 0
.LWORD 0
ENDPTAB
L10072:
; BUS ADDRESS RANGE (LOW IS DEFAULT)
; LOOP-BACK DEFAULT IS NO (SLU1)
; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
; SLU2 DMA OPERATION DEFAULT IS NO
; TEST USER ROM DEFAULT IS NO
; BUS ADDRESS RANGE (LOW IS DEFAULT)
; LOOP-BACK DEFAULT IS NO (SLU1)
; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
; SLU2 DMA OPERATION DEFAULT IS NO
; TEST USER ROM DEFAULT IS NO

```

SOFTWARE PARAMETER CODING SECTION

```

3134
3135           ; UNIT 12
3136
3137 025276      BGNPTAB
           025276 025326      .WORD L10073
           025300 000010      .WORD L10074-./2-1
           025302      L10071:
3138 025302 000000      .WORD 0
3139 025304 000001      .WORD 1           ; BUS ADDRESS RANGE (LOW IS DEFAULT)
3140 025306 000000      .WORD 0           ; LOOP-BACK DEFAULT IS NO (SLU1)
3141 025310 000000      .WORD 0           ; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
3142 025312 000000      .WORD 0           ; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
3143 025314 000000      .WORD 0           ; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
3144 025316 000000      .WORD 0           ; SLU2 DMA OPERATION DEFAULT IS NO
3145 025320 000000      .WORD 0           ; TEST USER ROM DEFAULT IS NO
3146 025322      ENDPTAB
           025322      L10074:
3147
3148           ; UNIT 13
3149
3150 025322      BGNPTAB
           025322 000000      .WORD 0
           025324 000010      .WORD L10076-./2-1
           025326      L10073:
3151 025326 000000      .WORD 0
3152 025330 000001      .WORD 1           ; BUS ADDRESS RANGE (LOW IS DEFAULT)
3153 025332 000000      .WORD 0           ; LOOP-BACK DEFAULT IS NO (SLU1)
3154 025334 000000      .WORD 0           ; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
3155 025336 000000      .WORD 0           ; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
3156 025340 000000      .WORD 0           ; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
3157 025342 000000      .WORD 0           ; SLU2 DMA OPERATION DEFAULT IS NO
3158 025344 000000      .WORD 0           ; TEST USER ROM DEFAULT IS NO
3159 025346      ENDPTAB
           025346      L10076:
3160
3161 025346      ENDSETUP
3162           000001      .END

```

SYMBOL TABLE

ABORT = 017704	C\$DU = 000053	DPR2 = 000004 G	G\$RADD = 000120	L\$DESC = 014432 G
ADR = 000020 G	C\$EDIT = 000003	DPR3 = 000006 G	G\$RADO = 000020	L\$DESP = 002076 G
ASSEMB = 000010	C\$ERDF = 000055	DPR4 = 000010 G	G\$XFER = 000004	L\$DEVP = 002060 G
BADSW = 003151	C\$ERHR = 000056	DPR5 = 000012 G	G\$YES = 000010	L\$DISP = 002124 G
BASE = 003443	C\$ERRO = 000060	DPR6 = 000014 G	HELP = 000000	L\$DLT = 002116 G
BEVNT = 004174	C\$ERSF = 000054	DPR7 = 000016 G	HIMEM = 002242	L\$DTP = 002040 G
BITC = 000001 G	C\$ERSO = 000057	DROP = 014772	HOE = 100000 G	L\$DTYP = 002034 G
BIT00 = 000001 G	C\$ESCA = 000010	DROPUN = 002206	IBF = 010000 G	L\$DU = 020042 G
BIT01 = 000002 G	C\$ESEG = 000005	DSPCOD = 002122 G	IDU = 000040 G	L\$DUT = 002072 G
BIT02 = 000004 G	C\$ESUB = 000003	EF.CON = 000036 G	IER = 020000 G	L\$DVTY = 014422 G
BIT03 = 000010 G	C\$ETST = 000001	EF.NEW = 000035 G	INITNG = 015676	L\$EF = 002052 G
BIT04 = 000020 G	C\$EXIT = 000032	EF.PWR = 000034 G	INITOK = 015763	L\$ENVI = 002044 G
BIT05 = 000040 G	C\$GETB = 000026	EF.RES = 000037 G	INTACK = 015606	L\$ETP = 002102 G
BIT06 = 000100 G	C\$GETW = 000027	EF.STA = 000040 G	INTFLG = 002240	L\$EXP1 = 002046 G
BIT07 = 000200 G	C\$GMAN = 000043	END = 017706	IOPN = 002212	L\$EXP4 = 002064 G
BIT08 = 000400 G	C\$GPHR = 000042	EVL = 000004 G	TOPNN = 002214	L\$EXP5 = 002066 G
BIT09 = 001000 G	C\$GPLO = 000030	E\$END = 002100	ISR = 000100 G	L\$HARD = 024502 G
BIT1 = 000002 G	C\$GPRI = 000040	E\$LOAD = 000035	IXE = 004000 G	L\$HIME = 002120 G
BIT10 = 002000 G	C\$INIT = 000011	F\$AU = 000015	I\$AU = 000041	L\$HPCP = 002016 G
BIT11 = 004000 G	C\$INLP = 000020	F\$AUTO = 000020	I\$AUTO = 000041	L\$HPTP = 002022 G
BIT12 = 010000 G	C\$MANI = 000050	F\$BGN = 000040	I\$CLN = 000041	L\$HW = 002162 G
BIT13 = 020000 G	C\$MEM = 000031	F\$CLEA = 000007	I\$DU = 000041	L\$ICP = 002104 G
BIT14 = 040000 G	C\$MSG = 000023	F\$DU = 000016	I\$HRD = 000041	L\$INIT = 017412 G
BIT15 = 100000 G	C\$OPEN = 000034	F\$END = 000041	I\$INIT = 000041	L\$LADP = 002026 G
BIT2 = 000004 G	C\$PNTB = 000014	F\$HARD = 000004	I\$MOD = 000041	L\$LAST = 024716 G
BIT3 = 000010 G	C\$PNTF = 000017	F\$HW = 000013	I\$MSG = 000041	L\$LOAD = 002100 G
BIT4 = 000020 G	C\$PNTS = 000016	F\$INIT = 000006	I\$PROT = 000040	L\$LUN = 002074 G
BIT5 = 000040 G	C\$PNTX = 000015	F\$JMP = 000050	I\$PTAB = 000041	L\$MREV = 002050 G
BIT6 = 000100 G	C\$QIO = 000377	F\$MOD = 000000	I\$PWR = 000041	L\$NAME = 002000 G
BIT7 = 000200 G	C\$RDBU = 000007	F\$MSG = 000011	I\$RPT = 000041	L\$PRIO = 002042 G
BIT8 = 000400 G	C\$REFG = 000047	F\$PROT = 000021	I\$SEG = 000041	L\$PROT = 017404 G
BIT9 = 001000 G	C\$RESE = 000033	F\$PWR = 000017	I\$SETU = 000041	L\$PRT = 002112 G
BOE = 000400 G	C\$REVI = 000003	F\$RPT = 000012	I\$SFT = 000041	L\$REPP = 002062 G
BVNT = 002254	C\$RFLA = 000021	F\$SEG = 000003	I\$SRV = 000041	L\$REV = 002010 G
CCPU = 003415	C\$RPT = 000025	F\$SOFT = 000005	I\$SUB = 000041	L\$RPT = 017402 G
CKTPRO = 017014	C\$SEFG = 000046	F\$SRV = 000010	I\$TST = 000041	L\$SOFT = 024572 G
CMDERR = 016570 G	C\$SPRI = 000041	F\$SUB = 000002	J\$JMP = 000167	L\$SPC = 002056 G
CMND = 003221	C\$SVEC = 000037	F\$SW = 000014	LOE = 040000 G	L\$SPCP = 002020 G
CMNDR = 015142	C\$YPRI = 000013	F\$TEST = 000001	LOOPB1 = 002222	L\$SPTP = 002024 G
CPU = 002252	DELCNT = 002236	GENMSG = 016444 G	LOOPB2 = 002224	L\$STA = 002030 G
CPUT = 004643	DFPTBL = 002162 G	GLBDAT = 002204 G	LOOPB3 = 002226	L\$SW = 002204 G
CSR = 002244	DIAGMC = 000000	GLBEQA = 002204 G	LOOPB4 = 002230	L\$TEST = 002114 G
CSRT = 004145	DMA = 002264	C\$CNT0 = 000200	LOOP1 = 003535	L\$TIML = 002014 G
C\$AU = 000052	DMAL = 004353	G\$DELM = 000372	LOOP2 = 003622	L\$UNIT = 002012 G
C\$AUTO = 000061	DMAT = 004413	G\$DISP = 000003	LOOP3 = 003702	L1000 = 002202
C\$BRK = 000022	DPR = 002270	G\$EXCP = 000400	LOOP4 = 003762	L10001 = 002204
C\$BSEG = 000004	DPRT = 004626	G\$HILI = 000002	LOT = 000010 G	L10002 = 016364
C\$BSUB = 000002	DPRO = 000000 G	G\$LOLI = 000001	LUN = 002210	L10003 = 016410
C\$CEFG = 000045	DPR1 = 000002 G	G\$NO = 000000	L\$ACP = 002110 G	L10004 = 016442
