

PCL11-A,B

STAND ALONE V020
CZPLBB0

AH-E263B-MC
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IDENTIFICATION

; PROGRAM CODE AC-E262B-MC
; PPROGRAM NAME CZPLBBO PCL11 STAND ALONE TEST
; DATE CREATED 22-OCT-75
; UPDATED 13-MAR-78
; MODIFIED 8-SEP-78
; MAINTAINER SPECIAL SYSTEMS KANATA
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.SBTTL HEADER AND INSTRUCTIONS
.REPT 0

1. GENERAL

THE PARALLEL COMMUNICATIONS LINK (PCL11) TEST WILL VIGOROUSLY TEST THE HARDWARE INVOLVED IN ANY ONE PCL11 PROCESSOR CONTAINING PCL11 HARDWARE.

THERE ARE THREE SEPARATE SECTIONS IN THIS TEST. TO COMPLETELY CHECK BOTH TRANSMITTER AND RECEIVER PORTIONS OF THE PCL11, ALL THREE SECTIONS MUST BE RUN SUCCESSFULLY.

THE FIRST TEST IS THE BASIC TRANSMITTER TEST WHICH IS DESIGNED TO BE RUN AS A STAND ALONE DEVICE TEST ON THE TRANSMITTER. IT WILL RUN WITH NO MANUAL INTERVENTION (AFTER INITIAL SETUP) ASSUMING THAT THE TRANSMITTER ADDRESS SWITCHES IN THE MASTER SECTION ARE SET TO BE AT LEAST EQUAL TO THE TRANSMITTERS OWN ADDRESS SWITCHES. THIS ASSURES THAT TIMING SLICES WILL SELECT THE TRANSMITTER BEING TESTED.

THE SECOND TEST IS THE BASIC RECEIVER TEST WHICH IS DESIGNED TO RUN AS A STAND ALONE DEVICE TEST FOR THE RECEIVER MODULE. AFTER INITIAL SETUP, THIS TEST RUNS WITH NO MANUAL INTERVENTION.

THE THIRD TEST IS THE TRANSMITTER-RECEIVER LOOP TEST. THE OBJECTIVE OF THE THIRD TEST IS TO TEST ANY FUNCTIONS THAT WERE NEGLECTED IN THE FIRST AND SECOND TESTS DUE TO THE NEED FOR TRANSMITTER TO RECEIVER COMMUNICATIONS. IT WILL ALSO TEST THE T.D.M. BUS DRIVERS AND RECEIVERS BY SENDING DATA PATTERNS AND CHECKING THE DATA RECEIVED. FURTHER, IT WILL EXERCISE THE ABILITY TO REJECT OR TRUNCATE COMMUNICATIONS.

THE TESTS ARE SELECTED, IN THE START-UP PROCEDURE, SO THAT ANY ONE OF THE TESTS MAY BE LOOPED INDIVIDUALLY, OR ALL THREE MAY BE LOOPED AS AN OVERALL TEST.

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- 2. REQUIREMENTS
- 2.1 GENERAL:
 - 2.11 PDP-11 PROCESSOR WITH 8K OF MEMORY
AND A CONSOLE DEVICE ON-LINE.
 - 2.12 PCL11 HARDWARE ON THE UNIBUS
 - 2.13 ALL PROCESSOR MAINDECS MUST HAVE BEEN RUN
SUCCESSFULLY PRIOR TO RUNNING PCL11 TEST.
 - 2.14 ONE PCL11 CONNECTED TO UNIBUS
(SEE PCL11 OPTION DESCRIPTION SEC 2.1)

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3. RESTRICTIONS

3.1 THIS TEST CANNOT BE LOADED INTO A PDP-11 WITH
LESS THAN 8K OF MEMORY.

3.3 SINCE THERE ARE TIMING LOOPS IN THIS TEST,
IT MAY NOT RUN SUCCESSFULLY IN SOLID-STATE MEMORY
IF THE DELAY CONSTANT (CNTRL-D) IS LOWERED TO
BELOW 6.
*** THIS ALSO APPLIES TO USING FASTER PDP-11'S (45, 70, ETC.)***

4. TEST SET-UP

4.1 ENSURE PCL11 HAS BEEN INSTALLED CORRECTLY
AS PER THE INSTALLATION PROCEDURE IN SEC 2.1 OF
PCL11 OPTION DESCRIPTION (YC-A20TC-00)

4.2 ENSURE ALL CABLES CONNECTING THE PCL11 UNDER
TEST TO OTHER PCL11 UNITS OR DISPLAY PANELS
ARE DISCONNECTED (OR DISABLED).

4.3 DETERMINE OR SET UP PROPER TDM ADDRESSES FOR
THE RECEIVER AND TRANSMITTER. THE TRANSMITTER'S
ADDRESS IS IN S1 ON THE M7991 MODULE; THE
RECEIVER'S IS IN S1 ON THE M7997 MODULE.

4.4 ENSURE S1 ON THE M7994 MODULE IS SET TO A NUMBER
GREATER THAN OR EQUAL TO THE TRANSMITTER'S ADDRESS.

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5. LOADING

THE PCL11 TEST IS ON PAPER TAPE IN PDP-11 .ABS
FORMAT. THE TAPE IS LOADED BY MEANS OF THE PDP-11
ABSOLUTE LOADER.

6. STARTING AND RESTARTING ADDRESSES

START ADDR

RESTART ADDR

200

204 (FOR DIFFERENT T.D.M. BUS ADDRESSES)
224 (FOR TEST SELECT)

7. SWITCH REGISTER OPTIONS

7.1 ALL TESTS

SW 15 = 0	HALT AFTER ERRORS
SW 15 = 1	DON'T HALT AFTER ERRORS
SW 14 = 0	ALLOW PRINTING
SW 14 = 1	INHIBIT PRINTING
SW 13 = 0	SEE SW 15
SW 13 = 1	AFTER ERROR, RE-TRY CURRENT ROUTINE
SW 12 = 0	CARRY ON TO NEXT SUBTEST
SW 12 = 1	DON'T EXIT THIS SUBTEST
SW 11 = 0	10 TIMES THRU ALL SUBTESTS PER PASS
SW 11 = 1	ONCE THRU ALL SUBTESTS PER PASS

7.2 TRANSMITTER TEST

SW 10 = 0	START AT 1ST SUBTEST AND RUN
SW 10 = 1	START AT SUBTEST # IN SW'S <3:0>
SW 09 = 0	STAY IN MASTER SECTION SCOPE LOOP
SW 09 = 1	EXIT MASTER SECTION SCOPE LOOP

7.3 RECEIVER TEST

SW 10 = 0	START AT 1ST SUBTEST AND RUN
SW 10 = 1	START AT SUBTEST # IN SW'S <2:0>

7.4 TRANSMITTER-RECEIVER LOOP

SW 10 = 0	START AT 1ST SUBTEST AND RUN
SW 10 = 1	START AT SUBTEST # IN SW'S <2:0>

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7.5 SWITCH REGISTER OPTION USE ON NON-SWITCH-REGISTER PDP-11'S

AT START UP TIME
THE PROGRAM WILL DECIDE WHETHER A HARDWARE SWITCH REGISTER
EXSISTS ON THE PDP-11. IF NONE EXSISTS, A SOFTWARE
FLAG WILL BE SET INDICATING TO THE REST OF THE PROGRAM THAT
THE 'SWITCH MONITOR' IS TO BE USED TO ACHIEVE CHANGING OF
SWITCH OPTIONS.
THE MONITOR IS ENTERED AT THE START OF THE TEST PROGRAM
AUTOMATICALLY. IT IS ALSO ENTERED AUTOMATICALLY ON AN ERROR
HALT IF SW 15 = 0. AT OTHER TIMES IT MUST BE CALLED BY THE
OPERATER BY TYPING CNTRL-S
WHEN THE MONITOR IS ENTERED THE FOLLOWING IS PRINTED:
SWR = XXXXXX :
SHOWING THE OPERATER THE PRESENT CONTENTS OF THE SOFTWARE
SWITCH REGISTER LOCATION. HE MAY CHANGE THE LOCATION BY TYPING:
YYYYYY <CR>
IN RESPONSE; OR HE MAY LEAVE THE LOCATION UNCHANGED BY TYPING
ONLY <CR>.
REFERENCE PAGE 9 OF THIS LISTING FOR 'SWITCH' BIT POSITIONS.
UPON DETECTING A <CR> THE MONITOR WILL TYPE:
CNTRL-P TO CONTINUE
THE OPERATER NOW HAS THE OPTION OF TYPING ^P TO CONTINUE
THE PROGRAM WHERE IT LEFT OFF, OR ^S TO RE-ENTER THE
SWITCH MONITOR.

8. TEST DESCRIPTION

8.1 TEST 1 - TRANSMITTER TEST:

SUBTEST 00	TEST INITIAL CONDITIONS AFTER RESET
SUBTEST 01	COMMAND REGISTER TEST
SUBTEST 02	BYTE COUNT REGISTER TEST
SUBTEST 03	BUS ADDRESS REGISTER TEST
SUBTEST 04	MASTER SECTION TEST
SUBTEST 05	DATA SILO TEST
SUBTEST 06	STATUS REGISTER AND ERRORS TEST
SUBTEST 07	INTERRUPT TEST
SUBTEST 10	C.R.C GENERATION TEST

8.2 TEST 2 - RECEIVER TEST:

SUBTEST 00	TEST INITIAL CONDITIONS AFTER RESET
SUBTEST 01	COMMAND REGISTER TEST
SUBTEST 02	BYTE COUNT REGISTER TEST
SUBTEST 03	BUS ADDRESS REGISTER TEST
SUBTEST 04	DATA SILO TEST
SUBTEST 05	STATUS REGISTER AND ERRORS TEST
SUBTEST 06	INTERRUPT TEST
SUBTEST 07	C.R.C GENERATION TEST

8.3 TEST 3 - XMTR-RCVR LOOP TEST:

SUBTEST 00	CHK NPR FROM RCVR SILO TO XMTR SILO
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SUBTEST 01 DATA LOOPS TEST
SUBTEST 02 TRANSMISSION ERRORS TEST
SUBTEST 03 REJECT AND TRUNCATE TEST

8.4 TEST 4 - COMBINATION RUN

RUN TEST 1 THEN
RUN TEST 2 THEN
RUN TEST 3 THEN
RUN TEST 1 ETC .

8.5 THE TESTS WILL IDENTIFY THEMSELVES UPON SELECTION, IN THE FOLLOWING WAY:

TEST 1 'PCL11 TRANSMITTER TEST'
TEST 2 'PCL11 RECEIVER TEST'
TEST 3 'TRANSMITTER - RECEIVER LOOP TESTS'
TEST 4 'PCL11 TESTS 1 - 3 SEQUENCE''

8.6 THE TESTS WILL SIGNIFY COMPLETION BY PRINTING THE FOLLOWING END PASS MESSAGES ALONG WITH THE PASS COUNT IN DECIMAL:

TEST 1 -- END PASS # N
TEST 2 -- END PASS # NA
TEST 3 -- END PASS # NB
TEST 4 -- END PASS # NC

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9. STARTING AND OPERATING PROCEDURE
- LOAD THE PROGRAM TAPE USING THE PDP-11 ABSOLUTE LOADER
- 9.1 START UP:
- START PROGRAM AT 200
PROGRAM WILL ASK THE FOLLOWING (ONE AT A TIME)
- XMTR 1ST UNIBUS ADDR.. (DEFAULT = 164200)
RCVR 1ST UNIBUS ADDR... (DEFAULT = 164220)
XMTR VECTOR.. (DEFAULT = 170)
RCVR VECTOR.. (DEFAULT = 174)
XMTR PRIORITY (4-7).. (DEFAULT = 5)
RCVR PRIORITY (4-7).. (DEFAULT = 5)
XMTR TDM BUS ADDR (1-37).. (DEFAULT = 1)
RCVR TDM BUS ADDR (1-37).. (DEFAULT = 1)
- RESPOND TO EACH PROMPT WITH:
<CR> IF DEFAULT IS DESIRED
XXXXX <CR> IF XXXXX IS DESIRED FOR NEW ENTRY
- 9.11 SELECT TEST:
- THE PROGRAM THEN TYPES:
SELECT TEST (<CR> FOR HELP)..
- THE OPERATOR HAS THE FOLLOWING CHOICES:
- 1 = SELECT TEST 1 TO RUN ONLY (TRANSMITTER LOGIC TEST)
2 = SELECT TEST 2 TO RUN ONLY (RECEIVER LOGIC TEST)
3 = SELECT TEST 3 TO RUN ONLY (XMTR -TO- RCVR LOOP TEST)
4 = SEQUENCE TEST 1, TEST 2, TEST 3 REPETEDLY.
<CR> PRINT THIS HELP MESSAGE.
- 9.12 POSSIBLE INTERVENTION:
- 9.121 IF SW 12 IS UP AT START TIME, THE FIRST SUBTEST WILL RUN CONTINUOUSLY AND THE TEST WILL NEVER ACHIEVE A SUCCESSFUL PASS COMPLETE. SWITCH 12 MUST BE LEFT DOWN UNLESS AN INTERMITTENT ERROR OCCURS IN A SUBTEST AND IT IS DESIRED TO SCOPE THE MODULE WITH THE SAME SUBTEST RUNNING CONTINUOUSLY. AT ANY TIME, SW 12 MAY BE LOWERED AND THE TEST SEQUENCE WILL RESUME.
- 9.122 ANY PARTICULAR SUBTEST MAY BE STARTED BY STARTING WITH OPTION SWITCH 10 = 1 AND THE NUMBER OF THE DESIRED SUBTEST IN SW'S <3:0>. IF IT IS DESIRED, HOWEVER, TO CONTINUOUSLY RUN ONLY THE SELECTED SUBTEST, SW 12 MUST BE RAISED AS WELL AS SW 10 AT START UP TIME.
- 9.123 WHEN THE MASTER SECTION TEST HAS IT'S TURN TO RUN THE FOLLOWING MESSAGE WILL APPEAR ON THE CONSOLE

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PRINTER

SCOPE SECTION FOR SLICE TIMING
RAISE SW 09 TO EXIT THIS LOOP

THIS IS A 'HANG-UP' PROVIDED FOR MAINTENANCE
PURPOSES OF CHECKING AND ADJUSTING SLICE
TIMING IN THE MASTER SECTION. NEITHER THE
PRINTOUT NOR THE 'HANG-UP' WILL OCCUR IF
SW 09 IS UP.

9.124

NORMALLY, 10 (OCTAL) PASSES ARE MADE OF THE
COMPLETE TEST BEFORE A PASS COMPLETE IS
ACHIEVED AND

END PASS XX

IS PRINTED ON THE CONSOLE PRINTER.
HOWEVER, RAISING SW 11 WILL CAUSE EVERY SINGLE
PASS TO BE CONSIDERED AS COMPLETE.

9.13

RESTARTING:

THE TEST MAY BE RE-STARTED AT LOC. 204
THIS WILL OMIT MOST OPENING DIALOGUE.
THE FOLLOWING WILL STILL BE REQUESTED, HOWEVER:

TRANSMITTER TDM BUS ADDRESS IS (1-37).. (DEFAULT = 1)
RECEIVER TDM BUS ADDRESS IS (1-37).. (DEFAULT = 1)

OR --THE TEST MAY BE RE-STARTED AT LOC. 224
THIS WILL OMIT ALL OF THE OPENING DIALOGUE
AND BEGIN RIGHT AT THE TEST SELECTOR.

9.14 (CONTROL CHARACTERS)

CNTRL-C RESTART TO SELECT NEW TDM BUS ADDRESSES
CNTRL-T RESTART AT TEST SELECTOR
CNTRL-D MODIFY DELAY CONSTANT
(NORMALLY SET FOR FASTEST PDP-11)
CNTRL-S MODIFY SWITCH OPTIONS ON NON-
SWITCH REGISTER PDP-11'S
CNTRL-P CONTINUE AFTER CONTROL FUNCTION

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ERRORS

BASICALLY, THE ERRORS IN THIS TEST ARE IN THE FORM:

**ERROR X AT LOCATION YYYYYY

WHERE X IS THE ERROR NUMBER:

TRANSMITTER TEST ERROR #'S 1 TO 121 (TEST # 1)
RECEIVER TEST ERROR #'S 200-262 (TEST # 2)
LOOP TEST ERROR #'S 300-355 (TEST # 3)

AND YYYYYY IS THE ADDRESS IN THE LISTING WHERE THE
ERROR OCCURRED.

