KMS11-K

KMS11-K DIAGNOSTIC
CZKMVA0

AH-U128A-MC
1 OF 1 JUL 1985

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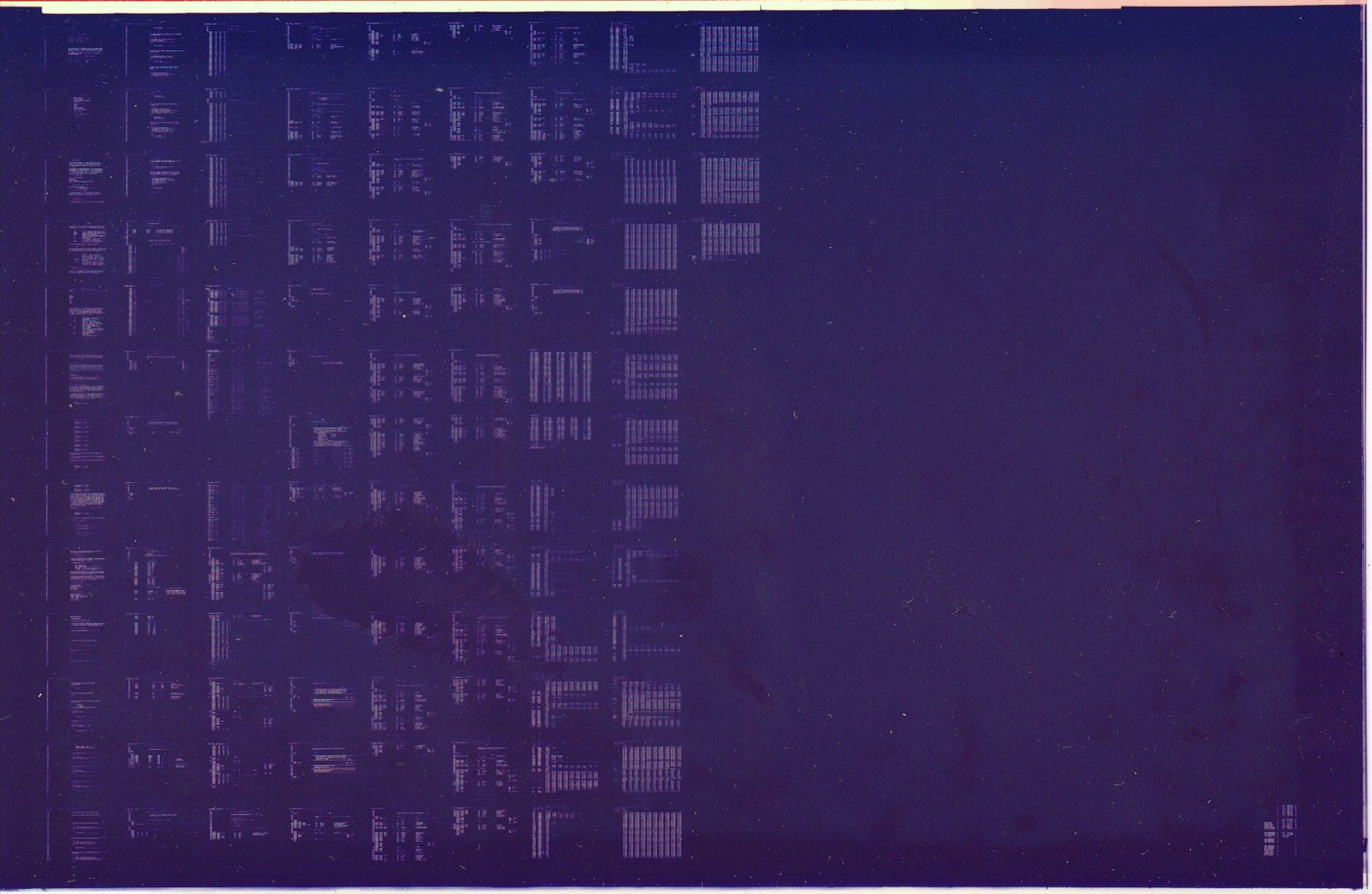
MADE IN USA



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                        .TITLE  USER DOCUMENTATION


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                                    IDENTIFICATION
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                        PRODUCT CODE:   AC-U127A-MC

                        PRODUCT NAME:   CZKMVA0 KMS11-K DIAGNOSTIC

                        PRODUCT DATE:   MARCH 1985

                        MAINTAINER:     COMPUTER SPECIAL SYSTEMS




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                                1.0   GENERAL INFORMATION

                                1.1   PROGRAM ABSTRACT

                                THIS DIAGNOSTIC REPRESENT A FUNCTIONAL TEST FOR THE KMS11-K
                                OPTION. KMS11-K PROVIDES A HIGH SPEED LINK BETWEEN UNIBUS
                                AND RS422 SIGNALS. THE KMS11-K OPTION CONSISTS OF TWO MODULES:
                                THE KMC11-B MICROPROCESS MODULE AND THE M8935 RS422 LINE
                                UNIT MODULE THAT CAN BE ACCESSED ONLY THROUGH KMC11-B BUT
                                NOT THE UNIBUS.

                                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+, ACT, APT, SLIDE AND PAPER
                                TAPE.  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

                                PDP-11 TYPE UNIBUS PROCESSOR
                                MINIMUM OF 16K OF MEMORY
                                LOAD DEVICE
                                CONSOLE TERMINAL
                                KMC11-B MICROPROCESSOR WITH CABLE FOR LINE UNIT
                                M8935 LINE UNIT WITH OPTIONAL LOOPBACK CABLE


                                1.3   RELATED DOCUMENTS AND STANDARDS

                                XXDP+ USER'S MANUAL - CHQUS
                                KMS11-K FUNCTIONAL SPECIFICATION
                                EVDIN VAX LEVEL 3 STANDALONE DIAGNOSTIC FROM WHICH THIS
                                                ONE WAS TRANSLATED

                                1.4   DIAGNOSTIC HIERARCY PREREQUISITES

                                THE DIAGNOSTIC ASSUMES THAT THE MAIN PROCESSOR, MEMORY, LOAD
                                DEVICE AND CONSOLE TERMINAL ARE FUNCTIONAL. THE DIAGNOSTIC
                                DOES NOT FULLY VERIFY THE KMC11-B MODULE, ONLY THE FUNCTIONS
                                RELATED TO THE OPERATION OF THE LINE UNIT ARE TESTED.


                                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).
```

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. SO YOU MAY, FOR EXAMPLE, TYPE "STA" INSTEAD OF "START".

2.2 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 "DDDDD".

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:DDDDD	EXECUTE DDDDD PASSES (DDDDD = 1 TO 64000)
/FLAGS:FLGS	SET SPECIFIED FLAGS. FLAGS ARE DESCRIBED IN SECTION 2.3.
/EOP:DDDDD	REPORT END OF PASS MESSAGE AFTER EVERY DDDDD PASSES ONLY. (DDDDD = 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 = 0-63)

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,

SEQ 0005

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					
ZFLAGS					
EXIT					

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 FLAGS 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
IBE*	INHIBIT ALL ERROR REPORTS EXCEPT FIRST LEVEL (FIRST LEVEL CONTAINS ERROR TYPE, NUMBER, PC, TEST AND UNIT)
IXE*	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

SEQ 0006

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
```

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). 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 THE FOLLOWING QUESTIONS FOR EACH UNIT.

```
# UNIT (D) ?

CSR ADDRESS (O) ?
EXTERNAL LOOPBACK (L) N ?
```

THE FIRST QUESTION REFER TO THE INSTALATION OF THE KMC11-B.
THE FIFTH QUESTION REFERS TO THE FACT WHETHER THE DIAGNOSTIC WILL RUN IN EXTERNAL OR INTERNAL LOOPBACK MODE.

2.5 SOFTWARE QUESTIONS

NONE

2.6 EXTENDED P-TABLE DIALOGUE

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. IF YOU HAVE A MULTIPLEXED DEVICE SUCH AS A MASS STORAGE CONTROLLER WITH SEVERAL DRIVES OR A COMMUNICATION DEVICE WITH SEVERAL LINES, THIS BECOMES TEDIOUS SINCE MOST OF THE ANSWERS ARE REPETITIOUS.

TO ILLUSTRATE A MORE EFFICIENT METHOD, SUPPOSE YOU ARE TESTING A FICTIONAL DEVICE, THE XY11. SUPPOSE THIS DEVICE CONSISTS OF A CONTROL MODULE WITH EIGHT UNITS (SUB-DEVICES) ATTACHED TO IT. THESE UNITS ARE DESCRIBED BY THE OCTAL NUMBERS 0 THROUGH 7. THERE IS ONE HARDWARE PARAMETER THAT CAN VARY AMONG UNITS CALLED THE Q-FACTOR. THIS Q-FACTOR MAY BE 0 OR 1. BELOW IS A SIMPLE WAY TO BUILD A TABLE FOR ONE XY11 WITH EIGHT UNITS.

```
# UNITS (D) ?  8<CR>

UNIT 1
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  0<CR>
```

```
300                                     Q-FACTOR (0) 0 ?  1<CR>
301
302                                     UNIT 2
303                                     CSR ADDRESS (0) ?  160000<CR>
304                                     SUB-DEVICE # (0) ?  1<CR>
305                                     Q-FACTOR (0) 1 ?  0<CR>
306
307                                     UNIT 3
308                                     CSR ADDRESS (0) ?  160000<CR>
309                                     SUB-DEVICE # (0) ?  2<CR>
310                                     Q-FACTOR (0) 0 ?  <CR>
311
312                                     UNIT 4
313                                     CSR ADDRESS (0) ?  160000<CR>
314                                     SUB-DEVICE # (0) ?  3<CR>
315                                     Q-FACTOR (0) 0 ?  <CR>
316
317                                     UNIT 5
318                                     CSR ADDRESS (0) ?  160000<CR>
319                                     SUB-DEVICE # (0) ?  4<CR>
320                                     Q-FACTOR (0) 0 ?  <CR>
321
322                                     UNIT 6
323                                     CSR ADDRESS (0) ?  160000<CR>
324                                     SUB-DEVICE # (0) ?  5<CR>
325                                     Q-FACTOR (0) 0 ?  <CR>
326
327                                     UNIT 7
328                                     CSR ADDRESS (0) ?  160000<CR>
329                                     SUB-DEVICE # (0) ?  6<CR>
330                                     Q-FACTOR (0) 0 ?  1<CR>
331
332                                     UNIT 8
333                                     CSR ADDRESS (0)  160000<CR>
334                                     SUB-DEVICE # (0) ?  7<CR>
335                                     Q-FACTOR (0) 1 ?  <CR>
336
337                             NOTICE THAT THE DEFAULT VALUE FOR THE Q-FACTOR CHANGES WHEN A
338                             NON-DEFAULT RESPONSE IS GIVEN.  BE CAREFUL WHEN SPECIFYING
339                             MULTIPLE UNITS!
340
341                             AS YOU CAN SEE FROM THE ABOVE EXAMPLE, THE HARDWARE PARAMETERS
342                             DO NOT VARY SIGNIFICANTLY FROM UNIT TO UNIT.  THE PROCEDURE SHOWN IS
343                             NOT VERY EFFICIENT.
344
345                             THE RUNTIME SERVICES CAN TAKE MULTIPLE UNIT SPECIFICATIONS HOWEVER.
346                             LET'S BUILD THE SAME TABLE USING THE MULTIPLE SPECIFICATION
347                             FEATURE.
348
349                                     # UNITS (D) ?  8<CR>
350
351                                     UNIT 1
352                                     CSR ADDRESS (0) ?  160000<CR>
353                                     SUB-DEVICE # (0) ?  0,1<CR>
354                                     Q-FACTOR (0) 0 ?  1,0<CR>
355
356                                     UNIT 3
```

```
                        CSR ADDRESS (O) ?  160000<CR>
                        SUB-DEVICE # (O) ?  2-5<CR>
                        Q-FACTOR (O) O ?  0<CR>

                        UNIT 7
                        CSR ADDRESS (O) ?  160000<CR>
                        SUB-DEVICE # (O) ?  6,7<CR>
                        Q-FACTOR (O) O ?  1<CR>
```

AS YOU CAN SEE IN THE ABOVE DIALOGUE, THE RUNTIME SERVICES WILL BUILD AS MANY ENTRIES AS IT CAN WITH THE INFORMATION GIVEN IN ANY ONE PASS THROUGH THE QUESTIONS. IN THE FIRST PASS, TWO ENTRIES ARE BUILT SINCE TWO SUB-DEVICES AND Q-FACTORS WERE SPECIFIED. THE SERVICES ASSUME THAT THE CSR ADDRESS IS 160000 FOR BOTH SINCE IT WAS SPECIFIED ONLY ONCE. IN THE SECOND PASS, FOUR ENTRIES WERE BUILT. THIS IS BECAUSE FOUR SUB-DEVICES WERE SPECIFIED. THE "-" CONSTRUCT TELLS THE RUNTIME SERVICES TO INCREMENT THE DATA FROM THE FIRST NUMBER TO THE SECOND. IN THIS CASE, SUB-DEVICES 2, 3, 4 AND 5 WERE SPECIFIED. (IF THE SUB-DEVICE WERE SPECIFIED BY ADDRESSES, THE INCREMENT WOULD BE BY 2 SINCE ADDRESSES MUST BE ON AN EVEN BOUNDARY.) THE CSR ADDRESSES AND Q-FACTORS FOR THE FOUR ENTRIES ARE ASSUMED TO BE 160000 AND 0 RESPECTIVELY SINCE THEY WERE ONLY SPECIFIED ONCE. THE LAST TWO UNITS ARE SPECIFIED IN THE THIRD PASS.

THE WHOLE PROCESS COULD HAVE BEEN ACCOMPLISHED IN ONE PASS AS SHOWN BELOW.

```
        # UNITS (D) ?  8<CR>

        UNIT 1
        CSR ADDRESS (O) ?  160000<CR>
        SUB-DEVICE # (O) ?  0-7<CR>
        Q-FACTOR (O) O ?  0,1,0,,,,1,1<CR>
```

AS YOU CAN SEE FROM THIS EXAMPLE, NULL REPLIES (COMMAS ENCLOSING A NULL FIELD) TELL THE RUNTIME SERVICES TO REPEAT THE LAST REPLY.

2.7 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 ZKMVA0", 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 2.5.

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

,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 "IBE" 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", "IBE" OR "IXE" 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

KMC11-B ERROR MESSAGES

KMC11-B NOT PRESENT AT SPECIFIED ADDRESS
CSR REGISTER FAILURE
BRG REGISTER FAILURE
MASTER CLEAR DID NOT INITIALIZE BRG REGISTER
CRAM FAILURE
DATA RAM FAILURE
KMC11 IS HUNG

LINE UNIT ERROR MESSAGES

MASTER CLEAR FAILED TO INTIALIZE REGISTERS
CABLE OK IS NOT SET
INTERNAL LOOPBACK FAILED TO SET
INTERNAL LOOPBACK FAILED TO CLEAR
EXTERNAL LOOPBACK FAILED TO SET
EXTERNAL LOOPBACK FAILED TO CLEAR
DATA PATH ERROR
IRDY FAILED TO SET
IRDY FAILED TO CLEAR

```
                        RNDR FAILED TO SET
                        RNDR FAILED TO CLEAR
                        DT FAILED TO SET
                        DT FAILED TO CLEAR
                        REGISTER ADDRESS UNIQUENESS FAILURE

                        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

                        P-TABLE CONTAINS CSR ADDRESS AND MODE OF OPERATION FLAG
                        (EXTERNAL OR INTERNAL LOOPBACK).


                        6.0 TEST SUMMARIES


                    6.1   TEST 1

                    SUBTEST 1

                        THIS SUBTEST IS USED TO CHECK WHETHER THE UNIBUS CAN
                        BE RESET AND THE UNIBUS STATUS REGISTER CLEARED.


                        ERRORS:

                                KMC11 NOT PRESENT AT SPECIFIED ADDRESS


                    SUBTEST 2

                        VERIFY THAT CSR'S CAN BE WRITTEN WITH
                        FLOATING 1 PATTERN

                         ERRORS:

                                CSR REGISTER FAILURE


                    6.2   TEST 2

                    SUBTEST 1

                        THIS SUBTEST VERIFIES CRAM ON KMC11-B BY WRITING AND READING
                        EVERY LOCATION WITH FLOATING 0'S PATTERN

                         ERRORS:

                                CRAM  ERROR
```

```
                        SUBTEST 2

                              THIS SUBTEST VERIFIES THAT BRG CAN BE LOADED
                              WITH A UNIQUE DATA PATTERN AND THAT MASTER
                              CLEAR CLEARS BRG.

                               ERRORS:

                                     BRG ERROR


                      SUBTEST 3

                              THIS SUBTEST VERIFIES KMC11-B DATA MEMORY.
                              MEMORY IS TESTED WITH FLOATING 0 PATTERN.

                               ERRORS:

                                     DATA RAM ERROR

                      6.3   TEST 3

                              THIS CHECKS VALIDATES THAT ALL REGISTERS ARE ZERO AFTER
                              MASTER CLEAR EXCEPT FOR  MAINT REGISTER BIT 2 WHICH IS
                              CABLE OK BIT.


                      SUBTEST 1

                            THIS TEST VEFIRIES THAT MAINT REGISTER IS ZERO
                            AFTER ISSUING MASTER CLEAR EXCEPT FOR CABLE OK BIT

                            SUBTEST STEPS:

                            1. ISSUE MASTER CLEAR
                            2. VERIFY MAINT TO BE A ZERO EXCEPT FOR CABLE OK BIT

                             ERRORS:

                                   CABLE OK IS CLEAR
                                   MASTER CLEAR FAILED TO INITIALIZE REGISTERS

                      SUBTEST 2

                            THIS SUBTEST VERIFIES THAT THE MODULE CAN BE PUT IN
                            LOOPBACK MODES.

                             SUBTEST STEPS:

                            1. WRITE MAINT REGISTER WITH BITS 3,4 SET
                            2. VERIFY ITS PRESENSE
                            3. VERIFY THAT MASTER CLEAR CLEARS BITS 3,4

                             ERRORS:

                                   INTERNAL LOOPBACK FAILED TO SET
                                   INTERNAL LOOPBACK FAILED TO CLEAR
```

```
                                        EXTERNAL LOOPBACK FAILED TO SET
                                        EXTERNAL LOOPBACK FAILED TO CLEAR
                                        MASTER CLEAR FAILED TO INITIALIZE REGISTERS


                                SUBTEST 3

                                      THIS TEST VEFIRIES THAT DATA_LO BYTE REGISTER IS ZERO
                                      AFTER ISSUING MASTER CLEAR.

                                       SUBTEST STEPS:

                                      1. ISSUE MASTER CLEAR
                                      2. SET UP MAINTENANCE MODE ACCORDING TO EVENT FLAG
                                      3. VERIFY DATA_LO TO BE A ZERO

                                       ERRORS:

                                            MASTER CLEAR FAILED TO INITIALIZE REGISTERS

                                SUBTEST 4

                                      THIS TEST VEFIRIES THAT DIN_HI BYTE REGISTER IS ZERO
                                      AFTER ISSUING MASTER CLEAR.

                                       SUBTEST STEPS:

                                      1. ISSUE MASTER CLEAR
                                      2. SET UP MAINTENANCE MODE ACCORDING TO EVENT FLAG
                                      3. VERIFY DIN_HI TO BE A ZERO

                                       ERRORS:

                                            MASTER CLEAR FAILED TO INITIALIZE REGISTERS


                              SUBTEST 5

                                      THIS TEST VEFIRIES THAT CONTROL REGISTER IS ZERO
                                      AFTER ISSUING MASTER CLEAR.

                                       SUBTEST STEPS:

                                      1. ISSUE MASTER CLEAR
                                      2. SET UP MAINTENANCE MODE ACCORDING TO EVENT FLAG
                                      3. VERIFY CONTROL TO BE A ZERO

                                       ERRORS:

                                            MASTER CLEAR FAILED TO INITIALIZE REGISTERS


                              6.4   TEST 4
```

```
                        THIS TEST VERIFIES THAT THE MODULE UNDER TEST CAN
                        SEND AND RECECIVE DATA IN INTERNAL LOOPBACK PROPERLY.

                        ALL SUBTESTS WILL RUN IN EITHER INTERNAL OR EXTERNAL
                        LOOPBACK MODE DEPENDING ON WHETHER THE EVENT FLAG IS
                        SET.



                SUBTEST 1

                        THIS SUBTEST VERIFIES THAT THE MODULE THE DATA_LO BYTE REGISTER
                        CAN BE WRITTEN TO AND READ FROM IN LOOPBACK MODE.

                         SUBTEST STEPS:

                        1. SET UP LOOPBACK MODE ACCORDING TO EVENT FLAG
                        2. WRITE/VERIFY FLOATING 0 PATTERN IN DATA_LO REGISTER
                        3. VERIFY THAT MASTER CLEAR CLEARS DATA_LO

                         ERRORS:

                                DATA PATH ERROR
                                MASTER CLEAR FAILED TO INITIALIZE REGISTERS


                SUBTEST 2

                        THIS SUBTEST VERIFIES THAT THE MODULE THE DATA_HI BITS 5 THROUGH 0
                        CAN BE WRITTEN TO AND READ FROM IN A LOOPBACK MODE.

                         SUBTEST STEPS:

                        1. SET LOOPBACK MODE ACCORDING TO EVENT FLAG 3
                        2. WRITE/VERIFY FLOATING 0 PATTERN IN DATA_HI<5-0> REGISTER
                        3. VERIFY THAT MASTER CLEAR CLEARS DATA_HI

                        ERRORS:

                                DATA PATH ERROR
                                MASTER CLEAR FAILED TO INITIALIZE REGISTERS

                SUBTEST 3

                        THIS SUBTEST VERIFIES THAT THE MODULE THE DATA_HI<7,6> BYTE REGISTER
                        CAN BE WRITTEN TO AND READ FROM CONTROL REGISTER IN A
                        LOOPBACK MODE.

                         SUBTEST STEPS:

                        1. SET LOOPBACK MODE ACCORDING TO EVENT FLAG 3
                        2. WRITE/VERIFY FLOATING 0 PATTERN IN DATA_HI<7,6> BY READING
                                THEM BACK THROUGH CONTROL REGISTER BITS 0 AND 1
                        3. VERIFY THAT MASTER CLEAR CLEARS CONTROL REGISTSTER

                        ERRORS:
```

```
                                        DATA PATH ERROR
                                        MASTER CLEAR FAILED TO INITIALIZE REGISTERS


                                SUBTEST 4

                                    THIS SUBTEST VERIFIES THAT THE MODULE THE DATA_HI REGISTER
                                    BITS 7 AND 6 CAN BE READ FROM BY WRITING TO EXTRA REGISTER
                                    IN A LOOPBACK MODE.

                                    SUBTEST STEPS:

                                    1. SET LOOPBACK MODE ACCORDING TO EVENT FLAG 3
                                    2. WRITE/VERIFY FLOATING 0 PATTERN IN DATA_HI<7,6> BY WRITING
                                    THEM THROUGH EXTRA REGISTER
                                    3. VERIFY THAT MASTER CLEAR CLEARS DATA_HI

                                     ERRORS:

                                           DATA PATH ERROR
                                           MASTER CLEAR FAILED TO INITIALIZE REGISTERS


                                SUBTEST 5

                                    THIS SUBTEST VERIFIES ADDRESS UNIQUENESS BETWEEN ALL THE REGISTERS.
                                    EACH ONE IS WRITTEN WITH A UNIQUE PATTERN AND READ BACK AGAINST
                                    EVERY OTHER ONE.

                                     SUBTEST STEPS:

                                    1. SET LOOPBACK MODE ACCORDING TO EVENT FLAG 3
                                    2. WRITE REGISTER 10 AND 11 WITH ALL ONE'S
                                    3. READ BACK AND COMPARE WITH ALL THE REGISTERS

                                     ERRORS:

                                           DATA PATH ERROR
                                           REGISTER ADDRESS UNIQUENESS ERROR


                            6.5   TEST 5

                                    THIS TEST CHECKS .25 MICROSECOND IRDY SIGNAL AFTER WRITING
                                    REGISTER 2. THIS IS ACCOMLISHED BY LOADING FIRMWARE IN
                                    INTERNAL LOOPBACK MODE AND CHECKING SIGNALS THROUGH
                                    FIRMWARE.

                                     TEST STEPS:

                                    1. INITIALIZE THE MODULE UNDER TEST
                                    2. SET LOOPBACK MODE ACCORDING TO EVENT FLAG
                                    3. LOAD FIRMWARE TO WRITE TO XREG2 TO GET STROBE AND READ
                                       THE REGISTER INTO KMC11-B MEMORY
                                    4. WAIT FOR DONE BIT IN SEL2<BIT07> FOR 10MSEC
```

```
                        5. READ KMC11-B MEMORY TO VERIFY THE PULSE

                        ERRORS:

                                KMC11-B ERROR
                                IRDY FAILED TO SET
                                IRDY FAILED TO CLEAR


            6.6   TEST 6

                        THIS TEST CHECKS RNDR DET SIGNAL AFTER WRITING
                        REGISTER 2. THIS IS ACCOMLISHED BY LOADING FIRMWARE IN
                        A LOOPBACK MODE.

                         TEST STEPS:

                        1. INITIALIZE THE MODULE UNDER TEST
                        2. SET LOOPBACK MODE ACCORDING TO EVENT FLAG
                        3. LOAD FIRMWARE TO WRITE TO XREG2 TO GET STROBE AND READ
                           THE REGISTER 7 INTO KMC11-B MEMORY
                        4. WAIT FOR DONE BIT IN SELO<BIT07> FOR 10MSEC
                        5. READ KMC11-B MEMORY TO VERIFY THE PULSE

                        ERRORS:

                                KMC11-B ERROR
                                RNDR FAILED TO SET
                                RNDR FAILED TO CLEAR

            6.7   TEST 7

                        THIS TEST CHECKS DT DET SIGNAL GENERATED AFTER READING
                        REGISTER 5. THIS IS ACCOMLISHED BY LOADING FIRMWARE IN
                        A LOOPBACK MODE.

                         TEST STEPS:

                        1. INITIALIZE THE MODULE UNDER TEST
                        2. SET LOOPBACK MODE ACCORDING TO EVENT FLAG
                        3. LOAD FIRMWARE TO WRITE TO XREG2 TO GET STROBE AND READ
                           THE REGISTER INTO KMC11-B MEMORY
                        4. WAIT FOR DONE BIT IN SELO<BIT07> FOR 10MSEC
                        5. READ KMC11-B MEMORY TO VERIFY THE PULSE

                         ERRORS:

                                KMC11-B ERROR
                                DT DET FAILED TO SET
                                DT DET FAILED TO CLEAR


            6.8   TEST 8
```

```
                        TEST DESCRIPTION:

                        THIS TEST TURNS ON AND OFF ON-BOARD LED'S THAT CORRESPOND
                        TO THE FOLLOWING BITS: INTERNAL LOOPBACK AND
                        EXTERNAL LOOPBACK. THE ONLY WAY TO VERIFY IT IS VISUALLY.


                        TEST STEPS:

                        1. WRITE ZEROES TO BITS 3 AND 4 OF MAINTENANCE REGISTER
                              TO TURN ON CORRESPONDING LED'S
                        2. REPEAT 5 TIMES STEP 1

              6.9   TEST 9

                        THIS TEST VERIFIES DATA TRANSFER OF 256 BYTES THROUGH
                        LINE UNIT. FIRMWARE IS LOADED INTO KMC11 TO COPY A DATA
                        BUFFER FROM MEMORY, SEND EACH BYTE IN A LOOPBACK MODE,
                        AND DUMP RECEIVED CHARACTERS BACK INTO MAIN MEMORY.

                        TEST STEPS:

                        1. INITIALIZE THE MODULE UNDER TEST
                        2. SET LOOPBACK MODE ACCORDING TO EVENT FLAG
                        3. WRITE TRANSMIT BUFFER WITH A DATA PATTERN
                        4. LOAD FIRMWARE TO TRANSMIT A DATA BUFFER THROUGH
                           THE LINE UNIT UNDER TEST
                        5. WAIT FOR DONE BIT IN SEL0<BIT7>
                        6. VERIFY THAT RECEIVED BUFFER IS THE SAME ONE AS
                           TRANSMITTED

                        ERRORS:

                                KMC11-B ERROR
                                DATA PATH ERROR


              7.0   MAINTENANCE HISTORY
```