C\$CLCK = 000062	DPR10 = 000020 G	G\$OFFS = 000400	L\$APT = 002036 G	L10005 = 016516
C\$CLEA = 000012	DPR11 = 000022 G	G\$OFSI = 000376	L\$AU = 020076 G	L10006 = 016566
C\$CLOS = 000035	DPR12 = 000024 G	G\$PRMA = 000001	L\$AUT = 020070 G	L10007 = 016616
C\$CLP1 = 000006	DPR13 = 000026 G	G\$PRMD = 000002	L\$AUTO = 017710 G	L10010 = 016646
C\$CVEC = 000036	DPR14 = 000030 G	G\$PRML = 000000	L\$CCP = 002106 G	L10011 = 016720
C\$DCLN = 000044	DPR15 = 000032 G	G\$RADA = 000140	L\$CLEA = 020034 G	L10012 = 017402
C\$DODU = 000051	DPR16 = 000034 G	G\$RADB = 000000	L\$CO = 002032 G	L10014 = 017706
C\$DRPT = 000024	DPR17 = 000036 G	G\$RADD = 000040	L\$DEPO = 002011 G	L10015 = 017730

SYMBOL TABLE

L10016	020040	NOTPR	003353	ROMT7B	005220	T\$PCNT*	000000	T11E4	012524
L10017	020074	NOTRDY	003264	ROM11A	005346	T\$PTAB*	010075	T11F5	012573
L10020	020102	NOTST	015240	ROM11B	005416	T\$PTHV*	000016	T12	023240 G
L10021	020242	NRES	016412 G	RTERR	016070 G	T\$PTNU*	000016	T12ADR	002314
L10022	020444	NXM	016366 G	RT1	002320	T\$SAVL*	177777	T12E0	012625
L10023	020664	NXMVEC*	000004	RT10	002606	T\$SEGL*	177777	T12E1	012721
L10024	021120	O\$APTS*	000000	RT11	002640	T\$SIZE*	000214	T12E2	012771
L10025	021340	O\$AU*	000001	RT12	002672	T\$SUBN*	000000	T12E3	013052
L10026	021564	O\$BGNR*	000001	RT13	002724	T\$TAGL*	177777	T12E4	013132
L10027	022022	O\$BGNS*	000000	RT2	002352	T\$TAGN*	010077	T12E5	013205
L10030	022302	O\$DU*	000001	RT3	002404	T\$TEMP*	000005	T12E6	013262
L10031	022542	O\$ERRT*	000000	RT4	002436	T\$TEST*	000016	T13	023522 G
L10032	022774	O\$GNSW*	000000	RT5	002470	T\$TSTM*	177777	T13ADR	002316
L10033	023236	O\$POIN*	000001	RT6	002522	T\$TSTS*	000001	T13E0	013336
L10034	023520	O\$SETU*	000001	RT7	002554	T\$\$AU*	010020	T13E1	013404
L10035	024302	PLLIO	002262	SAVEC	002204	T\$\$AUT*	010015	T13E10	014277
L10036	024300	PLLIP	004331	SETSW	015264	T\$\$CLE*	010016	T13E11	014350
L10037	024476	PNT*	001000 G	SFP TBL	002204 G	T\$\$DAT*	010076	T13E2	013460
L10040	024570	PNTFLG	017336	SKIPPED	016722	T\$\$DU*	010017	T13E3	013545
L10041	024572	PRI*	002000 G	SLOT	015532	T\$\$HAR*	010040	T13E4	013653
L10042	024722	PRI00*	000000 G	SLU1	002256	T\$\$HW*	010000	T13E5	013727
L10043	024746	PRI01*	000040 G	SLU1T	004202	T\$\$INI*	010014	T13E6	014005
L10044	024742	PRI02*	000100 G	SLU2	002260	T\$\$MSG*	010011	T13E7	014105
L10045	024772	PRI03*	000140 G	SLU2A	004235	T\$\$PC*	000016	T13E8	014161
L10046	024766	PRI04*	000200 G	SLU2B	004273	T\$\$PRO*	010013	T13E9	014227
L10047	025016	PRI05*	000240 G	SLU2CF	004027	T\$\$PTA*	010075	T14	024304 G
L10050	025012	PRI06*	000300 G	SL2DMA	002232	T\$\$RPT*	010012	T2	020244 G
L10051	025042	PRI07*	000340 G	SOFT	016520 G	T\$\$SOF*	010041	T2ADR	002274
L10052	025036	QBASE	002216	SVCGPL*	000000	T\$\$SRV*	010036	T2E0	006200
L10053	025066	QIR	002266	SVCINS*	000000	T\$\$SW*	010001	T2E1	006253
L10054	025062	QIRSRV	024272 G	SVCSUB*	177777	T\$\$TES*	010037	T2E2	006323
L10055	025112	QIRT	004453	SVCTAG*	000000	T1	020104 G	T2E3	006374
L10056	025106	QIRT1	004500	SVCTST*	177777	T1ADR	002272	T2E4	006457
L10057	025136	QIRT2	004552	SWITCH	015047	T1E0	005524	T2E5	006542
L10060	025132	QIRVEC	002220	S\$LSYM*	010000	T1E1	005570	T2E6	006613
L10061	025162	RAM	002246	TESTID	014570	T1E2	005634	T2E7	006661
L10062	025156	RAMT	004151	TPR	015377	T1E3	005700	T2E8	006725
L10063	025206	RDELAY	016754	TPRDIS	016650 G	T1E4	005746	T2E9	007003
L10064	025202	REINIT	017210	TPR1	015453	T1E5	006016	T3	020446 G
L10065	025232	ROM	002250	T\$TEHR	014653	T1E6	006064	T3ADR	002276
L10066	025226	ROMD	003112	T\$TNO	016045	T1E7	006132	T3E0	007061
L10067	025256	ROMETX	014556	T\$T1	004663	T10	022544 G	T3E1	007137
L10070	025252	ROMSG	014531	T\$ARGC*	000002	T10ADR	002310	T3E2	007215
L10071	025302	ROMT	004170	T\$CODE*	001004	T10E0	011477	T3E3	007313
L10072	025276	ROMTST	002234	T\$ERRN*	000063	T10E1	011560	T4	020666 G
L10073	025326	ROMT1	004721	T\$EXCP*	000000	T10E2	011621	T4ADR	002300
L10074	025322	ROMT10	005267	T\$FLAG*	000041	T10E3	011657	T5	021122 G
L10076	025346	ROMT11	005317	T\$FREE*	025346	T10E4	011714	T5ADR	002302
MOHEDR	002000 G	ROMT12	005462	T\$GMAN*	000000	T10E5	011767	T5E0	007411
NEXT	017516	ROMT13	005507	T\$HILI*	000017	T10E6	012037	T5F1	007471
NOINFO	014712	ROMT2	004744	T\$LAST*	000001	T10E7	012116	T5E2	007544
NOIOP	002756	ROMT3	004767	T\$LOLI*	000002	T11	022776 G	T5E3	007607
NONO	016620 G	ROMT4	005023	T\$LSYM*	010000	T11ADR	002312	T6	021342 G
NOREG	014500	ROMT5	005062	T\$LTNO*	000016	T11E0	012161	T6ADR	002304
NORES	003054	ROMT6	005117	T\$NEST*	177777	T11E1	012260	T6E0	007647
NOSEC	017732	ROMT7*	***** GX	T\$NSO*	000005	T11E2	012365	T6E1	007745
NOTCLR	015321	ROMT7A	005151	T\$NS1*	000010	T11E3	012437	T6E2	010025

SYMBOL TABLE

T6E3	010074	T7E0	010337	T7E4	010634	T7E9	011227	X\$ALWA	= 000000
T6E4	010154	T7E1	010417	T7E5	010707	T8	022024 G	X\$FALS	= 000040
T6E5	010223	T7E10	011320	T7E6	010775	T9	022304 G	X\$OFFS	= 000400
T6E6	010266	T7E11	011412	T7E7	011054	UAM	= 000200 G	X\$TRUE	= 000020
T7	021566 G	T7E2	010504	T7E8	011132	UROM	004127	\$PATCH	024572 G
T7ADR	002306	T7E3	010560						

. ABS. 025346 000
 000000 001

ERRORS DETECTED: 0

VIRTUAL MEMORY USED: 28581 WORDS (112 PAGES)
 DYNAMIC MEMORY: 19748 WORDS (75 PAGES)
 ELAPSED TIME: 00:18:19
 CNKTCA.BIC,CNK1CA.LST/CR/-SP=SVC34.MLB/ML,CNKTC.A.P11

SYMBOL CROSS REFERENCE

REF VOP

SYMBOL	VALUE	REFERENCES
ABORT	017704	110-1714 110-1724 111-1729 #111-1757
ADR	= 000020 G	#19-691
ASSEMB	= 000010	15-543
BADSW	003151	#29-1020 105-1466
BASE	003443	#32-1028 146-2918
BEVNT	004174	#37-1044 126-2241 127-2269
BIT0	= 000001 G	#19-691 127-2263 129-2330 129-2335 131-2405 133-2476 135-2544 137-2611 137-2615
		139-2682 139-2686 141-2751
BIT00	= 000001 G	#19-691 19-691
BIT01	= 000002 G	#19-691 19-691
BIT02	= 000004 G	#19-691 19-691
BIT03	= 000010 G	#19-691 19-691
BIT04	= 000020 G	#19-691 19-691
BIT05	= 000040 G	#19-691 19-691
BIT06	= 000100 G	#19-691 19-691
BIT07	= 000200 G	#19-691 19-691
BIT08	= 000400 G	#19-691 19-691
BIT09	= 001000 G	#19-691 19-691
BIT1	= 000002 G	#19-691 137-2616 139-2688 139-2692
BIT10	= 002000 G	#19-691 111-1747
BIT11	= 004000 G	#19-691
BIT12	= 010000 G	#19-691
BIT13	= 020000 G	#19-691
BIT14	= 040000 G	#19-691
BIT15	= 100000 G	#19-691
BIT2	= 000004 G	#19-691 141-2757
BIT3	= 000010 G	#19-691 145-2881 145-2885
BIT4	= 000020 G	#19-691
BIT5	= 000040 G	#19-691
BIT6	= 000100 G	#19-691
BIT7	= 000200 G	#19-691
BIT8	= 000400 G	#19-691
BIT9	= 001000 G	#19-691 107-1525
