

TM78, TU78

TM78 CTRL/LGC TST
CZTMICO

AH-E643C-MC
FICHE 1 OF 1

AUG 1981
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MADE IN USA



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IDENTIFICATION

PRODUCT CODE: AC-E642C-MC
PRODUCT NAME: CZTMICO TM78 CTRL/LGC TST
MAINTAINER: DIAGNOSTIC ENGINEERING
DATE: FEBRUARY 1, 1981
AUTHOR: G. COOKE

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DIGITAL	PDP	UNIBUS	MASSBUS
DEC	DECUS	DECTAPE	

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.SBTTL HISTORY
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HISTORY

JUNE 1, 1980	INITIAL RELEASE	CZTMIA
OCTOBER 1, 1980	SECOND RELEASE	CZTMIB
FEBRUARY 1, 1981	THIRD RELEASE	CZTMIC

CHANGES TO CZTMIA

1. CHANGED MODULE CALLOUT AFTER FAULT INSERTION INFORMATION WAS AVAILABLE.
2. EXACT ROUTINE PRINTS 2 SETS OF ACTUAL AND EXPECTED MESSAGES
3. CALX9 WAS MULTIPLYING BY WRONG NUMBER
4. TEST 17 WAS NOT READING ALL CAS
5. CHANGE DXTUID FROM KKTMAA TO KKTMA8 SO WE USE NEW MICRO DIAGNOSTIC PAK FILE.

CHANGES TO CZTMIB

1. CHANGED DXTUID: FROM KKTMA8 TO KKTMAC TO CALL NEW MICRO-DIAGNOSTIC PAK FILE.
2. INCREASED MES OVERFLOW ERROR.

SAGE BUFFER SIZE TO 5000. TO PREVENT

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1.2.2 SOFTWARE REQUIREMENTS

TM78 CONTROL LOGIC TEST PROGRAM
MICRO DIAGNOSTIC FILE /

1.3 RELATED DOCUMENTS AND STANDARDS

1.4 DIAGNOSTIC HIERARCHY PREREQUISITES

1.5 ASSUMPTIONS

THIS DIAGNOSTIC ASSUMES THAT ALL HARDWARE OTHER THAN THE TM78/TU78 ARE OPERATIONAL. THIS ALSO INCLUDES THE RH11/RH70 AS THE BASIC TESTS PERFORMED ON THE RH11/RH70 THAT ARE UNSUCCESSFUL DEDUCE THAT THE SUBSYSTEM UNDER TEST IS RESPONSIBLE FOR THE FAILURE, NOT THE RH11/RH70.

2.0 OPERATING INSTRUCTIONS

2.1 HARDWARE QUESTIONS

THE FOLLOWING SERIES OF QUESTIONS COMPRISE THE PARAMETERS NECESSARY TO IDENTIFY EACH TU78 TO BE TESTED.

2.1.1 RH ADDRESS

THIS PARAMETER DEFINES THE BASE UNIBUS ADDRESS OF THE MASSBUS CONTROLLER FOR THE TU78 TO BE TESTED.

2.1.2 RH VECTOR ADDRESS

THIS PARAMETER DEFINES THE INTERRUPT VECTOR ADDRESS FOR THE RH SPECIFIED BY RH ADDRESS. THE LOCATION SPECIFIED WILL BE LOADED WITH THE INTERRUPT SERVICE ROUTINE ADDRESS AND THE VALUE SPECIFIED PLUS TWO WILL BE LOADED WITH THE INTERRUPT SERVICE ROUTINE PSW.

2.1.3 TM78

THIS PARAMETER DEFINES THE MASSBUS DRIVE NUMBER (0-7) ASSIGNED TO THE TM78 UNDER TEST.

2.1.4 TU78

THIS PARAMETER DEFINES THE NUMBER (0-3) OF THE TU78 UNDER TEST.

2.1.5 TM78 PORT

THIS PARAMETER DEFINES THE PORT (0-1) ON THE TM78 THAT THE MASSBUS IS CONNECTED TO.

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2.1.6 RH TYPE

THIS PARAMETER DEFINES THE RH TYPE (RH11 OR RH70) ON THE SYSTEM AND DETERMINES WHETHER SILO TESTS (RH11 ONLY) WILL BE RUN.

2.2 SOFTWARE QUESTIONS

THE FOLLOWING SERIES OF QUESTIONS ARE INTENDED TO PROVIDE A MECHANISM OF ALTERING THE NORMAL OPERATION OF THE PROGRAM. THEY ARE ONLY USED BY TEST 40.

2.2.1 SKIP MTA MICRO-DIAGNOSTICS

ANSWERING YES TO THIS QUESTION WILL INHIBIT THE RUNNING OF ALL MICRO-DIAGNOSTICS THAT REQUIRE A TU78 TO BE ATTACHED. THIS IS NECESSARY FOR FORMATTER (TM78) ONLY TESTING. ANSWERING NO WILL RUN ALL MICRO-DIAGNOSTICS AND REQUIRE A TU78 TO BE ATTACHED.

2.2.2 MICRO-DIAGNOSTIC RELIABILITY MODE

THIS PARAMETER CONTROLS WHETHER THE MICRO DIAGNOSTICS WILL BE EXECUTED 1 TIME OR 11 TIMES:

N = 1 TIME
Y = 11 TIMES

2.2.3 MANUAL MICRO-DIAGNOSTIC SELECTION

THIS PARAMETER CONTROLS WHETHER THE MICRO DIAGNOSTICS WILL BE RUN AS A SCRIPT OR ALLOW THE OPERATOR TO SELECT THE MICRO DIAGNOSTICS INDIVIDUALLY.

NOTE: IF THIS OPTION IS SELECTED, THE FLAG SWITCH UAM CANNOT BE SET OR AN ERROR WILL BE PRINTED AND THE TEST ABORTED.

2.2.4 INDIVIDUAL MICRO-DIAGNOSTIC RUN/SKIP

THIS PARAMETER ALLOWS THE USER TO DECIDE ON A MICRO-DIAGNOSTIC MODULE BASIS, IF IT SHOULD BE EXECUTED OR NOT.

N = RUN NORMAL MICRO DIAGNOSTIC SCRIPT

Y = RUN NORMAL MICRO DIAGNOSTIC SCRIPT, BUT ALLOW USER TO ANSWER YES OR NO TO SKIPPING ANY TEST DESIRED.

NOTES: IF THE MANUAL MICRO-DIAGNOSTIC SELECTION OPTION IS SELECTED, THIS OPTION HAS NO EFFECT.

IF THE FLAG SWITCH UAM (UNATTENDED MODE) IS SET, THIS
OPTION WILL BE IGNORED AND THE NORMAL MICRO-DIAGNOSTIC
SCRIPT WILL RUN.

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2.3 AUTO DROP MODE

USING THE DRS COMMAND "/FLAG:ADR" WILL CAUSE THE AUTODROP
FEATURE TO BE ENABLED. WHEN THIS OCCURS ALL DEVICES TO BE
TESTED WILL BE VERIFIED FOR PROPER RESPONSE BEFORE EXECUTING
HARDWARE TEST NO. 1. IF A DEVICE DOES NOT RESPOND IT WILL
BE DROPPED FROM THE TESTING LIST. CAUTION MUST BE EXERSIZED
WHEN USING THIS FEATURE TO AVOID DROPPING A DEVICE, OR
ATTEMPTING TO TEST A NON EXISTENT DEVICE BECAUSE OF A
HARDWARE MALFUNCTION.

2.4 MANUAL INTERVENTION TESTS

IF THE USER HAS NOT STARTED THE DIAGNOSTIC WITH
THE FLAG "/FLAG:UAM" (UNATTENDED MODE), THE
MANUAL INTERVENTION TESTS WILL BE PERFORMED.
IN ORDER FOR THIS TO BE SUCCESSFUL A TU78 MAGNETIC
TAPE DRIVE MUST BE INSTALLED AND A SCRATCH TAPE
MUST BE LOADED AND WRITE ENABLED. THESE TESTS WILL
VERIFY THE CORRECT OPERATION OF THE TU78 PANEL SWITCHES
AND BASIC TAPE MOTION. OPERATOR INPUT IS REQUIRED
DURING EXECUTION OF THESE TESTS. THESE TESTS CAN
ALSO BE AVOIDED BY SETTING THE SOFTWARE SWITCH
MENTIONED AT 2.2.1 .

3.0 ERROR INFORMATION

THIS PROGRAM HAS TWO TYPES OF ERROR CLASSIFICATIONS, SYSTEM FATAL
AND DEVICE FATAL.

3.1 SYSTEM FATAL ERRORS

SYSTEM FATAL ERRORS ARE USED TO INDICATE THAT AN ERROR WAS
DETECTED IN RELATION TO LOADING/CONTROLLING THE MICRO DIAGNOSTIC
PROCESS. WHEN A SYSTEM FATAL ERROR IS DETECTED THE TEST IN PROGRESS
IS ABORTED AND THE NEXT TEST (IF ANY) IS EXECUTED.

THE FORMAT OF A SYSTEM FATAL ERROR IS AS FOLLOWS AND IS PRINTED
ON THE SYSTEM CONSOLE DEVICE UNLESS A LINE PRINTER IS BEING
UTILIZED. THE CONTENT OF EACH ERROR IS SUCH THAT IT SHOULD BE
SELF EXPLANATORY. HOWEVER, THE MESSAGES UTILIZE SOME TERMS THAT
ARE SPECIFIC TO THE TM78.

3.2 DEVICE FATAL ERRORS

4.0 PERFORMANCE AND PROGRESS REPORTS

NONE

5.0 DEVICE INFORMATION TABLES

RH11/RH70 ADDRESS SUMMARY

UNIBUS ADDRESS	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
BASE +0	SC ! TRE!MCPE! 0 ! DVA!PSEL! A17! A16! RDY! IE ! DT. FUNCTION CODE ! GO															
2	WORD COUNT															
4	BUS ADDRESS															
6	BYTE COUNT															
10	DLT! WCE! PE ! NED! NEM! PGE! MXF!MDPE! OR ! IR ! CLR! PAT! BAI! UNIT															
12	DT. FAILURE CODE ! 0 ! DPR! 0 ! DT. INTERRUPT CODE															
14	SER! FORMAT ! SKIP COUNT ! RECORD COUNT ! CMD ADR															
16	0 ! ATTENTION BIT															
20	RDY!PRES! ONL! REW! PE ! BOT! EOT! FPT!AVIL! SHR!MANT! DSE! 0															
22	DATA BUFFER															
24	PRNT FLGS! ERROR MSG NR ! DIAG TEST NR															
26	NSA! TAP! 0 !2/MB! 0 ! WCS! DRIVE TYPE (101)															
30	BCD SN 3 ! BCD SN 2 ! BCD SN 1 ! BCD SN 0															
32	AUX PRINT NR ! DATA PATTERN NR !LOOP! QV ! 0 !COMP! DIAG REQ															
34	EXPECTED DIAG DATA ! ACTUAL DIAG DATA															
36	NDT FAILURE CODE !ATTN ADR ! 0 ! NDT INTERRUPT CODE															
40	COMMAND COUNT 0 ! 0 ! NDT FUNCTION CODE 0 ! GO															
42	COMMAND COUNT 1 ! 0 ! NDT FUNCTION CODE 1 ! GO															
44	COMMAND COUNT 2 ! 0 ! NDT FUNCTION CODE 2 ! GO															
46	COMMAND COUNT 3 ! 0 ! NDT FUNCTION CODE 3 ! GO															
50	INTERNAL ADDRESS															
52	TM ! TM ! MC ! ILR! CPE! EV ! HLDA!HOLD! INTERNAL DATA RDY! CLR! PE !															
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- 1 COMMON ADDRESS SPACE (CAS)
- 2 TM78 HARDWARE CONTROL REGISTERS
- 3 RH11/RH70 REGISTERS

* = DIAGNOSTIC USE ONLY
** - SEE PDP-11 PERIPHERALS HANDBOOK

TM78 REGISTER CROSS REFERENCE CHART

UNIBUS ADDRESS	MASSBUS ADDRESS	8085 ADDRESS	LOCATION
BASE + 0	0	200-201	RH & CAS
2	***	***	RH ONLY
4	***	***	RH ONLY
6	5	212-213	CAS
10	***	***	RH ONLY
12	1	202-203	CAS
14	2	204-205	CAS
16	4	210-211	TM78 F/F
20	7	216-217	CAS
22	***	***	RH ONLY
24	3	206-207	CAS DIAG REG
26	6	214-215	CAS
30	10	220-221	CAS
32	11	222-223	CAS DIAG REG
34	12	224-225	CAS DIAG REG
36	13	226-227	CAS
40	14	230-231	CAS
42	15	232-233	CAS
44	16	234-235	CAS
46	17	236-237	CAS

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50	20	***	TM78 HDWR REG
52	22	***	TM78 HDWR REG

*** = NON EXISTENT REGISTER
DEFAULT BASE = 172400
CAS = COMMON ADDRESS SPACE
RH = RH11 OR RH70

TM78 RH11/70 BIT DEFINITION TABLE

RH CS1 BIT DEFINITIONS

UNIBUS ADDRESS	BIT PLACE	ABRIEV	NAME	LOCATION
BASE+0	100000	SC	SPECIAL CONDITION	RH
0	40000	TRE	TRANSFER ERROR	RH & CAS
0	20000	MCPE	MASSBUS CBUS PAR ERR	RH
0	4000	DVA	DRIVE AVAILABLE	RH & CAS
0	2000	PSEL	UNIBUS PORT SELECT	RH
0	1000	A17	UNIBUS ADDRESS BIT 17	RH
0	400	A16	UNIBUS ADDRESS BIT 16	RH
0	200	RDY	RH READY	RH
0	100	IE	INTERUPT ENABLE	RH
0	1	GO	DATA XFER GO BIT	RH & CAS

RH CS2 REGISTER BITS

10	100000	DLT	DATA LATE	RH
10	40000	WCE	WRITE CHECK ERROR	RH
10	20000	UPE	UNIBUS PARITY ERRGR	RH
10	10000	NED	NON EXISTENT DRIVE	RH
10	4000	NEM	NON EXISTENT MEMORY	RH
10	2000	PGE	PROGRAM ERROR	RH
10	1000	MXF	MISSED TRANSFER	RH

469	10	400	MDPE	MASSBUS DATA BUS PAR ERR	RH
470	10	200	OR	OUTPUT READY	RH
471	10	100	IR	INPUT READY	RH
472	10	40	CLR	CONTROLLER CLEAR	RH
473	10	20	PAT	PARITY TEST	RH
474	10	10	BAI	BUS ADDRESS INCREMENT INHIBIT	RH

TU78 DRIVE STATUS REGISTER BITS

481	20	100000	RDY	TU78 READY BIT	CAS
482	20	40000	PRES	TU78 PRESENT BIT	CAS
483	20	20000	ONL	TU78 ONLINE	CAS
484	20	10000	REW	TU78 REWINDING	CAS
485	20	4000	PE	1600 BPI MODE SET	CAS
486	20	2000	BOT	TU78 AT BEGINNING OF TAPE	CAS
487	20	1000	EOT	TU78 AT END-OF-TAPE	CAS
488	20	400	FPT	FILE PROTECTED	CAS
489	20	200	AVAIL	AVAILABLE TO MASSBUS	CAS
490	20	100	SHR	SHARED	CAS
491	20	40	MAINT	MAINTENANCE MODE	CAS
492	20	20	DSE	SECURITY ERASE IN PROGRESS	CAS

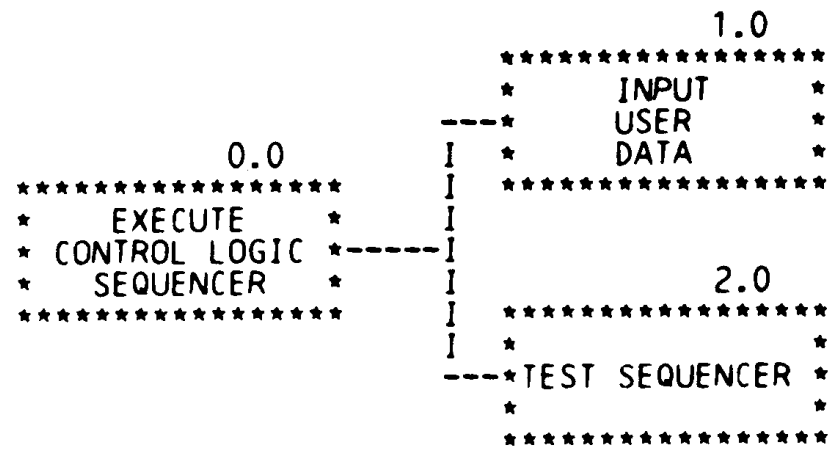
TM78 HARDWARE CONTROL REGISTER BITS

493	52	100000	TM RDY	TM78 READY	TM78
494	52	40000	TM CLR	TM78 CLEAR BIT	TM78
495	52	2000	MCPE	TM78 ROM PARITY ERROR	TM78
496	52	1000	ILR	ILLEGAL REGISTER ACCESSED	TM78
497	52	4000	CPE	MASSBUS CBUS PAR ERROR	TM78
498	52	2000	EV PAR	EVEN PARITY	TM78
499	52	1000	HLDA	HOLD ACKNOWLEDGED	TM78

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                                     2.1.2.1
*****
*   STOP THE   *
---* TM78 MICRO- *
I  *   PROCESSOR   *
I  *****
I
                                     2.1.2.2
*****
I  *   WRITE A   *
I--* PROGRAM TO  *
I  * TM78 MP WCS *
I  *****
I
                                     2.1.2.3
*****
I  * VERIFY TM78 *
I--* MP WCS      *
I  * WITH WRITTEN *
I  *****
I
                                     2.1.2.4
*****
I  * START TM78  *
I--* MP DIAGNOSTIC *
I  * MONITOR     *
I  *****
I
                                     2.1.2.5
*****
I  * PACK TM78 MP *
I--* LOAD MODULE *
I  * FROM LOAD MEDIA *
I  *****
I
                                     2.1.2.5.1
*****
*   READ   *
---* A     *
I  * CHARACTER *
I  *****
I
                                     2.1.2.6
*****
I  * LOAD THE   *
I--* MESSAGE   *
I  * MODULE    *
I  *****
I
                                     2.1.2.7
*****
I  *DIAGNOSTIC MON.*
---* SYSTEM ERROR *
I  * REPORTING  *
I  *****

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866
867 002000          POINTER BGNSW,BGNSFT,BGNAU,BGNDU
868
876
877          .NLIST BEX
878 002000          HEADER CZTMIC,0,0,1800.,0
879 002122          DEVTYP <TU78>
880 002130          DESCRIPT <TEST TM78 CONTROLLER LOGIC>
881
887          .SBTTL DISPATCH TABLE
888
889          :++
890          : THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST.
891          : IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
892          :--
893
894 002164          DISPATCH          40
895
896          .SBTTL DEFAULT HARDWARE P-TABLE
897
898          :++
899          : THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
900          : THE TEST-DEVICE PARAMETERS. THE STRUCTURE OF THIS TABLE
901          : IS IDENTICAL TO THE STRUCTURE OF THE RUN-TIME P-TABLE.
902          :--
903
904          BGNHW      DFPTBL
905          .WORD      172400          ;RH ADDRESS DEFAULT VALUE
906          .WORD      0              ;TM78 NUMBER DEFAULT VAULE
907          .WORD      0              ;TU78 NUMBER DEFAULT VALUE
908          .WORD      0              ;TM78 PORT NUMBER
909          .WORD      224            ;RH VECTOR ADDRESS DEFAULT VALUE
910          .WORD      70            ;RH TYPE (RH70)
911          ENDPHW
912
913          .SBTTL SOFTWARE P-TABLE
914
915          :++
916          : THE SOFTWARE P-TABLE CONTAINS THE VALUES OF THE PROGRAM
917          : PARAMETERS THAT CAN BE CHANGED BY THE OPERATOR.
918          :--
919
920          BGNHW      SFPTBL
921          .WORD      0              ;SKIP MTA TESTING FLAG DEVAULT = NO
922          .WORD      0              ;TM78 RELIABILITY FLAG DEFAULT = NO
923          .WORD      0              ;MANUAL TEST SELECTION FLAG DEFAULT = NO
924          .WORD      0              ;INDIV. MICRO MODULE RUN/SKIP FLAG DEFAULT - NO
925          .WORD      0
926          ENDSW
927
928          :++
929          : THE REPORT CODING SECTION CONTAINS THE
930          : 'PRINTS' CALLS THAT GENERATE STATISTICAL REPORTS.
931          :--
932
933          BGNRPT
934
935          .EXIT      RPT
936
937          ENDRPT
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957      .SBTTL  INITIALIZE SECTION
958
959      :++
960      : THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
961      : AT THE BEGINNING OF EACH PASS.
962      :--
963
964      002344      BGNINIT
965      002344      SETPRI  #PRI07
966      002352      READEF  #E'.CONT      ;IS THIS A CONTINUE?
967      002360      BCOMPLETE 2$          ;NO-CHECK FOR NEW PASS
968      002362      READEF  #EF.NEW
969      002370      BCOMPLETE 1$
970      002372      005237 004326      3$:  INC  UNINUM      ;UPDATE UNIT UNDER TEST
971      002376      023737 004326 002012  CMP  UNINUM,L$UNIT ;REACHED LIMIT?
972      002404      001002      BNE  2$          ;NO-DO THIS UNIT
973
974      002406      005037 004326      1$:  CLR  UNINUM
975      002412      2$:  GPHARD UNINUM,HARDPT
976      002424      BNCOMPLETE 3$
977      002426      013701 004324      MOV  HARDPT,R1      ;GET THE POINTER IN R1
978      002432      016102 000000      MOV  0(R1),R2      ;GET THE RH ADDRESS
979      002436      012703 004230      MOV  #XFRCMD,R3    ;GET THE START OF TABLE
980
981      002442      010223      INTO:  MOV  R2,(R3)+      ;STORE THE RH POINTER
982      002444      005202      INC  R2          ;INTO THE RH ADDRESS TABLE
983      002446      005202      INC  R2
984      002450      020327 004324      CMP  R3,#NON72+2  ;FINISHED?
985      002454      001372      BNE  INTO        ;NO - CONTINUE
986
987      002456      016137 000002 004352  MOV  2(R1),MBDRIV ;GET THE TM78 NUMBER
988      002464      012703 000001      MOV  #1,R3        ;LOAD THE BINARY UNIT VALUE
989      002470      016102 000004      MOV  4(R1),R2    ;GET THE TU78 NUMBER
990      002474      010237 004356      MOV  R2,TMUNIT   ;SAVE THE TU78 NUMBER
991      002500      001403      1$:  BEQ  2$          ;IF USER ENTERED 0 THEN EXIT
992      002502      006303      ASL  R3          ;SHIFT THE BINARY UNIT NUMBER
993      002504      005302      DEC  R2          ;DECREMENT THE TU78 NUMBER
994      002506      001374      BNE  1$          ;LOOP UNTIL 0
995      002510      010337 004354      2$:  MOV  R3,BINUNT   ;STORE THE BINARY UNIT NUMBER
996      002514      016137 000006 004360  MOV  6(R1),TMPORT ;GET THE TM78 PORT NUMBER
997      002522      016137 000010 004362  MOV  10(R1),RHVEC ;GET THE RH VECTOR ADDRESS
998      002530      016137 000012 004416  MOV  12(R1),RHTYP ;GET THE RHTYPE
999      002536      CLRVEC  RHVEC
1000     002544      005037 004412      CLR  CASLD      ;CLEAR THE CAS PROGRAM LOADED FLAG
1001     002550      BRESET
1002     002552      EXIT  INIT      ;ISSUE A BUS RESET
1003
1004     002556      ENDINIT
1005
1006     002560      BGNPROT
1007     002560      000000      .WORD 0          ;CSR OFFSET
1008     002562      000002      .WORD 2          ;TM #
1009     002564      000004      .WORD 4          ;TU #
1010     002566      ENDPROT
1011
1012      ;          AUTO DROP CODE

```

```
1013
1014
1015
1016
1017
1018
1019
1020
1021      000004      NXMLOC = 4      ;NXM VECTOR LOCATION
1022      000011      SENS GO = 11    ;NDT SENSE+GO COMMAND
1023      000001      SENS DN = 01    ;DONE INTERRUPT CODE
1024      040000      PRES = 40000   ;TU78 PRESENT FLAG IN TUSTAT REGISTER
1025
1026 002566      BGN AUTO
1027
1028 002566 005037 003450      CLR      NXMFLG      ;CLEAR NXM TRAPPED FLAG
1029 002572      SETVEC   #NXMLOC,#NXMTRP,#PRI07 ;SET UP NXM TRAP VECTOR
1030 002620 013701 004230      MOV      XFRCMD,R1  ;GET RH11/70 ADDRESS
1031 002624 005711      *ST      (R1)      ;ACCESS RH11/70 CS1 REGISTER
1032 002626      CLRVEC   #NXMLOC      ;RELEASE NXM VECTOR LOCATION
1033 002634 005737 003450      TST      NXMFLG    ;DID WE TRAP ?
1034 002640 001412      BEQ      1$        ;NO , CHECK TM78 #
1035 002642      PRINTF  #AU,RH,R1 ;TELL OPERATOR RH TIME OUT
1036 002664 000533      BR       DROPIT    ;DROP UNIT
1037
1038      ; NOW CHECK THE TM78# FOR 'NED'
1039
1040 002666 013702 004240      1$: MOV      CS2,R2      ;GET CS2 ADDRESS
1041 002672 013712 004352      MOV      MBDRIV,(R2) ;SET UNIT #
1042 002676 052711 040000      BIS      #TRE,(R1)   ;SET UNIT CLEAR
1043 002702 005011      CLR      (R1)      ;CLEAR 'TRE' BIT
1044 002704 032712 010000      BIT      #NED,(R2)  ;NON EXISTENT DRIVE ?
1045 002710 001413      BEQ      2$        ;NO , CHECK TU78
1046 002712      PRINTF  #AU,TM,MBDRIV ;TELL OPERATOR TM78 NED
1047 002736 000506      BR       DROPIT    ;DROP UNIT
1048
1049      ; NOW CHECK FOR TU78 AVAILABILITY BY ISSUING A SENSE COMMAND
1050
1051 002740 005077 001322      2$: CLR      @MOINT    ;CLEAR INTERRUPT CODE
1052 002744 013702 004356      MOV      TMUNIT,R2  ;GET TU78 #
1053 002750 006302      ASL      R2        ;MAKE OFFSET FOR COMMAND REG.
1054 002752 012772 000011 004270      MOV      #SENSGO,@MO0(R2) ;ISSUE SENSE COMMAND
1055 002760 012704 000100      MOV      #100,R4   ;SET UP TIMEOUT TIMER
1056 002764 005777 001256      3$: TST      @AS      ;COMMAND DONE ?
1057 002770 001030      BNE      4$        ;YES , PROCESS INT CODE
1058 002772      DELAY   250      ;DELAY FOR COMMAND TO FINISH
1059 003022      BREAK   ;CHECK FOR OPER PANIC 'AC'
1060 003024 005304      DEC      R4        ;DECREMENT TIMER
1061 003026 001356      BNE      3$        ;LOOP UNTIL TIMER EXPIRES
1062 003030      PRINTF  #AU,TO    ;TELL OPERATOR ATTENTION TIME OUT
1063 003050 000441      BR       DROPIT    ;TIME OUT DROP UNIT
1064 003052 117703 001210      4$: MOV      @MOINT,R3 ;GET INTERRUPT CODE
1065 003056 122703 000001      CMPB    #SENSDN,R3 ;SENSE DONE CODE ?
1066 003062 001412      BEQ      5$        ;YES , CHECK FOR PRESENT
1067 003064      PRINTF  #AU,TU,TMUNIT ;TELL OPERATOR TU78 NOT AVAILABLE
1068 003110 017703 001134      5$: MOV      @TUSTAT,R3 ;GET STATUS OF TU78
```


TM78 CONTROLLER LOGIC TEST
ZTMIC1.P11 24-FEB-81 12:22

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INITIALIZE SECTION PAGE 1-19

SEQ 0020

```
1069 003114 053777 004354 001124      BIS      BINUNT,@AS      ;RELEASE ATTENTION
1070 003122 032703 040000      BIT      #PRES,R3      ;DRIVE PRESENT ?
1071 003126 001027      BNE      EXAUTO      ;YES , EXIT AUTODROP CODE
1072 003130      PRINTF  #AU.TU, TMUNIT ;WRONG TU78 #
1073
1074 003154      DROPIT: DODU      UNINUM      ;DROP UNIT UNINUM
1075 003162      PRINTF  #AU.DRP, UNINUM ;DROP UNIT MESSAGE
1076 003206      EXAUTO: ENDAUTO      ;END OF AUTO DROP CODE
1077
1078 003210 047045 040445 052101 AU.TO:  .ASCIZ/%N%AATTENTION TIME OUT FOR TM78 # %02/
1079      .EVEN
1080 003256 047045 040445 047516 AU.RH:  .ASCIZ/%N%ANON EXISTENT RH ADDRESS %06/
1081      .EVEN
1082 003316 047045 040445 047516 AU.TM:  .ASCIZ/%N%ANON EXISTENT TM78 # %02/
1083      .EVEN
1084 003352 047045 040445 047516 AU.TU:  .ASCIZ/%N%ANON EXISTENT TU78 # %02/
1085      .EVEN
1086 003406 047045 040445 051104 AU.DRP: .ASCIZ/%N%ADROPPING LOGICAL UNIT # %02%N/
1087      .EVEN
1088
1089      ; NXM FLAG FOR AUTO DROP CODE
1090
1091 003450 000000      NXMFLG: .WORD 0      ;NXM FLAG
1092
1093      ; NON EXISTENT DEVICE TRAP DURING AUTO DROP CODE
1094
1095 003452      BGNSRV  NXMTRP
1096
1097 003452 005237 003450      INC      NXMFLG
1098
1099 003456      ENDSRV
1100
1101
1102
1103      .SBTTL  CLEANUP CODING SECTION
1104
1105      :++
1106      : THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
1107      : AT THE END OF EACH PASS.
1108      :--
1109
1110 003460      BGNCLN
1111 003460 012777 000040 000552      MOV      #MBINIT,@CS2 ;ISSUE A MASSBUS INIT.
1112 003466      DELAY  100      ;WAIT FOR IT TO FINISH
1113 003516      EXIT    CLN
1114
1115
1116
1117
1118
1119
1120
1121
1122
1123
1124
1125
1126
1127
1128 003522      ENDCLN
1129
1130      :++
1131      : THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
1132      : TO NO LONGER BE TESTED.
1133      :--
1134
1135
1136
1137
1138
1139 003524      BGN DU
1140 003524      EXIT    DU
1141 003530      ENDDU
```

```
1148
1149
1150
1151
1152
1153 003532
1159 003532
1166 003536
1167
1168
1169
1170
1171
1172
1173
1174
1175 003540
1176 003542
1177 003552
1178 003560
1179 003572
1180 003604
1181 003616
1182 003630
1183 003630 044122 040440 042104
1184 003643      124 033515 020070
1185 003652 052524 034067 021440
1186 003661      124 033515 020070
1187 003675      123 044513 020120
1188 003750 044515 051103 026517
1189 004012 044122 053040 041505
1190 004034 040515 052516 046101
1191 004076 047111 044504 044526
1192 004135      057
1193 004136 045523 050111      000
1194 004143      122 033510 037460
1195
1196
1197
1198
1199
1200
1201
1202
1203
1204
1205
1206
1207 004164
1214 004166
1215 004174
1216 004202
1217 004210
1224 004216

:++
: THE ADD-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
: TO BE (A) TESTED FOR THE FIRST TIME, OR (B) RESUMED IN TESTING. IF
: 'EF.AUNIT' IS SET, THE UNIT WILL BE TESTED AS A NEW UNIT.
:--
      BGNUA
      EXIT  AU
      ENDAU

:++
: 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.
:--
      BGNHRD
      GPRMA  MSG1,0,0,0,177777,YES
      GPRML  MSG10,12,100000,YES
      GPRMD  MSG7,10,0,777,0,777,YES
      GPRMD  MSG2,2,0,7,0,7,YES
      GPRMD  MSG3,4,0,3,0,3,YES
      GPRMD  MSG4,6,0,1,0,1,YES
      ENDHRD
      MSG1:  .ASCIZ  /RH ADDRESS/
      MSG2:  .ASCIZ  /TM78 #/
      MSG3:  .ASCIZ  /TU78 #/
      MSG4:  .ASCIZ  /TM78 PORT #/
      MSG5:  .ASCIZ  /SKIP MTA MICRODIAGNOSTICS (NO TU ATTACHED)/
      MSG6:  .ASCIZ  /MICRO-DIAGNOSTIC RELIABILITY MODE/
      MSG7:  .ASCIZ  /RH VECTOR ADDRESS/
      MSG8:  .ASCIZ  /MANUAL MICRO-DIAGNOSTIC SELECTION/
      MSG9:  .ASCII  /INDIV DUAL MICRO-DIAGNOSTIC RUN/
      .BYTE  57
      .ASCIZ  /SKIP/
      MSG10: .ASCIZ  /RH70? (NO-RH11)/
      .EVEN

      .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
      GPRML  MSG5,0,1,YES
      GPRML  MSG6,2,1,YES
      GPRML  MSG8,4,1,YES
      GPRML  MSG9,6,1,YES
      ENDSFT
```

1225
1226
1227
1228
1229
1230

004216

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

EQUALS

:
: BIT DIFINITIONS

(1) 100000
(1) 040000
(1) 020000
(1) 010000
(1) 004000
(1) 002000
(1) 001000
(1) 000400
(1) 000200
(1) 000100
(1) 000040
(1) 000020
(1) 000010
(1) 000004
(1) 000002
(1) 000001

BIT15== 100000
BIT14== 40000
BIT13== 20000
BIT12== 10000
BIT11== 4000
BIT10== 2000
BIT09== 1000
BIT08== 400
BIT07== 200
BIT06== 100
BIT05== 40
BIT04== 20
BIT03== 10
BIT02== 4
BIT01== 2
BIT00== 1

(1) 001000
(1) 000400
(1) 000200
(1) 000100
(1) 000040
(1) 000020
(1) 000010
(1) 000004
(1) 000002
(1) 000001

BIT9== BIT09
BIT8== BIT08
BIT7== BIT07
BIT6== BIT06
BIT5== BIT05
BIT4== BIT04
BIT3== BIT03
BIT2== BIT02
BIT1== BIT01
BIT0== BIT00

:
: EVENT FLAG DEFINITIONS
: EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION

(1) 000040
(1) 000037
(1) 000036
(1) 000035
(1) 000034

EF.START== 32. ; START COMMAND WAS ISSUED
EF.RESTART== 31. ; RESTART COMMAND WAS ISSUED
EF.CONTINUE== 30. ; CONTINUE COMMAND WAS ISSUED
EF.NEW== 29. ; A NEW PASS HAS BEEN STARTED
EF.PWR== 28. ; A POWER-FAIL/POWER-UP OCCURRED

:
: PRIORITY LEVEL DEFINITIONS

(1) 000340
(1) 000300
(1) 000240
(1) 000200
(1) 000140
(1) 000100
(1) 000040

PRI07== 340
PRI06== 300
PRI05== 240
PRI04== 200
PRI03== 140
PRI02== 100
PRI01== 40

```
(1)          000000          PRI00== 0
(1)
(1)          ;OPERATOR FLAG BITS
(1)
(1)          000004          EVL==      4
(1)          000010          LOT==     10
(1)          000020          ADR==     20
(1)          000040          IDU==     40
(1)          000100          ISR==    100
(1)          000200          UAM==    200
(1)          000400          BOE==    400
(1)          001000          PNT==   1000
(1)          002000          PRI==   2000
(1)          004000          IXE==   4000
(1)          010000          IBE==  10000
(1)          020000          IER==  20000
(1)          040000          LOE==  40000
(1)          100000          HOE== 100000

1231
1232          .DSABL  REG
1233          ;
1234          ;REGISTER DEFINITIONS
1235          000000          R0=%0          ;REGISTER 0 DEFINITION
1236          000001          R1=%1          ;REGISTER 1 DEFINITION
1237          000002          R2=%2          ;REGISTER 2 DEFINITION
1238          000003          R3=%3          ;REGISTER 3 DEFINITION
1239          000004          R4=%4          ;REGISTER 4 DEFINITION
1240          000005          R5=%5          ;REGISTER 5 DEFINITION
1241          000005          ERRCOD=%5      ;ERROR CODE
1242          000006          SP=%6          ;STACK POINTER
1243          000007          PC=%7          ;PROGRAM COUNTER
1244
1245          004216          000000          ROMIDT: .WORD 0          ;ROM IDENTIFICATION INFORMATION STORAGE
1246          004220          000000          .WORD 0
1247          004222          000000          .WORD 0
1248          004224          000000          .WORD 0
1249
1250          004226          000000          ERRLP: .WORD 0          ;ROM ERROR LOOP FLAG
1251
1252          ;MASS BUS COMMAND BYTES
1253          000037          DIGMON=000037      ;BEGIN DIAGNOSTIC MONITOR
1254          000035          TSTART=000035     ;BEGIN TM78 MP TEST
1255          000031          CONERR=000031     ;CONTINUE ON ERROR
1256          000033          LOPERR=000033     ;LOOP ON ERROR
1257
1258          ;TM78 REGISTER 21 COMMAND/STATUS BITS
1259          010000          NED=010000        ;NON EXISTENT DRIVE
1260          004000          CPE=004000        ;CONTROL BUS PARITY ERROR
1261          002000          EVPAR=002000     ;FORCE PARITY ERROR FROM TM78
1262          010000          ILR=010000        ;ILLEGAL REGISTER STATUS BIT
1263          020000          MCPE=020000     ;CONTROL BUS PARITY ERROR
1264          000400          HOLD=000400      ;HOLD COMMAND BIT
1265          001000          HLDA=001000     ;HOLD STATUS BIT
1266          040000          TMCLR=040000     ;TM CLEAR COMMAND BIT
1267          100000          TMRDY=100000     ;TM READY STATUS BIT
1268
```

```
1269      ;TM78 STATUS MASKS
1270      035400      CLRSTA=035400      ;STATUS ERROR ON CLEAR COMMAND
1271      034000      HLDSTA=034000      ;STATUS ERROR ON HOLD COMMAND
1272
1273      ;MASS BUS COMMAND/STATUS BITS
1274      000020      PAT=000020      ;RH PARITY TEST BIT
1275      000040      MBINIT=000040      ;MASS BUS INITIALIZE
1276      040000      TRE=040000      ;TRANSFER ERROR
1277
1278      ;TM78 INTERNAL ADDRESSES
1279      100340      MBSEL=100340      ;TM78 PORT SELECT ADDRESS
1280      100240      TMRDST=100240      ;ADDRESS OF TM READY CONTROL WORD
1281
1282      ;TM78 INTERNAL COMMAND BITS
1283      000100      STMRDY=000100      ;SET TM READY
1284
1285      ;CAS.A78 MEMORY ADDRESS EQUATES
1286      041420      CASCMD=041420      ;CAS READ/WRITE COMMAND ADDRESS X'4300'
1287      042000      CASBUF=042000      ;CAS READ BUFFER ADDRESS X'4210'
1288      042040      CASDAL=042040      ;CAS WRITE DATA BYTE LOW X'4320'
1289      042041      CASDAH=042041      ;CAS WRITE DATA BYTE HIGH X'4321'
1290
1291      000015      CR=000015      ;CARRIAGE RETURN
1292      000012      LF=000012      ;LINE FEED
1293      000011      TAB=000011      ;TAB CHARACTER
1294      000040      SPACE=000040      ;SPACE CHARACTER
1302      .SBTTL GLOBAL DATA SECTION
1303
1304      ;++
1305      ; THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
1306      ; IN MORE THAN ONE TEST.
1307      ;--
1308
1309      ;
1310      004230      000000      XFRCMD: 0      ;MASS BUS/TM78 DATA TRANSFER WORD
1311      004232      000000      WC: 0      ;MASS BUS WORD COUNT
1312      004234      000000      BA: 0      ;TRANSFER MEMORY ADDRESS
1313      004236      000000      FC: 0      ;FRAME COUNT
1314      004240      000000      CS2: 0      ;MASS BUS CONTROL/STATUS WORD
1315      004242      000000      XFRINT: 0      ;DATA TRANSFER INTERRUPT CODE
1316      004244      000000      TC: 0      ;TAPE CONTROL
1317      004246      000000      AS: 0      ;ATTENTION SUMMARY
1318      004250      000000      TUSTAT: 0      ;TAPE STATUS
1319      004252      000000      DB: 0      ;DATA BUFFER
1320      004254      000000      DI1: 0      ;DIAGNOSTIC REGISTER 1
1321      004256      000000      DT: 0      ;DRIVE TYPE
1322      004260      000000      SN: 0      ;SERIAL NUMBER
1323      004262      000000      DI2: 0      ;DIAGNOSTIC REGISTER 2
1324      004264      000000      DI3: 0      ;DIAGNOSTIC REGISTER 3
1325      004266      000000      MOINT: 0      ;MOTION INTERRUPT CODE
1326      004270      000000      MO0: 0      ;MOTION COMMAND FOR TU0
1327      004272      000000      MO1: 0      ;MOTION COMMAND FOR TU1
1328      004274      000000      MO2: 0      ;MOTION COMMAND FOR TU2
1329      004276      000000      MO3: 0      ;MOTION COMMAND FOR TU3
1330      004300      000000      AD80: 0      ;TM78 MP ADDRESS WORD
1331      004302      000000      DS80: 0      ;TM78 MP DATA/STATUS
```

1332	004304	000000	NON54:	0	;NON EXISTENT REG. 1
1333	004306	000000	NON56:	0	;NON EXISTENT REG. 2
1334	004310	000000	NON60:	0	;NON EXISTENT REG. 3
1335	004312	000000	NON62:	0	;NON EXISTENT REG. 4
1336	004314	000000	NON64:	0	;NON EXISTENT REG. 5
1337	004316	000000	NON66:	0	;NON EXISTENT REG. 6
1338	004320	000000	NON70:	0	;NON EXISTENT REG. 7
1339	004322	000000	NON72:	0	;NON EXISTENT REG. 10
1340			:		
1341	004324	000000	HARDPT:	.WORD 0	;RUN TIME P TABLE POINTER
1342	004326	000000	UNINUM:	.WORD 0	;UNIT UNDER TEST-CURRENTLY
1343	004330	000000	CASDTA:	.WORD 0	;DIAGNOSTIC TEST NUMBER
1344	004332	000000	DIAGTS:	.WORD 0	;DIAGNOSTIC TEST NUMBER
1345	004334	000000	DIAGER:	.WORD 0	;DIAGNOSTIC ERROR NUMBER
1346	004336	000000	BYTCNT:	.WORD 0	;BYTE COUNT
1347	004340	000000	CKSUM:	.WORD 0	;FILE SERVICES CHECKSUM LOCATION
1348	004342	000000	FILERR:	.WORD 0	;FILE HANDLING ERROR
1349	004344	000000	CHAR:	.WORD 0	;DATA CHARACTER FROM DISK
1350	004346	000000	COUNT:	.WORD 0	;ITERATION COUNTER
1351	004350	000000	CHKSUM:	.WORD 0	;CHECK SUM WORK REGISTER
1352	004352	000000	MBDRIV:	.WORD 0	;MASS BUS DRIVE NUMBER
1353	004354	000000	BINUNT:	.WORD 0	;TM78 BINARY UNIT NUMBER
1354	004356	000000	TMUNIT:	.WORD 0	;TM78 UNIT UNDER TEST
1355	004360	000000	TMPORT:	.WORD 0	;TM78 PORT NUMBER
1356	004362	000000	RHVEC:	.WORD 0	;RH VECTOR ADDRESS
1357	004364	000000	DINTCD:	.WORD 0	;TM78 MP DIAGNOSTIC MONITOR INTERRUPT CODE
1358	004366	000000	STAT80:	.WORD 0	;TM78 MP STATUS WORD (MASS BUS REG. 52)
1359	004370	000000	ADATA:	.WORD 0	;ACTUAL DATA
1360	004372	000000	EDATA:	.WORD 0	;EXPECTED DATA
1361	004374	000000	PC80:	.WORD 0	;TM78 MP PROGRAM COUNTER
1362	004376	000	LOAD80:	.BYTE 0	;LOW ORDER WCS ADDRESS
1363	004377	000	HIAD80:	.BYTE 0	;HIGH ORDER WCS ADDRESS
1364	004400	000000	FILNAM:	.WORD 0	;FILE NAME TO BE LOADED
1365	004402	000000	EOF:	.WORD 0	;END OF FILE FLAG
1366	004404	000000	BYPFLG:	.WORD 0	;BYPASS MICRO MODULE FLAG
1367	004406	000000	SEQNUM:	.WORD 0	;SEQUENCE NUMBER MANUAL MICRO MODULE SELECTION
1368	004410	000000	INTFLG:	.WORD 0	;INTERRUPT FLAG
1369	004412	000000	CASLD:	.WORD 0	;CAS PROGRAM LOADED FLAG
1370	004414	000000	SAVE:	.WORD 0	;LINE TERMINATOR BUFFER WORD
1371	004416	000000	RHTYP:	.WORD 0	;RH TYPE (RH70=1, RH11=0)
1372	004420	000000	DUMFLG:	.WORD 0	;DUMMY FLAG FOR SUPERVISOR COMPATABILITY
1373			.EVEN		

1380
1381 004422
(1)
(1)
(1)
1382
1383 004422
(1)
(1)
(1)
1384
1385
1386
1387
1388
1389
1390
1391
1392
1393
1394 004422
(1)
(1)
(1)
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```
.SBTTL TEST 01 - MASS BUS READY TEST
ST
: *****
: *TEST TITLE
: -----
: *TEST 1                MASS BUS READY TEST
SD
: *****
: *DESCRIPTION
: -----
: *THIS TEST CONSISTS OF 2 SUBTESTS.  THE FIRST SUBTEST IS A TEST OF THE
: *RH11 SILO, IT IS PERFORMED ONLY IF THE TU/TM 78 IS INTERFACED WITH AN
: *RH11 AND SKIPPED IF THE SYSTEM IS INTERFACED WITH AN RH70.  THE RH11
: *SUBTEST CONSISTS OF 5 SEGMENTS WHICH TEST THR RH11 SILO FOR:  READ
: *FROM EMPTY SILO, IR/OR, SILO DATA, SILO OVERFLOW, AND SILO RESET RES-
: *PECTIVELY.  THE SECOND SUBTEST IS PERFORMED REGARDLESSOF RH TYPE AND
: *TESTS CS2 BY LOADING -1 TO MASS BUS REGISTER 10 (CS2) WHICH SHOULD
: *CAUSE A MASS BUS INIT TO TAKE PLACE.  A 100 MICROSECOND TIMEOUT
: *IS PERFORMED, AND THE CS1 REGISTER IS THEN TESTED TO VERIFY
: *THAT ALL BITS ARE RESET EXCEPT BIT #6 WHICH IS NOT TESTED.
SP
: *****
: *PROCEDURE
: -----
: *BGNTST
: * CLEAR CAS PROGRAM LOADED FLAG
: * TEST RHTYP
: * IF RH70
: * : THEN-BRANCH MASS BUS READY
: * : ELSE-CONTINUE
: * ENDF
: * BGNSUB-RH11 TESTS
: * : BGNSEG-CS1 BITS
: * : : INIT THE RH
: * : : CONNECT TO TM UNDER TEST
: * : : WAIT FOR TM TO INITIALIZE
: * : : CLEAR CS1
: * : : TEST ALL BUT 'RDY' CLEARED
: * : : IF CLEAR
: * : : : THEN-CONTINUE
: * : : : ELSE-ERROR
: * : : ENDF
: * : ENDSEG-CS1 BITS
: * : BGNSEG-EMPTY SILO READ
: * : : INIT RH
: * : : READ DATA BUFFER
: * : : IF 'DLT' SET
: * : : : THEN-CONTINUE
: * : : : ELSE-ERROR
: * : : ENDF
: * : : IF 'SC' SET
: * : : : THEN-CONTINUE
: * : : : ELSE-ERROR
: * : : ENDF
: * : : IF 'TRE' SET
: * : : : THEN-CONTINUE
```

```
1427 : : : ELSE-ERROR
1428 : : : ENDF
1429 : : : ENDSEG EMPTY SILO READ
1430 : : : BGNSEG IR/OR CHECK
1431 : : : INIT RH
1432 : : : IF 'IR' SET
1433 : : : : THEN-CONTINUE
1434 : : : : ELSE-ERROR
1435 : : : : ENDF
1436 : : : IF 'OR' CLEAR
1437 : : : : THEN-CONTINUE
1438 : : : : ELSE-ERROR
1439 : : : : ENDF
1440 : : : LOAD SILO WITH 0
1441 : : : IF 'OR' CLEAR
1442 : : : : THEN-CONTINUE
1443 : : : : ELSE-ERROR
1444 : : : : ENDF
1445 : : : LOAD SILO WITH -1
1446 : : : IF 'OR' SET
1447 : : : : THEN-CONTINUE
1448 : : : : ELSE-ERROR
1449 : : : : ENDF
1450 : : : ENDSEG IR/OR CHECK
1451 : : : BGNSEG-SILO DATA TEST
1452 : : : : INIT RH
1453 : : : : LOAD SILO WITH DATA
1454 : : : : DO FOR DATA=0 TO DATA-102
1455 : : : : : LOAD DATA INTO SILO
1456 : : : : : INCREMENT DATA
1457 : : : : : ENDDO FOR
1458 : : : : IF 'IR' RESET
1459 : : : : : THEN-CONTINUE
1460 : : : : : ELSE-ERROR
1461 : : : : : ENDF
1462 : : : : READ DATA FROM SILO
1463 : : : : DO FOR DATA=0 TO DATA=102
1464 : : : : : READ DATA
1465 : : : : : COMPARE TO EXPECTED
1466 : : : : : IF MISCOMPARE
1467 : : : : : : THEN-ERROR
1468 : : : : : : ENDF
1469 : : : : : ENDDO FOR
1470 : : : : ENDSEG-SILO DATA TEST
1471 : : : : BGNSEG-SILO OVERFLOW
1472 : : : : : INIT RH
1473 : : : : : LOAD SILO FULL PLUS 1 WORD
1474 : : : : : DO FOR DATA=0 TO DATA=103
1475 : : : : : : LOAD DATA INTO SILO
1476 : : : : : : ENDDO FOR
1477 : : : : : IF 'DLT' SET
1478 : : : : : : THEN-CONTINUE
1479 : : : : : : ELSE-ERROR
1480 : : : : : : ENDF
1481 : : : : : ENDSEG-SILO OVERFLOW
1482 : : : : : BGNSEG-SILO RESET
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004422