&

SEQ 0017

```
                        .TITLE PROGRAM HEADER AND TABLES
                        .SBTTL  PROGRAM HEADER

                                .MCALL  SVC
000000                          SVC                             ; INITIALIZE SUPERVISOR MACROS

        000001          SVCINS= 1       ; LIST INSTRUCTIONS, SHIFTED RIGHT
        000001          SVCTST= 1       ; LIST TEST TAGS, SHIFTED RIGHT
        000001          SVCSUB= 1       ; LIST SUBTEST TAGS, SHIFTED RIGHT
        000001          SVCGBL= 1       ; LIST GLOBAL TAGS, SHIFTED RIGHT
        000001          SVCTAG= 1       ; LIST OTHER TAGS, SHIFTED RIGHT

000000                          .ENABL  ABS,AMA
        002000                  .       =       2000

                        ;++
                        ; THE PROGRAM HEADER IS THE INTERFACE BETWEEN
                        ; THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
                        ;--

002000                          POINTER BGNRPT,BGNSW,BGSFT,BGNAU,BGNDU,ERRTBL

002000                          HEADER  CZKMV,A,0,10,0
002000
002000      103                                                 L$NAME::
002001      132                         .ASCII /C/
002002      113                         .ASCII /Z/
002003      115                         .ASCII /K/
002004      126                         .ASCII /M/
002005      000                         .ASCII /V/
002006      000                         .BYTE   0
002007      000                         .BYTE   0
002010                                  .BYTE   0
002010      101                 L$REV::
002011                                  .ASCII  /A/
002011      060                 L$DEPO::
002012                                  .ASCII  /0/
002012  000000                  L$UNIT::
002014                                  .WORD   0
002014  000010                  L$TIML::
002016                                  .WORD   10
002016  012604                  L$HPCP::
002020                                  .WORD   L$HARD
002020  000000                  L$SPCP::
002022                                  .WORD   0
002022  002150                  L$HPTP::
002024                                  .WORD   L$HW
002024  002156                  L$SPTP::
002026                                  .WORD   L$SW
002026  012710                  L$LADP::
002030                                  .WORD   L$LAST
002030  000000                  L$STA::
002032                                  .WORD   0
002032  000000                  L$CO::
                                        .WORD   0
```

F2

PROGRAM HEADER

SEQ 0018

```
002034
002034  000000                          L$DTYP::
                                                .WORD   0
002036
002036  000000                          L$APT::
                                                .WORD   0
002040
002040  002124                          L$DTP::
                                                .WORD   L$DISPATCH
002042
002042  000000                          L$PRIO::
                                                .WORD   0
002044
002044  000000                          L$ENVI::
                                                .WORD   0
002046
002046  000000                          L$EXP1::
                                                .WORD   0
002050
002050     003                          L$MREV::
                                                .BYTE   C$REVISION
002051     003                                  .BYTE   C$EDIT
002052
002052  000000                          L$EF::
                                                .WORD   0
002054  000000                                  .WORD   0
002056
002056  000000                          L$SPC::
                                                .WORD   0
002060
002060  003224                          L$DEVP::
                                                .WORD   L$DVTYP
002062
002062  006144                          L$REPP::
                                                .WORD   L$RPT
002064
002064  000000                          L$EXP4::
                                                .WORD   0
002066
002066  000000                          L$EXP5::
                                                .WORD   0
002070
002070  006316                          L$AUT::
                                                .WORD   L$AU
002072
002072  006310                          L$DUT::
                                                .WORD   L$DU
002074
002074  000000                          L$LUN::
                                                .WORD   0
002076
002076  003234                          L$DESP::
                                                .WORD   L$DESC
002100
002100  104035                          L$LOAD::
                                                EMT     E$LOAD
002102
002102  002156                          L$ETP::
                                                .WORD   L$ERRTBL
002104
002104  006160                          L$ICP::
                                                .WORD   L$INIT
002106
002106  006302                          L$CCP::
                                                .WORD   L$CLEAN
002110
002110  006300                          L$ACP::
                                                .WORD   L$AUTO
002112
002112  006152                          L$PRT::
                                                .WORD   L$PROT
002114
002114  000000                          L$TEST::
                                                .WORD   0
002116
002116  000000                          L$DLY::
                                                .WORD   0
002120
002120  000000                          L$HIME::
                                                .WORD   0
902
```

SEQ 0019

```
                                .SBTTL  DISPATCH TABLE

                                ;++
                                ; THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST.
                                ; IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
                                ;--

002122                                  DISPATCH 9
002122  000011                                                         .WORD   9
002124                                                          L$DISPATCH::
002124  006324                                                          .WORD   T1
002126  006464                                                          .WORD   T2
002130  007050                                                          .WORD   T3
002132  007762                                                          .WORD   T4
002134  011324                                                          .WORD   T5
002136  011550                                                          .WORD   T6
002140  011774                                                          .WORD   T7
002142  012220                                                          .WORD   T8
002144  012334                                                          .WORD   T9

```

SEQ 0020

```
                        .SBTTL  DEFAULT HARDWARE P-TABLE

                        ;++
                        ; THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
                        ; THE TEST-DEVICE PARAMETERS.  THE STRUCTURE OF THIS TABLE
                        ; IS IDENTICAL TO THE STRUCTURE OF THE HARDWARE P-TABLES,
                        ; AND IS USED AS A "TEMPLATE" FOR BUILDING THE P-TABLES.
                        ;--

002146                          BGNHW   DFPTBL
002146  000002                                                  .WORD   L10000-L$HW/2
002150                                                  L$HW::
002150                                                  DFPTBL::

002150  000000                  .WORD   0               ; NO DEFAULT FOR ADDRESS
002152  000000                  .WORD   0               ; INTERNAL LOOPBACK
002154                          ENDHW
002154                                                  L10000:
```

SEQ 0021

```
                                .SBTTL  SOFTWARE P-TABLE

                                ;++
                                ; THE SOFTWARE TABLE CONTAINS VARIOUS DATA USED BY THE
                                ; PROGRAM AS OPERATIONAL PARAMETERS.  THESE PARAMETERS ARE
                                ; SET UP AT ASSEMBLY TIME AND MAY BE VARIED BY THE OPERATOR
                                ; AT RUN TIME.
                                ;--

002154                                  BGNSW   SFPTBL
002154  000000                                                 .WORD   L10001-L$SW/2
002156                                                  L$SW::
002156                                                  SFPTBL::

002156                                  ENDSW
002156                                                  L10001:
```

SEQ 0022

```
    945                             .TITLE GLOBAL AREAS
    946                             .SBTTL  GLOBAL EQUATES SECTION
    947
    948
    949                             ;++
    950                             ; THE GLOBAL EQUATES SECTION CONTAINS PROGRAM EQUATES THAT
    951                             ; ARE USED IN MORE THAN ONE TEST.
    952                             ;--
    953
    954 002156                              EQUALS
                                    ;
                                    ; BIT DIFINITIONS
                                    ;
                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
                000300              PRI06== 300
                000240              PRI05== 240
```

K2

GLOBAL EQUATES SECTION

SEQ 0023

```
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                  LOE== 40000
100000                  HOE== 100000
```

SEQ 0024

```
                        ;*
                        ; BIT DEFINITIONS FOR CSR REGISTER OF KMC11-B
                        ;-
000400                      STEP    ==      400             ; MICROSTEP
001000                      RAMI    ==      1000            ; RAMI (FOR SINGLE STEP)
002000                      RAMO    ==      2000            ; RAMO (FOR LOADING FIRWARE)
020000                      CRAMW   ==      20000           ; WRITE
040000                      MCLR    ==      40000           ; MASTER CLEAR
100000                      RUN     ==      100000          ; START EXECUTING
                        ;*
                        ; DATA INTERFACE REGISTERS
                        ;-

000010                      DLO     ==      10              ; DATA LOW BYTE
000011                      DOHI    ==      11              ; DATA HIGH BYTE (WRITE ONLY)
000015                      DIHI    ==      15              ; DATA HIGH BYTE (READ ONLY)

000012                      STRB    ==      12              ; STROBE (WRITE ONLY)
000016                      CNTRL   ==      16              ; CONTROL (READ ONLY)
000016                      EXTR    ==      16              ; EXTRA (WRITE ONLY)
000017                      MAINT   ==      17              ; MAINTENANCE
```

SEQ 0025

```
                                .SBTTL  GLOBAL DATA SECTION

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


                                        ERRTBL

002156                                                                  L$ERRTBL::
002156
002156  000000                ERRTYP::        .WORD   0
002160  000000                ERRNBR::        .WORD   0
002162  000000                ERRMSG::        .WORD   0
002164  000000                ERRBLK::        .WORD   0
002166  000000                KCSR::          .WORD   0               ; CSR ADDRESS
002170  000000                LOGUNT::        .WORD   0               ; UNIT NUMBER
002172  000000                MTMODE::        .WORD   0               ; LOOPBACK MODE
002174  0000C0                TEMP::          .WORD   0               ;
002176  000000                TEMP1::         .WORD   0               ;
002200                                          .BLKW   10
002220    377     077     003 RPNT::          .BYTE   377,77,3,0      ; READ PATTERN FOR ADDRESS
002223    000
                                                                        ; UNIQUENESS SUBTEST
002224                          TRBUF::         .BLKB   256.            ; TRANSMIT BUFFER
002624                          RCBUF::         .BLKB   256.            ; RECEIVE BUFFER
```

GLOBAL TEXT SECTION

SEQ 0026

```
                                .SBTTL  GLOBAL TEXT SECTION

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

                                ;
                                ; NAMES OF DEVICES SUPPORTED BY PROGRAM
                                ;
003224                                  DEVTYP  <KMS11-K>
003224                                                          L$DVTYP::
003224  113     115     123                                             .ASCIZ  %KMS11-K%
003227  061     061     055
003232  113     000
                                                                .EVEN

                                ; TEST DESCRIPTION
                                ;
003234                                  DESCRIPT        <KMS11-K DIAGNOSTIC>
003234                                                          L$DESC::
003234  113     115     123                                             .ASCIZ  /KMS11-K DIAGNOSTIC/
003237  061     061     055
003242  113     040     104
003245  111     101     107
003250  116     117     123
003253  124     111     103
003256  000
                                                                .EVEN
```

SEQ 0027

```
                                .SBTTL  GLOBAL ERROR MESSAGES

                                ;+
                                ; KMC11-B ERROR MESSAGES
                                ;-

003260  113  115  103  KMC1::  .ASCIZ  /KMC11-B NOT PRESENT AT SPECIFIED ADDRESS/
003263  061  061  055
003266  102  040  116
003271  117  124  040
003274  120  122  105
003277  123  105  116
003302  124  040  101
003305  124  040  123
003310  120  105  103
003313  111  106  111
003316  105  104  040
003321  101  104  104
003324  122  105  123
003327  123  000
003331  103  123  122  KMC2::  .ASCIZ  /CSR REGISTER FAILURE/
003334  040  122  105
003337  107  111  123
003342  124  105  122
003345  040  106  101
003350  111  114  125
003353  122  105  000
003356  102  122  107  KMC3::  .ASCIZ  /BRG REGISTER FAILURE/
003361  040  122  105
003364  107  111  123
003367  124  105  122
003372  040  106  101
003375  111  114  125
003400  122  105  000
003403  115  101  123  KMC4::  .ASCIZ  /MASTER CLEAR DID NOT INITIALIZE BRG REGISTER/
003406  124  105  122
003411  040  103  114
003414  105  101  122
003417  040  104  111
003422  104  040  116
003425  117  124  040
003430  111  116  111
003433  124  111  101
003436  114  111  132
003441  105  040  102
003444  122  107  040
003447  122  105  107
003452  111  123  124
003455  105  122  000
003460  103  122  101  KMC5::  .ASCIZ  /CRAM FAILURE/
003463  115  040  106
003466  101  111  114
003471  125  122  105
003474  000
003475  104  101  124  KMC6::  .ASCIZ  /DATA RAM FAILURE/
003500  101  040  122
003503  101  115  040
```

```
                003506  106     101     111
                003511  114     125     122
                003514  105     000
     1030       003516  113     115     103     KMC7::  .ASCIZ  /KMC11 IS HUNG/
                003521  061     061     040
                003524  111     123     040
                003527  110     125     116
                003532  107     000
     1031
     1032                                       ;+
     1033                                       ; LINE UNIT ERROR MESSAGES
     1034                                       ;-
     1035
     1036       003534  115     101     123     EM1::   .ASCIZ  /MASTER CLEAR FAILED TO INTIALIZE REGISTERS/
                003537  124     105     122
                003542  040     103     114
                003545  105     101     122
                003550  040     106     101
                003553  111     114     105
                003556  104     040     124
                003561  117     040     111
                003564  116     124     111
                003567  101     114     111
                003572  132     105     040
                003575  122     105     107
                003600  111     123     124
                003603  105     122     123
                003606  000
     1037       003607  103     101     102     EM2::   .ASCIZ  /CABLE OK IS NOT SET/
                003612  114     105     040
                003615  117     113     040
                003620  111     123     040
                003623  116     117     124
                003626  040     123     105
                003631  124     000
     1038       003633  111     116     124     EM3::   .ASCIZ  /INTERNAL LOOPBACK FAILED TO SET/
                003636  105     122     116
                003641  101     114     040
                003644  114     117     117
                003647  120     102     101
                003652  103     113     040
                003655  106     101     111
                003660  114     105     104
                003663  040     124     117
                003666  040     123     105
                003671  124     000
     1039       003673  111     116     124     EM4::   .ASCIZ  /INTERNAL LOOPBACK FAILED TO CLEAR/
                003676  105     122     116
                003701  101     114     040
                003704  114     117     117
                003707  120     102     101
                003712  103     113     040
                003715  106     101     111
                003720  114     105     104
                003723  040     124     117
                003726  040     103     114
                003731  105     101     122
```

SEQ 0029

```
          003734     000
   1040   003735     105     130     124  EM5::   .ASCIZ  /EXTERNAL LOOPBACK FAILED TO SET/
          003740     105     122     116
          003743     101     114     040
          003746     114     117     117
          003751     120     102     101
          003754     103     113     040
          003757     106     101     111
          003762     114     105     104
          003765     040     124     117
          003770     040     123     105
          003773     124     000
   1041   003775     105     130     124  EM6::   .ASCIZ  /EXTERNAL LOOPBACK FAILED TO CLEAR/
          004000     105     122     116
          004003     101     114     040
          004006     114     117     117
          004011     120     102     101
          004014     103     113     040
          004017     106     101     111
          004022     114     105     104
          004025     040     124     117
          004030     040     103     114
          004033     105     101     122
          004036     000
   1042   004037     104     101     124  EM7::   .ASCIZ  /DATA PATH ERROR/
          004042     101     040     120
          004045     101     124     110
          004050     040     105     122
          004053     122     117     122
          004056     000
   1043   004057     111     122     104  EM8::   .ASCIZ  /IRDY FAILED TO SET/
          004062     131     040     106
          004065     101     111     114
          004070     105     104     040
          004073     124     117     040
          004076     123     105     124
          004101     000
   1044   004102     111     122     104  EM9::   .ASCIZ  /IRDY FAILED TO CLEAR/
          004105     131     040     106
          004110     101     111     114
          004113     105     104     040
          004116     124     117     040
          004121     103     114     105
          004124     101     122     000
   1045   004127     122     116     104  EM10::  .ASCIZ  /RNDR FAILED TO SET/
          004132     122     040     106
          004135     101     111     114
          004140     105     104     040
          004143     124     117     040
          004146     123     105     124
          004151     000
   1046   004152     122     116     104  EM11::  .ASCIZ  /RNDR FAILED TO CLEAR/
          004155     122     040     106
          004160     101     111     114
          004163     105     104     040
          004166     124     117     040
          004171     103     114     105
```

SEQ 0030

```
        004174  101  122  000
1047    004177  104  124  040  EM12::  .ASCIZ  /DT FAILED TO SET/
        004202  106  101  111
        004205  114  105  104
        004210  040  124  117
        004213  040  123  105
        004216  124  000
1048    004220  104  124  040  EM13::  .ASCIZ  /DT FAILED TO CLEAR/
        004223  106  101  111
        004226  114  105  104
        004231  040  124  117
        004234  040  103  114
        004237  105  101  122
        004242  000
1049    004243  122  105  107  EM14::  .ASCIZ  /REGISTER ADDRESS UNIQUENESS FAILURE/
        004246  111  123  124
        004251  105  122  040
        004254  101  104  104
        004257  122  105  123
        004262  123  040  125
        004265  116  111  121
        004270  125  105  116
        004273  105  123  123
        004276  040  106  101
        004301  111  114  125
        004304  122  105  000
1050
1051                                .EVEN
```

SEQ 0031

```
                                .SBTTL  TEST MICROCODE FOR KMC11-B

004310                          IRDTST:
004310  002012  036740  036740          .WORD   2012, 36740,36740,36740         ; OUT IMM,0,XREG2
004316  036740
004320  036740  036740  036740          .WORD   36740,36740,36740,36740         ; MEM IBUS,XREG6,INCMAR
004326  036740
004330  036740  036740  036740          .WORD   36740,36740,36740,36740         ;     16 TIMES
004336  036740
004340  036740  036740  036740          .WORD   36740,36740,36740,36740         ;
004346  036740
004350  036740  001200  100400          .WORD   36740,1200, 100400              ; OUT IMM,200,0INCON
                                                                                ; ALWAYS 0

004356                          NDRTST:
004356  002012  036760  036760          .WORD   2012, 36760,36760,36760         ; OUT IMM,0,XREG2
004364  036760
004366  036760  036760  036760          .WORD   36760,36760,36760,36760         ; MEM IBUS,XREG7,INCMAR
004374  036760
004376  036760  036760  036760          .WORD   36760,36760,36760,36760         ;     22 TIMES
004404  036760
004406  036760  036760  036760          .WORD   36760,36760,36760,36760         ;
004414  036760
004416  036760  036760  036760          .WORD   36760,36760,36760,36760         ;
004424  036760
004426  036760  036760  036760          .WORD   36760,36760,36760,20660         ; BRWRTE IBUS,XRE3
004434  020660
004436  036760  001200  100400          .WORD   36760,1200, 100400              ; OUT IMM,200,0ICON
                                                                                ; ALWAYS 0

004444                          DTTST:
004444  022720  036760  036760          .WORD   22720,36760,36760,36760         ; MEM IBUS,XREG5
004452  036760
004454  036760  036760  036760          .WORD   36760,36760,36760,36760         ; MEM IBUS,XRER7,INCMAR
004462  036760
004464  036760  036760  036760          .WORD   36760,36760,36760,36760         ;    22 TIMES
004472  036760
004474  036760  036760  036760          .WORD   36760,36760,36760,36760         ;
004502  036760
004504  036760  036760  036760          .WORD   36760,36760,36760,36760         ;
004512  036760
004514  036760  036760  036760          .WORD   36760,36760,36760,20660         ; BRWRTE IBUS,XREG3
004522  020660
004524  036760  001200  100400          .WORD   36760,1200, 100400              ; OUT IMM,200,0ICON
                                                                                ; ALWAYS 0

004532                          DTST:
                                ;       8       000000                          OUT     IBUS,INCON,0XREG7       ; SE
T UP LOOPBACK
004532  122017                          .WORD           122017
                                ;       9       000002                          OUT     IMM,0,0INCON            ; CL
EAR THE REST
004534  001000                          .WORD           001000
                                ;       10      000004          1$:     OUT     IBUS,PORT1,IBA1         ; AD
DRESS LOW BYTE
004536  122104                          .WORD           122104
                                ;       11      000006                          OUT     IBUS,PORT2,IBA2         ; AD
DRESS HIGH BYTE
004540  122125                          .WORD           122125
                                ;       12      000010                          SP      IBUS,INCON,SP0          ; AD
DRESS 17, 16 TO SP
004542  123000                          .WORD           123000
```

```
 DT CAME BACK, BRANCH
   1150 004622  102036                .WORD            102036
   1094                          ;      13        000012                 OUT     BR,INCA,ONPR              ; DO
 TRANSFER
   1095 004544  061070                .WORD            061070
   1096                          ;      14        000014          10$:   BRWRTE  IBUS,NPR                  ; ST
ORE NPR
   1097 004546  120600                .WORD            120600
   1098                          ;      15        000016                 BRO     10$                       ; IF
 SET, SIT AND WAIT
   1099 004550  102006                .WORD            102006
   1100                          ;      16                        ;+
   1101                          ;      17                        ; STORE RECEIVED WORD INTO MEMORY
   1102                          ;      18                        ;-
   1103                          ;      19        000020                 MEM     IBUS,INDAT1,INCMAR        ; LO
W BYTE
   1104 004552  036400                .WORD            036400
   1105                          ;      20        000022                 MEM     IBUS,INDAT2,INCMAR        ; HI
GH BYTE
   1106 004554  036420                .WORD            036420
   1107                          ;      21        000024                 BRWRTE  IBUS,NPR                  ; RE
AD NPR, PAGE OVERF.
   1108 004556  120600                .WORD            120600
   1109                          ;      22        000026                 BRSHFT  IMM,0                     ; GE
T OVERF. FROM 5 TO 4
   1110 004560  001400                .WORD            001400
   1111                          ;      23        000030                 BR4     20$                       ; IF
 SET, GET OUT
   1112 004562  103025                .WORD            103025
   1113                          ;      24        000032                 SP      IBUS,PORT1,SPO            ; GE
T ADDRESS TO INCREMENT
   1114 004564  123100                .WORD            123100
   1115                          ;      25        000034                 SPBR    BR,INCA,SPO               ; WO
RD TRANSFER
   1116 004566  063460                .WORD            063460
   1117                          ;      26        000036                 OUT     BR,INCA,OPORT1            ; PU
T IT IN CSR4
   1118 004570  061064                .WORD            061064
   1119                          ;      27        000040                 C       11$
   1120 004572  101022                .WORD            101022
   1121                          ;      28        000042                 ALWAYS  1$                        ;
   1122 004574  100402                .WORD            100402
   1123                          ;      29        000044          11$:   SP      IBUS,PORT2,SPO            ;
   1124 004576  123120                .WORD            123120
   1125                          ;      30        000046                 OUT     BR,INCA,OPORT2
   1126 004600  061065                .WORD            061065
   1127                          ;      31        000050                 ALWAYS  1$                        ; OT
HERWISE CONTINUE
   1128 004602  100402                .WORD            100402
   1129                          ;      32                        ;+
   1130                          ;      33                        ; TRANSMIT DATA FROM KMC DATA MEMORY
   1131                          ;      34                        ;-
   1132                          ;      35        000052          20$:   NODST   IMM,0,LDMAR               ; CL
EAR MAR
   1133 004604  010000                .WORD            010000
   1134                          ;      36        000054                 NODST   IMM,0,LDMAPG              ;
   1135 004606  004000                .WORD            004000
   1136                          ;      37        000056          25$:   OUTPUT  MEMX,SELB,OXREG0,INCMAR   ; DA
TA LOW BYTE
   1137 004610  056230                .WORD            056230
   1138                          ;      38        000060                 OUTPUT  MEMX,SELB,OXREG1          ;
AND HIGH BYTE
   1139 004612  042231                .WORD            042231
   1140                          ;      39        000062                 OUTPUT  MEMX,SELB,OXREG6,INCMAR   ;
 BITS <7,6>
   1141 004614  056236                .WORD            056236
   1142                          ;      40        000064                 OUT     IMM,12,OXREG2             ; SE
T DATA TRANSFER
```