BOE	= 000400 G	#19-691
BVNT	002254	#20-768 126-2232 127-2259 127-2261
CCPU	003415	#31-1026 146-2916
CKTPRO	017014	#104-1442 117-1951 118-1978 120-2037 122-2101 124-2166 126-2230 128-2295 130-2364
		132-2439 134-2508 136-2577 138-2648 140-2723 144-2864
CMDERR	016570 G	#101-1353 119-2003 121-2062 123-2129 125-2191 127-2255 129-2322 131-2393 133-2468
		135-2536 137-2603 139-2674 140-2743 144-2872
CMND	003221	#30-1022 119-2003 121-2062 123-2129 125-2191 127-2255 129-2322 131-2393 133-2468
		135-2536 137-2603 139-2674 140-2743 144-2872
CMNDR	015142	#93-1240 101-1355
CPU	002252	#20-767 124-2168 125-2195 125-2197
CPUT	004643	#42-1060 124-2177 125-2199
CSR	002244	#20-764 118-1980 119-2007 119-2009
CSRT	004145	#35-1039 118-1989 119-2011
C\$AU	= 000052	#15-543 115-1900
C\$AUTO	= 000061	#15-543 112-1795
C\$BRK	= 000022	#15-543 103-1426
C\$BSEG	= 000004	#15-543
C\$BSUB	= 000002	#15-543

SYMBOL CROSS REFERENCE

CREF V02

SYMBOL	VALUE	REFERENCES
C\$CEFG	= 000045	#15-543
C\$CLOCK	= 000062	#15-543
C\$CLEA	= 000012	#15-543 113-1833
C\$CLOS	= 000035	#15-543
C\$CLP1	= 000006	#15-543 117-1953 118-1991 119-2014 120-2050 121-2076 122-2117 123-2143 124-2179 125-2205 126-2243 127-2272 128-2310 129-2341 130-2381 131-2416 132-2456 133-2485 134-2524 135-2553 136-2591 137-2623 138-2662 139-2699 141-2768 142-2794 143-2907 143-2819 145-2895
C\$CVEC	= 000036	#15-543 117-1954 142-2775
C\$DCLN	= 000044	#15-543 104-1453 105-1469 105-1474 111-1757 116-1942 118-1976 118-1994 120-2035 120-2053 121-2074 122-2099 122-2120 123-2141 124-2164 124-2182 125-2203 126-2228 126-2246 128-2293 128-2313 130-2362 130-2384 132-2437 132-2459 134-2506 134-2527 136-2575 136-2594 138-2646 138-2665 140-2721 143-2809 144-2862 145-2893
C\$DDDU	= 000051	#15-543 104-1451 105-1467 105-1472 116-1940 118-1992 120-2051 121-2072 122-2118 123-2139 124-2180 125-2201 126-2244 128-2311 130-2382 132-2457 134-2525 136-2592 138-2663 145-2891
C\$DRPT	= 000024	#15-543
C\$DU	= 000053	#15-543 114-1863
C\$EDIT	= 000003	#15-543 15-585
C\$ERDF	= 000055	#15-543 104-1450 105-1471 116-1939 118-1990 120-2049 121-2071 122-2116 123-2138 124-2178 125-2200 126-2242 128-2309 130-2380 132-2455 134-2523 136-2590 138-2661 143-2806 145-2890
C\$ERHR	= 000056	#15-543 119-2003 119-2012 121-2062 123-2129 125-2191 127-2255 127-2270 129-2322 129-2339 131-2393 131-2414 133-2468 133-2483 135-2536 135-2551 137-2603 137-2621 139-2674 139-2697 140-2743 141-2767 142-2793 143-2817 144-2872
C\$ERRO	= 000060	#15-543
C\$ERSF	= 000054	#15-543
C\$ERSO	= 000057	#15-543 105-1466
C\$ESCA	= 000010	#15-543
C\$ESEG	= 000005	#15-543
C\$ESUB	= 000003	#15-543
C\$ETST	= 000001	#15-543 117-1955 119-2016 121-2078 123-2145 125-2207 127-2274 129-2343 131-2418 133-2487 135-2555 137-2625 139-2701 143-2833 145-2897
C\$EXIT	= 000032	#15-543 111-1755 113-1817 127-2267 131-2409 133-2480 135-2548 140-2744 141-2755 141-2761 141-2769 142-2795 143-2820
C\$GETB	= 000026	#15-543
C\$GETW	= 000027	#15-543
C\$GMAN	= 000043	#15-543
C\$GPHR	= 000042	#15-543 110-1725
C\$GPLO	= 000030	#15-543
C\$GPRI	= 000040	#15-543
C\$INIT	= 000011	#15-543 111-1772
C\$INLP	= 000020	#15-543
C\$MANI	= 000050	#15-543
C\$MEM	= 000031	#15-543
C\$MSG	= 000023	#15-543 99-1329 100-1334 100-1339 100-1345 101-1351 101-1356 101-1361 102-1368
C\$OPEN	= 000034	#15-543
C\$PNTB	= 000014	#15-543 98-1288 100-1333 100-1338 100-1343 101-1349 101-1355 101-1360 102-1366 102-1382
C\$PNTF	= 000017	#15-543 106-1495 106-1510 107-1528 112-1793 114-1845
C\$PNTS	= 000016	#15-543
C\$PNTX	= 000015	#15-543 98-1300 98-1304 99-1308 99-1320 99-1328 100-1344 101-1350 102-1367

SYMBOL CROSS REFERENCE

CREF V02

SYMBOL	VALUE	REFERENCES
C\$QIO	= 000377	#15-543
C\$ROBU	= 000007	#15-543
C\$REFG	= 000047	#15-543 110-1709 110-1713 110-1715
C\$RESE	= 000033	#15-543 #15-543
C\$REVI	= 000003	#15-543 15-585
C\$RFLA	= 000021	#15-543 107-1524
C\$RPT	= 000025	#15-543 108-1643
C\$SEFG	= 000046	#15-543
C\$SPRI	= 000041	#15-543 116-1930 140-2732 140-2735 141-2764 142-2773 142-2779 142-2790
C\$SVEC	= 000037	#15-543 110-1707 116-1926 140-2730 142-2778
C\$TPRI	= 000013	#15-543
DELCNT	002236	#20-753 *103-1423 103-1425
DFPTBL	002162	G #17-624
DIAGMC	= 000000	15-543 15-543
DMA	002264	#20-772 136-2580 137-2607 137-2609 138-2651 139-2678 139-2680
DMAL	004353	#39-1051 136-2589 137-2620
DMAT	004413	#39-1052 138-2660 139-2696
DPR	002270	#20-774 144-2866 145-2877 145-2879
DPRT	004626	#41-1058 145-2889
DPRO	= 000000	G #20-723 104-1445 *106-1497 106-1500 *118-1980 118-1983 *120-2039 120-2042 *122-2107 122-2109 *124-2168 124-2171 *126-2232 126-2235 *128-2299 128-2302 *130-2370 130-2373 *132-2445 132-2448 *134-2513 134-2516 *136-2580 136-2583 *138-2651 138-2654 *140-2734 143-2802 *144-2866
DPR1	= 000002	G #20-724 104-1455 105-1464 106-1506 119-2001 121-2060 123-2127 125-2189 127-2253 129-2320 131-2391 133-2466 135-2534 137-2601 139-2672 140-2741 144-2870
DPR10	= 000020	G #20-771
DPR11	= 000022	G #20-752
DPR12	= 000024	G #20-733
DPR13	= 000026	G #20-734
DPR14	= 000030	G #20-735
DPR15	= 000032	G #20-736
DPR16	= 000034	G #20-737
DPR17	= 000036	G #20-738
DPR2	= 000004	G #20-725 *101-1476 119-2006 *119-2009 121-2065 *121-2068 123-2132 *123-2135 125-2194 *125-2197 127-2258 *127-2261 129-2325 *129-2328 131-2396 *131-2399 133-2471 *133-2474 135-2539 *135-2542 137-2606 *137-2609 139-2677 *139-2680 141-2747 143-2811 *143-2814 145-2876 *145-2879
DPR3	= 000006	G #20-726 *105-1477 *106-1496 119-2010 121-2069 *122-2105 123-2136 125-2198 127-2262 129-2329 *130-2369 131-2400 *132-2444 133-2475 135-2543 *136-2579 137-2610 *138-2650 139-2681 *140-2733 141-2750 147-2815 145-2880
DPR4	= 000010	G #20-727
DPR5	= 000012	G #20-728
DPR6	= 000014	G #20-729
DPR7	= 000016	G #20-730
DROP	014772	#92-1237 114-1845
DROPUN	002206	#20-741 *104-1452 *105-1468 *105-1473 *110-1712 *116-1941 118-1974 *118-1993 120-2033 *120-2052 *121-2073 122-2097 *122-2119 *123-2140 124-2162 *124-2181 *125-2202 126-2226 *126-2245 128-2291 *128-2312 130-2360 *130-2383 132-2435 *132-2458 134-2504 *134-2526 136-2573 *136-2593 138-2644 *138-2664 140-2719 *143-2808 144-2860 *145-2892
DSPCOD	002122	G #16-605
EF.CON	= 000036	G #19-691 110-1709
EF.NEW	= 000035	G #19-691 110-1715

SYMBOL CROSS REFERENCE

REF VO2

SYMBOL	VALUE	REFERENCES
EF.PWR	= 000034 G	#19-691 110-1713
EF.RES	= 000037 G	#19-691
EF.STA	= 000040 G	#19-691
END	= 017706	110-1710 #111-1758
EVL	= 000004 G	#19-691
E\$END	= 002100	#15-543
F\$LOAD	= 000035	#15-543 15-585