```

: * : : INIT RH
: * : : LOAD SILO WITH 4 WORDS
: * : : DO FOR DATA=0 TO DATA=4
: * : : : LOAD SILO
: * : : ENDDO FOR
: * : : LOAD 1 WORD INTO SILO
: * : : READ 2 WORDS FROM SILO
: * : : DO FOR DATA=0 TO DATA=1
: * : : : READ SILO
: * : : ENDDO FOR
: * : : IF 'DLT' SET
: * : : : THEN-CONTINUE
: * : : : ELSE-ERROR
: * : : ENDF
: * : : ENDSEG-SILO RESET
: * : ENDSUB-RH TESTS
: * : BCNSUB-CAS MASSBUS READY
: * : SELECT THE TM78 UNDER TEST
: * : CLEAR MASSBUS REGISTER 0 (CS1)
: * : STORE 177770(8) IN MASSBUS REGISTER 10(8) (CS2)
: * : DELAY
: * : AND MASSBUS REGISTER 10(8) (CS2) WITH 177670(8)
: * : IF RESULT OF THE AND=0
: * : : THEN-CONTINUE
: * : : ELSE-ERROR 1
: * : ENDF
: * : SELECT THE TM78 UNDER TEST
: * : AND MASSBUS REGISTER 0 (CS1) WITH 177577(8)
: * : IF RESULT OF THE AND=0
: * : : THEN-CONTINUE
: * : : ELSE-ERROR 1
: * : ENDF
: * : ENDSUB-CAS MASSBUS READY
: * : *ENDTST
: * SE
: * *****
: * *ERRORS
: * -----
: * *CZTMIA DVC FTL ERR 000001 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
: * *M8956, M8957, MASSBUS
: * *RH: AAAAAA TM:X TU:X PORT:X
: * *MB REG. 000000=XXXXXX AFTER MB CLEAR
: * *
: * *CZTMIA DVC FTL ERR 000040 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
: * *RH11 FAILURE
: * *NO 'DLT' AFTER READ FROM EMPTY SILO
: * *
: * *CZTMIA DVC FTL ERR 000041 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
: * *RH11 FAILURE
: * *NO 'SC' AFTER READ FROM EMPTY SILO
: * *
: * *CZTMIA DVC FTL ERR 000042 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
: * *RH11 FAILURE
: * *NO 'TRE' AFTER READ FROM EMPTY SILO
: * *
: * *CZTMIA DVC FTL ERR 000043 ON UNIT NN TST NNN SUB 000 PC: XXXXXX

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1536 : *RH11 FAILURE
1537 : *'IR' NOT SET AFTER RH CLEAR
1538 : *
1539 : *CZTMIA DVC FTL ERR 000044 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1540 : *RH11 FAILURE
1541 : *'OR' SET AFTER RH CLEAR
1542 : *
1543 : *CZTMIA DVC FTL ERR 000045 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1544 : *RH11 FAILURE
1545 : *'OR' SET AFTER 1 SILO LOAD
1546 : *
1547 : *CZTMIA DVC FTL ERR 000046 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1548 : *RH11 FAILURE
1549 : *'OR' RESET AFTER SECOND SILO LOAD
1550 : *
1551 : *CZTMIA DVC FTL ERR 000047 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1552 : *RH11 FAILURE
1553 : *'IR' NOT RESET BY SILO FULL
1554 : *
1555 : *CZTMIA DVC FTL ERR 000048 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1556 : *RH11 FAILURE
1557 : *'OR' NOT SET AFTER SILO FULL
1558 : *
1559 : *CZTMIA DVC FTL ERR 000049 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1560 : *RH11 FAILURE
1561 : *BAD SILO READ
1562 : *ACT=000000
1563 : *EXP=000000
1564 : *
1565 : *CZTMIA DVC FTL ERR 000050 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1566 : *RH11 FAILURE
1567 : *'DLT' NOT SET BY FILO OVERFLOW

```

1568 004422 S
(1) : *****

```

1569 :
1570 004422          BGNTST
1571 004422 005037 004412 CLR      CASLD      ;CLEAR THE CAS PROGRAM LOADED FLAG
1572 004426 005737 004416 TST      RHTYP      ;RH11 OR RH70?
1573 004432 001402          BEQ      1$          ;BR IF RH11
1574 004434 000137 005262 JMP      RDYTST     ;JUMP IF RH70
1575 :
1576 004440          1$:  BGNSUB      ;RH11 TESTS
1577 004442          BGNSEG     ;CS1 BITS
1578 004444 052777 000040 177566 BIS      #40,@CS2   ;INIT
1579 004452 013777 004352 177560 MOV      MBDRIV,@CS2 ;SELECT THE TM78 NUMBER
1580 004460 005001          CLR      R1          ;LOAD MASS BUS REGISTER NUMBER
1581 004462          DELAY     2.          ;WAIT .2 MS.
1582 004512 012777 040000 177510 MOV      #40000,@XFRCMD ;CLR TRE
1583 004520 005077 177504          CLR      @XFRCMD    ;CLR CS1
1584 004524 032777 177577 i77476 BIT      #177577,@XFRCMD ;CS1 STILL CLEAR EXCEPT 'RDY'?
1585 004532 001404          BEQ      2$          ;IF OK CONTINUE
1586 004534          ERDF      1,RHCAS,ERM001 ;YES-PRINT MASS BUS ERROR
1587 004544          2$:  CKLOOP
1588 004546          ENDSEG     ;CS1 BITS
1589 004550          BGNSEG     ;EMPTY SILO READ
1590 :

```

1591	004552	012777	000040	177460	MOV	#40,@CS2	:INIT RH11
1592	004560	013777	004352	177452	MOV	MBDRIV,@CS2	:SELECT THE TM78 NUMBER
1593	004566				DELAY	2.	:WAIT .2 MS.
1594	004616	012777	040000	177404	MOV	#40000,@XFRCMD	:CLEAR TRE
1595	004624	005077	177400		CLR	@XFRCMD	:CLEAR CS1
1596	004630	017701	177416		MOV	@DB,R1	:READ DATA BUFFER
1597	004634	005777	177400		TST	@CS2	:SEE IF 'DLT' SET
1598	004640	100404			BMI	3\$:IF SO BR
1599	004642				ERRDF	40.,RH11,ERM040	:NO 'DLT' ON READ FROM EMPTY SILO
1600	004652				3\$: CKLOOP		
1601	004654	005777	177350		TST	@XFRCMD	:SEE IF 'SC' IS SET
1602	004660	100404			BMI	4\$:IF SO BR
1603	004662				ERRDF	41.,RH11,ERM041	:NO 'SC' ON READ FROM EMPTY SILO
1604	004672				4\$: CKLOOP		
1605	004674	032777	040000	177326	BIT	#40000,@XFRCMD	:SEE IF 'TRE' IS SET
1606	004702	001004			BNE	5\$:IF SO BR
1607	004704				ERRDF	42.,RH11,ERM042	:NO 'TRE' ON READ FROM EMPTY SILO
1608	004714				5\$: CKLOOP		
1609	004716				ENDSEG		:EMPTY SILO READ
1610							
1611	004720				BGNSEG		:IR/OR CHECK
1612							
1613	004722	012777	000040	177310	MOV	#40,@CS2	:INIT THE RH11
1614	004730	032777	000100	177302	BIT	#100,@CS2	:SEE IF 'IR' IS SET
1615	004736	001004			BNE	6\$:IF SO BR
1616	004740				ERRDF	43.,RH11,ERM043	:NO 'IR' AFTER INIT
1617	004750				6\$: CKLOOP		
1618	004752	032777	000200	177260	BIT	#200,@CS2	:SEE IF 'OR' IS RESET
1619	004760	001404			BEQ	7\$:IF SO BR
1620	004762				ERRDF	44.,RH11,ERM044	: 'OR' SET AFTER INIT
1621	004772				7\$: CKLOOP		
1622	004774	012777	000000	177250	MOV	#0,@DB	:LOAD 0 INTO SILO
1623	005002	032777	000200	177230	BIT	#200,@CS2	:SEE THAT 'OR' RESET
1624	005010	001404			BEQ	8\$:IF IT DOES BR
1625	005012				ERRDF	45.,RH11,ERM045	: 'OR' SET AFTER 1 SILO LOAD
1626	005022				8\$: CKLOOP		
1627	005024	012777	177777	177220	MOV	#-1,@DB	:LOAD SILO WITH -1
1628	005032	032777	000200	177200	BIT	#200,@CS2	:SEE IF 'OR' IS SET
1629	005040	001004			BNE	9\$:IF SO BR
1630	005042				ERRDF	46.,RH11,ERM046	: 'OR' RESET AFTER 2 SILO LOADS
1631							
1632	005052				9\$: CKLOOP		
1633	005054				ENDSEG		
1634							
1635	005056				BGNSEG		:SILO DATA TEST
1636							
1637	005060	012777	000040	177152	MOV	#40,@CS2	:INIT THE RH11
1638	005066	005001			CLR	R1	:PRESET DATA
1639	005070	010177	177156		10\$: MOV	R1,@DB	:LOAD SILO
1640	005074	005201			INC	R1	:BUMP DATA
1641	005076	022701	000102		CMP	#102,R1	:SEE IF DONE
1642	005102	001372			BNE	10\$:IF NOT BR
1643	005104	032777	000100	177126	BIT	#100,@CS2	:SEE IF 'IR' IS RESET
1644	005112	001404			BEQ	11\$:IF SO BR
1645	005114				ERRDF	47.,RH11,ERM047	: 'IR' NOT RESET BY SILO FULL
1646	005124				11\$: CKLOOP		

```
1647 005126 032777 000200 177104 BIT #200,@CS2 ;SEE IF 'OR' IS SET
1648 005134 001004 BNE 12$ ;IF SO BR
1649 005136 ERRDF 48.,RH11,ERM048 ;'OR' NOT SET AFTER FILLING SILO
1650 005146 12$: CKLOOP
1651 005150 005001 CLR R1 ;PRESET DATA
1652 005152 017702 177074 13$: MOV @DB,R2 ;READ SILO
1653 005156 020102 CMP R1,R2 ;SEE IF EXPT=RCVD
1654 005160 001005 BNE 14$ ;
1655 005162 005201 INC R1 ;BUMP DATA
1656 005164 022701 000102 CMP #102,R1 ;SEE IF DONE
1657 005170 001370 BNE 13$ ;IF NOT BR
1658 005172 000404 BR 15$ ;CONTINUE TESTING
1659 005174 14$: ERRDF 49.,RH11,ERM049 ;SILO DATA COMPARE ERROR
1660
1661 005204 15$: CKLOOP
1662 005206 ENDSEG ;SILO DATA TEST
1663
1664 005210 BGNSEG ;SILO OVERFLOW
1665
1666 005212 012777 000040 177020 MOV #40,@CS2 ;INIT THE RH11
1667 005220 012701 000103 MOV #103,R1 ;SET SIZE OF SILO+1
1668 005224 010177 177022 16$: MOV R1,@DB ;LOAD DILO
1669 005230 005301 DEC R1 ;SEE IF DONE
1670 005232 001374 BNE 16$ ;IF NOT BR
1671 005234 005777 177000 TST @CS2 ;SEE IF DLT SET
1672 005240 100404 BMI 17$ ;CONTINUE TESTING
1673 005242 ERRDF 50.,RH11,ERM050 ;'DLT' NOT SET BY SILO OVERFLOW
1674
1675 005252 17$: CKLOOP
1676 005254 ENDSEG ;SILO OVERFLOW
1677
1678 005256 ENDSUB ;RH11 TESTS
1679
1680 005260 BGNSUB ;MASSBUS READY TEST
1681
1682 005262 013777 004352 176750 RDYTEST: MOV MBDRIV,@CS2 ;SELECT THE TM78 NUMBER
1683 005270 005077 176734 CLR @XFRCMD ;CLEAR CAS REGISTER 0
1684 005274 052777 177770 176736 BIS #177770,@CS2 ;SET ALL OTHER BITS
1685 005302 012701 000010 MOV #10,R1 ;LOAD THE MASS BUS REGISTER NUMBER
1686 005306 DELAY 3. ;WAIT .3 MS.
1687 005336 032777 177670 176674 BIT #177670,@CS2 ;ANY ERRORS?
1688 005344 001404 BEQ 18$ ;NO-CONTINUE
1689 005346 ERRDF 1.,RHCAS,ERM001 ;YES-PRINT MASS BUS ERROR
1690 005356 18$: CKLOOP
1691 005360 013777 004352 176652 MOV MBDRIV,@CS2
1692 005366 005001 CLR R1 ;LOAD THE MASS BUS REGISTER NUMBER
1693 005370 032777 173577 176632 BIT #173577,@XFRCMD ;ANY ERRORS?
1694 005376 001404 BEQ 19$ ;NO-CONTINUE
1695 005400 ERRDF 1.,RHCAS,ERM001 ;YES
1696 005410 19$: CKLOOP
1697 005412 ENDSUB
1698 005414 ENDTST
```

.SBTTL TEST 02 - TM78 HANDSHAKE TEST

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1736 005416
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1737 005416
1738 005416 005037 004412
1739 005422 013777 004352 176610
1740 005430 005077 176574
1741 005434 005001
1742 005436 020127 000054
1743 005442 001456
1744 005444
1745 005446 017102 004230

```
:*TEST TITLE
:-----
:*TEST 2          TM78 HANDSHAKE TEST
SD
:*****
:*DESCRIPTION
:-----
:*THIS TEST READS EACH COMMON ADDRESS SPACE (CAS) LOCATION BY
:*SEQUENTIALLY READING MASS BUS REGISTERS 0, 6, 12, 14, 16, 20,
:*24, 26, 30, 32, 34, 36, 40, 42, 44, 46, 50 AND 52(8). THE DATA
:*RECEIVED IS NOT USED BUT AFTER EACH ACCESS THE 'NON-EXISTENT-
:*DRIVE'' (NED) STATUS BIT IN MASS BUS REGISTER 10(8) IS EXAMINED.
:*ANY OTHER ERROR CONDITIONS ARE IGNORED.
SP
:*****
:*PROCEDURE
:-----
:*BGNTST
:* SELECT THE TM78 UNDER TEST
:* CLEAR MASSBUS REGISTER 0 (CS1)
:* CLEAR LOOP COUNT
:* BGND0
:* : DO WHILE LOOP COUNT < 54(8)
:* : READ MASSBUS REGISTER (LOOP COUNTER)
:* : IF MASSBUS STATUS BIT 'NED'=1
:* : : THEN-ERROR 2
:* : : ISSUE MASSBUS INIT
:* : : DELAY
:* : : SELECT THE TM78 UNDER TEST
:* : : ELSE-CONTINUE
:* : ENDF
:* : BGND0
:* : LET LOOP COUNT=LOOP COUNT+2
:* : DO UNTIL LOOP COUNT NOT=2,4,10(8),22(8)
:* : ENDD0
:* ENDD0
:*ENDTST
SE
:*****
:*ERRORS
:-----
:*CZTMIA DVC FTL ERR 000002 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957, MASSBUS
:*RH: AAAAAA TM: X TU: X PORT: X
:*'NED' WHEN READING MB REG. 000000
S
:*****
:          BGNTST
:          CLR          CASLD          ;CLEAR THE CAS PROGRAM LOADED FLAG
:          MOV          MBDRIV,@CS2    ;LOAD TM78 UNIT NUMBER
:          CLR          @XFRCMD        ;CLEAR CAS REGISTER 0
:          CLR          R1             ;CLEAR MASS BUS REGISTER PTR.
:          CMP          R1,#54         ;FINISHED?
:          BEQ          3$             ;YES-EXIT
:          BGNSEG
:          MOV          @XFRCMD(R1),R2 ;READ MB
```

```
1746 005452 032777 010000 176560 BIT #NED,@CS2 ;NON-EXISTENT DRIVE SET
1747 005460 001426 BEQ 4$
1748 005462 ERRDF 2.,RHCAS,ERM002
1749 005472 012777 000040 176540 MOV #MBINIT,@CS2 ;CLEAR THE NED ERROR
1750 005500 DELAY 5 ;WAIT 1 MS.
1751 005530 013777 004352 176502 MOV MBDRIV,@CS2
1752 005536 4$: CKLOOP
1753 005540 ENDSEG
1754 005542 005201 2$: INC R1 ;INCREMENT THE REGISTER NUMBER
1755 005544 005201 INC R1 ;INCREMENT THE REGISTER NUMBER
1756 005546 020127 000002 CMP R1,#2 ;REGISTER NUMBER=2?
1757 005552 001773 BEQ 2$ ;YES-DON'T TEST
1758 005554 020127 000004 CMP R1,#4 ;REGISTER NUMBER=4?
1759 005560 001770 BEQ 2$ ;YES-DON'T TEST
1760 005562 020127 000010 CMP R1,#10 ;REGISTER NUMBER=10?
1761 005566 001765 BEQ 2$ ;YES-DON'T TEST
1762 005570 020127 000022 CMP R1,#22 ;REGISTER=22?
1763 005574 001762 BFQ 2$ ;YES-DON'T TEST
1764 005576 000717 BR 1$ ;CONTINUE
1765 005600 3$: ENDTST ;END OF TEST
```

1766 .SBTTL TEST 03 - NON-EXISTENT REGISTER TEST
1767 ST

(1) : *****
(1) : *TEST TITLE
(1) : -----
1768 : *TEST 3 NON-EXISTENT REGISTER TEST

1769 005602 SD : *****
(1) : *DESCRIPTION
(1) : -----

1770 : *THIS TEST READS THE NON-EXISTENT MB REGISTERS (54, 56,
1771 : *60, 62, 64, 66, 70 AND 72(8) AND EXPECTS THE READ DATA
1772 : *TO BE ZERO, AND THE ILLEGAL REGISTER 'ILR' BIT IN MB
1773 : *REGISTER 52(8) CAS REGISTER 21(8) TO BE SET. THEN A MASS
1774 : *BUS INIT IS ISSUED AND A 100 MICROSECOND TIME PREFORMED.
1775 : *THE 'ILR' BIT IS AGAIN TESTED BUT SHOULD NOW BE RESET.

1776 005602 SP : *****
(1) : *PROCEDURE
(1) : -----

1777 : *BGNTST
1778 : * SELECT THE TM78 UNDER TEST
1779 : * CLEAR MASSBUS REGISTER 0 (CS1)
1780 : * SET THE LOOP COUNTER TO 54(8)
1781 : * BGND0
1782 : * : READ MASSBUS REGISTER (LOOP COUNTER)
1783 : * : IF MASSBUS STATUS BIT 'NED'=1
1784 : * : : THEN-ERROR 2
1785 : * : : ISSUE MASSBUS INIT
1786 : * : : DELAY
1787 : * : : SELECT THE TM78 UNDER TEST
1788 : * : : ELSE-CONTINUE
1789 : * : : ENDF
1790 : * : IF THE DATA READ FROM THE MASSBUS REGISTER=0
1791 : * : : THEN-ERROR 5
1792 : * : : ELSE-CONTINUE

```
1793 : * : ENDF
1794 : * : READ TM78 CAS REGISTER 21(8)
1795 : * : IF TM78 STATUS BIT 'ILR'=0
1796 : * : : THEN-ERROR 6
1797 : * : : ELSE-CONTINUE
1798 : * : ENDF
1799 : * : ISSUE MASSBUS INIT
1800 : * : DELAY
1801 : * : SELECT THE TM78 UNDER TEST
1802 : * : SET THE 'HOLD' BIT IN TM78 CAS REGISTER 21(8)
1803 : * : READ TM78 CAS REGISTER 21(8)
1804 : * : IF THE 'ILR' BIT IN TM78 CAS REGISTER 21(8)=1
1805 : * : : THEN-ERROR 19
1806 : * : : ELSE-CONTINUE
1807 : * : ENDF
1808 : * : LET LOOP COUNTER=LOOP COUNTER+2
1809 : * : DO UNTIL LOOP COUNTER=74(8)
1810 : * ENDDO
1811 : *ENDTST
1812 C05602 SE
(1) : *****
(1) : *ERRORS
(1) : -----
1813 : *CZTMIA DVC FTL ERR 000002 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1814 : *M8956, M8957, MASSBUS
1815 : *RH: AAAAAA TM: X TU: X PORT: X
1816 : *'NED' WHEN READING MB REG. 000000
1817 : *
1818 : *CZTMIA DVC FTL ERR 000005 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1819 : *M8956, M8957, MASSBUS
1820 : *RH: AAAAAA TM: X TU: X PORT: X
1821 : *NON-EXISTENT REG. 00 = 000000 SHOULD BE ZERO
1822 : *
1823 : *CZTMIA DVC FTL ERR 000006 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1824 : *M8956, M8956, MASSBUS
1825 : *RH: AAAAAA TM: X TU: X PORT: X
1826 : *TM78 'ILR' NOT SET AFTER REG. 00 READ
1827 : *
1828 : *CZTMIA DVC FTL ERR 000019 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1829 : *M8956, M8957, MASSBUS
1830 : *RH: AAAAAA TM: X TU: X PORT: X
1831 : *'ILR' NOT CLEAR WHEN WRITTEN CLEAR
1832 005602 S
(1) : *****
1833 005602 BGNTST
1834 005602 005037 004412 CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG
1835 005606 013777 004352 176424 MOV MBDRIV,@CS2 ;LOAD TM78 UNIT NUMBER
1836 005614 005077 176410 CLR @XFRCMD ;CLEAR CAS REGISTER 0
1837 005620 012701 000054 MOV #54,R1 ;SET UP THE REGISTER POINTER
1838 005624 3$: BGNSEG
1839 005626 017102 004230 MOV @XFRCMD(R1),R2 ;READ NON EXISTENT MB REGISTER
1840 005632 032777 010000 176400 BIT #NED,@CS2
1841 005640 001426 BEQ 5$
1842 005642 ERRDF 2.,RHCAS,ERM002
1843 005652 012777 000040 176360 MOV #MBINIT,@CS2 ;CLEAR THE NED ERROR
1844 005660 DELAY 5 ;WAIT 1 MS.
```

```

1845 005710 013777 004352 176322      MOV      MBDRIV,@CS2
1846 005716                               5$:     CKLOOP
1847 005720 005702                       TST      R2           ;DATA=ZERO?
1848 005722 001404                       BEQ      1$           ;YES-CONTINUE
1849 005724                               ERRDF    5,RHCAS,ERM005 ;NO-ERROR
1850 005734                               1$:     CKLOOP
1851 005736 017702 176340                 MOV      @DS80,R2     ;READ MB REGISTER 52
1852 005742 032702 010000                 BIT      #ILR,R2     ;'ILR' SET?
1853 005746 001004                       BNE      2$           ;YES-CONTINUE
1854 005750                               ERRDF    6,RHCAS,ERM006 ;NO-ERROR
1855 005760                               2$:     CKLOOP
1856 005762 052777 000040 176250         BIS      #MBINIT,@CS2 ;CLEAR 'ILR'
1857 005770                               DELAY    5           ;WAIT 1 MS.
1858 006020 013777 004352 176212         MOV      MBDRIV,@CS2 ;LOAD THE MASS BUSS DRIVE NUMBER
1859 006026 012777 000400 176246         MOV      #HOLD,@DS80 ;HOLD THE TM78 MP
1860 006034 017702 176242                 MOV      @DS80,R2     ;GET THE TM78 MP STATUS
1861 006040 032702 010000                 BIT      #ILR,R2     ;'ILR' CLEAR?
1862 006044 001404                       BEQ      4$           ;YES-CONTINUE
1863 006046                               ERRDF    19.,CASX,ERM019 ;NO-ERROR
1864 006056                               4$:     CKLOOP
1865 006060                               ENDSEG
1866 006062 062701 000002                 ADD      #2,R1        ;INC ILR REGISTER NUMBER
1867 006066 020127 000074                 CMP      R1,#74       ;DONE
1868 006072 001254                       BNE      3$           ;NO
1869 006074                               ENDTST              ;YES

```

.SBTTL TEST 04 - HOLD TOGGLE TEST

```

1870
1871 006076      ST
(1) : *****
(1) : *TEST TITLE
(1) : *-----
1872 : *TEST 4                                HOLD TOGGLE TEST
1873 006076      SD
(1) : *****
(1) : *DESCRIPTION
(1) : *-----
1874 : *THIS TEST SETS THE TM78MP 'HOLD' BIT IN MB REGISTER 52(8).
1875 : *AND TESTS FOR 'HLDA'.
1876 : *THEN MB REGISTER 50(8) IS READ AND THE ADDRESS BITS SAVED.
1877 : *A TIME DELAY IS PERFORMED THE REGISTER IS REREAD AND
1878 : *COMPARED TO THE INITIAL ADDRESS READ. - THESE ADDRESSES
1879 : *SHOULD BE EQUAL.
1880 : *
1881 : *THEN MB REGISTER 52(8) IS READ
1882 : *AND THE DATA BITS SAVED, A TIME DELAY IS PERFORMED AND
1883 : *THE REGISTER 52(8) DATA BITS ARE COMPARED WITH THE PREVIOUS
1884 : *READING - THESE VALUES SHOULD BE EQUAL.
1885 : *
1886 : *THEN 'HOLD' IS SET TO ZERO AND THE PROGRAM VERIFIES THAT
1887 : *'HOLD' AND 'HLDA' EQUAL ZERO.
1888 006076      SP
(1) : *****
(1) : *PROCEDURE
(1) : *-----
1889 : *BGNTST
1890 : * CALL SUBROUTINE HOLDMP
1891 : * CLEAR TM78 CAS REGISTER 20(8)

```

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(1)
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(1)
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1941
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1943
1944

006076

```
:* READ TM78 CAS REGISTER 20(8)
:* CALL SUBROUTINE NONEX
:* DELAY
:* READ TM78 CAS REGISTER 20(8) AGAIN
:* CALL SUBROUTINE NONEX
:* IF FIRST READ OF CAS REGISTER 20=SECOND READ
:* : THEN-CONTINUE
:* : ERROR 11
:* ENDF
:* READ TM78 CAS REGISTER 21(8)
:* CALL SUBROUTINE NONEX
:* DELAY
:* READ TM78 CAS REGISTER 21(8) AGAIN
:* IF FIRST READ OF CAS REGISTER 21(8)=SECOND READ
:* : THEN-CONTINUE
:* : ELSE-ERROR 10
:* ENDF
:* WRITE -1 TO TM78 CAS REGISTER 20(8)
:* CLEAR TM78 CAS REGISTER 21(8)
:* CALL SUBROUTINE NONEX
:* IF TM78 CONTROL BIT 'HOLD' 0
:* : THEN-CONTINUE
:* : ELSE-ERROR 12
:* ENDF
:* IF TM78 STATUS BIT 'HLDA'=-0
:* : THEN-CONTINUE
:* : ELSE-ERROR 13
:* ENDF
:*ENDTST
SE
*****
:*ERRORS
*****
:*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957, MASSBUS
:*RH: AAAAAA TM: X TU: X PORT: X
:*'NED' WHEN READING MB REG.
:*
:*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*'HLDA' NOT SET STATUS = 000000
:*
:*CZTMIA DVC FTL ERR 000010 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*TM78 DATA BUS CHANGING WHEN 'HLDA' SET
:*
:*CZTMIA DVC FTL ERR 000011 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*TM78 ADDR BUS CHANGING WHEN 'HLDA' SET
:*
:*CZTMIA DVC FTL ERR 000012 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
```

```
1945 :*'HOLD'' DID NOT RESET
1946 :*
1947 :*CZTMIA DVC FTL ERR 000013 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
1948 :*M8957, M8960
1949 :*RH: AAAAAA TM: X TU: X PORT: X
1950 :*'HLDA'' DID NOT RESET
1951 :*
1952 S
      (1)
1953 :*****
1954 006076 BGNTST
1955 006076 005037 004412 CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG
1956 006102 BGNSEG
1957 006104 004737 035154 CALL HOLDMP ;HOLD THE TM78 MP-WAIT FOR HLDA
1958 006110 012777 000000 176162 MOV #0,@AD80 ;LOAD THE TM78 ADDRESS BUS REGISTER WITH ZERO
1959 006116 000240 NOP ;WAIT
1960 006120 000240 NOP ;WAIT
1961 006122 017702 176152 MOV @AD80,R2 ;READ TM78 MP ADDRESS BUS
1962 006126 004737 035132 CALL NONEX ;CHECK FOR NONEX
1963 006132 CKLOOP
1964
1965 006134 DELAY 1. ;WAIT 100 MICRO SECONDS
1966
1967 006164 017703 176110 MOV @AD80,R3 ;READ TM78 MP ADDRESS BUS AGAIN
1968 006170 004737 035132 CALL NONEX ;CHECK FOR NONEX
1969 006174 CKLOOP
1970 006176 020203 CMP R2,R3 ;COMPARE BOTH ADDRESSES
1971 006200 001404 BEQ 2$ ;CONTINUE IF EQUAL
1972 006202 ERRDF 11.,PROCAS,ERM011
1973 006212 2$: CKLOOP
1974 006214 ENDSEG
1975 006216 BGNSEG
1976 006220 017702 176056 MOV @DS80,R2 ;READ TM78 MP DATA BUS
1977 006224 004737 035132 CALL NONEX ;CHECK FOR NONEX
1978 006230 CKLOOP
1979 006232 DELAY 1. ;WAIT 100 MICRO SECONDS
1980 006262 017703 176014 MOV @DS80,R3 ;READ TM78 MP DATA BUS AGAIN
1981 006266 004737 035132 CALL NONEX ;CHECK FOR NONEX
1982 006272 CKLOOP
1983 006274 120203 CMPB R2,R3 ;COMPARE BOTH BUS ADDRESSES
1984 006276 001404 BEQ 1$
1985 006300 ERRDF 10.,PROCAS,ERM010 ;ERROR
1986 006310 1$: CKLOOP
1987 006312 ENDSEG
1988 006314 012777 177777 175756 MOV #-1,@AD80 ;LOAD A NONEXISTENT ADDRESS
1989 006322 005077 175754 CLR @DS80 ;DROP HOLD
1990 006326 004737 035132 CALL NONEX
1991 006332 CKLOOP
1992 006334 017702 175742 MOV @DS80,R2 ;READ THE STATUS
1993 006340 032702 000400 BIT #HOLD,R2 ;HOLD=0?
1994 006344 001404 BEQ 3$ ;YES CONTINUE
1995 006346 ERRDF 12.,PROCAS,ERM012 ;NO
1996
1997 006356 3$: CKLOOP
1998 006360 032702 001000 BIT #HLDA,R2 ;HLDA=0?
1999 006364 001404 BEQ 4$ ;YES-CONTINUE
```

2000 006366

ERRDF 13.,PROCAS,ERM013 ;NO

2001

2002 006376

4\$: CKLOOP

2003 006400

ENDTST

2004

2005
2006 006402

.SBTTL TEST 05 - REGISTER 20 INTEGRITY CHECK

ST

(1)

(1)

(1)

2007

2008 006402

:*****

:*TEST TITLE

:*-----

:*TEST 5 REGISTER 20 INTEGRITY CHECK

SD

(1)

(1)

(1)

2009

2010

2011

2012

2013

2014 006402

:*****

:*DESCRIPTION

:*-----

:*THIS TEST SETS 'HOLD' AND WAITS FOR 'HLDA' TO SET, THEN

:*DATA FROM 000000(8)-177777(8) IS WRITTEN TO THE MB

:*REGISTER 50(8), CAS REGISTER 20 READ BACK AND COMPARED.

:*THIS PROVIDES A TEST OF BOTH THE ADDRESS REGISTER AND

:*THE MASS BUS TRANSCEIVERS.

SP

(1)

(1)

(1)

2015

2016

2017

2018

2019

2020

2021

2022

2023

2024

2025

2026

2027

2028

2029 006402

:*****

:*PROCEDURE

:*-----

:*BGNTST

:* CALL SUBROUTINE HOLDMP

:* CLEAR THE LOOP COUNTER

:* BGND0

:* : WRITE (LOOP COUNTER) TO CAS REGISTER 20(8)

:* : READ CAS REGISTER 20(8)

:* : IF VALUE WRITTEN=VALUE READ

:* : : THEN-CONTINUE

:* : : ELSE-ERROR 16

:* : ENDF

:* : LET LOOP COUNTER=LOOP COUNTER+1

:* : DO UNTIL THE LOOP COUNTER=0

:* ENDD0

:*ENDTST

SE

(1)

(1)

(1)

2030

2031

2032

2033

2034

2035

2036

2037

2038

2039

2040

2041 006402

(1)

2042 006402

:*****

:*ERRORS

:*-----

:*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX

:*M8957, M8960

:*RH: AAAAAA TM: X TU: X PORT: X

:*'HLDA' NOT SET STATUS = 000000

:*

:*CZTMIA DVC FTL ERR 000016 ON UNIT NN TST NNN SUB 000 PC: XXXXXX

:*M3956, M8957

:*RH: AAAAAA TM: X TU: X PORT: X

:*REG. 20 COMPARE FAIL

:*ACT = 000000

:*EXP = 000000

S

:*****

:*BGNTST


```
2043 006402 005037 004412 CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG
2044 006406 004737 035154 CALL HOLDMP ;HOLD TM78 MP-WAIT FOR HLDA
2045 006412 005003 CLR R3
2046 006414 005001 CLR R1 ;CLEAR THE ADDRESS
2047 006416 BGNSEG
2048 006420 010177 175654 1$: MOV R1,@AD80 ;MOVE TO ADDRESS REG IN TM78
2049 006424 017702 175650 MOV @AD80,R2 ;READ THE ADDRESS FROM REG IN TM78
2050 006430 020102 CMP R1,R2 ;=?
2051 006432 001406 BEQ 2$ ;YES-CONTINUE
2052 006434 ERRDF 16,CASX,ERM016 ;NO-ERROR
2053 006444 012703 000001 MOV #1,R3
2054 006450 005703 2$: TST R3
2055 006452 001401 BEQ 3$
2056 006454 CKLOOP
2057 006456 005201 3$: INC R1 ;INCREMENT THE ADDRESS
2058 006460 001357 BNE 1$ ;CONTINUE UNTIL DONE
2059 006462 ENDSEG
2060 006464 ENDTST
```

```
2061 .SBTTL TEST 06 - CLEAR FROM HOLD TEST
2062 006466 ST
(1) : *****
(1) : *TEST TITLE
(1) : *-----*
2063 : *TEST 6 CLEAR FROM HOLD TEST
2064 006466 SD
(1) : *****
(1) : *DESCRIPTION
(1) : *-----*
2065 : *THIS TEST SETS THE TM78MP 'HOLD' BIT IN MB REGISTER 52(8),
2066 : *CAS REGISTER 21 AND TESTS FOR 'HLDA'. THEN THE PDP11
2067 : *PROCESSOR ATTEMPTS TO SET 'TMRDY', AND CHECKS THAT
2068 : *IT SETS.
2069 : *
2070 : *THEN MB REGISTER 52(8), CAS REGISTER 21 IS WRITTEN WITH
2071 : *THE 'CLEAR' AND 'HOLD' BITS SET, AND THE FOLLOWING CON-
2072 : *DITIONS ARE TESTED.
2073 : *
2074 : * 'HLDA' IS STILL SET
2075 : * 'TMRDY' IS RESET
2076 006466 SP
(1) : *****
(1) : *PROCEDURE
(1) : *-----*
2077 : *BGNTST
2078 : * CALL SUBROUTINE HOLDMP
2079 : * LOAD THE TM78 INTERNAL ADDRESS FOR TM READY BIT 100240(8) TO TM78
2080 : * CAS REGISTER 20(8)
2081 : * LOAD THE 'HOLD' BIT+200(8) TO CAS REGISTER 21(8)
2082 : * READ CAS REGISTER 21(8)
2083 : * IF STATUS BIT 'TMRDY'=0
2084 : * : THEN-ERROR 4
2085 : * : ELSE-CONTINUE
2086 : * ENDF
2087 : * LOAD -1 TO CAS REGISTER 20(8)
2088 : * LOAD THE 'HOLD' AND 'CLR' BITS IN CAS REGISTER 21(8)
2089 : * WAIT
```


2142 006630 032702 100000
2143 006634 001404
2144 006636
2145
2146 006646
2147 006650
2148
2149
2150 006652
(1)
(1)
(1)
2151
2152 006652
(1)
(1)
(1)
2153
2154
2155 006652
(1)
(1)
(1)
2156
2157
2158
2159
2160
2161
2162
2163
2164
2165
2166
2167
2168
2169
2170
2171
2172
2173 006652
(1)
(1)
(1)
2174
2175
2176
2177
2178
2179
2180
2181
2182
2183 006652
(1)
2184

```
BIT #TMRDY,R2 ;TM READY SET?  
BEQ 3$ ;NO-CONTINUE  
ERRDF 15.,PROCAS,ERM015 ;YES-ERROR  
  
3$: CKLOOP  
ENDTST  
  
SBTTL TEST 07 - PORT SELECT TEST  
ST  
: *****  
: *TEST TITLE  
: *-----  
: *TEST 7 PORT SELECT TEST  
SD  
: *****  
: *DESCRIPTION  
: *-----  
: *THIS TEST CHECKS THE ABILITY OF THE PORT SELECT LOGIC IN THE TM78 TO  
: *SELECT TO THE USER SPECIFIED MASS BUS PORT.  
SP  
: *****  
: *PROCEDURE  
: *-----  
: *BGNTST  
: * CALL SUBROUTINE HOLDMP  
: * LOAD THE INTERNAL ADDRESS OF THE PORT SELECT BYTE 100340(8) TO CAS  
: * REGISTER 20(8)  
: * GET THE USER SPECIFIED MASS BUS PORT # (0 OR 1)  
: * IF USER SPECIFIED PORT=0  
: * : THEN-LOAD THE 'HOLD' BIT TO CAS REGISTER 21(8)  
: * : ELSE-LOAD THE 'HOLD' BIT+200(8) TO CAS REGISTER 21(8)  
: * ENDF  
: * LOAD THE INTERNAL ADDRESS OF THE PORT SELECT BYTE 100340(8) TO CAS  
: * REGISTER 20(8)  
: * READ CAS REGISTER 21(8)  
: * IF THE VALUE READ=THE VALUE WRITTEN  
: * : THEN-CONTINUE  
: * : ELSE-ERROR 17  
: * ENDF  
: *ENDTST  
SE  
: *****  
: *ERRORS  
: *-----  
: *CZTMIA DVC FTL ERR 00007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
: *M8957, M8960  
: *RH: AAAAAA TM: X TU: X PORT: X  
: *'HLDA' NOT SET STATUS = 000000  
: *  
: *CZTMIA DVC FTL ERR 00017 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
: *M8960  
: *RH: AAAAAA TM: X TU: X PORT: X  
: *PORT X SELECT BIT NOT SET  
S  
: *****
```

```
2185 006652          BGNSTST
2186 006652 005037 004412 CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG
2187 006656 004737 035154 CALL HOLDMP ;HOLD TM78MP-WAIT FOR HLDA
2188 006662 012777 100340 175410 MOV #MBSEL,@AD80 ;ADDRESS THE PORT SELECT BYTE
2189 006670 005003 CLR R3 ;CLEAR THE EXPECTED DATA BYTE
2190 006672 013701 004360 MOV TMPORT,R1 ;GET THE PORT SELECTED
2191 006676 001403 BEQ 1$ ;BRANCH IF PORT 0
2192 006700 012701 000200 MOV #200,R1 ;ELSE-LOAD PORT 1 SELECT BIT
2193 006704 005203 INC R3 ;UPDATE THE EXPECTED DATA BYTE
2194 006706 062701 000400 1$: ADD #HOLD,R1 ;ADD IN HOLD BIT
2195 006712 010177 175364 MOV R1,@DS80 ;LOAD PORT SELECT BYTE
2196 006716 000240 NOP
2197 006720 012777 100340 175352 MOV #MBSEL,@AD80
2198 006726 017702 175350 MOV @DS80,R2
2199 006732 042701 177400 BIC #177400,R1 ;REMOVE HOLD BIT FROM PORT BYTE
2200 006736 042702 177577 BIC #177577,R2 ;REMOVE BITS FROM ACTUAL
2201 006742 020102 CMP R1,R2 ;PROPER PORT SELECTED
2202 006744 001404 BEQ 2$ ;YES-EXIT TEST
2203 ;NO-ERROR
2204 006746 ERRDF 17.,PRO,ERM017
2205
2206 006756 2$: CKLOOP
2207 006760 ENDTST
```

```
2208
2209 .SBTTL TEST 08 - MASS BUS INIT FROM HOLD TEST
2210 006762 ST
(1) ;*****
(1) ;*TEST TITLE
(1) ;*-----
2211 ;*TEST 8 MASS BUS INIT FROM HOLD TEST
2212 006762 SD
(1) ;*****
(1) ;*DESCRIPTION
(1) ;*-----
2213 ;*THIS TEST SETS THE TM78MP 'HOLD' BIT IN MB REGISTER 52(8),
2214 ;*CAS REGISTER 21 AND TESTS FOR 'HLDA'. THEN THE PDP11
2215 ;*PROCESSOR ATTEMPTS TO SET 'TMRDY', AND CHECKS THAT IT
2216 ;*SETS.
2217 ;*
2218 ;*MB CLEAR IS THEN ISSUED, AND THE FOLLOWING CONDITIONS
2219 ;*ARE TESTED:
2220 ;*
2221 ;* 'HOLD' IS RESET
2222 ;* 'HLDA' IS RESET
2223 ;* 'TMRDY' IS RESET
2224 006762 SP
(1) ;*****
(1) ;*PROCEDURE
(1) ;*-----
2225 ;*BGNSTST
2226 ;* CALL SUBROUTINE HOLDMP
2227 ;* LOAD THE TM78 INTERNAL ADDRESS FOR TM READY 100240(8) TO CAS
2228 ;* REGISTER 20(8)
2229 ;* LOAD THE 'HOLD' BIT+100(8) TO CAS REGISTER 21(8)
2230 ;* CLEAR CAS REGISTER 20(8)
2231 ;* IF 'TMRDY' 1
```

```

2232 : * : THEN-CONTINUE
2233 : * : ELSE-ERROR 4
2234 : * ENDF
2235 : * SET THE 'CLEAR' BIT IN MB REGISTER 10(8)
2236 : * DELAY
2237 : * SELECT THE TM78 UNDER TEST
2238 : * IF THE 'HOLD' CONTROL BIT IN CAS REGISTER 21(8)=0
2239 : * : THEN-CONTINUE
2240 : * : ELSE-ERROR 12
2241 : * ENDF
2242 : * IF THE 'HOLD ACTIVE' STATUS BIT IN CAS REGISTER 21(8)-0
2243 : * : THEN-CONTINUE
2244 : * : ELSE-ERROR 13
2245 : * ENDF
2246 : * IF 'TM READY' STATUS BIT IN CAS REGISTER 21(8) 0
2247 : * : THEN-CONTINUE
2248 : * : ELSE-ERROR 15
2249 : * ENDF
2250 : *ENDTST

```

006762

```

2251 SE
(1) : *****
(1) : *ERRORS
(1) : -----
2252 : *CZTMIA DVC FTL ERR 000004 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
2253 : *M8956, M8957
2254 : *RH: AAAAAA TM: X TU: X PORT: X
2255 : *'TMRDY' NOT SET
2256 : *
2257 : *CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
2258 : *M8957, M8960
2259 : *RH: AAAAAA TM: X TU: X PORT: X
2260 : *'HLDA' NOT SET STATUS - 000000
2261 : *
2262 : *CZTMIA DVC FTL ERR 000012 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
2263 : *M8957, M8960
2264 : *RH: AAAAAA TM: X TU: X PORT: X
2265 : *'HOLD' DID NOT RESET
2266 : *
2267 : *CZTMIA DVC FTL ERR 000013 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
2268 : *M8957, M8960
2269 : *RH: AAAAAA TM: X TU: X PORT: X
2270 : *'HLDA' DID NOT RESET
2271 : *
2272 : *CZTMIA DVC FTL ERR 000015 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
2273 : *M8957, M8960
2274 : *RH: AAAAAA TM: X TU: X PORT: X
2275 : *'TMRDY' DID NOT RESET

```

006762

```

2276 : *
2277 : S
(1) : *****
2278 :
2279 : BGNTST
2280 : CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG
2281 : CALL HOLDMP ;HOLD TM78 MP-WAIT FOR HLDA
2282 : MOV #TMRDST,@AD80 ;LOAD ADDRESS OF TM READY
2283 : MOV #HOLD+#STMRDY,@DS80 ;SET TM READY

```

005037	004412		
004737	035154		
012777	100240	175300	
012777	000500	175274	

TM78 CONTROLLER LOGIC TEST
ZTMIC5.P11 04-FEB-81 13:02

MACY11 30(1046) 24-FEB-81 12:26 PAGE 3-18
TEST 08 - MASS BUS INIT FROM HOLD TEST

SEQ 0044

```

2284 007006 017702 175270      MOV    @DS80,R2      ;GET THE STATUS
2285 007012 032702 100000      BIT    #TMRDY,R2    ;TM READY SET?
2286 007016 001004              BNE    1$           ;YES-CONTINUE
2287 007020              ERRDF  4.,CASX,ERM004 ;NO-ERROR
2288
2289 007030              1$:   CKLOOP
2290 007032 052777 000040 175200 BIS    #MBINIT,@CS2 ;ISSUE MASS BUS INIT
2291 007040 000240              NOP
2292 007042 000240              NOP
2293 007044 013777 004352 175166 MOV    MBDRIV,@CS2  ;LOAD THE MASS BUSS DRIVE NUMBER
2294 007052 017702 175224      MOV    @DS80,R2    ;READ THE STATUS
2295 007056 032702 000400      BIT    #HOLD,R2    ;HOLD SET?
2296 007062 001404              BEQ    2$           ;NO-CONTINUE
2297 007064              ERRDF  12.,PROCAS,ERM012 ;YES-ERROR
2298 007074              2$:   CKLOOP
2299 007076 032702 001000      BIT    #HLDA,R2    ;HLDA SET?
2300 007102 001404              BEQ    3$           ;NO-CONTINUE
2301 007104              ERRDF  13.,PROCAS,ERM013 ;YES-ERROR
2302 007114              3$:   CKLOOP
2303 007116 032702 100000      BIT    #TMRDY,R2  ;TM READY SET?
2304 007122 001404              BEQ    4$           ;NO-CONTINUE
2305 007124              ERRDF  15.,ROCAS,ERM015 ;YES-ERROR
2306
2307 007134              4$:   CKLOOP
2308 007136              ENDTST

```

```

2309 .SBTTL TEST 09 - TM78 CONTROL BUS PARITY ERROR DETECT TEST
2310 ST

```

```

(1) : *****
(1) : *TEST TITLE
(1) : *-----
2311 : *TEST 9                      TM78 CONTROL BUS PARITY ERROR DETECT TEST
2312 SD

```

```

(1) : *****
(1) : *DESCRIPTION
(1) : *-----
2313 : *THIS TEST SETS THE 'PAT' BIT IN MB CONTROLLER AND THEN
2314 : *WRITES CAS REGISTER 3 (MB REGISTER 24) WITH THE TM78 MP
2315 : *IN 'HOLD'. CAS REGISTER 21 (MB REGISTER 52) IS READ AND
2316 : *THE 'CPE' BIT IS EXPECTED. THEN THE 'PAT' BIT IN THE MB
2317 : *CONTROLLER IS RESET, THE 'CPE' BIT IN CAS REGISTER 21
2318 : *(MB REGISTER 52) IS RESET, AND CAS REGISTER 3 (MB REGISTER 24)
2319 : *IS AGAIN WRITTEN. THE 'CPE' BIT IS THEN TESTED FOR THE
2320 : *RESET CONDITION.

```

```

2321 SP
(1) : *****
(1) : *PROCEDURE
(1) : *-----
2322 : *BGNTST
2323 : * CALL SUBROUTINE HOLDMP
2324 : * SET THE 'PAT' BIT IN MB REGISTER 10(8)
2325 : * CLEAR CAS REGISTER 3
2326 : * IF THE 'CPE' STATUS BIT IN CAS REGISTER 21(8)-1
2327 : * : THEN-CONTINUE
2328 : * : ELSE-ERROR 23
2329 : * ENDF
2330 : * SET THE 'CLEAR' BIT IN MB REGISTER 10(8)

```