H3

```
T DATA TRANSFER
   1143 004616  002012                     .WORD            002012
   1144                       ;      41
   1145                       ;      42                                    ; CHECK DATA TRANSFER AND DUMP RECEIVED DATA
 INTO MEMORY
   1146                       ;      43                                    ;-
   1147                       ;      44        000066                      30$:    BRWRTE  IBUS,XREG7              ; RE
AD MAINT.
   1148 004620  020760                     .WORD            020760
   1149                       ;      45        000070                              BRO     40$                     ; IF
```

```
   1151                              ;     46         000072                                   ALWAYS  30$                     ; OT
HERWISE, SIT AND WAIT
   1152 004624  100433                    .WORD                100433
   1153                              ;     47         000074                          40$:     BRWRTE  IBUS,XREG3
   1154 004626  020660                    .WORD                020660
   1155                              ;     48         000076                                   OUT     IBUS,PORT3,OBA1          ; AD
DRESS LOW BYTE
   1156 004630  122146                    .WORD                122146
   1157                              ;     49         000100                                   OUT     IBUS,PORT4,OBA2          ; AD
DRESS LOW BYTE
   1158 004632  122167                    .WORD                122167
   1159                              ;     50         000102                                   OUT     IBUS,XREG0,OUTDA1        ; DA
TA LOW
   1160 004634  022202                    .WORD                022202
   1161                              ;     51         000104                                   OUT     IBUS,XREG5,OUTDA2        ; AN
D HIGH BYTE
   1162 004636  022323                    .WORD                022323
   1163                              ;     52         000106                                   OUT     IBUS,INCON,OBR           ; BI
TS 17,16
   1164 004640  121011                    .WORD                121011
   1165                              ;     53         000110                                   BRWRTE  IMM,21                   ; OU
T NPR
   1166 004642  000421                    .WORD                000421
   1167                              ;     54         000112                                   OUT     BR,SELB,ONPR             ; DO
 TRANSFER
   1168 004644  061230                    .WORD                061230
   1169                              ;     55         000114                          41$:     BRWRTE  IBUS,NPR                 ; RE
AD NPR, PAGE OVERF.
   1170 004646  120600                    .WORD                120600
   1171                              ;     56         000116                                   BRO     41$                      ; IF
 NOT DONE, WAIT
   1172 004650  102046                    .WORD                102046
   1173                              ;     57         000120                                   BRSHFT  IMM,0                    ; GE
T OVERF. FROM 5 TO 4
   1174 004652  001400                    .WORD                001400
   1175                              ;     58         000122                                   BR4     100$                     ; IF
 SET, GET OUT
   1176 004654  103062                    .WORD                103062
   1177                              ;     59         000124                                   SP      IBUS,PORT3,SPO           ; GE
T ADDRESS TO INCREMENT
   1178 004656  123140                    .WORD                123140
   1179                              ;     60         000126                                   SPBR    BR,INCA,SPO              ; WO
RD TRANSFER
   1180 004660  063460                    .WORD                063460
   1181                              ;     61         000130                                   OUT     BR,INCA,OPORT3           ; PU
T IT IN CSR4
   1182 004662  061066                    .WORD                061066
   1183                              ;     62         000132                                   C       45$
   1184 004664  101057                    .WORD                101057
   1185                              ;     63         000134                                   ALWAYS  25$                      ; CO
NTINUE
   1186 004666  100427                    .WORD                100427
   1187                              ;     64         000136                          45$:     SP      IBUS,PORT4,SPO
   1188 004670  123160                    .WORD                123160
   1189                              ;     65         000140                                   OUT     BR,INCA,OPORT4
   1190 004672  061067                    .WORD                061067
   1191                              ;     66         000142                                   ALWAYS  25$
   1192 004674  100427                    .WORD                100427
   1193                              ;     67         000144                          100$:    OUT     IMM,200,OINCON           ; BI
T 7 SET
   1194 004676  001200                    .WORD                001200
   1195                              ;     68         000146                          200$:    ALWAYS  200$                     ; SI
T AND WAIT
   1196 004700  100463                    .WORD                100463
   1197
```

SEQ 0034

```
                        .SBTTL  GLOBAL ERROR REPORT SECTION

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


004702                          BGNMSG  PNTD
004702                                                                  PNTD::
004702  010546                  MOV     R5,-(SP)            ; STORE REGISTER 5
004704  010446                  MOV     R4,-(SP)            ; STORE REGISTER 4
004706  010346                  MOV     R3,-(SP)            ; STORE REGISTER 3
004710  042705  177400          BIC     #177400,R5          ; CLEAR HIGH BYTE FOR PRINTOUT
004714  042704  177400          BIC     #177400,R4          ; CLEAR HIGH BYTE FOR PRINTOUT
004720  042737  177770  002174  BIC     #177770,TEMP        ; LEAVE JUST 3 LAST BITS
004726                          PRINTB  #ERR0,R5,R4,TEMP
004726  013746  002174                                              MOV     TEMP,-(SP)
004732  010446                                                      MOV     R4,-(SP)
004734  010546                                                      MOV     R5,-(SP)
004736  012746  005126                                              MOV     #ERR0,-(SP)
004742  012746  000004                                              MOV     #4,-(SP)
004746  010600                                                      MOV     SP,R0
004750  104414                                                      TRAP    C$PNTB
004752  062706  000012                                              ADD     #12,SP
004756  012705  002200          MOV     #TEMP1+2,R5         ; POINTER FOR STORAGE
004762  012703  000010          MOV     #DL0,R3             ; START WITH DATA LOW
004766  010300          10$:    MOV     R3,R0               ; STORE REGISTER TO READ
004770  004737  005760          JSR     PC,READ             ; READ A REGISTER
004774  010415                  MOV     R4,(R5)             ; AND STORE IT
004776  042725  177400          BIC     #177400,(R5)+       ; CLEAR HIGH BYTE FOR PRINTOUT
005002  005203                  INC     R3                  ; GET NEXT
005004  122703  000020          CMPB    #20,R3              ; ALL DONE?
005010  001366                  BNE     10$                 ; IF NOT, BRANCH

005012  012705  002200          MOV     #TEMP1+2,R5         ; POINTER FOR STORAGE
005016                          PRINTX  #ERR01,(R5),2(R5),4(R5)
005016  016546  000004                                              MOV     4(R5),-(SP)
005022  016546  000002                                              MOV     2(R5),-(SP)
005026  011546                                                      MOV     (R5),-(SP)
005030  012746  005207                                              MOV     #ERR01,-(SP)
005034  012746  000004                                              MOV     #4,-(SP)
005040  010600                                                      MOV     SP,R0
005042  104415                                                      TRAP    C$PNTX
005044  062706  000012                                              ADD     #12,SP
005050                          PRINTX  #ERR02,6(R5),10(R5),12(R5),14(R5),16(R5)
005050  016546  000016                                              MOV     16(R5),-(SP)
005054  016546  000014                                              MOV     14(R5),-(SP)
005060  016546  000012                                              MOV     12(R5),-(SP)
005064  016546  000010                                              MOV     10(R5),-(SP)
005070  016546  000006                                              MOV     6(R5),-(SP)
005074  012746  005270                                              MOV     #ERR02,-(SP)
005100  012746  000006                                              MOV     #6,-(SP)
005104  010600                                                      MOV     SP,R0
005106  104415                                                      TRAP    C$PNTX
005110  062706  000016                                              ADD     #16,SP
```

SEQ 0035

```
                                        MOV     (SP)+,R3                ; RESTORE REGISTER 3
                                        MOV     (SP)+,R4                ; RESTORE REGISTER 4
                                        MOV     (SP)+,R5                ; RESTORE REGISTER 5
                                        EXIT    MSG
005122  000167                                                                  .WORD   J$JMP
005124  000210                                                                  .WORD   L10002-2-.
005126    045     116     045  ERR0:    .ASCIZ  /%N%AEXPECTED %03%A RECEIVED %03%A REGISTER %01%N/
005131    101     105     130
005134    120     105     103
005137    124     105     104
005142    040     045     117
005145    063     045     101
005150    040     122     105
005153    103     105     111
005156    126     105     104
005161    040     045     117
005164    063     045     101
005167    040     122     105
005172    107     111     123
005175    124     105     122
005200    040     045     117
005203    061     045     116
005206    000
005207    045     116     045  ERR01:   .ASCII  /%N%ALINE UNIT REGISTER DUMP%N%A%03/
005212    101     114     111
005215    116     105     040
005220    125     116     111
005223    124     040     122
005226    105     107     111
005231    123     124     105
005234    122     040     104
005237    125     115     120
005242    045     116     045
005245    101     045     117
005250    063
005251    045     101     040          .ASCIZ  /%A  %03%A  %03/
005254    040     045     117
005257    063     045     101
005262    040     040     045
005265    117     063     000
005270    045     101     040  ERR02:   .ASCII  /%A  %03%A      %03%A  %03%A  /
005273    040     045     117
005276    063     045     101
005301    011     045     117
005304    063     045     101
005307    040     040     045
005312    117     063     045
005315    101     040     040
005320    045     117     063          .ASCIZ  /%03%A  %03%N/
005323    045     101     040
005326    040     045     117
005331    063     045     116
005334    000
                                        .EVEN
005336                                  ENDMSG
005336                                                          L10002:
005336  104423                                                          TRAP    C$MSG
```

SEQ 0036

```
1240
1241 005340                                  BGNMSG  PNTRAM
     005340                                                                  PNTRAM::
1242 005340  010546                          MOV     R5,-(SP)          ; STORE REGISTER 5
1243 005342  042705  177400                  BIC     #177400,R5        ; CLEAR HIGH BYTE FOR PRINTOUT
1244 005346                                  PRINTB  #ERR1,R5,R4,R3
     005346  010346                                                              MOV     R3,-(SP)
     005350  010446                                                              MOV     R4,-(SP)
     005352  010546                                                              MOV     R5,-(SP)
     005354  012746  005402                                                      MOV     #ERR1,-(SP)
     005360  012746  000004                                                      MOV     #4,-(SP)
     005364  010600                                                              MOV     SP,R0
     005366  104414                                                              TRAP    C$PNTB
     005370  062706  000012                                                      ADD     #12,SP
1245 005374  012605                          MOV     (SP)+,R5          ; RESTORE REGISTER 5
1246 005376                                  EXIT    MSG
     005376  000167                                                              .WORD   J$JMP
     005400  000060                                                              .WORD   L10003-2-.
1247 005402    045     116     045  ERR1:    .ASCIZ  /%N%AEXPECTED %03%A RECEIVED %03%A ADDRESS %06%N/
     005405    101     105     130
     005410    120     105     103
     005413    124     105     104
     005416    040     045     117
     005421    063     045     101
     005424    040     122     105
     005427    103     105     111
     005432    126     105     104
     005435    040     045     117
     005440    063     045     101
     005443    040     101     104
     005446    104     122     105
     005451    123     123     040
     005454    045     117     066
     005457    045     116     000
1248                                         .EVEN
1249 005462                                  ENDMSG
     005462                                                          L10003:
     005462  104423                                                          TRAP    C$MSG
1250
1251 005464                                  BGNMSG  PNTREG
     005464                                                          PNTREG::
1252 005464                                  PRINTB  #ERR2,R5,R1,R3
     005464  010346                                                          MOV     R3,-(SP)
     005466  010146                                                          MOV     R1,-(SP)
     005470  010546                                                          MOV     R5,-(SP)
     005472  012746  005516                                                  MOV     #ERR2,-(SP)
     005476  012746  000004                                                  MOV     #4,-(SP)
     005502  010600                                                          MOV     SP,R0
     005504  104414                                                          TRAP    C$PNTB
     005506  062706  000012                                                  ADD     #12,SP
1253 005512                                  EXIT    MSG
     005512  000167                                                          .WORD   J$JMP
     005514  000060                                                          .WORD   L10004-2-.
1254 005516    045     116     045  ERR2:    .ASCIZ  /%N%AEXPECTED %06%A RECEIVED %06%A ADDRESS %06%N/
     005521    101     105     130
     005524    120     105     103
     005527    124     105     104
```

```
                005532     040     045     117
                005535     066     045     101
                005540     040     122     105
                005543     103     105     111
                005546     126     105     104
                005551     040     045     117
                005554     066     045     101
                005557     040     101     104
                005562     104     122     105
                005565     123     123     040
                005570     045     117     066
                005573     045     116     000
1255                                            .EVEN
1256 005576                                     ENDMSG
                005576                                                          L10004:
                005576  104423                                                          TRAP    C$MSG
1257
1258 005600                                     BGNMSG  ERPNT
                005600                                                          ERPNT::
1259 005600                                     PRINTB  #ERR3,-(R4),-(R5)
                005600  014546                                                          MOV     -(R5),-(SP)
                005602  014446                                                          MOV     -(R4),-(SP)
                005604  012746  005634                                                  MOV     #ERR3,-(SP)
                005610  012746  000003                                                  MOV     #3,-(SP)
                005614  010600                                                          MOV     SP,R0
                005616  104414                                                          TRAP    C$PNTB
                005620  062706  000010                                                  ADD     #10,SP
1260 005624  005724                             TST     (R4)+                   ; RESTORE OLD
1261 005626  005725                             TST     (R5)+                   ;   VALUES
1262 005630                                     EXIT    MSG
                005630  000167                                                          .WORD   J$JMP
                005632  000042                                                          .WORD   L10005-2-.
1263 005634     045     116     045     ERR3:   .ASCIZ  /%N%AEXPECTED %06%A RECEIVED %06%N/
                005637     101     105     130
                005642     120     105     103
                005645     124     105     104
                005650     040     045     117
                005653     066     045     101
                005656     040     122     105
                005661     103     105     111
                005664     126     105     104
                005667     040     045     117
                005672     066     045     116
                005675     000
1264                                            .EVEN
1265 005676                                     ENDMSG
                005676                                                          L10005:
                005676  104423                                                          TRAP    C$MSG
```

GLOBAL SUBROUTINES SECTION

SEQ 0038

```
                                .SBTTL  GLOBAL SUBROUTINES SECTION

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

                                ;**
                                ; FUNCTIONAL DESCRIPTION:
                                ;
                                ;    SUBROUTINE TO INITIALIZE KMC11-B UNDER TEST
                                ;
                                ; IMPLICIT INPUTS:
                                ;
                                ;       KCSR    POINTS TO DEVICE CSR
                                ;
                                ; CALLING SEQUENCE:
                                ;
                                ;       JSR     PC,MSCLR                ; GO TO INITIALIZE ROUTINE
                                ;
                                ;--


005700                          MSCLR::
005700  013702  002166                  MOV     KCSR,R2                 ; STORE POINTER TO 1ST REGISTER
005704  005012                          CLR     (R2)                    ; CLEAR RUN BIT JUST IN CASE
005706  012712  040000                  MOV     #MCLR,(R2)              ; SET MASTER CLEAR BIT
005712  005012                          CLR     (R2)                    ; CLEAR ALL CSR REGISTERS
005714  005062  000002                  CLR     2(R2)                   ;
005720  005062  000004                  CLR     4(R2)                   ;
005724  005062  000006                  CLR     6(R2)                   ;
005730  000207                          RTS     PC
```

SEQ 0039

```
                                ;**
                                ; FUNCTIONAL DESCRIPTION:
                                ;
                                ;    SUBROUTINE EXECUTE AN INSTRUCTION IN MAINTENANCE MODE
                                ;
                                ; INPUTS:
                                ;
                                ;       R0      CONTAINS INSTRUCTION TO EXECUTE
                                ;
                                ; IMPLICIT INPUTS:
                                ;
                                ;       KCSR    POINTS TO DEVICE CSR
                                ;
                                ; CALLING SEQUENCE:
                                ;
                                ;       MOV     #INTSTR,R0              ; LOAD INSTRUCTION INTO R0
                                ;       JSR     PC,ROMCLK               ; GO EXECUTE IT
                                ;
                                ;--

005732                          ROMCLK::
005732  013702  002166                  MOV     KCSR,R2                 ; STORE POINTER TO CSR
005736  012712  001000                  MOV     #RAMI,(R2)              ; CLEAR RUN
005742  010062  000006                  MOV     R0,6(R2)                ; STORE INSTRUCTION INTO REG.6
005746  012712  000400                  MOV     #STEP,(R2)              ; EXECUTE ONE INTSTRUCTION
005752  042712  000400                  BIC     #STEP,(R2)              ; CLEAR STEP BIT
005756  000207                        RTS     PC                      ; RETURN
```

SEQ 0040

```
                        ;**
                        ; FUNCTIONAL DESCRIPTION:
                        ;
                        ;    SUBROUTINE TO READ DATA INTERFACE REGISTER OR KMC11-B MEMORY
                        ;
                        ; INPUTS:
                        ;
                        ;       R0      CONTAINS REGISTER TO BE READ OR 377 TO READ
                        ;                       DATA MEMORY
                        ;               (FOR REGISTER READ ONLY 10,15,16,17 IN OCTAL
                        ;                       IS VALID)
                        ;
                        ; IMPLICIT INPUTS:
                        ;
                        ;       KCSR    POINTS TO DEVICE CSR
                        ;       R2      POINTS TO DEVICE CSR AFTER RETURN FROM ROMCLK SUBROUTINE
                        ;
                        ; OUTPUTS:
                        ;
                        ;       R4      CONTAINS RESULT OF THE READ OPERATION
                        ;
                        ; SUBORDINATE ROUTINES USED:
                        ;
                        ;       ROMCLK  SUBROUTINE IS USED TO EXECUTE READ OPERATION FROM
                        ;                       KMC11
                        ;
                        ; CALLING SEQUENCE:
                        ;
                        ;       MOV     #DLO,R0                 ; REGISTER NUMBER TO BE READ
                        ;       JSR     PC,READ                 ; GO READ IT
                        ;
                        ;--
                        
005760                  READ::
005760  010037  002174          MOV     R0,TEMP                 ; STORE WHAT TO BE READ
005764  122700  000377          CMPB    #377,R0                 ; MEMORY READ?
005770  001003                  BNE     10$                     ; IF NOT, BRANCH
                        ;+
                        ; TO READ MEMORY
                        ;-
005772  012700  055226          MOV     #55226,R0               ; OUT SELB,XREG6,INCMAR
005776  000410                  BR      20$                     ; GO EXECUTE WHAT IN R0
                        ;+
                        ; TO READ A DATA INTERFACE REGISTER
                        ;-
006000  006100          10$:    ROL     R0                      ; ROTATE LEFT 4 TIMES
006002  006100                  ROL     R0                      ;  TO GET BITS <7-4>
006004  006100                  ROL     R0                      ;   FROM BITS <3-0>
006006  006100                  ROL     R0                      ;
006010  042700  177417          BIC     #177417,R0              ; CLEAR ALL BUT <7-4>
006014  052700  021006          BIS     #21006,R0               ; OUT INBUS,REG N,XREG6
006020  004737  005732  20$:    JSR     PC,ROMCLK               ; NOW EXECUTE WHAT IN R0
006024  005004                  CLR     R4                      ; CLEAR R4
006026  116204  000006          MOVB    6(R2),R4                ; STORE RESULT
006032  000207                  RTS     PC
```

```
                                ;++
                                ; FUNCTIONAL DESCRIPTION:
                                ;
                                ;    SUBROUTINE TO WRITE TO A DATA INTERFACE REGISTER
                                ;
                                ; INPUTS:
                                ;
                                ;       R0      REGISTER TO BE WRITTEN
                                ;       R5      PATTERN TO BE WRITTEN
                                ;
                                ; IMPLICIT INPUTS:
                                ;
                                ;       KCSR    POINTS TO DEVICE CSR
                                ;
                                ; SUBORDINATE ROUTINES USED:
                                ;
                                ;       ROMCLK  SUBROUTINE IS USED TO EXECUTE WRITE OPERATION FROM
                                ;                       KMC11
                                ;
                                ; CALLING SEQUENCE:
                                ;
                                ;       MOV     #DLO,R0         ; REGISTER TO WRITE TO
                                ;       MOV     #5252,R5        ; PATTERN TO WRITE
                                ;       JSR     PC,WRITE        ; GO WRITE TO REGISTER
                                ;
                                ;--

006034                          WRITE::
006034  013702  002166                  MOV     KCSR,R2         ; STORE POINTER TO CSR
006040  042700  177760                  BIC     #177760,R0      ; CLEAR ALL BUT <3-0>
006044  052700  122100                  BIS     #122100,R0      ; OUT IBUS,XREG4,REG N
006050  010562  000004                  MOV     R5,4(R2)        ; PATTERN TO 4TH CSR
006054  004737  005732                  JSR     PC,ROMCLK       ; EXECUTE IT
006060  000207                          RTS     PC              ; AND RETURN
```

SEQ 0042

```
                        ;++
                        ; FUNCTIONAL DESCRIPTION:
                        ;
                        ;    SUBROUTINE TO LOAD FIRMWARE INTO KMC11-B
                        ;
                        ; INPUTS:
                        ;
                        ;       R0      SIZE OF FIRMWARE IN WORDS
                        ;       R5      ADDRESS OF THE ROUTINE TO LOAD
                        ;
                        ; IMPLICIT INPUTS:
                        ;
                        ;       R2      POINTS TO DEVICE CSR
                        ;
                        ; OUTPUTS:
                        ;
                        ;       R0      SUCCESS CODE ( 0 INDICATES SUCCESS)
                        ;                            ( 1 INDICATES FAILURE)
                        ;
                        ; CALLING SEQUENCE:
                        ;
                        ;       MOV     #19,R0          ; ROUTINE SIZE
                        ;       MOV     #IRDTST,R5      ; STARTING ADDRESS
                        ;       JSR     PC,LOAD         ; GO WRITE TO REGISTER
                        ;
                        ;--

006062                  LOAD:
006062  005003                  CLR     R3              ; STARTING ADDRESS OF CRAM
006064  012712  002000  10$:    MOV     #RAM0,(R2)      ; ENABLE WRITE
006070  010362  000004          MOV     R3,4(R2)        ; LOAD ADDRESS TO WRITE TO
006074  011562  000006          MOV     (R5),6(R2)      ; LOAD DATA
006100  052712  020000          BIS     #CRAMW,(R2)     ; WRITE TO CRAM
                        ;+
                        ; COMPARE DATA JUST WRITTEN
                        ;-
006104  005012                  CLR     (R2)            ; CLEAR TO DO NEXT CYCLE
006106  005062  000004          CLR     4(R2)           ; CLEAR ADDRESS
006112  005062  000006          CLR     6(R2)           ; AND DATA
006116  012712  002000          MOV     #RAM0,(R2)      ; ENABLE CRAM
006122  010362  000004          MOV     R3,4(R2)        ; MOVE ADDRESS
006126  021562  000006          CMP     (R5),6(R2)      ; WAS DATA OK?
006132  001003                  BNE     20$             ; NO, BRANCH
006134  005725                  TST     (R5)+           ; GET NEXT WORD TO LOAD
006136  005203                  INC     R3              ; TO THE NEXT ADDRESS
006140  077027                  SOB     R0,10$          ; LOOP UNTIL DONE
006142                  20$:
006142  000207                  RTS     PC              ; AND RETURN
```

SEQ 0043

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


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

006144                                  BGNRPT
006144                                                                  L$RPT::

                                        EXIT    RPT
006144  000167                                                                  .WORD   J$JMP
006146  000000                                                                  .WORD   L10006-2-.