F\$AU	= 000015	#15-543 115-1873 115-1900
F\$AUTO	= 000020	#15-543 112-1783 112-1795
F\$BGN	= 000040	#15-543 15-559 15-586 16-605 16-607 19-690 19-707 20-715 27-999
		98-1286 100-1332 100-1336 100-1341 101-1347 101-1353 101-1358 102-1364 108-1615
		109-1652 110-1681 111-1755 112-1783 113-1806 113-1817 114-1842 115-1873 116-1922
		117-1955 118-1971 119-2016 120-2029 121-2078 122-2093 123-2145 124-2158 125-2207
		126-2222 127-2267 127-2274 128-2287 129-2343 130-2356 131-2409 131-2418 132-2431
		133-2480 133-2487 134-2500 135-2548 135-2555 136-2569 137-2625 138-2640 139-2701
		140-2715 140-2744 141-2755 141-2761 141-2769 142-2795 143-2820 143-2828 143-2833
		144-2856 145-2897 146-2914 147-2934 148-2949 149-2971 149-2975 149-2975 149-2984
		149-2988 149-2988 149-2997 150-3002 150-3002 150-3011 150-3015 150-3015 150-3024
		151-3029 151-3029 151-3038 151-3042 151-3042 151-3051 152-3056 152-3056 152-3078
		152-3069 152-3069 152-3078 153-3083 153-3083 153-3092 153-3096 153-3096 153-3105
		154-3110 154-3110 154-3119 154-3123 154-3123 154-3132 155-3137 155-3137 155-3146
		155-3150 155-3150 155-3159 155-3161
F\$CL EA	= 000007	#15-543 113-1806 113-1833
F\$DU	= 000016	#15-543 114-1842 114-1863
F\$END	= 000041	#15-543 15-543 15-543 15-543 15-543 15-543 15-543 15-543 15-543 15-543
		15-586 16-605 16-607 19-690 19-707 20-715 27-999 99-1329 100-1334
		100-1339 100-1345 101-1351 101-1356 101-1361 102-1368 108-1643 111-1755 111-1772
		112-1795 113-1817 113-1833 114-1847 114-1863 115-1884 115-1900 116-1922 116-1922
		116-1922 117-1955 117-1955 118-1971 118-1971 118-1971 119-2016 119-2016 120-2029
		120-2029 120-2029 121-2078 121-2078 122-2093 122-2093 122-2093 123-2145 123-2145
		124-2158 124-2158 124-2158 125-2207 125-2207 126-2222 126-2222 126-2222 127-2267
		127-2274 127-2274 128-2287 128-2287 128-2287 129-2343 129-2343 130-2356 130-2356
		130-2356 131-2409 131-2418 131-2418 132-2431 132-2431 132-2431 133-2480 133-2487
		133-2487 134-2500 134-2500 134-2500 135-2548 135-2555 135-2555 136-2569 136-2569
		136-2569 137-2625 137-2625 138-2640 138-2640 138-2640 139-2701 139-2701 140-2715
		140-2715 140-2715 140-2744 141-2755 141-2761 141-2769 142-2795 143-2820 143-2831
		143-2833 143-2833 144-2856 144-2856 144-2856 145-2897 145-2897 147-2934 147-2935
		148-2951 149-2971 149-2975 149-2984 149-2988 149-2997 150-3002 150-3011 150-3015
		150-3024 151-3029 151-3038 151-3042 151-3051 152-3056 152-3065 152-3069 152-3078
		153-3083 153-3092 153-3096 153-3105 154-3110 154-3119 154-3123 154-3132 155-3137
		155-3146 155-3150 155-3159 155-3161
F\$HARD	= 000004	#15-543 146-2914 147-2934 147-2934 147-2935
F\$HW	= 000013	#15-543 17-624 17-653
F\$INIT	= 000006	#15-543 110-1681 111-1772
F\$JMP	= 000050	#15-543 111-1755 113-1817 114-1847 114-1847 115-1884 115-1884 127-2267 131-2409
		133-2480 135-2548 140-2744 141-2755 141-2761 141-2769 142-2795 143-2820 147-2934
F\$MOD	= 000000	#15-543 15-559 15-586 16-605 16-607 19-690 19-707 20-715 27-999
F\$MSG	= 000011	#15-543 98-1286 99-1329 100-1332 100-1334 100-1336 100-1339 100-1341 100-1345
		101-1347 101-1351 101-1353 101-1356 101-1358 101-1361 102-1364 102-1368
F\$PROT	= 000021	#15-543 109-1652 109-1658
F\$PWR	= 000017	#15-543

SYMBOL CROSS REFERENCE		REF	VO2							
SYMBOL	VALUE	REFERENCES								
F\$RPT	= 000012	#15-543	108-1615	108-1643						
F\$SEG	= 000003	#15-543								
F\$SOF1	= 000005	#15-543	148-2949	148-2951						
F\$SRV	= 000010	#15-543	143-2828	143-2831						
F\$SUB	= 000002	#15-543								
F\$SW	= 000014	#15-543	18-664	18-674						
F\$TEST	= 000001	#15-543	116-1922	117-1955	118-1971	119-2016	120-2029	121-2078	122-2093	123-2145
		124-2158	125-2207	126-2222	127-2274	128-2287	129-2343	130-2356	131-2418	132-2431
		133-2487	134-2500	135-2555	136-2569	137-2625	138-2640	139-2701	140-2715	143-2833
		144-2856	145-2897							
GENMSG	016444	G #100-1341	141-2767	142-2793						
GLBDAT	002204	G #20-715								
GLBEQA	002204	G #19-690								
G\$CNT0	= 000200	#15-543								
G\$DELM	= 000372	#15-543								
G\$DISP	= 000003	#15-543								
G\$EXCP	= 000400	#15-543								
G\$HILI	= 000002	#15-543								
G\$LOLI	= 000001	#15-543								
G\$NO	= 000000	#15-543	146-2916							
G\$OFFS	= 000400	#15-543	146-2916	146-2918	146-2920	146-2923	146-2925	146-2927	147-2930	147-2932
G\$OFFSI	= 000376	#15-543	146-2916	146-2918	146-2920	146-2923	146-2925	146-2927	147-2930	147-2932
G\$PRMA	= 000001	#15-543								
G\$PRMD	= 000002	#15-543	146-2916							
G\$PRML	= 000000	#15-543	146-2918	146-2920	146-2923	146-2925	146-2927	147-2930	147-2932	
G\$RADA	= 000140	#15-543								
G\$RADB	= 000000	#15-543								
G\$RADD	= 000040	#15-543	146-2916							
G\$RADL	= 000120	#15-543	146-2918	146-2920	146-2923	146-2925	146-2927	147-2930	147-2932	
G\$RADO	= 000020	#15-543								
G\$XFER	= 000004	#15-543	147-2934							
G\$YES	= 000010	#15-543	146-2918	146-2920	146-2923	146-2925	146-2927	147-2930	147-2932	
HELP	= 000000	#2-9	#15-550	15-568	15-588	16-608	17-626	18-666	#19-679	19-693
		89-1207	89-1217	97-1257	97-1269	102-1385	108-1533	108-1540	108-1546	108-1553
		108-1559	108-1566	108-1572	108-1580	108-1589	108-1596	#108-1604	108-1617	108-1629
		109-1660	110-1683	111-1760	112-1785	113-1808	113-1819	114-1849	115-1875	115-1886
		#116-1906								
HIMEM	002242	#20-755	*110-1717	*110-1718	138-2650					
HOE	= 100000	G #19-691								
IBE	= 010000	G #19-691								
IDU	= 000040	G #19-691								
TFR	= 020000	G #19-691								
INITNG	015676	#97-1252	106-1495							
INITOK	015763	#97-1253	106-1510							
INTACK	015606	#96-1250	98-1304							
INTFLG	002240	#20-754	*140-2728	140-2739	*142-2774	142-2782	*143-2830			
IOPN	002212	#20-743	*111-1728	111-1730	111-1736	*111-1742	111-1744			
IOPNN	002214	#20-744	98-1287	100-1337	100-1342	101-1348	101-1354	101-1359	102-1365	102-1381
		106-1493	107-1527	*111-1730	*111-1733	114-1844				
ISR	= 000100	G #19-691								
IXF	= 004000	G #19-691								
I\$AU	= 000041	#15-543	#115-1873	#115-1900						

SYMBOL CROSS REFERENCE

REF VO2

SYMBOL	VALUE	REFERENCES
I\$AUTO	= 000041	#15-543 #112-1783 #112-1795
I\$CLN	= 000041	#15-543 #113-1806 113-1817 #. 13-1833
I\$DU	= 000041	#15-543 #114-1842 #114-1863
I\$HRD	= 000041	#146-2914 #147-2935
I\$INIT	= 000041	#15-543 #110-1681 111-1755 #111-1772
I\$MOD	= 000041	#15-543 15-559 #15-559 15-586 #15-586 16-605 #16-605 16-607 #16-607
		19-690 #19-690 19-707 #19-707 20-715 #20-715 27-999 #27-999