```
2331 : * DELAY
2332 : * SELECT THE TM78 UNDER TEST
2333 : * SET THE 'HOLD' BIT IN CAS REGISTER 21(8)
2334 : * IF THE 'CPE' STATUS BIT IN CAS REGISTER 21(8)=0
2335 : * : THEN-CONTINUE
2336 : * : ELSE-ERROR 24
2337 : * ENDF
2338 : * CLEAR CAS REGISTER 3
2339 : * IF THE 'CPE' STATUS BIT IN CAS REGISTER 21(8)=0
2340 : * : THEN-CONTINUE
2341 : * : ELSE-ERROR 25
2342 : * ENDF
2343 : *ENDTST
2344 007140 SE
(1) : *****
(1) : *ERRORS
(1) : -----
2345 : *CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
2346 : *M8957, M8960
2347 : *RH: AAAAAA TM: X TU: X PORT: X
2348 : *'HLDA' NOT SET STATUS = 000000
2349 : *
2350 : *CZTMIA DVC FTL ERR 000023 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
2351 : *M8956, M8957, MASSBUS
2352 : *RH: AAAAAA TM: X TU: X PORT: X
2353 : *TM78 'CPE' NOT SET WHEN 'PAT' IS SET
2354 : *
2355 : *CZTMIA DVC FTL ERR 000024 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
2356 : *M8956, M8957, MASSBUS
2357 : *RH: AAAAAA TM: X TU: X PORT: X
2358 : *TM78 'CPE' NOT RESET WHEN 'PAT' IS CLEAR
2359 : *
2360 : *CZTMIA DVC FTL ERR 000025 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
2361 : *M8956, M8957, MASSBUS
2362 : *RH: AAAAAA TM: X TU: X PORT: X
2363 : *TM78 'CPE' SET WHEN 'PAT' CLEAR
2364 : *
2365 007140 S
(1) : *****
2366
2367 007140 BGNTST
2368 007140 005037 004412 CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG
2369 007144 004737 035154 CALL HOLDMP ;HOLD TM78 MP - WAIT FOR HLDA
2370 007150 013701 004352 MOV MBDRIV,R1
2371 007154 052701 000020 BIS #PAT,R1
2372 007160 010177 175054 MOV R1,@CS2
2373 007164 005077 175064 CLR @DI1 ;WRITE A MB REGISTER
2374 007170 017701 175106 MOV @DS80,R1 ;GET TM78 CONTROL BUS STATUS
2375 007174 032701 004000 BIT #CPE,R1 ;CPE SET?
2376 007200 001004 BNE 1$ ;YES-CONTINUE
2377 007202 ERRDF 23.,RHCAS,ERM023 ;NO-ERROR
2378
2379 007212 1$: CKLOOP
2380 007214 052777 000040 175016 BIS #MBINIT,@CS2 ;CLEAR 'PAT'
2381 007222 DELAY 5 ;WAIT 1 MS.
2382 007252 013777 004352 174760 MOV MBDRIV,@CS2 ;LOAD THE MASS BUSS DRIVE NUMBER
```

2383 007260 012777 000400 175014
2384 007266 017701 175010
2385 007272 032701 004000
2386 007276 001404
2387 007300
2388
2389 007310
2390 007312 005077 174736
2391 007316 017701 174760
2392 007322 032701 004000
2393 007326 001404
2394 007330
2395 007340
2396 007342
2397
2398
2399 007344
(1)
(1)
(1)
2400
2401 007344
(1)
(1)
(1)
2402
2403
2404
2405
2406
2407
2408 007344
(1)
(1)
(1)
2409
2410
2411
2412
2413
2414
2415
2416
2417
2418
2419
2420
2421
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2424
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2426
2427 007344
(1)
(1)

```
MOV #HOLD,@DS80 ;CLEAR 'CPE' IN THE TM78  
MOV @DS80,R1 ;DID IT CLEAR?  
BIT #CPE,R1  
BEQ 2$ ;YES-CONTINUE  
ERRDF 24.,RHCAS,ERM024 ;NO-ERROR  
  
2$: CKLOOP  
CLR @DI1 ;WRITE AGAIN  
MOV @DS80,R1 ;'CPE' SET?  
BIT #CPE,R1  
BEQ 3$ ;NO-EXIT TEST  
ERRDF 25.,RHCAS,ERM025 ;YES-ERROR  
  
3$: CKLOOP  
ENDTST ;END OF TEST
```

.SBTTL TEST 10 - TM78 CONTROL BUS PARITY ERROR FORCE TEST

```
ST  
: *****  
: *TEST TITLE  
: *-----  
: *TEST 10 TM78 CONTROL BUS PARITY ERROR FORCE TEST  
SD  
: *****  
: *DESCRIPTION  
: *-----  
: *THIS TEST 'HOLDS' THE TM78 MICRO PROCESSOR AND SETS THE EVEN  
: *PARITY 'EVPAR' BIT IN CAS REGISTER 21 (MB REGISTER 52).  
: *THEN CAS REGISTER 3 (MB REGISTER 24) IS READ AND THE MB  
: *STATUS BIT 'MCPE' IS EXPECTED. THEN A MB INIT IS ISSUED  
: *AND THE TM78 MP AGAIN HELD. CAS REGISTER 3 (MB REGISTER 24)  
: *IS THEN READ AGAIN, AND NO ERROR IS EXPECTED.  
SP  
: *****  
: *PROCEDURE  
: *-----  
: *BGNTST  
: * CALL SUBROUTINE HOLDMP  
: * LOAD THE 'HOLD' BIT AND 'EVPAR' BIT IN CAS REGISTER 21(8)  
: * READ CAS REGISTER 3  
: * IF THE 'MCPE' STATUS BIT IN MB REGISTER 0=1  
: * : THEN-CONTINUE  
: * : ELSE-ERROR 26  
: * ENDF  
: * LOAD THE 'CLEAR' BIT IN MB REGISTER 10(8)  
: * DELAY  
: * SELECT THE TM78 UNDER TEST  
: * LOAD THE 'HOLD' BIT IN CAS REGISTER 21(8) CLEAR 'EVPAR'  
: * READ CAS REGISTER 3  
: * IF THE 'MCPE' BIT IN MB REGISTER 0=0  
: * : THEN-CONTINUE  
: * : ELSE-ERROR 27  
: * ENDF  
: *ENDTST  
SE  
: *****  
: *ERRORS
```


(1)
2428
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2435
2436
2437
2438
2439
2440
2441
2442 007344
(1)
2443
2444 007344
2445 007344 005037 004412
2446 007350 004737 035154
2447 007354 012777 002400 174720
2448 007362 017701 174666
2449 007366 017701 174636
2450 007372 032701 020000
2451 007376 001004
2452 007400
2453
2454 007410
2455 007412 052777 000040 174620
2456 007420
2457 007450 013777 004352 174562
2458 007456 012777 000400 174616
2459 007464 000240
2460 007466 017701 174562
2461 007472 017701 174532
2462 007476 032701 020000
2463 007502 001404
2464 007504
2465
2466 007514
2467 007516
2468
2469
2470 007520
(1)
(1)
(1)
2471
2472 007520
(1)
(1)
(1)
2473
2474
2475

```
*****
*-----*
* CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
* M8957, M8960
* RH: AAAAAA TM: X TU: X PORT: X
* 'HLDA' NOT SET STATUS = 000000
*
* CZTMIA DVC FTL ERR 000026 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
* M8956, M8957, MASSBUS
* RH: AAAAAA TM: X TU: X PORT: X
* MP 'MCPE' NOT SET
*
* CZTMIA DVC FTL ERR 000027 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
* M8956, M8957, MASSBUS
* RH: AAAAAA TM: X TU: X PORT: X
* MB 'MCPE' SET
S
: *****
:
: BGNTST
: CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG
: CALL HOLDMP ;HOLD TM78 MP-WAIT FOR HLDA
: MOV #HOLD+#EVPAR,@DS80 ;SET THE EVEN PARITY BIT
: MOV @DI1,R1 ;READ A CAS REGISTER
: MOV @XFRCMD,R1 ;GET MASS BUS REGISTER 0
: BIT #MCPE,R1 ;MASS BUS PARITY ERROR
: BNE 1$ ;YES-CONTINUE
: ERRDF 26.,RHCAS,ERM026 ;NO-ERROR
:
: 1$: CKLOOP
: BIS #MBINIT,@CS2 ;ISSUE MB INIT
: DELAY 5 ;WAIT 1 MS.
: MOV MBDRIV,@CS2 ;LOAD THE MASS BUSS DRIVE NUMBER
: MOV #HOLD,@DS80 ;HOLD THE TM78 MP
: NOP
: MOV @DI1,R1 ;READ A CAS REGISTER
: MOV @XFRCMD,R1 ;GET THE MASS BUS REG. 0
: BIT #MCPE,R1 ;MASS BUS PARITY ERROR?
: BEQ 2$ ;NO-EXIT
: ERRDF 27.,RHCAS,ERM027 ;YES-ERROR
:
: 2$: CKLOOP
: ENDTST ;END OF TEST
: .SBTTL TEST 11 - TM78 ROM MEMORY TEST
:
: ST
: *****
: *TEST TITLE
: *-----*
: * TEST 11 TM78 ROM MEMORY TEST
: SD
: *****
: *DESCRIPTION
: *-----*
: * THIS TEST CHECKS PARITY IN ROM FROM 00000 (8) TO 37777 (8)
: * BY READING FROM THE LAST 4 LOCATIONS IN EACH ROM CHIP. THESE
: * 4 LOCATIONS CONTAIN ROM SEGMENT IDENTIFICATION NUMBER, VERSION NUMBER,
: *****
```

2476
2477
2478
2479 007520

(1)
(1)
(1)

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2523
2524
2525

2526 007520
(1)
(1)

AND ADDRESS OF LAST LOCATION USED IN THE ROM. BY CHECKING PARITY
BIT THERE SHOULD BE PARITY ERRORS FOR ALL UNUSED LOCATIONS. ANY DEVIATION
FROM THIS WILL CAUSE AN ERROR TO BE PRINTED.

SP *****

PROCEDURE

```
BGNTST
CALL SUBROUTINE HOLD MP
INITIALIZE THE ADDRESS TO 37777 (8)
INITIALIZE ROM SEGMENT IDENTIFICATION #
BGND0
: CLEAR ERROR LOOP FLAG
: INITIALIZE COUNTER 2K
: DECREMENT ROM ID #
: INITIALIZE ROM INFORMATION COUNTER = 4
: BGND0
: LOAD ROM ADDRESS
: READ ROM
: IF PARITY ERROR
: : THEN - ERROR IN ROM INFORMATION
: : CLEAR PARITY ERROR
: ENDIF
: DEC ROM INFORMATION COUNTER
: DEC ROM ADDRESS
: DEC COUNTER 2K
UNTIL COUNTER = 0 OR ERROR IN ROM INFORMATION
GET ROM ID #
IF NO PARITY ERROR IN ROM INFORMATION
: THEN-IF NOT EXPECTED #
: THEN-ERROR
: SET ERROR FLAG FOR ROM INFORMATION
ELSE-DO UNTIL FIND ABOVE ADDRESS
: DECREMENT COUNTER
: DECREMENT ADDRESS
: CHECK PARITY
: IF PARITY ERROR NOT SET
: : THEN-ERROR
: ENDIF
: CLEAR PARITY ERROR BIT
ENDDO
DO UNTIL COUNTER = -1
: DECREMENT ADDRESS
: DECREMENT COUNTER
: IF PARITY ERROR SET
: : THEN-ERROR
: : CLEAR PARITY ERROR
: ENDIF
ENDDO
ENDIF
UNTIL ALL IDENTIFICATION #'S USED OR ERROR IN ROM INFORMATION
ENDTEST
```

SE *****

ERRORS

(1)
2527
2528
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2551
2552
2553
2554
2555
2556 007520
(1)
2557 007520
2558 007520 005037 004412
2559 007524 004737 035154
2560 007530 012703 037777
2561 007534 012702 000010
2562 007540 005037 004226
2563 007544 012704 004000
2564 007550 005302
2565 007552 002002
2566 007554 000137 010116
2567 007560 012705 004216
2568 007564 012701 000004
2569 007570
2570 007572 010377 174502
2571 007576 017725 174500
2572 007602 032777 020000 174472
2573 007610 001414
2574 007612
2575 007622 052777 040400 174452
2576 007630 012737 000001 004226
2577 007636 162705 000002
2578 007642
2579 007644
2580 007646 005737 004226

```

*-----*
* TM78CLT DVC FTL ERR 000034 ON UNIT NN TST NNN SUB 000 PL: XXXXXX
* M8960
* RH: AAAAAA TM: X TU: X PORT: X
* TM78 ROM PARITY FAILURE
* ADD = 000000
*
* TM78CLT DVC FTL ERR 000035 ON UNIT NN TST NNN SUB 000 PL: XXXXXX
* M8960
* RH: AAAAAA TM: X TU: X PORT: X
* TM78 ROM IDENTIFICATION WRONG, CAN'T LOOP ON THIS ERROR
* ADD = 000000
* IDEN = 000
* VER = 000
*
* TM78CLT DVC FTL ERROR 000036 ON UNIT NN TST NNN SUB 000 PL: XXXXXX
* M8960
* RH: AAAAAA TM: X TU: X PORT: X
* ROM PARITY ERROR NOT SET AND SHOULD BE
* ADD = 000000
* IDEN = 000
* VER = 000
*
* TM78CLT DVC FTL ERR 000037 ON UNIT NN TST NNN SUB 000 PL: XXXXXX
* M8960
* RH: AAAAAA TM: X TU: X PORT: X
* ROM PARITY ERROR
* ADD = 000000
* IDEN = 000
* VER = 000
*
S
*****
: BGNSTST ;CLEAR ERROR LOOP FLAG
: CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG
: CALL HOLDMP ;HOLD THE TM78 - WAIT FOR HLDA
: MOV #37777,R3 ;GET LAST ADDRESS
: MOV #10,R2 ;GET ROM ID #
1$: CLR ERRLP
: MOV #4000,R4 ;INITIALIZE COUNTER
: DEC R2 ;DECREMENT ROM ID #
: BGE 2$ ;BRANCH IF NOT DONE
: JMP 10$ ;DONE
2$: MOV #ROMIDT,R5 ;R5 CONTAINS ROM STORAGE INFORMATION ADDRESS
: MOV #4,R1 ;SET UP COUNTER
3$: BGNSEG
: MOV R3,@AD80 ;LOAD STARTING ADDRESS
: MOV @DS80,(R5)+ ;STORE ROM INFORMATION
: BIT #20000,@DS80 ;SEE IF PARITY ERROR
: BEQ 4$ ;BRANCH IF NO ERROR
: ERRDF 34.,PRO,ERM034
: BIS #40400,@DS80 ;CLEAR PARITY ERROR
: MOV #1,ERRLP ;SET ERROR FLAG
: SUB #2,R5 ;RESTORE ERROR INFORMATION
4$: CKLOOP
: ENDSEG
: TST ERRLP ;SEE IF ERROR

```

```

2581 007652 001404          BEQ      11$          ;ERROR, GO GET ANOTHER ROM
2582 007654 062701 003774  ADD      #3774,R1
2583 007660 160103          SUB      R1,R3
2584 007662 000726          BR       1$
2585 007664 005304          11$: DEC     R4          ;DECREMENT # OF ADDRESSES LEFT TO TEST
2586 007666 005303          DEC     R3          ;DECREMENT ADDRESS
2587 007670 005301          DEC     R1          ;DECREMENT ROM INFORMATION COUNTER
2588 007672 001336          BNE     3$          ;BRANCH IF NOT DONE
2589 007674 012705 004216  MOV     #ROMIDT,R5  ;GET ROM ID #
2590 007700 042715 177400  BIC     #177400,(R5) ;CLEAR OFF GARBAGE BITS
2591 007704 020215          CMP     R2,(R5)    ;SEE IF ROM HAS CORRECT ID #
2592 007706 001411          BEQ     5$          ;BRANCH IF YES
2593 007710 062703 000004  ADD     #4,R3       ;GET ID ADDRESS
2594 007714          ERRDF  35.,PRO,ERM035
2595 007724 162703 004000  SUB     #4000,R3    ;GET ADDRESS OF NEXT ROM
2596 007730 000703          BR       1$          ;GO GET ANOTHER ROM
2597 007732 042765 177400 000004 5$: BIC     #177400,4(R5) ;MASK OFF HIGH BITS
2598 007740 042765 177400 000006  BIC     #177400,6(R5) ;MASK OFF HIGH BITS
2599 007746 000365 000004          SWAB   4(R5)       ;COMBINED HIGH & LOW BYTES TO MAKE ADDRESS
2600 007752 056565 000006 000004  BIS     6(R5),4(R5) ;
2601 007760 020365 000004          6$: CMP     R3,4(R5)  ;SEE IF LAST USED ADDRESS IN ROM
2602 007764 001426          BEQ     8$          ;BRANCH IF YES
2603 007766          BGNSEG
2604 007770 010377 174304  MOV     R3,@AD80    ;LOAD ADDRESS
2605 007774 017701 174302  MOV     @DS80,R1    ;DUMMY READ
2606 010000 032777 020000 174274  BIT     #20000,@DS80 ;SEE IF PARITY ERROR SET
2607 010006 001004          BNE     7$          ;BRANCH IF YES (NO ERROR)
2608 010010          ERRDF  36.,PRO,ERM036
2609 010020 052777 040400 174254 7$: BIS     #40400,@DS80 ;RESET PARITY ERROR BIT
2610 010026          CKLOOP
2611 010030          ENDSEG
2612 010032 005303          DEC     R3          ;GET NEXT ADDRESS
2613 010034 005304          DEC     R4          ;DECREMENT COUNTER
2614 010036 001640          BEQ     1$          ;BRANCH IF DONE WITH ROM
2615 010040 000747          BR       6$          ;CONTINUE LOOP
2616 010042          8$: BGNSEG
2617 010044 010377 174230  MOV     R3,@AD80    ;LOAD ADDRESS
2618 010050 017701 174226  MOV     @DS80,R1    ;DUMMY READ
2619 010054 032777 020000 174220  BIT     #20000,@DS80 ;SEE IF PARITY ERROR
2620 010062 001407          BEQ     9$          ;BRANCH IF NO PARITY ERROR
2621 010064          ERRDF  37.,PRO,ERM037
2622 010074 052777 040400 174200 9$: BIS     #40400,@DS80 ;RESET PARITY ERROR
2623 010102          CKLOOP
2624 010104          ENDSEG
2625 010106 005303          DEC     R3          ;GET NEXT ADDRESS
2626 010110 005304          DEC     R4          ;AM I DONE YET
2627 010112 001612          BEQ     1$          ;YES?
2628 010114 000752          BR       8$          ;GO GET MORE
2629 010116          10$: ENDTST

```

.SBTTL TEST 12 - TM78 MEMORY TEST - LOW ADDRESS LINES

```

ST
;*****
;*TEST TITLE

```

(1)
(1)

(1)
2635
2636 010120
(1)
(1)
(1)
2637
2638
2639
2640 010120
(1)
(1)
(1)
2641
2642
2643
2644
2645
2646
2647
2648
2649
2650
2651
2652
2653
2654
2655
2656
2657
2658
2659
2660
2661
2662
2663 010120
(1)
(1)
(1)
2664
2665
2666
2667
2668
2669
2670
2671
2672
2673
2674
2675
2676 010120
(1)
2677
2678 010120
2679 010120 005037 004412

```

:-----
:*TEST 12      TM78 MEMORY TEST - LOW ADDRESS BITS AS DATA
SD
:*****
:*DESCRIPTION
:-----
:*THIS TEST CHECKS THE TM78 RAM FROM LOCATION 40000(8) TO 50000(8) BY
:*WRITING THE LEAST SIGNIFICANT 8 BITS OF THE ADDRESS INTO THE BYTE AT
:*THAT ADDRESS.
SP
:*****
:*PROCEDURE
:-----
:*BGNTST
:*  CALL SUBROUTINE HOLDMP
:*  INITIALIZE THE ADDRESS TO 40000(8)
:*  BGNDO
:*  :  LOAD THE ADDRESS IN CAS REGISTER 20(8)
:*  :  LOAD THE LEAST SIGNIFICANT 8 BITS OF THE ADDRESS AND THE HOLD BIT
:*  :  IN CAS REGISTER 21(8)
:*  :  INCREMENT THE ADDRESS BY 1
:*  :  DO UNTIL THE ADDRESS=50000(8)
:*  ENDDO
:*  INITIALIZE THE ADDRESS TO 40000(8)
:*  BGNDO
:*  :  LOAD THE ADDRESS IN CAS REGISTER 20(8)
:*  :  INPUT CAS REGISTER 21(8) LOW 8 BITS
:*  :  IF LOW 8 BITS OF CAS REGISTER 21(8)=LOW 8 BITS OF ADDRESS
:*  :  :  THEN-CONTINUE
:*  :  :  ELSE-ERROR 28
:*  :  ENDF
:*  :  INCREMENT THE ADDRESS BY 1
:*  :  DO UNTIL THE ADDRESS=50000(8)
:*  ENDDO
:*ENDTST
SE
:*****
:*ERRORS
:-----
:*CZTMIA DVC FTL ERR 000007 ON UNIT NN  TST NNN  SUB 000  PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA  TM: X  TU: X  PORT: X
:*'HLDA' NOT SET  STATUS = 000000
:*
:*CZTMIA DVC FTL ERR 000028 ON UNIT NN  TST NNN  SUB 000  PC: XXXXXX
:*M8960
:*RH: AAAAAA  TM: X  TU: X  PORT: X
:*TM78 MEMORY FAILURE
:*ADD = 000000
:*ACT = 000000
:*EXP = 000000
S
:*****
:
BGNTST
CLR      CASLD      ;CLEAR THE CAS PROGRAM LOADED FLAG

```

```

2680 010124 004737 035154          CALL   HOLDMP          ;HOLD THE TM78MP-WAIT FOR HLDA
2681 010130 012703 040000          MOV    #040000,R3     ;LOAD STARTING MEMORY ADDRESS
2682 010134 010377 174140          1$:   MOV    R3,@AD80    ;ADDRESS THE TM78
2683 010140 010302                   MOV    R3,R2         ;COPY THE ADDRESS
2684 010142 042702 177400          BIC    #177400,R2    ;AND OFF LO BYTE
2685 010146 052702 000400          BIS    #HOLD,R2     ;ADD IN THE HOLD BIT
2686 010152 010277 174124          MOV    R2,@DS80     ;WRITE IT TO THE TM78MP
2687 010156 005203                   INC    R3            ;INCREMENT THE MEMORY ADDRESS
2688 010160 022703 050000          CMP    #050000,R3   ;COMPARE TO FINAL ADDRESS
2689 010164 001363                   BNE    1$           ;CONTINUE UNTIL DONE
2690
2691 010166 012703 040000          3$:   MOV    #040000,R3   ;LOAD THE STARTING MEMORY ADDRESS
2692 010172                   BGNSEG
2693 010174 010377 174100          MOV    R3,@AD80    ;ADDRESS TM78 RAM
2694 010200 010302                   MOV    R3,R2         ;COPY ADDRESS TO R2
2695 010202 042702 177400          BIC    #177400,R2   ;REMOVE LO BYTE
2696 010206 017704 174070          MOV    @DS80,R4     ;GET CONTENTS OF TM78 RAM
2697 010212 042704 177400          BIC    #177400,R4   ;REMOVE DATA BYTE
2698 010216 020204                   CMP    R2,R4         ;EXPECTED=ACTUAL?
2699 010220 001410                   BEQ    2$           ;YES-CONTINUE
2700
2701 010222                   ERRDF  28.,PRO,ERM028
2702 010232 052702 000400          BIS    #HOLD,R2     ;REWRITE THE FAILING LOCATION
2703 010236 010277 174040          MOV    R2,@DS80
2704
2705 010242          2$:   CKLOOP
2706 010244          ENDSEG
2707 010246 005203                   INC    R3            ;INCREMENT THE TM78 ADDRESS
2708 010250 022703 050000          CMP    #050000,R3   ;DONE?
2709 010254 001346                   BNE    3$           ;NO-KEEP ON TRUKIN'
2710 010256          ENDTST
2711
2712
2713
2714
2715 010260
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2717 010260
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2721 010260
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```

.SBTTL TEST 13 - TM78 MEMORY TEST - HIGH ADDRESS LINES

```

ST
: *****
: *TEST TITLE
: *-----
: TEST 13          TM78 MEMORY TEST - HIGH ADDRESS BITS AS DATA
SD
: *****
: *DESCRIPTION
: *-----
: *THIS TEST CHECKS THE TM78 RAM FROM LOCATION 40000(8) TO 50000(8) BY
: *WRITING THE MOST SIGNIFICANT 8 BITS OF THE ADDRESS INTO THE BYTE AT
: *THAT ADDRESS.
SP
: *****
: *PROCEDURE
: *-----
: *BGNTST
: * CALL SUBROUTINE HOLDMP
: * INITIALIZE THE ADDRESS TO 40000(8)
: * BGND0
: * : LOAD THE ADDRESS IN CAS REGISTER 20(8)

```


TM78 CONTROLLER LOGIC TEST
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TEST 13 - TM78 MEMORY TEST - HIGH ADDRESS LINES

C 5

SEQ 0054

2779 010352 017704 173724
2780 010356 042704 177400
2781 010362 020204
2782 010364 001410
2783

MOV @DS80,R4 ;GET CONTENTS OF TM78 RAM
BIC #177400,R4 ;REMOVE DATA BYTE
CMP R2,R4 ;EXPECTED=ACTUAL?
BEQ 2\$;YES-CONTINUE
 ;NO-PRINT ERROR

2784 010366
2785 010376 052702 000400
2786 010402 010277 173674
2787

ERRDF 28.,PRO,ERM028
BIS #HOLD,R2 ;REWRITE FAILING LOCATION
MOV R2,@DS80

2788 010406
2789 010410
2790 010412 005203
2791 010414 022703 050000
2792 010420 001345
2793 010422
2794

2\$: CKLOOP
ENDSEG
INC R3 ;INCREMENT THE TM78 ADDRESS
CMP #050000,R3 ;DONE?
BNE 3\$;NO-KEEP ON TRUKIN'
ENDTST ;YES-HANG IT UP

2795
2796 010424
(1)
(1)
(1)

.SBTTL TEST 14 - TM78 MEMORY TEST - DATA RELIABILITY

ST
: *****

: *TEST TITLE

: *TEST 14 TM78 MEMORY TEST - DATA RELIABILITY

SD
: *****

: *DESCRIPTION

: *THIS TEST CHECKS THE TM78 RAM FROM LOCATION 40000(8) TO 50000(8) BY
: *WRITING DATA OF 000-377(8) TO EACH RAM LOCATION AND CHECKING THE DATA.

2799 010424
2800
2801
(1)
(1)
(1)

SP
: *****

: *PROCEDURE

: *-----

: *BJNTST

: * CALL SUBROUTINE HOLDMP
: * CLEAR THE DATA PATTERN
: * BGND0
: * : INITIALIZE THE ADDRESS TO 40000(8)
: * : BGND0
: * : : LOAD THE ADDRESS IN CAS REGISTER 20(8)
: * : : LOAD THE DATA PATTERN + THE HOLD BIT IN CAS REGISTER 21(8)
: * : : INCREMENT THE ADDRESS BY 1
: * : : DO UNTIL THE ADDRESS=50000(8)
: * : ENDD0
: * : INITIALIZE THE ADDRESS TO 40000(8)
: * : BGND0
: * : : LOAD THE ADDRESS IN CAS REGISTER 20(8)
: * : : INPUT CAS REGISTER 21(8) LOW 8 BITS
: * : : IF LOW 8 BITS OF CAS REGISTER 21(8)=
: * : : : THEN-CONTINUE
: * : : : ELSE-ERROR 28
: * : : ENDF
: * : : INCREMENT THE ADDRESS BY 1
: * : : DO UNTIL THE ADDRESS=50000(8)
: * : ENDD0
: * : INCREMENT THE DATA PATTERN BY 1
: * : DO UNTIL THE DATA PATTERN=0

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```

2826      ;* ENDDO
2827      ;*ENDTST
2828 010424 SE
          ;*****
          ;*ERRORS
          ;*-----
2829      ;*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
2830      ;*M8957, M8960
2831      ;*RH: AAAAAA TM: X TU: X PORT: X
2832      ;*'HLDA' NOT SET STATUS = 000000
2833      ;*
2834      ;*CZTMIA DVC FTL ERR 000028 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
2835      ;*M8960
2836      ;*RH: AAAAAA TM: X TU: X PORT: X
2837      ;*TM78 MEMORY FAILURE
2838      ;*ADD = 000000
2839      ;*ACT = 000000
2840      ;*EXP = 000000
2841 010424 S
          ;*****
2842
2843      BGNTST
2844 010424 CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG
2845 010430 CALL HOLDMP ;HOLD THE TM78MP-WAIT FOR HLDA
2846 010434 CLR R2 ;SET UP STARTING DATA PATTERN
2847 010436 CLR R1 ;CLEAR THE ERROR OCCURED FLAG
2848 010440 4$: MOV #040000,R3 ;LOAD STARTING MEMORY ADDRESS
2849 010444 1$: MOV R3,@AD80 ;ADDRESS THE TM78
2850 010450 BIC #177400,R2 ;REMOVE JUNK BITS
2851 010454 BIS #HOLD,R2 ;ADD IN THE HOLD BIT
2852 010460 MOV R2,@DS80 ;WRITE IT TO THE TM78MP
2853 010464 INC R3 ;INCREMENT THE MEMORY ADDRESS
2854 010466 CMP #050000,R3 ;COMPARE TO FINAL ADDRESS
2855 010472 BNE 1$ ;CONTINUE UNTIL DONE
2856 010474 MOV #040000,R3 ;LOAD THE STARTING MEMORY ADDRESS
2857 010500 BGNSEG
2858 010502 3$: MOV R3,@AD80 ;ADDRESS TM78 RAM
2859 010506 BIC #177400,R2 ;REMOVE JUNK BITS
2860 010512 MOV @DS80,R4 ;GET CONTENTS OF TM78 RAM
2861 010516 BIC #177400,R4 ;REMOVE DATA BYTE
2862 010522 CMP R2,R4 ;EXPECTED=ACTUAL?
2863 010524 BEQ 2$ ;YES-CONTINUE
2864 010526 ERRDF 28.,PRO,ERM028 ;NO - PRINT ERROR
2865 010536 MOV #1,R1 ;SET THE ERROR OCCURED FLAG
2866 010542 BIS #HOLD,R2 ;REWRITE THE FAILING LOCATION
2867 010546 MOV R2,@DS80
2868 010552 2$: TST R1 ;HAVE ANY ERRORS OCCURED?
2869 010554 BEQ 5$ ;NO - SKIP THE CKLOOP TO SAVE TIME
2870 010556 CKLOOP
2871 010560 5$: INC R3 ;INCREMENT THE TM78 ADDRESS
2872 010562 CMP #050000,R3 ;DONE?
2873 010566 BNE 3$ ;NO-KEEP ON TRUKIN'
2874 010570 ENDSEG
2875 010572 INC R2 ;YES-INCREMENT THE DATA BYTE
2876 010574 CMP R2,#400 ;ALL PATTERNS RUN?
2877 010600 BNE 4$ ;NO-KEEP ON TRUKIN'

```

2878 010602
2879
2880 010604
(1)
(1)
(1)
2881
2882 010604
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(1)
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2884
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2886 010604
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(1)
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2902 010604
(1)
(1)
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```
ENDTST ;YES-HANG IT UP
.SBTTL TEST 15 - CAS WRITE/READ TEST - ADDRESS TO ADDRESS
ST
:*****
:*TEST TITLE
:-----
:*TEST 15 CAS WRITE/READ TEST - ADDRESS TO ADDRESS
SD
:*****
:*DESCRIPTION
:-----
:*THIS TEST PERFORMS A BASIC CHECK OF THE COMMON ADDRESS SPACE (CAS)
:*ADDRESSING LOGIC BY WRITING THE NUMBER OF THE CAS REGISTER TO ITS
:*RESPECTIVE REGISTER.
SP
:*****
:*PROCEDURE
:-----
:*BGNTST
:* CALL SUBROUTINE HOLDMP
:* SET CPU INTERRUPT PRIORITY TO IGNORE INTERRUPTS
:* INITIALIZE N TO ZERO
:* INITIALIZE THE DATA BYTE TO 2
:* BGNDO
:* : WRITE DATA BYTE TO CAS N
:* : INCREMENT THE CAS REGISTER NUMBER BY 1
:* : INCREMENT THE DATA BYTE BY 1
:* : DO UNTIL ALL CAS REGISTERS WRITTEN
:* ENDDO
:* CALL SUBROUTINE CASWRT
:* CALL SUBROUTINE CASRED
:* CALL SUBROUTINE CASCMP
:*ENDTST
SE
:*****
:*ERRORS
:-----
:*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957, MASSBUS
:*RH: AAAAAA TM: X TU: X PORT: X
:*'NED' WHEN READING MB REG.
:*
:*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*'HLDA' NOT SET STATUS = 000000
:*
:*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957
:*RH: AAAAAA TM: X TU: X PORT: X
:*CAS DATA COMPARE FAIL
:*CAS REG. 000000
:*
:*CZTMIA DVC FTL ERR 000029 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957, MASSBUS
:*RH: AAAAAA TM: X TU: X PORT: X
```

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2927
2928 010604
(1)
2929 010604
2930 010604 005037 004412
2931 010610 004737 035154
2932 010614 012702 000002
2933 010620 005001
2934 010622 010261 033642
2935 010626 005201
2936 010630 005201
2937 010632 005202
2938 010634 020127 000036
2939 010640 001370
2940 010642 004737 034350
2941 010646 004737 034452
2942 010652 004737 035020
2943 010656
2944
2945 010660
(1)
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2947 010660
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2952 010660
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```
;*PARITY ERR. READING CAS REG. 000000  
;*CZTMIA DVC FTL ERR 000030 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
;*M8956, M8957, MASSBUS  
;*RH: AAAAAA TM: X TU: X PORT: X  
;*PARITY ERR. WRITING CAS REG. 000000  
S  
: *****  
: BGNIST  
: CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG  
: CALL HOLDMP ;STOP THE 8085  
: MOV #2,R2 ;INITIALIZE THE DATA BYTE  
: CLR R1 ;CLEAR THE BUFFER POINTER  
1$: MOV R2,MBBUF(R1) ;WRITE DATA TO THE BUFFER  
: INC R1 ;ADD #2 TO THE BUFFER POINTER  
: INC R1  
: INC R2 ;ADD #1 TO THE DATA BYTE  
: CMP R1,#30. ;END OF BUFFER?  
: BNE 1$ ;NO-CONTINUE  
: CALL CASWRT ;GO WRITE CAS FROM HOST  
: CALL CASRED ;GO READ CAS FROM HOST  
: CALL CASCMP ;GO COMPARE DATA  
: ENDTST  
: .SBTTL TEST 16 - TM78 BASIC CONFIDENCE TEST  
: ST  
: *****  
: *TEST TITLE  
: *-----  
: *TEST 16 TM78 BASIC CONFIDENCE TEST  
: SD  
: *****  
: *DESCRIPTION  
: *-----  
: *THIS TEST LOADS A PROGRAM (MICRO-DIAGNOSTIC) TO THE TM78 RAM AND  
: *STARTS IT RUNNING. THE PURPOSE OF THE DIAGNOSTIC IS TO GAIN CON-  
: *FIDENCE IN THE TM78 MICRO-DIAGNOSTIC RAM THE ADDRESSING CAPABILITY  
: *OF THE 8085.  
: SP  
: *****  
: *PROCEDURE  
: *-----  
: *BGNTST  
: * CALL SUBROUTINE CASBOT  
: * IF ERRCOD=0  
: * : THEN-CALL SUBROUTINE HOLDMP  
: * : DEPOSIT 3 INTO TM78 RAM LOCATION 41420(8)  
: * : CALL SUBROUTINE DIAGST  
: * : IF ERRCOD=0  
: * : : THEN-LOAD 35(8) INTO CAS LOCATION 0  
: * : : DELAY  
: * : : IF INTERRUPT CODE 372(8)  
: * : : : THEN-CONTINUE  
: * : : : ELSE-ERROR  
: * : : : ENDF  
: * : ENDF  
: * ENDF
```

```
2968 : *ENDTST
2969 010660 SE
(1) : *****
(1) : *ERRORS
(1) : -----
2970 : *CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
2971 : *M8957, M8960
2972 : *RH: AAAAAA TM: X TU: X PORT: X
2973 : *MICRO DIAGNOSTIC RESPONSE TIMEOUT
2974 010660 S
(1) : *****
2975
2976 010660 BGNTST
2977 010660 004737 034242 CALL CASBOT
2978 010664 005705 TST ERRCOD
2979 010666 001402 BEQ 2$
2980 010670 EXIT TST
2981 010674 004737 035154 2$: CALL HOLDMP ;STOP THE TM78
2982 010700 012777 041420 173372 MOV #CASCMD,@AD80 ;ADDRESS THE COMMAND LOCATION
2983 010706 012777 000403 173366 MOV #HOLD+3,@DS80 ;STORE THE MEMORY TEST COMMAND
2984 010714 004737 014762 CALL DIAGST ;START THE DIAGNOSTIC MONITOR
2985 010720 005705 TST ERRCOD ;ERROR?
2986 010722 001402 BEQ 5$ ;NO - CONTINUE
2987 010724 EXIT TST ;YES - EXIT THE TEST
2988 010730 012777 000035 173272 5$: MOV #TSTART,@XFRCMD ;ISSUE CODE 35
2989 010736 012702 000214 MOV #140.,R2 ;TIMES TO DELAY TO EQUAL 35 SEC.
2990 010742 6$: DELAY 250 ;DELAY 25 MS.
2991 010772 BREAK
2992 010774 005302 DEC R2 ;DECREMENT LOOP COUNT
2993 010776 001361 BNE 6$ ;DO IT AGAIN
2994 011000 013777 004352 173232 MOV MBDRIV,@CS2 ;LOAD THE MASS BUSS DRIVE NUMBER
2995 011006 122777 000372 173214 CMPB #372,@XFRCMD ;DID PROC TEST FINISH.
2996 011014 001404 BEQ 1$ ;YES-DONE
2997 011016 ERRDF 8.,PROCAS,ERM008
2998 011026 1$: CKLOOP
2999 011030 004737 021660 CALL CLOSEX ;CLOSE THE CHANNEL
3000
3001 011034 ENDTST
3002
3003
3004 .SBTTL TEST 17 - CAS CONTENTION INTERRUPT TEST
3005 011036 ST
(1) : *****
(1) : *TEST TITLE
(1) : -----
3006 : *TEST 17 CAS CONTENTION INTERRUPT TEST
3007 011036 SD
(1) : *****
(1) : *DESCRIPTION
(1) : -----
3008 : *THIS TEST CHECKS THE OPERATION OF THE CAS CONTENTION (BETWEEN THE
3009 : *HOST AND THE 8085.) ERROR LOGIC. TO TEST THE PROPER OPERATION OF
3010 : *THE LOGIC A PROGRAM MUST BE LOADED AND EXECUTED IN THE TM78 THAT
3011 : *ACCESSES CAS WHILE THE HOST ACCESSES CAS.
3012 011036 SP
(1) : *****
```

```
(1)
(1)
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3036 011036
(1)
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(1)
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3046 011036
(1)
3047
3048 011036
3049 011036 004737 034242
3050 011042 005705
3051 011044 001402
3052 011046
3053 011052 004737 035154 5$:
3054 011056 012737 000777 004346
3055 011064 012777 041420 173206
3056 011072 012777 000402 173202
3057 011100 004737 014762
3058 011104 005705
3059 011106 001402
3060 011110
3061 011114 012777 000035 173106 4$:
3062 011122 013701 004230 2$:
```

```
;*PROCEDURE
-----
;*BGNTST
;* CALL SUBROUTINE CASBOT (LOAD THE CAS PROGRAM)
;* IF A BOOT ERROR
;* : THEN-EXIT TEST
;* : ELSE-CONTINUE
;* ENDF
;* CALL SUBROUTINE HOLDMP
;*
;* LOAD THE ADDRESS OF THE CAS CONTROL BYTE 41420 TO CAS REGISTER 20(8)
;* LOAD THE 'HOLD' BIT+002 TO CAS REGISTER 21(8)
;* CALL SUBROUTINE CONT
;* LOAD THE DIAGNOSTIC START/RESTART COMMAND 35(8) TO MB REGISTER 0
;* SET UP A TIMEOUT COUNT
;* BGND0
;* : READ ALL THE MB REGISTERS 000-052(8)
;* : DECREMENT THE TIMEOUT COUNT
;* : DO UNTIL TIMEOUT COUNT=0 OR MB REGISTER 0=372(8)
;* ENDD0
;* IF TIMEOUT COUNT=0
;* : THEN-ERROR 18
;* : ELSE-CONTINUE
;* ENDF
;*ENDTST
SE
*****
;*ERRORS
-----
;*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8957, M8960
;*RH: AAAAAA TM: X TU: X PORT: X
;* 'HLDA' NOT SET STATUS = 000000
;*
;*CZTMIA DVC FTL ERR 000018 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8956, M8957
;*RH: AAAAAA TM: X TU: X PORT: X
;*NO CONTENTION ERROR OCCURRED
S
*****
```

```
BGNTST
CALL CASBOT ;BOOT UP THE CAS PROGRAM
TST ERRCOD
BEQ 5$
EXIT TST
CALL HOLDMP
MOV #777,COUNT ;LOAD TIMEOUT COUNT
MOV #CASCMD,@AD80 ;ADDRESS THE COMMAND BYTE
MOV #HOLD+2,@DS80 ;WRITE THE CONTENTION TEST COMMAND
CALL DIAGST
TST ERRCOD ;ERROR?
BEQ 4$ ;NO - CONTINUE
EXIT TST ;YES - EXIT THE TEST
MOV #TSTART,@XFRCMD
MOV XFRCMD,R1 ;LOAD STARTING CAS ADDRESS
```

3063 011126 012100
3064 011130 023701 C04300
3065 011134 001374
3066 011136 122777 000372 173064
3067 011144 001407
3068 011146 005337 004346
3069 011152 001363
3070
3071 011154
3072
3073 011164
3074 011166
3075
3076
3077 011170
(1)
(1)
(1)
3078
3079 C11170
(1)
(1)
(1)
3080
3081
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3084 011170
(1)
(1)
(1)
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3089 011170
(1)
(1)
(1)
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3106

1\$: MOV (R1)+,R0 ;READ MASS BUS REGISTER
CMP AD80,R1
BNE 1\$
CMPB #372,@XFRCMD ;DID A CONTENTION INTERRUPT OCCUR?
BEQ 6\$;YES-CONTENTION ERROR OCCURRED
DEC COUNT ;NO-TRY AGAIN?
BNE 2\$;YES-CONTINUE
;NO-ERROR
ERRDF 18.,CASX,ERM018
6\$: CKLOOP
ENDTST
SBTTL TEST 18 - CAS WRITE TEST - ALL ZEROS
ST
:*****
:*TEST TITLE
:-----
:*TEST 18 CAS WRITE TEST - ALL ZEROS
SD
:*****
:*DESCRIPTION
:-----
:*THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
:*HOST CPU WITH A DATA PATTERN OF 000000(8), READING THE PATTERN FROM
:*THE TM78, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE ERRORS
:*ARE LOGGED.
SP
:*****
:*PROCEDURE
:-----
:*BGNTST
:* SET UP THE DATA PATTERN 000000(8)
:* CALL SUBROUTINE CASOW
:*ENDTST
SE
:*****
:*ERRORS
:-----
:*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957, MASSBUS
:*RH: AAAAAA TM: X TU: X PORT: X
:*'NED' WHEN READING MB REG.
:*
:*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*'HLDA' NOT SET STATUS = 000000
:*
:*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*MICRO DIAGNOSTIC RESPONSE TIMEOUT
:*
:*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957

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3111
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3115 011170
(1)
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3117 011170
3118 011170 005002
3119 011172 004737 034006
3120 011176
3121
3122 011200
(1)
(1)
(1)
3123
3124 011200
(1)
(1)
(1)
3125
3126
3127
3128
3129 011200
(1)
(1)
(1)
3130
3131
3132
3133
3134 011200
(1)
(1)
(1)
3135
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3137
3138
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3140
3141
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```
:*RH: AAAAAA TM: X TU: X PORT: X
:*CAS DATA COMPARE FAIL
:*CAS REG. 000000
:*
:*CZTMIA DVC FTL ERR 000030 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957, MASSBUS
:*RH: AAAAAA TM: X TU: X PORT: X
:*PARITY ERR. WRITING CAS REG. 000000
S
: *****
:
:          BGNTST
:          CLR      R2
:          CALL     CASOW
:          ENDTST
.SBTTL TEST 19 - CAS WRITE TEST - ALL ONES
ST
: *****
:*TEST TITLE
:-----
:*TEST 19          CAS WRITE TEST - ALL ONES
SD
: *****
:*DESCRIPTION
:-----
:*THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
:*HOST CPU WITH A DATA PATTERN OF 177777(8), READING THE PATTERN FROM
:*THE TM78, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE ERRORS
:*ARE LOGGED.
SP
: *****
:*PROCEDURE
:-----
:*BGNTST
:*  SET UP THE DATA PATTERN 177777(8)
:*  CALL SUBROUTINE CASOW
:*ENDTST
SE
: *****
:*ERRORS
:-----
:*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957, MASSBUS
:*RH: AAAAAA TM: X TU: X PORT: X
:*'NED' WHEN READING MB REG.
:*
:*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*'HLDA' NOT SET STATUS = 000000
:*
:*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*MICRO DIAGNOSTIC RESPONSE TIMEOUT
:*
```

```
3150 : *CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3151 : *M8956, M8957
3152 : *RH: AAAAAA TM: X TU: X PORT: X
3153 : *CAS DATA COMPARE FAIL
3154 : *CAS REG. 000000
3155 : *
3156 : *CZTMIA DVC FTL ERR 000030 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3157 : *M8956, M8957, MASSBUS
3158 : *RH: AAAAAA TM: X TU: X PORT: X
3159 : *PARITY ERR. WRITING CAS REG. 000000
3160 011200 S
(1) : *****
3161 :
3162 011200 BGNTST
3163 011200 012702 177777 MOV #177777,R2 ;LOAD ALL ONES DATA PATTERN
3164 011204 004737 034006 CALL CASCOW ;
3165 011210 ENDTST
3166 :
3167 : SBTTL TEST 20 - CAS WRITE TEST - DATA PATTERN 153271
3168 011212 ST
(1) : *****
(1) : *TEST TITLE
(1) : *-----*
3169 : *TEST 20 CAS WRITE TEST - DATA PATTERN 153271
3170 011212 SD
(1) : *****
(1) : *DESCRIPTION
(1) : *-----*
3171 : *THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
3172 : *HOST CPU WITH A DATA PATTERN OF 153271(8), READING THE PATTERN FROM
3173 : *THE TM78, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE ERRORS
3174 : *ARE LOGGED.
3175 011212 SP
(1) : *****
(1) : *PROCEDURE
(1) : *-----*
3176 : *BGNTST
3177 : * SET UP THE DATA PATTERN 153271(8)
3178 : * CALL SUBROUTINE CASCOW
3179 : *ENDTST
3180 011212 SE
(1) : *****
(1) : *ERRORS
(1) : *-----*
3181 : *CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3182 : *M8956, M8957, MASSBUS
3183 : *RH: AAAAAA TM: X TU: X PORT: X
3184 : *'NED' WHEN READING MB REG.
3185 : *
3186 : *CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3187 : *M8957, M8960
3188 : *RH: AAAAAA TM: X TU: X PORT: X
3189 : *'HLDA' NOT SET STATUS = 000000
3190 : *
3191 : *CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3192 : *M8957, M8960
```



```
3193 : *RH: AAAAAA TM: X TU: X PORT: X
3194 : *MICRO DIAGNOSTIC RESPONSE TIMEOUT
3195 : *
3196 : *CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3197 : *M8956, M8957
3198 : *RH: AAAAAA TM: X TU: X PORT: X
3199 : *CAS DATA COMPARE FAIL
3200 : *CAS REG. 000000
3201 : *
3202 : *CZTMIA DVC FTL ERR 000030 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3203 : *M8956, M8957, MASSBUS
3204 : *RH: AAAAAA TM: X TU: X PORT: X
3205 : *PARITY ERR. WRITING CAS REG. 000000
3206 011212 S
(1) : *****
3207
3208 011212 BGNTST
3209 011212 012702 153271 MOV #153271,R2 ;LOAD ALTERNATE ZEROS AND ONES
3210 011216 004737 034006 CALL CASCOW
3211 011222 ENDTST
3212
3213 .SBTTL TEST 21 - CAS WRITE TEST - DATA PATTERN 175747
3214 011224 ST
(1) : *****
(1) : *TEST TITLE
(1) : *-----
3215 : *TEST 21 CAS WRITE TEST - DATA PATTERN 175747
3216 011224 SD
(1) : *****
(1) : *DESCRIPTION
(1) : *-----
3217 : *THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
3218 : *HOST CPU WITH A DATA PATTERN OF 175747(8), READING THE PATTERN FROM
3219 : *THE TM78, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE ERRORS
3220 : *ARE LOGGED.
3221 011224 SP
(1) : *****
(1) : *PROCEDURE
(1) : *-----
3222 : *BGNTST
3223 : * SET UP THE DATA PATTERN 175747(8)
3224 : * CALL SUBROUTINE CASCOW
3225 : *ENDTST
3226 011224 SE
(1) : *****
(1) : *ERRORS
(1) : *-----
3227 : *CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3228 : *M8956, M8957, MASSBUS
3229 : *RH: AAAAAA TM: X TU: X PORT: X
3230 : *'NED' WHEN READING MB REG.
3231 : *
3232 : *CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3233 : *M8957, M8960
3234 : *RH: AAAAAA TM: X TU: X PORT: X
3235 : *'HLDA' NOT SET STATUS = 000000
```

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3236 :*
3237 :*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3238 :*M8957, M8960
3239 :*RH: AAAAAA TM: X TU: X PORT: X
3240 :*MICRO DIAGNOSTIC RESPONSE TIMEOUT
3241 :*
3242 :*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3243 :*M8956, M8957
3244 :*RH: AAAAAA TM: X TU: X PORT: X
3245 :*CAS DATA COMPARE FAIL
3246 :*CAS REG. 000000
3247 :*
3248 :*CZTMIA DVC FTL ERR 000030 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3249 :*M8956, M8957, MASSBUS
3250 :*RH: AAAAAA TM: X TU: X PORT: X
3251 :*PARI Y ERR. WRITING CAS REG. 000000
3252 011224 S
(1) : *****
3253 :
3254 011224 BGNTST
3255 011224 012702 175747 MOV #175747,R2 ;LOAD ALTERNATE ZEROS AND ONES
3256 011230 004737 034006 CALL CASCOW
3257 011234 ENDTST
3258 :
3259 :.SBTTL TEST 22 - CAS WRITE TEST - DATA PATTERN 062232
3260 011236 ST
(1) : *****
(1) :*TEST TITLE
(1) :*-----
3261 :*TEST 22 CAS WRITE TEST - DATA PATTERN 062232
3262 011236 SD
(1) : *****
(1) :*DESCRIPTION
(1) :*-----
3263 :*THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
3264 :*HOST CPU WITH A DATA PATTERN OF 062132(8), READING THE PATTERN FROM
3265 :*THE TM78, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE ERRORS
3266 :*ARE LOGGED.
3267 011236 SP
(1) : *****
(1) :*PROCEDURE
(1) :*-----
3268 :*BGNTST
3269 :* SET UP THE DATA PATTERN 062132(8)
3270 :* CALL SUBROUTINE CASCOW
3271 :*ENDTST
3272 011236 SE
(1) : *****
(1) :*ERRORS
(1) :*-----
3273 :*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3274 :*M8956, M8957, MASSBUS
3275 :*RH: AAAAAA TM: X TU: X PORT: X
3276 :*'NED' WHEN READING MB REG.
3277 :*
3278 :*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
```