                                        .EVEN

                                        ENDRPT
006150                                                                  L10006:
006150  104425                                                                  TRAP    C$RPT
```

SEQ 0044

```
                                .SBTTL  PROTECTION TABLE

                                ;++
                                ; THIS TABLE IS USED BY THE RUNTIME SERVICES
                                ; TO PROTECT THE LOAD MEDIA.
                                ;--

006152                                  BGNPROT
006152                                                                  L$PROT::

006152  177777                         -1              ;OFFSET INTO P-TABLE FOR CSR ADDRESS
006154  177777                         -1              ;OFFSET INTO P-TABLE FOR MASSBUS ADDRESS
006156  177777                         -1              ;OFFSET INTO P-TABLE FOR DRIVE NUMBER

006160                                  ENDPROT
```

```
                                  .SBTTL  INITIALIZE SECTION

                                  ;++
                                  ; THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
                                  ; AT THE BEGINNING OF EACH PASS.
                                  ;--

006160                                    BGNINIT
006160                                                                                 L$INIT::

                                  ;%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
                                  ;       THE INITIALIZE CODE IS EXECUTED UNDER FIVE CONDITIONS.  THERE
                                  ;       ARE SUPERVISOR EVENT FLAGS THAT ARE USED TO LET THE
                                  ;       DIAGNOSTIC KNOW UNDER WHICH CONDITION THE EXECUTION IS TAKING
                                  ;       PLACE.  THE EVENT FLAGS ARE READ USING THE "READEF" MACRO.
                                  ;       THE CONDITIONS UNDER WHICH THE INIT CODE IS EXECUTED AND THE
                                  ;       CORRRESPONDING EVENT FLAGS ARE:
                                  ;               START COMMAND           EF.START
                                  ;               RESTART COMMAND         EF.RESTART
                                  ;               CONTINUE COMMAND        EF.CONTINUE
                                  ;               POWERDOWN/POWERUP       EF.PWR
                                  ;               NEW PASS                EF.NEW
                                  ;       EXAMPLE OF EVENT FLAG USE:
                                  ;               READEF  #EF.START
                                  ;               BCOMPLETE       STARTCODE
                                  ;       DURING THE INIT CODE, USE THE "GPHARD" MACRO TO OBTAIN P-TABLE
                                  ;       INFORMATION FOR DEVICE TESTING.  GET ONE UNIT'S INFORMATION IF
                                  ;       THIS IS A SEQUENTIAL DIAGNOSTIC.  GET INFORMATION ON ALL
                                  ;       UNITS AVAILABLE FOR TESTING IF THIS IS AN EXERCISER.  THE NUMBER
                                  ;       OF UNITS AVAILABLE IS IN A HEADER LOCATION: "L$UNIT".
                                  ;%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

006160                                    READEF  #EF.CONTINUE            ; IF CONTINUE FLAG
006160  012700  000036                                                                    MOV     #EF.CONTINUE,RO
006164  104447                                                                            TRAP    C$REFG
006166                                    BCOMPLETE       ENDIN           ; DON'T DO ANYTHING
006166  103443                                                                            BCS     ENDIN
006170                                    READEF  #EF.START               ; IF START
006170  012700  000040                                                                    MOV     #EF.START,RO
006174  104447                                                                            TRAP    C$REFG
006176                                    BCOMPLETE       START           ;   START WITH 1ST UNIT
006176  103415                                                                            BCS     START
006200                                    READEF  #EF.NEW                 ; IF A NEW PASS
006200  012700  000035                                                                    MOV     #EF.NEW,RO
006204  104447                                                                            TRAP    C$REFG
006206                                    BCOMPLETE       START           ;   START WITH 1ST UNIT
006206  103411                                                                            BCS     START
006210                                    READEF  #EF.RESTART             ; IF RESTART
006210  012700  000037                                                                    MOV     #EF.RESTART,RO
006214  104447                                                                            TRAP    C$REFG
006216                                    BCOMPLETE       START           ;   START WITH 1ST UNIT
006216  103405                                                                            BCS     START
006220                                    READEF  #EF.PWR                 ; IF POWER UP
006220  012700  000034                                                                    MOV     #EF.PWR,RO
006224  104447                                                                            TRAP    C$REFG
006226                                    BCOMPLETE       ENDIN           ; TRY TO CONTINUE
006226  103423                                                                            BCS     ENDIN
```

```
MISCELLANEOUS SECTIONS  MACRO M1200  15-MAR-85 16:13  PAGE 24-1
INITIALIZE SECTION                                                                  SEQ 0046

1550 006230  000403                          BR              NEXT          ; IF NONE OF THE ABOV, GET NEXT UNIT
1551                                  ;
1552                                  ; IF START OR ANY OTHER COMMAND, START WITH UNIT 0
1553
1554 006232  012737  177777  002170  START:  MOV     #-1,LOGUNT            ; START WITH UNIT 0
1555 006240  005237  002170          NEXT:   INC     LOGUNT                ; GET NEXT UNIT
1556 006244  023737  002170  002012          CMP     LOGUNT,L$UNIT         ; REACHED THE MAX?
1557 006252  001767                          BEQ     START                 ; IF YES, START ALL OVER
1558 006254                                   GPHARD  LOGUNT,R1             ; GET HARDWARE TABLE
     006254  013700  002170                                                                MOV     LOGUNT,R0
     006260  104442                                                                       TRAP    C$GPHRD
     006262  010001                                                                       MOV     R0,R1
1559 006264                                   BNCOMPLETE      NEXT          ; IF UNAVAILBALE, TRY ANOTHER
     006264  103365                                                                       BCC     NEXT
1560 006266  012137  002166                   MOV     (R1)+,KCSR            ; GET CSR ADDRESS
1561 006272  011137  002172                   MOV     (R1),MTMODE           ; GET LOOPBACK MODE
1562                                          .EVEN
1563 006276                          ENDIN:
1564 006276                                   ENDINIT
     006276                                                                L10010:
     006276  104411                                                                       TRAP    C$INIT
```

SEQ 0047

```
                                .SBTTL  AUTODROP SECTION

                                ;++
                                ; THIS CODE IS EXECUTED IMMEDIATELY AFTER THE INITIALIZE CODE IF
                                ; THE "ADR" FLAG WAS SET.  THE UNIT(S) UNDER TEST ARE CHECKED TO
                                ; SEE IF THEY WILL RESPOND.  THOSE THAT DON'T ARE IMMEDIATELY
                                ; DROPPED FROM TESTING.
                                ;--

006300                                  BGNAUTO
006300                                                          L$AUTO::

006300                                  ENDAUTO
006300                                                          L10011:
006300  104461                                                          TRAP    C$AUTO
```

CLEANUP CODING SECTION

SEQ 0048

```
                                .SBTTL  CLEANUP CODING SECTION

                                ;++
                                ; THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
                                ; AFTER THE HARDWARE TESTS HAVE BEEN PERFORMED.
                                ;--

006302                                  BGNCLN
006302                                                                  L$CLEAN::

006302                                  EXIT    CLN
006302  104432                                                                  TRAP    C$EXIT
006304  000002                                                                  .WORD   L10012-.

                                .EVEN

006306                                  ENDCLN
006306                                                                  L10012:
006306  104412                                                                  TRAP    C$CLEAN
```

SEQ 0049

```
                        .SBTTL  DROP UNIT SECTION

                        ;++
                        ; THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
                        ; TO NO LONGER BE TESTED.
                        ;--

006310                          BGNDU
006310                                                          L$DU::

                        ;*****************************************************************************
                        ;       INSERT DROP CODE HERE.  THIS CODE WILL BE EXECUTED AFTER
                        ;       A "DROP" COMMAND OR A "DODU" MACRO EXECUTION.  THE PURPOSE
                        ;       OF THIS CODE IS TO DO ANY NECESSARY HOUSEKEEPING AFTER A
                        ;       UNIT HAS BEEN DROPPED.  THIS SECTION IS OPTIONAL.
                        ;*****************************************************************************

006310                          EXIT    DU
006310  000167                                                  .WORD   J$JMP
006312  000000                                                  .WORD   L10013-2-.

                        ;*****************************************************************************
                        ;     INSERT LOCAL STORAGE THAT IS USED ONLY
                        ;     DURING THE DROP-UNIT SECTION.
                        ;*****************************************************************************

                        ;*****************************************************************************
                        ;     INSERT MESSAGES THAT ARE USED ONLY
                        ;     DURING THE DROP-UNIT SECTION.
                        ;*****************************************************************************

                                .EVEN

                                ENDDU
006314                                                          L10013:
006314  104453                                                          TRAP    C$DU
```

SEQ 0050

```
                                .SBTTL  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.
                                ;--

006316                                  BGNAU
006316                                                                  L$AU::

                                ;*******************************************************************************
                                ;       INSERT ADD CODE HERE.  THIS CODE WILL BE EXECUTED AFTER
                                ;       AN "ADD" COMMAND.  THE PURPOSE OF THIS CODE IS TO DO ANY
                                ;       HOUSEKEEPING THAT MAY BE NECESSARY AFTER A UNIT HAS BEEN ADDED.
                                ;       THIS SECTION IS OPTIONAL.
                                ;*******************************************************************************

006316                                  EXIT    AU
006316  000167                                                          .WORD   J$JMP
006320  000000                                                          .WORD   L10014-2-.

                                ;*******************************************************************************
                                ;     INSERT LOCAL STORAGE THAT IS USED ONLY
                                ;     DURING THE ADD-UNIT SECTION.
                                ;*******************************************************************************

                                ;*******************************************************************************
                                ;     INSERT MESSAGES THAT ARE USED ONLY
                                ;     DURING THE ADD-UNIT SECTION.
                                ;*******************************************************************************

                                  .EVEN

006322                                  ENDAU
006322                                                                  L10014:
006322  104452                                                                  TRAP    C$AU
```

SEQ 0051

```
                                .SBTTL  TEST 1:  REGISTER TEST

                                        BGNTST
006324                                                                  T1::
                                ;**
                                ;
                                ;       SUBTEST TO VERIFY THAT ALL SELECTED UNITS CAN BE ACCESSED THROUGH
                                ;       UNIBUS.
                                ;
                                ;--
                                        BGNSUB
006324                                                                  T1.1:
006324  104402                                                                TRAP    C$BSUB
006326  012702  000004                MOV     #4,R2                   ; DO FOR ALL 4 REGISTERS
006332  013703  002166                MOV     KCSR,R3                 ; GET ADDRESS OF FIRST
006336  013737  000004  002174        MOV     @#4,TEMP                ; STORE NXM VECTOR
006344  012737  006360  000004        MOV     #2$,@#4                 ; POINT NEW ONE TO THE PROGRAM
006352  005723                1$:     TST     (R3)+                   ; CHECK WHETHER RESPONDED
006354  077202                        SOB     R2,1$                   ; DO FOR ALL REGISTERS
006356  000406                        BR      3$                      ; EXIT TEST
                                ;*
                                ; TIMEOUT ROUTINE
                                ;-
006360                          2$:
006360  062706  000004                ADD     #4,SP                   ; ADJUST STACK
006364                                ERRHRD  1,KMC1                  ; NOTHING AT THAT ADDRESS
006364  104456                                                                TRAP    C$ERHRD
006366  000001                                                                .WORD   1
006370  003260                                                                .WORD   KMC1
006372  000000                                                                .WORD   0
006374                          3$:
006374  013737  002174  000004        MOV     TEMP,@#4                ; RESTORE NXM VECTOR
006402                                ENDSUB
006402                                                                  L10016:
006402  104403                                                                TRAP    C$ESUB
```

```
                                ;**
                                ;
                                ;       SUBTEST TO VERIFY FLOATING 1 THROUGH ALL CSR REGISTERS
                                ;
                                ;--
                                        BGNSUB
                                                                                T1.2:
                                                                                        TRAP    C$BSUB
                                ;*
                                ; CHANGE THE PATTERN
                                ;-
                                3$:     CKLOOP                          ; LOOP ON ERROR
                                                                                        TRAP    C$CLP1
                                        ENDSUB
                                                                                L10017:
                                                                                        TRAP    C$ESUB
                                        ENDTST
                                                                                L10015:
                                                                                        TRAP    C$ETST
```

1701									
1702									
1703									
1704									
1705									
1706									
1707	006404								
	006404								
	006404	104402							
1708	006406	013703	002166		MOV	KCSR,R3	; GET ADDRESS OF FIRST		
1709	006412	005723			TST	(R3)+	; GET NEXT ONE		
1710	006414	012704	000003		MOV	#3,R4	; DO FOR ALL 7		
1711	006420	012705	100000	1$:	MOV	#100000,R5	; START WITH 1		
1712	006424	010513		2$:	MOV	R5,(R3)	; WRITE PATTERN		
1713	006426	011301			MOV	(R3),R1	; READ IT BACK		
1714	006430	020501			CMP	R5,R1	; WAS IT WRITTEN?		
1715	006432	001404			BEQ	3$	; IF OK, BRANCH		
1716	006434				ERRHRD	2,KMC2,PNTREG	; REGISTER ERROR		
	006434	104456						TRAP	C$ERHRD
	006436	000002						.WORD	2
	006440	003331						.WORD	KMC2
	006442	005464						.WORD	PNTREG
1717									
1718									
1719									
1720									
1721	006444			3$:	CKLOOP		; LOOP ON ERROR		
	006444	104406						TRAP	C$CLP1
1722	006446	000241			CLC		; CLEAR CARRY		
1723	006450	006005			ROR	R5	; CHANGE TO A DIFFERENT BIT		
1724	006452	001364			BNE	2$	; KEEP DOING UNITL 0		
1725	006454	005723			TST	(R3)+	; GET NEXT CSR		
1726	006456	077420			SOB	R4,1$	; DO FOR ALL 3 REGISTERS		
1727	006460				ENDSUB				
	006460							L10017:	
	006460	104403						TRAP	C$ESUB
1728									
1729	006462				ENDTST				
	006462							L10015:	
	006462	104401						TRAP	C$ETST
1730									

SEQ 0053

```
                                .SBTTL  TEST 2:  KMC11-B TEST
006464                                  BGNTST
006464                                                                  T2::
                                ;++
                                ;
                                ; TEST TO VERIFY THAT ALL FUNCTIONS OF THE KMC11-B NEED FOR FURTHER
                                ; TESTING ARE WORKING
                                ;
                                ;--
006464                                  BGNSUB
006464                                                                  T2.1:
006464  104402                                                                  TRAP    C$BSUB
                                ;++
                                ;
                                ;       SUBTEST TO VERIFY CRAM WITH FLOATING 1 PATTERN
                                ;
                                ;--
006466  005003                          CLR     R3                      ; FIRST ADDRESS
006470  013702  002166                  MOV     KCSR,R2                 ; GET CSR ADDRESS
006474  012705  100000          10$:    MOV     #100000,R5              ; INITIAL PATTERN
                                ;+
                                ; WRITE TO A LOCATION
                                ;-
006500  012712  002000          20$:    MOV     #RAM0,(R2)              ; SET RAM0 IN SEL0
006504  010362  000004                  MOV     R3,4(R2)                ; ADDRESS TO SEL4
006510  010562  000006                  MOV     R5,6(R2)                ; DATA TO SEL6
006514  052712  020000                  BIS     #CRAMW,(R2)             ; SET WRITE BIT IN SEL0
006520  042712  020000                  BIC     #CRAMW,(R2)             ; CLEAR WRITE BIT
                                ;+
                                ; READ A LOCATION BACK
                                ;-
006524  016237  000004  002174          MOV     4(R2),TEMP              ; READ THE ADDRESS
006532  016201  000006                  MOV     6(R2),R1                ; AND DATA
006536  020501                          CMP     R5,R1                   ; DATA OK?
006540  001404                          BEQ     30$                     ; IF SO, BRANCH
006542                                  ERRHRD  3,KMC5,PNTREG           ; CRAM ERROR
006542  104456                                                                  TRAP    C$ERHRD
006544  000003                                                                  .WORD   3
006546  003460                                                                  .WORD   KMC5
006550  005464                                                                  .WORD   PNTREG
006552  042712  002000          30$:    BIC     #RAM0,(R2)              ; CLEAR RAM0 BIT
006556  000241                          CLC                             ; CLEAR CARRY
006560  006005                          ROR     R5                      ; GET NEXT PATTERN
006562  005705                          TST     R5                      ; ALL DONE?
006564  001345                          BNE     20$                     ; IF NOT, BRANCH
                                ;+
                                ; GET NEXT ADDRESS
                                ;-
006566  005203                          INC     R3                      ; GET NEXT ADDRESS
006570  022703  010000                  CMP     #4096.,R3               ; ALL LOCATIONS?
006574  003337                          BGT     10$                     ; IF NOT, BRANCH
006576                                  ENDSUB
006576                                                                  L10021:
006576  104403                                                                  TRAP    C$ESUB
```

SEQ 0054

```
1778                                    ;++
1779                                    ;
1780                                    ;       SUBTEST TO VERIFY THAT BRG REGISTER CAN BE LOADED WITH A
1781                                    ;       UNIQUE DATA PATTERN AND THAT MASTER CLEAR CLEARS BRG.
1782                                    ;
1783                                    ;--
1784 006600                             BGNSUB
     006600
     006600  104402                                                    T2.2:
                                                                                TRAP    C$BSUB
1785 006602  013702  002166             MOV     KCSR,R2                ; STORE CSR POINTER
1786 006606  012705  177577             MOV     #177577,R5             ; LOW BYTE ALL 1'S
1787 006612  005004                     CLR     R4                     ; INITIALIZE RECEIVE PATTERN
1788                                    ;+
1789                                    ; WRITE AND READ BACK PATTERN FROM BRG
1790                                    ;-
1791 006614  010562  000004     10$:    MOV     R5,4(R2)               ; PATTERN TO CSR 4
1792 006620  012700  120500             MOV     #120500,R0             ; CSR4 TO BRG INSTRUCTION
1793 006624  004737  005732             JSR     PC,ROMCLK              ; EXECUTE IT
1794 006630  012700  061225             MOV     #61225,R0              ; BRG TO CSR4(HIGH BYTE)
1795 006634  004737  005732             JSR     PC,ROMCLK              ; EXECUTE IT
1796 006640  116204  000005             MOVB    5(R2),R4               ; READ BACK A PATTERN
1797 006644  120504                     CMPB    R5,R4                  ; WAS IT PATTERN WRITTEN?
1798 006646  001404                     BEQ     20$                    ; IF SO, BRANCH
1799 006650                             ERRHRD  4,KMC3                 ; BRG ERROR
     006650  104456                                                            TRAP    C$ERHRD
     006652  000004                                                            .WORD   4
     006654  003356                                                            .WORD   KMC3
     006656  000000                                                            .WORD   0
1800 006660  006005     20$:    ROR     R5                             ; ROTATE RIGHT
1801 006662  122705  000177             CMPB    #177,R5                ; ALL 1'S AGAIN?
1802 006666  001352                     BNE     10$                    ; IF NOT, DO NEXT PATTERN
1803                                    ;+
1804                                    ; CHECK THAT MASTER CLEAR CLEARS BRG REGISTER
1805                                    ;-
1806 006670  004737  005700             JSR     PC,MSCLR               ; RESET KMC11
1807 006674  012700  061225             MOV     #61225,R0              ; BRG TO CSR4(HIGH BYTE)
1808 006700  004737  005732             JSR     PC,ROMCLK              ; READ BRG
1809 006704  105762  000005             TSTB    5(R2)                  ; WAS IT CLEARED?
1810 006710  001404                     BEQ     30$                    ; IF SO, BRANCH
1811 006712                             ERRHRD  5,KMC4                 ; MASTER RESET DID NOT CLEAR BRG
     006712  104456                                                            TRAP    C$ERHRD
     006714  000005                                                            .WORD   5
     006716  003403                                                            .WORD   KMC4
     006720  000000                                                            .WORD   0
1812 006722                     30$:
1813 006722                             ENDSUB
     006722                                                     L10022:
     006722  104403                                                    TRAP    C$ESUB
```

SEQ 0055

```
                        ;++
                        ;
                        ;       SUBTEST TO VERIFY KMC11-B DATA MEMORY WITH FLOATING 0
                        ;       PATTERN
                        ;
                        ;--
                                BGNSUB
                                                                        T2.3:
                                                                                TRAP    C$BSUB
                        ;+
                        ; WRITE A PATTERN TO A MEMORY LOCATION
                        ;-
                                MOV     #177577,R5              ; LOW BYTE ALL 1'S
                                MOV     R5,4(R2)                ; STORE TO 4TH REGISTER
                                MOV     #122500,R0              ; REG4 TO MEMORY
                                JSR     PC,ROMCLK               ; EXECUTE IT
                                CLR     4(R2)                   ; CLEAR WHERE WILL BE RECEIVED
                                MOV     #41224,R0               ; MEMORY TO REG4
                                JSR     PC,ROMCLK               ; EXECUTE
                                MOVB    4(R2),R4                ; STORE WHAT'S RECEIVED
                                CMPB    R5,R4                   ; WAS DATA OK?
                                BEQ     30$                     ; IF SO, BRANCH
                                ERRHRD  6,KMC6,PNTRAM           ; ERROR IN DATA RAM
                                                                                TRAP    C$ERHRD
                                                                                .WORD   6
                                                                                .WORD   KMC6
                                                                                .WORD   PNTRAM
                        30$:    CLC                             ; CLEAR CARRY
                                ROR     R5                      ; CHANGE THE PATTERN
                                CMPB    #177,R5                 ; ALL ONES AGAIN
                                BNE     20$                     ; IF NOT, DO NEXT PATTERN
                        ;+
                        ; POINT TO NEXT LOCATION IN DATA RAM
                        ;-
                                MOV     #14000,R0               ; INCMAR TO GET NEXT ADDRESS
                                JSR     PC,ROMCLK               ; EXECUTE THAT ONE
                                INC     R3                      ; KEEP COUNT OF ADDRESSES
                                CMP     #4096.,R3               ; ALL DONE?
                                BNE     10$                     ; IF NOT, BRANCH TO DO NEXT
                                ENDSUB
                                                                                L10023:
                                                                                        TRAP    C$ESUB

                                ENDTST
                                                                                L10020:
                                                                                        TRAP    C$ETST
```

```
                                                                                                                    SEQ 0056
                                        .SBTTL  TEST 3:  RESET TEST
007050                                          BGNTST
007050                                                                                  T3::
                                        ;++
                                        ;
                                        ;       SUBTEST TO VEIRFY THAT MAINTENANCE REGISTER IS CLEAR
                                        ;       BY MASTER CLEAR EXCEPT FOR CABLE OK BIT
                                        ;
                                        ;--
007050                                          BGNSUB
007050                                                                                  T3.1:
007050  104402                                                                                TRAP    C$BSUB
007052  013702  002166                        MOV     KCSR,R2         ; STORE POINTER TO CSR
007056  004737  005700                        JSR     PC,MSCLR        ; CLEAR THE WORLD
007062  012700  000017                        MOV     #MAINT,R0       ; READ MAINT REG.
007066  004737  005760                        JSR     PC,READ         ; READ REGISTER
007072  132704  000350                        BITB    #350,R4         ; 7,6,5,3 CLEARED?
007076  001405                                BEQ     10$             ; YES, BRANCH
007100  005005                                CLR     R5              ; CLEAR EXPECTED PATTERN
007102                                          ERRHRD  7,EM1,PNTD      ; MASTER CLEAR DID NOT
007102  104456                                                                          TRAP    C$ERHRD
007104  000007                                                                        .WORD   7
007106  003534                                                                        .WORD   EM1
007110  004702                                                                        .WORD   PNTD
007112                                  10$:    CKLOOP                  ; LOOP ON ERROR
007112  104406                                                                          TRAP    C$CLP1
007114  132704  000004                        BITB    #4,R4           ; CABLE OK STILL SET?
007120  001007                                BNE     20$             ; YES, BRANCH
007122  005737  002172                        TST     MTMODE          ; INTERNAL MODE?
007126  001404                                BEQ     20$             ; IF SO, IGNORE
007130                                          ERRHRD  8,EM2           ; CABLE OK NOT SET
007130  104456                                                                          TRAP    C$ERHRD
007132  000010                                                                        .WORD   8
007134  003607                                                                        .WORD   EM2
007136  000000                                                                        .WORD   0
007140                                  20$:
007140                                          ENDSUB
007140                                                                          L10025:
007140  104403                                                                          TRAP    C$ESUB
```

SEQ 0057

```
                        ;++
                        ;
                        ;       SUBTEST TO VERIFY THAT LOOPBACK MODE BITS 3 AND 4
                        ;       CAN BE SET AND CLEARED IN MAINTENANCE REGISTER
                        ;
                        ;--
007142                          BGNSUB
007142                                                          T3.2:
007142  104402                                                          TRAP    C$BSUB
                        ;+
                        ; CHECK INTERNAL LOOPBACK MODE BIT
                        ;-
007144  012705  000010          MOV     #10,R5                  ; INTERNAL LOOPBACK BIT
007150  012700  000017          MOV     #MAINT,R0               ; MAINTENANCE REGISTER
007154  004737  006034          JSR     PC,WRITE                ; WRITE TO MAINTENANCE
007160  012700  000017          MOV     #MAINT,R0               ; MAINTENANCE REGISTER
007164  004737  005760          JSR     PC,READ                 ; READ IT BACK
007170  032704  000010          BIT     #10,R4                  ; WAS IT WRITTEN OK?
007174  001004                  BNE     10$                     ; IF YES, BRANCH
007176                          ERRHRD  9,EM3                   ; COULD NOT SET INTERNAL LOOP
007176  104456                                                          TRAP    C$ERHRD
007200  000011                                                          .WORD   9
007202  003633                                                          .WORD   EM3
007204  000000                                                          .WORD   0
007206                  10$:    CKLOOP                          ; LOOP ON ERROR
007206  104406                                                          TRAP    C$CLP1
007210  005005                  CLR     R5                      ; TRY TO CLEAR THAT BIT NOW
007212  012700  000017          MOV     #MAINT,R0               ; MAINTENANCE REGISTER
007216  004737  006034          JSR     PC,WRITE                ; WRITE 0
007222  012700  000017          MOV     #MAINT,R0               ; MAINTENANCE REGISTER
007226  004737  005760          JSR     PC,READ                 ; AND READ IT BACK
007232  032704  000010          BIT     #10,R4                  ; WAS IT CLEARED?
007236  001404                  BEQ     20$                     ; IF SO, BRANCH
007240                          ERRHRD  10,EM4                  ; INTERNAL LOOPBACK NOT CLEARED
007240  104456                                                          TRAP    C$ERHRD
007242  000012                                                          .WORD   10
007244  003673                                                          .WORD   EM4
007246  000000                                                          .WORD   0
                        ;+
                        ; CHECK EXTERNAL LOOPBACK MODE BIT
                        ;-
007250                  20$:    CKLOOP                          ; LOOP ON ERROR
007250  104406                                                          TRAP    C$CLP1
007252  012705  000030          MOV     #30,R5                  ; EXTERNAL LOOPBACK BIT
007256  012700  000017          MOV     #MAINT,R0               ; MAINTENANCE REGISTER
007262  004737  006034          JSR     PC,WRITE                ; WRITE TO MAINTENANCE
007266  012700  000017          MOV     #MAINT,R0               ; MAINTENANCE REGISTER
007272  004737  005760          JSR     PC,READ                 ; READ IT BACK
007276  032704  000020          BIT     #20,R4                  ; WAS IT WRITTEN OK?
007302  001004                  BNE     30$                     ; IF YES, BRANCH
007304                          ERRHRD  11,EM5                  ; COULD NOT SET EXTERNAL LOOP
007304  104456                                                          TRAP    C$ERHRD
007306  000013                                                          .WORD   11
007310  003735                                                          .WORD   EM5
007312  000000                                                          .WORD   0
007314                  30$:    CKLOOP                          ; LOOP ON ERROR
007314  104406                                                          TRAP    C$CLP1
```

SEQ 0058