I\$MSG	= 000041	#15-543 #98-1286 #99-1329 #100-1332 #100-1334 #100-1336 #100-1339 #100-1341 #100-1345
		#101-1347 #101-1351 #101-1353 #101-1356 #101-1358 #101-1361 #102-1364 #102-1368
I\$PROT	= 000040	#15-543 #109-1652
I\$PTAB	= 000041	#15-543 149-2975 #149-2975 149-2984 #149-2984 149-2988 #149-2988 149-2997 #149-2997
		150-3002 #150-3002 150-3011 #150-3011 150-3015 #150-3015 150-3024 #150-3024 151-3029 #151-3029
		#151-3029 151-3038 #151-3038 151-3042 #151-3042 151-3051 #151-3051 152-3056 #152-3056 #152-3065 #152-3065 152-3069 #152-3069 152-3078 #152-3078 153-3083 #153-3083 153-3092 #153-3092 153-3096 #153-3096 153-3105 #153-3105 154-3110 #154-3110 154-3119 #154-3119
		154-3123 #154-3123 154-3132 #154-3132 155-3137 #155-3137 155-3146 #155-3146 155-3150 #155-3150 155-3159 #155-3159
I\$PWR	= 000041	#15-543
I\$RPT	= 000041	#15-543 #108-1615 #108-1643
I\$SEG	= 000041	#15-543 116-1922 118-1971 120-2029 122-2093 124-2158 126-2222 128-2287 130-2356
		132-2431 134-2500 136-2569 138-2640 140-2715 144-2856
I\$SETU	= 000041	#15-543 149-2971 #149-2971 149-2975 149-2988 150-3002 150-3015 151-3029 151-3042
		152-3056 152-3069 153-3083 153-3096 154-3110 154-3123 155-3137 155-3150 155-3161
I\$SFT	= 000041	#148-2949 #148-2951
I\$SRV	= 000041	#15-543 #143-2828 #143-2831
I\$SUB	= 000041	#15-543 116-1922 118-1971 120-2029 122-2093 124-2158 126-2222 128-2287 130-2356
		132-2431 134-2500 136-2569 138-2640 140-2715 144-2856
I\$TST	= 000041	#15-543 116-1922 #116-1922 117-1955 #117-1955 #117-1955 118-1971 #118-1971 119-2016 #119-2016 120-2029 #120-2029 121-2078 #121-2078 #121-2078 122-2093 #122-2093
		123-2145 #123-2145 #123-2145 124-2158 #124-2158 125-2207 #125-2207 #125-2207 126-2222 #126-2222
		#126-2222 127-2267 127-2274 #127-2274 #127-2274 128-2287 #128-2287 129-2343 #129-2343
		#129-2343 130-2356 #130-2356 131-2409 131-2418 #131-2418 #131-2418 132-2431 #132-2431
		133-2480 133-2487 #133-2487 #133-2487 134-2500 #134-2500 135-2548 135-2555 #135-2555
		#135-2555 136-2569 #136-2569 137-2625 #137-2625 #137-2625 138-2640 #138-2640 139-2701 #139-2701
		#139-2701 #139-2701 140-2715 #140-2715 140-2744 141-2755 141-2761 141-2769 142-2795
		143-2820 143-2833 #143-2833 #143-2833 144-2856 #144-2856 145-2897 #145-2897 #145-2897
J\$JMP	= 000167	#15-543 114-1847 115-1884
LOE	= 040000 G	#19-691
LOOPB1	002222	#20-747 *111-1749 128-2296
LOOPB2	002224	#20-748 *111-1750 130-2365
LOOPB3	002226	#20-749 *111-1751 132-2440
LOOPB4	002230	#20-750 *111-1752 134-2509
LOOP1	003535	#32-1029 146-2920
LOOP2	003622	#33-1031 146-2923
LOOP3	003702	#33-1032 146-2925
LOOP4	003762	#34-1034 146-2927
LOT	= 000010 G	#19-691
LUN	002210	#20-742 104-1451 105-1467 105-1472 *110-1720 *110-1722 110-1723 110-1725 116-1940
		118-1992 120-2051 121-2072 122-2118 123-2139 124-2180 125-2201 126-2244 128-2311
		130-2382 132-2457 134-2525 136-2592 138-2663 145-2891
L\$ACP	002110 G	#15-585

SYMBOL CROSS REFERENCE

CREF V02

SYMBOL	VALUE	REFERENCES
L\$APT	002036 G	#15-585
L\$AU	020076 G	15-585 #115-1873
L\$AUT	002070 G	#15-585
L\$AUTO	017710 G	15-585 #112-1783
L\$CCP	002106 G	#15-585
L\$CLFA	020034 G	15-585 #113-1806
L\$CO	002032 G	#15-585
L\$DEPO	002011 G	#15-585
L\$DESC	014432 G	15-585 #89-1215
L\$DESP	002076 G	#15-585
L\$DEVP	002060 G	#15-585
L\$DISP	002124 G	15-585 #16-606
L\$DLY	002116 G	#15-585
L\$DTP	002040 G	#15-585
L\$DTYP	002034 G	#15-585
L\$DU	020042 G	15-585 #114-1842
L\$DUT	002072 G	#15-585
L\$DVTY	014422 G	15-585 #89-1205
L\$EF	002052 G	#15-585
L\$ENVI	002044 G	#15-585
L\$ETP	002102 G	#15-585
L\$EXP1	002046 G	#15-585
L\$EXP4	002064 G	#15-585
L\$EXP5	002066 G	#15-585
L\$HARD	024502 G	15-585 146-2914 #146-2914
L\$HIME	002120 G	#15-585 110-1717
L\$HPCP	002016 G	#15-585
L\$HPTP	002022 G	#15-585
L\$HW	002162 G	15-585 17-624 #17-624
L\$ICP	002104 G	#15-585
L\$INIT	017412 G	15-585 #110-1681
L\$LADP	002026 G	#15-585
L\$LAST	024716 G	15-585 #148-2956 155-3161
L\$LOAD	002100 G	#15-585
L\$LUN	002074 G	#15-585
L\$MREV	002050 G	#15-585
L\$NAME	002000 G	#15-585
L\$PRIO	002042 G	#15-585
L\$PROT	017404 G	15-585 #109-1652
L\$PRT	002112 G	#15-585
L\$REPP	002062 G	#15-585
L\$REV	002010 G	#15-585
L\$RPT	017402 G	15-585 #108-1615
L\$SOFT	024572 G	148-2949 #148-2949
L\$SPC	002056 G	#15-585
L\$SPCP	002020 G	#15-585
L\$SPTP	002024 G	#15-585
L\$STA	002030 G	#15-585
L\$SW	002204 G	18-664 #18-664
L\$TEST	002114 G	#15-585
L\$TIML	002014 G	#15-585
L\$UNIT	002012 G	#15-585 110-1723

SYMBOL CROSS REFERENCE

REF VOL

SYMBOL	VALUE	REFERENCES
L10000	002202	17-624 017-654
L10001	002204	18-664 018-674
L10002	016364	099-1329
L10003	016410	0100-1334
L10004	016442	0100-1339
L10005	016516	0100-1345
L10006	016566	0101-1351
L10007	016616	0101-1356
L10010	016646	0101-1361
L10011	016720	0102-1368
L10012	017402	0108-1643
L10014	017706	111-1755 0111-1772
L10015	017730	0112-1795
L10016	020040	113-1817 0113-1853
L10017	020074	114-1847 0114-1863
L10020	020102	115-1884 0115-1900
L10021	020242	0117-1955
L10022	020444	0119-2016
L10023	020664	0121-2078
L10024	021120	0123-2145
L10025	021340	0125-2207
L10026	021564	127-2267 0127-2274
L10027	022022	0129-2343
L10030	022302	131-2409 0131-2418
L10031	022542	133-2480 0133-2487
L10032	022774	135-2548 0135-2555
L10033	023236	0137-2625
L10034	023520	0139-2701
L10035	024302	140-2744 141-2755 141-2761 141-2769 142-2795 143-2820 0143-2833
L10036	024300	0143-2831
L10037	024476	0145-2897
L10040	024570	146-2914 147-2934 0147-2935
L10041	024572	148-2949 0148-2951
L10042	024722	0149-2975
L10043	024746	149-2975 0149-2988
L10044	024742	149-2975 0149-2984
L10045	024772	149-2988 0150-3002
L10046	024766	149-2988 0149-2997
L10047	025016	150-3002 0150-3015
L10050	025012	150-3002 0150-3011
L10051	025042	150-3015 0151-3029
L10052	025036	150-3015 0150-3024
L10053	025066	151-3029 0151-3042
L10054	025062	151-3029 0151-3038
L10055	025112	151-3042 0152-3056
L10056	025106	151-3042 0151-3051
L10057	025136	152-3056 0152-3069
L10060	025132	152-3056 0152-3065
L10061	025162	152-3069 0153-3083
L10062	025156	152-3069 0152-3078
L10063	025206	153-3083 0153-3096
L10064	025202	153-3083 0153-3092

SYMBOL CROSS REFERENCE		CREF	VAL
SYMBOL	VALUE	REFERENCES	
QIR	002266	020-773 140-2734 141-2748 143-2817 144-2814	
QIRSRV	024272	G 140-2730 142-2778 0143-2828	
QIR7	004453	040-1054 141-2765 142-2791 143-2804 143-2816	
QIR71	004500	040-1055 141-2766	
QIR72	004552	041-1057 142-2792	
QIRVEC	002220	020-746 *140-2727 140-2730 140-2733 142-2775 *142-2776 142-2778	