REFER TO THE LISTING ABOVE THE COMMENT:

***** ERROR X *****

TO DETERMINE THE CAUSE OF THE ERROR PRINTOUT.

DATA ERRORS WILL CAUSE A FURTHER PRINTOUT INDICATING
THE ERRONEOUS DATA:

SHOULD BE AAAAAA, WAS BBBBBB

OTHER ERRORS WILL CAUSE THE FOLLOWING FURTHER
PRINTOUTS:

TRANSMITTER STATUS REGISTER = CCCCCC

RECEIVER STATUS REGISTER = DDDDDD

NO. OF WORDS RECEIVED = EEEEE

SILO OUTPUT WORD WAS FFFFFF

SILO INPUT WORD WAS HHHHHH

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.ENDR
.TITLE CZPLBBO PCL11 STND ALN V02A
.SBTTL SYMBOLIC DEFINITIONS

;INTERNAL DEFINITIONS:

PS = 177776
HWSWR = 177570
SSWR = SWREG

;REGISTER DEFINITIONS

R0 = %0
R1 = %1
R2 = %2
R3 = %3
R4 = %4
R5 = %5
SP = %6
PC = %7

;BUS REQUEST DEFINITIONS:

P7 = 340
P6 = 300
P5 = 240
P4 = 200
P3 = 140
P2 = 100
P1 = 40

;BIT DEFINITIONS:

B15 = 100000
B14 = 40000
B13 = 20000
B12 = 10000
B11 = 4000
B10 = 2000
B09 = 1000
B08 = 400
B07 = 200
B06 = 100
B05 = 40
B04 = 20
B03 = 10
B02 = 4
B01 = 2
B00 = 1

;OTHER DEFINITIONS:

ISP = BEGIN

;INITIAL STACK POINTER

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.SBTTL MACRO DEFINITIONS
;BOARD INITIALIZE MACRO
.MACRO BDINIT DEV
.NLIST
.IF IDN <DEV>,<XMTR>
BIS #B01,@TCR
.IFF
.IF IDN <DEV>,<RCVR>
BIS #B01,@RCR
.IFF
.ERROR ;BAD ARGUMENT FOR BDINIT
.ENDC
.ENDC
.LIST
.ENDM
N = 1 ;INITIAL ERROR NUMBER
;ERROR MACROS
.MACRO ERROR P ;***** ERROR P *****
BIT #B14,@SR
BNE .+14
MOV #P,ERRNUM
JSR PC,ERR
N = N+1
.ENDM
.MACRO DATERR P ;***** ERROR P *****
BIT #B14,@SR
BNE .+14
MOV #P,ERRNUM
JSR PC,DERR
N = N+1
.ENDM
.MACRO HLT
JSR PC,SWHLT
.ENDM
;PRINT MACRO (MSG ADDR IN R0)
.MACRO PNTM A ;PRINT MESSAGE
MOV #A,R0 ;POINTED TO BY A
JSR PC,TYPOUT
.ENDM
;SCOPE LOOP MACRO
.MACRO SCOPE X
JSR R5,SCPRTN
X
.ENDM
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;INTER-PDP-11 COMPATABLE MOVE TO PS  
;TO RUN ON LSI-11: CHANGE THIS MACRO TO:  
:      MOV      SRC,-(SP)  
:      MOV      #LLL,-(SP)  
:      RTI  
:LLL:  
  
      .MACRO MTPS SRC,?LLL  
      MOV      SRC,@#PS  
      .ENDM
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539 000000 000000
540 000000 000002
541 000002 000000
542 000004 004262
543 000006 000340
544 000176
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.SBTTL TRAP CATCHERS
.ENABLE ABS
= 0
.WORD .+2
.WORD 0
.WORD ERRTRP
.WORD 340
.REPT 126.
.WORD .+2
.WORD 0
.ENDR