```
3279 : *M8957, M8960
3280 : *RH: AAAAAA TM: X TU: X PORT: X
3281 : *'HLDA' NOT SET STATUS = 000000
3282 : *
3283 : *CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3284 : *M8957, M8960
3285 : *RH: AAAAAA TM: X TU: X PORT: X
3286 : *MICRO DIAGNOSTIC RESPONSE TIMEOUT
3287 : *
3288 : *CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3289 : *M8956, M8957
3290 : *RH: AAAAAA TM: X TU: X PORT: X
3291 : *CAS DATA COMPARE FAIL
3292 : *CAS REG. 000000
3293 : *
3294 : *CZTMIA DVC FTL ERR 000030 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3295 : *M8956, M8957, MASSBUS
3296 : *RH: AAAAAA TM: X TU: X PORT: X
3297 : *PARITY ERR. WRITING CAS REG. 000000
3298 011236 S
      (1) : *****
3299
3300 011236 BGNTST
3301 011236 012702 062132 MOV #062132,R2 ;LOAD ALTERNATE ZEROS AND ONES
3302 011242 004737 034006 CALL CASCOW
3303 011246 ENDTST
3304
3305 .SBTTL TEST 23 - CAS WRITE TEST - DATA PATTERN 042002
3306 011250 ST
      (1) : *****
      (1) : *TEST TITLE
      (1) : *-----
3307 : *TEST 23 CAS WRITE TEST - DATA PATTERN 042002
3308 011250 SD
      (1) : *****
      (1) : *DESCRIPTION
      (1) : *-----
3309 : *THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
3310 : *HOST CPU WITH A DATA PATTERN OF 042002(8), READING THE PATTERN FROM
3311 : *THE TM78, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE ERRORS
3312 : *ARE LOGGED.
3313 011250 SP
      (1) : *****
      (1) : *PROCEDURE
      (1) : *-----
3314 : *BGNTST
3315 : * SET UP THE DATA PATTERN 042002(8)
3316 : * CALL SUBROUTINE CASCOW
3317 : *ENDTST
3318 011250 SE
      (1) : *****
      (1) : *ERRORS
      (1) : *-----
3319 : *CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
3320 : *M8956, M8957, MASSBUS
3321 : *RH: AAAAAA TM: X TU: X PORT: X
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(1)

011250

011250

011254

011260

011262

011262

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011262

012702 042002
004737 034006

```

: *'NED' WHEN READING MB REG.
: *
: *CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
: *M8957, M8960
: *RH: AAAAAA TM: X TU: X PORT: X
: *'HLDA' NOT SET STATUS = 000000
: *
: *CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
: *M8957, M8960
: *RH: AAAAAA TM: X TU: X PORT: X
: *MICRO DIAGNOSTIC RESPONSE TIMEOUT
: *
: *CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
: *M8956, M8957
: *RH: AAAAAA TM: X TU: X PORT: X
: *CAS DATA COMPARE FAIL
: *CAS REG. 000000
: *
: *CZTMIA DVC FTL ERR 000030 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
: *M8956, M8957, MASSBUS
: *RH: AAAAAA TM: X TU: X PORT: X
: *PARITY ERR. WRITING CAS REG. 000000
S
: *****
:
: BGNTST
: MOV #042002,R2 ;LOAD ALTERNATE ZEROS AND ONES
: CALL CASCOW
: ENDTST
:
: .SBTTL TEST 24 - CAS WRITE TEST - DATA PATTERN 070066
ST
: *****
: *TEST TITLE
: *-----
: *TEST 24 CAS WRITE TEST - DATA PATTERN 070066
SD
: *****
: *DESCRIPTION
: *-----
: *THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
: *HOST CPU WITH A DATA PATTERN OF 070066(8), READING THE PATTERN FROM
: *THE TM78, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE ERRORS
: *ARE LOGGED.
SP
: *****
: *PROCEDURE
: *-----
: *BGNTST
: * SET UP THE DATA PATTERN 070066(8)
: * CALL SUBROUTINE CASCOW
: *ENDTST
SE
: *****
: *ERRORS

```

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3404
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(1)
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(1)
3407
3408
3409
3410

011262

011262

011262

011266

011272

011274

011274

011274

012702 070066
004737 034006

```
:*-----  
:*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8956, M8957, MASSBUS  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*'NED' WHEN READING MB REG.  
:*  
:*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8957, M8960  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*'HLDA' NOT SET STATUS = 000000  
:*  
:*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8957, M8960  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*MICRO DIAGNOSTIC RESPONSE TIMEOUT  
:*  
:*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8956, M8957  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*CAS DATA COMPARE FAIL  
:*CAS REG. 000000  
:*  
:*CZTMIA DVC FTL ERR 000030 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8956, M8957, MASSBUS  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*PARITY ERR. WRITING CAS REG. 000000  
S  
: *****  
BGNTST  
MOV #070066,R2 ;LOAD ALTERNATE ZEROS AND ONES  
CALL CASCOV  
ENDTST  
  
.SBTTL TEST 25 - CAS WRITE TEST - DATA PATTERN 102332  
ST  
: *****  
:*TEST TITLE  
:*-----  
:*TEST 25 CAS WRITE TEST - DATA PATTERN 102332  
SD  
: *****  
:*DESCRIPTION  
:*-----  
:*THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE  
:*HOST CPU WITH A DATA PATTERN OF 102332(8), READING THE PATTERN FROM  
:*THE TM78, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE ERRORS  
:*ARE LOGGED.  
SP  
: *****  
:*PROCEDURE  
:*-----  
:*BGNTST  
:* SET UP THE DATA PATTERN 102332(8)  
:* CALL SUBROUTINE CASCOV  
:*ENDTST
```

3411 011274

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3437 011274

(1)

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3439 011274

3440 011274

3441 011300

3442 011304

3443

3444

3445 011306

(1)

(1)

(1)

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3447 011306

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3452 011306

(1)

(1)

(1)

3453

SE

```
*****
*ERRORS
*-----
*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
*M8956, M8957, MASSBUS
*RH: AAAAAA TM: X TU: X PORT: X
*'NED' WHEN READING MB REG.
*
*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
*M8957, M8960
*RH: AAAAAA TM: X TU: X PORT: X
*'HLDA' NOT SET STATUS = 000000
*
*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
*M8957, M8960
*RH: AAAAAA TM: X TU: X PORT: X
*MICRO DIAGNOSTIC RESPONSE TIMEOUT
*
*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
*M8956, M8957
*RH: AAAAAA TM: X TU: X PORT: X
*CAS DATA COMPARE FAIL
*CAS REG. 000000
*
*CZTMIA DVC FTL ERR 000030 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
*M8956, M8957, MASSBUS
*PH: AAAAAA TM: X TU: X PORT: X
*PARITY ERR. WRITING CAS REG. 000000
S
*****
```

```
BGNTST
MOV #102332,R2 ;LOAD ALTERNATE ZEROS AND ONES
CALL CASROW
ENDTST
```

.SBTTL TEST 26 - CAS WRITE TEST - FLOAT A 1

ST

```
*****
*TEST TITLE
*-----
*TEST 26 CAS WRITE TEST - FLOAT A 1
```

SD

```
*****
*DESCRIPTION
*-----
*THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
*HOST CPU WITH A DATA PATTERN THAT FLOATS A ONE THROUGH A FIELD OF ZEROS,
*READING THE PATTERN FROM THE TM78 SIDE, AND COMPARING THE WRITTEN WITH
*THE READ FOR EACH SHIFT OF THE PATTERN. DATA COMPARE ERRORS ARE LOGGED.
```

SP

```
*****
*PROCEDURE
*-----
*BGNTST
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(1)
(1)
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3495 011306
(1)
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3497 011306
3498 011306 004737 034242
3499 011312 005705
3500 011314 001402
3501 011316
3502 011322 012702 000001
3503 011326 010237 004330
3504 011332
3505 011334 004737 014566

```

: * CALL SUBROUTINE CASBOT
: * IF ERRCOD=0
: * : THEN-CONTINUE
: * : ELSE-EXIT TEST
: * ENDF
: * LOAD STARTING DATA PATTERN 000001(8)
: * BGND0
: * : CALL SUBROUTINE CASDAT
: * : CALL SUBROUTINE CASWRT
: * : CALL SUBROUTINE CASTMR
: * : CALL SUBROUTINE CASCMP
: * : ROTATE THE DATA PATTERN LEFT
: * : DO UNTIL THE DATA PATTERN=ZERO
: * ENDD0
: *ENDTST
SE
: *****
: *ERRORS
: *-----
: *CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
: *M8956, M8957, MASSBUS
: *RH: AAAAAA TM: X TU: X PORT: X
: *'NED' WHEN READING MB REG.
: *
: *CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
: *M8957, M8960
: *RH: AAAAAA TM: X TU: X PORT: X
: *'HLDA' NOT SET STATUS = 000000
: *
: *CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
: *M8957, M8960
: *RH: AAAAAA TM: X TU: X PORT: X
: *MICRO DIAGNOSTIC RESPONSE TIMEOUT
: *
: *CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
: *M8956, M8957
: *RH: AAAAAA TM: X TU: X PORT: X
: *CAS DATA COMPARE FAIL
: *CAS REG. 000000
: *
: *CZTMIA DVC FTL ERR 000030 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
: *M8956, M8957, MASSBUS
: *RH: AAAAAA TM: X TU: X PORT: X
: *PARITY ERR. WRITING CAS REG. 000000
S
: *****
BGNTST
CALL CASBOT ;BOOT UP THE CAS PROGRAM
TST ERRCOD
BEQ 5$
EXIT TST
5$: MOV #1,R2 ;LOAD THE STARTING DATA PATTERN
1$: MOV R2,CASDTA ;STORE THE DATA PATTERN
BGNSLG
CALL START ;START THE TM78

```

```
3506 011340 004737 034324 CALL CASDAT ;FILL THE CAS DATA BUFFER
3507 011344 004737 035154 CALL HOLDMP
3508 011350 012777 041420 172722 MOV #CASCMD,@AD80 ;ADDRESS COMMAND BYTE
3509 011356 012777 000400 172716 MOV #HOLD,@DS80 ;ISSUE THE READ CAS FROM TM78MP COMMAND
3510 011384 004737 014566 CALL START
3511 011370 004737 034350 CALL CASWRT ;GO WRITE CAS FROM HOST
3512 011374 CKLOOP
3513 011376 012777 000035 172624 MOV #TSTART,@XFRCMD
3514 011404 DELAY 100 ;PERFORM A 10MS. TIMEOUT
3515 011434 122777 000372 172566 CMPB #372,@XFRCMD ;DONE
3516 011442 001406 BEQ 5$ ;YES-CONTINUE
3517 011444 ERRDF 8.,PROCAS,ERM008 ;NO-PRINT THE ERROR
3518 011454 CKLOOP
3519 011456 000406 BR 6$ ;EXIT THE MODULE
3520 011460 3$: CKLOOP
3521 011462 004737 034560 CALL CASTMR ;GO READ CAS FROM TM78
3522 011466 004737 035020 CALL CASCMP ;GO COMPARE WRITTEN/READ
3523 011472 CKLOOP
3524 011474 6$: ENDSEG
3525 011476 013702 004330 MOV CASDTA,R2 ;GET THE PATTERN JUST WRITTEN
3526 011502 000241 CLC ;CLEAR THE C BIT
3527 011504 006102 ROL R2 ;SHIFT THE PATTERN LEFT
3528 011506 103307 BCC 1$
3529 011510 ENDTST
```

```
3530
3531 .SBTTL TEST 27 - CAS WRITE TEST - FLOAT A ZERO
3532 011512 ST
(1) : *****
(1) : *TEST TITLE
(1) : -----
3533 : *TEST 27 CAS WRITE TEST - FLOAT A ZERO
3534 011512 SD
(1) : *****
(1) : *DESCRIPTION
(1) : -----
3535 : *THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
3536 : *HOST CPU WITH A DATA PATTERN THAT FLOATS A ZERO THROUGH A FIELD OF ONES.
3537 : *READING THE PATTERN FROM THE TM78 SIDE, AND COMPARING THE WRITTEN WITH
3538 : *THE READ FOR EACH SHIFT OF THE PATTERN. DATA COMPARE ERRORS ARE LOGGED.
3539 011512 SP
(1) : *****
(1) : *PROCEDURE
(1) : -----
3540 : *BGNTST
3541 : * CALL SUBROUTINE CASBOT
3542 : * IF ERRCOD 0
3543 : * : THEN-CONTINUE
3544 : * : ELSE-EXIT TEST
3545 : * ENDF
3546 : * LOAD STARTING DATA PATTERN 177776(8)
3547 : * BGNDO
3548 : * : CALL SUBROUTINE CASDAT
3549 : * : CALL SUBROUTINE CASWRT
3550 : * : CALL SUBROUTINE CASTMR
3551 : * : CALL SUBROUTINE CASCMP
3552 : * : ROTATE THE DATA PATTERN LEFT
```


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3556 011512
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3582 011512
(1)
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3584 011512
3585 011512 004737 034242
3586 011516 005705
3587 011520 001402
3588 011522
3589 011526 012702 177776
3590 011532 010237 004330
3591 011536
3592 011540 004737 014566
3593 011544 004737 034324
3594 011550 004737 035154
3595 011554 012777 041420 172516
3596 011562 012777 000400 172512
3597 011570 004737 014566
3598 011574 004737 034350
3599 011600
3600 011602 012777 000035 172420
3601 011610
3602 011640 122777 000372 172362
3603 011646 001406
3604 011650

```
;* : DO UNTIL THE DATA PATTERN-177777(8)
;* ENDDO
;*ENDTST
SE
: *****
;*ERRORS
:-----
;*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8956, M8957, MASSBUS
;*RH: AAAAAA TM: X TU: X PORT: X
;* 'NED' WHEN READING MB REG.
:
;*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8957, M8960
;*RH: AAAAAA TM: X TU: X PORT: X
;* 'HLDA' NOT SET STATUS = 000000
:
;*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8957, M8960
;*RH: AAAAAA TM: X TU: X PORT: X
;*MICRO DIAGNOSTIC RESPONSE TIMEOUT
:
;*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8956, M8957
;*RH: AAAAAA TM: X TU: X PORT: X
;*CAS DATA COMPARE FAIL
;*CAS REG. 000000
:
;*CZTMIA DVC FTL ERR 000030 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*RH: AAAAAA TM: X TU: X PORT: X
;*PARITY ERR. WRITING CAS REG. 000000
;*M8956, M8957, MASSBUS
S
: *****

BGNTST
CALL CASBOT ;BOOT UP THE CAS PROGRAM
TST ERRCOD
BEQ 5$
EXIT TST
5$: MOV #177776,R2 ;LOAD THE DATA PATTERN
1$: MOV R2,CASDTA ;STORE THE DATA PATTERN
BGNSEG
CALL START ;START THE TM78
CALL CASDAT ;FILL THE CAS DATA BUFFER
CALL HOLDMP
MOV #CASCMD,@AD80 ;ADDRESS COMMAND BYTE
MOV #HOLD,@DS80 ;ISSUE THE READ CAS FROM TM78MP COMMAND
CALL START
CALL CASWRT ;GO WRITE CAS FROM HOST
CKLOOP
MOV #TSTART,@XFRCMD
DELAY 100 ;PERFORM A 10MS. TIMEOUT
CMPB #372,@XFRCMD ;DONE
BEQ 3$ ;YES-CONTINUE
ERRDF 8.,PROCAS,ERM008 ;NO-PRINT THE ERROR
```

3605 011660
3606 011662 000406
3607 011664
3608 011666 004737 034560
3609 011672 004737 035020
3610 011676
3611 011700
3612 011702 013702 004330
3613 011706 000261
3614 011710 006102
3615 011712 103707
3616 011714

```
CKLOOP  
BR 6$ ;EXIT THE MODULE  
3$: CKLOOP  
CALL CASTMR ;GO READ CAS FROM TM78  
CALL CASCMP ;GO COMPARE WRITTEN/READ  
CKLOOP  
6$: ENDSEG  
MOV (ASDTA,R2 ;GET THE PATTERN JUST WRITTEN  
SEC ;SET THE C BIT  
ROL R2 ;MAKE NEXT DATA PATTERN  
BCS 1$  
ENDTST
```

3617
3618
3619 011716

.SBTTL TEST 28 - CAS READ TEST - ALL ZEROS

(1)
(1)
(1)

```
ST  
:*****  
:*TEST TITLE  
:-----  
:*TEST 28 CAS READ TEST - ALL ZEROS
```

3620
3621 011716

```
SD  
:*****  
:*DESCRIPTION  
:-----  
:*THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE  
:*TM78 SIDE WITH A DATA PATTERN OF 000000(8), READING THE PATTERN FROM  
:*THE HOST CPU, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE  
:*ERRORS ARE LOGGED.
```

(1)
(1)
(1)

3622
3623
3624
3625
3626 011716

```
SP  
:*****  
:*PROCEDURE  
:-----  
:*BGNST  
:* SET UP THE DATA PATTERN 000000(8)  
:* CALL SUBROUTINE CASCOR  
:*ENDTST
```

(1)
(1)
(1)

3627
3628
3629
3630
3631 011716

```
SE  
:*****  
:*ERRORS  
:-----  
:*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8956, M8957, MASSBUS  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*'NED' WHEN READING MB REG.
```

(1)
(1)
(1)

3632
3633
3634
3635
3636
3637

```
:*  
:*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8957, M8960  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*'HLDA' NOT SET STATUS = 000000
```

3638
3639
3640

3641
3642
3643
3644
3645

```
:*  
:*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8957, M8960  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*MICRO DIAGNOSTIC RESPONSE TIMEOUT
```

3646
3647
3648

```
:*  
:*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8956, M8957
```

3649
3650
3651
3652
3653
3654
3655
3656
3657 011716
(1)

:*RH: AAAAAA TM: X TU: X PORT: X
:*CAS DATA COMPARE FAIL
:*CAS REG. 000000
:*
:*CZTMIA DVC FTL ERR 000029 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957, MASSBUS
:*RH: AAAAAA TM: X TU: X PORT: X
:*PARITY ERR. READING CAS REG. 000000
S
: *****

3658
3659 011716
3660 011716 005002
3661 011720 004737 034170
3662 011724
3663

BGNTST
CLR R2
CALL CASCOR
ENDTST

3664
3665 011726
(1)
(1)
(1)

.SBTTL TEST 29 - CAS READ TEST - ALL ONES
ST
: *****
:*TEST TITLE
:-----
:*TEST 29 CAS READ TEST - ALL ONES

3666
3667 011726
(1)
(1)
(1)

SD
: *****
:*DESCRIPTION
:-----

3668
3669
3670
3671
3672 011726
(1)
(1)
(1)

:*THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
:*TM78 SIDE WITH A DATA PATTERN OF 177777(8), READING THE PATTERN FROM
:*THE HOST CPU, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE
:*ERRORS ARE LOGGED.
SP
: *****

3673
3674
3675
3676
3677 011726
(1)
(1)
(1)

:*PROCEDURE
:-----
:*BGNTST
:* SET UP THE DATA PATTERN 177777(8)
:* CALL SUBROUTINE CASCOR
:*ENDTST

3678
3679
3680
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3688
3689
3690
3691

SE
: *****
:*ERRORS
:-----
:*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957, MASSBUS
:*RH: AAAAAA TM: X TU: X PORT: X
:*'NED' WHEN READING MB REG.
:*
:*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*'HLDA' NOT SET STATUS - 000000
:*
:*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*MICRO DIAGNOSTIC RESPONSE TIMEOUT

3692
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3696
3697
3698
3699
3700
3701
3702
3703 011726
(1)
3704
3705 011726
3706 011726 012702 177777
3707 011732 004737 034170
3708 011736
3709
3710
3711 011740
(1)
(1)
(1)
3712
3713 011740
(1)
(1)
(1)
3714
3715
3716 011740
(1)
(1)
(1)
3717
3718
3719
3720
3721
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3723
3724
3725
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3729
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3734
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3736
3737

```
.*
.*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
.*M8956, M8957
.*RH: AAAAAA TM: X TU: X PORT: X
.*CAS DATA COMPARE FAIL
.*CAS REG. 000000
.*
.*CZTMIA DVC FTL ERR 000029 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
.*M8956, M8957, MASSBUS
.*RH: AAAAAA TM: X TU: X PORT: X
.*PARITY ERR. READING CAS REG. 000000
S
: *****
:
:          BGNTST
:          MOV      #177777,R2      ;LOAD THE DATA PATTERN
:          CALL     CASCOR
:          ENDTST
:
:SBTTL TEST 30 - CAS READ TEST - DATA PATTERN 153271
ST
: *****
: *TEST TITLE
: *-----
: *TEST 30          CAS READ TEST - DATA PATTERN 153271
SD
: *****
: *DESCRIPTION
: *-----
: *THIS TEST CHECKS THE PROPER OPERATION OF THE ATTENTION BIT SET/CLEAR
: *OPERATION.
SP
: *****
: *PROCEDURE
: *-----
: *BGNTST
: * CALL SUBROUTINE CASBOT
: * IF ERRCOD 0
: * : THEN-SET A 16 BIT DATA PATTERN TO ALL 1'S
: * :         BGND0
: * :         : CALL SUBROUTINE CASDAT
: * :         : CALL SUBROUTINE CASTMW
: * :         : IF TM78 ATTENTION SUMMARY REG.=DATA PATTERN
: * :         : : THEN-CONTINUE
: * :         : : ELSE-ERROR
: * :         : ENDF
: * :         : LOAD THE ATTENTION SUMMARY REGISTER WITH ALL 1'S
: * :         : IF THE TM78 ATTENTION SUMMARY REGISTER=0
: * :         : : THEN-CONTINUE
: * :         : : ELSE-ERROR
: * :         : ENDF
: * :         : SHIFT THE DATA PATTERN LEFT 1 BIT
: * :         : DO UNTIL THE DATA PATTERN=177400(8)
: * :         ENDD0
: * : ELSE-CONTINUE
: * ENDF
```

3738
3739 011740
(1)
(1)
(1)
3740
3741
3742
3743
3744 011740
(1)
(1)
(1)
3745
3746
3747
3748
3749 011740
(1)
(1)
(1)
3750
3751
3752
3753
3754
3755
3756
3757
3758
3759
3760
3761
3762
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3764
3765
3766
3767
3768
3769
3770
3771
3772
3773
3774
3775 011740
(1)
3776
3777 011740
3778 011740 012702 153271
3779 011744 004737 034170
3780 011750
3781
3782
3783 011752

```
;*ENDTST
SP
:*****
;*DESCRIPTION
:-----
;*THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
;*TM78 SIDE WITH A DATA PATTERN OF 153271(8), READING THE PATTERN FROM
;*THE HOST CPU, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE
;*ERRORS ARE LOGGED.
SP
:*****
;*PROCEDURE
:-----
;*BGNTST
;* SET UP THE DATA PATTERN 153271(8)
;* CALL SUBROUTINE CASCOR
;*ENDTST
SE
:*****
;*ERRORS
:-----
;*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8956, M8957, MASSBUS
;*RH: AAAAAA TM: X TU: X PORT: X
;* 'NED' WHEN READING MB REG.
;*
;*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8957, M8960
;*RH: AAAAAA TM: X TU: X PORT: X
;* 'HLDA' NOT SET STATUS = 000000
;*
;*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8957, M8960
;*RH: AAAAAA TM: X TU: X PORT: X
;*MICRO DIAGNOSTIC RESPONSE TIMEOUT
;*
;*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8956, M8957
;*RH: AAAAAA TM: X TU: X PORT: X
;*CAS DATA COMPARE FAIL
;*CAS REG. 000000
;*
;*CZTMIA DVC FTL ERR 000029 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
;*M8956, M8957, MASSBUS
;*RH: AAAAAA TM: X TU: X PORT: X
;*PARITY ERR. READING CAS REG. 000000
S
:*****
BGNTST
MOV #153271,R2 ;LOAD THE DATA PATTERN
CALL CASCOR
ENDTST
.SBTTL TEST 31 - CAS READ TEST - DATA PATTERN 175747
ST
```

(1)
(1)
(1)
3784
3785 011752
(1)
(1)
(1)
3786
3787
3788
3789
3790 011752
(1)
(1)
(1)
3791
3792
3793
3794
3795 011752
(1)
(1)
(1)
3796
3797
3798
3799
3800
3801
3802
3803
3804
3805
3806
3807
3808
3809
3810
3811
3812
3813
3814
3815
3816
3817
3818
3819
3820
3821 011752
(1)
3822
3823 011752
3824 011752 012702 175747
3825 011756 004737 034170
3826 011762

```
*****
: *TEST TITLE
: *-----
: *TEST 31          CAS READ TEST - DATA PATTERN 175747
SD
: *-----
: *DESCRIPTION
: *-----
: *THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
: *TM78 SIDE WITH A DATA PATTERN OF 175747(8), READING THE PATTERN FROM
: *THE HOST CPU, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE
: *ERRORS ARE LOGGED.
SP
: *-----
: *PROCEDURE
: *-----
: *BGNTST
: *  SET UP THE DATA PATTERN 175747(8)
: *  CALL SUBROUTINE CASCOR
: *ENDTST
SE
: *-----
: *ERRORS
: *-----
: *CZTMIA DVC FTL ERR 000003 ON UNIT NN  TST NNN  SUB 000  PC: XXXXXX
: *M8956, M8957, MASSBUS
: *RH: AAAAAA  TM: X  TU: X  PORT: X
: *'NED' WHEN READING MB REG.
: *
: *CZTMIA DVC FTL ERR 000007 ON UNIT NN  TST NNN  SUB 000  PC: XXXXXX
: *M8957, M8960
: *RH: AAAAAA  TM: X  TU: X  PORT: X
: *'HLDA' NOT SET  STATUS = 000000
: *
: *CZTMIA DVC FTL ERR 000008 ON UNIT NN  TST NNN  SUB 000  PC: XXXXXX
: *M8957, M8960
: *RH: AAAAAA  TM: X  TU: X  PORT: X
: *MICRO DIAGNOSTIC RESPONSE TIMEOUT
: *
: *CZTMIA DVC FTL ERR 000009 ON UNIT NN  TST NNN  SUB 000  PC: XXXXXX
: *M8956, M8957
: *RH: AAAAAA  TM: X  TU: X  PORT: X
: *CAS DATA COMPARE FAIL
: *CAS REG. 000000
: *
: *CZTMIA DVC FTL ERR 000029 ON UNIT NN  TST NNN  SUB 000  PC: XXXXXX
: *M8956, M8957, MASSBUS
: *RH: AAAAAA  TM: X  TU: X  PORT: X
: *PARITY ERR. READING CAS REG. 000000
S
: *-----
:
BGNTST
MOV      #175747,R2      ;LOAD THE DATA PATTERN
CALL    CASCOR
ENDTST
```


3870 011764 012702 062132
3871 011770 004737 034170
3872 011774

MOV #062132,R2 ;LOAD THE DATA PATTERN
CALL CASCOR
ENDTST

3873
3874
3875 011776

.SBTTL TEST 33 - CAS READ TEST - DATA PATTERN 042002

(1)
(1)
(1)

ST
:*****
:*TEST TITLE
:-----
:*TEST 33 CAS READ TEST - DATA PATTERN 042002

3876
3877 011776

SD
:*****
:*DESCRIPTION
:-----
:*THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
:*TM78 SIDE WITH A DATA PATTERN OF 042002(8), READING THE PATTERN FROM
:*THE HOST CPU, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE
:*ERRORS ARE LOGGED.

(1)
(1)
(1)

3878
3879
3880
3881

SP
:*****
:*PROCEDURE
:-----

3882 011776

(1)
(1)
(1)

3883
3884
3885
3886

*BGNST
* SET UP THE DATA PATTERN 042002(8)
* CALL SUBROUTINE CASCOR
*ENDTST

3887 011776

(1)
(1)
(1)

3888
3889
3890
3891

SE
:*****
:*ERRORS
:-----
:*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957, MASSBUS
:*RH: AAAAAA TM: X TU: X PORT: X
:*'NED' WHEN READING MB REG.

3892
3893
3894
3895

*
:*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*'HLDA' NOT SET STATUS = 000000

3896
3897
3898
3899

*
:*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*MICRO DIAGNOSTIC RESPONSE TIMEOUT

3900
3901
3902

3903
3904
3905
3906

*
:*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957
:*RH: AAAAAA TM: X TU: X PORT: X
:*CAS DATA COMPARE FAIL
:*CAS REG. 000000

3907
3908
3909

*
:*CZTMIA DVC FTL ERR 000029 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957, MASSBUS
:*RH: AAAAAA TM: X TU: X PORT: X
:*PARITY ERR. READING CAS REG. 000000

3910
3911
3912

3913 011776

S

(1)
3914
3915 011776
3916 011776 012702 042002
3917 012002 004737 034170
3918 012006
3919
3920
3921 012010
(1)
(1)
(1)
3922
3923 012010
(1)
(1)
(1)
3924
3925
3926
3927
3928 012010
(1)
(1)
(1)
3929
3930
3931
3932
3933 012010
(1)
(1)
(1)
3934
3935
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3942
3943
3944
3945
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3949
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3951
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3953
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3955
3956

```
*****  
          BGNTST  
          MOV     #042002,R2      ;LOAD THE DATA PATTERN  
          CALL   CASCOR  
          ENDTST  
  
          .SBTTL  TEST 34 - CAS READ TEST - DATA PATTERN 070066  
          ST  
          *****  
          : *TEST TITLE  
          : *-----  
          : *TEST 34          CAS READ TEST - DATA PATTERN 070066  
          SD  
          *****  
          : *DESCRIPTION  
          : *-----  
          : *THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE  
          : *TM78 SIDE WITH A DATA PATTERN OF 070066(8), READING THE PATTERN FROM  
          : *THE HOST CPU, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE  
          : *ERRORS ARE LOGGED.  
          SP  
          *****  
          : *PROCEDURE  
          : *-----  
          : *BGNTST  
          : * SET UP THE DATA PATTERN 070066(8)  
          : * CALL SUBROUTINE CASCOR  
          : *ENDTST  
          SE  
          *****  
          : *ERRORS  
          : *-----  
          : *CZTMIA DVC FTL ERR 000003 ON UNIT NN  TST NNN  SUB 000  PC: XXXXXX  
          : *M8956, M8957, MASSBUS  
          : *RH: AAAAAA  TM: X  TU: X  PORT: X  
          : *'NED' WHEN READING MB REG.  
          : *  
          : *CZTMIA DVC FTL ERR 000007 ON UNIT NN  TST NNN  SUB 000  PC: XXXXXX  
          : *M8957, M8960  
          : *RH: AAAAAA  TM: X  TU: X  PORT: X  
          : *'HLDA' NOT SET  STATUS - 000000  
          : *  
          : *CZTMIA DVC FTL ERR 000008 ON UNIT NN  TST NNN  SUB 000  PC: XXXXXX  
          : *M8957, M8960  
          : *RH: AAAAAA  TM: X  TU: X  PORT: X  
          : *MICRO DIAGNOSTIC RESPONSE TIMEOUT  
          : *  
          : *CZTMIA DVC FTL ERR 000009 ON UNIT NN  TST NNN  SUB 000  PC: XXXXXX  
          : *RH: AAAAAA  TM: X  TU: X  PORT: X  
          : *CAS DATA COMPARE FAIL  
          : *CAS REG. 000000  
          : *M8956, M8957  
          : *  
          : *CZTMIA DVC FTL ERR 000029 ON UNIT NN  TST NNN  SUB 000  PC: XXXXXX  
          : *M8956, M8957, MASSBUS
```

3957
3958
3959 012010
(1)
3960
3961 012010
3962 012010 012702 070066
3963 012014 004737 034170
3964 012020
3965
3966
3967 012022
(1)
(1)
(1)
3968
3969 012022
(1)
(1)
(1)
3970
3971
3972
3973
3974 012022
(1)
(1)
(1)
3975
3976
3977
3978
3979 012022
(1)
(1)
(1)
3980
3981
3982
3983
3984
3985
3986
3987
3988
3989
3990
3991
3992
3993
3994
3995
3996
3997
3998
3999

:*RH: AAAAAA TM: X TU: X PORT: X
:*PARITY ERR. READING CAS REG. 000000
S
: *****
BGNTST
MOV #070066,R2 ;LOAD THE DATA PATTERN
CALL CASCOR
ENDTST
SBTTL TEST 35 - CAS READ TEST - DATA PATTERN 102332
ST
: *****
:*TEST TITLE
:-----
:*TEST 35 CAS READ TEST - DATA PATTERN 102332
SD
: *****
:*DESCRIPTION
:-----
:*THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
:*TM78 SIDE WITH A DATA PATTERN OF 102332(8), READING THE PATTERN FROM
:*THE HOST CPU, AND COMPARING THE WRITTEN WITH THE READ. DATA COMPARE
:*ERRORS ARE LOGGED.
SP
: *****
:*PROCEDURE
:-----
:*BGNTST
:* SET UP THE DATA PATTERN 102332(8)
:* CALL SUBROUTINE CASCOR
:*ENDTST
SE
: *****
:*ERRORS
:-----
:*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957, MASSBUS
:*RH: AAAAAA TM: X TU: X PORT: X
:*'NED' WHEN READING MB REG.
:*
:*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*'HLDA' NOT SET STATUS = 000000
:*
:*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*MICRO DIAGNOSTIC RESPONSE TIMEOUT
:*
:*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957
:*RH: AAAAAA TM: X TU: X PORT: X
:*CAS DATA COMPARE FAIL
:*CAS REG. 000000

4000
4001
4002
4003
4004
4005 012022
(1)
4006
4007 012022
4008 012022 012702 102332
4009 012026 004737 034170
4010 012032
4011
4012
4013 012034
(1)
(1)
(1)
4014
4015 012034
(1)
(1)
(1)
4016
4017
4018
4019
4020 012034
(1)
(1)
(1)
4021
4022
4023
4024
4025
4026
4027
4028
4029
4030
4031
4032
4033
4034
4035
4036
4037 012034
(1)
(1)
(1)
4038
4039
4040
4041
4042

```
:*
:*CZTMIA DVC FTL ERR 000029 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957, MASSBUS
:*RH: AAAAAA IM: X TU: X PORT: X
:*PARITY ERR. READING CAS REG. 000000
S
: *****
:
:          BGNTST
:          MOV      #102332,R2      ;LOAD THE DATA PATTERN
:          CALL     CASCOR
:          ENDTST
:
:SBTTL TEST 36 - CAS READ TEST - FLOAT A 1
ST
: *****
:*TEST TITLE
:-----
:*TEST 36      CAS READ TEST - FLOAT A 1
SD
: *****
:*DESCRIPTION
:-----
:*THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
:*TM78 SIDE WITH A DATA PATTERN THAT FLOATS A 1 THROUGH A FIELD OF ZEROS,
:*READING THE PATTERN FROM THE HOST CPU, AND COMPARING THE WRITTEN WITH
:*THE READ FOR EACH SHIFT OF THE PATTERN. DATA COMPARE ERRORS ARE LOGGED.
SP
: *****
:*PROCEDURE
:-----
:*BGNTST
:* CALL SUBROUTINE CASBOT
:* IF ERRCOD=0
:* : THEN-CONTINUE
:* : ELSE-EXIT TEST
:* ENDF
:* LOADING STARTING DATA PATTERN 000001(8)
:* BGNDO
:* : CALL SUBROUTINE CASDAT
:* : CALL SUBROUTINE CASTMW
:* : CALL SUBROUTINE CASRED
:* : CALL SUBROUTINE CASCMP
:* : ROTATE THE DATA PATTERN LEFT
:* : DO UNTIL THE DATA PATTERN-ZERO
:* ENDDO
:*ENDTST
SE
: *****
:*ERRORS
:-----
:*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957, MASSBUS
:*RH: AAAAAA IM: X TU: X PORT: X
:*'NED' WHEN READING MB REG.
:*
```

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4060
4061
4062
4063 012034
(1)
4064
4065 012034
4066 012034 004737 034242
4067 012040 005705
4068 012042 001402
4069 012044
4070 012050 012702 000001
4071 012054 010237 004330
4072 012060
4073 012062 004737 014566
4074 012066 004737 034324
4075 012072 004737 034630
4076 012076 004737 034452
4077 012102
4078 012104 004737 035020
4079 012110
4080 012112
4081 012114 013702 004330
4082 012120 000241
4083 012122 006102
4084 012124 103353
4085 012126
4086
4087
4088 012130
(1)
(1)
(1)
4089
4090 012130
(1)
(1)
(1)
4091

```
:*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8957, M8960  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*'HLDA' NOT SET STATUS = 000000  
:  
:*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8957, M8960  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*MICRO DIAGNOSTIC RESPONSE TIMEOUT  
:  
:*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8956, M8957  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*CAS DATA COMPARE FAIL  
:*CAS REG. 000000  
:  
:*CZTMIA DVC FTL ERR 000029 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8956, M8957, MASSBUS  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*PARITY ERR. READING CAS REG. 000000  
S  
: *****  
:  
BGNTST  
CALL CASBOT ;BOOT THE CAS PROGRAM  
TST ERRCOD  
BEQ 5$  
EXIT TST  
5$: MOV #1,R2 ;LOAD THE DATA PATTERN  
1$: MOV R2,CASDTA ;STORE THE DATA PATTERN  
BGNSEG  
CALL START ;START THE TM78  
CALL CASDAT ;FILL THE CAS DATA BUFFER  
CALL CASTMW ;GO WRITE CAS FROM TM78  
CALL CASRED ;GO READ CAS FROM HOST  
CKLOOP  
CALL CASCMP ;COMPARE WRITTEN/READ  
CKLOOP  
ENDSEG  
MOV CASDTA,R2 ;GET THE PATTERN JUST WRITTEN  
CLC ;CLEAR THE C BIT  
ROL R2 ;SHIFT THE PATTERN LEFT  
BCC 1$ ;DO UNTIL THE ONE IS SHIFTED OUT  
ENDTST  
.  
SBITL TEST 37 - CAS READ TEST - FLOAT A 0  
ST  
: *****  
:*TEST TITLE  
:-----  
:*TEST 37 CAS READ TEST - FLOAT A 0  
SD  
: *****  
:*DESCRIPTION  
:-----  
:*THIS TEST CHECKS THE COMMON ADDRESS SPACE BY WRITING THE CAS FROM THE
```

4092
4093
4094
4095 012130
(1)
(1)
(1)
4096
4097
4098
4099
4100
4101
4102
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4104
4105
4106
4107
4108
4109
4110
4111
4112 012130
(1)
(1)
(1)
4113
4114
4115
4116
4117
4118
4119
4120
4121
4122
4123
4124
4125
4126
4127
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4131
4132
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4134
4135
4136
4137
4138 012130
(1)
4139
4140 012130

```
;*TM78 SIDE WITH A DATA PATTERN THAT FLOATS A 0 THROUGH A FIELD OF ONES,  
;*READING THE PATTERN FROM THE HOST CPU, AND COMPARING THE WRITTEN WITH  
;*THE READ FOR EACH SHIFT OF THE PATTERN. DATA COMPARE ERRORS ARE LOGGED.  
SP  
: *****  
;*PROCEDURE  
:-----  
;*BGNTST  
:* CALL SUBROUTINE CASBOT  
:* IF ERRCOD=0  
:* : THEN-CONTINUE  
:* : ELSE-EXIT TEST  
:* ENDIF  
:* LOADING STARTING DATA PATTERN 177776(8)  
:* BGND0  
:* : CALL SUBROUTINE CASDAT  
:* : CALL SUBROUTINE CASTMW  
:* : CALL SUBROUTINE CASRED  
:* : CALL SUBROUTINE CASCMP  
:* : ROTATE THE DATA PATTERN LEFT  
:* : DO UNTIL THE DATA PATTERN=177777(8)  
:* ENDD0  
;*ENDTST  
SE  
: *****  
;*ERRORS  
:-----  
:*CZTMIA DVC FTL ERR 000003 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8956, M8957, MASSBUS  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*'NED' WHEN READING MB REG.  
:*  
:*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8957, M8960  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*'HLDA' NOT SET STATUS 000000  
:*  
:*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8957, M8960  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*MICRO DIAGNOSTIC RESPONSE TIMEOUT  
:*  
:*CZTMIA DVC FTL ERR 000009 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8956, M8957  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*CAS DATA COMPARE FAIL  
:*CAS REG. 000000  
:*  
:*CZTMIA DVC FTL ERR 000029 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
:*M8956, M8957, MASSBUS  
:*RH: AAAAAA TM: X TU: X PORT: X  
:*PARITY ERR. READING CAS REG. 000000  
S  
: *****  
BGNTST
```

4141 012130 004737 034242
4142 012134 005705
4143 012136 001402
4144 012140
4145 012144 012702 177776
4146 012150 010237 004330
4147 012154
4148 012156 004737 014566
4149 012162 004737 034324
4150 012166 004737 034630
4151 012172 004737 034452
4152 012176
4153 012200 004737 035020
4154 012204
4155 012206
4156 012210 013702 004330
4157 012214 000261
4158 012216 006102
4159 012220 103753
4160 012222
4161
4162
4163 012224
 (1)
 (1)
 (1)
4164
4165 012224
 (1)
 (1)
 (1)
4166
4167
4168
4169
4170
4171
4172
4173
4174
4175
4176
4177
4178
4179
4180
4181
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4183
4184
4185
4186
4187 012224
 (1)
4188
4189 012224

```
CALL CASBOT ;BOOT THE CAS PROGRAM
TST ERRCOD
BEQ 5$
EXIT TST
5$: MOV #177776,R2 ;LOAD THE DATA PATTERN
1$: MOV R2,CASDTA ;STORE THE DATA PATTERN
BGNSEG
CALL START ;START THE TM78
CALL CASDAT ;FILL THE CAS DATA BUFFER
CALL CASTMW ;GO WRITE CAS FROM TM78
CALL CASRED ;GO READ CAS FROM HOST
CKLOOP
CALL CASCMP ;COMPARE WRITTEN/READ
CKLOOP
ENDSEG
MOV CASDTA,R2 ;GET THE PATTERN JUST WRITTEN
SEC ;SET THE C BIT
ROL R2 ;ROTATE THE PATTERN LEFT
BCS 1$ ;DO UNTIL CARRY IS SET
ENDTST

.SBTTL TEST 38 - CAS REGISTER 4 TEST
ST
: *****
:*TEST TITLE
:-----
:*TEST 38 CAS REGISTER 4 TEST
SE
: *****
:*ERRORS
:-----
:*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*'HLDA' NOT SET STATUS = 000000
:*
:*CZTMIA DVC FTL ERR 000008 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8957, M8960
:*RH: AAAAAA TM: X TU: X PORT: X
:*MICRO DIAGNOSTIC RESPONSE TIMEOUT
:*
:*CZTMIA DVC FTL ERR 000020 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957
:*RH: AAAAAA TM: X TU: X PORT: X
:*DATA FROM CAS REG 4 NOT AS EXPECTED
:*ACT = 000000
:*EXP = 000000
:*
:*CZTMIA DVC FTL ERR 000021 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
:*M8956, M8957
:*RH: AAAAAA TM: X TU: X PORT: X
:*ATTEN. REG. = 000000 AFTER WRITTEN CLEAR
S
: *****
BGNTST
```

```

4190 012224 004737 034242          CALL  CASBOT          ;BOOT THE CAS PROGRAM
4191 012230 005705                   TST  ERRCOD
4192 012232 001402                   BEQ  5$
4193 012234                   EXIT  TST
4194 012240 012702 177777          5$: MOV  #-1,R2          ;LOAD THE DATA PATTERN
4195 012244 010237 004330          3$: MOV  R2,CASDTA      ;STORE THE DATA PATTERN
4196 012250 004737 034324          CALL  CASDAT          ;FILL THE COMPARE BUFFER
4197 012254 004737 034630          CALL  CASTMW         ;GO WRITE CAS FROM TM78
4198 012260 017702 171762          MOV  @AS,R2          ;READ THE ATTENTION SUMMARY
4199 012264 020237 033642          CMP  R2,MBBUF        ;=EXPECTED?
4200 012270 001404                   BEQ  1$              ;YES-CONTINUE
4201 012272                   ERRDF 20.,CASX,ERM020
4202
4203 012302                   1$: CKLOOP
4204 012304 012777 177777 171734  MOV  #-1,@AS          ;WRITE ALL 1'S TO ATTENTION
4205 012312 000240                   NOP                    ;WAIT
4206 012314 017702 171726          MOV  @AS,R2          ;GET THE ATTENTION SUMMARY
4207 012320 001404                   BEQ  2$              ;ZERO-CONTINUE
4208
4209 012322                   ERRDF 21.,CASX,ERM021 ;ELSE-ERROR
4210
4211 012332                   2$: CKLOOP
4212 012334 013702 004330          MOV  CASDTA,R2        ;GET LAST DATA USED
4213 012340 000241                   CLC                    ;CLEAR THE C BIT
4214 012342 006102                   ROL  R2              ;SHIFT IT LEFT
4215 012344 020227 177400          CMP  R2,#177400      ;ALL ATTENTION BITS SET?
4216 012350 001335                   BNE  3$              ;NO-CONTINUE
4217 012352                   ENDTST              ;YES-END OF TEST
4218
4219                   .SBTTL TEST 39 - INTERRUPT TEST
4220 012354                   ST
(1) : *****
(1) : *TEST TITLE
(1) : -----
4221                   : *TEST 39          INTERRUPT TEST
4222 012354                   SD
(1) : *****
(1) : *DESCRIPTION
(1) : -----
4223                   : *THIS TEST CHECKS THE ABILITY OF THE TM78 TO PROPERLY INTERRUPT THE CPU
4224                   : *THROUGH THE MASS BUS.
4225 012354                   SP
(1) : *****
(1) : *PROCEDURE
(1) : -----
4226                   : *BGNTST
4227                   : * ISSUE MASS BUS INIT
4228                   : * WAIT
4229                   : * CALL SUBROUTINE HOLDMP
4230                   : * CLEAR THE ATTENTION SUMMARY REGISTER
4231                   : * SET UP THE INTERRUPT VECTOR ADDRESS
4232                   : * SET THE CPU PRIORITY TO ZERO
4233                   : * LOAD 100241(8) IN CAS REGISTER 20(8)
4234                   : * LOAD 'HOLD' BIT IN CAS REGISTER 21(8)
4235                   : * IF INTERRUPT OCCURED
4236                   : * : THEN - CONTINUE

```

4237
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4240 012354
 (1)
 (1)
 (1)
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4249
4250 012354
 (1)
4251
4252 012354
4253 012354 005037 004412
4254 012360 005037 004410
4255 012364 012777 000040 171646
4256 012372
4257 012422 004737 035154
4258 012426 012777 000377 171612
4259 012434 012777 000100 171566
4260 012442 013701 004362
4261 012446 062701 000002
4262 012452 005011
4263 012454
4264 012502
4265 012510 012777 100240 171562
4266 012516 012777 000500 171556
4267 012524 000240
4268 012526 012777 100241 171544
4269 012534 012777 000400 171540
4270 012542 000240
4271 012544 000240
4272 012546 000240
4273 012550 005737 004410
4274 012554 001004
4275 012556
4276 012566
4277 012574
4278 012576
4279 012604
4280 012606
4281 012606 005237 004410
4282 012612
4283
4284
4285 012614
 (1)
 (1)
 (1)

```
;* : ELSE - ERROE  
;* ENDIF  
;*ENDTST  
SE  
:*****  
;*ERRORS  
:-----  
;*CZTMIA DVC FTL ERR 000007 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
;*M8957, M8960  
;*RH: AAAAAA TM: X TU: X PORT: X  
;*HLDA NOT SET STATUS = 000000  
;*CZTMIA DVC FTL ERR 000022 ON UNIT NN TST NNN SUB 000 PC: XXXXXX  
;*M8957, M8960  
;*UNIT U RH: AAAAAA TM: X TU: X PORT: X  
;*CPU WAS NOT INTERRUPTED BY TM78 SETTING ATTENTION  
S  
:*****  
BGNTST  
CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG  
CLR INTFLG ;CLEAR THE INTERRUPT FLAG  
MOV #MBINIT,@CS2 ;ISSUE MASS BUS INIT  
DELAY 10 ;WAIT  
CALL HOLDMP ;HOLD THE TM78 MP  
MOV #377,@AS ;CLEAR THE ATTENTION BITS  
MOV #100,@XFRCMD ;SET THE INTERRUPT ENABLE BIT  
MOV RHVEC,R1 ;GET THE USER ENTERED VECTOR  
ADD #2,R1 ;POINT TO THE PSW PORTION  
CLR (R1) ;CLEAR THE NEW PSW  
SETVEC RHVEC,#INTMB,#PRI07 ;SET UP THE INTERRUPT VECTOR  
SETPRI #PRI00 ;SET CPU PRIORITY TO 0  
MOV #100240,@AD80 ;SET THE TM READY BIT  
MOV #500,@DS80  
NOP  
MOV #100241,@AD80 ;GENERATE AN INTERRUPT  
MOV #HOLD,@DS80  
NOP  
NOP  
NOP  
TST INTFLG ;DID THE INTERRUPT OCCUR?  
BNE 1$ ;YES-CONTINUE  
ERRDF 22.,PROCAS,ERM022 ;NO-ERROR  
1$: SETPRI #PRI07 ;SET CPU PRIORITY TO 7  
CKLOOP ;CHECK LOOP ON ERROR  
CLRVEC RHVEC ;CLEAR THE VECTOR  
ENDTST  
BGNSRV INTMB  
INC INTFLG  
ENDSRV  
  