RAM	002246	020-765 120-2039 121-2066 121-2068	
RAMI	004151	036-1041 120-2048 121-2070	
RDELAY	016754	0103-1120 104-1443 106-1498 118-1985 120-2044 122-2111 124-2173 126-2257 128-2304 130-2375 132-2450 134-2518 136-2585 138-2656 140-2737 142-2784 143-2809 144-2867	
REINIT	017210	104-1447 104-1460 0106-1493 117-1948	
ROM	002250	020-766 122-2107 123-2133 123-2135	
ROMD	003112	029-1019 119-2012 121-2071 123-2138 125-2200 127-2270 129-2339 131-2414 133-2483 135-2551 137-2621 139-2697 141-2767 142-2793 143-2817 145-2890	
ROMETX	014556	090-1231 91-1300 100-1344	
ROMSG	014531	090-1230 99-1308	
ROMT	004170	036-1042 122-2115 123-2137	
ROMTST	002234	020-752 *111-1754 122-2103	
ROMT1	004721	22-833 043-1063 118-1972	
ROMT10	005267	25-934 047-1075 134-2502	
ROMT11	005317	26-949 047-1076	
ROMT12	005462	26-963 049-1081 140-2717	
ROMT13	005507	27-978 049-1082 144-2858	
ROMT2	004744	22-847 043-1064 120-2031	
ROMT3	004767	23-862 044-1066 122-2095	
ROMT4	005023	23-876 044-1067 124-2160	
ROMT5	005062	24-891 045-1069 126-2224	
ROMT6	005117	24-905 045-1070 128-2289	
ROMT7	* *****	GX 25-920	
ROMT7A	005151	046-1072 130-2358	
ROMT7B	005220	046-1073 132-2433	
ROM11A	005346	048-1078 136-2571	
ROM11B	005416	048-1079 138-2642	
RTERR	016070	G 098-1286 119-2012 121-2071 123-2138 125-2200 127-2270 129-2339 131-2414 133-2483 135-2551 137-2621 139-2697 143-2817 145-2890	
RT1	002320	21-807 022-833	
RT10	002606	21-814 025-934	
RT11	002640	21-815 026-949	
RT12	002672	21-816 026-963	
RT13	002724	21-817 027-978	
RT2	002352	21-808 022-847	
RT3	002404	21-809 023-862	
RT4	002436	21-810 023-876	
RT5	002470	21-811 024-891	
RT6	002522	21-812 024-905	
RT7	002554	21-813 025-920	
SAVEC	002204	020-740	
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SFPTBL	002204	G 018-664	
SKIPPED	016722	0102-1381 127-2266 129-2333 131-2408 133-2479 135-2547 137-2614 139-2685 139-2691 141-2754 141-2760 145-2884	
SLUT	015532	096-1249 98-1300	

SYMBOL CROSS REFERENCE

CREF V02

SYMBOL	VALUE	REFERENCES
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101-1350	101-1350	101-1350
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104-1450	104-1450	104-1450
104-1451	104-1451	104-1451
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105-1469	105-1471	105-1471
105-1472	105-1472	105-1472
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SYMBOL CROSS REFERENCE

REF VO2

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124-2180	124-2182	124-2182
125-2191	125-2191	125-2200
125-2200	125-2201	125-2201
125-2207	125-2207	126-2228
126-2242	126-2242	126-2242
126-2246	126-2246	126-2246
127-2255	127-2255	127-2255
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128-2293	128-2309	128-2309
128-2310	128-2310	128-2311
129-2322	129-2322	129-2322
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133-2485	133-2485	133-2487
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134-2525	134-2525	134-2527
135-2536	135-2536	135-2536
135-2551	135-2551	135-2551
135-2555	136-2575	136-2575
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SYMBOL CROSS REFERENCE

REF VOL

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SWITCH	015047	#92-1238 101-1349
S&LSYM	= 010000	#15-543 #17-653 #18-674 #99-1329 #100-1334 #100-1339 #100-1345 #101-1351 #101-1356
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		#119-2016 #121-2078 #123-2145 #125-2207 #127-2274 #129-2343 #131-2418 #133-2487 #135-2555

SYMBOL CROSS REFERENCE

CREF VOP

SYMBOL	VALUE	REFERENCES
TESTID	014570	#137-2695 #139-2701 #143-2831 #143-2833 #145-2897 #147-2935 #148-2951
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TPRDT5	016650 G	#95-1246 102-1366
TPR1	015453	#102-1364 105-1471
TSTERR	014653	#95-1247 102-1367
TSTND	016045	#91-1234 98-1288 100-1343
TST1	004663	#97-1254 107-1528
T\$ARGC	= 000002	#42-1061 116-1923
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T\$EXCP	= 000000	#146-2916 146-2916
T\$FLAG	= 000041	#111-1755 #111-1755 111-1755 111-1755 #113-1817 #113-1817 113-1817 113-1817 #114-1847 114-1847 #114-1847
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T\$GMAN	= 000000	#15-543
T\$HILI	= 000017	#146-2916 146-2916
T\$LAST	= 000001	#15-543 #148-2956 149-2971

SYMBOL CROSS REFERENCE

CREF V02

SYMBOL	VALUE	REFERENCES
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		133-2487 133-2487 133-2487 #133-2487 134-2500 #134-2500 134-2500 135-2555 135-2555
		135-2555 #135-2555 136-2569 #136-2569 136-2569 137-2625 137-2625 137-2625 #137-2625
		138-2640 #138-2640 138-2640 139-2701 139-2701 139-2701 #139-2701 140-2715 #140-2715
		140-2715 143-2828 #143-2828 143-2828 143-2831 143-2831 143-2831 #143-2831 143-2833
		143-2833 143-2833 #143-2833 144-2856 #144-2856 144-2856 145-2897 145-2897 145-2897
		#145-2897 146-2914 #146-2914 146-2914 147-2934 147-2934 147-2935 147-2935 147-2935
		#147-2935 148-2949 #148-2949 148-2949 148-2949 148-2951 148-2951 148-2951 #148-2951
T\$NSO	= 000005	#15-559 15-586 #16-605 16-607 #17-624 17-653 #18-664 18-674 #19-690
		19-707 #20-715 27-999 #98-1286 99-1329 #100-1332 100-1334 #100-1336 100-1339
		#100-1341 100-1345 #101-1347 101-1351 #101-1353 101-1356 #101-1358 101-1361 #102-1364
		102-1368 #108-1615 108-1643 #109-1652 109-1658 #110-1681 111-1772 #112-1783 112-1795
		#113-1806 113-1833 #114-1842 114-1863 #115-1873 115-1900 #116-1922 117-1955 #118-1971
		119-2016 #120-2029 121-2078 #122-2093 123-2145 #124-2158 125-2207 #126-2222 127-2274
		#128-2287 129-2343 #130-2356 131-2418 #132-2431 133-2487 #134-2500 135-2555 #136-2569
		137-2625 #138-2640 139-2701 #140-2715 143-2833 #144-2856 145-2897 #146-2914 147-2934
		147-2934 #148-2949 148-2951
T\$NS1	= 000010	#143-2828 143-2831
T\$PCNT	= 000000	#149-2971 149-2975 #149-2975 149-2975 149-2988 #149-2988 149-2988 150-3002 #150-3002
		150-3002 150-3015 #150-3015 150-3015 151-3029 #151-3029 151-3029 151-3042 #151-3042
		151-3042 152-3056 #152-3056 152-3056 152-3069 #152-3069 152-3069 153-3083 #153-3083
		153-3083 153-3096 #153-3096 153-3096 154-3110 #154-3110 154-3110 154-3123 #154-3123
		154-3123 155-3137 #155-3137 155-3137 155-3150 #155-3150 155-3150 155-3150
T\$PTAB	= 010075	#149-2975 149-2975 149-2975 #149-2988 149-2988 149-2988 #150-3002 150-3002 150-3002

SYMBOL CROSS REFERENCE

CREF V02

SYMBOL	VALUE	REFERENCES
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		#152-3056 152-3056 152-3056 #152-3069 152-3069 152-3069 #153-3083 153-3083 153-3083