```
1921 007316  012705  000010          MOV     #10,R5          ; TRY TO CLEAR THAT BIT NOW
1922 007322  012700  000017          MOV     #MAINT,R0       ; MAINTENANCE REGISTER
1923 007326  004737  006034          JSR     PC,WRITE        ; WRITE 0
1924 007332  012700  000017          MOV     #MAINT,R0       ; MAINTENANCE REGISTER
1925 007336  004737  005760          JSR     PC,READ         ; AND READ IT BACK
1926 007342  032704  000020          BIT     #20,R4          ; WAS IT CLEARED?
1927 007346  001404                  BEQ     40$             ; IF SO, BRANCH
1928 007350                          ERRHRD  12,EM6          ; EXTERNAL LOOPBACK NOT CLEARED
     007350  104456                                                  TRAP    C$ERHRD
     007352  000014                                                  .WORD   12
     007354  003775                                                  .WORD   EM6
     007356  000000                                                  .WORD   0
1929
1930                          ;+
1931                          ; VERIFY THAT MASTER CLEAR CLEARS BOTH BITS
1932 007360                   ;-
     007360  104406           40$:    CKLOOP                  ; LOOP ON ERROR
                                                                     TRAP    C$CLP1
1933 007362  012705  000030          MOV     #30,R5          ; PATTERN = BOTH SET
1934 007366  012700  000017          MOV     #MAINT,R0       ; MAINTENANCE REGISTER
1935 007372  004737  006034          JSR     PC,WRITE        ;    TO WRITE
1936 007376  004737  005700          JSR     PC,MSCLR        ; DO MASTER CLEAR
1937 007402  005737  002172          TST     MTMODE          ; INTERNAL MODE?
1938 007406  001005                  BNE     41$             ; IF NOT BRANCH
1939 007410  012705  000010          MOV     #10,R5          ; SET INTERNAL LOOPBACK
1940 007414  012701  000014          MOV     #14,R1          ; EXPECTED PATTERN
1941 007420  000404                  BR      42$             ; CONTINUE
1942 007422  012705  000020  41$:    MOV     #20,R5          ; SET EXTERNAL LOOPBACK
1943 007426  012701  000024          MOV     #24,R1          ; EXPECTED PATTERN
1944 007432  012700  000017  42$:    MOV     #MAINT,R0       ; MAINTENANCE REGISTER
1945 007436  004737  006034          JSR     PC,WRITE        ; WRITE TO THAT REGISTER
1946 007442  012700  000017          MOV     #MAINT,R0       ; READ MAINT. REG
1947 007446  004737  005760          JSR     PC,READ         ;    BACK
1948 007452  132704  000004          BITB    #4,R4           ; CABLE OK SET ?
1949 007456  001010                  BNE     50$             ; YES, BRANCH
1950 007460  005737  002172          TST     MTMODE          ; INTERNAL MODE?
1951 007464  001405                  BEQ     50$             ; IF SO BRANCH
1952 007466  010105                  MOV     R1,R5           ; SAVE FOR PRINT OUT
1953 007470                          ERRHRD  13,EM2,PNTD     ; ERROR
     007470  104456                                                  TRAP    C$ERHRD
     007472  000015                                                  .WORD   13
     007474  003607                                                  .WORD   EM2
     007476  004702                                                  .WORD   PNTD
1954 007500                   50$:    ENDSUB
     007500                                                  L10026:
     007500  104403                                                  TRAP    C$ESUB
```

SEQ 0059

```
                        ;++
                        ;
                        ;       SUBTEST TO VERIFY THAT DATA LOW BYTE REGISTER IS CLEAR
                        ;       BY MASTER CLEAR
                        ;
                        ;--
                                BGNSUB
                                                                                T3.3:
                                                                                        TRAP    C$BSUB
                                MOV     KCSR,R2                 ; STORE POINTER TO CSR
                                JSR     PC,MSCLR                ; CLEAR THE WORLD
                                TST     MTMODE                  ; INTERNAL MODE?
                                BNE     1$                      ; IF NOT BRANCH
                                MOV     #10,R5                  ; SET INTERNAL LOOPBACK
                                BR      2$                      ; CONTINUE
                        1$:     MOV     #20,R5                  ; SET EXTERNAL LOOPBACK
                        2$:     MOV     #MAINT,R0               ; MAINTENANCE REGISTER
                                JSR     PC,WRITE                ; WRITE TO THAT REGISTER
                                MOV     #DLO,R0                 ; READ DATA LOW BYTE REG.
                                JSR     PC,READ                 ; READ REGISTER
                                TSTB    R4                      ; REALLY CLEARED?
                                BEQ     10$                     ; YES, BRANCH
                                CLR     R5                      ; CLEAR EXPECTED PATTERN
                                ERRHRD  14,EM1,PNTD             ; MASTER CLEAR DID NOT
                                                                                TRAP    C$ERHRD
                                                                                .WORD   14
                                                                                .WORD   EM1
                                                                                .WORD   PNTD
                        10$:
                                ENDSUB
                                                                        L10027:
                                                                                TRAP    C$ESUB
```

```
                        ;**
                        ;
                        ;       SUBTEST TO VERIFY THAT DATA HIGH BYTE REGISTER IS CLEAR
                        ;       BY MASTER CLEAR
                        ;
                        ;--
007574                          BGNSUB
007574                                                                  T3.4:
007574  104402                                                                TRAP    C$BSUB
007576  013702  002166          MOV     KCSR,R2                 ; STORE POINTER TO CSR
007602  004737  005700          JSR     PC,MSCLR                ; CLEAR THE WORLD
007606  005737  002172          TST     MTMODE                  ; INTERNAL MODE?
007612  001003                  BNE     1$                      ; IF NOT BRANCH
007614  012705  000010          MOV     #10,R5                  ; SET INTERNAL LOOPBACK
007620  000402                  BR      2$                      ; CONTINUE
007622  012705  000020  1$:     MOV     #20,R5                  ; SET EXTERNAL LOOPBACK
007626  012700  000017  2$:     MOV     #MAINT,R0               ; MAINTENANCE REGISTER
007632  004737  006034          JSR     PC,WRITE                ; WRITE TO THAT REGISTER
007636  012700  000011          MOV     #DOHI,R0                ; READ DATA HIGH BYTE REG.
007642  004737  005760          JSR     PC,READ                 ; READ REGISTER
007646  105704                  TSTB    R4                      ; REALLY CLEARED?
007650  001405                  BEQ     10$                     ; YES, BRANCH
007652  005005                  CLR     R5                      ; CLEAR EXPECTED PATTERN
007654                          ERRHRD  15,EM1,PNTD             ; MASTER CLEAR DID NOT
007654  104456                                                                TRAP    C$ERHRD
007656  000017                                                                .WORD   15
007660  003534                                                                .WORD   EM1
007662  004702                                                                .WORD   PNTD
007664                  10$:
007664                          ENDSUB
007664                                                                  L10030:
007664  104403                                                                TRAP    C$ESUB
```

```
                                ;++
                                ;
                                ;       SUBTEST TO VEIRFY THAT CONTROL REGISTER IS CLEAR
                                ;       BY MASTER CLEAR
                                ;
                                ;--
                                        BGNSUB
007666                                                                          T3.5:
007666  104402                                                                  TRAP    C$BSUB
007670  013702  002166                MOV     KCSR,R2                 ; STORE POINTER TO CSR
007674  004737  005700                JSR     PC,MSCLR                ; CLEAR THE WORLD
007700  005737  002172                TST     MTMODE                  ; INTERNAL MODE?
007704  001003                        BNE     1$                      ; IF NOT BRANCH
007706  012705  000010                MOV     #10,R5                  ; SET INTERNAL LOOPBACK
007712  000402                        BR      2$                      ; CONTINUE
007714  012705  000020        1$:     MOV     #20,R5                  ; SET EXTERNAL LOOPBACK
007720  012700  000017        2$:     MOV     #MAINT,R0               ; MAINTENANCE REGISTER
007724  004737  006034                JSR     PC,WRITE                ; WRITE TO THAT REGISTER
007730  012700  000016                MOV     #CNTRL,R0               ; READ CONTROL REG.
007734  004737  005760                JSR     PC,READ                 ; READ REGISTER
007740  105704                        TSTB    R4                      ; REALLY CLEARED?
007742  001405                        BEQ     10$                     ; YES, BRANCH
007744  005005                        CLR     R5                      ; CLEAR EXPECTED PATTERN
007746                                ERRHRD  16,EM1,PNTD             ; MASTER CLEAR DID NOT
007746  104456                                                                  TRAP    C$ERHRD
007750  000020                                                                  .WORD   16
007752  003534                                                                  .WORD   EM1
007754  004702                                                                  .WORD   PNTD
007756                          10$:
007756                                  ENDSUB
007756                                                                  L10031:
007756  104403                                                                  TRAP    C$ESUB
007760                                  ENDTST
007760                                                                  L10024:
007760  104401                                                                  TRAP    C$ETST
```

SEQ 0062

```
                                .SBTTL  TEST 4:  DATA PATH TEST
007762                                  BGNTST
007762                                                                  T4::
                                ;++
                                ;
                                ;       SUBTEST TO VERIFY THAT DATA LOW BYTE REGISTER CAN BE WRITTEN
                                ;       TO AND READ BACK WITH A FLOATING 0 DATA PATTERN.
                                ;
                                ;--
007762                                  BGNSUB
007762                                                                  T4.1:
007762  104402                                                                  TRAP    C$BSUB
007764  013702  002166                MOV     KCSR,R2                 ; STORE POINTER TO CSR
                                ;+
                                ; SET UP MAINTENANCE MODE ACCORDING TO SELECTION
                                ;-
007770  005737  002172                  TST     MTMODE                  ; INTERNAL MODE?
007774  001003                        BNE     10$                     ; IF NOT BRANCH
007776  012705  000010                MOV     #10,R5                  ; SET INTERNAL LOOPBACK
010002  000402                        BR      20$                     ; CONTINUE

010004  012705  000020          10$:  MOV     #20,R5                  ; SET EXTERNAL LOOPBACK
010010  012700  000017          20$:  MOV     #MAINT,R0               ; MAINTENANCE REGISTER
010014  004737  006034                JSR     PC,WRITE                ; WRITE TO THAT REGISTER
                                ;+
                                ; WRITE TO DATA LOW BYTE REGISTER
                                ;-
010020  012705  177577                  MOV     #177577,R5              ; START WITH 1'S IN LOW BYTE
010024  012700  000010          30$:  MOV     #DLO,R0                 ; SELECT REGISTER
010030  004737  006034                JSR     PC,WRITE                ; AND WRITE TO IT
010034  012700  000010                MOV     #DLO,R0                 ; NOW READ IT
010040  004737  005760                JSR     PC,READ                 ;    BACK
010044  120405                        CMPB    R4,R5                   ; DATA OK?
010046  001404                        BEQ     40$                     ; IF YES, BRANCH
010050                                  ERRHRD  17,EM7,PNTD             ; DATA PATH ERROR
010050  104456                                                                  TRAP    C$ERHRD
010052  000021                                                                  .WORD   17
010054  004037                                                                  .WORD   EM7
010056  004702                                                                  .WORD   PNTD
010060                          40$:  CKLOOP                          ; ON ERROR LOOP
010060  104406                                                                  TRAP    C$CLP1
010062  006005                        ROR     R5                      ; CHANGE THE PATTERN
010064  122705  000177                CMPB    #177,R5                 ; ALL DONE?
010070  001355                        BNE     30$                     ; IF NOT, BRANCH
                                ;+
                                ; VERIFY THAT MASTER CLEAR CLEARS DATA LOW BYTE REGISTER
                                ;-
010072  004737  005700                  JSR     PC,MSCLR                ; DO MASTER CLEAR
010076  005737  002172                  TST     MTMODE                  ; INTERNAL MODE?
010102  001003                        BNE     50$                     ; IF NOT BRANCH
010104  012705  000010                MOV     #10,R5                  ; SET INTERNAL LOOPBACK
010110  000402                        BR      60$                     ; CONTINUE
010112  012705  000020          50$:  MOV     #20,R5                  ; SET EXTERNAL LOOPBACK
010116  012700  000017          60$:  MOV     #MAINT,R0               ; MAINTENANCE REGISTER
010122  004737  006034                JSR     PC,WRITE                ; WRITE TO THAT REGISTER
010126  012700  000010                MOV     #DLO,R0                 ; READ DATA LOW
```

```
                                                                                                                SEQ 0063

 2081 010132  004737  005760                JSR     PC,READ          ;     BYTE REGISTER
 2082 010136  005005                        CLR     R5               ; CLEAR EXPECTED PATTERN
 2083 010140  105704                        TSTB    R4               ; WAS IT CLEAR?
 2084 010142  001404                        BEQ     70$              ; IF SO, BRANCH
 2085 010144                                ERRHRD  18,EM1,PNTD      ; DATA LOW BYTE DIDN'T CLEAR
      010144  104456                                                         TRAP    C$ERHRD
      010146  000022                                                         .WORD   18
      010150  003534                                                         .WORD   EM1
      010152  004702                                                         .WORD   PNTD
 2086 010154                          70$:
 2087 010154                                ENDSUB
      010154                                                          L10033:
      010154  104403                                                         TRAP    C$ESUB
```

```
                                ;**
                                ;
                                ;       SUBTEST TO VERIFY THAT DATA HIGH BYTE REGISTER CAN BE WRITTEN
                                ;       TO AND READ BACK WITH A FLOATING 0 DATA PATTERN.
                                ;
                                ;--
010156                                  BGNSUB
010156                                                                          T4.2:
010156  104402                                                                TRAP    C$BSUB
010160  013702  002166                    MOV     KCSR,R2                 ; STORE POINTER TO CSR
                                ;*
                                ; SET UP MAINTENANCE MODE ACCORDING TO SELECTION
                                ;-
010164  005737  002172                    TST     MTMODE                  ; INTERNAL MODE?
010170  001003                           BNE     10$                     ; IF NOT BRANCH
010172  012705  000010                    MOV     #10,R5                  ; SET INTERNAL LOOPBACK
010176  000402                           BR      20$                     ; CONTINUE

010200  012705  000020          10$:     MOV     #20,R5                  ; SET EXTERNAL LOOPBACK
010204  012700  000017          20$:     MOV     #MAINT,R0               ; MAINTENANCE REGISTER
010210  004737  006034                    JSR     PC,WRITE                ; WRITE TO THAT REGISTER
                                ;*
                                ; WRITE TO DATA HIGH BYTE REGISTER
                                ;-
010214  012705  177677                    MOV     #177677,R5              ; START WITH 1'S IN LOW BYTE
010220  012700  000011          30$:     MOV     #DOHI,R0                ; SELECT REGISTER
010224  004737  006034                    JSR     PC,WRITE                ; AND WRITE TO IT
010230  012700  000015                    MOV     #DIHI,R0                ; NOW READ IT
010234  004737  005760                    JSR     PC,READ                 ;    BACK
010240  010502                           MOV     R5,R2                   ; STORE PATTERN
010242  042702  177700                    BIC     #177700,R2              ; LEAVE JUST BITS 5-0
010246  120402                           CMPB    R4,R2                   ; DATA OK?
010250  001407                           BEQ     40$                     ; IF YES, BRANCH
010252  010503                           MOV     R5,R3                   ; STORE
010254  010205                           MOV     R2,R5                   ;  FOR PRINTOUT
010256                                   ERRHRD  19,EM7,PNTD             ; DATA PATH ERROR
010256  104456                                                                    TRAP    C$ERHRD
010260  000023                                                                    .WORD   19
010262  004037                                                                    .WORD   EM7
010264  004702                                                                    .WORD   PNTD
010266  010305                           MOV     R3,R5                   ; RESTORE
010270                          40$:     CKLOOP                          ; ON ERROR LOOP
010270  104406                                                                    TRAP    C$CLP1
010272  000241                           CLC                             ; CLEAR CARRY
010274  006005                           ROR     R5                      ; CHANGE THE PATTERN
010276  122705  000377                    CMPB    #377,R5                 ; ALL DONE?
010302  001346                           BNE     30$                     ; IF NOT, BRANCH
                                ;*
                                ; VERIFY THAT MASTER CLEAR CLEARS DATA HIGH BYTE REGISTER
                                ;-
010304  004737  005700                    JSR     PC,MSCLR                ; DO MASTER CLEAR
010310  005737  002172                    TST     MTMODE                  ; INTERNAL MODE?
010314  001003                           BNE     50$                     ; IF NOT BRANCH
010316  012705  000010                    MOV     #10,R5                  ; SET INTERNAL LOOPBACK
010322  000402                           BR      60$                     ; CONTINUE
010324  012705  000020          50$:     MOV     #20,R5                  ; SET EXTERNAL LOOPBACK
010330  012700  000017          60$:     MOV     #MAINT,R0               ; MAINTENANCE REGISTER
```

```
MISCELLANEOUS SECTIONS  MACRO M1200  15-MAR-85 16:13  PAGE 41-1
TEST 4:  DATA PATH TEST                                                                                    SEQ 0065

   2139 010334  004737  006034                    JSR     PC,WRITE            ; WRITE TO THAT REGISTER
   2140 010340  012700  000015                    MOV     #DIHI,R0            ; READ DATA HIGH
   2141 010344  004737  005760                    JSR     PC,READ             ;     BYTE REGISTER
   2142 010350  005005                            CLR     R5                  ; EXPECETED PATTERN
   2143 010352  105704                            TSTB    R4                  ; WAS IT CLEAR?
   2144 010354  001404                            BEQ     70$                 ; IF SO, BRANCH
   2145 010356                                    ERRHRD  20,EM1,PNTD         ; DATA HIGH BYTE DIDN'T CLEAR
        010356  104456                                                                TRAP    C$ERHRD
        010360  000024                                                                .WORD   20
        010362  003534                                                                .WORD   EM1
        010364  004702                                                                .WORD   PNTD
   2146 010366                            70$:
   2147 010366                                    ENDSUB
        010366                                                                  L10034:
        010366  104403                                                                TRAP    C$ESUB
```

```
                                ;++
                                ;
                                ;       SUBTEST TO VERIFY THAT DATA HIGH BYTE REGISTER BITS 7,6 CAN
                                ;       BE READ FROM BY WRITING TO EXTRA REGISTER BITS 7,6
                                ;
                                ;--
010370                                  BGNSUB
010370                                                                          T4.3:
010370  104402                                                                        TRAP    C$BSUB
010372  013702  002166                 MOV     KCSR,R2                 ; STORE POINTER TO CSR
                                ;+
                                ; SET UP MAINTENANCE MODE ACCORDING TO SELECTION
                                ;-
010376  005737  002172                  TST     MTMODE                  ; INTERNAL MODE?
010402  001003                          BNE     10$                     ; IF NOT BRANCH
010404  012705  000010                  MOV     #10,R5                  ; SET INTERNAL LOOPBACK
010410  000402                          BR      20$                     ; CONTINUE

010412  012705  000020          10$:    MOV     #20,R5                  ; SET EXTERNAL LOOPBACK
010416  012700  000017          20$:    MOV     #MAINT,R0               ; MAINTENANCE REGISTER
010422  004737  006034                  JSR     PC,WRITE                ; WRITE TO THAT REGISTER
                                ;+
                                ; WRITE TO EXTRA REGISTER AND READ BACK FROM DATA HIGH BYTE
                                ;-
010426  012705  177377                  MOV     #177377,R5              ; START WITH 1'S IN LOW BYTE
010432  012700  000016          30$:    MOV     #EXTR,R0                ; SELECT REGISTER
010436  004737  006034                  JSR     PC,WRITE                ; AND WRITE TO IT
010442  012700  000015                  MOV     #DIHI,R0                ; NOW READ HIGH BYTE
010446  004737  005760                  JSR     PC,READ                 ;    BACK
010452  010502                          MOV     R5,R2                   ; STORE PATTERN
010454  042702  177477                  BIC     #177477,R2              ; LEAVE JUST BITS 7,6
010460  120402                          CMPB    R4,R2                   ; DATA OK?
010462  001407                          BEQ     40$                     ; IF YES, BRANCH
010464  010503                          MOV     R5,R3                   ; STORE
010466  010205                          MOV     R2,R5                   ;   FOR PRINTOUT
010470                                  ERRHRD  21,EM7,PNTD             ; DATA PATH ERROR
010470  104456                                                                  TRAP    C$ERHRD
010472  000025                                                                  .WORD   21
010474  004037                                                                  .WORD   EM7
010476  004702                                                                  .WORD   PNTD
010500  010305                          MOV     R3,R5                   ; RESTORE
010502                          40$:    CKLOOP                          ; ON ERROR LOOP
010502  104406                                                                  TRAP    C$CLP1
010504  000241                          CLC                             ; CLEAR CARRY
010506  006005                          ROR     R5                      ; CHANGE THE PATTERN
010510  122705  000337                  CMPB    #337,R5                 ; ALL DONE?
010514  001346                          BNE     30$                     ; IF NOT, BRANCH
                                ;+
                                ; VERIFY THAT MASTER CLEAR CLEARS DATA HIGH BYTE REGISTER
                                ;-
010516  004737  005700                  JSR     PC,MSCLR                ; DO MASTER CLEAR
010522  005737  002172                  TST     MTMODE                  ; INTERNAL MODE?
010526  001003                          BNE     50$                     ; IF NOT BRANCH
010530  012705  000010                  MOV     #10,R5                  ; SET INTERNAL LOOPBACK
010534  000402                          BR      60$                     ; CONTINUE
010536  012705  000020          50$:    MOV     #20,R5                  ; SET EXTERNAL LOOPBACK
010542  012700  000017          60$:    MOV     #MAINT,R0               ; MAINTENANCE REGISTER
```

D6

SEQ 0067

```
   2199 010546  004737  006034                JSR     PC,WRITE        ; WRITE TO THAT REGISTER
   2200 010552  012700  000015                MOV     #DIHI,R0        ; READ DATA HIGH
   2201 010556  004737  005760                JSR     PC,READ         ;     BYTE REGISTER
   2202 010562  005005                        CLR     R5              ; EXPECTED PATTERN
   2203 010564  105704                        TSTB    R4              ; WAS IT CLEAR?
   2204 010566  001404                        BEQ     70$             ; IF SO, BRANCH
   2205 010570                                ERRHRD  22,EM1,PNTD     ; DATA HIGH BYTE DIDN'T CLEAR
        010570  104456                                                        TRAP    C$ERHRD
        010572  000026                                                        .WORD   22
        010574  003534                                                        .WORD   EM1
        010576  004702                                                        .WORD   PNTD
   2206 010600                          70$:
   2207 010600                                ENDSUB
        010600                                                          L10035:
        010600  104403                                                        TRAP    C$ESUB
```

```
                                                                                                                    SEQ 0068
 2209                                ;++
 2210                                ;
 2211                                ;       SUBTEST TO VERIFY THAT BITS 7 AND 6 OF DATA HIGH BYTE REGISTER
 2212                                ;       CAN BE WRITTEN TO AND READ FROM BITS 0 AND 1 OF CONTROL IN REGISTER
 2213                                ;
 2214                                ;--
 2215 010602                                BGNSUB
      010602                                                                                    T4.4:
      010602  104402                                                                                   TRAP    C$BSUB
 2216 010604  013702  002166                MOV     KCSR,R2                 ; STORE POINTER TO CSR
 2217                                ;+
 2218                                ; SET UP MAINTENANCE MODE ACCORDING TO SELECTION
 2219                                ;-
 2220 010610  005737  002172                TST     MTMODE                  ; INTERNAL MODE?
 2221 010614  001003                        BNE     10$                     ; IF NOT BRANCH
 2222 010616  012705  000010                MOV     #10,R5                  ; SET INTERNAL LOOPBACK
 2223 010622  000402                        BR      20$                     ; CONTINUE
 2224
 2225 010624  012705  000020        10$:    MOV     #20,R5                  ; SET EXTERNAL LOOPBACK
 2226 010630  012700  000017        20$:    MOV     #MAINT,R0               ; MAINTENANCE REGISTER
 2227 010634  004737  006034                JSR     PC,WRITE                ; WRITE TO THAT REGISTER
 2228                                ;+
 2229                                ; WRITE TO DATA HIGH BYTE REGISTER <7,6> AND READ FROM CONTROL IN
 2230                                ; REGISTER <0,1> ( BITS ARE REVERSED)
 2231                                ;-
 2232 010640  012705  177377                MOV     #177377,R5              ; START WITH BITH BITS 1'S
 2233 010644  012700  000011        30$:    MOV     #DOHI,R0                ; WRITE TO DATA HIGH BYTE
 2234 010650  004737  006034                JSR     PC,WRITE                ; GO WRITE
 2235 010654  012700  000016                MOV     #CNTRL,R0               ; READ FROM CONTROL IN REGISTER
 2236 010660  004737  005760                JSR     PC,READ                 ; GO READ
 2237                                ;+
 2238                                ; CHANGE FORMAT OF THE PATTERN TO TRANSLATE BITS 7,6 TO 0,1
 2239                                ;-
 2240 010664  010502                        MOV     R5,R2                   ; STORE PATTERN WRITTEN
 2241 010666  012703  000005                MOV     #5,R3                   ; PREPARE TO SHIFT 5 TIMES
 2242 010672  006002        40$:    ROR     R2                      ;  UNTILL BIT6->BIT1
 2243 010674  077302                        SOB     R3,40$                  ; DO FOR ALL 5 TIMES
 2244 010676  105705                        TSTB    R5                      ; WAS BIT 7 = 1?
 2245 010700  100403                        BMI     50$                     ; IF YES, BRANCH
 2246 010702  042702  000001                BIC     #1,R2                   ; OTHERWISE CLEAR 0
 2247 010706  000402                        BR      60$                     ;
 2248 010710  052702  000001        50$:    BIS     #1,R2                   ; IF 7=1, BIT 0 =1 TOO
 2249 010714  042702  177774        60$:    BIC     #177774,R2              ; CLEAR ALL BITS BUT 1,0
 2250 010720  120204                        CMPB    R2,R4                   ; IS IT THE SAME AS READ?
 2251 010722  001407                        BEQ     70$                     ; IF YES, BRANCH
 2252 010724  010503                        MOV     R5,R3                   ; STORE FOR PRINTOUT
 2253 010726  010205                        MOV     R2,R5                   ;
 2254 010730                                ERRHRD  23,EM7,PNTD             ; DATA PATH ERROR
      010730  104456                                                                    TRAP    C$ERHRD
      010732  000027                                                                    .WORD   23
      010734  004037                                                                    .WORD   EM7
      010736  004702                                                                    .WORD   PNTD
 2255 010740  010305                        MOV     R3,R5                   ; RESTORE
 2256                                ;+
 2257                                ; CHANGE THE PATTERN WRITTEN INTO REGISTER
 2258                                ;-
 2259 010742                        70$:    CKLOOP                          ; ON ERROR LOOP
```