;SBTTL TEST 40 - TM78 MICRO TESTS  
ST  
:*****  
;*TEST TITLE  
:-----
```


4286
4287 012614
(1)
(1)
(1)
4288
4289
4290
4291
4292
4293 012614
(1)
(1)
(1)
4294
4295
4296
4297
4298
4299
4300
4301
4302
4303
4304
4305
4306
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4332
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4334
4335

```
:*TEST 40          TM78 MICRO DIAGNOSTICS
SD
:*****
:*DESCRIPTION
:-----
:*THIS TEST HAS TWO MODES OF RUNNING THE MICRO DIAGNOSTIC SCRIPT FILE.
:*THE DEFAULT MODE WILL RUN ALL MICRO DIAGNOSTICS FROM TOP TO BOTTOM.
:*THE ALTERNATE MODE ALLOWS FOR MANUAL EXECUTION OF A SINGLE MICRO
:*DIAGNOSTIC, OR OPERATOR ACKNOWLEDGEMENT BEFORE EACH TEST SECTION IS
:*EXECUTED.
SP
:*****
:*PROCEDURE
:-----
:*BGNTST
:*      IF MANUAL MICRO MODULE SELECTION=0
:*      : THEN-LOAD POINTER TO MICRODIAGNOSTIC FILE NAME
:*      : CALL SUBROUTINE MICCTL
:*      : ELSE-IF MANUAL INTERVENTION FLAG=1
:*      : : THEN-PRINT WARNING MESSAGE
:*      : : ELSE-ASK USER IF DIRECTORY IS WANTED
:*      : : IF RESPONSE=YES
:*      : : : THEN-PRINT DIRECTORY HEADER
:*      : : : INITIALIZE THE SEQUENCE NUMBER TO 1
:*      : : : LOAD POINTER TO FILE NAME
:*      : : : CALL SUBROUTINE DIRLST
:*      : : : IF ERRCOD NOT=0
:*      : : : : THEN-EXIT TEST
:*      : : : : ELSE-CONTINUE
:*      : : : ENDIF
:*      : : ELSE-CONTINUE
:*      : ENDIF
BGND0
:*      : ASK USER FOR THE NUMBER OF THE DESIRED DIAG.
:*      : LOAD POINTER TO FILE NAME
:*      : CALL SUBROUTINE DIRSRC
:*      : IF ERRCOD NOT=0
:*      : : THEN-EXIT TEST
:*      : : ELSE-CONTINUE
:*      : ENDIF
:*      : IF SEQNUM=0
:*      : : THEN-CONTINUE
:*      : : ELSE-LOAD ERRCOD WITH 14.
:*      : : : CALL SUBROUTINE SYSERR
:*      : : : EXIT TEST
:*      : ENDIF
:*      : CALL SUBROUTINE LOADER
:*      : IF ERRCOD NOT=0
:*      : : THEN-EXIT TEST
:*      : : ELSE-CONTINUE
:*      : ENDIF
:*      : PRINT THE MICRO DIAGNOSTIC HEADER
:*      : CLEAR BYPFLG
BGND0
:*      : CALL SUBROUTINE CONTRL
:*      : IF ERRCOD NOT=0
```

```
4336 : : : : : THEN-EXIT TEST
4337 : : : : : ELSE-CONTINUE
4338 : : : : : ENDIF
4339 : : : : : IF BYPFLG=0
4340 : : : : : THEN-ASK USER IF LOOP THIS MODULE
4341 : : : : : ELSE-CONTINUE
4342 : : : : : ENDIF
4343 : : : : : IF BYPFLG=0
4344 : : : : : THEN-CONTINUE
4345 : : : : : ELSE-CALL SUBROUTINE DIAGST
4346 : : : : : IF ERRCOD NOT=0
4347 : : : : : THEN-EXIT TEST
4348 : : : : : ELSE-CONTINUE
4349 : : : : : ENDIF
4350 : : : : : ENDIF
4351 : : : : : DO WHILE BYPFLG NOT=0
4352 : : : : : ENDDO
4353 : : : : : DO FOREVER
4354 : : : : : ENDDO
4355 : : : : : ENDIF
4356 : : : : : ENDIF
4357 : *ENDTST
4358 012614 SE
(1) : *****
(1) : *ERRORS
(1) : -----
4359 : *CZTMIA DVC FTL ERR 000031 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
4360 : *MODULE UNDER TEST AS PER MICRO DIAGNOSTIC HEADER LINE
4361 : *RH: AAAAAA TM: X TU: X PORT: X
4362 : *TM78 MICRO TEST = 000000
4363 : *TM78 MICRO PC = 000000
4364 : *MB STATUS ERROR - CS2 = 000000
4365 : *
4366 : *CZTMIA DVC FTL ERR 000032 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
4367 : *MODULE UNDER TEST AS PER MICRO DIAGNOSTIC HEADER LINE
4368 : *RH: AAAAAA TM: X TU: X PORT: X
4369 : *TM78 MICRO TEST = 000000
4370 : *TM78 MICRO PC = 000000
4371 : *MB DATA COMP. FAIL
4372 : *BYTE COUNT = 000000
4373 : *ACT = 000000
4374 : *EXP = 000000
4375 : *
4376 : *CZTMIA DVC FTL ERR 000033 ON UNIT NN TST NNN SUB 000 PC: XXXXXX
4377 : *MODULE UNDER TEST AS PER MICRO DIAGNOSTIC HEADER LINE
4378 : *RH: AAAAAA TM: X TU: X PORT: X
4379 : *TM78 MICRO TEST = 000000
4380 : *TM78 MICRO PC = 000000
4381 : *NO MB STATUS ERROR WHEN EXPECTED
4382 012614 S
(1) : *****
4383 :
4384 012614 BGNTST
4385 012614 005037 004412 CLR CASLD ;CLEAR THE CAS PROGRAM LOADED FLAG
4386 012620 005737 002332 TST MANTST ;MANUAL MICRO MODULE SELECTION?
4387 012624 001007 BNE 1$ ;YES - GO TRY IT
```

```

4388 012626 012737 013662 004400      MOV    #DXTUID,FILNAM  ;LOAD ADDRESS OF MODULE
4389 012634 004737 013402      CALL   MICCTL          ;CALL THE MICRO DIAGNOSTIC CONTROL MODULE
4390 012640 000137 013146      7$:   JMP    3$            ;END OF THE TEST
4391
4392 012644      1$:   MANUAL          ;CAN MANUAL INTERVENTION BE DONE?
4393 012646      BCOMPLETE 2$        ;YES - CONTINUE
4394 012650      PRINTF #FATAL
4395 012670 000526      BR    3$            ;END OF THE TEST
4396 012672      2$:   GMANIL DIRQUE,BYPFLG,1,NO
4397 012706 005737 004404      TST   BYPFLG          ;PRINT THE DIRECTORY
4398 012712 001422      BEQ   5$            ;NO - GO INPUT DESIRED FILE
4399 012714      PRINTF #DIRHED
4400 012734 012737 000001 004406      MOV   #1,SEQNUM      ;INITIALIZE THE SEQUENCE NUMBER
4401 012742 012737 013662 004400      MOV   #DXTUID,FILNAM ;LOAD THE FIRST FILE NAME
4402 012750 004737 015552      CALL  DIRLST          ;GO MAKE A DIRECTORY
4403 012754 005705      TST   ERRCOD          ;WAS THERE AN ERROR?
4404 012756 001073      BNE   3$            ;YES - END IT
4405 012760      5$:   GMANID SEQ,SEQNUM,0,17777,1,77,NO
4406 013000 012737 013662 004400      MOV   #DXTUID,FILNAM ;LOAD THE FIRST FILE NAME
4407 013006 004737 015546      CALL  DIRSRC          ;GO SEARCH FOR THE PROPER SEQUENCE NUMBER
4408 013012 005705      TST   ERRCOD          ;ERROR?
4409 013014 001054      BNE   3$            ;YES - END THE ROUTINE
4410 013016 005737 004406      TST   SEQNUM          ;DID WE FIND THE USER SPECIFIED FILE?
4411 013022 001405      BEQ   4$            ;YES - GO LOAD IT
4412 013024 012705 000014      MOV   #14,ERRCOD     ;LOAD THE EOF ERROR
4413 013030 004737 015340      CALL  SYSERR          ;GO LOG THE ERROR
4414 013034 000444      BR    3$            ;END THE ROUTINE
4415 013036 004737 013742      4$:   CALL  LOADER        ;GO LOAD THE PROGRAM
4416 013042 005705      TST   ERRCOD          ;LOAD ERROR?
4417 013044 001040      BNE   3$            ;END THE ROUTINE
4418 013046      PRINTF #MICRO,#BUFER
4419 013072 005037 004404      CLR   BYPFLG          ;SET RESPONSE TO - NO
4420 013076 004737 016102      6$:   CALL  CONTRL        ;START THE TEST
4421 013102 005705      TST   ERRCOD          ;CONTROL ERROR?
4422 013104 001020      BNE   3$            ;YES - END THE ROUTINE
4423 013106 005737 004404      TST   BYPFLG          ;IS RESPONSE YES?
4424 013112 001011      BNE   8$            ;YES - LOOP MICRO MODULE
4425 013114      GMANIL RERET,BYPFLG,1,NO ;DO IT AGAIN?
4426 013130 005737 004404      TST   BYPFLG          ;LOOP MICRO MODULE?
4427 013134 001711      BEQ   5$            ;NO - GO WAIT FOR ANOTHER ONE
4428 013136 004737 014762      8$:   CALL  DIAGST        ;RESTART THE CODE
4429 013142 005705      TST   ERRCOD          ;RESTART ERROR?
4430 013144 001754      BEQ   6$            ;NO - GO DO IT AGAIN
4431 013146      3$:   ENDTST
4432 013150 047514 050117 052040 RERET: .ASCIZ /LOOP THIS MICRO MODULE?/
4433      .EVEN
4434 013200 051120 047111 020124 DIRQUE: .ASCIZ /PRINT DIRECTORY OF MICRO MODULES?/
4435      .EVEN
4436 013242 047105 042524 020122 SEQ:   .ASCIZ /ENTER SEQUENCE NUMBER OF MICRO MODULE/
4437      .EVEN
4438 013310 047045 040445 040515 FATAL: .ASCIZ /%N%AMANUAL SELECTION NOT ALLOWED WITH THE UAM FLAG SET%N/
4439      013402 .EVEN
4440 013402 004737 021660      MICCTL: CALL  CLOSEX      ;CLOSE THE CHANNEL
4441 013406 004737 013730      CALL  OPENX          ;OPEN THE CHANNEL
4442 013412 005705      TST   ERRCOD          ;OPEN CHANNEL ERROR?
4443 013414 001114      BNE   NOREX          ;YES-EXIT

```

4444	013416	004737	013742		CALL	LOADER	;SKIP OVER THE BCT PROGRAM
4445	013422	004737	013742	3\$:	CALL	LOADER	;NO-LOAD A SEGMENT
4446	013426	005705			TST	ERRCOD	;LOAD ERROR?
4447	013430	001106			BNE	NOREX	;YES-EXIT
4448	013432	005737	004402		TST	EOF	;NO-END OF FILE?
4449	013436	001103			BNE	NOREX	;EXIT THE MODULE
4450	013440	012702	021666		MOV	#BUFFER,R2	
4451	013444	122227	000073	6\$:	CMPB	(R2)+,#073	;SEARCH FOR ;
4452	013450	001375			BNE	6\$	
4453	013452	122227	000040	1\$:	CMPB	(R2)+,#040	;IS IT A SPACE?
4454	013456	001775			BEQ	1\$;YES-IGNORE IT
4455	013460	005302			DEC	R2	;NO - ADJUST THE POINTER
4456	013462	122227	000115		CMPB	(R2)+,#115	;IS IT A M?
4457	013466	001011			BNE	2\$;NO-GET OUT
4458	013470	122227	000124		CMPB	(R2)+,#124	;YES-IS NEXT CHARACTER A T?
4459	013474	001006			BNE	2\$;NO-GET OUT
4460	013476	121227	000101		CMPB	(R2),#101	;IS NEXT CHARACTER AN A?
4461	013502	001003			BNE	2\$;NO-GET OUT
4462	013504	005737	002326		TST	MTATST	;YES-SHOULD MTA TESTS BE SKIPPED?
4463	013510	001344			BNE	3\$;YES-SKIP THEM
4464	013512			2\$:	MANUAL		;CAN I ENTER DIALOG WITH THE OPERATOR
4465	013514				BNCOMPLETE	4\$;NO - JUST RUN THE TESTS
4466	013516	005737	002334		TST	RUNSKP	;YES - BUT DOES USER WANT RUN/SKIP?
4467	013522	001426			BEQ	4\$;NO - JUST RUN
4468	013524				PRINTF	#MICRO,#BUFFER	;PRINT TEST HEADER
4469	013550	005037	004404		CLR	BYPFLG	;DEFAULT THE QUESTION RESPONSE TO NO
4470	013554				GMANIL	SKIP,BYPFLG,1,YES	;ASK THE QUESTION
4471	013570	005737	004404		TST	BYPFLG	;SKIP THE MICRO MODULE
4472	013574	001312			BNE	3\$;YES - GO GET THE NEXT MODULE
4473	013576	000417			BR	5\$;NO-GO START TEST
4474	013600			4\$:	RFLAGS	R2	;GET USER FLAGS
4475	013604	032702	001000		BIT	#PNT,R2	;PNT FLAG SET
4476	013610	001412			BEQ	5\$;NO-RUN THE TEST
4477	013612				PRINTF	#MICRO,#BUFFER	;YES-PRINT TEST HEADER
4478	013636	004737	016102	5\$:	CALL	CONTRL	;GO START THE TEST
4479	013642	005705			TST	ERRCOD	
4480	013644	001666			BEQ	3\$	
4481	013646	004737	021660	NOREX:	CALL	CLOSEX	;CLOSE THE CHANNEL
4482	013652	000207			RTS	PC	
4483							
4484							
4485	013654	047045	052045	000	MICRO:	.ASCIZ /%N%T/	
4486		013662				.EVEN	
4487							
4488							
4489							
4490	013662	045513	046524	041501	DXTUID:	.ASCIZ /KKTMAC.PAK/	
4491		013676				.EVEN	
4492							
4493	013676	054502	040520	051523	SKIP:	.ASCIZ /BYPASS THIS MICRO MODULE?/	
4494						.EVEN	

```
4495      .SBTTL  MODULE 2.1.1 - OPENX
4496 013730  SSUB
(1)      : *****
(1)      : *SUBROUTINE TITLE
(1)      : *-----
4497      : *MODULE 2.1.1  OPEN A FILE
4498 013730  SP
(1)      : *****
(1)      : *PROCEDURE
(1)      : *-----
4499      : *BGNSUB
4500      : *  CLEAR THE ERROR CODE
4501      : *  ISSUE OPEN FILE CALL TO DIAGNOSTIC SUPERVISOR
4502      : *ENDSUB
4503 013730  SIO
(1)      : *****
(1)      : *SUBROUTINE INPUT/OUTPUT
(1)      : *-----
4504      : *      INPUT:
4505      : *
4506      : *      FILNAM  CONTAINING A POINTER TO AN .ASCIZ CHARACTER STRING,
4507      : *              WITH THE NAME OF THE FILE TO BE OPENED.
4508      : *
4509 013730  S
(1)      : *****
4510 013730  OPENX:  OPEN      FILNAM      ;OPEN A FILE
4511 013736 005005      CLR      ERRCOD      ;CLEAR THE ERROR CODE
4512 013740 000207      RTS      PC
4513      .SBTTL  MODULE 2.1.2 - LOADER
4514 013742  SSUB
(1)      : *****
(1)      : *SUBROUTINE TITLE
(1)      : *-----
4515      : *MODULE 2.1.2  INPUT/LOAD THE TM78 MICRO-DIAGNOSTIC
4516 013742  SP
(1)      : *****
(1)      : *PROCEDURE
(1)      : *-----
4517      : *BGNSUB
4518      : *  CLEAR THE ERROR CODE
4519      : *  CLEAR THE EOF FLAG
4520      : *  CALL SUBROUTINE 'LDMOD'
4521      : *  IF ERROR CODE=0
4522      : *      : THEN-CONTINUE
4523      : *      : ELSE-CALL SUBROUTINE 'SYSERR'
4524      : *      : EXIT SUBROUTINE
4525      : *  ENDIF
4526      : *  SELECT THE TM78 UNIT UNDER TEST
4527      : *  CALL SUBROUTINE "STOP"
4528      : *  IF ERROR CODE=0
4529      : *      : THEN-CONTINUE
4530      : *      : ELSE-CALL SUBROUTINE 'SYSERR'
4531      : *      : EXIT SUBROUTINE
4532      : *  ENDIF
4533      : *  CALL SUBROUTINE 'WRITE'
4534      : *  IF ERROR CODE=0
```

```

4535 : *      : THEN-CONTINUE
4536 : *      : ELSE-CALL SUBROUTINE 'SYSERR'
4537 : *      : EXIT SUBROUTINE
4538 : *      : ENDF
4539 : *      : CALL SUBROUTINE 'COMP'
4540 : *      : IF ERROR CODE=0
4541 : *      : THEN-CONTINUE
4542 : *      : ELSE-CALL SUBROUTINE 'SYSERR'
4543 : *      : EXIT SUBROUTINE
4544 : *      : ENDF
4545 : *      : CALL SUBROUTINE 'START'
4546 : *      : IF ERROR CODE=0
4547 : *      : THEN-CONTINUE
4548 : *      : ELSE-CALL SUBROUTINE 'SYSERR'
4549 : *      : EXIT SUBROUTINE
4550 : *      : ENDF
4551 : *      : CALL SUBROUTINE 'MESS'
4552 : *      : IF ERROR CODE=0
4553 : *      : THEN-CONTINUE
4554 : *      : ELSE-CALL SUBROUTINE 'SYSERR'
4555 : *      : EXIT SUBROUTINE
4556 : *      : ENDF
4557 : *      : ENDSUB
4558 : *      : SIO
(1) : *      : *****
(1) : *      : SUBROUTINE INPUT/OUTPUT
(1) : *      : -----
4559 : *      : INPUT:
4560 : *      : BINBUF  CONTAINING THE LOAD MODULE OF THE TEST TO BE WRITTEN
4561 : *      :
4562 : *      : OUTPUT:
4563 : *      : EOF      END OF FILE FLAG
4564 : *      :          =0 IF NORMAL EOF NOT DETECTED
4565 : *      :          >0 IF NORMAL EOF DETECTED
4566 : *      :
4567 : *      : ERRCOD  ERROR CODE-AS FOLLOWS
4568 : *      :          0- NO LOAD ERROR OCCURED
4569 : *      :          >0- LOAD ERROR OCCURED
4570 : *      :          ABORT THE TEST
4571 : *      : S
(1) : *      : *****
4572 : *      :
4573 : *      : LOADER: CLR      ERRCOD      ; CLEAR THE ERROR CODE
4574 : *      :         CLR      EOF         ; CLEAR END OF FILE FLAG
4575 : *      :         CALL     LDMOD       ; BUILD A LOAD MODULE
4576 : *      :         TST      ERRCOD      ; BUILD ERROR?
4577 : *      :         BNE      ERLOAD      ; YES-GO PRINT ERROR
4578 : *      :         TST      EOF         ; END OF FILE?
4579 : *      :         BNE      LOADEX      ; YES - EXIT THE MODULE
4580 : *      :         MOV      M$DRIV, @CS2 ; SET UP TM78 UNIT #
4581 : *      :         CALL     STOP        ; STOP THE TM78 MP FOR LOADING
4582 : *      :         TST      ERRCOD      ; DID AN TM78 MP STATUS ERROR OCCUR?
4583 : *      :         BNE      ERLOAD      ; YES - GO LOG THE ERROR
4584 : *      :         CALL     WRITE       ; NO-GO WRITE THE TM78 MP RAM
4585 : *      :         TST      ERRCOD      ; DID AN TM78 MP LOAD ERROR OCCUR?
4586 : *      :         BNE      ERLOAD      ; YES - GO LOG THE ERKOR

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013742

013742

170244

014212

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4587 014014 004737 014432      CALL    COMP      ;NO - GO COMPARE TM78 MP MEMORY WITH
4588                                ;WHAT WAS WRITTEN
4589 014020 005705      TST     ERRCOD    ;DID A COMPARE ERROR OCCUR?
4590 014022 001010      BNE     ERLOAD    ;YES - GO LOG THE ERROR
4591 014024 004737 014566      CALL    START     ;NO - GO START THE TM78 MP MONITOR?
4592 014030 005705      TST     ERRCOD    ;DID THE MONITOR START?
4593 014032 001004      BNE     ERLOAD    ;NO-GO LOG A ERROR
4594 014034 004737 015204      CALL    MESS      ;GO INPUT/BUILD MESSAGE FILE
4595 014040 005705      TST     ERRCOD    ;MESSAGE FILE ERROR
4596 014042 001402      BEQ     LOADEX    ;NO-EXIT MODULE
4597 014044 004737 015340      ERLOAD: CALL    SYSERR ;NO - GO LOG THE ERROR
4598 014050 000207      LOADEX: RTS     PC  ;RETURN
4599                                .SBTTL  MODULE 2.1.2.1 - STOP
4600 014052      SSUB
(1) ;*****
(1) ;*SUBROUTINE TITLE
(1) ;-----
4601 ;*MODULE 2.1.2.1      STOP THE TM78 MICRO PROCESSOR
4602 014052      SP
(1) ;*****
(1) ;*PROCEDURE
(1) ;-----
4603 ;*BGNSUB
4604 ;*   LOAD A NON-EXISTENT TM78 MICROPROCESSOR MEMORY ADDRESS
4605 ;*   SET THE HOLD BIT IN CAS REGISTER 21
4606 ;*   TIMEOUT 100 MICRO SECONDS
4607 ;*   IF TM78 MICROPROCESSOR STATUS ERROR
4608 ;*   :   THEN-LOAD ERROR CODE 01
4609 ;*   :   -EXIT SUBROUTINE
4610 ;*   :   ELSE-CONTINUE
4611 ;*   ENDF
4612 ;*   IF HOLD ACTIVE SET
4613 ;*   :   THEN-CONTINUE
4614 ;*   :   -EXIT SUBROUTINE
4615 ;*   :   ELSE-LOAD ERROR CODE 02
4616 ;*   ENDF
4617 ;*ENDSUB
4618 014052      SIO
(1) ;*****
(1) ;*SUBROUTINE INPUT/OUTPUT
(1) ;-----
4619 ;*
4620 ;*   INPUT:
4621 ;*   ERRCOD  ERROR CODE SET TO 0
4622 ;*
4623 ;*   OUTPUT:
4624 ;*   STAT80  TM78 MP STATUS FOR ERROR CODE 01 AND 02
4625 ;*   ERRCOD  ERROR CODE -AS FOLLWS
4626 ;*           =00-IF NO ERROR DETECTED
4627 ;*           =01-IF AN TM78 MP STATUS ERROR
4628 ;*           WAS DETECTED
4629 ;*           =02-IF THE TM78 MP WILL NOT STOP
4630 ;*
4631 014052      S
(1) ;*****
4632 014052 012777 077777 1/0220 STOP:  MOV    #077777,@AD80 ;LOAD A NON-EXISTENT TM78 MP ADDRESS
```

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4633 014060 012777 000400 170214      MOV      #HOLD,@DS80      ;SET THE HOLD BIT
4634                                     ;
4635 014066                                     DELAY    1                ;PERFORM A 100 MICRO SECOND TIMEOUT
4636 014116 017737 170160 004366      MOV      @DS80,STAT80    ;GET THE TM78 MP STATUS
4637 014124 032737 034000 004366      BIT      #HLDSTA,STAT80 ;IS THERE AN TM78 MP STATUS ERROR?
4638 014132 001403                                     BEQ      STOP1           ;NO- GO CHECK HOLD ACTIVE
4639 014134 012705 000001      MOV      #01.,ERRCOD    ;YES-LOAD THE STATUS ERROR CODE
4640 014140 000423                                     BR       STOPEX         ;EXIT THE MODULE
4641 014142 032737 001000 004366 STOP1:  BIT      #HLDA,STAT80    ;IS THE TM78 MP STOPPED?
4642 014150 001003                                     BNE     STOP2           ;YES -EXIT WITH NO ERROR CODE CLEAR
4643 014152 012705 000002      MOV      #02.,ERRCOD    ;NO-LOAD THE TM78 MP WILL NOT STOP ERROR CODE
4644 014156 000414                                     BR       STOPEX         ;EXIT THE MODULE
4645 014160 013702 004360      STOP2:  MOV      TMPORT,R2 ;GET THE PORT NUMBER
4646 014164 001402                                     BEQ      STOP3
4647 014166 012702 000200      MOV      #200,R2        ;LOAD PORT 1 SELECT CODE
4648 014172 012777 100340 170100 STOP3:  MOV      #MSEL,@AD80 ;ADDRESS THE MSEL SELECT BYTE
4649 014200 062702 000400      ADD      #HOLD,R2       ;SET HOLD BIT IN DATA
4650 014204 010277 170072      MOV      R2,@DS80      ;SELECT DESIRED PORT
4651 014210 000207      STOPEX: RTS      PC      ;RETURN TO CALLING MODULE
4652                                     .SBTTL  MODULE 2.1.2.2 - WRITE
4653 014212      SSUB
(1)                                     ; *****
(1)                                     ; *SUBROUTINE TITLE
(1)                                     ; *-----
4654                                     ; *MODULE 2.1.2.2      WRITE A PROGRAM TO TM78 MP WCS
4655 014212      SP
(1)                                     ; *****
(1)                                     ; *PROCEDURE
(1)                                     ; *-----
4656                                     ; *BGNSUB
4657      GET THE BYTE COUNT FOR THE RECORD FROM THE BINARY TEST FILE
4658      BGND0
4659      : DO WHILE ERROR CODE=0 AND THE BYTE COUNT FOR THE RECORD NOT=0
4660      : SET THE CHECKSUM=THE BYTE COUNT
4661      : GET THE HIGH ORDER BYTE OF THE TM78 MP WCS ADDRESS FROM THE RECORD
4662      : ADD THE HIGH ORDER BYTE OF THE TM78 MP WCS ADDRESS TO THE CHECKSUM
4663      : GET THE LOW ORDER BYTE OF THE TM78 MP WCS ADDRESS FROM THE RECORD
4664      : ADD THE LOW ORDER BYTE OF THE TM78 MP WCS ADDRESS TO THE CHECKSUM
4665      : ADD THE UNUSED BYTE IN THE RECORD TO THE CHECKSUM
4666      : BGND0
4667      : : LOAD THE TM78 MP WCS ADDRESS INTO CAS REGISTER 20
4668      : : WRITE THE WCS DATA FROM THE RECORD TO CAS REG. 21 WITH THE HOLD BIT
4669      : : GET THE TM78 MP STATUS BYTE FROM CAS REGISTER 21
4670      : : IF TM78 MP STATUS ERROR
4671      : : THEN-LOAD ERROR CODE 01
4672      : : ELSE-CONTINUE
4673      : : ENDF
4674      : : ADD THE DATA BYTE TO THE CHECKSUM BYTE
4675      : : INCREMENT THE WCS MEMORY ADDRESS
4676      : : DECREMENT THE BYTE COUNT
4677      : : DO UNTIL BYTE COUNT IS DECREMENTED TO 0
4678      : : ENDDO
4679      : ADD THE CHECKSUM CALCULATED TO THE CHECKSUM CHARACTER FROM THE RECORD
4680      : IF SUM OF CHECKSUM CHARACTERS=0
4681      : THEN-GET THE BYTE COUNT FROM THE NEXT RECORD
4682      : ELSE-LOAD ERROR CODE 03

```


4683
4684
4685
4686 014212
 (1)
 (1)
 (1)
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4697
4698
4699
4700 014212
 (1)
4701 014212 012703 021666
4702 014216 112301
4703 014220 042701 177400
4704 014224 005705
4705 014226 001002
4706 014230 005701
4707 014232 001001
4708 014234 000207
4709
4710 014236 010137 004350
4711 014242 112302
4712 014244 042702 177400
4713 014250 060237 004350
4714 014254 110237 004377
4715
4716 014260 112302
4717 014262 042702 177400
4718 014266 060237 004350
4719 014272 110237 004376
4720 014276 112302
4721 014300 042702 177400
4722 014304 060237 004350
4723
4724
4725 014310 013777 004376 167762
4726 014316 111302
4727 014320 042702 177400
4728 014324 052702 000400
4729 014330 010277 167746
4730 014334 000240
4731 014336 017737 167740 004366
4732 014344 032737 034000 004366
4733 014352 001402
4734 014354 012705 000001

```

: *      :      ENDIF
: *      :      ENDDO
: *      :      ENDSUB
SIO
: *****
: *      :      SUBROUTINE INPUT/OUTPUT
: -----
: *      :      INPUT:
: *      :      BINBUF  CONTAINING THE LOAD MODULE FOR THE TEST TO BE WRITTEN
: *      :      ERRCOD  ERROR CODE SET TO 0
: *      :
: *      :      OUTPUT:
: *      :      ERRCOD  ERROR CODE - AS FOLLOWS
: *      :              =00-IF NO ERROR DETECTED
: *      :              =01-IF AN TM78 MP STATUS ERROR
: *      :                  WAS DETECTED
: *      :              =03-IF A CHECK SUM ERROR
: *      :                  WAS DETECTED
: *      :
: *      :      STAT80  TM78 MP STATUS FOR ERROR CODE 01
: *      :
: *      :      S
: *****
WRITE:  MOV      #BUFFER,R3      ;GET THE BUFFER ADDRESS
WRIT:   MOVVB   (R3)+,R1        ;GET THE BYTE COUNT FOR THIS RECORD
        BIC     #177400,R1      ;REMOVE ANY SIGN EXTENSION BITS
WRITE0: TST     ERRCOD          ;IS THE ERROR CODE ZERO?
        BNE    WRITEX         ;NO- EXIT THE MODULE
        TST    R1             ;YES- IS THE BYTE COUNT ZERO?
        BNE    WRITE1        ;NO- CONTINUE TO LOAD
WRITEX: RTS     PC             ;YES- EXIT THE MODULE
:
WRITE1: MOV     R1,CHKSUM       ;LOAD THE CHECK SUM WITH THE BYTE COUNT
        MOVVB  (R3)+,R2        ;GET THE HO WCS ADDRESS BYTE
        BIC   #177400,R2      ;REMOVE ANY SIGN EXTENSION BITS
        ADD   R2,CHKSUM       ;ADD HO WCS ADDRESS BYTE TO THE CHKSUM
        MOVVB R2,HIAD80       ;STORE IN THE TEMP HO WCS ADDRESS
:
        MOVVB  (R3)+,R2        ;GET THE LO WCS ADDRESS BYTE
        BIC   #177400,R2      ;REMOVE ANY SIGN EXTENSION BITS
        ADD   R2,CHKSUM       ;ADD LO WCS ADDRESS BYTE TO THE CHKSUM
        MOVVB R2,LOAD80       ;STORE IN THE TEMP LO WCS ADDRESS
        MOVVB  (R3)+,R2        ;GET THE 'DUMMY' BYTE IN THE RECORD
        BIC   #177400,R2      ;REMOVE ANY SIGN EXTENSION BITS
        ADD   R2,CHKSUM       ;ADD THE 'DUMMY' BYTE TO THE CHKSUM
:
WRITE2: MOV     LOAD80,@AD80    ;R3 NOW POINTS TO THE FIRST DATA BYTE
        MOVVB  (R3),R2        ;LOAD THE TM78 MP WCS ADDRESS
        BIC   #177400,R2      ;LOAD THE TM78 MP WCS DATA BYTE
        BIS   #HOLD,R2        ;REMOVE ANY SIGN EXTENSION BITS
        MOV   R2,@DS80
        NOP
        MOV   @DS80,STAT80    ;GET THE TM78 MP STATUS
        BIT   #HLDSTA,STAT80 ;IS THERE A STATUS ERROR?
        BEQ  WRITE3          ;NO- CONTINUE
        MOV   #01.,ERRCOD     ;YES- LOAD THE STATUS ERROR CODE

```

4735 014360 112302
4736 014362 042702 177400
4737 014366 060237 004350
4738
4739 014372 062737 000001 004376
4740 014400 005301
4741 014402 001342
4742 014404 112302
4743
4744 014406 042702 177400
4745 014412 060237 004350
4746
4747 014416 105737 004350
4748 014422 001675
4749 014424 012705 000003
4750 014430 000675
4751
4752 014432
(1)
(1)
(1)
4753
4754 014432
(1)
(1)
(1)
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4784 014432

```
WRITE3: MOVB (R3)+,R2 ;GET THE DATA BYTE
        BIC #177400,R2 ;REMOVE ANY SIGN EXTENTION BITS
        ADD R2,CHKSUM ;ADD THE DATA BYTE TO THE CHKSUM
        ;
        ADD #1,LOAD80 ;INCREMENT THE TM78 MP WCS ADDRESS
        DEC R1 ;DECREMENT THE BYTE COUNT
        BNE WRITE2 ;CONTINUE IF NOT ZERO
        MOVB (R3)+,R2 ;GET THE CHKSUM BYTE FROM THE INPUT
        ;RECORD
        BIC #177400,R2 ;REMOVE ANY SIGN EXTENTION BITS
        ADD R2,CHKSUM ;ADD THE CHKSUM BYTE FROM THE RECORD
        ;TO THE CHKSUM CALCULATED
        TSTB CHKSUM ;IS THE CHKSUM RESULT ZERO?
        BEQ WRIT ;YES- GET NEXT BYTE COUNT
        MOV #03,ERRCOD ;NO- CHECK SUM ERROR
        BR WRITE0
;
.SBTTL MODULE 2.1.2.3 - COMP
SSUB
;*****
;*SUBROUTINE TITLE
;-----
;*MODULE 2.1.2.3 VERIFY TM78 MP WCS WITH WRITTEN
SP
;*****
;*PROCEDURE
;-----
;*BGNSUB
;* GET THE BYTE COUNT FOR THE RECORD FROM THE BINARY TEST FILE
;*
;* BGND0
;* : DO WHILE THE ERROR CODE=0 AND THE BYTE COUNT NOT=0
;* : GET THE HIGH ORDER BYTE OF THE TM78 MP WCS ADDRESS FROM THE RECORD
;* : GET THE LOW ORDER BYTE OF THE TM78 MP WCS ADDRESS FROM THE RECORD
;* : SKIP OVER THE UNUSED BYTE IN THE RECORD
;* :
;* : BGND0
;* : : LOAD THE TM78 MP WCS ADDRESS INTO CAS REGISTER 20
;* : : READ THE TM78 MP DATA FROM CAS REGISTER 21
;* : : IF TM78 MP STATUS ERROR
;* : : : THEN-LOAD ERROR CODE 01
;* : : : ELSE-CONTINUE
;* : : : IF DATA BYTE EQUAL
;* : : : : THEN-INCREMENT THE TM78 MP WCS ADDRESS
;* : : : : -DECREMENT THE BYTE COUNT
;* : : : : ELSE-STORE THE EXPECTED DATA BYTE
;* : : : : -STORE THE ACTUAL DATA BYTE
;* : : : : -LOAD ERROR CODE 04
;* : : : :
;* : : : : ENDF
;* : : : ENDF
;* : : DO UNTIL THE BYTE COUNT IS DECREMENTED TO 0 OR ERROR CODE NOT = 0
;* : ENDD0
;* : IF ERROR CODE = ZERO
;* : : THEN-GET THE BYTE COUNT OF THE NEXT RECORD
;* : : ELSE-CONTINUE
;* : ENDF
;* ENDD0
;ENDSUB
SIO
```

```
(1)
(1)
(1)
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4805 014432
(1)
4806 014432 012703 021666
4807 014436 112301
4808 014440 042701 177400
4809
4810 014444 005705
4811 014446 001002
4812 014450 005701
4813 014452 001001
4814 014454 000207
4815
4816 014456 112337 004377
4817 014462 112337 004376
4818 014466 105723
4819
4820 014470 013777 004376 167602
4821 014476 017737 167600 004366
4822 014504 032737 034000 004366
4823 014512 001403
4824 014514 012705 000001
4825 014520 000755
4826
4827 014522 122337 004366
4828 014526 001410
4829 014530 114337 004372
4830 014534 113737 004366 004370
4831 014542 012705 000004
4832 014546 000742
4833
4834 014550 062737 000001 004376
4835 014556 005301
4836 014560 001343
```

```
*****
: SUBROUTINE INPUT/OUTPUT
:-----
:
: INPUT:
: BINBUF CONTAINING THE LOAD MODULE FOR THE TEST BEING VERIFIED
: ERRCOD ERROR CODE SET TO 0
:
: OUTPUT:
: ERRCOD ERROR CODE - AS FOLLOWS
: -00 - NO ERROR DETECTED
: =01 - IF AN TM78 MP STATUS ERROR
: WAS DETECTED
: =04 - IF A WCS COMPARE ERROR
: WAS DETECTED
:
: STAT80 TM78 MP STATUS FOR ERROR CODE 01 AND FAILING DATA BYTE
: FOR ERROR CODE 04.
:
: ADATA CONTAINS THE ACTUAL DATA BYTE ON COMPARE ERROR
:
: EDATA CONTAINS THE EXPECTED DATA BYTE ON COMPARE ERROR
:
: S
:-----
:
: COMP: MOV #BUFFER,R3 ;GET THE BUFFER ADDRESS
: COMP0: MOVB (R3)+,R1 ;GET THE BYTE COUNT FOR THE RECORD
: BIC #177400,R1 ;REMOVE ANY SIGN EXTENTION BITS
:
: TST ERRCOD ;IS THE ERROR CODE ZERO?
: BNE COMPEX ;NO -EXIT THE MODULE
: TST R1 ;YES - IS THE BYTE COUNT ZERO?
: BNE COMP1 ;NO - CONTINUE WITH COMPARE
: COMPEX: RTS PC ;YES -EXIT THE MODULE
:
: COMP1: MOVB (R3)+,HIAD80 ;GET THE HO WCS ADDRESS BYTE
: MOVB (R3)+,LOAD80 ;GET THE LG WCS ADDRESS BYTE
: TSTB (R3)+ ;SKIP OVER THE UNUSED BYTE
:
: COMP2: MOV LOAD80,@AD80 ;LOAD THE TM78 MP WCS ADDRESS
: MOV @DS80,STAT80 ;GET THE TM78 MP DATA/STATUS WORD
: BIT #HLDSTA,STAT80 ;IS THERE A STATUS ERROR?
: BEQ COMP3 ;NO - CHECK THE DATA
: MOV #01,ERRCOD ;YES - LOAD THE ERROR CODE
: BR COMPEX ;EXIT THE MODULE
:
: COMP3: CMPB (R3)+,STAT80 ;IS THE DATA VALID?
: BEQ COMP4 ;YES - PROCEED
: MOVB -(R3),EDATA ;SAVF THE EXPECTED DATA
: MOVB STAT80,ADATA ;SAVE THE ACTUAL DATA
: MOV #04,ERRCOD ;NO - LOAD THE ERROR CODE
: BR COMPEX ;EXIT THE MODULE
:
: COMP4: ADD #1,LOAD80 ;INCREMENT THE TM78 MP WCS ADDRESS
: DEC R1 ;DECREMENT THE BYTE COUNT
: BNE COMP2 ;CONTINUE COMPARE IF NOT ZERO
```

```
4837 014562 105723          TSTB   (R3)+          ;SKIP OVER THE CHECKSUM BYTE
4838 014564 000724          BR     COMPO          ;
4839                          .SBTTL  MODULE 2.1.2.4 - START
4840 014566          SSUB
(1)                          :*****
(1)                          :*SUBROUTINE TITLE
(1)                          :-----
4841                          :*MODULE 2.1.2.4          START TM78 MP DIAGNOSTIC MONITOR
4842 014566          SP
(1)                          :*****
(1)                          :*PROCEDURE
(1)                          :-----
4843                          :*BGNSUB
4844                          :   ISSUE MASS BUS INIT
4845                          :   WAIT 10 MILLISECONDS
4846                          :   IF TM78 MP STATUS ERROR
4847                          :       THEN-LOAD ERROR CODE 01
4848                          :       -EXIT SUBROUTINE
4849                          :   ELSE-
4850                          :       IF TM READY RESET
4851                          :           THEN-LOAD ERROR CODE 05
4852                          :           -EXIT SUBROUTINE
4853                          :       ELSE-ISSUE FUNCTION CODE 37 TO TM78
4854                          :       -WAIT 10 MILLISECONDS
4855                          :       IF COMMAND GO BIT=0
4856                          :           THEN-CONTINUE
4857                          :           ELSE-LOAD ERROR CODE 06
4858                          :           -EXIT SUBROUTINE
4859                          :       ENDIF
4860                          :   ENDIF
4861                          : ENDIF
4862                          :*ENDSUB
4863 014566          SIO
(1)                          :*****
(1)                          :*SUBROUTINE INPUT/OUTPUT
(1)                          :-----
4864                          :
4865                          :   INPUT:
4866                          :   ERRCOD ERROR CODE SET TO 0
4867                          :
4868                          :   OUTPUT:
4869                          :   ERRCOD ERROR CODE SET AS FOLLOWS
4870                          :       =00 IF NO ERROR DETECTED
4871                          :       =01-IF AN TM78 MP STATUS ERROR
4872                          :           WAS DETECTED
4873                          :       -05-IF TM READY IS NOT ACTIVE
4874                          :           AFTER A 10 MS. TIMEOUT
4875                          :       =06-DIAGNOSTIC MONITOR NOT READY
4876                          :           AFTER ISSUEING
4877                          :           CODE 37 AND A TIMEOUT
4878                          :
4879 014566          STAT80
(1)                          :
4880 014566 052777 000040 167444 START: BIS     #MBINIT,@CS2 ;START THE TM78
4881 014574          DELAY 50 ;PERFORM A 5 MILLISECOND TIMEOUT
4882 014624 013777 004352 167406 MOV     MBDRIV,@CS2 ;LOAD THE MASS BUSS PORT NUMBER
```

```
4883
4884 014632 017737 167444 004366      MOV    @DS80,STAT80      ;GET THE TM78 MP STATUS
4885 014640 032737 035400 004366      BIT    #CLRSTA,STAT80   ;IS THERE A STATUS ERROR
4886 014646 001403                BEQ    START1           ;NO - CONTINUE
4887 014650 012705 000001          MOV    #0!,ERRCOD      ;YES - LOAD THE ERROR CODE
4888 014654 000436                BR     STAREX           ;EXIT THE MODULE
4889 014656 032737 100000 004366  START1: BIT    #TMRDY,STAT80 ;IS TM READY ACTIVE
4890 014664 001003                BNE    START2           ;YES - GO START THE DIAGNOSTIC MONITER
4891 014666 012705 000005          MOV    #05.,ERRCOD     ;NO - LOAD THE ERROR CODE
4892 014672 000427                BR     STAREX           ;EXIT THE MODULE
4893 014674 005077 167342          START2: CLR    @XFRINT  ;CLEAR THE DATA TRANSFER INTERRUPT CODE
4894 014700 012777 000037 167322      MOV    #DIGMON,@XFRCMD ;ISSUE CODE 37
4895
4896 014706                DELAY  100              ;PERFORM A 100 MILLISECOND TIMEOUT
4897
4898 014736 032777 000001 167264          BIT    #1,@XFRCMD      ;TEST FOR CODE ACCEPTED
4899 014744 001402                BEQ    STAREX           ;YES - EXIT THE MODULE
4900 014746 012705 000006          MOV    #06.,ERRCOD     ;NO - LOAD THE ERROR CODE
4901 014752 012777 000377 167266  STAREX: MOV    #377,@AS  ;CLEAR THE ATTENTION INTERRUPT
4902 014760 000207                RTS    PC               ;MODULE EXIT
4903
4904 014762 005005                DIAGST: CLR    ERRCOD   ;CLEAR THE ERROR CODE
4905 014764 004737 014566          CALL   START           ;START THE TM78
4906 014770 005705                TST    ERRCOD          ;ANY START ERRORS
4907 014772 001402                BEQ    1$              ;NO EXIT
4908 014774 004737 015340          CALL   SYSERR          ;GO LOG THE ERROR
4909 015000 000207          1$:    RTS    PC       ;RETURN TO THE USER
4910
4911 015002          .SBTTL  MODULE 2.1.2.5 - LDMOD
4912          SSUB
4913          ; *****
4914          ; *SUBROUTINE TITLE
4915          ; *-----
4916          ; *MODULE 2.1.2.5          PACK TM78 MP LOAD MODULE FROM THE LOAD MEDIA
4917          SP
4918          ; *****
4919          ; *PROCEDURE
4920          ; *-----
4921          ; *BGNSUB
4922          ; *  BGND0
4923          ; * : CALL SUBROUTINE READ
4924          ; * : IF ERROR CODE=0
4925          ; * : : THEN-CONTINUE
4926          ; * : : ELSE-IF ERROR CODE=14(8)
4927          ; * : : : THEN-CLEAR ERROR CODE
4928          ; * : : : INCREMENT THE END OF FILE FLAG
4929          ; * : : : EXIT SUBROUTINE
4930          ; * : : : ELSE-EXIT SUBROUTINE
4931          ; * : : : ENDF
4932          ; * : ENDF
4933          ; * : DO UNTIL CHARACTER READ-:
4934          ; * ENDDO
4935          ; * CLEAR BUFFER POINTER
4936          ; * CLEAR RIGHT/LEFT NIBBLE FLAG
4937          ; * BGND0
4938          ; * : CALL SUBROUTINE READ
4939          ; * : IF ERROR CODE=0
```

```

4933 : * : : THEN-CONTINUE
4934 : * : : ELSE-EXIT SUBROUTINE
4935 : * : : ENDF
4936 : * : : IF CHARACTER=0-9 OR A-F
4937 : * : : THEN-SAVE LEAST SIGNIFICANT 4 BITS
4938 : * : : : IF RIGHT/LEFT FLAG=0
4939 : * : : : THEN-SHIFT THE 4 LS BITS LEFT 4
4940 : * : : : : SET THE RIGHT/LEFT FLAG
4941 : * : : : ELSE-OR THE 4 BITS WITH 4 PREVIOUS BITS
4942 : * : : : : CLEAR THE RIGHT/LEFT FLAG
4943 : * : : : : SAVE THE COMPLETED BYTE IN THE BUFFER
4944 : * : : : : INCREMENT THE BUFFER POINTER
4945 : * : : : ENDF
4946 : * : : ELSE-CONTINUE
4947 : * : : ENDF
4948 : * : : DO UNTIL CHARACTER=$ OR BUFFER POINTER=MAXIMUM
4949 : * : : ENDDO
4950 : * : : IF BUFFER POINTER=MAX
4951 : * : : THEN-LOAD ERROR CODE 17(8)
4952 : * : : ELSE-CONTINUE
4953 : * : : ENDF
4954 : * : : ENDSUB
4955 015002 SIO
(1) : * : : *****
(1) : * : : *SUBROUTINE INPUT/OUTPUT
(1) : * : : -----
4956 : * : : INPUT:
4957 : * : : EOF END OF FILE FLAG SET TO ZERO
4958 : * : :
4959 : * : : ERRCOD ERROR CODE SET TO ZERO
4960 : * : :
4961 : * : : OUTPUT:
4962 : * : :
4963 : * : : ERRCOD ERROR CODE SET AS FOLLOWS:
4964 : * : :
4965 : * : : =0 - NO ERROR DETECTED
4966 : * : : =014 - UNEXPECTED EOF
4967 : * : : =015 - DISK ACCESS ERROR
4968 : * : : -017 - BINARY BUFFER FULL
4969 : * : :
4970 015002 S
(1) : * : : *****
4971 015002 004737 015524 LDMOD: JSR PC,READ ;READ A CHARACTER
4972 015006 005705 TST ERRCOD ;READ ERROR?
4973 015010 001407 BEQ LDMOD1 ;YES-EXIT LOOP
4974 015012 022705 000014 CMP #14,ERRCOD
4975 015016 001010 BNE LDMOD2
4976 015020 005005 CLR ERRCOD
4977 015022 005237 004402 INC EOF
4978 015026 000465 BR LMODEX
4979 015030 123727 004344 000072 LDMOD1: CMPB CHAR,#' :NO-CHARACTER=?
4980 015036 001361 BNE LDMOD ;NO-CONTINUE
4981 : * : :
4982 015040 005705 LDMOD2: TST ERRCOD ;ERROR?
4983 015042 001057 BNE LMODEX ;YES-EXIT THE MODULE
4984 : * : :