;TRAP BAD DEVICE ADDRESSES

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549          .SBTTL TEST SUPERVISOR
550
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552          000200          =          200
553
554 000200 000167 001574          JMP          BEGIN          ;TEST STARTS AT 200
555 000204 012706 002000          MOV          #ISP,SP
556 000210          MTPS          #P7
557 000216 000005          RESET
558 000220 000167 002472          JMP          RESTRT
559 000224 012706 002000          MOV          #ISP,SP
560 000230          MTPS          #P7
561 000236 000167 002670          JMP          BCONT          ;GO TO TEST SELECT
562
563          002000          =          2000
564
565 002000 000005          BEGIN: RESET          ;CLEAR ALL
566 002002 012706 002000          MOV          #ISP,SP          ;SET UP STACK
567 002006          MTPS          #P7          ;DISABLE C.P. INTERRUPT
568 002014 005067 033276          CLR          SWRFLG          ;CLEAR SWR FLAG
569 002020 012737 003774 000004          MOV          #SRTST,@#4          ;SET UP TO TRAP IF NO HSWR
570 002026 012737 000340 000006          MOV          #P7,@#6
571 002034 012767 177570 027706          MOV          #HWSWR,SR          ;SET SR TO HDWARE SW REG
572 002042 005777 027702          TST          @SR          ;SEE IF IT'S THERE
573 002046          PNTM          TSTHDR          ;PRINT TEST HEADER
574 002056          PROMT: PNTM          TMTR          ;PRINT 'TRANSMITTER'
575 002066          PNTM          FRAD          ;PRINT '1ST BUS ADDR'
576 002076 016767 033346 030420          MOV          TXMADR,KBBUF          ;LOAD DEFAULT ADDR
577 002104 004767 030142          JSR          PC,INPKB          ;GET KBD INPUT
578 002110 016767 030410 033332          MOV          KBBUF,TXMADR          ;REPLACE XMTR ADDR
579 002116 026727 033326 164000          CMP          TXMADR,#164000          ;IS IT WITHIN LIMITS?
580 002124 103006          BHIS          PRMT1          ;YES, CARRY ON
581 002126          PNTM          TOOLOW          ;NO ERROR, ASK AGAIN
582 002136 000167 177714          JMP          PROMT
583 002142 012737 004242 000004          PRMT1: MOV          #DVATST,@#4
584 002150 005777 033274          TST          @TXMADR          ;IS IT A GOOD ADDRESS?
585 002154          PRMT2: PNTM          RECVR          ;PRINT 'RECEIVER'
586 002164          PNTM          FRAD          ;PRINT 1ST UNIBUS ADDR'
587 002174 016767 033252 030322          MOV          RCVADR,KBBUF          ;LOAD DEFAULT ADDRESS
588 002202 004767 030044          JSR          PC,INPKB          ;GET KBD INPUT
589 002206 016767 030312 033236          MOV          KBBUF,RCVADR          ;LOAD NEW ADDRESS
590 002214 026727 033232 164000          CMP          RCVADR,#164000          ;IS IT WITHIN LIMITS?
591 002222 103006          BHIS          PRMT3          ;YES, CARRY ON
592 002224          PNTM          TOOLOW
593 002234 000167 177714          JMP          PRMT2
594 002240 005777 033206          PRMT3: TST          @RCVADR          ;IS IT A GOOD ADDRESS?
595 002244 012737 004262 000004          MOV          #ERRTRP,@#4          ;SET UP FOR FURTHER TRAPS
596 002252          PRMT4: PNTM          TMTR          ;PRINT 'TRANSMITTER'
597 002262          PNTM          VCTR          ;PRINT 'VECTOR IS'
598 002272 016767 033146 030224          MOV          TXMVEC,KBBUF          ;LOAD DEFAULT VECTOR
599 002300 004767 027746          JSR          PC,INPKB          ;GET KBD INPUT
600 002304 016767 030214 033132          MOV          KBBUF,TXMVEC          ;REPLACE XMTR VECTOR
601 002312 026727 030206 000776          CMP          KBBUF,#776          ;IS IT WITHIN LIMITS?
602 002320 101406          BLOS          PRMT5
603 002322          PNTM          AGAIN
604 002332 000167 177714          JMP          PRMT4
  
```


605	002336					PRMT5:	PNTM	RECVR		:PRINT 'RECEIVER'
606	002346						PNTM	VCTR		:PRINT 'VECTOR IS'
607	002356	016767	033064	030140			MOV	RCVVEC,KBBUF		:LOAD DEFAULT VECTOR
608	002364	004767	027662				JSR	PC,INPKB		:GET KEYBOARD INPUT
609	002370	016767	030130	033050			MOV	KBBUF,RCVVEC		:LOAD NEW VECTOR
610	002376	026727	030122	000776			CMP	KBBUF,#776		:IS IT WITHIN LIMITS?
611	002404	101406					BLOS	PRMT6		
612	002406						PNTM	AGAIN		
613	002416	000167	177714				JMP	PRMT5		
614	002422					PRMT6:	PNTM	TMTR		:PRINT 'TRANSMITTER'
615	002432						PNTM	PRIOTY		:PRINT 'PRIORITY LEVEL IS'
616	002442	016767	032714	030054			MOV	FKPRIO,KBBUF		:LOAD DEFAULT PRIORITY
617	002450	004767	027576				JSR	PC,INPKB		:GET KBD INPUT
618	002454	026727	030044	000007			CMP	KBBUF,#7		:IS IT WITHIN LIMITS?
619	002462	003406					BLE	PRMT7		:LOW ENOUGH, O.K.
620	002464						PNTM	AGAIN		
621	002474	000167	177722				JMP	PRMT6		
622	002500	026727	030020	000004		PRMT7:	CMP	KBBUF,#4		:HIGH ENOUGH?
623	002506	002006					BGE	PRMT8		
624	002510						PNTM	AGAIN		
625	002520	000167	177676				JMP	PRMT6		
626	002524	006367	027774			PRMT8:	ASL	KBBUF		
627	002530	006367	027770				ASL	KBBUF		
628	002534	006367	027764				ASL	KBBUF		
629	002540	006367	027760				ASL	KBBUF		
630	002544	006367	027754				ASL	KBBUF		:SHIFT INTO PLACE
631	002550	016767	027750	032612			MOV	KBBUF,XPRIO		:LOAD NEW PRIORITY.
632	002556					PRMT9:	PNTM	RECVR		:PRINT 'RECEIVER'
633	002566						PNTM	PRIOTY		:PRINT 'PRIORITY LEVEL IS ''
634	002576	016767	032560	027720			MOV	FKPRIO,KBBUF		:LOAD DEFAULT PRIORITY
635	002604	004767	027442				JSR	PC,INPKB		:GET KBD INPUT
636	002610	026727	027710	000007			CMP	KBBUF,#7		:LOW ENOUGH, O.K.
637	002616	003406					BLE	3\$		
638	002620						PNTM	AGAIN		
639	002630	000167	177722				JMP	PRMT9		
640	002634	026727	027664	000004		3\$:	CMP	KBBUF,#4		:HIGH ENOUGH?
641	002642	002006					BGE	4\$		
642	002644						PNTM	AGAIN		
643	002654	000167	177676				JMP	PRMT9		
644	002660	006367	027640			4\$:	ASL	KBBUF		
645	002664	006367	027634				ASL	KBBUF		
646	002670	006367	027630				ASL	KBBUF		
647	002674	006367	027624				ASL	KBBUF		
648	002700	006367	027620				ASL	KBBUF		:SHIFT INTO PLACE
649	002704	016767	027614	032460			MOV	KBBUF,RPRI0		:LOAD NEW PRIORITY
650	002712	004767	001132				JSR	PC,DEVGEN		:GENERATE PCL-11 ADDRESSES
651	002716					RESTRT:	PNTM	TMTR		:PRINT 'TRANSMITTER'
652	002726						PNTM	TDMA0		:PRINT 'TDM BUS ADDRESS''
653	002736	012767	000001	027560			MOV	#1,KBBUF		:LOAD DEFAULT OF '1'
654	002744	004767	027302				JSR	PC,INPKB		:GET KBD INPUT.
655	002750	005767	027550				TST	KBBUF		:DON'T ALLOW 0
656	002754	001006					BNE	ADOK		
657	002756						PNTM	AGAIN		
658	002766	000167	177724				JMP	RESTRT		
659	002772	026727	027526	000040		ADOK:	CMP	KBBUF,#40		:CAN'T BE 40 OR HIGHER
660	003000	103406					BLO	ADGD		

661	003002					PNTM	AGAIN		
662	003012	000167	177700			JMP	RESTR		
663	003016	116767	027502	032327	ADGD:	MOVB	KBBUF,TRAD+1		:SAVE ADDR IN UPPER BYTE
664	003024				PRMT10:	PNTM	RECVR		:PRINT 'RECIEVER'
665	003034					PNTM	TDMAD		:PRINT 'TDM BUS ADDRESS'
666	003044	012767	000001	027452		MOV	#1,KBBUF		:LOAD DEFAULT OF 1
667	003052	004767	027174			JSR	PC,INPKB		:GET KBD INPUT
668	003056	005767	027442			TST	KBBUF		:DON'T ALLOW 0
669	003062	001006				BNE	ADROK		
670	003064					PNTM	AGAIN		
671	003074	000167	177724			JMP	PRMT10		
672	003100	026727	027420	000040	ADROK:	CMP	KBBUF,#40		:CAN'T BE 40 OR HIGHER
673	003106	103406				BLO	ADRGD		
674	003110					PNTM	AGAIN		
675	003120	000167	177700			JMP	PRMT10		
676	003124	116767	027374	032217	ADRGD:	MOVB	KBBUF,RCAD+1		:SAVE ADDR IN UPPER BYTE
677	003132				BCONT:	PNTM	TSTSEL		:PRINT 'SELECT TEST <CR> = HELP'
678	003142	012767	000077	027354		MOV	#77,KBBUF		:DEFAULT TO HELP
679	003150	004767	027076			JSR	PC,INPKB		:GET KEYBOARD INPUT
680	003154	026727	027344	000005		CMP	KBBUF,#5		:DID HE TYPE 5 OR HIGHER?
681	003162	103005				BHIS	BHLPMG		:YES, GIVE ASSISTANCE.
682	003164	005767	027334			TST	KBBUF		:HOPE IT WASN'T '0'
683	003170	001402				BEQ	BHLPMG		: 'CAUSE THAT'S NO GOOD EITHER
684	003172	000167	000014			JMP	TESTGO		:EVERYTHING OK. GO TO TESTS
685	003176				BHLPMG:	PNTM	HLPMSG		:NO GOOD, PRINT HELP MESSAGE.
686	003206	000167	177720			JMP	BCONT		
687									
688	003212	016767	027306	032124	TESTGO:	MOV	KBBUF,TESTNO		:SAVE TEST NUMBER
689	003220	005767	032072			TST	SWRFLG		:GOT ANY SWITCHES?
690	003224	001402				BEQ	1\$:YES, YOU'RE ON YOUR OWN
691	003226	004767	026154			JSR	PC,SWDMP		:OTHERWISE, SHOW SW OPTIONS.
692	003232	005067	032074		1\$:	CLR	PSNO1		:CLEAR END PASS COUNTER
693	003236	005067	032072			CLR	PSNO2		:CLEAR END PASS A COUNTER
694	003242	005067	032070			CLR	PSNO3		:CLEAR END PASS B COUNTER
695	003246	005067	032066			CLR	PSNO4		:CLEAR END PASS C COUNTER
696	003252	026727	032066	000001		CMP	TESTNO,#1		:SELECT TEST 1?
697	003260	001012				BNE	2\$:NO.
698	003262	005067	032060			CLR	\$4FLAG		:CLEAR END PASS INHIBIT FLAG
699	003266					PNTM	TXHDR		:PRINT XMTR TEST HEADER
700	003276	004767	000220		11\$:	JSR	PC,TEST1		:YES, GO DO IT (LOOP)
701	003302	000167	177770			JMP	11\$		
702	003306	026727	032032	000002	2\$:	CMP	TESTNO,#2		:SELECT TEST 2?
703	003314	001012				BNE	3\$:NO.
704	003316	005067	032024			CLR	\$4FLAG		:CLEAR END PASS INHIBIT FLAG
705	003322					PNTM	RCHDR		:PRINT RCVR TEST HEADER
706	003332	004767	011304		21\$:	JSR	PC,TEST2		:YES, GO DO IT (LOOP)
707	003336	000167	177770			JMP	21\$		
708	003342	026727	031776	000003	3\$:	CMP	TESTNO,#3		:SELECT TEST 3?
709	003350	001012				BNE	4\$:NO.
710	003352	005067	031770			CLR	\$4FLAG		:CLEAR END PASS INHIBIT FLAG
711	003356					PNTM	XRHDR		:PRINT LOOP TEST HEADER
712	003366	004767	017144		31\$:	JSR	PC,TEST3		:YES, GO DO IT.
713	003372	000167	177770			JMP	31\$		
714	003376	026727	031742	000004	4\$:	CMP	TESTNO,#4		:SELECT TEST 4?
715	003404	001044				BNE	5\$:NO?????
716	003406	012767	177777	031732		MOV	#-1,\$4FLAG		:SET FLAG TO INHIBIT END PASS

717	003414			PNTM	ALTHDR		:PRINT TRIPLE TEST HEADER
718	003424	004767	000072	41\$: JSR	PC,TEST1		
719	003430	004767	011206	JSR	PC,TEST2		
720	003434	004767	017076	JSR	PC,TEST3		:DO ALL TESTS (LOOP)
721	003440	005267	031674	INC	PSNO4		:UPDATE PASS COUNTER
722	003444			PNTM	PEND		:PRINT END PASS #
723	003454	016700	031660	MOV	PSNO4,RO		:GET PASS # TO RO
724	003460	004767	027116	JSR	PC,DECPNT		:PRINT IT IN DECIMAL
725	003464	012700	000040	MOV	#40,RO		:ALSO, PRINT 'C'
726	003470	004767	027276	JSR	PC,TTO		
727	003474	012700	000103	MOV	#'C,RO		:TO IDENTIFY END PASS OF
728	003500	004767	027266	JSR	PC,TTO		:TEST 4
729	003504	005000		CLR	RO		
730	003506	004767	027260	JSR	PC,TTO		:NULLS TO ALLOW PASS #
731	003512	004767	027254	JSR	PC,TTO		
732	003516	000167	177702	5\$: JMP	41\$		

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.SBTTL TRANSMITTER TESTS

- :TEST 1: TRANSMITTER LOGIC TESTS
- : (00) RESET TEST
- : (01) TCR REG. TEST
- : (02) TSBC REG TEST
- : (03) TSBA REG TEST
- : (04) MASTER SECT. TEST
- : (05) DATA SILO TEST
- : (06) TSR REG. & ERRORS TEST
- : (07) INTERRUPT TEST
- : (10) C.R.C. TEST

003522
003530 012767 000010 031564
003536 004767 025612
003542 032777 002000 026200
003550 001424
003552 017767 026172 031544
003560 042767 177760 031536
003566 026727 031532 000010
003574 003012
003576 000241
003600 006167 031520
003604 006167 031514
003610 062767 003622 031506
003616 000177 031502
003622 004767 000550
003626 004767 001176
003632 004767 001760
003636 004767 002130
003642 004767 002300
003646 004767 004312
003652 004767 005760
003656 004767 010016
003662 004767 010476
003666 032777 004000 026054
003674 001003
003676 005367 031420
003702 001347
003704 005767 031436
003710 001020
003712 005267 031414
003716
003726 016700 031400
003732 004767 026644
003736 005000
003740 004767 027026
003744 005000
003746 004767 027020
003752 000207

003754 005767 031336

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TEST1:  MTPS      #P7
        MOV      #10,ITER      ;INITIAL ITERATION OF 10 PER PASS
        JSR     PC,MONIT      ;CHECK FOR KBD INPUT
        BIT     #B10,@SR      ;CHECK SW 10
        BEQ     LOOP          ;IF 0, RUN SEQUENTIALLY
        MOV     @SR,SWI      ;IF SET, GET TEST # FROM SWR
        BIC     #-20,SWI     ;MASK LOW DIGIT
        CMP     SWI,#10      ;DON'T ALLOW SW = >10
        BGT     LOOP          ;IF GREATER, START 1'ST TEST
        CLC
        ROL     SWI          ;CLEAR 'C' BIT BEFORE ROTATE
        ROL     SWI
        ADD     #LOOP,SWI    ;MULTIPLY BY 4
        JMP     @SWI         ;GENERATE OFFSET
        JSR     PC,XINIT      ;GO TO SELECTED TEST
        JSR     PC,TCRTST     ;DO INITIAL CLR TEST
        JSR     PC,TXRTST     ;DO TCR REG TEST
        JSR     PC,BCTST      ;DO BYTE COUNT REG TST
        JSR     PC,BATST      ;DO BYTE ADDR REG TEST
        JSR     PC,MSRTST     ;DO MASTER SECTION TEST
        JSR     PC,SILTST     ;DO DATA SILO TEST
        JSR     PC,TSRTST     ;DO TSR REG & ERRORS TEST
        JSR     PC,INTST      ;DO INTERRUPT TEST
        JSR     PC,CRCTST     ;DO CRC GENERATION TEST
        BIT     #B11,@SR     ;CHECK SWITCH 11
        BNE     XEND          ;PRINT END IF SET
        DEC     ITER         ;OTHERWISE, REITERATE
        BNE     LOOP
        TST     $4FLAG       ;SHOULD WE PRINT END PASS?
        BNE     REPEAT       ;NO, LEAVE
        INC     PSNO1        ;UPDATE PASS NUMBER
        PNTM    PEND        ;PRINT 'END PASS #'
        MOV     PSNO1,RO
        JSR     PC,DECPNT     ;PRINT PASSNO.
        CLR     RO
        JSR     PC,TT0        ;PRINT NULLS TO ALLOW TIME
        CLR     RO           ;FOR PASS # TO BE PRINTED
        JSR     PC,TT0
        REPEAT: RTS         ;RETURN TO SUPERVISOR
        PC

;NON-SWR PROCESSOR HALT SUBROUTINE
SWHLT:  TST     SWRFLG      ;ANY HARDWARE SWR?
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790 003760 001403          BEQ 1$          ;IF YES GO HALT
791 003762 004767 025420   JSR PC,SWDMP    ;IF NOT GO GET SW LOC
792 003766 000207          RTS PC
793 003770 000000   1$:  HALT
794 003772 000207          RTS PC          ;RETURN IF CONT KEY HIT
795
796 003774 012767 031746 025746 SRTST: MOV #SSWR,SR    ;NO HDWARE SWR, USE MEM LOC
797 004002 012767 177777 031306   MOV #-1,SWRFLG ;SET SOFT SWR FLAG
798 004010 000002          RTI          ;RETURN
799
800          ;THIS ROUTINE ENTERED FOR SCOPE ROUTINES
801
802 004012 004767 025336   SCPRTN: JSR PC,MONIT ;SEE IF ^S WAS TYPED
803 004016 005777 025726   TST @SR        ;BIT 15 SET?
804 004022 100402          BMI SBAK        ;YES, DON'T HALT
805 004024          HLT          ;COMMON ERROR HALT. EXAMINE
806
807 004030 012500          SBAK:  MOV (R5)+,R0 ;GET DIRECTION FOR SCOPE LOOP
808 004032 032777 020000 025710   BIT #B13,@SR  ;SW 13 SET?
809 004040 001402          BEQ SCONT      ;NO, DON'T LOOP
810 004042 012605          MOV (SP)+,R5   ;YES, RESTORE R5
811 004044 000110          JMP (R0)      ;AND LOOP
812 004046 000205          SCONT: RTS R5 ;JUST RETURN

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814          .SBTTL UTILITY ROUTINES
815
816          ;DEVICE ADDRESS GENERATION
817
818
819 004050 016700 031374      DEVGEN: MOV      TXMADR,R0      ;GET BASIC XMTR ADDRESS
820 004054 010067 031314      MOV      R0,TCR      ;GENERATE TCR
821 004060 062700 000002      ADD      #2,R0
822 004064 010067 031306      MOV      R0,TSR      ;GENERATE TSR
823 004070 062700 000002      ADD      #2,R0
824 004074 010067 031300      MOV      R0,TSDB     ;GENERATE TSDB
825 004100 062700 000002      ADD      #2,R0
826 004104 010067 031272      MOV      R0,TSBC     ;GENERATE TSBC
827 004110 062700 000002      ADD      #2,R0
828 004114 010067 031264      MOV      R0,TSBA     ;GENERATE TSBA
829 004120 062700 000002      ADD      #2,R0
830 004124 010067 031256      MOV      R0,TMMR     ;GENERATE TMMR
831 004130 005200              INC      R0
832 004132 010067 031252      MOV      R0,TMMRH    ;GEN. TMMR HIGH BYTE
833 004136 005200              INC      R0
834 004140 010067 031246      MOV      R0,TSCRC    ;GENERATE TSCRC
835 004144 016767 031274      MOV      TXMVEC,TXVEC ;GENERATE TXVEC
836 004152 016700 031274      MOV      RCVADR,R0   ;GET BASIC RCVR ADDRESS
837 004156 010067 031232      MOV      R0,RCR      ;GENERATE RCR
838 004162 062700 000002      ADD      #2,R0
839 004166 010067 031224      MOV      R0,RSR      ;GENERATE RSR
840 004172 062700 000002      ADD      #2,R0
841 004176 010067 031216      MOV      R0,RDDB     ;GENERATE RDDB
842 004202 062700 000002      ADD      #2,R0
843 004206 010067 031210      MOV      R0,RDBC     ;GENERATE RDBC
844 004212 062700 000002      ADD      #2,R0
845 004216 010067 031202      MOV      R0,RDBA     ;GENERATE RDBA
846 004222 062700 000004      ADD      #4,R0
847 004226 010067 031174      MOV      R0,RDCRC    ;GENERATE RDCRC
848 004232 016767 031210      MOV      RCVVEC,RCVEC ;GENERATE RCVEC
849 004240 000207              RTS      PC           ;RETURN.
850
851
852          ;DEVICE TEST TRAP HANDLER
853
854 004242 012706 002000      DVATST: MOV      #ISP,SP
855 004246              PNTM      INVLAD      ;PRINT NON-EXST ADDR MSG
856 004256 000167 175574      JMP      PROMT      ;RETURN TO ASK ALL AGAIN
857
858
859
860          ;ROUTINE TO CATCH TRAPS TO 4
861
862 004262 011667 031054      ERRTRP: MOV      (SP),TEMP      ;SAVE STACK FOR ADDRESS OF TRAP
863 004266 012737 000340      MOV      #P7,@#PS      ;RAISE PRIORITY
864 004274 012706 002000      MOV      #ISP,SP      ;FIX THE STACK
865 004300              PNTM      TRAP4      ;PRINT "TRAPPED TO 4 " MSG
866 004310 162767 000002      SUB      #2,TEMP
867 004316 016700 031020      MOV      TEMP,R0
868 004322 004767 026200      JSR      PC,OCTPNT
869 004326 000167 176600      JMP      BCONT

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870
871
872           ;STANDARD DELAY SUBROUTINE
873           ;MODIFY LOCATION 'DLCON' TO CHANGE
874           ;DELAY PERIOD.
875
876 004332 012567 030754      DELAY: MOV      (R5)+,DILLY      ;GET DELAY PARAMETER
877 004336 005767 025410      TST      DLCON          ;IS DLCON = 0?
878 004342 001003              BNE      DLWT          ;IF NOT, CARRY ON
879 004344 012767 000001 025400  MOV      #1,DLCON      ;IF SO, MAKE IT = 1
880 004352 016767 025374 030734  DLWT:  MOV      DLCON,DLY      ;GET DELAY CONSTANT
881 004360 005367 030730      DLWT1: DEC      DLY
882 004364 001375              BNE      DLWT1
883 004366 005367 030720      DEC      DILLY
884 004372 001367              BNE      DLWT
885 004374 000205              RTS      R5
886
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888 .SBTTL INITIALIZE TEST
889
890 ;CHECK INITIAL CONDITIONS AFTER A RESET
891
892 004376 000005 XINIT: RESET ;CLEAR ALL
893 004400 017767 030776 025576 MOV @TSBC,BAD ;GET BYTE COUNT REGISTER
894 004406 005067 025574 CLR GOOD
895 004412 005767 025566 TST BAD ;WAS TSBC = 0?
896 004416 001414 BEQ XA1
897 004420 DATERR \N ;ERROR:TSBC NOT CLEARED BY RESET
898 004442 SCOPE XINIT
899 004450 017767 030730 025526 XA1: MOV @TSBA,BAD ;GET BYTE ADDRESS REGISTER
900 004456 005067 025524 CLR GOOD
901 004462 005767 025516 TST BAD ;WAS TSBA = 0?
902 004466 001414 BEQ XA2
903 004470 DATERR \N ;ERROR:TSBA NOT CLEARED BY RESET
904 004512 SCOPE XINIT
905 004520 017767 030662 025456 XA2: MOV @TMMR,BAD ;GET TMMR REGISTER
906 004526 042767 000377 025450 BIC #377,BAD ;MASK OFF ANY ADDR SILO DATA
907 004534 012767 050000 025444 MOV #50000,GOOD ;SET UP GOOD FOR COMPARE
908 004542 026767 025440 025434 CMP GOOD,BAD ;IGNORE BIT 8 WHEN DETERMINING
909 004550 001420 BEQ XA3 ;ERROR
910 004552 022767 050400 025424 CMP #50400,BAD
911 004560 001414 BEQ XA3
912 004562 DATERR \N ;ERROR:TMMR NOT INITIATED BY RESET
913 004604 SCOPE XINIT
914 004612 017767 030560 025364 XA3: MOV @TSR,BAD ;GET TSR REGISTER
915 004620 012767 000400 025360 MOV #400,GOOD ;SET UP GOOD FOR COMPARE
916 004626 026767 025354 025350 XA4: CMP GOOD,BAD
917 004634 001414 BEQ XA5
918 004636 DATERR \N ;ERROR:TSR NOT INITIALIZED BY RESET
919 004660 SCOPE XINIT
920 004666 017767 030502 025310 XA5: MOV @TCR,BAD ;GET TCR REGISTER
921 004674 005067 025306 CLR GOOD
922 004700 005767 025300 TST BAD ;WAS TCR = 0?
923 004704 001414 BEQ XA6
924 004706 DATERR \N ;ERROR:TCR NOT CLR'D BY RESET
925 004730 SCOPE XINIT
926 004736 017767 030450 025240 XA6: MOV @TSCRC,BAD
927 004744 005067 025236 CLR GOOD ;CHECK CRC REGISTER
928 004750 005767 025230 TST BAD ;WAS IT 0?
929 004754 001414 BEQ XA7 ;YES,CONTINUE
930 004756 DATERR \N ;ERROR:TSCRC NOT CLEARED BY RESET
931 005000 SCOPE XINIT
932 005006 004767 024342 XA7: JSR PC,MONIT
933 005012 032777 010000 024730 BIT #B12,@SR ;CHECK EXIT SW (SW 12)
934 005020 001402 BEQ XART
935 005022 000167 177350 JMP XINIT ;IF SET, STAY IN THIS TEST
936 005026 000207 XART: RTS PC
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938          .SBTTL TCR TEST
939
940          ;TRANSMITTER COMMAND REGISTER TEST
941
942 005030 005077 030340 TCRST: CLR @TCR ;CLEAR TCR REG
943 005034 012767 017400 025144 XD1: MOV #17400,GOOD ;SET ALL DEST. CODE BITS
944 005042 016777 025140 030324 MOV GOOD,@TCR
945 005050 017767 030320 025126 MOV @TCR,BAD ;AND READ THEM BACK
946 005056 026767 025124 025120 CMP GOOD,BAD ;ALL DEST CODE BITS SET?
947 005064 001414 BEQ XD2
948 005066 DATERR \N ;ERROR:CANNOT SET SOME DEST. CODE BITS
949 005110 SCOPE XD1
950 005116 005067 025064 XD2: CLR GOOD ;NOW CLR DEST. CODE BITS AFTER
951 005122 005077 030246 CLR @TCR ;SETTING THEM
952 005126 017767 030242 025050 MOV @TCR,BAD ;READ THEM BACK
953 005134 042767 160377 025042 BIC #160377,BAD ;IGNORE ALL BUT DEST. CODE BITS
954 005142 026767 025040 025034 CMP GOOD,BAD ;ALL CLEAR?
955 005150 001414 BEQ XD3
956 005152 DATERR \N ;ERROR:CANNOT CLR SOME DEST.CODE BITS
957 005174 SCOPE XD2
958 005202 005077 030166 XD3: CLR @TCR
959 005206 005077 030164 CLR @TSR ;CLEAR POSSIBLE TIMEOUT
960 005212 012767 120365 024766 MOV #120365,GOOD ;SET ST TXM,INH ADR INC,EA 16&17,
961 005220 016777 024762 030146 MOV GOOD,@TCR ;IE,RD SILO,SND WD,&RIB
962 005226 017767 030142 024750 MOV @TCR,BAD ;SEE IF THEY ALL SET
963 005234 026767 024746 024742 CMP GOOD,BAD
964 005242 001414 BEQ XD4
965 005244 DATERR \N ;ERROR:BAD BITS IN TCR
966 005266 SCOPE XD3
967 005274 012777 137765 030072 XD4: MOV #137765,@TCR ;SET ALL SETTABLE BITS IN TCR
968 005302 012777 177777 030072 MOV #-1,@TSBC ;AND IN TSBC
969 005310 012777 177777 030066 MOV #-1,@TSBA ;AND IN TSBA
970 005316 012777 037240 030052 MOV #37240,@TSR ;AND IN TSR
971 005324 052777 000002 030042 BIS #2,@TCR ;B O A R D I N I T
972 005332 017767 030036 024644 MOV @TCR,BAD ;CHK TCR
973 005340 005067 024642 CLR GOOD
974 005344 026767 024636 024632 CMP GOOD,BAD ;TCR = 0?
975 005352 001414 BEQ XD5
976 005354 DATERR \N ;ERROR:TCR NOT CLR'D BY BOARD INIT
977 005376 SCOPE XD4
978 005404 017767 027772 024572 XD5: MOV @TSBC,BAD ;CHECK TSBC
979 005412 026767 024570 024564 CMP GOOD,BAD ;TSBC = 0?
980 005420 001414 BEQ XD6
981 005422 DATERR \N ;ERROR:TSBC NOT CLR'D BY BD INIT
982 005444 SCOPE XD4
983 005452 017767 027726 024524 XD6: MOV @TSBA,BAD ;TSBA = 0?
984 005460 026767 024522 024516 CMP GOOD,BAD
985 005466 001414 BEQ XD7
986 005470 DATERR \N ;ERROR:TSBA NOT CLR'D BY BD INIT
987 005512 SCOPE XD4
988 005520 017767 027652 024456 XD7: MOV @TSR,BAD ;TSR OK?
989 005526 012767 000400 024452 MOV #400,GOOD
990 005534 026767 024446 024442 XD8: CMP GOOD,BAD
991 005542 001414 BEQ XD9
992 005544 DATERR \N ;ERROR:TSR BAD AFTER BD INIT
993 005566 SCOPE XD4