```
                                                                                                        SEQ 0069
      010742  104406                                                                    TRAP    C$CLP1
 2260 010744  000241                    CLC                     ; CLEAR CARRY
 2261 010746  006005                    ROR     R5              ; GET NEXT PATTERN
 2262 010750  122705  000337            CMPB    #337,R5         ; BACK TO ALL 1'S?
 2263 010754  001333                    BNE     30$             ; IF NOT, BRANCH TO DO NEXT
 2264                                ;+
 2265                                ; VERIFY THAT MASTER CLEAR CLEARS CONTROL IN REGISTER
 2266                                ;-
 2267 010756  004737  005700            JSR     PC,MSCLR        ; DO MASTER CLEAR
 2268 010762  005737  002172            TST     MTMODE          ; INTERNAL MODE?
 2269 010766  001003                    BNE     150$            ; IF NOT BRANCH
 2270 010770  012705  000010            MOV     #10,R5          ; SET INTERNAL LOOPBACK
 2271 010774  000402                    BR      160$            ; CONTINUE
 2272 010776  012705  000020    150$:   MOV     #20,R5          ; SET EXTERNAL LOOPBACK
 2273 011002  012700  000017    160$:   MOV     #MAINT,R0       ; MAINTENANCE REGISTER
 2274 011006  004737  006034            JSR     PC,WRITE        ; WRITE TO THAT REGISTER
 2275 011012  012700  000016            MOV     #CNTRL,R0       ; READ FROM CONTROL IN
 2276 011016  004737  005760            JSR     PC,READ         ;     REGISTER
 2277 011022  005005                    CLR     R5              ; EXPECTED PATTERN
 2278 011024  105704                    TSTB    R4              ; WAS IT CLEAR?
 2279 011026  001404                    BEQ     170$            ; IF SO, BRANCH
 2280 011030                            ERRHRD  24,EM1,PNTD     ; DATA HIGH BYTE DIDN'T CLEAR
      011030  104456                                                                    TRAP    C$ERHRD
      011032  000030                                                                    .WORD   24
      011034  003534                                                                    .WORD   EM1
      011036  004702                                                                     WORD   PNTD
 2281 011040                    170$:   ENDSUB
      011040                                                                  L10036:
      011040  104403                                                                    TRAP    C$ESUB
 2282
```

SEQ 0070

```
                        ;++
                        ;
                        ;       SUBTEST TO CHECK REGISTER ADDRESS UNIQUENSS.
                        ;       REGISTERS ARE WRITTEN WITH A UNIQUE DATA PATTERN
                        ;       AND THEN COMPARED WITH REMAINING REGISTERS.
                        ;
                        ;--

011042                          BGNSUB
011042
011042  104402                                                          T4.5:
                                                                                TRAP    C$BSUB
011044  013702  002166            MOV     KCSR,R2                 ; STORE POINTER TO CSR
                        ;+
                        ; SET UP MAINTENANCE MODE ACCORDING TO SELECTION
                        ;-
011050  012703  002220            MOV     #RPNT,R3                ; POINTER TO READ PATTERN
011054  005737  002172            TST     MTMODE                  ; INTERNAL MODE?
011060  001006                    BNE     10$                     ; IF NOT BRANCH
011062  012705  000010            MOV     #10,R5                  ; SET INTERNAL LOOPBACK
011066  112763  000014  000003    MOVB    #14,3(R3)               ; STORE WHAT'S WRITTEN TO MAINTEN.
011074  000405                    BR      20$                     ; CONTINUE

011076  012705  000020    10$:    MOV     #20,R5                  ; SET EXTERNAL LOOPBACK
011102  112763  000024  000003    MOVB    #24,3(R3)               ; STORE WHAT'S WRITTEN TO MAINTEN.
011110  012700  000017    20$:    MOV     #MAINT,R0               ; MAINTENANCE REGISTER
011114  004737  006034            JSR     PC,WRITE                ; WRITE TO THAT REGISTER
                        ;+
                        ; WRITE ALL ONE'S TO BOTH DATA REGISTERS
                        ;-
011120  012705  000377            MOV     #377,R5                 ; WRITE ALL ONE'S
011124  012700  000010            MOV     #DLO,R0                 ; TO DATA LOW BYTE REGISTER
011130  004737  006034            JSR     PC,WRITE                ;  GO WRITE
011134  012705  000377            MOV     #377,R5                 ; WRITE ALL ONE'S
011140  012700  000011            MOV     #DOHI,R0                ; TO DATA HIGH BYTE REGISTER
011144  004737  006034            JSR     PC,WRITE                ;  GO WRITE
                        ;+
                        ; READ BACK ALL THE REGISTERS
                        ;-
011150  012737  000010  002176    MOV     #DLO,TEMP1              ; REGISTER TO READ FIRST
011156  012701  000010    30$:    MOV     #DLO,R1                 ; START CHECKING
011162  010100    40$:    MOV     R1,R0                   ; PREPARE TO
011164  004737  005760            JSR     PC,READ                 ;  READ A REGISTER
011170  120137  002176            CMPB    R1,TEMP1                ; WAS IT A REGISTER WRITTEN?
011174  001015                    BNE     50$                     ; IF NOT, BRANCH
011176  111305                    MOVB    (R3),R5                 ; STORE EXPECTED PATTERN
011200  120504                    CMPB    R5,R4                   ; IS IT WHAT WAS WRITTEN?
011202  001421                    BEQ     60$                     ; IF SO, BRANCH
011204  022701  000017            CMP     #MAINT,R1               ; WAS IT MAINTENANCE REG?
011210  001002                    BNE     45$                     ; IF NOT, BRANCH
011212  030504                    BIT     R5,R4                   ; IGNORE TIMING PULSES
011214  001014                    BNE     60$                     ; IF AT LEAST SOMETHING SET, BRANCH
011216            45$:    ERRHRD  25,EM7,PNTD             ; DATA PATH ERROR
011216  104456                                                            TRAP    C$ERHRD
011220  000031                                                            .WORD   25
011222  004037                                                            .WORD   EM7
011224  004702                                                            .WORD   PNTD
011226  000407                    BR      60$                     ;
```

```
                                                                                                                    SEQ 0071
 2335 011230  121304                50$:    CMPB    (R3),R4                 ; IS IT WHAT WAS WRITTEN?
 2336 011232  001005                        BNE     60$                     ; IF NOT, BRANCH
 2337 011234  005005                        CLR     R5                      ; CLEAR EXPECTED PATTERN
 2338 011236                                ERRHRD  26,EM14,PNTD            ; ADDRESS UNIQUENESS ERROR
      011236  104456                                                                    TRAP    C$ERHRD
      011240  000032                                                                    .WORD   26
      011242  004243                                                                    .WORD   EM14
      011244  004702                                                                    .WORD   PNTD
 2339                               ;+
 2340                               ; CHANGE REGISTER TO NEXT FOR COMPARISON
 2341                               ;-
 2342 011246  005201                60$:    INC     R1                      ; GET NEXT REGISTER
 2343 011250  122701  000020               CMPB    #20,R1                  ; ALL DONE (10 TO 17)?
 2344 011254  001342                        BNE     40$                     ; IF NOT, BRANCH
 2345 011256  105723                        TSTB    (R3)+                   ; GET TO NEXT EXPECTED READ
 2346 011260  122737  000010  002176        CMPB    #DLO,TEMP1              ; STILL FIRST REGISTER?
 2347 011266  001004                        BNE     70$                     ; IF NOT, BRANCH
 2348 011270  012737  000015  002176        MOV     #DIHI,TEMP1             ; GET TO REGISTER 15
 2349 011276  000727                        BR      30$                     ; GO READ NEXT REGISTER
 2350 011300  005237  002176        70$:    INC     TEMP1                   ; GET TO NEXT REGISTER
 2351 011304  122737  000020  002176        CMPB    #20,TEMP1               ; ALL DONE (10,15 TO 17)?
 2352 011312  001321                        BNE     30$                     ; IF NOT, BRANCH
 2353 011314  004737  005700                JSR     PC, MSCLR               ; CLEAR THE WORLD BEFORE LEAVING
 2354 011320                                ENDSUB
      011320                                                                        L10037:
      011320  104403                                                                    TRAP    C$ESUB
 2355 011322                                ENDTST
      011322                                                                        L10032:
      011322  104401                                                                    TRAP    C$ETST
 2356
```

```
                                .SBTTL  TEST 5:  IRDY TEST
                                ;++
                                ;
                                ;       TEST TO VERIFY THAT IRDY SIGNAL GOES HIGH AFTER WRITING
                                ;       TO REGISTER 2 FOR ABOUT .25 MICROSECOND. THIS IS DONE BY
                                ;       LOADING A FIRMWARE ROUTINE "IRDTST" INTO KMC11-B.
                                ;
                                ;--
011324                                  BGNTST
011324                                                                                  T5::

011324  013702  002166                  MOV     KCSR,R2                 ; STORE REGISTER POINTER
011330  004737  005700                  JSR     PC,MSCLR                ; CLEAR THE WORLD
                                ;+
                                ; SET UP MAINTENANCE MODE ACCORDING TO SELECTION
                                ;-
011334  005737  002172                  TST     MTMODE                  ; INTERNAL MODE?
011340  001003                          BNE     10$                     ; IF NOT BRANCH
011342  012705  000010                  MOV     #10,R5                  ; SET INTERNAL LOOPBACK
011346  000402                          BR      20$                     ; CONTINUE

011350  012705  000020          10$:    MOV     #20,R5                  ; SET EXTERNAL LOOPBACK
011354  012700  000017          20$:    MOV     #MAINT,R0               ; MAINTENANCE REGISTER
011360  004737  006034                  JSR     PC,WRITE                ; WRITE TO THAT REGISTER
                                ;+
                                ; LOAD TEST MICROCODE
                                ;-
011364  012700  000023                  MOV     #19.,R0                 ; SIZE
011370  012705  004310                  MOV     #IRDTST,R5              ; STARTING ADDRESS OF ROUTINE
011374  004737  006062                  JSR     PC,LOAD                 ; GO LOAD
011400  005700                          TST     R0                      ; ANY ERRORS LOADING
011402  001406                          BEQ     30$                     ; IF NO, BRANCH
011404                                  ERRHRD  27,KMC5                 ; CRAM FAILURE
011404  104456                                                                  TRAP    C$ERHRD
011406  000033                                                                  .WORD   27
011410  003460                                                                  .WORD   KMC5
011412  000000                                                                  .WORD   0
011414                                  ESCAPE  TST
011414  104410                                                                  TRAP    C$ESCAPE
011416  000130                                                                  .WORD   L10040-.

011420  012712  100000          30$:    MOV     #RUN,(R2)               ; SET RUN BIT
011424  012703  177777                  MOV     #177777,R3              ; SET UP DELAY
011430  105712                  35$:    TSTB    (R2)                    ; DONE BIT SET?
011432  100407                          BMI     40$                     ; IF YES, BRANCH
011434  077303                          SOB     R3,35$                  ; WAIT A WHILE
011436                                  ERRHRD  28,KMC7                 ; KMC HUNG
011436  104456                                                                  TRAP    C$ERHRD
011440  000034                                                                  .WORD   28
011442  003516                                                                  .WORD   KMC7
011444  000000                                                                  .WORD   0
011446                                  ESCAPE  TST
011446  104410                                                                  TRAP    C$ESCAPE
011450  000076                                                                  .WORD   L10040-.
                                ;+
                                ; CHECK TIMING SIGNALS BY READING DATA MEMORY
                                ;-
011452  004737  005700          40$:    JSR     PC,MSCLR                ; CLEAR THE WORLD
```

J6

SEQ 0073

```
 2402 011456  012703  000020            MOV     #16.,R3         ; SETUP FOR 16 READS
 2403 011462  012700  000377     50$:   MOV     #377,R0         ; READ MEMORY
 2404 011466  004737  005760            JSR     PC,READ         ; GO DO IT
 2405 011472  032704  000004            BIT     #4,R4           ; IRDY SET?
 2406 011476  001007                    BNE     60$             ; IF YES, GET OUT
 2407 011500  077310                    SOB     R3,50$          ; CONTINUE READING
 2408 011502                            ERRHRD  29,EM8          ; IRDY NEVER SET
      011502  104456                                                    TRAP    C$ERHRD
      011504  000035                                                    .WORD   29
      011506  004057                                                    .WORD   EM8
      011510  000000                                                    .WORD   0
 2409 011512                            ESCAPE  TST
      011512  104410                                                    TRAP    C$ESCAPE
      011514  000032                                                    .WORD   L10040-.
 2410 011516  012700  000377     60$:   MOV     #377,R0         ; READ MEMORY
 2411 011522  004737  005760            JSR     PC,READ         ; GO DO IT
 2412 011526  032704  000004            BIT     #4,R4           ; IRDY CLEAR?
 2413 011532  001405                    BEQ     70$             ; IF YES, GET OUT
 2414 011534  077310                    SOB     R3,60$          ; CONTINUE READING
 2415 011536                            ERRHRD  30,EM9          ; IRDY NEVER CLEARED
      011536  104456                                                    TRAP    C$ERHRD
      011540  000036                                                    .WORD   30
      011542  004102                                                    .WORD   EM9
      011544  000000                                                    .WORD   0
 2416 011546                     70$:   ENDTST
      011546                                                    L10040:
      011546  104401                                                    TRAP    C$ETST
```

SEQ 0074

```
                                .SBTTL  TEST 6:  RNDR TEST
                                ;++
                                ;
                                ;       TEST TO VERIFY THAT AFTER WRITING TO REGISTER 2 RNDR GOES
                                ;       HIGH. THIS IS DONE BY LOADING FIRMWARE ROUTINE "NDRTST"
                                ;       INTO KMC11-B.
                                ;
                                ;--

011550                                  BGNTST
011550                                                                          T6::
011550  013702  002166                  MOV     KCSR,R2                 ; STORE REGISTER POINTER
011554  004737  005700                  JSR     PC,MSCLR                ; CLEAR THE WORLD
                                ;+
                                ; SET UP MAINTENANCE MODE ACCORDING TO SELECTION
                                ;-
011560  005737  002172                  TST     MTMODE                  ; INTERNAL MODE?
011564  001003                          BNE     10$                     ; IF NOT BRANCH
011566  012705  000010                  MOV     #10,R5                  ; SET INTERNAL LOOPBACK
011572  000402                          BR      20$                     ; CONTINUE

011574  012705  000020          10$:    MOV     #20,R5                  ; SET EXTERNAL LOOPBACK
011600  012700  000017          20$:    MOV     #MAINT,R0               ; MAINTENANCE REGISTER
011604  004737  006034                  JSR     PC,WRITE                ; WRITE TO THAT REGISTER
                                ;+
                                ; LOAD TEST MICROCODE
                                ;-
011610  012700  000033                  MOV     #27.,R0                 ; SIZE
011614  012705  004356                  MOV     #NDRTST,R5              ; STARTING ADDRESS OF ROUTINE
011620  004737  006062                  JSR     PC,LOAD                 ; GO LOAD
011624  005700                          TST     R0                      ; ANY ERRORS LOADING
011626  001406                          BEQ     30$                     ; IF NO, BRANCH
011630                                  ERRHRD  31,KMC5                 ; CRAM FAILURE
011630  104456                                                                  TRAP    C$ERHRD
011632  000037                                                                  .WORD   31
011634  003460                                                                  .WORD   KMC5
011636  000000                                                                  .WORD   0
011640                                  ESCAPE  TST
011640  104410                                                                  TRAP    C$ESCAPE
011642  000130                                                                  .WORD   L10041-.

011644  012712  100000          30$:    MOV     #RUN,(R2)               ; SET RUN BIT
011650  012703  177777                  MOV     #177777,R3              ; SET UP DELAY
011654  105712          35$:    TSTB    (R2)                    ; DONE BIT SET?
011656  100407                          BMI     40$                     ; IF YES, BRANCH
011660  077303                          SOB     R3,35$                  ; WAIT A WHILE
011662                                  ERRHRD  32,KMC7                 ; KMC HUNG
011662  104456                                                                  TRAP    C$ERHRD
011664  000040                                                                  .WORD   32
011666  003516                                                                  .WORD   KMC7
011670  000000                                                                  .WORD   0
011672                                  ESCAPE  TST
011672  104410                                                                  TRAP    C$ESCAPE
011674  000076                                                                  .WORD   L10041-.

                                ;+
                                ; CHECK TIMING SIGNALS BY READING DATA MEMORY
                                ;-
```

SEQ 0075

```
 2462 011676  004737  005700      40$:   JSR     PC,MSCLR        ; CLEAR THE WORLD
 2463 011702  012703  000027             MOV     #23.,R3         ; SETUP FOR 23 READS
 2464 011706  012700  000377      50$:   MOV     #377,R0         ; READ MEMORY
 2465 011712  004737  005760             JSR     PC,READ         ; GO DO IT
 2466 011716  032704  000001             BIT     #1,R4           ; RNDR SET?
 2467 011722  001007                     BNE     60$             ; IF YES, GET OUT
 2468 011724  077310                     SOB     R3,50$          ; CONTINUE READING
 2469 011726                             ERRHRD  33,EM10         ; RNDR NEVER SET
      011726  104456                                             TRAP    C$ERHRD
      011730  000041                                             .WORD   33
      011732  004127                                             .WORD   EM10
      011734  000000                                             .WORD   0
 2470 011736                             ESCAPE  TST
      011736  104410                                             TRAP    C$ESCAPE
      011740  000032                                             .WORD   L10041-.
 2471
 2472 011742  012700  000377      60$:   MOV     #377,R0         ; READ MEMORY
 2473 011746  004737  005760             JSR     PC,READ         ; GO DO IT
 2474 011752  032704  000001             BIT     #1,R4           ; RNDR CLEAR?
 2475 011756  001405                     BEQ     70$             ; IF YES, GET OUT
 2476 011760  077310                     SOB     R3,60$          ; CONTINUE READING
 2477 011762                             ERRHRD  34,EM11         ; NEVER CLEARED
      011762  104456                                             TRAP    C$ERHRD
      011764  000042                                             .WORD   34
      011766  004152                                             .WORD   EM11
      011770  000000                                             .WORD   0
 2478 011772                      70$:   ENDTST
      011772                                             L10041:
      011772  104401                                             TRAP    C$ETST
```

SEQ 0076

```
                        .SBTTL  TEST 7:  DT DETECT TEST
                        ;**
                        ;
                        ;       TEST TO VERIFY THE EXISTENCE OF DT DETECT PULSE AFTER
                        ;       READING REGISTER 5 (DOHI). THIS IS DONE BY LOADING
                        ;       FIRMWARE ROUTINE "DTTST" INTO KMC11-B.
                        ;
                        ;--

011774                          BGNTST
011774                                                                  T7::
012000  004737  005700          JSR     PC,MSCLR                ; CLEAR THE WORLD
                        ;*
                        ; SET UP MAINTENANCE MODE ACCORDING TO SELECTION
                        ;-
012004  005737  002172          TST     MTMODE                  ; INTERNAL MODE?
012010  001003                  BNE     10$                     ; IF NOT BRANCH
012012  012705  000010          MOV     #10,R5                  ; SET INTERNAL LOOPBACK
012016  000402                  BR      20$                     ; CONTINUE

012020  012705  000020  10$:    MOV     #20,R5                  ; SET EXTERNAL LOOPBACK
012024  012700  000017  20$:    MOV     #MAINT,R0               ; MAINTENANCE REGISTER
012030  004737  006034          JSR     PC,WRITE                ; WRITE TO THAT REGISTER
                        ;*
                        ; LOAD TEST MICROCODE
                        ;-
012034  012700  000033          MOV     #27.,R0                 ; SIZE
012040  012705  004444          MOV     #DTTST,R5               ; STARTING ADDRESS OF ROUTINE
012044  004737  006062          JSR     PC,LOAD                 ; GO LOAD
012050  005700                  TST     R0                      ; ANY ERRORS LOADING
012052  001406                  BEQ     30$                     ; IF NO, BRANCH
012054                          ERRHRD  35,KMC5                 ; CRAM FAILURE
012054  104456                                                          TRAP    C$ERHRD
012056  000043                                                          .WORD   35
012060  003460                                                          .WORD   KMC5
012062  000000                                                          .WORD   0
012064                          ESCAPE  TST
012064  104410                                                          TRAP    C$ESCAPE
012066  000130                                                          .WORD   L10042-.

012070  012712  100000  30$:    MOV     #RUN,(R2)               ; SET RUN BIT
012074  012703  177777          MOV     #177777,R3              ; SET UP DELAY
012100  105712          35$:    TSTB    (R2)                    ; DONE BIT SET?
012102  100407                  BMI     40$                     ; IF YES, BRANCH
012104  077303                  SOB     R3,35$                  ; WAIT A WHILE
012106                          ERRHRD  36,KMC7                 ; KMC HUNG
012106  104456                                                          TRAP    C$ERHRD
012110  000044                                                          .WORD   36
012112  003516                                                          .WORD   KMC7
012114  000000                                                          .WORD   0
012116                          ESCAPE  TST
012116  104410                                                          TRAP    C$ESCAPE
012120  000076                                                          .WORD   L10042-.