```

```

4985 015044 005004          LDMOD3: CLR      R4          :CLEAR BUFFER POINTER
4986 015046 005003          CLR      R3          :CLEAR NIBBLE FLAG
4987
4988 015050 004737 015524    LDMOD4: JSR      PC,READ    :READ A CHARACTER
4989 015054 005705          TST      ERRCOD        :READ ERROR?
4990 015056 001051          BNE      LMODEX        :YES-EXIT THE LOOP
4991 015060 113702 004344    MOVB     CHAR,R2       :GET THE CHARACTER
4992 015064 120227 000060    CMPB     R2,#'0        :IS THE CHARACTER <0?
4993 015070 100433          BMI      LDMOD8        :YES - BAD CHARACTER - DO NOT PROCESS
4994 015072 120227 000072    CMPB     R2,#':        :NO - IS THE CHARACTER 0-9?
4995 015076 100410          BMI      LDMOD6        :YES - VALID CHARACTER
4996 015100 120227 000101    CMPB     R2,#'A        :NO - IS THE CHARACTER <A?
4997 015104 100425          BMI      LDMOD8        :YES - BAD CHARACTER - DO NOT PROCESS
4998 015106 120227 000107    CMPB     R2,#'G        :NO - IS THE CHARACTER A-F?
4999 015112 100022          BPL      LDMOD8        :NO - BAD CHARACTER - DO NOT PROCESS
5000 015114 062702 000011    ADD      #11,R2       :ADD THE ALPHA CAHRACTER CONVERSION FACTOR
5001
5002 015120 042702 177760    LDMOD6: BIC      #177760,R2 :REMOVE JUNK BITS
5003 015124 005703          -ST      R3           :TEST THE NIBBLE PACK FLAG
5004 015126 001007          BNE      LDMOD7        :NON-ZERO - PACK THE LOW NIBBLE
5005 015130 006302          ASL      R2           :PACK THE HIGH NIBBLE
5006 015132 006302          ASL      R2
5007 015134 006302          ASL      R2
5008 015136 006302          ASL      R2
5009 015140 110201          MOVB     R2,R1        :STORE THE BYTE FOR NEXT PASS
5010 015142 005203          INC      R3           :SET THE LOW NIBBLE INDICATOR
5011 015144 000405          BR       LDMOD8        :CONTINUE
5012
5013 015146 050201          LDMOD7: BIS      R2,R1    :FORM THE FINAL BYTE
5014 015150 110164 021666    MOVB     R1,BUFER(R4) :STORE THE BYTE IN THE LOAD MODULE
5015 015154 005204          INC      R4           :INC. THE LOAD MODULE BYTE POINTER
5016 015156 005003          CLR      R3           :SET THE HIGH NIBBLE INDICATOR
5017
5018 015160 123727 004344 000044 LDMOD8: CMPB     CHAR,#'$  :CHARACTER=$?
5019 015166 001405          BEQ      LMODEX        :YES-EXIT THE MODULE
5020 015170 020427 011610    CMP      R4,#BUFEND-BUFER :NO-END OF BUFFER?
5021 015174 001325          BNE      LDMOD4        :NO-CONTINUE
5022 015176 012705 000017    MOV      #17,ERRCOD    :YES-QUEUE THE BINARY BUFFER FULL ERROR
5023 015202 000207          LMODEX: RTS      PC     :RETURN TO CALLING MODULE
5024
5025
5026
5027
5028 015204          .SBTTL  MODULE 2.1.2.6 - MESS
5029          SSUB
5030          : *****
5031          : *SUBROUTINE TITLE
5032          : *-----
5033          : *MODULE 2.1.2.6          LOAD THE MESSAGE MODULE
5034          SP
5035          : *****
5036          : *PROCEDURE
5037          : *-----
5038          : *BGNSUB
5039          : *   CLEAR MESSAGE BUFFER POINTER
5040          : *   BGND0
5041          : *   : CALL SUBROUTINE 'READ'

```

```
5035 : * : IF ERROR CODE=ZERO
5036 : * : : THEN-CONTINUE
5037 : * : : ELSE-EXIT SUBROUTINE
5038 : * : : ENDF
5039 : * : DO UNTIL CHARACTER READ=% OR !
5040 : * ENDDO
5041 : * STORE THE % OF ! IN THE MESSAGE BUFFER
5042 : * INCREMENT THE MESSAGE BUFFER POINTER
5043 : * BGNDO
5044 : * : CALL SUBROUTINE 'READ'
5045 : * : IF ERROR CODE=ZERO
5046 : * : : THEN-CONTINUE
5047 : * : : ELSE-EXIT SUBROUTINE
5048 : * : : ENDF
5049 : * : IF CHARACTER = TAB
5050 : * : : THEN - REPLACE THE TAB WITH A SPACE
5051 : * : : ELSE - CONTINUE
5052 : * : : ENDF
5053 : * : STORE THE CHARACTER IN THE MESSAGE BUFFER
5054 : * : INCREMENT THE MESSAGE BUFFER POINTER
5055 : * : IF CHARACTER STORED WAS A LINE FEED
5056 : * : : THEN-STORE A ZERO IN THE MESSAGE BUFFER
5057 : * : : -INCREMENT THE MESSAGE BUFFER POINTER
5058 : * : : ELSE-CONTINUE
5059 : * : : ENDF
5060 : * : DO UNTIL BUFFER POINTER=MAX OR CHARACTER=$
5061 : * ENDDO
5062 : * IF BUFFER POINTER=MAX
5063 : * : THEN-LOAD ERROR CODE 16
5064 : * : ELSE-CONTINUE
5065 : * : ENDF
5066 : * ENDSUB
5067 015204 SIO
(1) : *****
(1) : *SUBROUTINE INPUT/OUTPUT
(1) : -----
5068 : *
5069 : * INPUT:
5070 : * ERRCOD ERROR CODE EQUAL TO ZERO
5071 : *
5072 : * OUTPUT:
5073 : * ERRCOD ERROR CODE AS FOLLOWS:
5074 : *
5075 : * =0 - NO ERROR DETECTED
5076 : * =14 - UNEXPECTED EOF
5077 : * =15 - DISK ACCESS ERROR
5078 : * =16 - MESSAGE BUFFER FULL
5079 : *
5080 : *
5081 015204 S
(1) : *****
5082 : *
5083 015204 005004 MESS: CLR R4 ;CLEAR THE MESSAGE BUFFER PTR
5084 : *
5085 015206 004737 015524 MESS1: JSR PC,READ ;READ A CHARACTER
5086 015212 005705 TST ERRCOD ;READ ERROR?
```



```

5087 015214 001050          BNE     MESSEX      ;YES-EXIT THE MODULE
5088 015216 123727 004344 000073  CMPB   CHAR,#'      ;NO-IS IT A :?
5089 015224 001370          BNE     MESS1       ;NO-KEEP LOOKING
5090 015226 113764 004344 021666  MOVB   CHAR,BUFER(R4) ;STORE THE CHARACTER
5091 015234 005204          INC     R4          ;BUMP THE BUFFER POINTER
5092
5093 015236 004737 015524  MESS3: JSR     PC,READ  ;GET A CHARACTER
5094 015242 005705          TST    ERRCOD      ;READ ERROR?
5095 015244 001034          BNE     MESSEX      ;YES-EXIT THE MODULE
5096 015246 123727 004344 000011  CMPB   CHAR,#TAB    ;IS THE CHARACTER A TAB
5097 015254 001003          BNE     MESS2       ;NO - CONTINUE
5098 015256 112737 000040 004344  MOVB   #SPACE,CHAR  ;YES - REPLACE IT WITH A SPACE
5099 015264 113764 004344 021666  MESS2: MOVB   CHAR,BUFER(R4) ;NO-STORE THE CHARACTER
5100 015272 005204          INC     R4          ;INCREMENT THE BUFFER POINTER
5101 015274 123727 004344 000012  CMPB   CHAR,#LF     ;IS IT A LF?
5102 015302 001004          BNE     MESS4       ;NO-CONTINUE
5103 015304 112764 000000 021666  MOVB   #0,BUFER(R4) ;YES-STORE A LINE TERMINATOR
5104 015312 005204          INC     R4          ;INCREMENT THE BUFFER POINTER
5105 015314 123727 004344 000044  MESS4: CMPB   CHAR,#'$  ;CHARACTER=$?
5106 015322 001405          BEQ    MESSEX      ;YES-EXIT
5107 015324 020427 011606  CMP    R4,#BUFEND-BUFER-2 ;NO-END OF BUFFER?
5108 015330 003742          BLE    MESS3       ;NO-CONTINUE
5109
5110 015332 012705 000016  MOV    #16,ERRCOD   ;YES-QUEUE THE ERROR
5111 015336 000207  MESSEX: RTS    PC    ;LOAD-END OF MESSAGE BUFFER AREA ERROR
5112
5113          .SBTTL  MODULE 2.1.2.7 - SYSERR
5114 015340  SSUB
(1)          ; *****
(1)          ; *SUBROUTINE TITLE
(1)          ; -----
5115          ; *MODULE 2.1.2.7          DIAGNOSTIC MONITOR SYSTEM ERROR REPORTING
5116 015340  SP
(1)          ; *****
(1)          ; *PROCEDURE
(1)          ; -----
5117          ; *BGNSUB
5118          ; *      GET THE ERROR CODE
5119          ; *      IF ERROR CODE NOT LEGAL
5120          ; *      THEN-PRINT ILLEGAL ERROR CODE MESSAGE
5121          ; *      ELSE-CONSTRUCT THE ERROR MACRO
5122          ; *      -PRINT THE ERROR
5123          ; *      ENDIF
5124          ; *ENDSUB
5125 015340  SIO
(1)          ; *****
(1)          ; *SUBROUTINE INPUT/OUTPUT
(1)          ; -----
5126          ;
5127          ; INPUT:
5128          ; ERRCOD ERROR CODE FOR THE MESSAGE TO BE PRINTED.
5129          ;
5130 015340  S
(1)          ; *****
5131 015340 010501  SYSERR: MOV    ERRCOD,R1      ;GET THE ERROR CODE
5132 015342 010137 015400  MOV    R1,SYSERM+2      ;PUT THE ERROR NUMBER IN THE MESSAGE

```

5133	015346	020127	000022		CMP	R1,#HEDMPE-HEDJMP/#2	:VALID MESSAGE NUMBER?
5134	015352	003402			BLE	1\$:YES - CONTINUE
5135	015354	000137	035264	2\$:	JMP	SERFAL	:NO - ERROR
5136	015360	006301		1\$:	ASL	R1	:MULTIPLY BY 2
5137	015362	016137	015410	015402	MOV	HEDJMP(R1),SYSERM+4	:PUT THE HEADER MESSAGE IN THE ERROR
5138	015370	016137	015456	015404	MOV	MSGJMP(R1),SYSERM+6	:PUT THE MESSAGE IN THE ERROR
5139	015376			SYSERM:	ERRSF	1.,HEAD1,MSG001	
5140	015406	000207			RTS	PC	:RETURN
5141							
5142	015410	000000		HEDJMP:	.WORD	0	:DUMMY TABLE ENTRY
5143	015412	035276			.WORD	HEAD1	:ERROR 01 HEADING VECTOR
5144	015414	035276			.WORD	HEAD1	:ERROR 02 HEADING VECTOR
5145	015416	035276			.WORD	HEAD1	:ERROR 03 HEADING VECTOR
5146	015420	035276			.WORD	HEAD1	:ERROR 04 HEADING VECTOR
5147	015422	035276			.WORD	HEAD1	:ERROR 05 HEADING VECTOR
5148	015424	035276			.WORD	HEAD1	:ERROR 06 HEADING VECTOR
5149	015426	035334			.WORD	HEAD2	:ERROR 07 HEADING VECTOR
5150	015430	035334			.WORD	HEAD2	:ERROR 08 HEADING VECTOR
5151	015432	035334			.WORD	HEAD2	:ERROR 09 HEADING VECTOR
5152	015434	035374			.WORD	HEAD3	:ERROR 10 HEADING VECTOR
5153	015436	035374			.WORD	HEAD3	:ERROR 11 HEADING VECTOR
5154	015440	035374			.WORD	HEAD3	:ERROR 12 HEADING VECTOR
5155	015442	035374			.WORD	HEAD3	:ERROR 13 HEADING VECTOR
5156	015444	035374			.WORD	HEAD3	:ERROR 14 HEADING VECTOR
5157	015446	035374			.WORD	HEAD3	:ERROR 15 HEADING VECTOR
5158	015450	035334			.WORD	HEAD2	:ERROR 16 HEADING VECTOR
5159	015452	035334			.WORD	HEAD2	:ERROR 17 HEADING VECTOR
5160	015454	035334		HEDMPE:	.WORD	HEAD2	:ERROR 18 HEADING VECTOR
5161							
5162	015456	000000		MSGJMP:	.WORD	0	:DUMMY TABLE ENTRY
5163	015460	035434			.WORD	MSG001	:ERROR 01 MESSAGE VECTOR
5164	015462	035574			.WORD	MSG002	:ERROR 02 MESSAGE VECTOR
5165	015464	035672			.WORD	MSG003	:ERROR 03 MESSAGE VECTOR
5166	015466	035744			.WORD	MSG004	:ERROR 04 MESSAGE VECTOR
5167	015470	036166			.WORD	MSG005	:ERROR 05 MESSAGE VECTOR
5168	015472	036304			.WORD	MSG006	:ERROR 06 MESSAGE VECTOR
5169	015474	036372			.WORD	MSG007	:ERROR 07 MESSAGE VECTOR
5170	015476	036456			.WORD	MSG008	:ERROR 08 MESSAGE VECTOR
5171	015500	036544			.WORD	MSG009	:ERROR 09 MESSAGE VECTOR
5172	015502	036616			.WORD	MSG010	:ERROR 10 MESSAGE VECTOR
5173	015504	036664			.WORD	MSG011	:ERROR 11 MESSAGE VECTOR
5174	015506	036750			.WORD	MSG012	:ERROR 12 MESSAGE VECTOR
5175	015510	037032			.WORD	MSG013	:ERROR 13 MESSAGE VECTOR
5176	015512	037106			.WORD	MSG014	:ERROR 14 MESSAGE VECTOR
5177	015514	037160			.WORD	MSG015	:ERROR 15 MESSAGE VECTOR
5178	015516	037232			.WORD	MSG016	:ERROR 16 MESSAGE VECTOR
5179	015520	037304			.WORD	MSG017	:ERROR 17 MESSAGE VECTOR
5180	015522	037356			.WORD	MSG018	:ERROR 18 MESSAGE VECTOR

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5184 015524
(1)
(1)
(1)
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```
.SBTTL MODULE 2.1.2.5.1 - READ
SSUB
:*****
:*SUBROUTINE TITLE
:-----
:*MODULE 2.1.2.5.1 READ A CHARACTER
```

5186 015524
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5194 015524
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5210 015524
(1)
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5212 015524
5213 015532
5214 015534 012705 000014
5215 015540 000207
5216 015542 005005
5217 015544 000207
5218 015546 005003
5219 015550 000402
5220 015552 012703 000001
5221 015556 005005
5222 015560 004737 021660
5223 015564 004737 013730
5224 015570 005705
5225 015572 001100
5226 015574 004737 015524
5227 015600 005705
5228 015602 001065
5229 015604 123727 004344 000133
5230 015612 001370
5231 015614 004737 015524
5232 015620 005705
5233 015622 001055
5234 015624 123727 004344 000133

```
SP
*****
*PROCEDURE
*-----
*BGMSUB
*  ISSUE GET BYTE CALL TO THE DIAGNOSTIC SUPERVISOR
*  IF END OF FILE
*  : THEN - LOAD ERROR CODE 14(8)
*  : ELSE - CONTINUE
*  ENDF
*ENDSUB
SIO
*****
*SUBROUTINE INPUT/OUTPUT
*-----
*
*  INPUT:
*  ERRCOD  ERROR CODE EQUAL TO ZERO
*
*  OUTPUT:
*
*  CHAR    THE CHARACTER FROM THE DISK
*
*  ERRCOD  SET AS FOLLOWS:
*
*          -0 - IF NO ERROR DETECTED
*          -14 - IF NO MORE DATA AVAILABLE END OF FILE
*                DETECTED
*          -15 - IF DISK ACCESS ERROR DETECTED
*
S
*****
READ:  GETBYTE CHAR          ;REQUEST A BYTE FROM THE SUPERVISOR
        BCOMPLETE          1$ ;IF NOT END OF FILE CONTINUE
        MOV #14,ERRCOD      ;IF END OF FILE LOAD THE ERROR CODE
        RTS PC              ;RETURN TO CALLING MODULE
1$:    CLR  ERRCOD          ;CLEAR THE ERROR CODE
        RTS PC              ;RETURN TO CALLING MODULE
DIRSRC: CLR  R3            ;SET THE SEARCH FLAG
        BR   DIR1           ;CONTINUE
DIRLST: MOV  #1,R3         ;SET THE DIRECTORY LIST FLAG
DIR1:  CLR  ERRCOD          ;CLEAR THE ERROR CODE
        CALL CLOSEX         ;CLOSE THE FILE
        CALL OPENX          ;OPEN THE DESIRED FILE
        TST  ERRCOD         ;OPEN ERROR?
        BNE  DIREX          ;YES - LOG THE ERROR
        6$: CALL  READ       ;GET A CHARACTER FROM THE OPEN FILE
        TST  ERRCOD         ;READ ERROR?
        BNE  DIRERR        ;YES - LOG THE ERROR
        CMPB CHAR,#'['     ;IS THE CHARACTER A [
        BNE  6$            ;NO - KEEP ON LOCKING
        1$: CALL  READ       ;GET A CHARACTER FROM THE OPEN FILE
        TST  ERRCOD         ;READ ERROR?
        BNE  DIRERR        ;YES - LOG THE ERROR
        CMPB CHAR,#'['     ;IS THE CHARACTER A [
```

```
5235 015632 001370          BNE      1$          ;NO - KEEP ON LOOKING
5236 015634 005703          TST      R3          ;SEARCH ?
5237 015636 001004          BNE      5$          ;NO - DIRECTORY
5238 015640 005337 004406    DEC      SEQNUM      ;DECREMENT THE SEQUENCE NUMBER
5239 015644 001453          BEQ      DIREX       ;EXIT IF FOUND
5240 015646 000762          BR       1$          ;CONTINUE IF NOT
5241 015650 005037 015776    5$:     CLR      NAME          ;CLEAR THE PROGRAM NAME
5242 015654 005037 016000      CLR     NAME+2
5243 015660 005037 016002      CLR     NAME+4
5244 015664 005002          CLR      R2          ;CLEAR THE CHARACTER COUNTER
5245 015666 004737 015524    2$:     CALL     READ          ;READ A CHARACTER FROM THE OPER FILE
5246 015672 123727 004344 000135  CMPB    [CHAR,#']    ;IS THE CHARACTER A ]?
5247 015700 001407          BEQ      4$          ;YES - END OF THE PROGRAM NAME
5248 015702 113762 004344 015776  MOVB    CHAR,NAME(R2) ;SAVE THE CHARACTER
5249 015710 005202          INC      R2          ;UPDATE THE CHARACTER COUNT
5250 015712 020227 000006    CMP     R2,#6        ;REACHED CHARACTER MAX?
5251 015716 001363          BNE      2$          ;NO - CONTINUE
5252 015720          4$:     PRINTF  #DIRENT,SEQNUM,#NAME ;UPDATE THE SEQUENCE NUMBER
5253 015750 005237 004406    INC     SEQNUM
5254 015754 000717          BR       1$
5255 015756 020527 000014    DIRERR: CMP     ERRCOD,#14 ;EOF?
5256 015762 001002          BNE      3$          ;NO - ERROR
5257 015764 005005          CLR     ERRCOD      ;EOF IS NOT A ERROR FOR THE ROUTINE
5258 015766 000402          BR       DIREX       ;CONTINUE
5259 015770 004737 015340    3$:     CALL     SYSERR      ;LOG THE ERROR
5260 015774 000207    DIREX:  RTS      PC          ;RETURN TO THE USER
5261
5262 015776 000000          NAME:   .WORD    0          ;PROGRAM NAME
5263 016000 000000          .WORD    0
5264 016002 000000          .WORD    0
5265 016004 000000          .WORD    0
5266
5267 016006 047045 040445 042523  DIRHED: .ASCIZ  /%N%ASEQUENCE NUMBER  NAME%N/
5268          .EVEN
5269 016044 040445 020040 020040  DIRENT: .ASCIZ  /%A      %02%A      %T%N/
5270          016102          .EVEN
5271          .SBTTL  MODULE 2.1.3 - CONTRL
5272 016102          SSUB
(1)          ; *****
(1)          ; *SUBROUTINE TITLE
(1)          ; -----
5273          ; *MODULE 2.1.3 - TM78 TEST CONTROL MODULE
5274 016102          SP
(1)          ; *****
(1)          ; *PROCEDURE
(1)          ; -----
5275          ; *BGNSUB
5276          ; * CLEAR THE ERROR CODE
5277          ; * SELECT THE TM78 UNDER TEST
5278          ; * CALL SUBROUTINE DIAGO
5279          ; * IF ERROR CODE=0
5280          ; * : THEN-CONTINUE
5281          ; * : ELSE-CALL SUBROUTINE SYSERR
5282          ; * : EXIT SUBROUTINE
5283          ; * ENDF
5284          ; * BGND0
```

```
5285 : * : CALL SUBROUTINE WAIT
5286 : * : IF ERROR CODE=0
5287 : * : : THEN-CONTINUE
5288 : * : : ELSE-CALL SUBROUTINE SYSERR
5289 : * : : EXIT SUBROUTINE
5290 : * : ENDF
5291 : * : INPUT CAS REGISTER 3 (MICRO TEST # + ERROR #)
5292 : * : IF CAS REGISTER 1=374(8)
5293 : * : : THEN-CALL SUBROUTINE ERR78
5294 : * : : ELSE-CONTINUE
5295 : * : ENDF
5296 : * : IF CAS REGISTER 1=376(8)
5297 : * : : THEN-CALL SUBROUTINE UTIL80
5298 : * : : ELSE-CONTINUE
5299 : * : ENDF
5300 : * : IF CAS REGISTER 1=375(8)
5301 : * : : THEN-DEPOSIT 377(8) CAS REGISTER 0
5302 : * : : DEPOSIT 33(8) CAS REGISTER 0
5303 : * : : ELSE-CONTINUE
5304 : * : ENDF
5305 : * : IF CAS REGISTER 1=373(8)
5306 : * : : THEN-CALL SUBROUTINE QUEUE
5307 : * : : ELSE-CONTINUE
5308 : * : ENDF
5309 : * : IF CAS REGISTER 1=377(8)
5310 : * : : THEN-CALL SUBROUTINE QUEUEM
5311 : * : : ELSE-CONTINUE
5312 : * : ENDF
5313 : * : DO UNTIL CAS REGISTER 1-372(*)
5314 : * ENDDO
5315 : * ENDSUB
5316 016102 SIO
5317 (1) : *****
5318 (1) : *SUBROUTINE INPUT/OUTPUT
5319 (1) : -----
5320 : * INPUT:
5321 : * NO REQUIRED INPUT
5322 : * OUTPUT:
5323 : * ERRCOD ERROR CODE AS FOLLOWS
5324 : * =0- NO CONTROL ERRORS DETECTED
5325 : * >0- CONTROL ERROR OCCURED
5326 016102 : * ABORT THE TEST
5327 (1) : S
5328 016102 005005 : *****
5329 016104 013777 004352 166126 : CONTRL: CLR ERRCOD ;CLEAR THE ERROR CODE
5330 016112 004737 016304 : MOV MBDRIV,@CS2 ;LOAD THE TM78 UNIT NUMBER
5331 016116 005705 : JSR PC,DIAGO ;GO START THE TM78 MP TEST LOADED
5332 016120 001034 : TST ERRCOD ;DIAGNOSTIC START ERROR
5333 016122 004737 016424 : BNE CTLERR ;YES - GO LOG THE ERROR
5334 016126 005705 : CONTR1: JSR PC,WAIT ;GO WAIT FOR A TM78 MP-INTERRUPT CODE
5335 016130 001030 : TST ERRCOD ;TEST WAIT FAILURE?
5336 016132 017701 166116 : BNE CTLERR ;YES - GO LOG THE ERROR
5337 : : : GET THE DIAG. 1 REGISTER
```

```
5337 016136 110137 004332          MOVB   R1,DIAGTS      ;STORE THE DIAGNOSTIC TEST NUM.
5338 016142 000301          SWAB   R1             ;SWAP THE BYTES
5339 016144 042701 177700          BIC   #177700,R1     ;LEAVE THE DIAGNOSTIC ERROR NUM.
5340 016150 010137 004334          MOV   R1,DIAGER      ;STORE THE DIAGNOSTIC ERROR NUM.
5341 016154 022737 000374 004364    CMP   #374,DINTCD    ;TM78 MP RUN TIME ERROR?
5342 016162 001003          BNE   CONTR3         ;NO - CONTINUE
5343 016164 004737 016552          JSR   PC,ERR78       ;YES - GO PROCESS THE ERROR
5344 016170 000754          BR    CONTR1         ;GO WAIT FOR OTHER EVENTS
5345
5346 016172 022737 000376 004364    CONTR3: CMP   #376,DINTCD ;TM78 MP RUN TIME UTILITY REQUEST?
5347 016200 001007          BNE   CONTR4         ;NO - CONTINUE
5348 016202 004737 020604          JSR   PC,UTIL80      ;YES-GO PROCESS THE UTILITY REQ
5349 016206 005705          TST   ERRCOD         ;UTILITY REQUEST ERROR
5350 016210 001744          BEQ   CONTR1         ;NO-CONTINUE LOOP
5351 016212 004737 015340          CTLERR: CALL  SYSERR   ;YES-PRINT THE ERROR
5352 016216 000207          RTS   PC             ;ABORT THE MODULE
5353
5354 016220 022737 000375 004364    CONTR4: CMP   #375,DINTCD ;TM78 MP LOOP ON ERROR - NO ERROR
5355 016226 001007          BNE   CONTR5         ;NO - CONTINUE
5356 016230 012777 000377 166010    MOV   #377,@AS       ;CLEAR THE INTERRUPT
5357 016236 012777 000033 165764    MOV   #LOPERR,@XFRCMD ;ISSUE LOOP ON ERROR
5358 016244 000726          BR    CONTR1         ;YES - BUT NOT IMPLEMENTED
5359 016246 022737 000373 004364    CONTR5: CMP   #373,DINTCD ;PRINT MESSAGE REQUEST?
5360 016254 001003          BNE   CONTR6         ;NO - CONTINUE
5361 016256 004737 021534          CALL  QUEUE         ;YES - GO PRINT THE MICRO MESSAGE
5362 016262 000717          BR    CONTR1         ;CONTINUE TO LOOP
5363 016264 022737 000377 004364    CONTR6: CMP   #377,DINTCD ;MANUAL INTERVENTION REQUEST?
5364 016272 001003          BNE   CONTR7         ;NO - CONTINUE
5365 016274 004737 021532          JSR   PC,QUEUEM      ;YES - GO DO PRINT/WAIT SEQUENCE
5366 016300 000710          BR    CONTR1         ;CONTINUE TO LOOP
5367 016302 000207          CONTR7: RTS   PC     ;ASSUME DONE INTERRUPT - RETURN
5368
5369 016304          .SBTTL  MODULE 2.1.3.1 - DIAGO
5370          SSUB
5371          ; *****
5372          ; *SUBROUTINE TITLE
5373          ; *-----
5374          ; *MODULE      2.1.3.1 START THE TM78 MP TEST
5375          ; *
5376          ; *-----
5377          ; *PROCEDURE
5378          ; *-----
5379          ; *BGNSUB
5380          ; * CLEAR THE RELIABILITY, SCOPE LOOP & MANUAL FLAG IN CAS REGISTER 11
5381          ; * IF USER SPECIFIED RELIABILITY MODE
5382          ; * : THEN-SET THE RELIABILITY FLAG IN CAS REGISTER 11
5383          ; * : ELSE-CONTINUE
5384          ; * ENDF
5385          ; * IF MANUAL INTERVENTION ALLOWED
5386          ; * : THEN-SET THE MANUAL INTERVENTION FALG IN CAS REGISTER 11
5387          ; * : ELSE-CONTINUE
5388          ; * ENDF
5389          ; * LOAD 377(8) IN CAS REGISTER 4
5390          ; * LOAD 35(8) IN CAS REGISTER 0
5391          ; * WAIT 10 MILLISECONDS
5392          ; * IF CAS REGISTER 0 BITS 5:0=0
5393          ; * : THEN-CONTINUE
```

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5390 016304
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5401 016304
 (1)
5402
5403 016304 042777 000340 165750
5404 016312 005737 002330
5405 016316 001403
5406 016320 052777 000100 165734
5407 016326
5408 016330
5409 016332 052777 000040 165722
5410 016340 012777 000377 165700
5411 016346 112777 000035 165654
5412
5413 016354
5414
5415 016404 017701 165620
5416 016410 042701 177700
5417 016414 001402
5418 016416 012705 000007
5419 016422 000207
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5421 016424
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5423 016424
 (1)
 (1)
 (1)
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```
;* : ELSE-LOAD ERROR CODE 7(10)
;* ENDIF
;*ENDSUB
SIO
*****
*SUBROUTINE INPUT/OUTPUT
-----
*
*   INPUT:
*   ERRCOD ERROR CODE SET TO 0
*
*   OUTPUT:
*   ERRCOD ERROR CODE SET AS FOLLOWS
*   =0-IF NO ERROR DETECTED
*   -07-IF A TEST STARTED INDICATION
*   IS NOT RECEIVED IN SMS.
*
S
*****
DIAGO: BIC    #340,@D12      ;CLEAR THE REL.,SCOPE LOOP & MANUAL FLAG
        TST    RELI78      ;WAS RELIABILITY MODE SET?
        BEQ    2$          ;NO-CONTINUE
        BIS    #100,@D12
2$:     MANUAL
        BNCOMPLETE 3$
        BIS    #40,@D12    ;SET THE MANUAL FLAG
3$:     MOV    #377,@AS    ;CLEAR THE ATTENTION SUMMARY REGISTER
        MOVB  #TSTART,@XFRCMD ;ISSUE THE TEST START CMD.
1$:     DELAY  100        ;WAIT 10 MILLISECONDS
        MOV    @XFRCMD,R1  ;GET THE COMMAND REGISTER
        BIC    #177700,R1 ;REMOVE JUNK BITS
        BEQ    DIAGEX     ;YES-RETURN
        MOV    #07.,ERRCOD ;NO - LOAD ERROR CODE
DIAGEX: RTS    PC        ;RETURN TO CALLING ROUTINE
.SBTTL  MODULE 2.1.3.2 - WAIT
SSUB
*****
*SUBROUTINE TITLE
-----
*MODULE 2.1.3.2 WAIT/TIMEOUT TM78 MP-HOST COMMUNICATION
SP
*****
*PROCEDURE
-----
*BGNSUB
* SET UP THE LOOP COUNTER TO 1200(10)
* BGND0
* : PERFORM A 100 MILLISECOND TIMEOUT
* : IF SCOPE LOOP SPECIFIED
* : : THEN-CONTINUE
* : : ELSE-DECREMENT THE LOOP COUNTER
* : : ENDF
* : DO UNTIL INTERRUPT CODE NOT=0 OR LOOP COUNTER=0
```

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5444 016474
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5450
5451
5452
5453
5454
5455
5456 016424
 (1)
5457 016424 005037 004364
5458
5459 016430 012701 002260
5460 016434
5461 016464
5462 016466 033777 004354 165552
5463
5464 016474 001012
5465 016476 005301
5466 016500 001355
5467 016502
5468 016506 032702 040000
5469 016512 001346
5470 016514 012705 000010
5471 016520 000413
5472
5473 016522 117737 165514 004364
5474 016530 005077 165506
5475 016534 123727 004364 000371
5476 016542 003002
5477 016544 012705 000011
5478 016550 000207
5479
5480
5481
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5483
5484

```

;* ENDDO
;* IF LOOP COUNTER=0
;* : THEN-LOAD ERROR CODE 10(8)
;* : EXIT SUBROUTINE
;* : ELSE-CONTINUE
;* ENDF
;* IF INTERRUPT CODE > 371
;* : THEN-CONTINUE
;* : ELSE-LOAD ERROR CODE 11(8)
;* ENDF
;*ENDSUB
SIO
*****
*SUBROUTINE INPUT/OUTPUT
-----
*
* INPUT:
* ERRCOD ERROR CODE SET TO 0
*
* OUTPUT:
* ERRCOD ERROR CODE SET AS FOLLOWS
* =0-IF NO ERROR DETECTED
* -10-IF THE HOST TIMED OUT
* THE TM78 MP-HOST COMMUNICATION.
* =11-IF THE HOST RECEIVED AN
* ILLEGAL REQUEST CODE
*
S
*****
WAIT: CLR DINTCD ;CLEAR THE INTERRUPT CODE LOC.
;
WAIT0: MOV #1200.,R1 ;INITIALIZE R1 TO 1200
WAIT1: DELAY 100 ;PERFORM A 100 SEC. TIMEOUT
BREAK
BIT BINUNT,@AS ;IS THE ATTENTION LINE
;STILL ZERO?
BNE WAIT2 ;NO - GO SAVE THE CODE
DEC R1 ;YES - DECREMENT THE COUNT
BNE WAIT1 ;LOOP UNTIL TIMEOUT
RFLAGS R2
BIT #LOE,R2
BNE WAIT0
MOV #10,ERRCOD ;LOAD TIMEOUT ERROR CODE
BR WAIT3 ;EXIT THE MODULE
;
WAIT2: MOVB @XFRINT,DINTCD ;STORE THE INTERRUPT CODE
CLR @XFRINT ;CLEAR THE INTERRUPT CODE
CMPB DINTCD,#371 ;VALID INTERRUPT CODE?
BGT WAIT3 ;YES - RETURN TO CALLING ROUTINE
MOV #11,ERRCOD ;NO - LOAD ERROR CODE
WAIT3: RTS PC ;RETURN
.SBTTL MODULE 2.1.3.3 - ERR78
;
;MODULE 2.1.3.3 PROCESS TM78 MP DETECTED ERRORS
;
; INPUT:
; CAS MASS BUS REGISTERS CONTAINING THE ERROR MESSAGE

```



```

5485      :
5486      :
5487      :
5488      :
5489      :
5490      :
5491      :
5492      :
5493 016552 005001 ERR78: CLR R1 ;CLEAR THE MESS. BUFFER PTR.
5494      :
5495 016554 126127 021666 000041 10$: CMPB BUFR(R1),#'!' ;IS THE CHAR. A .?
5496 016562 001402 BEQ 1$ ;YES-CONTINUE
5497 016564 005201 INC R1 ;NO-UPDATE BUFFER POINTER
5498 016566 000772 BR 10$ ;LOOP
5499 016570 005201 1$: INC R1 ;
5500      :
5501      :
5502      :
5503 016572 005003 :HAVE FOUND THE . THE NEXT N CHARACTERS ARE THE TEST #
5504 016574 116102 021666 2$: CLR R3 ;CLEAR RESULT LOCATION
5505 016600 005201 MOVB BUFR(R1),R2 ;GET A CHAR.
5506 016602 120227 000060 INC R1 ;UPDATE THE POINTER
5507 016606 100412 CMPB R2,#'0' ;IS THE CHARACTER < ASCII ZERO?
5508 016610 120227 000070 BMI 3$ ;YES - END OF TEST NUMBER
5509 016614 100007 CMPB R2,#'8' ;NO - IS THE CHARACTER < ASCII 8?
5510 016616 042702 177770 BPL 3$ ;NO - END OF TEST NUMBER
5511 016622 006303 BIC #177770,R2 ;NO-GET THE CHAR
5512 016624 006303 ASL R3 ;SHIFT
5513 016626 006303 ASI R3 ;THE
5514 016630 050203 ASI R3 ;RESULT
5515 016632 000760 BIS R2,R3 ;UPDATE THE RESULT
5516      :
5517 016634 042703 177400 3$: BR 2$ ;CONTINUE UNTIL A NON-OCTAL CHARACTER
5518 016640 120337 004332 BIC #177400,R3 ;LEAVE ONLY 8 BITS
5519 016644 001343 CMPB R3,DIAGTS ;THIS TEST?
5520      :
5521 016646 116102 021666 6$: BNE 10$ ;NO - CONTINUE
5522 016652 005201 MOVB BUFR(R1),R2 ;YES-GET NEXT CHAR.
5523 016654 120227 000045 INC R1 ;INC THE BUFFER POINTER
5524 016660 001372 CMPB R2,#'%' ;IS IT A %?
5525 016662 010103 BNE 6$ ;NO-CONTINUE
5526 016664 116102 021666 5$: MOV R1,R3 ;SAVE THE POINTER
5527 016670 005201 MOVB BUFR(R1),R2 ;GET THE NEXT CHARACTER
5528 016672 120227 000046 INC R1 ;UPDATE THE CHARACTER POINTER
5529 016676 001372 CMPB R2,#'&' ;IS IT A & ?
5530 016700 012702 021666 BNE 5$ ;NO - CONTINUE TO LOOK
5531 016704 060102 MOV #BUFR,R2 ;GET THE BASE BUFFER ADDRESS
5532 016706 010237 016736 ADD R1,R2 ;BUILD POINTER TO MODULE CALLOUTS
5533      :
5534 016712 105722 7$: MOV R2,ERR78X+4
5535 016714 001376 TSTB (R2)+ ;LOOK FOR LINE TERMINATOR
5536 016716 005302 BNE 7$ ;LOOP UNTIL FOUND
5537 016720 005302 DEC R2 ;MOVE POINTER BACK TO THE
5538 016722 005302 DEC R2 ;CARRIAGE RETURN
5539 016724 111237 004414 DEC R2 ;LINE FEED
5540 016730 105012 MOVB (R2),SAVE ;SAVE THE LINE TERMINATOR
      CLRB (R2) ;PUT IN A NEW

```

```

5541
5542 016732
5543 016742 113712 004414
5544 016746 010301
5545 016750 004737 017234
5546 016754 005003
5547 016756 116102 021666
5548 016762 005201
5549 016764 120227 000076
5550 016770 001372
5551 016772 005203
5552 016774 020337 004334
5553 017000 001407
5554
5555 017002 116102 021666
5556 017006 005201
5557 017010 120227 000074
5558 017014 001372
5559
5560 017016 000757
5561
5562
5563 017020 004737 017234
5564
5565 017024 116102 021666
5566 017030 005201
5567 017032 120227 000076
5568 017036 001770
5569 017040 120227 000074
5570 017044 001367
5571 017046 122737 000374 004364
5572 017054 001004
5573 017056 004737 017450
5574 017062 004737 017560
5575
5576 017066 004737 017234
5577
5578 017072 116102 021666
5579 017076 005201
5580 017100 120227 000074
5581 017104 001770
5582 017106 120227 000076
5583 017112 001410
5584 017114 120227 000043
5585 017120 001364
5586
5587 017122 122737 000374 004364
5588 017130 001401
5589 017132 000207
5590 017134 042777 000200 165120
5591 017142 012777 040000 165060
5592 017150 005077 165054
5593 017154
5594 017156
5595 017160 012777 000377 165060
5596 017166 012777 000031 165034

ERR78X: ERRDF 0,ERR78X,MPPC ;LINE TERMINATOR
          MOV  SAVE,(R2) ;PRINT THE ERROR
          MOV  R3,R1 ;RESTORE THE ORIGINAL LINE TERMINATOR
          CALL ERR78P ;RESTORE THE % VECTOR
          ;PRINT THE % LINE

MSGPAR: CLR R3
9$: MOV  BUFER(R1),R2 ;GET A CHAR
     INC R1 ;UPDATE THE POINTER
     CMPB R2,#'> ;>?
     BNE 9$ ;NO-LOOP
     INC R3 ;INC. THE MESSAGE PAIR COUNT
     CMP R3,DIAGER ;MSG. PAIR=ERROR #
     BEQ FOUND ;YES-EXIT LOOP

8$: MOV  BUFER(R1),R2 ;MESSAGE PAIR
     INC R1 ;UPDATE BUFFER POINTER
     CMPB R2,#'< ;<?
     BNE 8$ ;NO-KEEP ON LOOPING
     BR 9$ ;YES-END OF PAIR
     ;TRY TO MATCH ON NEXT
     ;PAIR

FOUND: CALL ERR78P ;GO PRINT THE LINE

3$: MOV  BUFER(R1),R2 ;GET A CHARACTER
     INC R1 ;UPDATE THE POINTER
     CMPB R2,#'> ;>?
     BEQ FOUND ;YES-PRINT THE LINE
     CMPB R2,#'< ;NO-<?
     BNE 3$ ;NO-KEEP LOOPING
     CMPB #374,DINTCD ;ERROR INTERRUPT
     BNE SECPAR ;NO - SKIP EXP/ACT & AUX. PRINT
     CALL EXACT
     CALL AUXPNT

SECPAR: CALL ERR78P ;PRINT THE LINE

2$: MOV  BUFER(R1),R2 ;GET A CHARACTER
     INC R1 ;UPDATE THE POINTER
     CMPB R2,#'< ;<?
     BEQ SECPAR ;YES-GO PRINT IT
     CMPB R2,#'> ;NO >?
     BEQ RESPON ;YES - EXIT
     CMPB R2,#'# ;END OF BUFFER?
     BNE 2$ ;NO - KEEP LOOKING

#374,DINTCD ;ERROR INTERRUPT?
RESPON: BEQ RESPON ;YES - CONTINUE
        RTS PC ;NO - RETURN TO CALLING MODULE
        BIC #200,@DI2 ;CLEAR THE SCOPE LOOP FLAG
        MOV #TRE,@XFRCMD ;CLEAR THE MB ERROR
        CLR @XFRCMD ;FIX UP THE HARDWARE HACK
        INLOOP ;LOOP ON ERROR SPECIFIED?
        BCOMPLETE 1$ ;YES
        MOV #377,@AS ;CLEAR THE ATTENTION BIT
        MOV #CONERR,@XFRCMD ;NO - ISSUE CONTINUE ON ERROR COMMAND

```

```
5597 017174 000207          RTS      PC          ;RETURN
5598
5599 017176          1$:      RFLAGS  R2          ;GET THE USER FLAGS
5600 017202 032702 040000      BIT      #LOE,R2      ;SCOPE LOOP INDICATED?
5601 017206 001403          BEQ      2$          ;NO-CONTINUE
5602 017210 052777 000200 165044  BIS      #200,@DI2    ;YES-SET THE SCOPE LOOP BIT
5603
5604 017216 012777 000377 165022 2$:      MOV      #377,@AS   ;CLEAR THE ATTENTION BIT
5605 017224 012777 000033 164776  MOV      #LOPERR,@XFRCMD ;ISSUE LOOP ON ERROR COMMAND
5606 017232 000207          RTS      PC          ;
5607
5608
5609 017234 012704 021666      ERR78P: MOV      #BUFFER,R4   ;CALCULATE STARTING ADDRESS
5610 017240 060104          ADD      R1,R4       ;OF A CHARACTER STRING
5611 017242 122737 000374 004364  CMPB    #374,DINTCD   ;ERROR INTERRUPT?
5612 017250 001412          BEQ      1$          ;YES - PRINT THE ERROR LINES WITH DISTINCTION
5613 017252          PRINTF  #FMT78P,R4 ;NO - FORCE PRINT THE MESSAGE LINES
5614 017274 000411          BR      2$          ;
5615 017276          1$:      PRINTX  #FMT78P,R4 ;PRINT THE LINE
5616 017320 000207          2$:      RTS      PC          ;RETURN TO USER
5617
5618 017322 052045 000          FMT78P: .ASCIZ  /%T/
5619 017326          .EVEN
5620 017326          BGNMSG  MPPC
5621 017326 004737 046112      CALL    HEADER
5622 017332          PRINTB  #XTNOPC,DIAGER,DIAGTS,@TUSTAT
5623 017366          ENDMMSG
5624
5625 017370 040445 046524 034067  XTNOPC: .ASCIZ  /%ATM78 MICRO ERROR %05%A TST %03%A PC: %06%N/
5626          .EVEN
5627
5628          .SBTTL  MODULE 2.1.3.3.1 - EXACT
5629 017450          SSUB
5630          (1)      ;*****
5631 017450          (1)      ;*SUBROUTINE TITLE
5632          (1)      ;*-----
5633          (1)      ;*MODULE 2.1.3.3.1 PRINT ACTUAL/EXPECTED DATA
5634          (1)      SP
5635          (1)      ;*****
5636          (1)      ;*PROCEDURE
5637          (1)      ;*-----
5638          (1)      ;*BGNSUB
5639          (1)      ;* IF BIT 15 IN CAS REGISTER 3-1
5640          (1)      ;* : THEN-PRINT LOW BYTE OF CAS REGISTER 12 AS ACTUAL DATA
5641          (1)      ;* : ELSE-CONTINUE
5642          (1)      ;* ENDF
5643          (1)      ;* IF BIT 14 IN CAS REGISTER 3 1
5644          (1)      ;* : THEN-PRINT HIGH BYTE OF CAS REGISTER 12 AS EXPECTED DATA
5645          (1)      ;* : ELSE-CONTINUE
5646          (1)      ;* ENDF
5647          (1)      ;*ENDSUB
5648          (1)      S
5649          (1)      ;*****
5650          (1)      EXACT: BIT      #100000,@DI1 ;ACTUAL DATA TO PRINT?
5651          (1)      BEQ      1$          ;NO-GO CHECK EXPECTED
```

```
5646 017460 017704 164600      MOV    @DI3,R4      :YES
5647 017464 042704 177400      BIC    #177400,R4  :GET THE ACTUAL DATA BYTE
5648 017470                      PRINTX #FMTACT,R4   :PRINT IT
5649
5650 017512 032777 040000 164534 1$: BIT    #040000,@DI1 :EXPECTED DATA TO PRINT?
5651 017520 001416                      BEQ    2$          :NO - RETURN
5652 017522 017704 164536      MOV    @DI3,R4      :YES
5653 017526 000304                      SWAB   R4
5654 017530 042704 177400      BIC    #177400,R4  :GET THE EXPECTED DATA BYTE
5655 017534                      PRINTX #FMTEXP,R4
5656 017556 000207      2$: RTS    PC
```

```
5657
5658      .SBTTL  MODULE 2.1.3.3.2 - AUXPNT
5659 017560      SSUB
(1)      :*****
(1)      :*SUBROUTINE TITLE
(1)      :-----
5660      :*MODULE 2.1.3.3.2 AUXILIARY PRINT REQUESTS
5661 017560      SP
(1)      :*****
(1)      :*PROCEDURE
(1)      :-----
5662      :*BGNSUB
5663      :* IF CAS REGISTER 11 BIT 15:12=0
5664      : : THEN-CONTINUE
5665      : : ELSE-IF BITS 15:12 RIGHT JUSTIFIED=0 > OR 7
5666      : : : THEN-CONTINUE
5667      : : : ELSE-IF BITS 15:12 RIGHT JUSTIFIED=1
5668      : : : : THEN-PRINT MESSAGE 1 BELOW
5669      : : : : ELSE-CONTINUE
5670      : : : : ENDF
5671      : : : : IF BITS 15:12 RIGHT JUSTIFIED=2
5672      : : : : : THEN-PRINT MESSAGE 2 BELOW
5673      : : : : : ELSE-CONTINUE
5674      : : : : ENDF
5675      : : : : IF BITS 15:12 RIGHT JUSTIFIED=3
5676      : : : : : THEN-PRINT MESSAGE 3 BELOW
5677      : : : : : ELSE-CONTINUE
5678      : : : : ENDF
5679      : : : : IF BITS 15:12 RIGHT JUSTIFIED=4
5680      : : : : : THEN-PRINT MESSAGE 4 BELOW
5681      : : : : : ELSE-CONTINUE
5682      : : : : ENDF
5683      : : : : IF BITS 15:12 RIGHT JUSTIFIED=5
5684      : : : : : THEN-PRINT MESSAGE 5 BELOW
5685      : : : : : ELSE-CONTINUE
5686      : : : : ENDF
5687      : : : : IF BITS 15:12 RIGHT JUSTIFIED=6
5688      : : : : : THEN-PRINT MESSAGE 6 BELOW
5689      : : : : : PRINT MESSAGE 5 BELOW
5690      : : : : : ELSE-CONTINUE
5691      : : : : ENDF
5692      : : : : IF BITS 15:12 RIGHT JUSTIFIED=7
5693      : : : : : THEN-PRINT MESSAGE 7 BELOW
5694      : : : : : ELSE-CONTINUE
5695      : : : : ENDF
```

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5705 017560
(1)
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:      :      :      IF BITS 15:12 RIGHT JUSTIFIED=10
:      :      :      :      THEN-PRINT MESSAGE 1 BELOW
:      :      :      :      PRINT MESSAGE 2 BELOW
:      :      :      :      PRINT MESSAGE 5 BELOW
:      :      :      :      ELSE-CONTINUE
:      :      :      :      ENDIF
:      :      :      ENDIF
:      :      :      ENDIF
:      :      :      *ENDSUB
S
*****
:      :      :      MESSAGE #      PRINT LINE
:      :      :      -----
:      :      :      1      REQUEST HOST CPU TO PRINT:
:      :      :      :      'BYTE/SCLK COUNT NUMBER - LLL'
:      :      :      :      WHERE: LLL = THE VALUE STORED IN CAS
:      :      :      :      :      REGISTER 5 (THE BYTE COUNT
:      :      :      :      :      REGISTER 16 BITS).
:      :      :      2      REQUEST HOST CPU TO PRINT:
:      :      :      :      DATA FORMAT = MM
:      :      :      :      SKIP COUNT = NN
:      :      :      :      WHERE: MM = DATA FORMAT FROM CAS REG 2
:      :      :      :      :      NN = SKIP COUNT FROM CAS REG 2
:      :      :      3      REQUEST HOST CPU TO PRINT:
:      :      :      :      BYTE-SCLK COUNT = LLL
:      :      :      :      DATA FORMAT = MM
:      :      :      :      SKIP COUNT = NN
:      :      :      :      WHERE: LLL = AS ABOVE
:      :      :      :      :      MM = AS ABOVE
:      :      :      :      :      NN = AS ABOVE
:      :      :      4      REQUEST HOST TO PRINT:
:      :      :      :      TRANSITION COUNT = LLL
:      :      :      :      WHERE: LLL = COUNT FROM CAS REGISTER 05
:      :      :      5      REQUEST HOST CPU TO PRINT:
:      :      :      :      EXPECTED 18 BITS =      E EEEEE
:      :      :      :      ACTUAL 18 BITS =      A AAAAA
:      :      :      :      WHERE EXPECTED BITS 15-0 ARE IN CAS REG
:      :      :      :      14 AND BITS 17-16 ARE IN REG 15...PRINT
:      :      :      :      FLAG IS SIGN BIT OF CAS REG 15 LOW BYTE.
:      :      :      :      ACTUAL 18 BITS DATA CONTAINED IN REG 16
:      :      :      :      (BITS 15-0) AND IN REG 17 (BITS 17-16)..
:      :      :      :      PRINT FLAG IS CAS REG 17 LOW BYTE SIGN BIT.
:      :      :      6      REQUEST THE HOST CPU TO PRINT BOTH ROUTINE
:      :      :      :      #1 AND #5 TO REPORT THE BYTE/SCLK COUNT
:      :      :      :      AND 18 BITS OF EXPECTED AND/OR ACTUAL
:      :      :      :      DATA.
:      :      :      7      REQUEST HOST CPU TO PRINT:

```

5751
5752
5753
5754
5755
5756 017560
(1)
5757
5758 017560 017704 164476
5759 017564 032704 170000
5760 017570 001410
5761 017572 042704 007777
5762 017576 000304
5763 017600 006204
5764 017602 006204
5765 017604 006204
5766 017606 000174 017614
5767 017612 000207
5768
5769 017614 017612
5770 017616 017654
5771 017620 017662
5772 017622 017670
5773 017624 017702
5774 017626 017710
5775 017630 017716
5776 017632 017730
5777 017634 017756
5778 017636 017612
5779 017640 017612
5780 017642 017612
5781 017644 017612
5782 017646 017612
5783 017650 017612
5784 017652 017612
5785
5786 017654 004737 020026
5787 017660 000207
5788 017662 004737 020106
5789 017666 000207
5790 017670 004737 020026
5791 017674 004737 020106
5792 017700 000207
5793 017702 004737 020264
5794 017706 000207
5795 017710 004737 020346
5796 017714 000207
5797 017716 004737 020026
5798 017722 004737 020346
5799 017726 000207
5800 017730
5801 017754 000207
5802 017756 004737 020026
5803 017762 004737 020106
5804 017766 004737 020346
5805 017772 000207