```

994	005574	004767	023554		XD9:	JSR	PC,MONIT
995	005600	032777	010000	024142		BIT	#B12,@SR
996	005606	001402				BEQ	XDRT
997	005610	000167	177214			JMP	TCRTST
998	005614	000207			XDRT:	RTS	PC

;LEAVE IF SW 12 = 0
;OTHERWISE, MUST STAY

```
1000 .SBTTL TSBC TEST
1001
1002 ;BYTE COUNT REG. DATA TEST
1003
1004 005616 BCTST: BDINIT XMTR ;INIT XMTR MODULE
1005 005624 012767 177777 027474 MOV #-1,PAT ;SET PATTERN
1006 005632 012767 000001 027470 MOV #B00,MASK ;SET BIT MASK
1007 005640 016767 027462 024340 XB1: MOV PAT,GOOD ;LOAD 'GOOD' WITH PATTERN
1008 005646 016777 024334 027526 MOV GOOD,@TSBC ;LOAD PATTERN INTO TSBC
1009 005654 017767 027522 024322 MOV @TSBC,BAD ;READ TSBC
1010 005662 026767 024320 024314 CMP GOOD,BAD
1011 005670 001414 BEQ XB2
1012 005672 DATERR \N ;ERROR:BAD DATA IN TSBC
1013 005714 SCOPE XB1
1014 005722 032767 100000 027376 XB2: BIT #B15,PAT ;DONE WHOLE REGISTER?
1015 005730 001407 BEQ XB3 ;IF YES, DONE
1016 005732 046767 027372 027366 BIC MASK,PAT ;NO, PREPARE FOR NEXT BIT
1017 005740 006367 027364 ASL MASK ;ROTATE MASK
1018 005744 000167 177670 JMP XB1 ;AND CONTINUE
1019 005750 004767 023400 XB3: JSR PC,MONIT
1020 005754 032777 010000 023766 BIT #B12,@SR ;IF SO, CONSIDER LEAVING
1021 005762 001402 BEQ XBRT ;EXIT IF SW 12 = 0
1022 005764 000167 177626 JMP BCTST ;STAY HERE IF SW 12 = 1
1023 005770 000207 XBRT: RTS PC
```

```
1025 .SBTTL TSBA TEST
1026
1027 ;BYTE ADDRESS REGISTER TEST
1028
1029 005772 BATST: BDINIT XMTR ;INIT XMTR MODULE
1030 006000 012767 177777 027320 MOV #-1,PAT ;SET PATTERN
1031 006006 012767 000001 027314 MOV #B00,MASK ;SET BIT MASK
1032 006014 016767 027306 024164 XC1: MOV PAT,GOOD ;LOAD 'GOOD' WITH PATTERN
1033 006022 016777 024160 027354 MOV GOOD,@TSBA ;LOAD PATTERN INTO TSBA
1034 006030 017767 027350 024146 MOV @TSBA,BAD ;READ IT BACK
1035 006036 026767 024144 024140 CMP GOOD,BAD
1036 006044 001414 BEQ XC2
1037 006046 DATERR \N ;ERROR:BAD DATA IN TSBA
1038 006070 SCOPE XC1
1039 006076 032767 100000 027222 XC2: BIT #B15,PAT ;DONE WHOLE REGISTER?
1040 006104 001407 BEQ XC3 ;IF YES, DONE
1041 006106 046767 027216 027212 BIC MASK,PAT ;NO,PREPARE FOR NEXT BIT
1042 006114 006367 027210 ASL MASK ;ROTATE MASK
1043 006120 000167 177670 JMP XC1 ;AND CONTINUE
1044 006124 004767 023224 XC3: JSR PC,MONIT
1045 006130 032777 010000 023612 BIT #B12,@SR ;IF SO, CONSIDER LEAVING
1046 006136 001402 BEQ XCRT ;EXIT IF SW 12 = 0
1047 006140 000167 177626 JMP BATST ;STAY HERE IF SW 12 = 1
1048 006144 000207 XCRT: RTS PC
```

```
1050 .SBTTL MASTER SECTION TEST
1051
1052 ;TEST MASTER CONTROL AND ADDRESS SILO
1053
1054 006146 MSRTST: BDINIT XMTR ;INIT BOADR
1055 006154 112777 000001 027226 MOVB #1,@TMMRH ;SET MASTER FLOP
1056 006162 132777 000001 027220 BITB #1,@TMMRH ;IS MASTER SET?
1057 006170 001014 BNE XE1
1058 006172 ERROR \N ;ERROR:COULD NOT SET MASTER FLOP
1059 006214 SCOPE MSRTST
1060 006222 004767 023126 XE1: JSR PC,MONIT
1061 006226 032777 001000 023514 BIT #B09,@SR ;CHECK SW 09
1062 006234 001024 BNE XE3 ;IF ON, SKIP SCOPE LOOP
1063 006236 012767 177777 027054 MOV #-1,PNTFLG ;SET PRINT ALLOW FLAG
1064 006244 PNTM SCSEC ;OTHERWISE PRINT 'SCOPE SECTION..ETC'
1065 006254 005067 027040 CLR PNTFLG ;CLEAR PRINT ALLOW FLAG
1066 006260 005767 027032 TST SWRFLG ;REAL SW REG?
1067 006264 001402 BEQ XE2 ;YES, SKIP
1068 006266 004767 023114 JSR PC,SWDMP
1069 006272 004767 023056 XE2: JSR PC,MONIT
1070 006276 032777 001000 023444 BIT #B09,@SR ;KEEP AN EYE ON SW 09
1071 006304 001772 BEQ XE2 ;STAY HERE 'TILL IT GETS SET
1072 006306 142777 000001 027074 XE3: BICB #1,@TMMRH ;CLR MASTER FLOP
1073 006314 132777 000001 027066 BITB #1,@TMMRH ;IS MASTER CLEAR?
1074 006322 001414 BEQ XE3A
1075 006324 ERROR \N ;ERROR:COULD NOT CLR MASTER FLOP
1076 006346 SCOPE XE3
1077 006354 152777 000004 027026 XE3A: BISB #4,@TMMRH ;SET 'NOW MASTER' FLOP
1078 006362 132777 000004 027020 BITB #4,@TMMRH ;IS IT SET?
1079 006370 001014 BNE XE3B ;YES, GO TO CLEAR IT
1080 006372 ERROR \N ;ERROR:COULD NOT SET 'NOW MASTER FLOP
1081 006414 SCOPE XE3A
1082 006422 142777 000004 026760 XE3B: BICB #4,@TMMRH ;OKAY, NOW CLEAR 'NOW MASTER'
1083 006430 132777 000004 026752 BITB #4,@TMMRH ;IS IT CLEAR?
1084 006436 001414 BEQ XE5A ;YES, OKAY.
1085 006440 ERROR \N ;ERROR:COULD NOT CLEAR 'NOW MASTER'
1086 006462 SCOPE XE3B
1087 006470 112777 000002 026712 XE5A: MOVB #2,@TMMRH ;SET SECONDARY FLOP
1088 006476 132777 000001 026704 BITB #1,@TMMRH ;IS MASTER SET?
1089 006504 001017 BNE XE6
1090 006506 142777 000002 026674 BICB #2,@TMMRH ;CLR SEC FOR RE-TRY
1091 006514 ERROR \N ;ERROR:SETTING SEC DID NOT SET MASTER
1092 006536 SCOPE XE5A
1093 006544 132777 000002 026636 XE6: BITB #2,@TMMRH ;IS SEC CLR?
1094 006552 001417 BEQ XE6A
1095 006554 142777 000002 026626 BICB #2,@TMMRH ;CLR SEC FOR RETRY
1096 006562 ERROR \N ;ERROR:SEC NOT CLR'D BY THE SETTING OF MASTER
1097 006604 SCOPE XE5A
1098 006612 132777 000004 026570 XE6A: BITB #4,@TMMRH ;IS 'NOW MASTER '' SET?
1099 006620 001017 BNE XE7 ;YES, OKAY
1100 006622 142777 000002 026560 BICB #2,@TMMRH ;CLR SEC FOR RETRY.
1101 006630 ERROR \N ;ERROR:'NOW MASTER' NOT SET VIA SECONDARY
1102 006652 SCOPE XE5A
```

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1104 ;ADDRESS SILO TEST
1105
1106 006660 152777 000060 026522 XE7: BISB #60,@TMMRH ;SET AUT ADR TO LD SILO &CLR SILO
1107 006666 132777 000020 026514 BITB #20,@TMMRH ;IS AUT ADR SET?
1108 006674 001014 BNE XE7A
1109 006676 ERROR \N ;ERROR:COULD NOT SET TMMR BIT 12
1110 006720 SCOPE XE7
1111 006726 132777 000200 026454 XE7A: BITB #200,@TMMRH ;CHECK FOR OUTPUT RDY
1112 006734 001414 BEQ XE8
1113 006736 ERROR \N ;ERROR:TMMR BIT 13 DOES NOT CLR ADDR SILO
1114 006760 SCOPE XE7
1115 006766 012704 177700 XE8: MOV #-64.,R4 ;R4 IS COUNTER
1116 006772 005003 CLR R3 ;R3 IS DATA
1117 006774 132777 000100 026406 BITB #100,@TMMRH ;ADR SILO INPUT RDY?
1118 007002 001014 BNE XE9
1119 007004 ERROR \N ;ERROR:ADR SILO INPUT NOT RDY
1120 007026 SCOPE XE8
1121 007034 110377 026346 XE9: MOVB R3,@TMMR ;LOAD ADDR SILO
1122 007040 005203 INC R3
1123 007042 005204 INC R4
1124 007044 001420 BEQ XE11
1125 007046 132777 000100 026334 XE10: BITB #100,@TMMRH ;INPUT READY?
1126 007054 001367 BNE XE9
1127 007056 ERROR \N ;ERROR:INPUT NOT RDY-PREMATURLY FULL?
1128 007100 SCOPE XE7
1129 007106 132777 000100 026274 XE11: BITB #100,@TMMRH ;SILO SHOULD BE FULL NOW
1130 007114 001414 BEQ XE12 ;INPUT READY?
1131 007116 ERROR \N ;ERROR:SILO FULL-BUT STILL RDY FOR INPUT
1132 007140 SCOPE XE7
1133 007146 132777 000200 026234 XE12: BITB #200,@TMMRH ;SILO OUTPUT RDY?
1134 007154 001014 BNE XE13
1135 007156 ERROR \N ;ERROR:FULL SILO NOT RDY FOR OUTPUT
1136 007200 SCOPE XE7
1137 007206 005003 XE13: CLR R3 ;R3 IS FOR DATA COMPARE
1138 007210 012704 177700 MOV #-64.,R4 ;R4 IS COUNTER
1139 007214 052777 000200 026152 XE14: BIS #B07,@TCR ;SET RD SILO
1140 007222 117767 026160 022754 MOVB @TMMR,BAD ;READ WORD FROM ADDRESS SILO
1141 007230 005077 026140 CLR @TCR ;CLEAR RD SILO BIT
1142 007234 042767 177400 022742 BIC #177400,BAD ;ONLY INTERESTED IN LOW BYTE
1143 007242 010367 022740 MOV R3,GOOD
1144 007246 026767 022734 022730 XE15: CMP GOOD,BAD ;SILO OUTPUT OK?
1145 007254 001414 BEQ XE16
1146 007256 DATERR \N ;ERROR:BAD DATA READ FROM ADDR SILO
1147 007300 SCOPE XE7
1148 007306 005203 XE16: INC R3
1149 007310 042703 177740 BIC #177740,R3 ;KEEP R3 DOWN TO 5 BITS
1150 007314 005204 INC R4
1151 007316 001420 BEQ XE18
1152 007320 132777 000200 026062 XE17: BITB #200,@TMMRH ;AFTER 64 WDS, EXIT
1153 007326 001332 BNE XE14 ;SILO OUTPUT READY?
1154 007330 ERROR \N ;ERROR:SILO OUT NOT RDY-SILO NOT EMPTY
1155 007352 SCOPE XE7
1156 007360 132777 000200 026022 XE18: BITB #200,@TMMRH ;SILO OUT RDY AFTER 64 READS?
1157 007366 001414 BEQ XE19
1158 007370 ERROR \N ;ERROR:EMPTY SILO READY FOR OUTPUT
1159 007412 SCOPE XE7