		#153-3096 153-3096 153-3096 #154-3110 154-3110 154-3110 #154-3123 154-3123 154-3123
		#155-3137 155-3137 155-3137 #155-3150 155-3150 155-3150
T\$PTNV	= 000016	15-585 #155-3161
T\$PTNU	= 000016	#15-543 149-2975 #149-2975 149-2988 #149-2988 150-3002 #150-3002 150-3015 #150-3015
		151-3029 #151-3029 151-3042 #151-3042 152-3056 #152-3056 152-3069 #152-3069 153-3083
		#153-3083 153-3096 #153-3096 154-3110 #154-3110 154-3123 #154-3123 155-3137 #155-3137
		155-3150 #155-3150 155-3161 155-3161
T\$SAVL	= 177777	#15-543
T\$SFGI	= 177777	#15-543
T\$SIZE	= 000214	148-2956 #155-3161
T\$SUBN	= 000000	#15-543 #116-1922 #118-1971 #120-2029 #122-2093 #124-2158 #126-2222 #128-2287 #130-2356
		#132-2431 #134-2500 #136-2569 #138-2640 #140-2715 #144-2856
T\$TAGL	= 177777	#15-543
T\$TAGN	= 010077	#15-543 17-624 17-624 #17-624 18-664 18-664 #18-664 98-1286 98-1286
		#98-1286 100-1332 100-1332 #100-1332 100-1336 100-1336 #100-1336 100-1341 100-1341
		#100-1341 101-1347 101-1347 #101-1347 101-1353 101-1353 #101-1353 101-1358 101-1358
		#101-1358 102-1364 102-1364 #102-1364 108-1615 108-1615 #108-1615 109-1652 109-1652
		#109-1652 110-1681 110-1681 #110-1681 112-1783 112-1783 #112-1783 113-1806 113-1806
		#113-1806 114-1842 114-1842 #114-1842 115-1873 115-1873 #115-1873 116-1922 116-1922
		#116-1922 118-1971 118-1971 #118-1971 120-2029 120-2029 #120-2029 122-2093 122-2093
		#122-2093 124-2158 124-2158 #124-2153 126-2222 126-2222 #126-2222 128-2287 128-2287
		#128-2287 130-2356 130-2356 #130-2356 132-2431 132-2431 #132-2431 134-2500 134-2500
		#134-2500 136-2569 136-2569 #136-2569 138-2640 138-2640 #138-2640 140-2715 140-2715
		#140-2715 143-2828 143-2828 #143-2828 144-2856 144-2856 #144-2856 146-2914 146-2914
		#146-2914 148-2949 148-2949 #148-2949 149-2971 149-2971 #149-2971 149-2975 149-2975
		#149-2975 149-2975 149-2975 #149-2975 149-2988 149-2988 #149-2988 149-2988 149-2988
		#149-2988 150-3002 150-3002 #150-3002 150-3002 150-3002 #150-3002 150-3015 150-3015
		#150-3015 150-3015 150-3015 #150-3015 151-3029 151-3029 #151-3029 151-3029 151-3029
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		#152-3069 153-3083 153-3083 #153-3083 153-3083 153-3083 #153-3083 153-3096 153-3096
		#153-3096 153-3096 153-3096 #153-3096 154-3110 154-3110 #154-3110 154-3110 154-3110
		#154-3110 154-3123 154-3123 #154-3123 154-3123 154-3123 #154-3123 155-3137 155-3137
		#155-3137 155-3137 155-3137 #155-3137 155-3150 155-3150 #155-3150 155-3150 155-3150
		#155-3150
T\$TEMP	= 000005	#15-586 15-586 #16-606 16-606 16-606 #16-606 16-606 16-606 #16-606 16-606 #16-606
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		#16-607 16-607 #17-653 17-653 #18-674 18-674 #19-707 19-707 #27-999
		27-999 #99-1329 99-1329 #100-1334 100-1334 #100-1339 100-1339 #100-1345 100-1345
		#101-1351 101-1351 #101-1356 101-1356 #101-1361 101-1361 #102-1368 102-1368 #108-1643
		108-1643 #109-1658 109-1658 #111-1755 111-1755 #111-1772 111-1772 #112-1795 112-1795
		#113-1817 113-1817 #113-1833 113-1833 #114-1847 114-1847 #114-1863 114-1863 #115-1884
		115-1884 #115-1900 115-1900 #117-1955 117-1955 #119-2016 119-2016 #121-2078 121-2078
		#123-2145 123-2145 #125-2207 125-2207 #127-2267 127-2267 #127-2274 127-2274 #129-2343
		129-2343 #131-2409 131-2409 #131-2418 131-2418 #133-2480 133-2480 #133-2487 133-2487
		#135-2548 135-2548 #135-2555 135-2555 #137-2625 137-2625 #139-2701 139-2701 #140-2744
		140-2744 #141-2755 141-2755 #141-2761 141-2761 #141-2769 141-2769 #142-2795 142-2795

SYMBOL CROSS REFERENCE

REF VO2

SYMBOL	VALUE	REFERENCES
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		146-2916 #146-2916 146-2916 #146-2916 146-2916 #146-2916 146-2916 #146-2918 146-2918 #146-2918
		#146-2918 146-2918 #146-2920 146-2920 #146-2920 146-2920 #146-2920 146-2920 #146-2923 146-2923 #146-2923
		146-2923 #146-2923 146-2923 #146-2923 146-2923 #146-2923 146-2923 #146-2925 146-2925 #146-2925
		#146-2925 146-2925 #146-2927 146-2927 #146-2927 146-2927 #146-2927 146-2927 #146-2927 146-2927 #147-2930
		147-2930 #147-2930 147-2930 #147-2930 147-2930 #147-2930 147-2930 #147-2932 147-2932 #147-2932
		#147-2932 147-2932 #147-2934 147-2934 #147-2934 147-2934 #147-2935 147-2935 #148-2951 148-2951
T\$TEST	= 000016	#15-543 116-1922 #116-1922 116-1922 118-1971 #118-1971 118-1971 120-2029 #120-2029
		120-2029 122-2093 #122-2093 122-2093 124-2158 #124-2158 124-2158 126-2222 #126-2222
		126-2222 128-2287 #128-2287 128-2287 130-2356 #130-2356 130-2356 132-2431 #132-2431
		132-2431 134-2500 #134-2500 134-2500 136-2569 #136-2569 136-2569 138-2640 #138-2640
		138-2640 140-2715 #140-2715 140-2715 144-2856 #144-2856 144-2856 148-2956
T\$TSTM	= 177777	#15-543 98-1288 98-1300 98-1304 99-1308 99-1320 99-1328 99-1329 100-1333
		100-1334 100-1338 100-1339 100-1343 100-1344 100-1345 101-1349 101-1350 101-1351
		101-1355 101-1356 101-1360 101-1361 102-1366 102-1367 102-1368 102-1382 103-1426
		104-1450 104-1451 104-1453 105-1466 105-1467 105-1469 105-1471 105-1472 105-1474
		106-1495 106-1510 107-1524 107-1528 108-1643 110-1707 110-1709 110-1713 110-1715
		110-1725 111-1755 111-1757 111-1772 112-1793 112-1795 113-1817 113-1833 114-1845
		114-1863 115-1900 116-1926 116-1930 116-1939 116-1940 116-1942 117-1953 117-1954
		117-1955 118-1976 118-1990 118-1991 118-1992 118-1994 119-2003 119-2012 119-2014
		119-2016 120-2035 120-2049 120-2050 120-2051 120-2053 121-2062 121-2071 121-2072
		121-2074 121-2076 121-2078 122-2099 122-2116 122-2117 122-2118 122-2120 123-2129
		123-2138 123-2139 123-2141 123-2143 123-2145 124-2164 124-2178 124-2179 124-2180
		124-2182 125-2191 125-2200 125-2201 125-2203 125-2205 125-2207 126-2228 126-2242
		126-2243 126-2244 126-2246 127-2255 127-2267 127-2270 127-2272 127-2274 128-2293
		128-2309 128-2310 128-2311 128-2313 129-2322 129-2339 129-2341 129-2343 130-2362
		130-2380 130-2381 130-2382 130-2384 131-2393 131-2409 131-2414 131-2416 131-2418
		132-2437 132-2455 132-2456 132-2457 132-2459 133-2468 133-2480 133-2483 133-2485
		133-2487 134-2506 134-2523 134-2524 134-2525 134-2527 135-2536 135-2548 135-2551
		135-2553 135-2555 136-2575 136-2590 136-2591 136-2592 136-2594 137-2603 137-2621
		137-2623 137-2625 138-2646 138-2661 138-2662 138-2663 138-2665 139-2674 139-2697
		139-2699 139-2701 140-2721 140-2730 140-2732 140-2735 140-2743 140-2744 141-2755
		141-2761 141-2764 141-2767 141-2768 141-2769 142-2773 142-2775 142-2778 142-2779