                        ;*
                        ; CHECK TIMING SIGNALS BY READING DATA MEMORY
                        ;
```

```
2524 012122  004737  005700    40$:    JSR     PC,MSCLR          ; CLEAR THE WORLD
2525 012126  012703  000027            MOV     #23.,R3           ; SETUP FOR 23 READS
2526 012132  012700  000377    50$:    MOV     #377,R0           ; READ MEMORY
2527 012136  004737  005760            JSR     PC,READ           ; GO DO IT
2528 012142  032704  000002            BIT     #2,R4             ; DT DETECT SET?
2529 012146  001007                    BNE     60$               ; IF YES, GET OUT
2530 012150  077310                    SOB     R3,50$            ; CONTINUE READING
2531 012152                            ERRHRD  37,EM12           ; DT NEVER SET
     012152  104456                                                          TRAP    C$ERHRD
     012154  000045                                                          .WORD   37
     012156  004177                                                          .WORD   EM12
     012160  000000                                                          .WORD   0
2532 012162                            ESCAPE  TST
     012162  104410                                                          TRAP    C$ESCAPE
     012164  000032                                                          .WORD   L10042-.
2533
2534 012166  012700  000377    60$:    MOV     #377,R0           ; READ MEMORY
2535 012172  004737  005760            JSR     PC,READ           ; GO DO IT
2536 012176  032704  000002            BIT     #2,R4             ; DT DETECT CLEAR?
2537 012202  001405                    BEQ     70$               ; IF YES, GET OUT
2538 012204  077310                    SOB     R3,60$            ; CONTINUE READING
2539 012206                            ERRHRD  38,EM13           ; DT NEVER CLEARED
     012206  104456                                                          TRAP    C$ERHRD
     012210  000046                                                          .WORD   38
     012212  004220                                                          .WORD   EM13
     012214  000000                                                          .WORD   0
2540 012216                    70$:    ENDTST
     012216                                                          L10042:
     012216  104401                                                          TRAP    C$ETST
```

SEQ 0078

```
                                .SBTTL  TEST 8:  LED TEST
                                ;++
                                ;
                                ;       TEST TO TURN ON AND OFF EACH OF THE ON-BOARD LED'S:
                                ;       INTERNAL MAINTENANCE, EXTERNAL MAINTENANCE.
                                ;
                                ;--
012220                                  BCNTST
012220                                                                          T8::
012220  013702  002166                  MOV     KCSR,R2                 ; STORE POINTER TO CSR
012224  012701  000005                  MOV     #5,R1                   ; REPEAT 5 TIMES
012230                          10$:
                                ;+
                                ; TURN ON CABLE OK LED
                                ;-
012230  012703  000002                  MOV     #2,R3                   ; ONE DELAY
012234  012704  177777          120$:   MOV     #177777,R4              ; SECOND DELAY
012240  077401                  130$:   SOB     R4,130$                 ; WAIT A
012242  077304                          SOB     R3,120$                 ;    WHILE
                                ;+
                                ; TURN ON INTERNAL MAINTENANCE LED
                                ;-
012244  012705  000010                  MOV     #10,R5                  ; INTERNAL MAINTENANCE BIT
012250  012700  000017                  MOV     #MAINT,R0               ; MAINTENANCE REGISTER
012254  004737  006034                  JSR     PC,WRITE                ; WRITE TO SELECTED REGISTER
012260  012703  000002                  MOV     #2,R3                   ; ONE DELAY
012264  012704  177777          220$:   MOV     #177777,R4              ; SECOND DELAY
012270  077401                  230$:   SOB     R4,230$                 ; WAIT A
012272  077304                          SOB     R3,220$                 ;    WHILE
                                ;+
                                ; TURN ON EXTERNAL MAINTENANCE LED
                                ;-
012274  012705  000020                  MOV     #20,R5                  ; EXTERNAL MAINTENANCE BIT
012300  012700  000017                  MOV     #MAINT,R0               ; MAINTENANCE REGISTER
012304  004737  006034                  JSR     PC,WRITE                ; WRITE TO SELECTED REGISTER
012310  012703  000002                  MOV     #2,R3                   ; ONE DELAY
012314  012704  177777          320$:   MOV     #177777,R4              ; SECOND DELAY
012320  077401                  330$:   SOB     R4,330$                 ; WAIT A
012322  077304                          SOB     R3,320$                 ;   .WHILE
                                ;+
                                ; REPEAT THE PATTERN 5 TIMES
                                ;-
012324  077137                          SOB     R1,10$                  ; REPEAT LOOP
012326  004737  005700                  JSR     PC,MSCLR                ; CLEAR BEFORE LEAVING
012332                                  ENDTST
012332                                                                          L10043:
012332  104401                                                                          TRAP    C$ETST
```

SEQ 0079

```
                                .SBTTL  TEST 9:  DATA TRANSFER TEST
                                ;++
                                ;
                                ;       TEST TO SEND 256 BYTES OF DATA THOUGH LINE UNIT DOING
                                ;       NPR'S TO GET THE DATA FROM UNIBUS
                                ;--

012334                                  BGNTST
012334                                                                          T9::

012334  013702  002166                  MOV     KCSR,R2                 ; STORE REGISTER POINTER
012340  004737  005700                  JSR     PC,MSCLR                ; CLEAR THE WORLD
                                ;+
                                ; LOAD TEST MICROCODE
                                ;-
012344  012700  000064                  MOV     #64,R0                  ; SIZE
012350  012705  004532                  MOV     #DTST,R5                ; STARTING ADDRESS OF ROUTINE
012354  004737  006062                  JSR     PC,LOAD                 ; GO LOAD
012360  005700                          TST     R0                      ; ANY ERRORS LOADING
012362  001406                          BEQ     25$                     ; IF NO, BRANCH
012364                                  ERRHRD  39,KMC5                 ; CRAM FAILURE
012364  104456                                                                  TRAP    C$ERHRD
012366  000047                                                                  .WORD   39
012370  003460                                                                  .WORD   KMC5
012372  000000                                                                  .WORD   0
012374                                  ESCAPE  TST
012374  104410                                                                  TRAP    C$ESCAPE
012376  000202                                                                  .WORD   L10044-.
                                ;+
                                ; CLEAR RECEIVE BUFFER
                                ;-
012400  012703  000377          25$:    MOV     #255.,R3                ; COUNTER
012404  012705  002624                  MOV     #RCBUF,R5               ; START OF THE BUFFER
012410  105025                  26$:    CLRB    (R5)+                   ; CLEAR EACH BYTE
012412  077302                          SOB     R3,26$                  ; DO FOR THE WHOLE BUFFER
                                ;+
                                ; LOAD TRANSMIT BUFFER WITH A PATTERN
                                ;-
012414  012703  000377                  MOV     #255.,R3                ; LAST PATTERN
012420  012705  002624                  MOV     #RCBUF,R5               ; END OF THE BUFFER
012424  110345                  27$:    MOVB    R3,-(R5)                ; LOAD WITH A PATTERN
012426  077302                          SOB     R3,27$                  ; DO FOR THE WHOLE BUFFER
                                ;+
                                ; SET UP MAINTENANCE MODE ACCORDING TO SELECTION
                                ;-
012430  005737  002172                  TST     MTMODE                  ; INTERNAL MODE?
012434  001003                          BNE     28$                     ; IF NOT BRANCH
012436  012712  000010                  MOV     #10,(R2)                ; SET INTERNAL LOOPBACK
012442  000402                          BR      29$                     ; CONTINUE
012444  012712  000020          28$:    MOV     #20,(R2)                ; SET EXTERNAL LOOPBACK
012450  012762  002224  000004  29$:    MOV     #TRBUF,4(R2)            ; SETUP ADDRESSES
012456  012762  002624  000006          MOV     #RCBUF,6(R2)            ;   IN CSR'S
012464  052712  040000                  BIS     #MCLR,(R2)              ; CLEAR THE WORLD
012470  042712  040000                  BIC     #MCLR,(R2)              ; CLEAR BIT
012474  052712  100000                  BIS     #RUN,(R2)               ; SET RUN BIT
012500  012703  000001                  MOV     #1,R3                   ; SET UP DELAY
012504  012704  000001          32$:    MOV     #1,R4                   ;
```

```
MISCELLANEOUS SECTIONS  MACRO M1200  15-MAR-85 16:13  PAGE 49-1
TEST 9:  DATA TRANSFER TEST

                                                                                                SEQ 0080
 2637 012510  012705  020000          33$:    MOV     #20000,R5       ;
 2638 012514  105712                  35$:    TSTB    (R2)            ; DONE BIT SET?
 2639 012516  100411                          BMI     40$             ; IF YES, BRANCH
 2640 012520  077503                          SOB     R5,35$          ; WAIT A WHILE
 2641 012522  077406                          SOB     R4,33$          ; WAIT A WHILE
 2642 012524  077311                          SOB     R3,32$          ; WAIT A WHILE
 2643 012526                                  ERRHRD  40,KMC7         ; KMC HUNG
      012526  104456                                                          TRAP    C$ERHRD
      012530  000050                                                          .WORD   40
      012532  003516                                                          .WORD   KMC7
      012534  000000                                                          .WORD   0
 2644 012536                                  ESCAPE  TST
      012536  104410                                                          TRAP    C$ESCAPE
      012540  000040                                                          .WORD   L10044-.
 2645                                 ;+
 2646                                 ; CHECK THE RESULTS
 2647                                 ;-
 2648 012542  012704  002224          40$:    MOV     #TRBUF,R4       ; TRANSMIT BUFFER
 2649 012546  012705  002624                  MOV     #RCBUF,R5       ; RECEIVE BUFFER
 2650 012552  022425                  45$:    CMP     (R4)+,(R5)+     ; ARE THEY THE SAME?
 2651 012554  001404                          BEQ     50$             ; IF YES, BRANCH
 2652 012556                                  ERRHRD  41,EM7,ERPNT    ; DATA PATH ERROR
      012556  104456                                                          TRAP    C$ERHRD
      012560  000051                                                          .WORD   41
      012562  004037                                                          .WORD   EM7
      012564  005600                                                          .WORD   ERPNT
 2653 012566  022704  002624          50$:    CMP     #RCBUF,R4       ; ALL DONE?
 2654 012572  001367                          BNE     45$             ; IF NOT, BRANCH
 2655 012574  004737  005700                  JSR     PC,MSCLR        ; CLEAR THE WORLD
 2656 012600                                  ENDTST
      012600                                                                  L10044:
      012600  104401                                                          TRAP    C$ETST
```

```
                                                                                                                    SEQ 0081
                                .TITLE PARAMETER CODING

                                .SBTTL  HARDWARE PARAMETER CODING SECTION


                                ;++
                                ; THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
                                ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
                                ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
                                ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
                                ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
                                ; WITH THE OPERATOR.
                                ;--

012602                                  BGNHRD
012602  000007                                                          .WORD L10045-L$HARD/2
012604                                                          L$HARD::

012604                                  GPRMA   HD2,0,0,160000,177770,NO        ; CSR ADDRESS
012604  000021                                                          .WORD   T$CODE
012606  012622                                                          .WORD   HD2
012610  160000                                                          .WORD   T$LOLIM
012612  177770                                                          .WORD   T$HILIM
012614                                  GPRML   HD5,2,-1,YES                    ; LOOPBACK, INTERNAL DEFAULT
012614  001130                                                          .WORD   T$CODE
012616  012637                                                          .WORD   HD5
012620  177777                                                          .WORD   -1

012622                                  ENDHRD

012622                                                          .EVEN
                                                                L10045:

012622  103     123     122     HD2:    .ASCIZ  /CSR ADDRESS?/
012625  040     101     104
012630  104     122     105
012633  123     123     077
012636  000
012637  105     130     124     HD5:    .ASCIZ  /EXTERNAL LOOPBACK?/
012642  105     122     116
012645  101     114     040
012650  114     117     117
012653  120     102     101
012656  103     113     077
012661  000

                                .EVEN
```

SEQ 0082

```
                        .SBTTL  SOFTWARE PARAMETER CODING SECTION

                        ;++
                        ; THE SOFTWARE PARAMETER CODING SECTION CONTAINS MACROS
                        ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
                        ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
                        ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
                        ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
                        ; WITH THE OPERATOR.
                        ;--

                                BGNSFT
012662  000000                                                    .WORD L10046-L$SOFT/2
012664                                                        L$SOFT::

                                ENDSFT
                                                                .EVEN
012664                                                        L10046:

                        $PATCH::
                                .BLKW   10

                                LASTAD
                                                                .EVEN
012704  000000                                                  .WORD   0
012706  000000                                                  .WORD   0
012710                  L$LAST::

000001                  .END
```

PARAMETER CODING MACRO M1200 15-MAR-85 16:13 PAGE 51-1
SYMBOL TABLE

SEQ 0083

```
ADR    = 000020 G
ASSEMB= 000010
BIT0   = 000001 G
BIT00  = 000001 G
BIT01  = 000002 G
BIT02  = 000004 G
BIT03  = 000010 G
BIT04  = 000020 G
BIT05  = 000040 G
BIT06  = 000100 G
BIT07  = 000200 G
BIT08  = 000400 G
BIT09  = 001000 G
BIT1   = 000002 G
BIT10  = 002000 G
BIT11  = 004000 G
BIT12  = 010000 G
BIT13  = 020000 G
BIT14  = 040000 G
BIT15  = 100000 G
BIT2   = 000004 G
BIT3   = 000010 G
BIT4   = 000020 G
BIT5   = 000040 G
BIT6   = 000100 G
BIT7   = 000200 G
BIT8   = 000400 G
BIT9   = 001000 G
BOE    = 000400 G
CNTRL  = 000016 G
CRAMW  = 020000 G
C$AU   = 000052
C$AUTO= 000061
C$BRK  = 000022
C$BSEG= 000004
C$BSUB= 000002
C$CEFG= 000045
C$CLCK= 000062
C$CLEA= 000012
C$CLOS= 000035
C$CLP1= 000006
C$CVEC= 000036
C$DCLN= 000044
C$DODU= 000051
C$DRPT= 000024
C$DU   = 000053
C$EDIT= 000003
C$ERDF= 000055
C$ERHR= 000056
C$ERRO= 000060
C$ERSF= 000054
C$ERSO= 000057
C$ESCA= 000010
C$ESEG= 000005
C$ESUB= 000003
C$ETST= 000001
C$EXIT= 000032
C$GETB= 000026
C$GETW= 000027
C$GMAN= 000043
C$GPHR= 000042
C$GPLO= 000030
C$GPRI= 000040
C$INIT= 000011
C$INLP= 000020
C$MANI= 000050
C$MEM  = 000031
C$MSG  = 000023
C$OPEN= 000034
C$PNTB= 000014
C$PNTF= 000017
C$PNTS= 000016
C$PNTX= 000015
C$QIO  = 000377
C$RDBU= 000007
C$REFG= 000047
C$RESE= 000033
C$REVI= 000003
C$RFLA= 000021
C$RPT  = 000025
C$SEFG= 000046
C$SPRI= 000041
C$SVEC= 000037
C$TPRI= 000013
DFPTBL  002150 G
DIAGMC= 000000
DIHI   = 000015 G
DLO    = 000010 G
DOHI   = 000011 G
DTST     004532
DTTST    004444
EF.CON= 000036 G
EF.NEW= 000035 G
EF.PWR= 000034 G
EF.RES= 000037 G
EF.STA= 000040 G
EM1      003534 G
EM10     004127 G
EM11     004152 G
EM12     004177 G
EM13     004220 G
EM14     004243 G
EM2      003607 G
EM3      003633 G
EM4      003673 G
EM5      003735 G
EM6      003775 G
EM7      004037 G
EM8      004057 G
EM9      004102 G
ENDIN    006276
ERPNT    005600 G
ERRBLK   002164 G
ERRMSG   002162 G
ERRNBR   002160 G
ERRTYP   002156 G
ERR0     005126
ERR01    005207
ERR02    005270
ERR1     005402
ERR2     005516
ERR3     005634
EVL    = 000004 G
EXTR   = 000016 G
E$END  = 002100
E$LOAD= 000035
F$AU   = 000015
F$AUTO= 000020
F$BGN  = 000040
F$CLEA= 000007
F$DU   = 000016
F$END  = 000041
F$HARD= 000004
F$HW   = 000013
F$INIT= 000006
F$JMP  = 000050
F$MOD  = 000000
F$MSG  = 000011
F$PROT= 000021
F$PWR  = 000017
F$RPT  = 000012
F$SEG  = 000003
F$SOFT= 000005
F$SRV  = 000010
F$SUB  = 000002
F$SW   = 000014
F$TEST= 000001
G$CNTO= 000200
G$DELM= 000372
G$DISP= 000003
G$EXCP= 000400
G$HILI= 000002
G$LOLI= 000001
G$NO   = 000000
G$OFFS= 000400
G$OFSI= 000376
G$PRMA= 000001
G$PRMD= 000002
G$PRML= 000000
G$RADA= 000140
G$RADB= 000000
G$RADD= 000040
G$RADL= 000120
G$RADO= 000020
G$XFER= 000004
G$YES  = 000010
HD2      012622
HD5      012637
HELP   = 000001
HOE    = 100000 G
IBE    = 010000 G
IDU    = 000040 G
IER    = 020000 G
IRDTST   004310
ISR    = 000100 G
IXE    = 004000 G
I$AU   = 000041
I$AUTO= 000041
I$CLN  = 000041
I$DU   = 000041
I$HRD  = 000041
I$INIT= 000041
I$MOD  = 000041
I$MSG  = 000041
I$PROT= 000040
I$PTAB= 000041
I$PWR  = 000041
I$RPT  = 000041
I$SEG  = 000041
I$SETU= 000041
I$SFT  = 000041
I$SRV  = 000041
I$SUB  = 000041
I$TST  = 000041
J$JMP  = 000167
KCSR     002166 G
KMC1     003260 G
KMC2     003331 G
KMC3     003356 G
KMC4     003403 G
KMC5     003460 G
KMC6     003475 G
KMC7     003516 G
LOAD     006062
LOE    = 040000 G
LOGUNT   002170 G
LOT    = 000010 G
L$ACP    002110 G
L$APT    002036 G
L$AU     006316 G
L$AUT    002070 G
L$AUTO   006300 G
L$CCP    002106 G
L$CLEA   006302 G
L$CO     002032 G
L$DEPO   002011 G
L$DESC   003234 G
L$DESP   002076 G
L$DEVP   002060 G
L$DISP   002124 G
L$DLY    002116 G
L$DTP    002040 G
L$DTYP   002034 G
L$DU     006310 G
L$DUT    002072 G
L$DVTY   003224 G
L$EF     002052 G
L$ENVI   002044 G
L$ERRT   002156 G
L$ETP    002102 G
L$EXP1   002046 G
L$EXP4   002064 G
L$EXP5   002066 G
L$HARD   012604 G
L$HIME   002120 G
L$HPCP   002016 G
L$HPTP   002022 G
L$HW     002150 G
L$ICP    002104 G
L$INIT   006160 G
L$LADP   002026 G
L$LAST   012710 G
L$LOAD   002100 G
L$LUN    002074 G
L$MREV   002050 G
L$NAME   002000 G
L$PRIO   002042 G
L$PROT   006152 G
L$PRT    002112 G
L$REPP   002062 G
L$REV    002010 G
L$RPT    006144 G
L$SOFT   012664 G
L$SPC    002056 G
L$SPCP   002020 G
L$SPTP   002024 G
L$STA    002030 G
L$SW     002156 G
L$TEST   002114 G
L$TIML   002014 G
L$UNIT   002012 G
L10000   002154
L10001   002156
L10002   005336
L10003   005462
L10004   005576
L10005   005676
L10006   006150
L10010   006276
L10011   006300
L10012   006306
L10013   006314
L10014   006322
L10015   006462
L10016   006402
L10017   006460
L10020   007046
L10021   006576
L10022   006722
L10023   007044
L10024   007760
L10025   007140
L10026   007500
L10027   007572
L10030   007664
```

```
PARAMETER CODING        MACRO M1200  15-MAR-85 16:13  PAGE 51-2
SYMBOL TABLE                                                                                                    SEQ 0084

L10031  007756          O$GNSW= 000001          SVCGBL= 000000          T$SUBN= 000000          T2.2    006600
L10032  011322          O$POIN= 000001          SVCINS= 000001          T$TAGL= 177777          T2.3    006724
L10033  010154          O$SETU= 000000          SVCSUB= 000001          T$TAGN= 010047          T3      007050 G
L10034  010366          PNT   = 001000 G        SVCTAG= 000001          T$TEMP= 000005          T3.1    007050
L10035  010600          PNTD    004702 G        SVCTST= 000001          T$TEST= 000011          T3.2    007142
L10036  011040          PNTRAM  005340 G        S$LSYM= 010000          T$TSTM= 177777          T3.3    007502
L10037  011320          PNTREG  005464 G        TEMP    002174 G        T$TSTS= 000001          T3.4    007574
L10040  011546          PRI   = 002000 G        TEMP1   002176 G        T$$AU = 010014          T3.5    007666
L10041  011772          PRI00 = 000000 G        TRBUF   002224 G        T$$AUT= 010011          T4      007762 G
L10042  012216          PRI01 = 000040 G        T$ARGC= 000003          T$$CLE= 010012          T4.1    007762
L10043  012332          PRI02 = 000100 G        T$CODE= 001130          T$$DU = 010013          T4.2    010156
L10044  012600          PRI03 = 000140 G        T$ERRN= 000051          T$$HAR= 010045          T4.3    010370
L10045  012622          PRI04 = 000200 G        T$EXCP= 000000          T$$HW = 010000          T4.4    010602
L10046  012664          PRI05 = 000240 G        T$FLAG= 000040          T$$INI= 010010          T4.5    011042
MAINT = 000017 G        PRI06 = 000300 G        T$GMAN= 000000          T$$MSG= 010005          T5      011324 G
MCLR  = 040000 G        PRI07 = 000340 G        T$HILI= 177770          T$$PRO= 010007          T6      011550 G
MSCLR   005700 G        RAMI  = 001000 G        T$LAST= 000001          T$$RPT= 010006          T7      011774 G
MTMODE  002172 G        RAMO  = 002000 G        T$LOLI= 160000          T$$SOF= 010046          T8      012220 G
NDRTST  004356          RCBUF   002624 G        T$LSYM= 010000          T$$SUB= 010037          T9      012334 G
NEXT    006240          READ    005760 G        T$LTNO= 000011          T$$SW = 010001          UAM   = 000200 G
ONEFIL= 000001          ROMCLK  005732 G        T$NEST= 177777          T$$TES= 010044          WRITE   006034 G
O$APTS= 000000          RPNT    002220 G        T$NS0 = 000005          T1      006324 G        X$ALWA= 000000
O$AU  = 000001          RUN   = 100000 G        T$NS1 = 000002          T1.1    006324          X$FALS= 000040
O$BGNR= 000001          SFPTBL  002156 G        T$PTNU= 000000          T1.2    006404          X$OFFS= 000400
O$BGNS= 000000          START   006232          T$SAVL= 177777          T2      006464 G        X$TRUE= 000020
O$DU  = 000001          STEP  = 000400 G        T$SEGL= 177777          T2.1    006464          $PATCH  012664 G
O$ERRT= 000001          STRB  = 000012 G