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1160	007420	005077	025750		XE19:	CLR	@TCR		;CLR RD SILO
1161	007424	112777	000000	025754		MOVB	#0,@TMMR		;LOAD A WORD INTO SILO
1162	007432	004567	174674			JSR	R5,DELAY		;WAIT FOR MIGRATION
1163	007436	000010				.WORD	10		
1164	007440	132777	000200	025742		BITB	#200,@TMMRH		;CHECK OUT RDY AFTER DELAY
1165	007446	001022				BNE	XE20		
1166	007450					ERROR	\N		;ERROR:SILO SETTLING TIME TOO LONG
1167	007472	052777	000200	025674		BIS	#B07,@TCR		;SET RD SILO BIT
1168	007500	117767	025702	022476		MOVB	@TMMR,BAD		;GET RID OF THE WORD IN SILO
1169	007506					SCOPE	XE19		
1170	007514	152777	000041	025666	XE20:	BISB	#41,@TMMRH		;SET 'CLR SILO' BIT & SET MASTER
1171	007522	132777	000200	025660		BITB	#200,@TMMRH		;SILO RDY?
1172	007530	001414				BEQ	XE21		
1173	007532					ERROR	\N		;ERROR:BIT 13 OF TMMR DID NOT CLR ADR SILO
1174	007554					SCOPE	XE20		
1175	007562	112777	000037	025616	XE21:	MOVB	#37,@TMMR		;LOAD SILO WITH TEST WORD
1176	007570	132777	000200	025612	XE22:	BITB	#200,@TMMRH		;SILO OUT RDY?
1177	007576	001774				BEQ	XE22		;WAIT FOR IT
1178	007600	142777	000020	025602	XE22A:	BICB	#20,@TMMRH		;CLR AUT ADR
1179	007606	016704	022140			MOV	DLCON,R4		
1180	007612	012703	177000		XE22B:	MOV	#177000,R3		;SET UP FOR ABOUT SMS DELAY
1181	007616	132777	000200	025564	XE23:	BITB	#200,@TMMRH		;OUTPUT RDY?
1182	007624	001420				BEQ	XE24		;IF NO - CARRY ON
1183	007626	005203				INC	R3		;WAITED SMS?
1184	007630	001372				BNE	XE23		;NOT YET
1185	007632	005304				DEC	R4		
1186	007634	001366				BNE	XE22B		
1187	007636					ERROR	\N		;ERROR:ADDRESS SILO IS NOT CYCLING
1188	007660					SCOPE	XE22A		
1189	007666	142777	000001	025514	XE24:	BICB	#1,@TMMRH		;CLEAR MASTER FOR SYNC.
1190	007674	004567	174432			JSR	R5,DELAY		
1191	007700	000010				.WORD	10		
1192	007702	132777	000200	025500		BITB	#200,@TMMRH		;OUTPUT READY
1193	007710	001014				BNE	XE25		
1194	007712					ERROR	\N		;ERROR:CYCLED WORD WAS LOST-OUT NOT RDY
1195	007734					SCOPE	XE20		
1196	007742	004567	174364		XE25:	JSR	R5,DELAY		
1197	007746	000010				.WORD	10		
1198	007750	152777	000021	025432		BISB	#21,@TMMRH		;SET AUTO ADDR & MASTER
1199	007756	052777	000200	025410		BIS	#B07,@TCR		;SET RD SILO
1200	007764	117767	025416	022212		MOVB	@TMMR,BAD		;CHECK VALIDITY OF OUTPUT
1201	007772	042767	177400	022204		BIC	#177400,BAD		;ONLY INTERESTED IN LOW BYTE
1202	010000	012767	000037	022200		MOV	#37,GOOD		
1203	010006	026767	022174	022170		CMP	GOOD,BAD		;OUTPUT SHOULD BE 37
1204	010014	001417				BEQ	XE26		
1205	010016					DATERR	\N		;ERROR:CYCLED WORD IS BAD DATA
1206	010040	042777	000200	025326		BIC	#B07,@TCR		;CLR RD SILO BIT FOR SCOPE
1207	010046					SCOPE	XE20		
1208	010054	004567	174252		XE26:	JSR	R5,DELAY		;WAIT ANOTHER SETTLING TIME
1209	010060	000010				.WORD	10		
1210	010062	132777	000200	025320		BITB	#200,@TMMRH		;IS SILO OUT RDY (SHOULDN'T BE)?
1211	010070	001417				BEQ	XE27		;NO, LEAVE
1212	010072					ERROR	\N		;ERROR:EXTRA WORD FOUND IN SILO
1213	010114	042777	000200	025252		BIC	#B07,@TCR		;CLR RD SILO
1214	010122					SCOPE	XE20		
1215	010130	152777	000060	025252	XE27:	BISB	#60,@TMMRH		;SET AUTO ADDRESS & CLR ADDR SILO

1216	010136	005077	025232		CLR	@TCR		:CLEAR RD SILO
1217	010142	004767	021206		JSR	PC,MONIT		
1218	010146	032777	010000	021574	BIT	#B12,@SR		:OK TO EXIT IF SW 12 = 0
1219	010154	001402			BEQ	XERT		
1220	010156	000167	175764		JMP	MSRTST		:OTHERWISE, STAY HERE
1221	010162	000207			XERT:	RTS	PC	


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1223          .SBTTL DATA SILO TEST
1224
1225          ;TRANSMITTER DATA SILO TEST
1226
1227 010164      SILTST: BDINIT  XMTR          ;CLEAR BOARD
1228 010172      JSR          R5,DELAY
1229 010176      .WORD        10
1230 010200      004567 174134      BIT          #B03,@TCR          ;SILO OUTPUT READY?
1231 010206      000010      BEQ          XF1
1232 010210      032777 000010 025166  ERROR        \N          ;ERROR:BD INIT DID NOT CLEAR DATA SILO
1233 010232      SCOPE        SILTST
1234 010240      004567 174134      BIT          #B08,@TSR          ;SILO INPUT READY?
1235 010246      000010      BNE          XF2
1236 010250      032777 000400 025130  ERROR        \N          ;ERROR:BD INIT DID NOT SET INPUT READY
1237 010272      SCOPE        SILTST
1238 010300      012777 177777 025072  XF2:  MOV          #-1,@TSDB        ;LOAD 177777 INTO DATA SILO
1239 010306      004567 174020      JSR          R5,DELAY
1240 010312      .WORD        10
1241 010314      032777 000010 025052  BIT          #B03,@TCR          ;SILO OUTPUT READY?
1242 010322      001017      BNE          XF3
1243 010324      ERROR        \N          ;ERROR:NO SILO OUTPUT 37 US. AFTER LOAD
1244 010346      BDINIT      XMTR          ;CLEAR SILO
1245 010354      SCOPE        XF2
1246 010362      017767 025012 021614  XF3:  MOV          @TSDB,BAD        ;READ WORD FROM SILO
1247 010370      012767 177777 021610  MOV          #-1,GOOD
1248 010376      026767 021604 021600  CMP          GOOD,BAD          ;SILO OUTPUT = 177777
1249 010404      001417      BEQ          XF3A
1250 010406      DATERR      \N          ;ERROR:DROPPED BITS IN DATA SILO
1251 010430      BDINIT      XMTR          ;CLEAR SILO
1252 010436      SCOPE        XF2
1253 010444      052777 000200 024722  XF3A:  BIS          #B07,@TCR        ;SET RD SILO BIT IN TCR
1254 010452      017703 024722      MOV          @TSDB,R3          ;POP WORD FROM SILO
1255 010456      032777 000010 024710  BIT          #B03,@TCR        ;SILO OUTPUT READY?
1256 010464      001414      BEQ          XF5
1257 010466      ERROR        \N          ;ERROR:WORD DID NOT GET POPPED FROM SILO
1258 010510      SCOPE        XF3
1259 010516      032777 000400 024652  XF5:  BIT          #B08,@TSR        ;IS INPUT READY?
1260 010524      001014      BNE          XF6
1261 010526      ERROR        \N          ;ERROR:DATA SILO INPUT NOT READY
1262 010550      SCOPE        XF5
1263 010556      042777 000200 024610  XF6:  BIC          #B07,@TCR        ;CLEAR RD SILO BIT
1264 010564      005077 024610      CLR          @TSDB            ;LOAD 0'S INTO SILO
1265 010570      032777 000010 024576  XF6A:  BIT          #B03,@TCR        ;OUTPUT RDY?
1266 010576      001774      BEQ          XF6A            ;WAIT FOR IT
1267 010600      017767 024574 021376  MOV          @TSDB,BAD        ;READ OUTPUT OF SILO
1268 010606      005067 021374      CLR          GOOD
1269 010612      026767 021370 021364  CMP          GOOD,BAD          ;OUTPUT = 0?
1270 010620      001417      BEQ          XF7
1271 010622      DATERR      \N          ;ERROR:BITS PICKED UP IN DATA SILO
1272 010644      BDINIT      XMTR          ;CLR SILO
1273 010652      SCOPE        XF6
1274 010660      012777 177600 024506  XF7:  BDINIT      XMTR          ;CLR XMITTER BOARD
1275 010666      012777 033026 024502  MOV          #-128,@TSBC      ;SET BYTE COUNT TO -128
1276 010674      052777 040000 024464  MOV          #SILDAT,@TSBA    ;POINT DEVICE AT CORE BUFFER
1277 010702      032777 040000 024456  BIS          #B14,@TCR        ;SET TX NPR
1278 010710      032777 040000 024456  BIT          #B14,@TCR        ;IS TX NPR SET?
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1279	010716	001014				BNE	XF8		
1280	010720					ERROR	\N		;ERROR:CANNOT SET TX NPR
1281	010742					SCOPE	XF7		
1282	010750	016704	020776		XF8:	MOV	DLCON,R4		
1283	010754	012703	177500		XF8A:	MOV	#177500,R3		;SET UP 2 MS DELAY
1284	010760	005777	024416		XF9:	TST	@TSBC		;IS BYTE COUNT 0?
1285	010764	001420				BEQ	XF10		
1286	010766	005203				INC	R3		;WAITED 2 MS?
1287	010770	001373				BNE	XF9		;NO, KEEP LOOKING
1288	010772	005304				DEC	R4		
1289	010774	001367				BNE	XF8A		
1290	010776					ERROR	\N		;ERROR: NPR NOT COMPLETE AFTER 2 MS
1291	011020					SCOPE	XF7		
1292	011026	032777	000400	024342	XF10:	BIT	#B08,@TSR		;INPUT READY?
1293	011034	001414				BEQ	XF11		
1294	011036					ERROR	\N		;ERROR:SILO FULL BUT INPUT RDY SET
1295	011060					SCOPE	XF10		
1296	011066	032777	000010	024300	XF11:	BIT	#B03,@TCR		;OUTPUT READY?
1297	011074	001014				BNE	XF12		
1298	011076					ERROR	\N		;ERROR:FULL SILO NOT RDY FOR OUTPUT
1299	011120					SCOPE	XF11		
1300	011126	052777	000200	024240	XF12:	BIS	#B07,@TCR		;SET RD SILO BIT
1301	011134	012704	033026			MOV	#SILDAT,R4		;R4 IS DATA POINTER
1302	011140	012703	177700			MOV	#-64.,R3		;R3 IS COUNTER
1303	011144	017767	024230	021032	XF13:	MOV	@TSDB,BAD		;POP WORD FROM SILO TO 'BAD'
1304	011152	012467	021030			MOV	(R4)+,GOOD		;AND POP A WORD FROM BUFFER
1305	011156	026767	021024	021020		CMP	GOOD,BAD		;DATA OK?
1306	011164	001422				BEQ	XF14		
1307	011166					DATERR	\N		;ERROR:DATA FROM SILO IS WRONG
1308	011210	042777	000200	024156		BIC	#B07,@TCR		;CLR RD SILO BIT
1309	011216					SCOPE	XF7		;GO TO RE-FILL SILO FOR RE-TRY
1310	011224	052777	000200	024142		BIS	#B07,@TCR		;RE-SET RD SILO BIT
1311	011232	005203			XF14:	INC	R3		;ALL DONE?
1312	011234	001343				BNE	XF13		;IF NOT, POP ANOTHER WORD
1313	011236				XF17:	BDINIT	XMTR		;CLEAR THE BOARD
1314	011244	012777	177774	024130		MOV	#-4,@TSBC		;SET BYTE COUNT TO -4
1315	011252	012777	033026	024124		MOV	#SILDAT,@TSBA		;POINT NPR TO DATA BUFFER
1316	011260	012767	033026	020720		MOV	#SILDAT,GOOD		
1317	011266	052777	040004	024100		BIS	#40004,@TCR		;SET TX NPR AND INH ADR INC
1318	011274	005777	024102		XF18:	TST	@TSBC		;WAIT FOR NPR TO FINISH
1319	011300	001375				BNE	XF18		
1320	011302	017767	024076	020674		MOV	@TSBA,BAD		;READ BYTE ADDRESS
1321	011310	026767	020672	020666		CMP	GOOD,BAD		;HAS IT CHANGED?
1322	011316	001417				BEQ	XF19		
1323	011320					DATERR	\N		;ERROR:TSBA SHD NOT CHANGE WITH INH ADR INC SET
1324	011342					BDINIT	XMTR		
1325	011350					SCOPE	XF17		

.SBTTL DATA SILO BLOCK COUNTER TEST

```

1327
1328
1329
1330
1331
1332
1333 011356
1334 011364 142777 000001 024016
1335 011372 004767 000136
1336 011376 012702 000100
1337 011402 004767 000176
1338 011406 004767 000122
1339 011412 012702 000020
1340 011416 004767 000162
1341 011422 004767 000106
1342 011426 012702 000060
1343 011432 004767 000146
1344
1345
1346 011436 032777 000010 023730
1347 011444 001414
1348 011446
1349 011470
1350 011476
1351 011504 152777 000020 023676
1352 011512 004767 017636
1353 011516 032777 010000 020224
1354 011524 001402
1355 011526 000167 176432
1356 011532 000207
1357
1358
1359
1360 011534 012777 177600 023640
1361 011542 012777 033026 023634
1362 011550 052777 040000 023616
1363 011556 016704 020170
1364 011562 012703 175000
1365 011566 005203
1366 011570 001376
1367 011572 005304
1368 011574 001372
1369 011576 005077 023572
1370 011602 000207
1371
1372
1373
1374 011604 052777 000200 023562
1375 011612 010203
1376 011614 017767 023560 020362
1377 011622 005303
1378 011624 001373
1379 011626 042777 000200 023540
1380 011634 000207

```

```

:THIS TESTS THAT, AFTER PULLING 200 (OCTAL) WORDS THRU THE SILO
:THE BLOCK COUNTER COUNTS THE 200 WORDS AND HOLDS SILO OUTPUT READY
:IN A FALSE STATE.

XF19:  BDINIT  XMTR          ;CLEAR THE BOARD
      BICB    #B00,@TMMRH   ;CLEAR MASTER FOR THIS TEST
      JSR    PC,XFSR        ;FILL THE DATA SILO
      MOV    #64,R2
      JSR    PC,XFEMT       ;POP ALL 64 WORDS OUT
      JSR    PC,XFSR        ;FILL SILO AGAIN
      MOV    #20,R2
      JSR    PC,XFEMT       ;POP 20 (OCTAL) WORDS OUT
      JSR    PC,XFSR        ;FILL SILO AGAIN
      MOV    #60,R2
      JSR    PC,XFEMT       ;POP 60 (OCTAL) WORDS OUT
                          ; LEAVING 20 (OCTAL) IN SILO
                          ; AND HAVING PULLED OUT 200 TOTAL (OCTAL)
                          ;NOW CHECK OUTPUT READY
                          ;IF IT'S CLEAR, OKAY
      BIT    #B03,@TCR
      BEQ    XF19A
      ERROR  \N              ;ERROR:OUTPUT RDY AFTER 200 WORD BLOCK
      SCOPE  XF19
XF19A: BDINIT  XMTR          ;CLEAN UP.
XF20:  BISB    #20,@TMMRH   ;SET AUT ADR
      JSR    PC,MONIT
      BIT    #B12,@SR
      BEQ    XFRT
      JMP    SILTST
XFRT:  RTS    PC

```

```

;ROUTINE TO FILL DATA SILO VIA NPR
XF SR:  MOV    #-128,@TSBC   ;SET BYTE COUNT FOR FILL-UP
      MOV    #SILDAT,@TSBA  ;POINT DEVICE AT CORE BUFFER
      BIS    #B14,@TCR     ;START NPR
      MOV    DLCON,R4
XF SR1: MOV    #175000,R3    ;SET UP TO WAIT FOR CMPL
XF SRW: INC    R3
      BNE    XF SRW        ;WAIT FOR NPR COMPLETION
      DEC    R4
      BNE    XF SR1
      CLR    @TCR         ;CLEAR TXNPR
      RTS    PC           ;RETURN WITH SILO FULL

```

```

;ROUTINE TO POP (R2) NUMBER OF WORDS FROM DATA SILO
XFEMT:  BIS    #B07,@TCR    ;SET RD SILO
      MOV    R2,R3
XFMTW:  MOV    @TSDB,BAD    ;POP A WORD OUT
      DEC    R3            ;KEEP TRACK OF # OF WORDS
      BNE    XFMTW
      BIC    #B07,@TCR     ;LEAVE WITH RD SILO CLEAR
      RTS    PC