		142-2790 142-2793 142-2794 142-2795 143-2806 143-2807 143-2809 143-2817 143-2819
		143-2820 143-2833 144-2862 144-2872 145-2890 145-2891 145-2893 145-2895 145-2897
T\$TSTS	= 000001	#15-543 #116-1922 #118-1971 #120-2029 #122-2093 #124-2158 #126-2222 #128-2287 #130-2356
		#132-2431 #134-2500 #136-2569 #138-2640 #140-2715 #144-2856
T\$\$AU	= 010020	#115-1873 115-1884 115-1900
T\$\$AUT	= 010015	#112-1783 112-1795
T\$\$CLE	= 010016	#113-1806 113-1817 113-1833
T\$\$DAT	= 010076	#149-2975 149-2975 149-2984 #149-2988 149-2988 149-2997 #150-3002 150-3002 150-3011
		#150-3015 150-3015 150-3024 #151-3029 151-3029 151-3038 #151-3042 151-3042 151-3051
		#152-3056 152-3056 152-3065 #152-3069 152-3069 152-3078 #153-3083 153-3083 153-3097
		#153-3096 153-3096 153-3105 #154-3110 154-3110 154-3119 #154-3123 154-3123 154-3132
		#155-3137 155-3137 155-3146 #155-3150 155-3150 155-3159
T\$\$DU	= 010017	#114-1842 114-1847 114-1863
T\$\$HAR	= 010040	#146-2914 146-2914 147-2934 147-2935
T\$\$HW	= 010000	#17-624 17-624 17-653
T\$\$INI	= 010014	#110-1681 111-1755 111-1772
T\$\$MSG	= 010011	#98-1286 99-1329 #100-1332 100-1334 #100-1336 100-1339 #100-1341 100-1345 #101-1347
		101-1351 #101-1353 101-1356 #101-1358 101-1361 #102-1364 102-1368
T\$\$PC	= 000016	#149-2971 155-3161

SYMBOL CROSS REFERENCE

CREF V02

SYMBOL	VALUE	REFERENCES
T\$\$PRO	= 010013	#109-1652
T\$\$PTA	= 010075	#149-2971 149-2975 #149-2975 149-2988 #149-2988 150-3002 #150-3002 150-3015 #150-3015
		151-3029 #151-3029 151-3042 #151-3042 152-3056 #152-3056 152-3069 #152-3069 153-3083
		#153-3083 153-3096 #153-3096 154-3110 #154-3110 154-3123 #154-3123 155-3137 #155-3137
		155-3150 #155-3150
T\$\$RPT	= 010012	#108-1615 108-1643
T\$\$SOF	= 010041	#148-2949 148-2949 148-2951
T\$\$SRV	= 010036	#143-2828 143-2831
T\$\$SW	= 010001	#18-664 18-664 18-674
T\$\$TES	= 010037	#116-1922 117-1955 #118-1971 119-2016 #120-2029 121-2078 #122-2093 123-2145 #124-2158
		125-2207 #126-2222 127-2267 127-2274 #128-2287 129-2343 #130-2356 131-2409 131-2418
		#132-2431 133-2480 133-2487 #134-2500 135-2548 135-2555 #136-2569 137-2625 #138-2640
		139-2701 #140-2715 140-2744 141-2755 141-2761 141-2769 142-2795 143-2820 143-2833
		#144-2856 145-2897
T1	020104 G	16-606 #116-1922
T1ADR	002272	#21-807 99-1306
T1E0	005524	22-834 #50-1084
T1E1	005570	22-835 #50-1085
T1E2	005634	22-836 #51-1087
T1E3	005700	22-837 #51-1083
T1E4	005746	22-838 #52-1090
T1E5	006016	22-839 #52-1091
T1E6	006064	22-840 #53-1093
T1E7	006132	22-841 #53-1094
T10	022544 G	16-606 #134-2500
T10ADR	002310	#21-814
T10E0	011477	25-935 #72-1151 135-2546
T10E1	011560	25-936 #73-1153
T10E2	011621	25-937 #73-1154
T10E3	011657	25-938 #74-1156
T10E4	011714	25-939 #74-1157
T10E5	011767	25-940 #75-1159
T10E6	012037	25-941 #75-1160
T10E7	012116	25-942 #76-1162
T11	022776 G	16-606 #136-2569
T11ADR	002312	#21-815
T11E0	012161	26-950 #76-1163 137-2613 139-2684
T11E1	012260	26-951 #77-1165 139-2690
T11E2	012365	26-952 #77-1166
T11E3	012437	26-953 #78-1168
T11E4	012524	26-954 #78-1169
T11E5	012573	26-955 #79-1171
T12	023240 G	16-606 #138-2640
T12ADR	002314	#21-816
T12E0	012625	26-964 #79-1172 141-2753
T12E1	012721	26-965 #80-1174
T12E2	012771	26-966 #80-1175 141-2759
T12E3	013052	26-967 #81-1177
T12E4	013132	26-968 #81-1178
T12E5	013205	26-969 #82-1180
T12E6	013262	26-970 #82-1181
T13	023522 G	16-606 #140-2715

SYMBOL CROSS REFERENCE

REF V02

SYMBOL	VALUE		REFERENCES		
T13ADR	002316		#21-817		
T13E0	013536		27-979	#83-1183	
T13E1	013404		27-980	#83-1184	
T13E10	014277		27-989	#88-1198	
T13E11	014350		27-990	#88-1199	
T13E2	013460		27-981	#84-1186	
T13E3	013545		27-982	#84-1187	145-2883
T13E4	013653		27-983	#85-1189	
T13E5	013727		27-984	#85-1190	
T13E6	014005		27-985	#86-1192	
T13E7	014105		27-986	#86-1193	
T13E8	014161		27-987	#87-1195	
T13E9	014227		27-988	#87-1196	
T14	024304	G	16-606	#144-2856	
T2	020244	G	16-606	#118-1971	
T2ADR	002274		#21-808		
T2E0	006200		22-848	#54-1096	
T2E1	006253		22-849	#54-1097	
T2E2	006323		22-850	#55-1099	
T2E3	006374		22-851	#55-1100	
T2E4	006457		22-852	#56-1102	
T2E5	006542		22-853	#56-1103	
T2E6	006613		22-854	#57-1105	
T2E7	006661		22-855	#57-1106	
T2E8	006725		22-856	#58-1108	
T2E9	007003		22-857	#58-1109	
T3	020446	G	16-606	#120-2029	
T3ADR	002276		#21-809		
T3E0	007061		23-863	#59-1111	
T3E1	007137		23-864	#59-1112	
T3E2	007215		23-865	#60-1114	
T3E3	007313		23-866	#60-1115	
T4	020666	G	16-606	#122-2093	
T4ADR	002300		#21-810		
T5	021122	G	16-606	#124-2158	
T5ADR	002302		#21-811		
T5E0	007411		24-892	#61-1117	127-2265 129-2332
T5E1	007471		24-893	#61-1118	
T5E2	007544		24-894	#62-1120	
T5E3	007607		24-895	#62-1121	
T6	021342	G	16-606	#126-2222	
T6ADR	002304		#21-812		
T6E0	007647		24-906	#63-1123	
T6E1	007745		24-907	#63-1124	
T6E2	010025		24-908	#64-1126	
T6E3	010074		24-909	#64-1127	
T6E4	010154		24-910	#65-1129	
T6E5	010223		24-911	#65-1130	
T6E6	010266		24-912	#66-1132	
T7	021566	G	16-606	#128-2287	
T7ADR	002306		#21-813		
T7E0	010337		25-921	#66-1133	131-2407 133-2478

1115

0183

SYMBOL CROSS REFERENCE

QREF VOP

SYMBOL	VALUE	REFERENCES
T#1	010417	25-927 067-1135
T#10	011320	25-931 071-1148
T#11	011412	25-932 072-1150
T#12	010504	25-927 067-1136
T#13	010560	25-924 068-1138
T#14	010634	25-925 068-1139
T#15	010707	25-926 069-1141
T#16	010775	25-927 069-1142
T#17	011054	25-928 070-1144
T#18	011132	25-929 070-1145
T#19	011227	25-930 071-1147
TA	022024 G	16-606 0130-2356
TB	022304 G	16-606 0132-2431
TAM	* 000200 G	019-691
URDM	004127	035-1037 147-2932
X\$ALWA	* 000000	015-543 147-2934
X\$ALB	* 000040	015-543
X\$CFE	* 000400	015-543 147-2934
X\$TRK	* 000020	015-543
\$PATCH	024572 G	0148-2953

D.S.

MACRO CROSS REFERENCE

CREF VOL

MACRO NAME	REFERENCES	CREF	VOL
ENDST	117-1955 119-2016 121-2078 123-2145 125-2207 127-2274 129-2343 131-2418 133-2487 135-2555		
EQUALS	137-2625 139-2701 143-2833 145-2897		
ERRDF	19-691		
ERRDF	104-1450 105-1471 116-1939 118-1990 120-2049 121-2071 122-2116 123-2138 124-2178 125-2200		
ERRDF	126-2242 128-2309 130-2380 132-2455 134-2523 136-2590 138-2661 143-2806 145-2890		
ERRDF	119-2003 119-2012 121-2062 123-2129 125-2191 127-2255 127-2270 129-2322 129-2339 141-2392		
ERRDF	131-2414 133-2468 133-2483 135-2536 135-2551 137-2603 137-2621 139-2674 139-2697 140-2743		
ERRDF	141-2767 142-2793 143-2817 144-2872		
ERRSOF	105-1466		
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