. ABS.  012710      000
        000000      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  28476 WORDS  ( 112 PAGES)
DYNAMIC MEMORY:  19748 WORDS  ( 75 PAGES)
ELAPSED TIME:  00:03:07
CZKMVA,CZKMVA/CR/NL:TOC=SVC34/ML,CZKMVA.MAC/DS:GBL
```

CZKMVA CREATED BY MACRO ON 15-MAR-85 AT 16:15 PAGE 1

SYMBOL CROSS REFERENCE CREF V02 SEQ 0085

SYMBOL	VALUE		REFERENCES							
ADR	= 000020	G	#10-954							
ASSEMB	= 000010		6-875	6-875						
BIT0	= 000001	G	#10-954							
BIT00	= 000001	G	#10-954	10-954						
BIT01	= 000002	G	#10-954	10-954						
BIT02	= 000004	G	#10-954	10-954						
BIT03	= 000010	G	#10-954	10-954						
BIT04	= 000020	G	#10-954	10-954						
BIT05	= 000040	G	#10-954	10-954						
BIT06	= 000100	G	#10-954	10-954						
BIT07	= 000200	G	#10-954	10-954						
BIT08	= 000400	G	#10-954	10-954						
BIT09	= 001000	G	#10-954	10-954						
BIT1	= 000002	G	#10-954							
BIT10	= 002000	G	#10-954							
BIT11	= 004000	G	#10-954							
BIT12	= 010000	G	#10-954							
BIT13	= 020000	G	#10-954							
BIT14	= 040000	G	#10-954							
BIT15	= 100000	G	#10-954							
BIT2	= 000004	G	#10-954							
BIT3	= 000010	G	#10-954							
BIT4	= 000020	G	#10-954							
BIT5	= 000040	G	#10-954							
BIT6	= 000100	G	#10-954							
BIT7	= 000200	G	#10-954							
BIT8	= 000400	G	#10-954							
BIT9	= 001000	G	#10-954							
BOE	= 000400	G	#10-954							
CNTRL	= 000016	G	#11-974	39-2022	43-2235	43-2275				
CRAMW	= 020000	G	#11-962	21-1453	32-1755	32-1756				
C$AU	= 000052		#6-875	28-1668						
C$AUTO	= 000061		#6-875	25-1578						
C$BRK	= 000022		#6-875							
C$BSEG	= 000004		#6-875							
C$BSUB	= 000002		#6-875	30-1683	31-1707	32-1740	33-1784	34-1821	35-1863	36-1887
			37-1962	38-1987	39-2012	40-2041	41-2095	42-2155	43-2215	44-2292
C$CEFG	= 000045		#6-875							
C$CLCK	= 000062		#6-875							
C$CLEA	= 000012		#6-875	26-1595						
C$CLOS	= 000035		#6-875							
C$CLP1	= 000006		#6-875	31-1721	35-1872	36-1899	36-1911	36-1920	36-1932	40-2065
			41-2124	42-2184	43-2259					
C$CVEC	= 000036		#6-875							
C$DCLN	= 000044		#6-875							
C$DODU	= 000051		#6-875							
C$DRPT	= 000024		#6-875							
C$DU	= 000053		#6-875	27-1631						
C$EDIT	= 000003		#6-875	6-901						
C$ERDF	= 000055		#6-875							
C$ERHR	= 000056		#6-875	30-1696	31-1716	32-1764	33-1799	33-1811	34-1838	35-1871
			35-1877	36-1898	36-1907	36-1919	36-1928	36-1953	37-1977	38-2002
			39-2027	40-2064						

SYMBOL	VALUE		REFERENCES								
			40-2085	41-2122	41-2145	42-2182	42-2205	43-2254	43-2280	44-2333	44-2338
			45-2389	45-2396	45-2408	45-2415	46-2450	46-2457	46-2469	46-2477	47-2512
			47-2519	47-2531	47-2539	49-2606	49-2643	49-2652			
C$ERRO	= 000060		#6-875								
C$ERSF	= 000054		#6-875								
C$ERSO	= 000057		#6-875								
C$ESCA	= 000010		#6-875	45-2390	45-2397	45-2409	46-2451	46-2458	46-2470	47-2513	47-2520
			47-2532	49-2607	49-2644						
C$ESEG	= 000005		#6-875								
C$ESUB	= 000003		#6-875	30-1699	31-1727	32-1776	33-1813	34-1851	35-1879	36-1954	37-1979
			38-2004	39-2029	40-2087	41-2147	42-2207	43-2281	44-2354		
C$ETST	= 000001		#6-875	31-1729	34-1853	39-2030	44-2355	45-2416	46-2478	47-2540	48-2585
			49-2656								
C$EXIT	= 000032		#6-875	26-1590							
C$GETB	= 000026		#6-875								
C$GETW	= 000027		#6-875								
C$GMAN	= 000043		#6-875								
C$GPHR	= 000042		#6-875	24-1558							
C$GPLO	= 000030		#6-875								
C$GPRI	= 000040		#6-875								
C$INIT	= 000011		#6-875	24-1564							
C$INLP	= 000020		#6-875								
C$MANI	= 000050		#6-875								
C$MEM	= 000031		#6-875								
C$MSG	= 000023		#6-875	16-1239	16-1249	16-1256	16-1265				
C$OPEN	= 000034		#6-875								
C$PNTB	= 000014		#6-875	16-1215	16-1244	16-1252	16-1259				
C$PNTF	= 000017		#6-875								
C$PNTS	= 000016		#6-875								
C$PNTX	= 000015		#6-875	16-1227	16-1228						
C$QIO	= 000377		#6-875								
C$RDBU	= 000007		#6-875								
C$REFG	= 000047		#6-875	24-1540	24-1542	24-1544	24-1546	24-1548			
C$RESE	= 000033		#6-875	#6-875							
C$REVI	= 000003		#6-875	6-901							
C$RFLA	= 000021		#6-875								
C$RPT	= 000025		#6-875	22-1489							
C$SEFG	= 000046		#6-875								
C$SPRI	= 000041		#6-875								
C$SVEC	= 000037		#6-875								
C$TPRI	= 000013		#6-875								
DFPTBL	002150	G	#8-923								
DIAGMC	= 000000		6-875	6-875							
DIHI	= 000015	G	#11-971	41-2114	41-2140	42-2174	42-2200	44-2348			
DLO	= 000010	G	#11-969	16-1217	37-1972	40-2058	40-2060	40-2080	44-2312	44-2320	44-2321
			44-2346								
DOHI	= 000011	G	#11-970	38-1997	41-2112	43-2233	44-2315				
DTST	004532		#15-1083	49-2602							
DTTST	004444		#15-1073	47-2508							
EF.CON	= 000036	G	#10-954	24-1540							
EF.NEW	= 000035	G	#10-954	24-1544							
EF.PWR	= 000034	G	#10-954	24-1548							

SYMBOL CROSS REFERENCE CREF V02 SEQ 0087

SYMBOL	VALUE		REFERENCES							
EF.RES	= 000037	G	#10-954	24-1546						
EF.STA	= 000040	G	#10-954	24-1542						
EM1	003534	G	#14-1036	35-1871	37-1977	38-2002	39-2027	40-2085	41-2145	42-2205	43-2280
EM10	004127	G	#14-1045	46-2469							
EM11	004152	G	#14-1046	46-2477							
EM12	004177	G	#14-1047	47-2531							
EM13	004220	G	#14-1048	47-2539							
EM14	004243	G	#14-1049	44-2338							
EM2	003607	G	#14-1037	35-1877	36-1953						
EM3	003633	G	#14-1038	36-1898							
EM4	003673	G	#14-1039	36-1907							
EM5	003735	G	#14-1040	36-1919							
EM6	003775	G	#14-1041	36-1928							
EM7	004037	G	#14-1042	40-2064	41-2122	42-2182	43-2254	44-2333	49-2652		
EM8	004057	G	#14-1043	45-2408							
EM9	004102	G	#14-1044	45-2415							
ENDIN	006276		24-1541	24-1549	#24-1563						
ERPNT	005600	G	#16-1258	49-2652							
ERRBLK	002164	G	#12-987								
ERRMSG	002162	G	#12-987								
ERRNBR	002160	G	#12-987								
ERRTYP	002156	G	#12-987								
ERR0	005126		16-1215	#16-1233							
ERR01	005207		16-1227	#16-1234							
ERR02	005270		16-1228	#16-1236							
ERR1	005402		16-1244	#16-1247							
ERR2	005516		16-1252	#16-1254							
ERR3	005634		16-1259	#16-1263							
EVL	= 000004	G	#10-954								
EXTR	= 000016	G	#11-975	42-2172							
E$END	= 002100		#6-875								
E$LOAD	= 000035		#6-875	6-901							
F$AU	= 000015		#6-875	28-1641	28-1668						
F$AUTO	= 000020		#6-875	25-1575	25-1578						
F$BGN	= 000040		#6-875	16-1208	16-1241	16-1251	16-1258	22-1482	23-1498	24-1514	25-1575
			26-1587	26-1590	27-1604	28-1641	30-1676	30-1683	30-1683	30-1699	31-1707
			31-1707	31-1727	31-1729	32-1733	32-1740	32-1740	32-1776	33-1784	33-1784
			33-1813	34-1821	34-1821	34-1851	34-1853	35-1856	35-1863	35-1863	35-1879
			36-1887	36-1887	36-1954	37-1962	37-1962	37-1979	38-1987	38-1987	38-2004
			39-2012	39-2012	39-2029	39-2030	40-2033	40-2041	40-2041	40-2087	41-2095
			41-2095	41-2147	42-2155	42-2155	42-2207	43-2215	43-2215	43-2281	44-2292
			44-2292	44-2354	44-2355	45-2366	45-2390	45-2397	45-2409	45-2416	46-2427
			46-2451	46-2458	46-2470	46-2478	47-2489	47-2513	47-2520	47-2532	47-2540
			48-2549	48-2585	49-2594	49-2607	49-2644	49-2656	50-2672	51-2696	
F$CLEA	= 000007		#6-875	26-1587	26-1595						
F$DU	= 000016		#6-875	27-1604	27-1631						
F$END	= 000041		#6-875	6-875	6-875	6-875	6-875	6-875	6-875	6-875	6-875
			6-875	6-875	6-875	6-875	6-875	6-875	6-875	6-875	16-1232
			16-1239	16-1246	16-1249	16-1253	16-1256	16-1262	16-1265	22-1484	22-1489
			24-1564	25-1578	26-1590	26-1595	27-1615	27-1631	28-1652	28-1668	30-1676
			30-1676	30-1676	30-1683	30-1683	30-1699	30-1699	31-1707	31-1707	31-1727
			31-1727	31-1729	31-1729	32-1733	32-1733	32-1733	32-1740	32-1740	32-1776

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SYMBOL CROSS REFERENCE CREF V02 SEQ 0088

SYMBOL	VALUE	REFERENCES								
		32-1776	33-1784	33-1784	33-1813	33-1813	34-1821	34-1821	34-1851	34-1851
		34-1853	34-1853	35-1856	35-1856	35-1856	35-1863	35-1863	35-1879	35-1879
		36-1887	36-1887	36-1954	36-1954	37-1962	37-1962	37-1979	37-1979	38-1987
		38-1987	38-2004	38-2004	39-2012	39-2012	39-2029	39-2029	39-2030	39-2030
		40-2033	40-2033	40-2033	40-2041	40-2041	40-2087	40-2087	41-2095	41-2095
		41-2147	41-2147	42-2155	42-2155	42-2207	42-2207	43-2215	43-2215	43-2281
		43-2281	44-2292	44-2292	44-2354	44-2354	44-2355	44-2355	45-2366	45-2366
		45-2366	45-2390	45-2397	45-2409	45-2416	45-2416	46-2427	46-2427	46-2427
		46-2451	46-2458	46-2470	46-2478	46-2478	47-2489	47-2489	47-2489	47-2513
		47-2520	47-2532	47-2540	47-2540	48-2549	48-2549	48-2549	48-2585	48-2585
		49-2594	49-2594	49-2594	49-2607	49-2644	49-2656	49-2656	50-2677	51-2700
F$HARD	= 000004	#6-875	50-2672	50-2677						
F$HW	= 000013	#6-875	8-923	8-927						
F$INIT	= 000006	#6-875	24-1514	24-1564						
F$JMP	= 000050	#6-875	16-1232	16-1232	16-1246	16-1246	16-1253	16-1253	16-1262	16-1262
		22-1484	22-1484	26-1590	27-1615	27-1615	28-1652	28-1652		
F$MOD	= 000000	#6-875								
F$MSG	= 000011	#6-875	16-1208	16-1239	16-1241	16-1249	16-1251	16-1256	16-1258	16-1265
F$PROT	= 000021	#6-875	23-1498	23-1504						
F$PWR	= 000017	#6-875								
F$RPT	= 000012	#6-875	22-1482	22-1489						
F$SEG	= 000003	#6-875								
F$SOFT	= 000005	#6-875	51-2696	51-2700						
F$SRV	= 000010	#6-875								
F$SUB	= 000002	#6-875	30-1683	30-1699	31-1707	31-1727	32-1740	32-1776	33-1784	33-1813
		34-1821	34-1851	35-1863	35-1879	36-1887	36-1954	37-1962	37-1979	38-1987
		38-2004	39-2012	39-2029	40-2041	40-2087	41-2095	41-2147	42-2155	42-2207
		43-2215	43-2281	44-2292	44-2354					
F$SW	= 000014	#6-875	9-938	9-941						
F$TEST	= 000001	#6-875	30-1676	31-1729	32-1733	34-1853	35-1856	39-2030	40-2033	44-2355
		45-2366	45-2416	46-2427	46-2478	47-2489	47-2540	48-2549	48-2585	49-2594
		49-2656								
G$CNTO	= 000200	#6-875								
G$DELM	= 000372	#6-875								
G$DISP	= 000003	#6-875								
G$EXCP	= 000400	#6-875								
G$HILI	= 000002	#6-875								
G$LOLI	= 000001	#6-875								
G$NO	= 000000	#6-875	50-2674							
G$OFFS	= 000400	#6-875	50-2674	50-2675						
G$OFSI	= 000376	#6-875	50-2674	50-2675						
G$PRMA	= 000001	#6-875	50-2674							
G$PRMD	= 000002	#6-875								
G$PRML	= 000000	#6-875	50-2675							
G$RADA	= 000140	#6-875								
G$RADB	= 000000	#6-875								
G$RADD	= 000040	#6-875								
G$RADL	= 000120	#6-875	50-2675							
G$RADO	= 000020	#6-875	50-2674							
G$XFER	= 000004	#6-875								
G$YES	= 000010	#6-875	50-2675							
HD2	012622	50-2674	#50-2679							

SYMBOL CROSS REFERENCE CREF V02 SEQ 0089

SYMBOL	VALUE		REFERENCES								
HD5	012637		50-2675	#50-2680							
HELP	= 000001		#6-860	6-870	6-884	24-1516	27-1606	27-1617	28-1643	28-1654	
HOE	= 100000	G	#10-954								
IBE	= 010000	G	#10-954								
IDU	= 000040	G	#10-954								
IER	= 020000	G	#10-954								
IRDTST	004310		#15-1055	45-2385							
ISR	= 000100	G	#10-954								
IXE	= 004000	G	#10-954								
I$AU	= 000041		#6-875	#28-1641	#28-1668						
I$AUTO	= 000041		#6-875	#25-1575	#25-1578						
I$CLN	= 000041		#6-875	#26-1587	26-1590	#26-1595					
I$DU	= 000041		#6-875	#27-1604	#27-1631						
I$HRD	= 000041		#50-2672	#50-2677							
I$INIT	= 000041		#6-875	#24-1514	#24-1564						
I$MOD	= 000041		#6-875								
I$MSG	= 000041		#6-875	#16-1208	#16-1239	#16-1241	#16-1249	#16-1251	#16-1256	#16-1258	#16-1265
I$PROT	= 000040		#6-875	#23-1498							
I$PTAB	= 000041		#6-875								
I$PWR	= 000041		#6-875								
I$RPT	= 000041		#6-875	#22-1482	#22-1489						
I$SEG	= 000041		#6-875	30-1676	30-1683	31-1707	32-1733	32-1740	33-1784	34-1821	35-1856
			35-1863	36-1887	37-1962	38-1987	39-2012	40-2033	40-2041	41-2095	42-2155
			43-2215	44-2292	45-2366	46-2427	47-2489	48-2549	49-2594		
I$SETU	= 000041		#6-875								
I$SFT	= 000041		#51-2696	#51-2700							
I$SRV	= 000041		#6-875								
I$SUB	= 000041		#6-875	30-1676	30-1683	#30-1683	30-1699	#30-1699	#30-1699	31-1707	#31-1707
			31-1727	#31-1727	#31-1727	32-1733	32-1740	#32-1740	32-1776	#32-1776	#32-1776
			33-1784	#33-1784	33-1813	#33-1813	#33-1813	34-1821	#34-1821	34-1851	#34-1851
			#34-1851	35-1856	35-1863	#35-1863	35-1879	#35-1879	#35-1879	36-1887	#36-1887
			36-1954	#36-1954	#36-1954	37-1962	#37-1962	37-1979	#37-1979	#37-1979	38-1987
			#38-1987	38-2004	#38-2004	#38-2004	39-2012	#39-2012	39-2029	#39-2029	#39-2029
			40-2033	40-2041	#40-2041	40-2087	#40-2087	#40-2087	41-2095	#41-2095	41-2147
			#41-2147	#41-2147	42-2155	#42-2155	42-2207	#42-2207	#42-2207	43-2215	#43-2215
			43-2281	#43-2281	#43-2281	44-2292	#44-2292	44-2354	#44-2354	#44-2354	45-2366
			46-2427	47-2489	48-2549	49-2594					
I$TST	= 000041		#6-875	30-1676	#30-1676	30-1683	31-1707	31-1729	#31-1729	#31-1729	32-1733
			#32-1733	32-1740	33-1784	34-1821	34-1853	#34-1853	#34-1853	35-1856	#35-1856
			35-1863	36-1887	37-1962	38-1987	39-2012	39-2030	#39-2030	#39-2030	40-2033
			#40-2033	40-2041	41-2095	42-2155	43-2215	44-2292	44-2355	#44-2355	#44-2355
			45-2366	#45-2366	45-2390	45-2397	45-2409	45-2416	#45-2416	#45-2416	46-2427
			#46-2427	46-2451	46-2458	46-2470	46-2478	#46-2478	#46-2478	47-2489	#47-2489
			47-2513	47-2520	47-2532	47-2540	#47-2540	#47-2540	48-2549	#48-2549	48-2585
			#48-2585	#48-2585	49-2594	#49-2594	49-2607	49-2644	49-2656	#49-2656	#49-2656
J$JMP	= 000167		#6-875	16-1232	16-1246	16-1253	16-1262	22-1484	27-1615	28-1652	
KCSR	002166	G	#12-988	17-1291	18-1322	20-1414	*24-1560	30-1685	31-1708	32-1747	33-1785
			34-1822	35-1864	37-1963	38-1988	39-2013	40-2042	41-2096	42-2156	43-2216
			44-2293	45-2368	46-2429	47-2491	48-2550	49-2596			
KMC1	003260	G	#14-1024	30-1696							
KMC2	003331	G	#14-1025	31-1716							
KMC3	003356	G	#14-1026	33-1799							

SYMBOL	VALUE		REFERENCES					
KMC4	003403	G	#14-1027	33-1811				
KMC5	003460	G	#14-1028	32-1764	45-2389	46-2450	47-2512	49-2606
KMC6	003475	G	#14-1029	34-1838				
KMC7	003516	G	#14-1030	45-2396	46-2457	47-2519	49-2643	
LOAD	006062		#21-1448	45-2386	46-2447	47-2509	49-2603	
LOE	• 040000	G	#10-954					
LOGUNT	002170	G	#12-989	*24-1554	*24-1555	24-1556	24-1558	
LOT	• 000010	G	#10-954					
L$ACP	002110	G	#6-901					
L$APT	002036	G	#6-901					
L$AU	006316	G	6-901	#28-1641				
L$AUT	002070	G	#6-901					
L$AUTO	006300	G	6-901	#25-1575				
L$CCP	002106	G	#6-901					
L$CLEA	006302	G	6-901	#26-1587				
L$CO	002032	G	#6-901					
L$DEPO	002011	G	#6-901					
L$DESC	003234	G	6-901	#13-1015				
L$DESP	002076	G	#6-901					
L$DEVP	002060	G	#6-901					
L$DISP	002124	G	6-901	#7-911				
L$DLY	002116	G	#6-901					
L$DTP	002040	G	#6-901					
L$DTYP	002034	G	#6-901					
L$DU	006310	G	6-901	#27-1604				
L$DUT	002072	G	#6-901					
L$DVTY	003224	G	6-901	#13-1010				
L$EF	002052	G	#6-901					
L$ENVI	002044	G	#6-901					
L$ERRT	002156	G	6-901	#12-987				
L$ETP	002102	G	#6-901					
L$EXP1	002046	G	#6-901					
L$EXP4	002064	G	#6-901					
L$EXP5	002066	G	#6-901					
L$HARD	012604	G	6-901	50-2672	#50-2672			
L$HIME	002120	G	#6-901					
L$HPCP	002016	G	#6-901					
L$HPTP	002022	G	#6-901					
L$HW	002150	G	6-901	8-923	#8-923			
L$ICP	002104	G	#6-901					
L$INIT	006160	G	6-901	#24-1514				
L$LADP	002026	G	#6-901					
L$LAST	012710	G	6-901	#51-2708				
L$LOAD	002100	G	#6-901					
L$LUN	002074	G	#6-901					
L$MREV	002050	G	#6-901					
L$NAME	002000	G	#6-901					
L$PRIO	002042	G	#6-901					
L$PROT	006152	G	6-901	#23-1498				
L$PRT	002112	G	#6-901					
L$REPP	002062	G	#6-901					
L$REV	002010	G	#6-901					

SYMBOL CROSS REFERENCE CREF V02

SEQ 0091

SYMBOL	VALUE		REFERENCES								
L$RPT	006144	G	6-901	#22-1482							
L$SOFT	012664	G	51-2696	#51-2696							
L$SPC	002056	G	#6-901								
L$SPCP	002020	G	#6-901								
L$SPTP	002024	G	#6-901								
L$STA	002030	G	#6-901								
L$SW	002156	G	6-901	9-938	#9-938						
L$TEST	002114	G	#6-901								
L$TIML	002014	G	#6-901								
L$UNIT	002012	G	#6-901	24-1556							
L10000	002154		8-923	#8-927							
L10001	002156		9-938	#9-941							
L10002	005336		16-1232	#16-1239							
L10003	005462		16-1246	#16-1249							
L10004	005576		16-1253	#16-1256							
L10005	005676		16-1262	#16-1265							
L10006	006150		22-1484	#22-1489							
L10010	006276		#24-1564								
L10011	006300		#25-1578								
L10012	006306		26-1590	#26-1595							
L10013	006314		27-1615	#27-1631							
L10014	006322		28-1652	#28-1668							
L10015	006462		#31-1729								
L10016	006402		#30-1699								
L10017	006460		#31-1727								
L10020	007046		#34-1853								
L10021	006576		#32-1776								
L10022	006722		#33-1813								
L10023	007044		#34-1851								
L10024	007760		#39-2030								
L10025	007140		#35-1879								
L10026	007500		#36-1954								
L10027	007572		#37-1979								
L10030	007664		#38-2004								
L10031	007756		#39-2029								
L10032	011322		#44-2355								
L10033	010154		#40-2087								
L10034	010366		#41-2147								
L10035	010600		#42-2207								
L10036	011040		#43-2281								
L10037	011320		#44-2354								
L10040	011546		45-2390	45-2397	45-2409	#45-2416					
L10041	011772		46-2451	46-2458	46-2470	#46-2478					
L10042	012216		47-2513	47-2520	47-2532	#47-2540					
L10043	012332		#48-2585								
L10044	012600		49-2607	49-2644	#49-2656						
L10045	012622		50-2672	#50-2677							
L10046	012664		51-2696	#51-2700							
MAINT	= 000017	G	#11-976	35-1866	36-1892	36-1894	36-1901	36-1903	36-1913	36-1915	36-1922
			36-1924	36-1934	36-1944	36-1946	37-1970	38-1995	39-2020	40-2052	40-2078
			41-2106	41-2138	42-2166	42-2198	43-2226	43-2273	44-2306	44-2329	45-2379
			46-2440	47-2502	48-2564	48-2574					

SYMBOL CROSS REFERENCE CREF V02 SEQ 0092

SYMBOL	VALUE		REFERENCES								
MCLR	= 040000	G	#11-963	17-1293	49-2632	49-2633					
MSCLR	005700	G	#17-1290	33-1806	35-1865	36-1936	37-1964	38-1989	39-2014	40-2072	41-2132
			42-2192	43-2267	44-2353	45-2369	45-2401	46-2430	46-2462	47-2492	47-2524
			48-2584	49-2597	49-2655						
MTMODE	002172	G	#12-990	*24-1561	35-1875	36-1937	36-1950	37-1965	38-1990	39-2015	40-2046
			40-2073	41-2100	41-2133	42-2160	42-2193	43-2220	43-2268	44-2298	45-2373
			46-2434	47-2496	49-2625						
NDRTST	004356		#15-1063	46-2446							
NEXT	006240		24-1550	#24-1555	24-1559						
ONEFIL	= 000001		#6-864	6-888	9-943	10-944	21-1470	22-1471	28-1671	29-1672	
O$APTS	= 000000		#6-875	6-901							
O$AU	= 000001		#6-875	#6-899	6-901						
O$BGNR	= 000001		#6-875	#6-899	6-901						
O$BGNS	= 000000		#6-875	6-901							
O$DU	= 000001		#6-875	#6-899	6-901						
O$ERRT	= 000001		#6-875	#6-899	6-901						
O$GNSW	= 000001		#6-875	#6-899	6-901						
O$POIN	= 000001		#6-875	#6-899	#6-899	#6-899	#6-899	#6-899	6-899	6-901	
O$SETU	= 000000		#6-875	6-901	51-2708						
PNT	= 001000	G	#10-954								
PNTD	004702	G	#16-1208	35-1871	36-1953	37-1977	38-2002	39-2027	40-2064	40-2085	41-2122
			41-2145	42-2182	42-2205	43-2254	43-2280	44-2333	44-2338		
PNTRAM	005340	G	#16-1241	34-1838							
PNTREG	005464	G	#16-1251	31-1716	32-1764						
PRI	= 002000	G	#10-954								
PRI00	= 000000	G	#10-954								
PRI01	= 000040	G	#10-954								
PRI02	= 000100	G	#10-954								
PRI03	= 000140	G	#10-954								
PRI04	= 000200	G	#10-954								
PRI05	= 000240	G	#10-954								
PRI06	= 000300	G	#10-954								
PRI07	= 000340	G	#10-954								
RAMI	= 001000	G	#11-960	18-1323							
RAMO	= 002000	G	#11-961	21-1450	21-1460	32-1752	32-1765				
RCBUF	002624	G	#12-997	49-2612	49-2619	49-2631	49-2649	49-2653			
READ	005760	G	16-1219	#19-1362	35-1867	36-1895	36-1904	36-1916	36-1925	36-1947	37-1973
			38-1998	39-2023	40-2061	40-2081	41-2115	41-2141	42-2175	42-2201	43-2236
			43-2276	44-2323	45-2404	45-2411	46-2465	46-2473	47-2527	47-2535	
ROMCLK	005732	G	#18-1321	19-1380	20-1418	33-1793	33-1795	33-1808	34-1831	34-1834	34-1847
RPNT	002220	G	#12-994	44-2297							
RUN	= 100000	G	#11-964	45-2391	46-2452	47-2514	49-2634				
SFPTBL	002156	G	#9-938								
START	006232		24-1543	24-1545	24-1547	#24-1554	24-1557				
STEP	= 000400	G	#11-959	18-1325	18-1326						
STRB	= 000012	G	#11-973								
SVCGBL	= 000000		#6-875	#6-881	6-901	6-901	6-901	6-901	6-901	6-901	6-901
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                                                              D8
CZKMVA     CREATED BY  MACRO  ON 15-MAR-85 AT 16:15      PAGE 9
SYMBOL CROSS REFERENCE                                   CREF   V02
SYMBOL  VALUE              REFERENCES                                                                                        SEQ 0093

                            24-1514   25-1575   26-1587   27-1604   28-1641   50-2672   51-2696   #51-2708  51-2708
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SVCINS  = 000001           #6-875    #6-878    6-901     6-901     6-901     6-901     6-901     6-901     6-901
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SYMBOL VALUE REFERENCES

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                  46-2477  46-2478 47-2512 47-2513 47-2519 47-2520 47-2531 47-2532 47-2539
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T$TSTS  = 000001  #6-875   #30-1676 #32-1733 #35-1856 #40-2033 #45-2366 #46-2427 #47-2489 #48-2549
                  #49-2594
T$$AU   = 010014  #28-1641 28-1652  28-1668
T$$AUT  = 010011  #25-1575 25-1578
T$$CLE  = 010012  #26-1587 26-1590  26-1595
T$$DU   = 010013  #27-1604 27-1615  27-1631
T$$HAR  = 010045  #50-2672 50-2672  50-2677
T$$HW   = 010000  #8-923   8-923    8-927
T$$INI  = 010010  #24-1514 24-1564
T$$MSG  = 010005  #16-1208 16-1232  16-1239 #16-1241 16-1246 16-1249 #16-1251 16-1253 16-1256
                  #16-1258 16-1262  16-1265
T$$PRO  = 010007  #23-1498
T$$RPT  = 010006  #22-1482 22-1484  22-1489
T$$SOF  = 010046  #51-2696 51-2696  51-2700
T$$SUB  = 010037  #30-1683 30-1699 #31-1707 31-1727 #32-1740 32-1776 #33-1784 33-1813 #34-1821
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			43-2281	#44-2292	44-2354						
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T$$TES	= 010044		#30-1676	31-1729	#32-1733	34-1853	#35-1856	39-2030	#40-2033	44-2355	#45-2366
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T1.2	006404		#31-1707								
T2	006464	G	7-911	#32-1733							
T2.1	006464		#32-1740								
T2.2	006600		#33-1784								
T2.3	006724		#34-1821								
T3	007050	G	7-911	#35-1856							
T3.1	007050		#35-1863								
T3.2	007142		#36-1887								
T3.3	007502		#37-1962								
T3.4	007574		#38-1987								
T3.5	007666		#39-2012								
T4	007762	G	7-911	#40-2033							
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T4.2	010156		#41-2095								
T4.3	010370		#42-2155								
T4.4	010602		#43-2215								
T4.5	011042		#44-2292								
T5	011324	G	7-911	#45-2366							
T6	011550	G	7-911	#46-2427							
T7	011774	G	7-911	#47-2489							
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T9	012334	G	7-911	#49-2594							
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WRITE	006034	G	#20-1413	36-1893	36-1902	36-1914	36-1923	36-1935	36-1945	37-1971	38-1996
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			42-2199	43-2227	43-2234	43-2274	44-2307	44-2313	44-2316	45-2380	46-2441
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BGNDU	27-1604									
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BGNHW	8-923									
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BGNRPT	22-1482									
BGNSFT	51-2696									
BGNSUB	30-1683	31-1707	32-1740	33-1784	34-1821	35-1863	36-1887	37-1962	38-1987	39-2012
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DEVTYP	13-1010									
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ENDSW	9-941									
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EQUALS	10-954									
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	42-2182	42-2205	43-2254	43-2280	44-2333	44-2338	45-2389	45-2396	45-2408	45-2415
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	49-2652									
ERRTBL	12-987									
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GPRMA	50-2674									
GPRML	50-2675									
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M8

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