```

```

1382          .SBTTL TSRTST
1383
1384          ;STATUS REGISTER AND ERRORS TEST
1385
1386 011636    TSRTST: BDINIT XMTR          ;CLR BOARD
1387 011644    052777 000200 023524    BIS      #B07,@TSR          ;SET SUCC XFER
1388 011652    032777 000200 023516    BIT      #B07,@TSR          ;IS IT SET?
1389 011660    001014    BNE      XH1
1390 011662    ERROR    \N          ;ERROR:CANNOT SET TSR BIT 07
1391 011704    SCOPE    TSRTST
1392 011712    042777 000200 023456    XH1: BIC      #B07,@TSR          ;CLR SUCC XFER
1393 011720    032777 000200 023450    BIT      #B07,@TSR          ;IS IT CLR?
1394 011726    001414    BEQ      XH2
1395 011730    ERROR    \N          ;ERROR:CANNOT CLR SUCC XFR
1396 011752    SCOPE    XH1
1397 011760    XH2: BDINIT XMTR          ;CLEAR BOARD
1398 011766    012777 177777 023404    MOV      #-1,@TSDB          ;LOAD WORD INTO SILO
1399 011774    032777 000010 023372    BIT      #B03,@TCR          ;OUTPUT READY?
1400 012002    001774    BEQ      -6          ;WAIT FOR WORD TO HIT BOTTOM
1401 012004    152777 000001 023376    BISB    #1,@TMMRH          ;SET MASTER FOR TIME SLICES
1402 012012    012777 120000 023354    MOV      #120000,@TCR       ;SET RIB AND SND WD
1403 012020    016704 017726    MOV      DLCON,R4
1404 012024    012703 177763    XH2B: MOV      #177763,R3          ;SET UP FOR 100 U.S. ALARM
1405 012030    032777 000020 023340    XH2A: BIT      #B04,@TSR          ;TDM BUS BSY SET?
1406 012036    001020    BNE      XH3
1407 012040    005203    INC      R3          ;WAIT 100 US.
1408 012042    001372    BNE      XH2A
1409 012044    005304    DEC      R4
1410 012046    001366    BNE      XH2B
1411 012050    ERROR    \N          ;ERROR:TDM BUS BSY NOT SET
1412 012072    SCOPE    XH2
1413 012100    032777 000100 023270    XH3: BIT      #B06,@TSR          ;IS BUSY SET?
1414 012106    001014    BNE      XH4
1415 012110    ERROR    \N          ;ERROR:BUSY NOT SET WITH SND WD & RIB
1416 012132    SCOPE    XH2
1417 012140    042777 100000 023226    XH4: BIC      #B15,@TCR          ;CLEAR RIB
1418 012146    000240    NOP
1419 012150    032777 020000 023216    BIT      #B13,@TCR          ;WAIT FOR TIME SLICE
1420 012156    001414    BEQ      XH5          ;IS SND WD CLR?
1421 012160    ERROR    \N          ;ERROR:INTR REQ DID NOT CLR SND WD
1422 012202    SCOPE    XH2
1423 012210    032777 000100 023160    XH5: BIT      #B06,@TSR          ;IS BUSY CLR?
1424 012216    001414    BEQ      XH6
1425 012220    ERROR    \N          ;ERROR:SND WD-0 DID NOT CLR BUSY
1426 012242    SCOPE    XH2
1427 012250    005077 023122    XH6: CLR      @TSR          ;CLEAR TSR
1428 012254    052777 120000 023112    BIS      #120000,@TCR       ;SET RIB & SND WD
1429 012262    052777 001000 023106    BIS      #B09,@TSR          ;SET OVERRUN ERR BIT
1430 012270    032777 001000 023100    BIT      #B09,@TSR          ;IS IT SET?
1431 012276    001014    BNE      XH7
1432 012300    ERROR    \N          ;ERROR:CANNOT SET TSR BIT 09
1433 012322    SCOPE    XH6
1434 012330    032777 100000 023040    XH7: BIT      #B15,@TSR          ;IS ERROR BIT SET (BIT 15)
1435 012336    001014    BNE      XH8
1436 012340    ERROR    \N          ;ERROR:OVERRUN DID NOT SET ERROR BIT 15 IN TSR
1437 012362    SCOPE    XH6
  
```

1438	012370	032777	020000	022776	XH8:	BIT	#B13,@TCR		;IS SND WD CLR?
1439	012376	001414				BEQ	XH8A		
1440	012400					ERROR	\N		;ERROR:TSR BIT 15 DID NOT CAUSE INTR REQ
1441	012422					SCOPE	XH6		
1442	012430				XH8A:	BDINIT	XMTR		;CLEAR ALL IN XMTR
1443	012436	012777	000000	022734		MOV	#0,@TSDB		;LOAD A WORD INTO SILO
1444	012444	032777	001000	022724		BIT	#B09,@TSR		;IS OVERRUN SET??
1445	012452	001414				BEQ	XH9		
1446	012454					ERROR	\N		;ERROR:LOADING EMPTY SILO GIVES OVERRUN ERROR!
1447	012476					SCOPE	XH8A		
1448	012504	005077	022666		XH9:	CLR	@TSR		
1449	012510	052777	002000	022660		BIS	#B10,@TSR		;SET TIMEOUT BIT IN TSR
1450	012516	032777	002000	022652		BIT	#B10,@TSR		;IS IT SET?
1451	012524	001014				BNE	XH10		
1452	012526					ERROR	\N		;ERROR:CANNOT SET TSR BIT 10
1453	012550					SCOPE	XH9		
1454	012556	032777	100000	022612	XH10:	BIT	#B15,@TSR		;IS ERROR BIT SET?
1455	012564	001014				BNE	XH11		
1456	012566					ERROR	\N		;ERROR:TIMEOUT DID NOT SET TSR BIT 15
1457	012610					SCOPE	XH9		
1458	012616	005077	022554		XH11:	CLR	@TSR		;CLR TSR
1459	012622	052777	004000	022546		BIS	#B11,@TSR		;SET MST DWN
1460	012630	032777	004000	022540		BIT	#B11,@TSR		;IS IT SET?
1461	012636	001014				BNE	XH12		
1462	012640					ERROR	\N		;ERROR:CANNOT SET TSR BIT 11
1463	012662					SCOPE	XH11		
1464	012670	032777	100000	022500	XH12:	BIT	#B15,@TSR		;IS ERROR BIT SET?
1465	012676	001014				BNE	XH13		
1466	012700					ERROR	\N		;ERROR:MST DWN DIDN'T SET TSR BIT 15
1467	012722					SCOPE	XH11		
1468	012730	005077	022442		XH13:	CLR	@TSR		
1469	012734	052777	010000	022434		BIS	#B12,@TSR		;SET TXM ERR
1470	012742	032777	010000	022426		BIT	#B12,@TSR		;IS IT SET?
1471	012750	001014				BNE	XH14		
1472	012752					ERROR	\N		;ERROR:CANNOT SET TSR BIT 12
1473	012774					SCOPE	XH13		
1474	013002	032777	100000	022366	XH14:	BIT	#B15,@TSR		;IS ERROR BIT SET?
1475	013010	001014				BNE	XH15		
1476	013012					ERROR	\N		;ERROR:TXM ERR DIDN'T SET TSR BIT 15
1477	013034					SCOPE	XH13		
1478	013042	005077	022330		XH15:	CLR	@TSR		
1479	013046	052777	020000	022322		BIS	#B13,@TSR		;SET MEM OFL
1480	013054	032777	020000	022314		BIT	#B13,@TSR		;IS IT SET?
1481	013062	001014				BNE	XH16		
1482	013064					ERROR	\N		;ERROR:CANNOT SET TSR BIT 13
1483	013106					SCOPE	XH15		
1484	013114	032777	100000	022254	XH16:	BIT	#B15,@TSR		;IS ERROR BIT SET?
1485	013122	001014				BNE	XH17		
1486	013124					ERROR	\N		;ERROR:MEM OFL DIDN'T SET TSR BIT 15
1487	013146					SCOPE	XH15		

```

1489 ;ERROR GENERATION TESTS
1490
1491 013154 XH17: BDINIT XMTR ;CLEAR BOARD
1492 013162 012777 177774 022212 MOV #-4,@TSBC ;SET UP TO GENERATE NXM ERR
1493 013170 012777 164176 022206 MOV #164176,@TSBA ;LOAD NON-EXST ADDR INTO TSBA
1494 013176 052777 040060 022170 BIS #40060,@TCR ;START NPR AND SET EXT ADD BITS
1495 013204 000240 NOP
1496 013206 000240 NOP
1497 013210 005777 022166 TST @TSBC ;DID BYTE COUNT GO TO 0 ?
1498 013214 001014 BNE XH18
1499 013216 ERROR \N ;ERROR:REPLACE #764176 WITH NON EXST ADDR
1500 013240 SCOPE XH17
1501 013246 032777 040000 022122 XH18: BIT #B14,@TSR ;NOW CHECK NXL ERR BIT
1502 013254 001014 BNE XH19
1503 013256 ERROR \N ;ERROR:NPR TO NON-EXST ADDR DIDN'T SET NXL ERR
1504 013300 SCOPE XH17
1505 013306 032777 100000 022062 XH19: BIT #B15,@TSR ;IS ERROR BIT (15) SET?
1506 013314 001014 BNE XH20
1507 013316 ERROR \N ;ERROR:NXL ERR DIDN'T SET TSR BIT 15
1508 013340 SCOPE XH17
1509 013346 XH20: BDINIT XMTR ;CLEAR BOARD
1510 013354 016777 177774 022016 XH20L: MOV XH20L,@TSDB ;FILL THE SILO WITH GARBAGE
1511 013362 000240 NOP
1512 013364 000240 NOP
1513 013366 032777 000400 022002 BIT #B08,@TSR ;SILO INPUT READY?
1514 013374 001367 BNE XH20L ;IF YES, KEEP LOADING
1515 013376 016777 177752 021774 MOV XH20L,@TSDB ;NO,SILO FULL;LOAD 1 MORE WORD
1516 013404 032777 001000 021764 BIT #B09,@TSR ;IS TSR BIT 9 SET?
1517 013412 001014 BNE XH21
1518 013414 ERROR \N ;ERROR:LOADING FULL SILO DIDN'T SET TSR-09
1519 013436 SCOPE XH20L
1520 013444 XH21: BDINIT XMTR ;CLEAR BOARD
1521 013452 052777 120000 021714 BIS #120000,@TCR ;SET SND WD & RIB
1522 013460 016702 016266 MOV DLCON,R2
1523 013464 005003 XH21A: CLR R3 ;R3 AND R4 ARE COUNTERS
1524 013466 012704 177773 MOV #-5,R4
1525 013472 032777 002000 021676 XH22: BIT #B10,@TSR ;IS TIMEOUT SET?
1526 013500 001022 BNE XH22A
1527 013502 005203 INC R3 ;WATCH IT FOR A SEC
1528 013504 001372 BNE XH22
1529 013506 005204 INC R4
1530 013510 001370 BNE XH22
1531 013512 005302 DEC R2
1532 013514 001363 BNE XH21A
1533 013516 ERROR \N ;ERROR:NO TIMEOUT IN A SECOND
1534 013540 SCOPE XH21
1535 013546 XH22A: BDINIT XMTR ;CLR XMTR
1536 013554 105077 021630 CLRB @TMMRH ;CLEAR MASTER
1537 013560 012777 177777 021612 MOV #-1,@TSDB ;LOAD A WORD INTO XMTR DATA SILO
1538 013566 004567 170540 JSR R5,DELAY ;WAIT FOR MIGRATION
1539 013572 000010 .WORD 10
1540 013574 052777 120000 021572 BIS #120000,@TCR ;SET RIB AND SND WORD
1541 013602 004567 170524 JSR R5,DELAY
1542 013606 000010 .WORD 10
1543 013610 032777 004000 021560 BIT #B11,@TSR ;CHECK FOR MASTER DOWN
1544 013616 001014 BNE XH23 ;ERROR:ATTEMPT TO SEND WORD WITH MASTER CLEAR
    
```

1545 013620
1546 013642
1547 013650
1548 013656 004767 015472
1549 013662 032777 010000 016060
1550 013670 001402
1551 013672 000167 175740
1552 013676 000207

XH23: ERROR \N
SCOPE XH22A
BDINIT XMTR
JSR PC,MONIT
BIT #B12,@SR
BEQ XHRT
JMP TSRTST
XHRT: RTS PC

;DID NOT SET MASTER DOWN

;IS SW 12 = 1?

;IF SO, TRY THIS TEST OVER

```

1554          .SBTTL  INTERRUPT TEST
1555
1556          ;TRANSMITTER INTERRUPT TEST
1557
1558 013700    INTST:  MTPS      #P7          ;DIS-ALLOW INTERRUPT
1559 013706    BDINIT   XMTR          ;CLR THE BOARD
1560 013714    016700    021444    MOV      TXVEC,RO
1561 013720    012760    000340    000002    MOV      #340,2(RO)      ;SET NEW PS = P7
1562 013726    012777    013756    021430    MOV      #ERRINT,@TXVEC ;SET-UP FOR ERROR INTERRUPT
1563 013734    052777    000100    021432    BIS      #B06,@TCR      ;SET INTERRUPT ENABLE
1564 013742    MTPS      #0          ;ALLOW INTERRUPT
1565 013750    000240    NOP
1566 013752    000167    000046    JMP      XJ0            ;SKIP ERROR IF NO INTERRUPT
1567 013756    ERRINT:  MTPS      #P7          ;INTERRUPT OFF
1568 013764    022626    CMP      (SP)+,(SP)+    ;CORRECT STACK
1569 013766    042777    000100    021400    BIC      #B06,@TCR      ;CLR INTERRUPT ENABLE
1570 013774    ERROR    \N          ;ERROR:ERRONEOUS INTERRUPT;NO FLAGS SET
1571 014016    SCOPE    INTST
1572 014024    005067    021330    XJ0:    CLR      TMPRIO      ;START WITH C.P. AT PRIORITY 0
1573 014030    012777    014304    021326    MOV      #INTA,@TXVEC   ;SET VECTOR FOR GOOD INTERRUPT
1574 014036    XJ1:    MTPS      #P7          ;INTERRUPT OFF
1575 014044    052777    000100    021322    BIS      #B06,@TCR      ;ENABLE XMTR INTERRUPT
1576 014052    052777    000200    021316    BIS      #B07,@TSR      ;FORCE INTR WITH SUCC XFER
1577 014060    MTPS      TMPRIO        ;ALLOW INTERRUPT
1578 014066    000240    NOP
1579 014070    000240    NOP          ;WAIT FOR IT
1580 014072    005767    021262    TST      TMPRIO        ;IS PSW = 0?
1581 014076    001014    BNE      XJ2
1582 014100    ERROR    \N          ;ERROR:NO INTERRUPT FROM TRANSMITTER
1583 014122    SCOPE    INTST
1584 014130    026767    021234    021222    XJ2:    CMP      XPRIO,TMPRIO    ;HAVE WE REACHED EXPECTED PRIORITY?
1585 014136    001414    BEQ      XJ3
1586 014140    ERROR    \N          ;ERROR:DEVICE NOT JUMPERED TO EXPECTED PRIORITY
1587 014162    SCOPE    INTST
1588 014170    022767    000340    021162    XJ3:    CMP      #340,TMPRIO    ;IS PSW = 7?
1589 014176    001426    BEQ      XJ4
1590 014200    BDINIT   XMTR
1591 014206    062767    000040    021144    ADD      #40,TMPRIO
1592 014214    012777    014326    021142    XJ3S:  MOV      #INTB,@TXVEC   ;SET VECTOR FOR ERROR INTR.
1593 014222    052777    000100    021144    BIS      #B06,@TCR      ;ENABLE XMTR INTERRUPT
1594 014230    052777    000200    021140    BIS      #B07,@TSR      ;FORCE INTERRUPT REQUEST
1595 014236    MTPS      TMPRIO        ;SET CP TO NEXT PRIORITY
1596 014244    000240    NOP
1597 014246    000240    NOP          ;WAIT FOR POSSIBLE INTERRUPT
1598 014250    000167    177714    JMP      XJ3
1599 014254    XJ4:    BDINIT   XMTR          ;CLEAR BOARD
1600 014262    004767    015066    JSR      PC,MONIT
1601 014266    032777    010000    015454    BIT      #B12,@SR      ;SW 12 = 1?
1602 014274    001402    BEQ      XJRT
1603 014276    000167    177376    JMP      INTST
1604 014302    000207    XJRT:   RTS      PC      ;YES, DO TEST OVER
1605          ;NO, LEAVE THIS TEST
1606 014304    INTA:   BDINIT   XMTR          ;CLR INTERRUPT ETC
1607 014312    062767    000040    021040    ADD      #40,TMPRIO    ;INCR TEMP PRIORITY
1608 014320    022626    CMP      (SP)+,(SP)+    ;CORRECT STACK POINTER
1609 014322    000167    177510    JMP      XJ1            ;TRY AGAIN