```

: * 'SUBGROUP NUMBER = LLL'
: * WHERE: LLL = THE VALUE STORED IN CAS REG 5
: * (THE BYTE COUNT REG 16 BITS).
: *
: * 10 REQUEST THE HOST TO PRINT ROUTINES #1, #2, & #5
: *
: * *****
: *
AUXPNT: MOV @DI2,R4
        BIT #170000,R4 ;AUXILIARY PRINT REQ?
        BEQ AUXILL ;NO-GO DO SECOND MSG. PAIR
        BIC #007777,R4 ;REMOVE UNWANTED BITS
        SWAB R4 ;SWAP BYTES
        ASR R4 ;SHIFT RIGHT
        ASR R4 ;SHIFT RIGHT
        ASR R4 ;SHIFT RIGHT
        JMP @AUXTBL(R4)
AUXILL: RTS PC

AUXTBL: .WORD AUXILL ;AUXILIARY PRINT REQUEST 0 - ILLEGAL
        .WORD AUX1 ;AUXILIARY PRINT REQUEST 1
        .WORD AUX2 ;AUXILIARY PRINT REQUEST 2
        .WORD AUX3 ;AUXILIARY PRINT REQUEST 3
        .WORD AUX4 ;AUXILIARY PRINT REQUEST 4
        .WORD AUX5 ;AUXILIARY PRINT REQUEST 5
        .WORD AUX6 ;AUXILIARY PRINT REQUEST 6
        .WORD AUX7 ;AUXILIARY PRINT REQUEST 7
        .WORD AUX8 ;AUXILIARY PRINT REQUEST 8
        .WORD AUXILL ;AUXILIARY PRINT REQUEST 9 - ILLEGAL
        .WORD AUXILL ;AUXILIARY PRINT REQUEST 10 - ILLEGAL
        .WORD AUXILL ;AUXILIARY PRINT REQUEST 11 - ILLEGAL
        .WORD AUXILL ;AUXILIARY PRINT REQUEST 12 - ILLEGAL
        .WORD AUXILL ;AUXILIARY PRINT REQUEST 13 - ILLEGAL
        .WORD AUXILL ;AUXILIARY PRINT REQUEST 14 - ILLEGAL
        .WORD AUXILL ;AUXILIARY PRINT REQUEST 15 - ILLEGAL

AUX1: CALL AUX1X ;GO PRINT AUXILIARY LINE 1
        RTS PC ;RETURN TO CALLING MODULE
AUX2: CALL AUX2X ;GO PRINT AUXILIARY LINE 2
        RTS PC ;RETURN TO CALLING MODULE
AUX3: CALL AUX1X ;GO PRINT AUXILIARY LINE 1
        CALL AUX2X ;GO PRINT AUXILIARY LINE 2
        RTS PC ;RETURN TO CALLING MODULE
AUX4: CALL AUX4X ;GO PRINT AUXILIARY LINE 4
        RTS PC ;RETURN TO CALLING MODULE
AUX5: CALL AUX5X ;GO PRINT AUXILIARY LINE 5
        RTS PC ;RETURN TO CALLING MODULE
AUX6: CALL AUX1X ;GO PRINT AUXILIARY LINE 1
        CALL AUX5X ;GO PRINT AUXILIARY LINE 5
        RTS PC ;RETURN TO CALLING MODULE
AUX7: PRINTX #AUXMS7,@FC
        RTS PC
AUX8: CALL AUX1X ;GO PRINT AUXILIARY LINE 1
        CALL AUX2X ;GO PRINT AUXILIARY LINE 2
        CALL AUX5X ;GO PRINT AUXILIARY LINE 5
        RTS PC ;RETURN TO CALLING MODULE
```

```

5806
5807
5808 017774 040445 052523 043502 AUXMS7: .ASCIZ /%ASUBGROUP NUMBER - %06%N/
5809 .EVEN
5810
5811 ;THIS AUXILIARY PRINT ROUTINE WILL PRINT THE SCLK/BYTE COUNT BASED ON
5812 ;THE CONTENTS OF THE CAS REGISTER 5.
5813
5814 020026 AUX1X: PRINTX #AUXMS1,@FC
5815 020052 000207 RTS PC
5816 020054 040445 054502 042524 AUXMS1: .ASCIZ /%ABYTE-SCLK COUNT = %06%N/
5817 .EVEN
5818
5819 ;THIS AUXILIARY PRINT ROUTINE WILL PRINT THE DATA FORMAT AND SKIP COUNT
5820 ;BASED ON THE DATA FORMAT AND SKIP COUNT INFORMATION IN CAS REGISTER 2
5821 ;(MASS BUS REGISTER 14).
5822
5823 020106 017702 164132 AUX2X: MOV @TC,R2 ;GET THE TAPE CONTROL REGISTER
5824 020112 000302 SWAB R2 ;SWAP THE BYTES
5825 020114 042702 177760 BIC #177760,R2 ;GET ONLY THE SKIP COUNT
5826 020120 017704 164120 MOV @TC,R4 ;GET THE TAPE CONTROL REGISTER
5827 020124 000304 SWAB R4 ;SWAP THE BYTES
5828 020126 042704 177617 BIC #177617,R4 ;MASK OUT ONLY THE FORMAT BITS
5829 020132 006204 ASR R4 ;JUSTIFY RIGHT
5830 020134 006204 ASR R4
5831 020136 006204 ASR R4
5832 020140 006204 ASR R4
5833 020142 PRINTX #AUXMS2,R4 ;GET ONLY THE DATA FORMAT
5834 020164 PRINTX #AUXMO2,R2
5835 020206 000207 RTS PC
5836 020210 040445 040504 040524 AUXMS2: .ASCIZ /%ADATA FORMAT = %06%N/
5837 020236 040445 045523 050111 AUXMO2: .ASCIZ /%ASKIP COUNT = %06%N/
5838 020264 .EVEN
5839
5840 ;THIS AUXILIARY PRINT ROUTINE WILL PRINT THE TRANSITION COUNT BASED
5841 ;ON THE CONTENTS OF CAS REGISTER 5.
5842 020264 AUX4X: PRINTX #AUXMS4,@FC
5843 020310 000207 RTS PC
5844
5845 020312 040445 051124 047101 AUXMS4: .ASCIZ /%ATRANSITION COUNT = %06%N/
5846 020346 .EVEN
5847
5848 ;THIS AUXILIARY PRINT ROUTINE WILL PRINT EXPECTED DATA AND/OR ACTUAL
5849 ;DATA IN 18 BIT FORMAT (6 OCTAL CHARACTERS). THE ACTUAL DATA (BITS
5850 ;15:0) IS CONTAINED IN CAS REGISTER 16 AND (BITS 17:16) IN CAS REGISTER
5851 ;17. THE EXPECTED DATA (BITS 15:0) IS CONTAINED IN CAS REGISTER 14 AND
5852 ;(BITS 17:16) IN CAS REGISTER 15. ASSOCIATED WITH BOTH THE ACTUAL AND
5853 ;EXPECTED DATA IS A PRINT FLAG INDICATING IF THE INFORMATION IS TO BE
5854 ;PRINTED. THE ACTUAL DATA PRINT FLAG IS BIT 7 OF CAS REGISTER 17, AND
5855 ;THE PRINT FLAG FOR THE EXPECTED DATA IS BIT 7 OF CAS REGISTER 15.
5856 020346 032777 000200 163716 AUX5X: BIT #200,@M01 ;EXPECTED DATA TO PRINT?
5857 020354 001415 BEQ 1$ ;NO-GO CHECK FOR ACTUAL
5858 020356 005003 CLR R3 ;YES-LOAD THE DISPLACEMENT VALUE
5859 020360 004737 020456 CALL AUX18 ;GET THE DATA
5860 020364 PRINTX #AUXMS5,R2,R4
5861 020410 032777 000200 163660 1$: BIT #200,@M03 ;ACTUAL DATA TO PRINT?

```

```
5862 020416 001416          BEQ      2$          :NO-RETURN TO USER
5863 020420 012703 000002    MOV      #2,R3      :YES-LOAD THE DISPLACEMENT VALUE
5864 020424 004737 020456    CALL    AUX18      :GET THE DATA
5865 020430          PRINTX  #A'JXMO5,R2,R4
5866 020454 000207          2$:   RTS      PC          :RETURN
5867
5868 020456 017302 004272    AUX18: MOV      @MO1(R3),R2 :GET BIT 17:16
5869 020462 042702 177774    BIC     #177774,R2 :REMOVE UNWANTED BITS
5870 020466 006302          ASL     R2          :JUSTIFY THE CHARACTER
5871 020470 017304 004270    MOV      @MO0(R3),R4 :GET THE MISSING BIT
5872 020474 042704 077777    BIC     #077777,R4 :JUSTIFY THE BIT
5873 020500 000241          CLC
5874 020502 006304          ASL     R4
5875 020504 006304          ASL     R4
5876 020506 050402          BIS     R4,R2      :COMPLETE THE PARTIAL CHARACTER
5877 020510 017304 004270    MOV      @MO0(R3),R4 :GET THE OTHER 5 CHARACTERS
5878 020514 000207          RTS      PC          :RETURN
5879
```

```
5880 020516 040445 054105 027124  AUXM55: .ASCIZ  /%AEXT. EXPECTED = %01%05%/
5881          020552          .EVEN
5882 020552 040445 054105 027124  AUXM05: .ASCIZ  /%AEXT. ACTUAL - %01%05%/
5883          020604          .EVEN
```

```
5884          .SBTTL  MODULE 2.1.3.4 - UTIL80
```

```
5885 020604          SSUB
```

```
(1) : *****
(1) : *SUBROUTINE TITLE
(1) : -----
```

```
5886          *MODULE      2.1.3.4 PROCESS TM78 MP UTILITY REQUEST
```

```
5887 020604          SP
```

```
(1) : *****
(1) : *PROCEDURE
(1) : -----
```

```
5888          *BGNSUB
```

```
5889          * IF CAS REGISTER 11 BITS 3:0=0 OR 4 OR > 7
5890          * : THEN-LOAD ERRCOD WITH 16(10)
5891          * : EXIT SUBROUTINE
5892          * : ELSE-IF REGISTER 11 BITS 3:0=1 OR 2
5893          * : : THEN-CALL SUBROUTINE CALBYT
5894          * : : IF ERRCOD=0
5895          * : : : THEN-CALL SUBROUTINE PATGEN
5896          * : : : IF ERRCOD=0
5897          * : : : : THEN-LOAD 377(8) CAS REGISTER 4
5898          * : : : : SET UP THE WRITE BUFFER ADDRESS
5899          * : : : : : LOAD 65(8) CAS REGISTER 0
5900          * : : : : : ELSE-EXIT SUBROUTINE
5901          * : : : : : ENDIF
5902          * : : : : ELSE-EXIT SUBROUTINE
5903          * : : : : ENDIF
5904          * : : : ELSE-CONTINUE
5905          * : : : ENDF
5906          * : : IF CAS REGISTER 11 BITS 3:0=3
5907          * : : : THEN-CALL SUBROUTINE CALBYT
5908          * : : : IF ERRCOD=0
5909          * : : : : THEN-CALL SUBROUTINE PATGEN
5910          * : : : : IF ERRCOD=0
5911          * : : : : : THEN-LOAD 377(8) TO CAS REGISTER 4
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5980 020604
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5981 020604 017701 163452
5982 020610 042701 177760
5983 020614 006301
5984 020616 000171 020622
5985
5986 020622 020772
5987 020624 020662
5988 020626 020662
5989 020630 020726
5990 020632 020772
5991 020634 021000
5992 020636 021066
5993 020640 021110
5994 020642 020772
5995 020644 020772
5996 020646 020772
5997 020650 020772
5998 020652 020772
5999 020654 020772
6000 020656 020772
6001 020660 020772
6002
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6005
6006 020662 004737 021142
6007 020666 005705
6008 020670 001015
6009 020672 004737 021312
6010 020676 005705
6011 020700 001011
6012 020702 012777 000377 163336
6013 020710 012777 033642 163316
6014 020716 012777 000065 163304
6015 020724 000207
6016
6017
6018
6019
6020 020726 004737 021142
6021 020732 005705
6022 020734 001015

```

```

LOAD 31(8) IN CAS REGISTER 0
:
:
: ENDIF
: ELSE-CONTINUE
:
: ENDIF
: IF CAS REGISTER 11 BITS 3:0=7
: THEN-LOAD THE BIT UNIT NUMBER IN CAS REGISTER 12
: LOAD 377(8) TO CAS REGISTER 4
: LOAD 31(8) TO CAS REGISTER 0
: ELSE-CONTINUE
: ENDIF
: ENDIF
: *ENDSUB
S
*****
UTIL80: MOV @D12,R1 ;GET THE UTILITY REQ #
BIC #177760,R1 ;MASK OUT DESIRED BITS
ASL R1 ;MULTIPLY BY 2
JMP @UTILTB(R1) ;JUMP TO REQUIRED REQUEST

UTILTB: .WORD UTLILL ;REQUEST CODE 0 INVALID
: .WORD WGCRPE ;REQUEST CODE 1 WRITE PE
: .WORD WGCRPE ;REQUEST CODE 2 WRITE GCR
: .WORD RFWD ;REQUEST CODE 3 READ FORWARD
: .WORD UTLILL ;REQUEST CODE 4 INVALID
: .WORD STNER ;REQUEST CODE 5 STATUS CHECK-NO ERR
: .WORD STER ;REQUEST CODE 6 STATUS CHECK-ERROR
: .WORD UNITS ;REQUEST CODE 7 UNITS UNDER TEST
: .WORD UTLILL ;REQUEST CODE 8 INVALID
: .WORD UTLILL ;REQUEST CODE 9 INVALID
: .WORD UTLILL ;REQUEST CODE A INVALID
: .WORD UTLILL ;REQUEST CODE B INVALID
: .WORD UTLILL ;REQUEST CODE C INVALID
: .WORD UTLILL ;REQUEST CODE D INVALID
: .WORD UTLILL ;REQUEST CODE E INVALID
: .WORD UTLILL ;REQUEST CODE F INVALID

:
: WRITE GCR/PE UTILITY REQUEST
:
WGCRPE: CALL CALBYT ;CALCULATE BYTE COUNT
TST ERRCOD ;TEST ERROR CODE
BNE WGCRX ;EXIT IF SET
CALL PATGEN ;GENERATE THE DATA PATTERN
TST ERRCOD ;TEST ERROR CODE
BNE WGCRX ;EXIT IF SET
MOV #377,@AS ;CLEAR THE ATTENTION SUMMARY REGISTER
MOV #WRTBUF,@BA ;LOAD THE BUFFER ADDRESS FOR WRITE
MOV #65,@XFRCMD ;ISSUE WRITE GCR-NOT 18 BIT COMPAT.
WGCRX: RTS PC

:
: READ FORWARD UTILITY REQUEST
:
RFWD: CALL CALBYT ;CALCULATE THE BYTE COUNT
TST ERRCOD ;TEST ERROR CODE
BNE RFWDX ;EXIT IF SET

```

```

6023 020736 004737 021312          CALL  PATGEN          ;GENERATE THE DATA PATTERN
6024 020742 005705                   TST   ERRCOD          ;TEST ERROR CODE
6025 020744 001011                   BNE   RFWDX           ;EXIT IF SET
6026 020746 012777 033476 163260    MOV   #REDBUF,@BA     ;LOAD THE BUFFER ADDRESS FOR READ
6027 020754 012777 000377 163264    MOV   #377,@AS        ;CLEAR THE ATTENTION SUMMARY REGISTER
6028 020762 012777 000071 163240    MOV   #71,@XFRCMD     ;ISSUE READ FORWARD
6029 020770 000207                   RFWDX: RTS            PC
6030
6031                                     ;
6032                                     ;ILLEGAL UTILITY REQUEST CODE ERROR TRAP
6033
6034 020772 012705 000020             U*LLIL: MOV           #16.,ERRCOD ;LOAD THE ILLEGAL HOST REQUEST ERROR CODE
6035 020776 000207                   RTS            PC
6036
6037 021000 032777 040000 163222    STNER: BIT           #040000,@XFRCMD ;TEST THE MASS BUS STATUS
6038 021006 001404                   BEQ   STNER1          ;CONTINUE IF NONE
6039 021010                   ERRDF #31.,,ERM031 ;ELSE - ERROR
6040
6041 021020 032777 000020 163234    STNER1: BIT          #000020,@DI2 ;SHOULD DATA BE COMPARED?
6042 021026 001415                   BEQ   2$              ;NO-EXIT
6043 021030 005002                   CLR   R2              ;CLEAR THE BUFFER POINTER
6044 021032 126262 033476 033642    3$:  (MPB) REDBUF(R2),WRTBUF(R2)
6045 021040 001404                   BEQ   1$              ;
6046 021042                   ERRDF #32.,,ERM032 ;ELSE - DATA COMPARE FAILURE
6047 021052 005202                   1$:  INC             R2 ;UPDATE THE POINTER
6048 021054 020237 004336                   CMP   R2,BYTCNT      ;DONE?
6049 021060 001364                   BNE   3$              ;NO - CONTINUE
6050 021062 000137 017134                   2$:  JMP             RESPON ;GO SPECIFY CONTINUE/LOOP ON ERROR
6051
6052 021066 032777 040000 163134    STER:  BIT           #040000,@XFRCMD
6053 021074 001351                   BNE   STNER1          ;
6054 021076                   ERRDF #33.,,ERM033 ;
6055
6056 021106 000744                   BR    STNER1          ;
6057
6058                                     ;
6059                                     ;UNIT NUMBERS UTILITY REQUEST
6060
6061 021110 013701 004354             UNITS: MOV           BINUNT,R1 ;GET THE UNITS WORD
6062 021114 042701 177760                   BIC   #177760,R1     ;REMOVE UNUSED BITS
6063 021120 010177 163140                   MOV   R1,@DI3        ;STORE IN CAS REGISTER 12 LOW
6064 021124 012777 000377 163114    MOV   #377,@AS        ;CLEAR THE ATTENTION SUMMARY REGISTER
6065 021132 012777 000031 163070    MOV   #31,@XFRCMD     ;ISSUE DIAGNOSTIC CONTINUE COMMAND
6066 021140 000207                   RTS            PC     ;RETURN
6067
6068 021142                   .SBTTL MODULE 2.1.3.4.1 - CALBYT
(1)                                     SSUB
(1)                                     ;*****
(1)                                     ;*SUBROUTINE TITLE
6069                                     ;*-----*
021142                                     ;*MODULE      2.1.4.1 - CALCULATE BYTE COUNT
(1)                                     SD
(1)                                     ;*****
(1)                                     ;*DESCRIPTION
(1)                                     ;*-----*
6071                                     ;*THIS ROUTINE WILL CALCUALTE THE BYTE COUNT FOR A GIVEN TM78 DATA
6072                                     ;*TRANSFER REQUEST. THIS BYTE COUNT IS BASED ON THE "SCLOCK" COUNT

```

6073
6074
6075 021142
(1)
6076
6077 021142 017701 163070
6078 021146 010102
6079 021150 006302
6080 021152 010237 004336
6081 021156 010102
6082 021160 005402
6083 021162 010277 163044
6084 021166 017702 163052
6085 021172 042702 107777
6086 021176 000302
6087 021200 006202
6088 021202 006202
6089 021204 006202
6090 021206 000172 021212
6091 021212 021232
6092 021214 021232
6093 021216 021242
6094 021220 021246
6095 021222 021264
6096 021224 021234
6097 021226 021304
6098 021230 021304
6099
6100 021232 006301 162776
6101 021234 010177
6102 021240 000207
6103 021242 006301
6104 021244 000772
6105 021246 010102
6106 021250 006301
6107 021252 006202
6108 021254 060201
6109 021256 010177 162754
6110 021262 000207
6111 021264 010102
6112 021266 006301
6113 021270 006202
6114 021272 006202
6115 021274 060201
6116 021276 010177 162734
6117 021302 000207
6118
6119 021304 012705 000021
6120 021310 000207
6121
6122
6123
6124 021312
(1)
(1)
(1)

```
;*RETURNED IN CAS REGISTER 5, MASS BUS REGISTER 6, AND THE DATA FORMAT  
;*IN CAS REGISTER 2, MASS BUS REGISTER 14.  
S  
: *****  
CALBYT: MOV @FC,R1 ;GET THE NUMBER OF 'SCLK'S  
MOV R1,R2 ;COPY TO R2  
ASL R2 ;MULTIPLY BY 2  
MOV R2,BYTCNT ;SAVE FOR LATER USE  
MOV R1,R2 ;COPY TO R2  
NEG R2 ;TAKE TWOS COMPLEMENT  
MOV R2,@WC ;SET UP THE WORD COUNT  
MOV @TC,R2 ;GET THE DATA FORMAT  
BIC #107777,R2 ;REMOVE JUNK BITS  
SWAB R2 ;SWAP THE BYTES  
ASR R2  
ASR R2  
ASR R2 ;R2=DATA FORMAT CODE X 2  
JMP @CALTBL(R2)  
CALTBL: .WORD CALX2 ;11 NORMAL FORMAT  
;WORD CALX2 ;15 NORMAL FORMAT  
;WORD CALX4 ;10 COMPAT. FORMAT  
;WORD CALX5 ;10 DUMP FORMAT  
;WORD CALX9 ;10 HIGH DENSITY FORMAT  
;WORD CALX1 ;IMAGE FORMAT  
;WORD CALILL ;ILLEGAL  
;WORD CALILL ;ILLEGAL  
CALX2: ASL R1 ;MULTIPLY 'SCLK' COUNT BY 2  
CALX1: MOV R1,@FC ;SET UP THE FRAMC COUNT  
RTS PC  
CALX4: ASL R1 ;MULTIPLY 'SCLK' COUNT BY 2  
BR CALX2 ;GO MULTIPLY AGAIN  
CALX5: MOV R1,R2 ;COPY THE 'SCLK' COUNT  
ASL R1 ;MULTIPLY BY 2  
ASR R2 ;DIVIDE BY 2  
ADD R2,R1 ;MULTIPLY BY 5  
MOV R1,@FC ;STORE IN THE FRAME COUNT  
RTS PC ;RETURN  
CALX9: MOV R1,R2 ;COPY THE 'SCLK' COUNT  
ASL R1 ;MULTIPLY BY 2  
ASR R2 ;DIVIDE COPY BY 2  
ASR R2 ;DIVIDE COPY BY 4  
ADD R2,R1 ;MULTIPLY BY 2.25  
MOV R1,@FC  
RTS PC  
CALILL: MOV #21,ERRCOD ;LOAD THE ILLEGAL  
RTS PC ;RETURN TO CALLING MODULE  
;SBTTL MODULE 2.1.3.4.2 - PATGEN  
SSUB  
: *****  
;*SUBROUTINE TITLE  
:*****
```

```

6125
6126 021312
(1)
(1)
(1)
6127
6128
6129
6130 021312
(1)
6131 021312 017701 162744
6132 021316 000301
6133 021320 042701 177776
6134 021324 006301
6135 021326 005002
6136 021330 000171 021334
6137
6138 021334 021340
6139 021336 021364
6140
6141 021340 012705 000022
6142 021344 000207
6143
6144 021346 010162 033642
6145 021352 005202
6146 021354 005202
6147 021356 020237 004336
6148 021362 000207
6149
6150
6151
6152
6153
6154
6155
6156 021364 012701 000001
6157 021370 004737 021346
6158 021374 002055
6159 021376 006301
6160 021400 103373
6161 021402 005001
6162 021404 004737 021346
6163 021410 002047
6164 021412 004737 021346
6165 021416 002044
6166
6167 021420 012701 177777
6168 021424 004737 021346
6169 021430 002037
6170 021432 004737 021346
6171 021436 002034
6172
6173 021440 012701 077777
6174 021444 004737 021346
6175 021450 002027
6176 021452 006201
    
```

```

;*MODULF      2.1.3.4.2 - GENERATE THE DATA PATTERN
SD
:*****
;*DESCRIPTION
:-----
;*THIS ROUTINE IS CALLED TO GENERATE THE PROPER DATA PATTERN FOR THE
;*REQUESTED TRANSFER ON A WRITE OR FOR COMPARE BUFFER GENERATION
;*ON A READ.
S
:*****
PATGEN: MOV    @DI2,R1      ;GET MASS BUS REGISTER
        SWAB   R1          ;SWAP THE HIGH-LOW BYTE
        BIC   #177776,R1   ;REMOVE JUNK BITS
        ASL   R1          ;MULTIPLY BY 2
        CLR   R2          ;CLEAR THE BYTE COUNTER
        JMP   @PATTBL(R1)

PATTBL: .WORD  PATILL      ;PATTERN 0 - UNDEFINED
        .WORD  MPDPAR      ;PATTERN 1 - MASS BUS PARITY

PATILL: MOV    #22,FRRCOD  ;LOAD ILLEGAL DATA PATTERN ERROR CODE
        RTS    PC

FILLX:  MOV    R1,WRTBUF(R2) ;STORE THE DATA IN THE BUFFER
        INC   R2          ;INC THE COUNT
        INC   R2          ;INC THE COUNT
        CMP   R2,BYTCNT   ;DONE?
        RTS    PC        ;YES-RETURN

:
:WORST CASE MASSBUS DATA PATTERN
:
MPDPAR: MOV    #1,R1      ;LOAD STARTING DATA PATTERN
2$: CALL  FILLX          ;WRITE TO THE BUFFER
        BGE  4$         ;DONE?
        ASL  R1          ;GENERATE NEXT PATTERN
        BCC  2$         ;
        CLR  R1          ;LOAD DATA OF ZEROS
        CALL FILLX      ;WRITE TO THE BUFFER
        BGE  4$         ;DONE?
        CALL FILLX      ;WRITE TO THE BUFFER
        BGE  4$         ;DONE?
        ;
        MOV  #-1,R1     ;LOAD ALL ONES DATA
        CALL FILLX      ;WRITE THE BUFFER
        BGE  4$         ;DONE?
        CALL FILLX      ;WRITE THE BUFFER
        BGE  4$         ;DONE?
        ;
3$: MOV    #77777,R1     ;LOAD STARTING DATA PATTERN
        CALL FILLX      ;WRITE THE BUFFER
        BGE  4$         ;DONE?
        ASR  R1          ;GENERATE NEXT PATTERN
    
```

```
6177 021454 052701 100000      BIS    #100000,R1      ;
6178 021460 103771              BCS    3$             ;
6179                                ;
6180 021462 012701 177777      MOV    #177777,R1     ;LOAD ALL ONES DATA
6181 021466 004737 021346      CALL  FILLX          ;WRITE TO BUFFER
6182 021472 002016              BGE    4$             ;DONE?
6183                                ;
6184 021474 005001              CLR    R1             ;LOAD ALL ZEROS DATA
6185 021476 004737 021346      CALL  FILLX          ;WRITE TO BUFFER
6186 021502 002012              BGE    4$             ;DONE?
6187                                ;
6188 021504 012701 052525      MOV    #052525,R1    ;LOAD ALTERNATE ONES DATA
6189 021510 004737 021346      CALL  FILLX          ;WRITE TO BUFFER
6190 021514 002005              BGE    4$             ;DONE?
6191                                ;
6192 021516 012701 125252      MOV    #125252,R1    ;WRITE COMP. ALTER. ONES DATA
6193 021522 004737 021346      CALL  FILLX          ;WRITE TO BUFFER
6194 021526 003716              BLE    MPDPAR        ;DONE?-NO CONTINUE
6195                                ;
6196 021530 000207      4$:    RTS    PC      ;RETURN
6197                                ;
6198 021532      .SBTTL  MODULE 2.1.3.5 - QUEUEM
6199      SSUB
6200      ;*****
6201      ;*SUBROUTINE TITLE
6202      ;*-----
6203      ;*MODULE 2.1.3.5 - QUEUE A PRINT LINE/MANUAL INTERVENTION
6204      SP
6205      ;*****
6206      ;*PROCEDURE
6207      ;*-----
6208      ;*BGNSUB
6209      ;* PRINT DEVICE HEADER
6210      ;* CALL SUBROUTINE MSGPAR
6211      ;* IF DATA TRANSFER INTERRUPT CODE=373(8)
6212      ;* : THEN-CONTINUE
6213      ;* : ELSE-PRINT 'TYPE CARRIAGE RETURN TO CONTINUE'
6214      ;* : WAIT FOR CARRIAGE RETURN
6215      ;* ENDF
6216      ;* LOAD 377(8) IN CAS REGISTER 4
6217      ;* LOAD 31(8) IN CAS REGISTER 1
6218      ;*ENDSUB
6219      S
6220      ;*****
6221      QUEJEM: NOP          ;MANUAL INTERVENTION ENTRY
6222      QUEUE:  CALL    HEADER
6223              CLR    R1          ;CLEAR THE BUFFER POINTER
6224              CALL  MSGPAR        ;GO PRINT THE MESSAGE
6225              CMPB  #373,DINTCD   ;PRINT ONLY REQUEST?
6226              BEQ   1$           ;YES - DONE
6227              MOV   #1,DUMFLG     ;
6228              GMANIL MANMSG,DUMFLG,1,YES
6229      1$:    MOV    #377,@AS      ;CLEAR THE ATTENTION SUMMARY REGISTER
6230              MOV   #CONERR,@XFRCMD ;ISSUE CODE 31
6231              RTS   PC          ;RETURN TO THE CALLING MODULE
6232      MANMSG: .ASCIZ  /TYPE CARRIAGE RETURN TO CONTINUE/
```

6226 021660
6227
6228 021660
(1)
(1)
(1)
6229
6230 021660
(1)
(1)
(1)
6231
6232
6233
6234 021660
(1)
(1)
(1)
6235
6236
6237
6238
6239
6240 021660
(1)
6241 021660
6242 021662 005005
6243 021664 000207
6244
6245
6246
6247
6248 021666
(1)
6249
6250 021666 011610
6251 033476
6252
6253 033476
(1)
6254
6255 033476
6256 033476 000144
6257
6258 033642
(1)
6259
6260 033642
6261 033642 000144

```
.EVEN  
.SBTTL MODULE 2.1.4 - CLOSEX  
SSUB  
: *****  
: *SUBROUTINE TITLE  
: *****  
: *MODULE 2.1.4 - CLOSEX  
SP  
: *****  
: *PROCEDURE  
: *****  
: *BGNSUB  
: * ISSUE CLOSE FILE CALL TO SUPERVISOR  
: *ENDSUB  
SIO  
: *****  
: *SUBROUTINE INPUT/OUTPUT  
: *****  
: * INPUT: NONE  
: *  
: * OUTPUT: NONE  
: *  
S  
: *****  
CLOSEX: CLOSE ;CLOSE FILE  
CLR ERRCOD ;CLEAR THE ERROR CODE  
RTS PC  
  
.SBTTL BUFFERS  
S  
: *****  
: *MICRO-DIAGNOSTIC/ERROR MESSAGE BUFFER  
BUF: .BLKB 5000. ;5.0K BUFFER  
BUFEND:  
  
S  
: *****  
: *READ DATA BUFFER  
MBREAD: ;MASS BUS DATA READ  
REDBUF: .BLKB 100. ;READ DATA TRANSFER BUFFER  
:  
  
S  
: *****  
: *WRITE DATA BUFFER  
MWBUFF: ;MASS BUS DATA WRITTEN  
WRIBUF: .BLKB 100. ;WRITE DATA TRANSFER BUFFER
```

```

6262
6263 034006 010237 004330          CASCOW: MOV      R2,CASDTA
6264 034012 004737 034242          CALL     CASBOT      ;BOOT UP THE CAS PROGRAM
6265 034016 005705                TST      ERRCOD
6266 034020 001062                BNE      5$
6267 034022                BGNSEG
6268 034024 004737 014566          CALL     START       ;START THE TM78
6269 034030 004737 034324          CALL     CASDAT      ;FILL THE CAS DATA BUFFER
6270 034034 004737 035154          CALL     HOLDMP
6271 034040 012777 041420 150232    MOV      #CASCMD,@AD80 ;ADDRESS COMMAND BYTE
6272 034046 012777 000400 150226    MOV      #HOLD,@DS80  ;ISSUE THE READ CAS FROM TM78MP COMMAND
6273 034054 004737 014566          CALL     START
6274 034060 004737 034350          CALL     CASWRT      ;GO WRITE CAS FROM HOST
6275 034064
6276 034066 012777 000035 150134    MOV      #TSTART,@XFRCMD
6277 034074                DELAY     100         ;PERFORM A 10MS. TIMEOUT
6278 034124 122777 000372 150076    CMPB    #372,@XFRCMD ;DONE
6279 034132 001406                BEQ      3$         ;YES-CONTINUE
6280 034134                ERDF     8.,PROCAS,ERM008 ;NO-PRINT THE ERROR
6281 034144                CKLOOP
6282 034146 000406                BR       6$         ;EXIT THE MODULE
6283 034150          3$: CKLOOP
6284 034152 004737 034560          CALL     CASTMR      ;GO READ CAS FROM TM78
6285 034156 004737 035020          CALL     CASCMP      ;GO COMPARE DATA
6286 034162                CKLOOP
6287 034164          6$: ENDSEG
6288 034166 000207          5$: RTS      PC      ;RETURN
6289 034170 010237 004330          CASCOR: MOV      R2,CASDTA
6290 034174 004737 034242          CALL     CASBOT      ;BOOT THE CAS PROGRAM
6291 034200 005705                TST      ERRCOD
6292 034202 001016                BNE      5$
6293 034204                BGNSEG
6294 034206 004737 014566          CALL     START       ;START THE TM78
6295 034212 004737 034324          CALL     CASDAT      ;FILL THE CAS DATA BUFFER
6296 034216 004737 034630          CALL     CASTMW      ;GO WRITE CAS FROM TM78
6297 034222 004737 034452          CALL     CASRED      ;GO READ CAS FROM HOST
6298 034226                CKLOOP
6299 034230 004737 035020          CALL     CASCMP      ;GO COMPARE DATA
6300 034234                CKLOOP
6301 034236                ENDSEG
6302 034240 000207          5$: RTS      PC      ;RETURN
6303                ;
6304                ;CASBOT
6305                ;
6306 034242 005737 004412          CASBOT: TST      CASLD ;IS THE CAS PROGRAM ALREADY LOADED?
6307 034246 001402                BEQ      3$         ;NO - LOAD IT
6308 034250 005005                CLR      ERRCOD     ;YES - DON'T LOAD IT BUT CLEAR THE ERRCOD
6309 034252 000422                BR       2$         ;GET OUT
6310 034254 012737 013662 004400 3$: MOV      #DXTUID,FILNAM ;LOAD THE FILE NAME
6311 034262 004737 021660          CALL     CLOSEX     ;CLOSE THE CHANNEL
6312 034266 004737 013730          CALL     OPENX      ;OPEN THE CHANNEL
6313 034272 005705                TST      ERRCOD     ;OPEN CHANNEL ERROR
6314 034274 001007                BNE      1$         ;YES - RETURN TO USER
6315 034276 004737 013742          CALL     LOADER     ;NO-LOAD THE TM78
6316 034302 005705                TST      ERRCOD     ;LOAD ERROR?
6317 034304 001003                BNE      1$         ;YES - EXIT

```



```

6318 034306 012737 000001 004412 MOV #1,CASLD ;SET THE CAS PROGRAM LOADED FLAG
6319 034314 004737 021660 1$: CALL CLOSEX ;CLOSE THE CHANNEL
6320 034320 000207 2$: RTS PC
6321
6322
6323 .SBTTL SUBROUTINE FILL CAS DATA BUFFER - CASDAT
6324 :CASDAT FILL CAS DATA BUFFER ROUTINE
6325
6326 INPUT:
6327 CASDTA DATA WORD TO BE WRITTEN IN THE BUFFER
6328
6329 OUTPUT:
6330 MBBUF FILLED WITH DESIRED DATA BYTE
6331
6332 REGISTER USED
6333 R1
6334 034322 000001 CASDAT: CLR R1 ;CLEAR THE COUNTER
6335 034324 005001 1$: MOV CASDTA,MBBUF(R1) ;STORE DATA IN THE BUFFER
6336 034326 013761 004330 033642 INC R1 ;BUMP THE COUNTER
6337 034334 005201 INC R1 ;BUMP THE COUNTER
6338 034336 005201 CMP R1,#30. ;DONE?
6339 034340 020127 000036 BNE 1$ ;NO-CONTINUE
6340 034344 001370 RTS PC ;YES-RETURN
6341 034346 000207
6342
6343 .SBTTL SUBROUTINE CAS WRITE FROM HOST - CASWRT
6344 :CASWRT CAS WRITE SUBROUTINE-FROM HOST
6345
6346 INPUT:
6347 MBBUF CONTAINING THE DATA TO BE
6348 WRITTEN TO THE CAS
6349
6350 OUTPUT:
6351 NONE
6352
6353 REGISTERS USED:
6354 R1
6355 R2
6356 R3
6357
6358 CASWRT: BGNSEG
6359 034350 MOV MBDRIV,@CS2 ;LOAD THE UNIT NUMBER
6360 034352 013777 004352 147660 CLR R1 ;CLEAR MB REGISTER TABLE COUNT
6361 034360 005001 CLR R2 ;CLEAR DATA BUFFER POINTER
6362 034362 005002 1$: MOV MBTBL(R1),R3 ;GET MASS BUS REGISTER #
6363 034364 116103 035112 MOV MBBUF(R2),@XFRCMD(R3) ;LOAD THE MASS BUS
6364 034370 016273 033642 004230 INC R1 ;INCREMENT THE CAS REGISTER NUMBER
6365 034376 005201 CALL NONEX ;CHECK FOR NONEXISTENT DRIVE
6366 034400 004737 035132 BIT #CPE,@DS80 ;PARITY ERROR?
6367 034404 032777 004000 147670 BEQ 2$ ;NO-EXIT
6368 034412 001407 ERRDF 30.,RHCAS,ERM030 ;YES-ERROR
6369 034414 BIS #040400,@DS80 ;DO TM CLR AND KEEP HOLD SET
6370 034424 052777 040400 147650 2$: CKLOOP
6371 034432 INC R2 ;INCREMENT THE BUFFER POINTER
6372 034434 005202 INC R2
6373 034436 005202

```

6374 034440 020127 000017
6375 034444 001347
6376 034446
6377 034450 000207
6378
6379
6380
6381
6382
6383
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6387
6388
6389
6390
6391
6392
6393
6394 034452
6395 034454 013777 004352 147556
6396 034462 005001
6397 034464 005002
6398 034466 116103 035112
6399 034472 017362 004230 033476
6400 034500 005201
6401 034502 004737 035132
6402 034506 032777 020000 147514
6403 034514 001411
6404 034516
6405 034526 052777 040000 147474
6406 034534 005077 147470
6407 034540
6408 034542 005202
6409 034544 005202
6410 034546 020127 000017
6411 034552 001345
6412 034554
6413 034556 000207
6414
6415
6416 034560
6417 034562 004737 035154
6418 034566 005001
6419 034570 012702 042000
6420 034574 010277 147500
6421 034600 000240
6422 034602 017703 147474
6423 034606 110361 033476
6424 034612 005202
6425 034614 005201
6426 034616 020127 000036
6427 034622 001364
6428 034624
6429 034626 000207

```

CMP      R1,#15.          ;FINISHED?
BNE      1$              ;NO=CONTINUE
3$:      ENDSEG
RTS      PC              ;YES=RETURN
.SBTTL   SUBROUTINE CAS READ FROM HOST - CASRED

:
: CASRED CAS READ SUBROUTINE-FROM HOST
:
: INPUT:
: NONE
:
: OUTPUT:
: MBREAD THE DATA READ FROM
: CAS VIA THE MASS BUS.
:
: REGISTERS USED
: R1
: R2
: R3
:
: CASRED: BGNSEG
MOV      MBDRIV,@CS2      ;LOAD THE UNIT NUMBER
CLR      R1              ;CLEAR MASS BUS REGISTER TABLE COUNT
CLR      R2              ;CLEAR DATA BUFFER POINTER
1$:      MOVB MBTBL(R1),R3 ;GET MASS BUS REGISTER NUMBER
MOV      @XFRCMD(R3),MBREAD(R2) ;GET THE CAS DATA
INC      R1              ;INCREMENT THE REGISTER NUMBER
CALL     NONEX           ;CHECK FOR NON-EXISTENT DRIVE
BIT      #MCPE,@XFRCMD  ;PARITY ERROR?
BEQ      2$             ;NO=EXIT
ERRDF   29.,RHCAS,ERM029 ;YES=ERROR
BIS      #TRE,@XFRCMD   ;RH CLR TO CLR MCPE
LLR      @XFRCMD
2$:      CKLOOP
INC      R2              ;INCREMENT THE BUFFER POINTER
INC      R2
CMP      R1,#15.        ;FINISHED?
BNE      1$             ;NO=CONTINUE
3$:      ENDSEG
RTS      PC              ;YES=RETURN

.SBTTL   SUBROUTINE CAS READ FROM TM78 MICROPROCESSOR - CASTMR
CASTMR: BGNSEG
CALL     HOLDMP         ;HALT THE TM78 MP
CLR      R1              ;CLEAR THE READ DATA BYTE COUNT
MOV      #CASBUF,R2     ;LOAD THE TM78 MP DATA BUFFER ADDRESS
4$:      MOV      R2,@AD80 ;ADDRESS THE TM78 MP DATA BUFFER
NOP
MOV      @DS80,R3       ;GET THE DATA BYTE
MOVB    R3,MBREAD(R1)  ;STORE THE DATA
INC      R2              ;INCREMENT TM78 MP ADDRESS
INC      R1              ;INCREMENT BYTE POINTER
CMP      R1,#30.        ;DONE?
BNE      4$             ;NO=CONTINUE
6$:      ENDSEG
RTS      PC              ;YES=RETURN

```

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6430          .SBTTL SUBROUTINE CAS WRITE FROM TM78 MICROPROCESSOR - CASTMW
6431 034630    CASTMW: BGNSEG
6432 034632    004737 035154    CALL    HOLDMP
6433 034636    012777 041420 147434    MOV     #CASCMD,@AD80    ;ADDRESS COMMAND BYTE
6434 034644    012777 000401 147430    MOV     #HOLD+1,@DS80   ;WRITE THE WRITE CAS FROM TM78MP COMMAND
6435 034652    000240          NOP
6436 034654    012777 042040 147416    MOV     #CASDAL,@AD80   ;ADDRESS CAS WRITE DATA LOW BYTE
6437 034662    113701 033642          MOVB    MBBUF,R1        ;GET THE CAS LOW BYTE DATA
6438 034666    042701 177400          BIC     #177400,R1      ;REMOVE ANY SIGN EXTENTION BITS
6439 034672    062701 000400          ADD     #HOLD,R1        ;ADD IN THE HOLD BIT
6440 034676    010177 147400          MOV     R1,@DS80        ;WRITE THE LOW BYTE TO TM78
6441 034702    012777 042041 147370    MOV     #CASDAH,@AD80   ;ADDRESS CAS WRITE DATA HIGH BYTE
6442 034710    113701 033643          MOVB    MBBUF+1,R1     ;GET THE CAS HIGH BYTE DATA
6443 034714    042701 177400          BIC     #177400,R1      ;REMOVE ANY SIGN EXTENTION BITS
6444 034720    062701 000400          ADD     #HOLD,R1        ;ADD IN THE HOLD BIT
6445 034724    010177 147352          MOV     R1,@DS80        ;WRITE HIGH BYTE TO TM78
6446 034730    004737 014566          CALL    START
6447 034734    012777 000035 147266    MOV     #TSTART,@XFRCMD
6448 034742          DELAY    100           ;PERFORM A 100 MS. TIMEOUT
6449 034772    122777 000372 147230    CMPB    #372,@XFRCMD   ;DONE?
6450 035000    001404          BEQ     3$              ;YES-CONTINUE
6451 035002          ERRDF    8.,PROCAS,ERM008 ;NO-ERROR
6452 035012    3$:          CKLOOP
6453 035014          ENDSEG
6454 035016    000207          RTS     PC
6455          .SBTTL SUBROUTINE CAS DATA COMPARE - CASCMP
6456 035020    CASCMP: BGNSEG
6457 035022    005001          CLR     R1              ;YES-COMPARE THE DATA
6458 035024    026161 033642 033476 7$:    CMP     MBBUF(R1),MBREAD(R1) ;
6459 035032    001420          BEQ     5$              ;
6460 035034    010105          MOV     R1,R5           ;COPY INDEX
6461 035036    005205          INC     R5              ;ADJUST R5
6462 035040    005205          INC     R5              ;ADJUST R5
6463 035042    006205          ASR     R5              ;DIVIDE BY 2
6464 035044    020527 000001          CMP     R5,#1          ;CAS REG 1
6465 035050    001411          BEQ     5$              ;YES - IGNORE THE ERROR
6466 035052    020527 000004          CMP     R5,#4          ;CAS REG 4
6467 035056    001406          BEQ     5$              ;YES - IGNORE THE ERROR
6468 035060          ERRDF    9.,CASX,ERM009
6469 035070          INLOOP
6470 035072          BCOMPLETE 2$          ;ARE WE LOOPING ON AN ERROR?
6471 035074    005201 5$:    INC     R1              ;YES - GET OUT OF THE COMPARE BUSINESS
6472 035076    005201          INC     R1              ;INCREMENT THE BUFFER POINTER
6473 035100    020127 000036          CMP     R1,#30.        ;
6474 035104    001347          BNE     7$              ;DONE
6475 035106    2$:          ENDSEG
6476 035110    000207          RTS     PC
6477          .SBTTL TABLE MASS BUS VS. CAS REGISTER
6478 035112    012    MBTBL: .BYTE 12    ;CAS REGISTER 1
6479 035113    014          .BYTE 14    ;CAS REGISTER 2
6480 035114    024          .BYTE 24    ;CAS REGISTER 3
6481 035115    016          .BYTE 16    ;CAS REGISTER 4
6482 035116    006          .BYTE 6     ;CAS REGISTER 5
6483 035117    026          .BYTE 26    ;CAS REGISTER 6
6484 035120    020          .BYTE 20    ;CAS REGISTER 7
6485 035121    030          .BYTE 30    ;CAS REGISTER 10

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6486 035122 032 .BYTE 32 ;CAS REGISTER 11
6487 035123 034 .BYTE 34 ;CAS REGISTER 12
6488 035124 036 .BYTE 36 ;CAS REGISTER 13
6489 035125 040 .BYTE 40 ;CAS REGISTER 14
6490 035126 042 .BYTE 42 ;CAS REGISTER 15
6491 035127 044 .BYTE 44 ;CAS REGISTER 16
6492 035130 046 .BYTE 46 ;CAS REGISTER 17
6493 .EVEN
6494
6501 .SBTTL NON EXISTENT DRIVE CHECK SUBROUTINE
6502
6503 .NON EXISTENT DRIVE (NED) SUBROUTINE
6504
6505 INPUT:
6506 NONE
6507
6508 OUTPUT:
6509 CKLOOP ERROR CONTROL
6510 ERROR3 PRINTED ON CONSOLE IF 'NED' IS ACTIVE
6511
6512 035132 032777 010000 147100 NONEX: BIT #NED,@CS2 ;'NED' SET?
6513 035140 001404 BEQ MBREGX ;NO-EXIT
6514 035142 ERRDF 3,RHCAS,ERM003 ;YES-PRINT 'NED' ERROR
6515 035152 000207 MBREGX: RTS PC ;EXIT THE SUBROUTINE
6516 .SBTTL HOLD TM78 MICRO PROCESSOR SUBROUTINE
6517
6518 .HOLDMP SUBROUTINE
6519
6520 INPUT: NONE
6521
6522 OUTPUT:
6523
6524 ERR7 IF HOLD ACTIVE (HLDA) NOT SET
6525
6526 035154 HOLDMP: BGNSEG
6527 035156 013777 004352 147054 MOV MBDRIV,@CS2 ;LOAD THE MASS BUSS DRIVE NUMBER
6528 035164 005077 147040 CLR @XFRCMD ;CLEAR CAS REGISTER 0
6529 035170 052777 000400 147104 BIS #HOLD,@DS80 ;STOP THE TM78MP
6530 035176 000240 NOP
6531 035200 000240 NOP
6532 035202 000240 NOP
6533 035204 017701 147072 MOV @DS80,R1 ;GET THE TM78MP STATUS
6534 035210 032701 001000 BIT #HLDA,R1 ;IS 'HLDA' SET?
6535 035214 001004 BNE 1$ ;YES-CONTINUE
6536 035216 ERRDF 7.,PROCAS,ERM007 ;NO-
6537 035226 1$: CKLOOP
6538 035230 013701 004360 MOV TMPORTR,R1 ;GET THE PORT NUMBER
6539 035234 001402 BEQ 2$
6540 035236 012701 000200 MOV #200,R1 ;LOAD PORT 1 SELECT CODE
6541 035242 012777 100340 147030 2$: MOV #MBSE,@AD80 ;ADDRESS THE MB SELECT BYTE
6542 035250 062701 000400 ADD #HOLD,R1 ;SET HOLD BIT IN DATA
6543 035254 010177 147022 MOV R1,@DS80 ;SELECT DESIRED PORT
6544 035260 ENDSEG
6545 035262 000207 RTS PC ;RETURN TO CALLING ROUTINE

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035274 000207
035276 046524 034067 046040
035334
035334 046524 034067 041440
035374 044506 042514 051440

035434

035434 004737 046112
035440
035460
035504
035506 040445 046524 034067
035534 040445 041115 020056
035574

035574 004737 046112
035600
035620
035644

035646 040445 044042 042114
035672

035672