```


1610
1611 014326 022626
1612 014330
1613 014352
1614 014360 000167 177604

INTB: CMP (SP)+,(SP)+
ERROR \N
SCOPE XJ3S
JMP XJ3

;CORRECT STACK
;ERROR:GOT INTR WHEN C.P. AT HIGHER PRIORITY

```
1616 .SBTTL C.R.C. CHECK
1617
1618 ;CYCLIC REDUNDANCY CHECK CHARACTER TEST
1619
1620 014364 CRCTST: BDINIT XMTR ;CLEAR BOARD
1621 014372 012777 177600 021002 MOV #-128.,@TSBC ;SET UP BYTE COUNT TO FILL SILO
1622 014400 012777 033026 020776 MOV #SILDAT,@TSBA
1623 014406 052777 040000 020760 BIS #B14,@TCR ;START NPR
1624 014414 005777 020762 XK1: TST @TSBC ;IS BYTE COUNT 0?
1625 014420 001375 BNE XK1 ;WAIT FOR NPR TO FINISH
1626 014422 032777 040000 020744 BIT #B14,@TCR ;NOW CHECK TX NPR BIT
1627 014430 001414 BEQ XK2
1628 014432 ERROR \N ;ERROR:TX NPR NOT CLR'D BY TSBC OFL
1629 014454 SCOPE CRCTST
1630 014462 052777 000200 020704 XK2: BIS #B07,@TCR ;SET RD SILO BIT
1631 014470 012767 177700 020656 MOV #-64.,COUNT ;COUNT READS
1632 014476 012704 033226 MOV #SILCRC,R4 ;R4 POINTS TO GOOD CRC'S
1633 014502 000240 XK3: NOP
1634 014504 017767 020702 015472 MOV @TSCRC,BAD ;GET CRC CHAR FOR LAST SILO WORD
1635 014512 017703 020662 MOV @TSDB,R3 ;R3 HOLDS SILO DATA WORD
1636 014516 011467 015464 MOV (R4),GOOD ;GET GOOD CRC FROM BUFFER
1637 014522 026767 015460 015454 CMP GOOD,BAD ;IS CRC OK?
1638 014530 001423 BEQ XK4
1639 014532 PNTM SLOWD ;PRINT 'SILO OUTPUT WORD WAS ''
1640 014542 010300 MOV R3,R0
1641 014544 004767 015756 JSR PC,OCTPNT ;PRINT SILO DATA WORD
1642 014550 DATERR \N ;ERROR:BAD CRC FOR ABOVE WORD
1643 014572 SCOPE CRCTST
1644 014600 062704 000002 XK4: ADD #2,R4 ;UPDATE CRC POINTER
1645 014604 005267 020544 INC COUNT ;HAVE WE CHECKED 64 WORDS?
1646 014610 001334 BNE XK3 ;NO, CONTINUE
1647 014612 004767 014536 JSR PC,MONIT
1648 014616 032777 010000 015124 BIT #B12,@SR ;CHECK SW 12
1649 014624 001402 BEQ XKRT ;IF CLR, EXIT
1650 014626 000167 177532 JMP CRCTST ;IF SET STAY
1651 014632 XKRT: BDINIT XMTR
1652 014640 000207 RTS PC
1653
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.SBTTL RECEIVER TESTS

:TEST 2: RECEIVER TESTS
: (00) RESET TEST
: (01) RCR REG TEST
: (02) RDBC REG TEST
: (03) RDBA REG TEST
: (04) DATA SILO TESTS
: (05) RSR & ERRORS TESTS
: (06) INTERRUPT TEST
: (07) C.R.C. TEST

000200

N = 200

:RECEIVER ERRORS START AT 200

TEST2: MTPS #P7
MOV #10,ITER
JSR PC,MONIT
BIT #B10,@SR
BEQ LOOPR
MOV @SR,SWI
BIC #-10,SWI
CLC
ROL SWI
ROL SWI
ADD #LOOPR,SWI
JMP @SWI
LOOPR: JSR PC,RINIT
JSR PC,RCRTST
JSR PC,RBCTST
JSR PC,RBATST
JSR PC,SLOTST
JSR PC,RSRTST
JSR PC,RINTST
JSR PC,RCRCTS
BIT #B11,@SR
BNE REPEAT
DEC ITER
BNE LOOPR
REPEAT: TST \$4FLAG
BNE REPEAT
INC PSNO2
PNTM PEND
MOV PSNO2,R0
JSR PC,DECPNT
MOV #40,R0
JSR PC,TTO
MOV #101,R0
JSR PC,TTO
CLR R0
JSR PC,TTO
CLR R0
JSR PC,TTO
REPEAT: RTS PC

:INITIAL ITERATION OF 10 PER PASS

:CHECK SW 10
:IF 0, RUN SEQUENTIALLY
:IF SET, GET TEST # FROM SWR
:MASK LOW DIGIT
:CLR C BIT BEFORE ROTATE

:MULTIPLY BY 4
:GENERATE OFFSET
:GO TO SELECTED TEST
:DO INITIAL CLEAR TEST
:DO RCR REG TEST
:DO BYTE COUNT REG TEST
:DO BYTE ADDR REG TEST
:DO RECVR DATA SILO TEST
:DO RSR REG & ERRORS TEST
:DO INTERRUPT TEST
:DO RCVR CRC GENERATION TEST
:CHECK SW 11
:PRINT END IF SET
:OTHERWISE, REITERATE

:CAN WE PRINT END PASS?
:NO, LEAVE
:UPDATE PASS NO.
:PRINT 'END PASS # ''

:PRINT PASS NO.

:PRINT A SPACE

:PRINT 'A' (TO INDICATE RCVR TST)

:NULLS IN CASE RESET FOLLOWS
:RETURN

```
1710 .SBTTL INITIALIZE TEST
1711
1712 ;CHECK INITIAL CONDITIONS AFTER RESET
1713
1714 015100 000005 RINIT: RESET ;CLEAR THE WORLD
1715 015102 017767 020314 015074 MOV @RDBC,BAD ;GET BYTE COUNT REG
1716 015110 005067 015072 CLR GOOD
1717 015114 005767 015064 TST BAD ;WAS RDBC 0?
1718 015120 001414 BEQ RA1
1719 015122 DATERR \N ;ERROR:RDBC NOT CLR'D BY RESET
1720 015144 SCOPE RINIT
1721 015152 017767 020246 015024 RA1: MOV @RDBA,BAD ;GET BYTE ADDRESS REG
1722 015160 005067 015022 CLR GOOD
1723 015164 005767 015014 TST BAD ;WAS RDBA 0?
1724 015170 001414 BEQ RA2
1725 015172 DATERR \N ;ERROR:RDBA NOT CLR'D BY RESET
1726 015214 SCOPE RINIT
1727 015222 017767 020166 014754 RA2: MOV @RCR,BAD ;GET RCR REGISTER
1728 015230 012767 000010 014750 MOV #10,GOOD ;SET UP GOOD FOR COMPARE
1729 015236 026767 014744 014740 CMP GOOD,BAD
1730 015244 001414 BEQ RA3
1731 015246 DATERR \N ;ERROR:RCR NOT INITIALIZED BY RESET
1732 015270 SCOPE RINIT
1733 015276 017767 020124 014700 RA3: MOV @RDCRC,BAD ;GET CRC REG
1734 015304 005067 014676 CLR GOOD
1735 015310 005767 014670 TST BAD ;IS CRC REG 0?
1736 015314 001414 BEQ RA4
1737 015316 DATERR \N ;ERROR:RCVR CRC NOT CLR'D BY RESET
1738 015340 SCOPE RINIT
1739 015346 017767 020044 014630 RA4: MOV @RSR,BAD ;GET RSR REG
1740 015354 005067 014626 CLR GOOD
1741 015360 005767 014620 TST BAD ;IS RSR REG 0?
1742 015364 001414 BEQ RA5
1743 015366 DATERR \N ;ERROR:RSR REG NOT CLR'D BY RESET
1744 015410 SCOPE RINIT
1745 015416 004767 013732 RA5: JSR PC,MONIT
1746 015422 032777 010000 014320 BIT #B12,@SR ;CHK SW 12 FOR EXIT VISA
1747 015430 001402 BEQ RART
1748 015432 000167 177442 JMP RINIT ;IF SET,STAY IN THIS TEST
1749 015436 000207 RART: RTS PC ;OTHERWISE, EXIT
```

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1751                                     .SBTTL RCR TEST
1752
1753                                     ;RECEIVER COMMAND REGISTER TEST
1754
1755 015440 005077 017750 RCRTST: CLR @RCR ;CLEAR RCR REGISTER
1756 015444 012767 160375 014534 RD1: MOV #160375,GOOD ;SET ALL SETTABLE BITS IN RCR
1757 015452 016777 014530 017734 MOV GOOD,@RCR
1758 015460 017767 017730 014516 MOV @RCR,BAD ;AND READ THEM BACK
1759 015466 026767 014514 014510 CMP GOOD,BAD ;ALL BITS SET?
1760 015474 001414 BEQ RD2
1761 015476 DATERR \N ;ERROR:CANNOT SET ALL SETTABLE RCR BITS
1762 015520 SCOPE RD1
1763 015526 005067 014454 RD2: CLR GOOD ;NOW CLR BITS AFTER SETTING THEM
1764 015532 005077 017656 CLR @RCR
1765 015536 017767 017652 014440 MOV @RCR,BAD ;READ THEM BACK
1766 015544 042767 017412 014432 BIC #17412,BAD ;IGNORE R/O BITS
1767 015552 026767 014430 014424 CMP GOOD,BAD ;ALL CLR?
1768 015560 001414 BEQ RD3
1769 015562 DATERR \N ;ERROR:CANNOT CLR ALL RCR BITS
1770 015604 SCOPE RD2
1771 015612 012777 160375 017574 RD3: MOV #160375,@RCR ;SET ALL SETTABLE BITS IN RCR
1772 015620 012777 177777 017574 MOV #-1,@RDBC ;AND IN RDBC
1773 015626 012777 177777 017570 MOV #-1,@RDBA ;AND IN RDBA
1774 015634 012777 037200 017554 MOV #37200,@RSR ;AND IN RSR
1775 015642 052777 000002 017544 BIS #B01,@RCR ;B O A R D I N I T
1776 015650 017767 017540 014326 MOV @RCR,BAD ;CHECK RCR
1777 015656 012767 000010 014322 MOV #10,GOOD ;SEE IF RCR = 10
1778 015664 026767 014316 014312 CMP GOOD,BAD
1779 015672 001414 BEQ RD4
1780 015674 DATERR \N ;ERROR:RCR NOT INIT'D BY BD INIT
1781 015716 SCOPE RD3
1782 015724 017767 017466 014252 RD4: MOV @RSR,BAD ;CHECK RSR
1783 015732 005067 014250 CLR GOOD
1784 015736 026767 014244 014240 CMP GOOD,BAD ;RSR = 0?
1785 015744 001414 BEQ RD5
1786 015746 DATERR \N ;ERROR:RSR NOT CLR'D BY BD INIT
1787 015770 SCOPE RD3
1788 015776 017767 017420 014200 RD5: MOV @RDBC,BAD ;CHECK RDBC
1789 016004 005067 014176 CLR GOOD
1790 016010 026767 014172 014166 CMP GOOD,BAD ;RDBC = 0?
1791 016016 001414 BEQ RD6
1792 016020 DATERR \N ;ERROR:RDBC NOT CLR'D BY BD INIT
1793 016042 SCOPE RD3
1794 016050 017767 017350 014126 RD6: MOV @RDBA,BAD ;CHECK RDBA
1795 016056 005067 014124 CLR GOOD
1796 016062 026767 014120 014114 CMP GOOD,BAD ;RDBA = 0?
1797 016070 001414 BEQ RD7
1798 016072 DATERR \N ;ERROR:RDBA NOT CLR'D BY BD INIT
1799 016114 SCOPE RD3
1800 016122 004767 013226 RD7: JSR PC,MONIT
1801 016126 032777 010000 013614 BIT #B12,@SR ;CHECK SW 12
1802 016134 001402 BEQ RDRT
1803 016136 000167 177276 JMP RCRTST ;STAY IN THIS LOOP IF SW 12 = 1
1804 016142 000207 RDRT: RTS PC

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1806 .SBTTL RDBC TEST
1807
1808 ;BYTE COUNT REG DATA TEST
1809
1810 016144 RBCTST: BDINIT RCVR ;INIT RCVR MODULE
1811 016152 012767 177777 017146 MOV #-1,PAT ;SET PATTERN
1812 016160 012767 000001 017142 MOV #B00,MASK ;SET BIT MASK
1813 016166 016767 017134 014012 RB1: MOV FAT,GOOD ;LOAD 'GOOD' WITH PATTERN
1814 016174 016777 014006 017220 MOV GOOD,@RDBC ;LOAD PATTERN INTO RDBC
1815 016202 017767 017214 013774 MOV @RDBC,BAD ;READ RDBC
1816 016210 026767 013772 013766 CMP GOOD,BAD ;DATA OK?
1817 016216 001414 BEQ RB2
1818 016220 DATERR \N ;ERROR:BAD DATA IN RDBC
1819 016242 SCOPE RB1
1820 016250 032767 100000 017050 RB2: BIT #B15,PAT ;DONE WHOLE REGISTER?
1821 016256 001407 BEQ RB3 ;IF YES, DONE
1822 016260 046767 017044 017040 BIC MASK,PAT ;NO, PREPARE FOR NEXT BIT
1823 016266 006367 017036 ASL MASK ;ROTATE MASK
1824 016272 000167 177670 JMP RB1 ;AND CONTINUE
1825 016276 004767 013052 RB3: JSR PC,MONIT
1826 016302 032777 010000 013440 BIT #B12,@SR ;IF SO, CONSIDER LEAVING
1827 016310 001402 BEQ RBRT ;EXIT IF SW 12 = 0
1828 016312 000167 177626 JMP RBCTST ;STAY HERE IF SW 12 = 1
1829 016316 000207 RBRT: RTS PC
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1831          .SBTTL  RDBA TEST
1832
1833          ;BYTE ADDRESS REG DATA TEST
1834
1835 016320          RBATST: BDINIT  RCVR          ;INIT RECEIVER MODULE
1836 016326 012767 177777 016772          MOV      #-1,PAT          ;SET PATTERN
1837 016334 012767 000001 016766          MOV      #B00,MASK        ;SET BIT MASK
1838 016342 016767 016760 013636  RC1:  MOV      PAT,GOOD          ;LOAD 'GOOD' WITH PATTERN
1839 016350 016777 013632 017046          MOV      GOOD,@RDBA       ;LOAD PATTERN INTO RDBA
1840 016356 017767 017042 013620          MOV      @RDBA,BAD        ;READ RDBA
1841 016364 026767 013616 013612          CMP      GOOD,BAD
1842 016372 001414          BEQ      RC2
1843 016374          DATERR  \N          ;ERROR:BAD DATA IN RDBA REG
1844 016416          SCOPE   RC1
1845 016424 032767 100000 016674  RC2:  BIT      #B15,PAT          ;DONE WHOLE REGISTER?
1846 016432 001407          BEQ      RC3          ;IF YES, DONE
1847 016434 046767 016670 016664          BIC      MASK,PAT        ;NO, PREPARE FOR NEXT BIT
1848 016442 006367 016662          ASL      MASK          ;ROTATE MASK
1849 016446 000167 177670          JMP      RC1          ;AND CONTINUE
1850 016452 004767 012676          RC3:  JSR      PC,MONIT
1851 016456 032777 010000 013264          BIT      #B12,@SR
1852 016464 001402          BEQ      RCRT
1853 016466 000167 177626          JMP      RBATST
1854 016472 000207          RCRT:  RTS      PC
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1856          .SBTTL DATA SILO TEST
1857
1858          ;RECEIVER DATA SILO TEST
1859
1860 016474          SLOTST: BDINIT RCVR          ;CLEAR RCVR MODULE
1861 016502 004567 165624          JSR R5,DELAY
1862 016506 000010          .WORD 10
1863 016510 032777 000400 016700          BIT #B08,@RSR          ;SILO OUTPUT READY?
1864 016516 001414          BEQ RE1
1865 016520          ERROR \N          ;ERROR:BD INIT DID NOT CLR SILO
1866 016542          SCOPE SLOTST
1867 016550 032777 000010 016636 RE1: BIT #B03,@RCR          ;SILO INPUT RDY?
1868 016556 001014          BNE RE2
1869 016560          ERROR \N          ;ERROR:BD INIT DID NOT SET SILO INPUT RDY
1870 016602          SCOPE SLOTST
1871 016610 052777 000200 016576 RE2: BIS #B07,@RCR          ;SET LD SILO BIT
1872 016616 012777 177777 016574          MOV #-1,@RDDB          ;LOAD 177777 INTO DATA SILO
1873 016624 042777 000200 016562          BIC #B07,@RCR          ;CLR LD SILO BIT
1874 016632 004567 165474          JSR R5,DELAY
1875 016636 000010          .WORD 10
1876 016640 032777 000400 016550          BIT #B08,@RSR          ;SILO OUTPUT RDY NOW?
1877 016646 001017          BNE RE3
1878 016650          ERROR \N          ;ERROR:NO SILO OUTPUT AFTER LOAD
1879 016672          BDINIT RCVR          ;CLR SILO
1880 016700          SCOPE RE2
1881 016706 017767 016506 013270 RE3: MOV @RDDB,BAD          ;POP WORD FROM SILO
1882 016714 012767 177777 013264          MOV #-1,GOOD
1883 016722 026767 013260 013254          CMP GOOD,BAD          ;SILO OUTPUT = 177777
1884 016730 001417          BEQ RE4
1885 016732          DATERR \N          ;ERROR:DROPPED BITS IN DATA SILO
1886 016754          BDINIT RCVR
1887 016762          SCOPE RE2
1888 016770 032777 000400 016420 RE4: BIT #B08,@RSR          ;SILO OUTPUT RDY?
1889 016776 001414          BEQ RE5
1890 017000          ERROR \N          ;ERROR:WORD DID NOT GET POPPED FROM SILO
1891 017022          SCOPE RE3
1892 017030 032777 000010 016356 RE5: BIT #B03,@RCR          ;SILO INPUT RDY?
1893 017036 001014          BNE RE6
1894 017040          ERROR \N          ;ERROR:SILO INPUT NOT READY
1895 017062          SCOPE RE5
1896 017070 052777 000200 016316 RE6: BIS #B07,@RCR          ;SET LD SILO BIT
1897 017076 005077 016316          CLR @RDDB          ;LOAD 0'S INTO SILO
1898 017102 042777 000200 016304          BIC #B07,@RCR          ;CLR LD SILO BIT
1899 017110 032777 000400 016300 RE7: BIT #B08,@RSR          ;SILO OUTPUT RDY?
1900 017116 001774          BEQ RE7          ;WAIT FOR IT
1901 017120 017767 016274 013056          MOV @RDDB,BAD          ;READ SILO OUTPUT
1902 017126 005067 013054          CLR GOOD
1903 017132 026767 013050 013044          CMP GOOD,BAD          ;SILO OUTPUT = 0?
1904 017140 001417          BEQ RE7A
1905 017142          DATERR \N          ;ERROR:PICKED UP BITS IN DATA SILO
1906 017164          BDINIT RCVR          ;CLR SILO
1907 017172          SCOPE RE6
1908 017200 004767 000476          JSR PC,CLRCBF          ;MAKE SURE BUFF IS CLR
1909 017204          RE8: BLINIT RCVR          ;CLR RCVR BOARD
1910 017212 052777 000200 016174          BIS #B07,@RCR          ;SET LD SILO BIT
1911 017220 012704 033026          MOV #SILDAT,R4          ;R4 POINTS TO DATA FOR SILO
  