```
.SBTTL GLOBAL TEXT SECTION
:
:++
: THE GLOBAL TEXT SECTION CONTAINS FORMAT STATEMENTS,
: MESSAGES, AND ASCII INFORMATION THAT ARE USED IN
: MORE THAN ONE TEST.
:
:--
:
: FORMAT STATEMENTS USED IN PRINT CALLS
:
SERFAL: FRRSF 19.,HEAD2,MSG019
RTS PC
HEAD1: .ASCIZ /TM78 LOAD ERROR-TEST ABORTED/
.EVEN
HEAD2: .ASCIZ /TM78 CONTROL ERROR-TEST ABORTED/
.EVEN
HEAD3: .ASCIZ /FILE SERVICE ERROR-TEST ABORTED/
.EVEN
:
:*
:*SYSTEM ERROR MESSAGES
:*
:S
: *****
:*TM78CLT SYS FTL ERR 000001 TST 000 SUB 000 PC: 000000
:*UNIT: X RH: 000000 TM: X TU: X PORT: X
:*TM78 STATUS ERROR
:*TM78 LOAD ERROR-TEST ABORTED
:*MB. REG. 52 (CAS 21) = 000000
:
BGNMSG MSG001
CALL HEADER
PRINTB #FMT001
PRINTB #FMTSTA,STAT80
ENDMSG
FMT001: .ASCIZ /%ATM78 STATUS ERROR%/
.EVEN
FMTSTA: .ASCIZ /%AMB. REG. 52 (CAS 21) = %06%/
.EVEN
:
:S
: *****
:*TM78CLT SYS FTL ERR 000002 TST 000 SUB 000 PC: 000000
:*UNIT: X RH: 000000 TM: X TU: X PORT: X
:*'HLDA' NOT SET
:*TM78 LOAD ERROR-TEST ABORTED
:*STATUS = 000000
:
BGNMSG MSG002
CALL HEADER
PRINTB #FMT002
PRINTB #FMTSTA,STAT80
ENDMSG
FMT002: .ASCIZ /%A'HLDA' NOT SET%/
.EVEN
:
:S
```

(1)

6605
6606
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6608
6609
6610 035672
6611 035672 004737 046112
6612 035676
6613 035716

```
*****  
: *TM78CLT SYS FTL ERR 000003 TST 000 SUB 000 PC: 000000  
: *UNIT: X RH: 000000 TM: X TU: X PORT: X  
: *TM78 LOAD ERROR-TEST ABORTED  
: *WMC CKSUM ERROR
```

BGNMSG MSG003
CALL HEADER
PRINTB #FMT003
ENDMSG

6614
6615 035720 040445 041527 020123 FMT003: .ASCIZ /%AWCS CKSUM FRROR%/

.EVEN

6616
6617
6618 035744

```
S  
: *****
```

(1)

6619
6620
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6625
6626

```
: *TM78CLT SYS FTL ERR 000004 TST 000 SUB 000 PC: 000000  
: *UNIT: X RH: 000000 TM: X TU: X PORT: X  
: *TM78 LOAD ERROR-TEST ABORTED  
: *WCS VERIFY ERROR  
: *ADD = 000000  
: *ACT = 000000  
: *EXP = 000000
```

6627 035744
6628 035744 004737 046112
6629 035750
6630 035770
6631 036014
6632 036040
6633 036064

BGNMSG MSG004
CALL HEADER
PRINTB #FMT004
PRINTB #FMTWAD,LOAD80
PRINTB #FMTACT,ADATA
PRINTB #FMTEXP,EDATA
ENDMSG

6634
6635 036066 040445 041527 020123 FMT004: .ASCIZ /%AWCS VERIFY ERROR%/

.EVEN

6636
6637 036114 040445 042101 020104 FMTWAD: .ASCIZ /%AADD - %06%/

.EVEN

6638
6639 036132 040445 041501 020124 FMTACT: .ASCIZ /%AACT = %06%/

.EVEN

6640
6641 036150 040445 054105 020120 FMTEXP: .ASCIZ /%AEXP = %06%/

.EVEN

6642
6643
6644 036166

```
S  
: *****
```

(1)

6645
6646
6647
6648
6649

```
: *TM78CLT SYS FTL ERR 000005 TST 000 SUB 000 PC: 000000  
: *UNIT: X RH: 000000 TM: X TU: X PORT: X  
: *TM78 LOAD ERROR-TEST ABORTED  
: *'TMRDY' RESET AFTER CLEAR CMD.  
: *STATUS = 000000
```

6650
6651 036166
6652 036166 004737 046112
6653 036172
6654 036212
6655 036236

BGNMSG MSG005
CALL HEADER
PRINTB #FMT005
PRINTB #FMTSTA,STAT80
ENDMSG

6656
6657 036240 040445 052042 051115 FMT005: .ASCIZ /%A'TMRDY' RESET AFTER CLEAR CMD.%N/

```
6658          036304          .EVEN
6659
6660 036304          S
(1)          : *****
6661          : *TM78CLT SYS FTL ERR 000006 TST 000 SUB 000 PC: 000000
6662          : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6663          : *TM78 LOAD ERROR-TEST ABORTED
6664          : *TM78 MONITOR DID NOT START
6665
6666 036304          BGNMSG MSG006
6667 036304 004737 046112 CALL HEADER
6668 036310          PRINTB #FMT006
6669 036330          ENDMSG
6670
6671 036332 040445 046524 034067 FMT006: .ASCIZ /%ATM78 MONITOR DID NOT START%/
6672          036372          .EVEN
6673
6674 036372          S
(1)          : *****
6675          : *TM78CLT SYS FTL ERR 000007 TST 000 SUB 000 PC: 000000
6676          : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6677          : *TM78 CONTROL ERROR-TEST ABORTED
6678          : *MICRO TEST DID NOT START
6679
6680 036372          BGNMSG MSG007
6681 036372 004737 046112 CALL HEADER
6682 036376          PRINTB #FMT007
6683 036416          ENDMSG
6684
6685 036420 040445 044515 051103 FMT007: .ASCIZ /%AMICRO TEST DID NOT START%/
6686          036456          .EVEN
6687
6688 036456          S
(1)          : *****
6689          : *TM78CLT SYS FTL ERR 000008 TST 000 SUB 000 PC: 000000
6690          : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6691          : *TM78 CONTROL ERROR-TEST ABORTED
6692          : *TM78 COMMUNICATION TIMEOUT
6693
6694 036456          BGNMSG MSG008
6695 036456 004737 046112 CALL HEADER
6696 036462          PRINTB #FMT008
6697 036502          ENDMSG
6698
6699 036504 040445 046524 034067 FMT008: .ASCIZ /%ATM78 COMMUNICATION TIMEOUT%/
6700          036544          .EVEN
6701
6702 036544          S
(1)          : *****
6703          : *TM78CLT SYS FTL ERR 000009 TST 000 SUB 000 PC: 000000
6704          : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6705          : *TM78 CONTROL ERROR-TEST ABORTED
6706          : *ILL. REQ. CODE
6707
6708 036544          BGNMSG MSG009
6709 036544 004737 046112 CALL HEADER
```

```
6710 036550          PRINTB #FMT009
6711 036570          ENDMSG
6712
6713 036572 040445 046111 027114 FMT009: .ASCIZ  /%AILL. REQ. CODE%N/
6714          036616          .EVEN
6715
6716 036616          S
(1)          : *****
6717          : *TM78CLT SYS FTL ERR 000010 TST 000 SUB 000 PC: 000000
6718          : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6719          : *FIELD SERVICE ERROR-TEST ABORTED
6720          : *OPEN FAILED
6721
6722 036616          BGNMSG MSG010
6723 036616 004737 046112          CALL    HEADER
6724 036622          PRINTB #FMT010
6725 036642          ENDMSG
6726 036644 040445 050117 047105 FMT010: .ASCIZ  /%AOPEN FAILED%N/
6727          .EVEN
6728
6729 036664          S
(1)          : *****
6730          : *TM78CLT SYS FTL ERR 000011 TST 000 SUB 000 PC: 000000
6731          : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6732          : *FIELD SERVICE ERROR-TEST ABORTED
6733          : *FILE NOT FOUND 'FILNAM.EXT'
6734
6735 036664          BGNMSG MSG011
6736 036664 004737 046112          CALL    HEADER
6737 036670          PRINTB #FMT011,FILNAM
6738 036714          ENDMSG
6739 036716 040445 044506 042514 FMT011: .ASCIZ  /%AFILE NOT FOUND '%T%A'%N/
6740          .EVEN
6741
6742 036750          S
(1)          : *****
6743          : *TM78CLT SYS FTL ERR 000012 TST 000 SUB 000 PC: 000000
6744          : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6745          : *FIELD SERVICE ERROR-TEST ABORTED
6746          : *EOF READING 'FILNAM.EXT'
6747
6748 036750          BGNMSG MSG012
6749 036750 004737 046112          CALL    HEADER
6750 036754          PRINTB #FMT012,FILNAM
6751 037000          ENDMSG
6752 037002 040445 047505 020106 FMT012: .ASCIZ  /%AEOF READING '%T%A'%N/
6753          037032          .EVEN
6754
6755 037032          S
(1)          : *****
6756          : *TM78CLT SYS FTL ERR 000013 TST 000 SUB 000 PC: 000000
6757          : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6758          : *FIELD SERVICE ERROR-TEST ABORTED
6759          : *LOAD DEVICE ERROR
6760
6761 037032          BGNMSG MSG013
```


6762	037032	004737	046112			CALL	HEADER
6763	037036					PRINTB	#FMT013
6764	037056					ENDMSG	
6765	037060	040445	047514	042101	FMT013:	.ASCIZ	/%ALOAD DEVICE ERROR%/
6766						.EVEN	
6767							
6768	037106					S	
(1)						:	*****
6769						:	*TM78CLT SYS FTL ERR 000014 TST 000 SJB 000 PC: 000000
6770						:	*UNIT: X RH: 000000 TM: X TU: X PORT: X
6771						:	*FIELD SERVICE ERROR-TEST ABORTED
6772						:	*MSG. BUF. FULL
6773							
6774	037106					BGNMSG	MSG014
6775	037106	004737	046112			CALL	HEADER
6776	037112					PRINTB	#FMT014
6777	037132					ENDMSG	
6778	037134	040445	051515	027107	FMT014:	.ASCIZ	/%AMSG. BUF. FULL%/
6779		037160				.EVEN	
6780							
6781	037160					S	
(1)						:	*****
6782						:	*TM78CLT SYS FTL ERR 000015 TST 000 SUB 000 PC: 000000
6783						:	*UNIT: X RH: 000000 TM: X TU: X PORT: X
6784						:	*FIELD SERVICE ERROR-TEST ABORTED
6785						:	*BIN. BUF. FULL
6786							
6787	037160					BGNMSG	MSG015
6788	037160	004737	046112			CALL	HEADER
6789	037164					PRINTB	#FMT015
6790	037204					ENDMSG	
6791	037206	040445	044502	027116	FMT015:	.ASCIZ	/%ABIN. BUF. FULL%/
6792		037232				.EVEN	
6793							
6794	037232					S	
(1)						:	*****
6795						:	*TM78CLT SYS FTL ERR 000016 TST 000 SUB 000 PC: 000000
6796						:	*UNIT: X RH: 000000 TM: X TU: X PORT: X
6797						:	*TM78 CONTROL ERROR-TEST ABORTED
6798						:	*ILL. UTIL. REQ.
6799							
6800	037232					BGNMSG	MSG016
6801	037232	004737	046112			CALL	HEADER
6802	037236					PRINTB	#FMT016
6803	037256					ENDMSG	
6804	037260	040445	046111	027114	FMT016:	.ASCIZ	/%AILL. UTIL. REQ.%/
6805						.EVEN	
6806							
6807	037304					S	
(1)						:	*****
6808						:	*TM78CLT SYS FTL ERR 000017 TST 000 SUB 000 PC: 000000
6809						:	*UNIT: X RH: 000000 TM: X TU: X PORT: X
6810						:	*TM78 CONTROL ERROR-TEST ABORTED
6811						:	*ILL. DATA FMT.
6812							
6813	037304					BGNMSG	MSG017

```
6814 037304 004737 046112          CALL  HEADER
6815 037310                          PRINTB #FMT017
6816 037330                          ENDMSG
6817 037332 040445 046111 027114 FMT017: .ASCIZ  /%AILL. DATA FMT.%N/
6818                                037356          .EVEN
6819
6820 037356                          S
(1) : *****
6821 : *TM78CLT SYS FTL ERR 000018 TST 000 SJB 000 PC: 000000
6822 : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6823 : *TM78 CONTROL ERROR-TEST ABORTED
6824 : *ILL. DATA PAT.
6825
6826 037356                          BGNMSG MSG018
6827 037356 004737 046112          CALL  HEADER
6828 037362                          PRINTB #FMT018
6829 037402                          ENDMSG
6830 037404 040445 046111 027114 FMT018: .ASCIZ  /%AILL. DATA PAT.%N/
6831                                037430          .EVEN
6832
6833 037430                          S
(1) : *****
6834 : *TM78CLT SYS FTL ERR 000019 TST 000 SUB 000 PC: 000000
6835 : *UNIT: X RH: 000000 TM: X TU: X PORT: X
6836 : *ILL. ERR CODE.
6837 037430                          S
(1) : *****
6838 037430                          BGNMSG MSG019
6839 037430 004737 046112          CALL  HEADER
6840 037434                          PRINTB #FMT019
6841 037454                          ENDMSG
6842
6843
6844 037456 040445 046111 027114 FMT019: .ASCIZ  /%AILL. ERR CODE.%N/
6845                                037502          .EVEN
```

```

6846
6847
6848
6849
6850
6851
6852
6853
6854 037502
6855 037502 004737 046112
6856 037506
6857 037534
6858 037536 040445 041115 051040 FMM001: .ASCIZ /%AMB REG. %06%A = %06%A AFTER MB CLEAR%/
6859 037610 .EVEN
6860
6861 037610
6862 037610 004737 046112
6863 037614
6864 037636
6865 037640 040445 047042 042105 FMM002: .ASCIZ /%A'NFD'' WHEN READING MB REG. %06%/
6866 037704 .EVEN
6867
6868 037704
6869 037704 004737 046112
6870 037710
6871 037730
6872 037732 040445 047042 042105 FMM003: .ASCIZ /%A'NED'' WHEN READING MB REG. %N/
6873 037772 .EVEN
6874
6875 037772
6876 037772 004737 046112
6877 037776
6878 040016
6879 040020 040445 052042 051115 FMM004: .ASCIZ /%A'TMRDY'' NOT SET%/
6880 040162 .EVEN
6881
6882 040044
6883 040044 004737 046112
6884 040050
6885 040074
6886 040076 040445 047516 026516 FMM005: .ASCII /%ANON-EXISTENT REG. %02%A = %06%A SHOULD /
6887 040147 102 020105 042532 .ASCIZ /BE ZERO%/
6888 040162 .EVEN
6889
6890 040162
6891 040162 004737 046112
6892 040166
6893 040210
6894 040212 040445 046524 034067 FMM006: .ASCIZ /%ATM78 'ILR'' NOT SET AFTER REG. %02%A READ%/
6895 040270 .EVEN
6896
6897 040270
6898 040270 004737 046112
6899 040274
6900 040314
6901 040336
    
```

.SBTTL ERROR MESSAGE AREA

*
*
*ERROR MESSAGES
*
*

```

BGNMSG ERM001
CALL HEADER
PRINTB #FMM001,R1,@XFRCMD(R1)
ENDMSG
FMM001: .ASCIZ /%AMB REG. %06%A = %06%A AFTER MB CLEAR%/
.EVEN

BGNMSG ERM002
CALL HEADER
PRINTB #FMM002,R1
ENDMSG
FMM002: .ASCIZ /%A'NFD'' WHEN READING MB REG. %06%/
.EVEN

BGNMSG ERM003
CALL HEADER
PRINTB #FMM003
ENDMSG
FMM003: .ASCIZ /%A'NED'' WHEN READING MB REG. %N/
.EVEN

BGNMSG ERM004
CALL HEADER
PRINTB #FMM004
ENDMSG
FMM004: .ASCIZ /%A'TMRDY'' NOT SET%/
.EVEN

BGNMSG ERM005
CALL HEADER
PRINTB #FMM005,R1,R2
ENDMSG
FMM005: .ASCII /%ANON-EXISTENT REG. %02%A = %06%A SHOULD /
.ASCIZ /BE ZERO%/
.EVEN

BGNMSG ERM006
CALL HEADER
PRINTB #FMM006,R1
ENDMSG
FMM006: .ASCIZ /%ATM78 'ILR'' NOT SET AFTER REG. %02%A READ%/
.EVEN

BGNMSG ERM007
CALL HEADER
PRINTB #FMT002
PRINTB #FMTSTA,R1
ENDMSG
    
```


6958	041302					PRINTB	#FMM015
6959	041322					ENDMSG	
6960	041324	040445	052042	051115	FMM015:	.ASCIZ	/%A'TMRD\'' DID NOT RESET%N/
6961						.EVEN	
6962							
6963	041356					BGNMSG	ERM016
6964	041356	004737	046112			CALL	HEADER
6965	041362					PRINTB	#FMM016
6966	041402					PRINTB	#FMTACT,R2
6967	041424					PRINTB	#FMTEXP,R1
6968	041446					ENDMSG	
6969							
6970	041450	040445	042522	027107	FMM016:	.ASCIZ	/%AREG. 20 COMPARE FAIL%N/
6971		041502				.EVEN	
6972							
6973	041502					BGNMSG	ERM017
6974	041502	004737	046112			CALL	HEADER
6975	041506					PRINTB	#FMM017,R3
6976	041530					ENDMSG	
6977	041532	040445	047520	052122	FMM017:	.ASCIZ	/%APORT %01%A SELECT BIT NOT SET%N/
6978						.EVEN	
6979							
6980	041574					BGNMSG	ERM018
6981	041574	004737	046112			CALL	HEADER
6982	041600					PRINTB	#FMM018
6983	041620					ENDMSG	
6984	041622	040445	047516	041440	FMM018:	.ASCIZ	/%ANO CONTENTION ERROR OCCURRED%N/
6985		041664				.EVEN	
6986							
6987	041664					BGNMSG	ERM019
6988	041664	004737	046112			CALL	HEADER
6989	041670					PRINTB	#FMM019
6990	041710					ENDMSG	
6991	041712	040445	044442	051114	FMM019:	.ASCIZ	/%A'ILR'' NOT CLEAR WHEN WRITTEN CLEAR%N/
6992		041762				.EVEN	
6993							
6994	041762					BGNMSG	ERM020
6995	041762	004737	046112			CALL	HEADER
6996	041766					PRINTB	#FMM020
6997	042006					PRINTB	#FMTACT,@AS
6998	042032					PRINTB	#FMTEXP,MBBUF
6999	042056					ENDMSG	
7000	042060	040445	040504	040524	FMM020:	.ASCIZ	/%ADATA FROM CAS REG. 4 NOT AS EXPECTED%N/
7001		042132				.EVEN	
7002							
7003	042132					BGNMSG	ERM021
7004	042132	004737	046112			CALL	HEADER
7005	042136					PRINTB	#FMM021,R2
7006	042160					ENDMSG	
7007	042162	040445	052101	042524	FMM021:	.ASCIZ	/%AATTEN. REG. = %06%AAFTER WRITTEN CLEAR%N/
7008		042236				.EVEN	
7009	042236					BGNMSG	ERM022
7010	042236	004737	046112			CALL	HEADER
7011	042242					PRINTB	#FMM022
7012	042262					ENDMSG	
7013	042264	040445	050103	020125	FMM022:	.ASCIZ	/%ACPU WAS NOT INTERRUPTED BY TM78 SETTING ATTENTION%N/

Line	Code	Seq	Time	Event	Message
7014				.EVEN	
7015					
7016	042352			BGNMSG	ERM023
7017	042352	004737	046112	CALL	HEADER
7018	042356			PRINTB	#FMM023
7019	042376			ENDMSG	
7020	042400	040445	046524	034067 FMM023:	.ASCIZ /%ATM78 'CPE' NOT SET WHEN 'PAT' IS SET%/
7021		042452		.EVEN	
7022					
7023	042452			BGNMSG	ERM024
7024	042452	004737	046112	CALL	HEADER
7025	042456			PRINTB	#FMM024
7026	042476			ENDMSG	
7027	042500	040445	046524	034067 FMM024:	.ASCIZ /%ATM78 'CPE' NOT RESET WHEN 'PAT' IS CLEAR%/
7028		042556		.EVEN	
7029					
7030	042556			BGNMSG	ERM025
7031	042556	004737	046112	CALL	HEADER
7032	042562			PRINTB	#FMM025
7033	042602			ENDMSG	
7034	042604	040445	046524	034067 FMM025:	.ASCIZ /%ATM78 'CPE' SET WHEN 'PAT' CLEAR%/
7035				.EVEN	
7036					
7037	042650			BGNMSG	ERM026
7038	042650	004737	046112	CALL	HEADER
7039	042654			PRINTB	#FMM026
7040	042674			ENDMSG	
7041	042676	040445	050115	021040 FMM026:	.ASCIZ /%AMP 'MCPE' NOT SET%/
7042				.EVEN	
7043					
7044	042724			BGNMSG	ERM027
7045	042724	004737	046112	CALL	HEADER
7046	042730			PRINTB	#FMM027
7047	042750			ENDMSG	
7048	042752	040445	041115	021040 FMM027:	.ASCIZ /%AMB 'MCPE' SET%/
7049				.EVEN	
7050					
7051	042774			BGNMSG	ERM028
7052	042774	004737	046112	CALL	HEADER
7053	043000			PRINTB	#FMM028
7054	043020			PRINTB	#FMTWAD,R3
7055	043042			PRINTB	#FMTACT,R4
7056	043064			PRINTB	#FMTEXP,R2
7057	043106			ENDMSG	
7058	043110	040445	046524	034067 FMM028:	.ASCIZ /%ATM78 MEMORY FAILURE%/
7059				.EVEN	
7060					
7061	043140			BGNMSG	ERM029
7062	043140	004737	046112	CALL	HEADER
7063	043144			PRINTB	#FMM029,R1
7064	043166			ENDMSG	
7065	043170	040445	040520	044522 FMM029:	.ASCIZ /%APARITY ERR. READING CAS REG. %06%/
7066		043236		.EVEN	
7067					
7068	043236			BGNMSG	ERM030
7069	043236	004737	046112	CALL	HEADER

7070	043242					PRINTB	#FMM030,R1
7071	043264					ENDMSG	
7072	043266	040445	040520	044522	FMM030:	.ASCIZ	/%APARITY ERR. WRITING CAS REG. %06%N/
7073		043334				.EVEN	
7074							
7075	043334					BGNMSG	ERM031
7076	043334	004737	046112			CALL	HEADER
7077	043340					PRINTB	#TNOPC,DIAGTS
7078	043364					PRINTB	#FMMPPC,@TUSTAT
7079	043410					PRINTB	#FMM031,@CS2
7080	043434					ENDMSG	
7081	043436	040445	046524	034067	FMMPPC:	.ASCIZ	/%ATM78 MICRO PC = %06%N/
7082						.EVEN	
7083	043466	040445	046524	034067	TNOPC:	.ASCIZ	/%ATM78 MICRO TEST = %06%N/
7084						.EVEN	
7085	043520	040445	041115	051440	FMM031:	.ASCIZ	/%AMB STATUS ERROR - CS2 = %06%N/
7086						.EVEN	
7087							
7088	043560					BGNMSG	ERM032
7089	043560	004737	046112			CALL	HEADER
7090	043564					PRINTB	#TNOPC,DIAGTS
7091	043610					PRINTB	#FMMPPC,@TUSTAT
7092	043634					PRINTB	#FMM032
7093	043654					PRINTB	#FNN032,R2
7094	043676					PRINTB	#FMTACT,<B,REDBUF(R2)>
7095	043724					PRINTB	#FMTEXP,<B,WRTBUF(R2)>
7096	043752					ENDMSG	
7097	043754	040445	041115	042040	FMM032:	.ASCIZ	/%AMB DATA COMP. FAIL%N/
7098		044004				.EVEN	
7099	044004	040445	054502	042524	FNN032:	.ASCIZ	/%ABYTE COUNT - %06%N/
7100		044032				.EVEN	
7101							
7102	044032					BGNMSG	ERM033
7103	044032	004737	046112			CALL	HEADER
7104	044036					PRINTB	#TNOPC,DIAGTS
7105	044062					PRINTB	#FMMPPC,@TUSTAT
7106	044106					PRINTB	#FMM033
7107	044126					ENDMSG	
7108	044130	040445	047516	046440	FMM033:	.ASCIZ	/%AND MB STATUS ERROR WHEN EXPECTED%N/
7109		044170				.EVEN	
7110	044176					BGNMSG	ERM034
7111	044176	004737	046112			CALL	HEADER
7112	044202					PRINTB	#FMM034,R3
7113	044224					ENDMSG	
7114							
7115	044226	040445	046524	034067	FMM034:	.ASCIZ	/%ATM78 ROM INFORMATION PARITY ERROR %N%AADR %06%N/
7116						.EVEN	
7117							
7118	044310					BGNMSG	ERM035
7119	044310	004737	046112			CALL	HEADER
7120	044314					PRINTB	#FMM035
7121	044334					PRINTB	#FMM035,R3,(R5),2(R5)
7122	044364					ENDMSG	
7123	044366	040445	046524	034067	FMM035:	.ASCIZ	/%ATM78 ROM ID# WRONG (CAN NOT LOOP ON THIS ERROR) %N/
7124	044453	045	040501	051104	FMM035:	.ASCIZ	/%AADR %06%N%AIDEN %01%N%AVER # %03%N/
7125						.EVEN	

7126						BGNMSG	ERM036
7127	044520					CALL	HEADER
7128	044520	004737	046112			PRINTB	#FMM036
7129	044524					PRINTB	#FMMA35, R3, (R5), 2(R5)
7130	044544					ENDMSG	
7131	044574					.ASCIZ	/%AROM PARITY ERROR NOT SET AND SHOULD BE %N/
7132	044576	040445	047522	020115	FMM036:	.EVEN	
7133							
7134						BGNMSG	ERM037
7135	044652					CALL	HEADER
7136	044652	004737	046112			PRINTB	#FMM037
7137	044656					PRINTB	#FMMA35, R3, (R5), 2(R5)
7138	044676					ENDMSG	
7139	044726						
7140						.ASCIZ	/%AROM PARITY ERROR %N/
7141	044730	040445	047522	020115	FMM037:	.EVEN	
7142						BGNMSG	ERM040
7143	044756					PRINTB	#FMM040
7144	044756					ENDMSG	
7145	044776						
7146						.ASCIZ	/%ANO 'DLT' AFTER READ FROM EMPTY SILO%N/
7147	045000	040445	047516	023440	FMM040:	.EVEN	
7148							
7149						BGNMSG	ERM041
7150	045050					PRINTB	#FMM041
7151	045050					ENDMSG	
7152	045070						
7153						.ASCIZ	/%ANO 'SC' AFTER READ FROM EMPTY SILO%N/
7154	045072	040445	047516	023440	FMM041:	.EVEN	
7155		045142					
7156						BGNMSG	ERM042
7157	045142					PRINTB	#FMM042
7158	045142					ENDMSG	
7159	045162						
7160						.ASCIZ	/%ANO 'TRE' AFTER READ FROM EMPTY SILO%N/
7161	045164	040445	047516	023440	FMM042:	.EVEN	
7162							
7163						BGNMSG	ERM043
7164	045234					PRINTB	#FMM043
7165	045234					ENDMSG	
7166	045254						
7167						.ASCIZ	/%A'IR' NOT SET AFTER RH CLEAR%N/
7168	045256	040445	044447	023522	FMM043:	.EVEN	
7169							
7170						BGNMSG	ERM044
7171	045316					PRINTB	#FMM044
7172	045316					ENDMSG	
7173	045336						
7174						.ASCIZ	/%A'OR' SET AFTER RH CLEAR%N/
7175	045340	040445	047447	023522	FMM044:	.EVEN	
7176							
7177						BGNMSG	ERM045
7178	045374					PRINTB	#FMM045
7179	045374					ENDMSG	
7180	045414						
7181							

TM78 CONTROLLER LOGIC TEST
ZTMIC7.P11 27-AUG-80 15:25

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ERROR MESSAGE AREA

SEQ 0143

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7182 045416 040445 047447 023522 FMM045: .ASCIZ  /%A'OR' SET AFTER 1 SILO LOAD%N/
7183      045456
7184
7185 045456      BGNMSG  ERM046
7186 045456      PRINTB  #FMM046
7187 045476      ENDMSG
7188
7189 045500 040445 047447 023522 FMM046: .ASCIZ  /%A'OR' RESET AFTER SECOND SILO LOAD%N/
7190      .EVEN
7191
7192 045546      BGNMSG  ERM047
7193 045546      PRINTB  #FMM047
7194 045566      ENDMSG
7195
7196 045570 040445 044447 023522 FMM047: .ASCIZ  /%A'IR' NOT RESET BY SILO FULL%N/
7197      .EVEN
7198
7199 045630      BGNMSG  ERM048
7200 045630      PRINTB  #FMM048
7201 045650      ENDMSG
7202
7203 045652 040445 047447 023522 FMM048: .ASCIZ  /%A'OR' NOT SET AFTER SILO FULL%N/
7204      045714
7205
7206 045714      BGNMSG  ERM049
7207 045714      PRINTB  #FMM049
7208 045734      PRINTB  #FMTACT,R2
7209 045756      PRINTB  #FMTEXP,R1
7210 046000      ENDMSG
7211
7212 046002 040445 040502 020104 FMM049: .ASCIZ  /%ABAD SILO READ%N/
7213      .EVEN
7214
7215 046024      BGNMSG  ERM050
7216 046024      PRINTB  #FMM050
7217 046044      ENDMSG
7218
7219 046046 040445 042047 052114 FMM050: .ASCIZ  /%A'DLT' NOT SET BY SILO OVERFLOW%N/
7220      046112
7221 046112      HEADER: PRINTB  #FHEAD,XFRCMD,MBDRIV, TMUNIT, TIMPORT
7222 046152 000207      RTS      PC
7223
7224 046154 040445 044122 020072 FHEAD:  .ASCIZ  /%ARH: %06%A TM: %01%A TU: %01%A PORT: %01%N/
7225      .FVEN
7226 046230 034115 032471 026066 RHCAS:  .ASCIZ  /M8956, M8957, MASSBUS/
7227 046256 034115 032471 026066 CASX:   .ASCIZ  /M8956, M8957, M8960, M8958, M8953/
7228 046320 034115 032471 026067 PROCAS: .ASCIZ  /M8957, M8960/
7229 046335      115 034470 030066 PRO:    .ASCIZ  /M8960, M8958, M8953/
7230 046361      115 034470 034465 WMC:    .ASCIZ  /M8959/
7231 046367      122 030510 020061 RH11:   .ASCIZ  /RH11 FAILURE/
7232      .EVEN
7233      .LIST  BEX
7234 046404      LASTAD
(3) 046410
L$LAST::

```


F\$CLEA= 000007
F\$DJ = 000016
F\$END = 000041

2943	2976	2980	2987	3001	3048	3052	3060	3074	3117	3120	3162	3165
3208	3211	3254	3257	3300	3303	3347	3350	3393	3396	3439	3442	3497
3501	3504	3529	3584	3588	3591	3616	3659	3662	3705	3708	3777	3780
3923	3826	3869	3872	3915	3918	3961	3964	4007	4010	4065	4069	4072
4085	4140	4144	4147	4160	4189	4193	4217	4252	4279	4280	4384	4431
5620	6267	6293	6359	6394	6416	6431	6456	6526	6578	6595	6610	6627
6651	6666	6680	6694	6708	6722	6735	6748	6761	6774	6787	6800	6813
6826	6858	6854	6861	6868	6875	6882	6890	6897	6903	6910	6921	6928
6935	6942	6949	6956	6963	6973	6980	6987	6994	7003	7009	7016	7023
7030	7037	7044	7051	7061	7068	7075	7088	7102	7110	7118	7127	7135
7143	7150	7157	7164	7171	7178	7185	7192	7199	7206	7215		
551#	1110	1128										
551#	1133	1146										
551#	947	956	1002	1004	1076	1099	1119	1128	1139	1146	1159	1166
1182	1224	1570	1576	1588	1609	1633	1662	1676	1678	1680	1697	1698
1737	1753	1765	1833	1865	1869	1954	1974	1987	2003	2042	2059	2060
2122	2147	2185	2207	2279	2308	2367	2396	2444	2467	2557	2579	2611
2624	2629	2678	2706	2710	2759	2789	2793	2843	2874	2878	2929	2943
2976	2980	2987	3001	3048	3052	3060	3074	3117	3120	3162	3165	3208
3211	3254	3257	3300	3303	3347	3350	3393	3396	3439	3442	3497	3501
3524	3529	3584	3588	3611	3616	3659	3662	3705	3708	3777	3780	3823
3826	3869	3872	3915	3918	3961	3964	4007	4010	4065	4069	4080	4085
4140	4144	4155	4160	4189	4193	4217	4252	4279	4282	4384	4431	5623
6287	6301	6376	6412	6428	6453	6475	6544	6582	6599	6613	6633	6655
6669	6683	6697	6711	6725	6738	6751	6764	6777	6790	6803	6816	6829
6841	6857	6864	6871	6878	6885	6893	6901	6906	6916	6924	6931	6938
6945	6952	6959	6968	6976	6983	6990	6999	7006	7012	7019	7026	7033
7040	7047	7057	7064	7071	7080	7096	7107	7113	7122	7131	7139	7145
7152	7159	7166	7173	7180	7187	7194	7201	7210	7217			
551#	1175	1182										
551#	908	915										
551#	964	1004										
551#	947	1002	1119	1139	1159	2980	2987	3052	3060	3501	3588	4069
4144	4193											
551#												
551#	5620	5623	6578	6582	6595	6599	6610	6613	6627	6633	6651	6655
6666	6669	6680	6683	6694	6697	6708	6711	6722	6725	6735	6738	6748
6751	6761	6764	6774	6777	6787	6790	6800	6803	6813	6816	6826	6829
6838	6841	6854	6857	6861	6864	6868	6871	6875	6878	6882	6885	6890
6893	6897	6901	6903	6906	6910	6916	6921	6924	6928	6931	6935	6938
6942	6945	6949	6952	6956	6959	6963	6968	6973	6976	6980	6983	6987
6990	6994	6999	7003	7006	7009	7012	7016	7019	7023	7026	7030	7033
7037	7040	7044	7047	7051	7057	7061	7064	7068	7071	7075	7080	7088
7096	7102	7107	7110	7113	7118	7122	7127	7131	7135	7139	7143	7145
7150	7152	7157	7159	7164	7166	7171	7173	7178	7180	7185	7187	7192
7194	7199	7201	7206	7210	7215	7217						
551#	1006	1010										
551#												
551#	939	956										
551#	1577	1588	1589	1609	1611	1633	1635	1662	1664	1676	1744	1753
1838	1865	1956	1974	1975	1987	2047	2059	2569	2579	2603	2611	2616
2624	2692	2706	2774	2789	2857	2874	3504	3524	3591	3611	4072	4080
4147	4155	6267	6287	6293	6301	6359	6376	6394	6412	6416	6428	6431
6453	6456	6475	6526	6544								
551#	1207	1224										
551#	1095	1099	4280	4282								

F\$PROT= 000021
F\$PWR = 000017
F\$RPT = 000012
F\$SEG = 000003

F\$SOFT= 000005
F\$SRV = 000010

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L\$SPC	002056	G	878#		
L\$SPCP	002020	G	878#		
L\$SPTP	002024	G	878#		
L\$STA	002030	G	878#		
L\$SW	002326	G	878	921#	
L\$TEST	002114	G	878#		
L\$TIML	002014	G	878#		
L\$UNIT	002012	G	878#	971	
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L10002	002342		947	956#	
L10003	002556		1002	1004#	
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L10010	003530		1139	1146#	
L10011	003536		1159	1166#	
L10012	003630		1175	1182#	
L10013	004216		1207	1224#	
L10014	005414		1698#		
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CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0156

L10057	012020	3964#	
L10060	012032	4010#	
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L10062	012222	4144	4160#
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L10072	035716	6613#	
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L10077	036502	6697#	
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7044	7051	7061	7068	7075	7088	7102	7110	7118	7127	7135	7143	7150
7157	7164	7171	7178	7185	7192	7199	7206	7215	7234#			
551#	557#	878	879	880	894	908	921	947	956	965	966	967
968	969	975	976	999	1001	1002	1004	1029	1032	1035	1046	1058
1059	1062	1067	1072	1074	1075	1076	1099	1118	1119	1128	1139	1146
1159	1166	1175	1176	1177	1178	1179	1180	1181	1182	1207	1214	1215
1216	1217	1224	1576	1577	1581	1586	1587	1588	1589	1593	1599	1600
1603	1604	1607	1608	1609	1611	1616	1617	1620	1621	1625	1626	1630
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1752	1753	1765	1838	1842	1844	1846	1849	1850	1854	1855	1857	1863
1864	1865	1869	1956	1963	1965	1969	1972	1973	1974	1975	1978	1979
1982	1985	1986	1987	1991	1995	1997	2000	2002	2003	2047	2052	2056
2059	2060	2131	2132	2135	2139	2141	2144	2146	2147	2204	2206	2207
2287	2289	2297	2298	2301	2302	2305	2307	2308	2377	2379	2381	2387
2389	2394	2395	2396	2452	2454	2456	2464	2466	2467	2569	2574	2578
2579	2594	2603	2608	2610	2611	2616	2621	2623	2624	2629	2692	2701
2705	2706	2710	2774	2784	2788	2789	2793	2857	2864	2870	2874	2878
2943	2980	2987	2990	2991	2997	2998	3001	3052	3060	3071	3073	3074
3120	3165	3211	3257	3303	3350	3396	3442	3501	3504	3512	3514	3517
3518	3520	3523	3524	3529	3588	3591	3599	3601	3604	3605	3607	3610
3611	3616	3662	3708	3780	3826	3872	3918	3964	4010	4069	4072	4077
4079	4080	4085	4144	4147	4152	4154	4155	4160	4193	4201	4203	4209
4211	4217	4256	4263	4264	4275	4276	4277	4278	4279	4282	4392	4393
4394	4396	4399	4405	4418	4425	4431	4464	4465	4468	4470	4474	4477
4510	4635	4881	4896	5139	5212	5213	5252	5407	5408	5413	5460	5461
5467	5542	5593	5594	5599	5613	5615	5622	5623	5648	5655	5800	5814
5833	5834	5842	5860	5865	6039	6046	6054	6220	6241	6267	6275	6277
6280	6281	6283	6286	6287	6293	6298	6300	6301	6359	6369	6371	6376
6394	6404	6407	6412	6416	6428	6431	6448	6451	6452	6453	6456	6468
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6598	6599	6612	6613	6629	6630	6631	6632	6633	6653	6654	6655	6668
6669	6682	6683	6696	6697	6710	6711	6724	6725	6737	6738	6750	6751
6763	6764	6776	6777	6789	6790	6802	6803	6815	6816	6828	6829	6840
6841	6856	6857	6863	6864	6870	6871	6877	6878	6884	6885	6892	6893
6899	6900	6901	6905	6906	6912	6913	6914	6915	6916	6923	6924	6930
6931	6937	6938	6944	6945	6951	6952	6958	6959	6965	6966	6967	6968
6975	6976	6982	6983	6989	6990	6996	6997	6998	6999	7005	7006	7011
7012	7018	7019	7025	7026	7032	7033	7039	7040	7046	7047	7053	7054
7055	7056	7057	7063	7064	7070	7071	7077	7078	7079	7080	7090	7091
7092	7093	7094	7095	7096	7104	7105	7106	7107	7112	7113	7120	7121
7122	7129	7130	7131	7137	7138	7139	7144	7145	7151	7152	7158	7159
7165	7166	7172	7173	7179	7180	7186	7187	7193	7194	7200	7201	7207
7208	7209	7210	7216	7217	7221	7234						
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551#	561#	915	932	956	1004	1076	1099	1128	1146	1166	1182	1224
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1987	2003	2059	2060	2147	2207	2308	2396	2467	2579	2611	2624	2629
2706	2710	2789	2793	2874	2878	2943	3001	3074	3120	3165	3211	3257
3303	3350	3396	3442	3524	3529	3611	3616	3662	3708	3780	3826	3872
3918	3964	4010	4080	4085	4155	4160	4217	4279	4282	4396	4405	4425
4431	4470	5623	6220	6287	6301	6376	6412	6428	6453	6475	6544	6582
6599	6613	6633	6655	6669	6683	6697	6711	6725	6738	6751	6764	6777
6790	6803	6816	6829	6841	6857	6864	6871	6878	6885	6893	6901	6906

SVCSUB= 177777
SVCTAG= 177777

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SEQ 0162

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T\$LSYM= 010000

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1697	1698	1765	1869	2003	2060	3165	3211	3257	3303	3350	3396	3442
2793	2878	2943	3001	3074	3120	3872	3918	3964	4010	4085	4160	4217
3529	3616	3662	3708	3780	3826	6613	6633	6655	6669	6683	6697	6711
4279	4282	4431	5623	6582	6599	6803	6816	6829	6841	6857	6864	6871
6725	6738	6751	6764	6777	6790	6924	6931	6938	6945	6952	6959	6968
6878	6885	6893	6901	6906	6916	7012	7026	7033	7040	7047	7057	7064
6976	6983	6990	6999	7006	7012	7131	7139	7145	7152	7159	7166	7173
7071	7080	7096	7107	7113	7122							
7180	7187	7194	7201	7210	7217							

T\$LTNO= 000050
T\$NEST= 177777

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2976#	3001#	3048#	3074#	3117#	3120#	3162#	3165#	3208#	3211#	3254#	3257#	3300#
3303#	3347#	3350#	3393#	3396#	3439#	3442#	3497#	3504#	3524#	3529#	3584#	3591#
3611#	3616#	3659#	3662#	3705#	3708#	3777#	3780#	3823#	3826#	3869#	3872#	3915#
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4189#	4217#	4252#	4279#	4280#	4282#	4384#	4431#	5620#	5623#	6267#	6287#	6293#
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7003#	7006#	7009#	7012#	7016#	7019#	7023#	7026#	7030#	7033#	7037#	7040#	7044#
7047#	7051#	7057#	7061#	7064#	7068#	7071#	7075#	7080#	7088#	7096#	7102#	7107#
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T\$NSO 000011

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1737#	1765	1833#	1869	1954#	2003	2042#	2060	2122#	2147	2185#	2207	2279#
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3257	3300#	3303	3347#	3350	3393#	3396	3439#	3442	3497#	3529	3584#	3616
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3964	4007#	4010	4065#	4085	4140#	4160	4189#	4217	4252#	4279	4280#	4282
4384#	4431	5620#	5623	6267#	6287	6293#	6301	6359#	6376	6394#	6412	6416#
6428	6431#	6453	6456#	6475	6526#	6544	6578#	6582	6595#	6599	6610#	6613
6627#	6633	6651#	6655	6666#	6669	6680#	6683	6694#	6697	6708#	6711	6722#
6725	6735#	6738	6748#	6751	6761#	6764	6774#	6777	6787#	6790	6800#	6803
6813#	6816	6826#	6829	6838#	6841	6854#	6857	6861#	6864	6868#	6871	6875#
6878	6882#	6885	6890#	6893	6897#	6901	6903#	6906	6910#	6916	6921#	6924
6928#	6931	6935#	6938	6942#	6945	6949#	6952	6956#	6959	6963#	6968	6973#
6976	6980#	6983	6987#	6990	6994#	6999	7003#	7006	7009#	7012	7016#	7019
7023#	7026	7030#	7033	7037#	7040	7044#	7047	7051#	7057	7061#	7064	7068#
7071	7075#	7080	7088#	7096	7102#	7107	7110#	7113	7118#	7122	7127#	7131
7135#	7139	7143#	7145	7150#	7152	7157#	7159	7164#	7166	7171#	7173	7178#
7180	7185#	7187	7192#	7194	7199#	7201	7206#	7210	7215#	7217		

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	3504#	3524	3591#	3611	4072#	4080	4147#	4155					
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T\$SAVL= 177777	551#												
T\$SEGL= 177777	551#	1577#	1588#	1589#	1609#	1611#	1633#	1635#	1662#	1664#	1676#	1744#	1753#
	1838#	1865#	1956#	1974#	1975#	1987#	2047#	2059#	2569#	2579#	2603#	2611#	2616#
	2624#	2692#	2706#	2774#	2789#	2857#	2874#	3504#	3524#	3591#	3611#	4072#	4080#
	4147#	4155#	6267#	6287#	6293#	6301#	6359#	6376#	6394#	6412#	6416#	6428#	6431#
	6453#	6456#	6475#	6526#	6544#								
T\$SEK0= 010010	1577#	1588	1589#	1609	1611#	1633	1635#	1662	1664#	1676	1744#	1753	1838#
	1865	1956#	1974	1975#	1987	2047#	2059	2569#	2579	2603#	2611	2616#	2624
	2692#	2706	2774#	2789	2857#	2874	3504#	3524	3591#	3611	4072#	4080	4147#
	4155	6267#	6287	6293#	6301	6359#	6376	6394#	6412	6416#	6428	6431#	6453
	6456#	6475	6526#	6544									
T\$SUBN= 000000	551#	1570#	1576#	1680#	1737#	1833#	1954#	2042#	2122#	2185#	2279#	2367#	2444#
	2557#	2678#	2759#	2843#	2929#	2976#	3048#	3117#	3162#	3208#	3254#	3300#	3347#
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	6708#	6722#	6735#	6748#	6761#	6774#	6787#	6800#	6813#	6826#	6838#	6854#	6861#
	6868#	6875#	6882#	6890#	6897#	6903#	6910#	6921#	6928#	6935#	6942#	6949#	6956#
	6963#	6973#	6980#	6987#	6994#	7003#	7009#	7016#	7023#	7030#	7037#	7044#	7051#
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	7171#	7178#	7185#	7192#	7199#	7206#	7215#						
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1978	1982	1985	1986	1987	1991	1995	1997	2000	2002	2003	2047	2052
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T\$\$INI= 010003
T\$\$MSG= 010172

T\$\$PRO= 010004
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TM78 CONTROLLER LOGIC TEST
ZTMIC7.P11 27-AUG-80 15:25

MACY11 50(1046) 24-FEB-81 12:26 PAGE 8-21
CROSS REFERENCE TABLE -- USER SYMBOLS

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- T1.1 004440
- T1.2 005260
- T10 007344 G
- T11 007520 G
- T12 C10120 G
- T13 010260 G
- T14 010424 G
- T15 010604 G
- T16 010660 G
- T17 011036 G
- T18 011170 G
- T19 011200 G
- T2 005416 G
- T20 011212 G
- T21 011224 G
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- T39 012354 G
- T4 006076 G
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ENDHW	915														
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	2301	2305	2377	2387	2394	2452	2464	2574	2594	2608	2621	2701	2784	2864	2997
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	4805	4879	4970	5081	5130	5210	5326	5401	5456	5642	5705	5756	5980	6075	6130
	6212	6240	6248	6253	6258	6571	6588	6604	6618	6644	6660	6674	6688	6702	6716
	6729	6742	6755	6768	6781	6794	6807	6820	6833	6837					
SD	816#	1383	1703	1769	1873	2008	2064	2152	2212	2312	2401	2472	2636	2717	2798

TM78 CONTROLLER LOGIC TEST
ZTMIC7.P11 27-AUG-80 15:25

MACY11 30(1046) 24-FEB-81 12:26 PAGE 9-8
CROSS REFERENCE TABLE == MACRO NAMES..

SEQ 0175

	2882	2947	3007	3079	3124	3170	3216	3262	3308	3355	3401	3447	3534	3621	3667
	3713	3739	3785	3831	3877	3923	3969	4015	4090	4222	4287	6070	6126		
SE	827#	1517	1731	1812	1921	2029	2099	2173	2251	2344	2427	2526	2663	2744	2828
	2902	2969	3036	3089	3134	3180	3226	3272	3318	3365	3411	3469	3556	3631	3677
	3749	3795	3841	3887	3933	3979	4037	4112	4165	4240	4358				
SETPRI	965	4264	4276												
SETVEC	1029	4263													
SIO	847#	4503	4558	4618	4686	4784	4863	4955	5067	5125	5194	5316	5390	5444	6234
SP	837#	1394	1710	1776	1888	2014	2076	2155	2224	2321	2408	2479	2640	2721	2801
	2886	2952	3012	3084	3129	3175	3221	3267	3313	3360	3406	3452	3539	3626	3672
	3716	3744	3790	3836	3882	3928	3974	4020	4095	4225	4293	4498	4516	4602	4655
	4754	4842	4913	5030	5116	5186	5274	5371	5423	5631	5661	5887	6200	6230	
SSUB	806#	4496	4514	4600	4653	4752	4840	4911	5028	5114	5184	5272	5369	5421	5629
	5659	5885	6068	6124	6198	6228									
ST	796#	1381	1701	1767	1871	2006	2062	2150	2210	2310	2399	2470	2634	2715	2796
	2880	2945	3005	3077	3122	3168	3214	3260	3306	3353	3399	3445	3532	3619	3665
	3711	3783	3829	3875	3921	3967	4013	4088	4163	4220	4285				
SVC	550#	551													
XFER	947#	1002#	1119#	1139#	1159#	2980#	2987#	3052#	3060#	3501#	3588#	4069#	4144#	4193#	

. ABS. 046410 000

ERRORS DETECTED: 0

CZTMIC,CZTMIC/CRF/EQ:ONEFILE-SVC33/ML,ZTMIC1.P11,ZTMIC2.P11,ZTMIC5.P11,ZTMIC4.P11,ZTMIC6.P11,ZTMIC3.P11,ZTMIC7.P11
RUN-TIME: 59 64 6 SECONDS
RUN-TIME RATIO: 290/130=2.2
CORE USED: 23K (46 PAGES)