```


1912	017224	012703	177700			MOV	#-64.,R3		:R3 COUNTS WORDS
1913	017230	012477	016164		RE9:	MOV	(R4)+,@RDDB		:LOAD DATA INTO SILO
1914	017234	005203				INC	R3		
1915	017236	001374				BNE	RE9		:KEEP LOADING FOR 64 WORDS
1916	017240	032777	000010	016146		BIT	#B03,@RCR		:FULL...IS SILO INPUT RDY?
1917	017246	001414				BEQ	RE10		
1918	017250					ERROR	\N		:ERROR:FULL SILO STILL RDY FOR INPUT
1919	017272					SCOPE	RE8		
1920	017300	042777	000200	016106	RE10:	BIC	#B07,@RCR		:CLR LD SILO BIT
1921	017306	012777	177600	016106		MOV	#-128.,@RDBC		:SET UP BYTE COUNT FOR 64 WORDS
1922	017314	012777	033426	016102		MOV	#CMPBUF,@RDBA		:POINT INTERF AT 64 WD BUFFER
1923	017322	052777	040000	016064		BIS	#B14,@RCR		:SET RC NPR
1924	017330	016704	012416			MOV	DLCON,R4		
1925	017334	012703	177500		RE10A:	MOV	#177500,R3		:SET UP FOR 2 MS DELAY
1926	017340	005777	016056		RE11:	TST	@RDBC		:IS BYTE COUNT 0?
1927	017344	001420				BEQ	RE12		
1928	017346	005203				INC	R3		:WAITED 2 MS ?
1929	017350	001373				BNE	RE11		:NO, KEEP LOOKING
1930	017352	005304				DEC	R4		
1931	017354	001367				BNE	RE10A		
1932	017356					ERROR	\N		:ERROR:NPR NOT COMPLETE AFTER 2 MS
1933	017400					SCOPE	RE8		
1934	017406	042777	040000	016000	RE12:	BIC	#B14,@RCR		:CLEAR RC NPR
1935	017414	012702	033026			MOV	#SILDAT,R2		:SET UP TO CHECK SILO OUTPUT
1936	017420	012703	033426			MOV	#CMPBUF,R3		:R2 & R3 ARE DATA POINTERS
1937	017424	012704	177700			MOV	#-64.,R4		:R4 IS COUNTER
1938	017430	012267	012552		RE13:	MOV	(R2)+,GOOD		:GET GOOD DATA
1939	017434	012367	012544			MOV	(R3)+,BAD		:GET SILO DATA
1940	017440	026767	012542	012536		CMP	GOOD,BAD		:COMPARE MEM BUFFERS
1941	017446	001414				BEQ	RE14		
1942	017450					DATERR	\N		:ERROR:DATA FROM SILO IS WRONG
1943	017472					SCOPE	RE8		
1944	017500	005204			RE14:	INC	R4		:DONE COMPARE?
1945	017502	001352				BNE	RE13		
1946	017504	032777	000400	015704		BIT	#B08,@RSR		:YES,SEE IF SILO WAS EMPTIED
1947	017512	001414				BEQ	RE15		
1948	017514					ERROR	\N		:ERROR:SILO OUT RDY, BUT SILO SHD BE EMPTY
1949	017536					SCOPE	RE8		

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1951                                     .SBTTL DATA SILO BLOCK COUNTER TEST
1952
1953                                     ;THIS TESTS THAT, AFTER PUTTING 200 (OCTAL) WORDS INTO THE DATA SILO
1954                                     ;THE BLOCK COUNTER COUNTS THE 200 WORDS AND HOLDS SILO INPUT READY
1955                                     ;IN THE FALSE STATE.
1956
1957 017544 RE15: BDINIT RCVR ;CLEAR THE BOARD
1958 017552 012702 000100 MOV #64.,R2
1959 017556 004767 000140 JSR PC,RESR ;PUT 100 (OCTAL) WORDS INTO SILO
1960 017562 004767 000166 JSR PC,REEMT ;EMPTY IT VIA NPR
1961 017566 012702 000020 MOV #20,R2
1962 017572 004767 000124 JSR PC,RESR ;PUT 20 (OCTAL) WORDS INTO SILO
1963 017576 004767 000152 JSR PC,REEMT ;EMPTY IT AGAIN
1964 017602 012702 000060 MOV #60,R2
1965 017606 004767 000110 JSR PC,RESR ;PUT 60 (OCTAL) WORDS INTO SILO
1966 ; MAKING A TOTAL OF 200 IN WHILE
1967 ; THERE IS ROOM FOR 20 MORE.
1968 017612 032777 000010 015574 BIT #B03,@RCR ;IS SILO INPUT READY?
1969 017620 001414 BEQ RE16 ;IF NOT, OKAY
1970 017622 ERROR \N ;ERROR: INPUT READY AFTER A 200 WORD BLOCK
1971 017644 SCOPE RE15
1972 017652 RE16: BDINIT RCVR
1973 017660 004767 011470 JSR PC,MONIT
1974 017664 032777 010000 012056 BIT #B12,@SR ;CHECK SW 12
1975 017672 001402 BEQ RERT
1976 017674 000167 176574 JMP SLOTST ;STAY IN THIS TEST IF SW 12 = 1
1977 017700 000207 RERT: RTS PC
1978 017702 012703 177700 CLRCBF: MOV #-64.,R3 ;ROUTINE TO CLR BUFFER AREA
1979 017706 012704 033426 MOV #CMPBUF,R4
1980 017712 005024 RECB: CLR (R4)+
1981 017714 005203 INC R3
1982 017716 001375 BNE RECB
1983 017720 000207 RTS PC
1984
1985 ;ROUTINE TO FILL DATA SILO WITH (R2) NUMBER OF WORDS
1986
1987 017722 052777 000200 015464 RESR: BIS #B07,@RCR ;SET LOAD SILO
1988 017730 010203 MOV R2,R3
1989 017732 012777 012345 015460 RESRW: MOV #12345,@RDDB ;LOAD A WORD
1990 017740 005303 DEC R3 ;KEEP TRACK OF # OF WORDS
1991 017742 001373 BNE RESRW
1992 017744 042777 000200 015442 BIC #B07,@RCR ;LEAVE WITH LD SILO CLR
1993 017752 000207 RTS PC
1994
1995 ;ROUTINE TO EMPTY DATA SILO VIA RC NPR
1996
1997 017754 012777 177600 015440 REEMT: MOV #-128.,@RDBC ;SET BYTE COUNT TO EMPTY SILO
1998 017762 012777 033426 015434 MOV #CMPBUF,@RDBA ;POINT SILO AT DAT BUFFER
1999 017770 052777 040000 015416 BIS #B14,@RCR ;START NPR
2000 017776 016704 011750 MOV DLCON,R4
2001 020002 012703 175000 REEMT1: MOV #175000,R3 ;SET UP TO WAIT FOR COMPL
2002 020006 005203 REMTW: INC R3
2003 020010 001376 BNE REMTW ;WAIT FOR NPR COMPLETION
2004 020012 005077 015376 CLR @RCR ;CLEAR RC NPR
2005 020016 005304 DEC R4
2006 020020 001370 BNE REEMT1
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CZPLBBO PCL11 STND ALN VO2A
PCLTST.P11 12-SEP-78 15:13

MACY11 30A(1052) 18-OCT-78 14:35^{L 4} PAGE 33-1
DATA SILO BLOCK COUNTER TEST

SEQ 0050

2007 020022 000207

RTS PC

;RETURN WITH SILO EMPTY

CZ
PC

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2009 .SBTTL RSR TEST
2010
2011 ;RCVR STATUS REG & ERRORS TEST
2012
2013 020024 RSRTST: BDINIT RCVR ;CLEAR THE BOARD
2014 020032 052777 020000 015354 BIS #B13,@RCR ;SET RCV WD
2015 020040 032777 000100 015350 BIT #B06,@RSR ;IS BUSY SET?
2016 020046 001014 BNE RF1
2017 020050 ERROR \N ;ERROR:RCV WD DID NOT SET BUSY
2018 020072 SCOPE RSRTST
2019 020100 052777 000200 015310 RF1: BIS #B07,@RSR ;SET SUC XFR
2020 020106 032777 000200 015302 BIT #B07,@RSR ;IS SUC XFR SET?
2021 020114 001014 BNE RF2
2022 020116 ERROR \N ;ERROR:CANNOT SET RSR BIT 07
2023 020140 SCOPE RF1
2024 020146 032777 020000 015240 RF2: BIT #B13,@RCR ;IS RCV WD CLR?
2025 020154 001414 BEQ RF3
2026 020156 ERROR \N ;ERROR:SUC XFR DID NOT CLR RCV WD
2027 020200 SCOPE RSRTST
2028 020206 042777 000200 015202 RF3: BIC #B07,@RSR ;CLR SUC XFR
2029 020214 032777 000200 015174 BIT #B07,@RSR ;SEE IF IT CLR'D
2030 020222 001414 BEQ RF4
2031 020224 ERROR \N ;ERROR:CANNOT CLR SUC XFR
2032 020246 SCOPE RF3
2033 020254 RF4: BDINIT RCVR ;CLEAR THE BOARD
2034 020262 052777 020200 015124 BIS #20200,@RCR ;SET LD SILO & RCV WD
2035 020270 012703 177774 MOV #-4,R3
2036 020274 012777 177777 015116 RF5: MOV #-1,@RDBB ;MOVE 4 -1'S INTO SILO
2037 020302 000240 NOP
2038 020304 000240 NOP
2039 020306 005203 INC R3
2040 020310 001371 BNE RF5
2041 020312 012777 177776 015102 RF6: MOV #-2,@RDBC ;SET BYTE COUNT FOR 1 WORD
2042 020320 052777 000004 015066 BIS #B02,@RCR ;SET INH ADDR INC
2043 020326 012777 033426 015070 MOV #CMPBUF,@RDBA ;POINT NPR TO MEM BUFF.
2044 020334 052777 040000 015052 BIS #B14,@RCR ;START NPR
2045 020342 005777 015054 RF7: TST @RDBC ;BYTE COUNT = 0?
2046 020346 001375 BNE RF7
2047 020350 032777 000400 015040 BIT #B08,@RSR ;SILO OUTPUT RDY?
2048 020356 001014 BNE RF8
2049 020360 ERROR \N ;ERROR:SILO SHOULD NOT BE EMPTY
2050 020402 SCOPE RF4
2051 020410 012767 033426 011570 RF8: MOV #CMPBUF,GOOD ;BYTE ADDRESS SHD NOT INCREMENT
2052 020416 017767 015002 011560 MOV @RDBA,BAD ;READ BYTE ADDRESS
2053 020424 026767 011556 011552 CMP GOOD,BAD ;SAME AS BEFORE?
2054 020432 001414 BEQ RF9
2055 020434 DATERR \N ;ERROR:RCR BIT 2 DID NOT INH ADR INCREMENT
2056 020456 SCOPE RF4
2057 020464 032777 001000 014724 RF9: BIT #B09,@RSR ;IS BYTE COUNT OFL SET?
2058 020472 001014 BNE RF9A
2059 020474 ERROR \N ;ERROR:RDBC =0, SILO NOT EMPTY, BUT BC OFL = 0
2060 020516 SCOPE RF4
2061 020524 032777 100000 014664 RF9A: BIT #B15,@RSR ;IS RSR BIT 15 SET?
2062 020532 001014 BNE RF10 ;IF YES, CHECK FOR INTR REQ
2063 020534 ERROR \N ;ERROR:BYTE COUNT OFL DID NOT SET RSR BIT 15
2064 020556 SCOPE RF4
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2065	020564	032777	020000	014622	RF10:	BIT	#B13,@RCR		;IS RCV WD = 0?
2066	020572	001414				BEQ	RF11		
2067	020574					ERROR	\N		;ERROR:BC OFL DID NOT REQUEST INTERRUPT
2068	020616					SCOPE	RF4		
2069	020624				RF11:	BDINIT	RCVR		
2070	020632	052777	020000	014554		BIS	#B13,@RCR		;SET RCV WD
2071	020640	052777	002000	014550		BIS	#B10,@RSR		;SET TIMEOUT
2072	020646	032777	002000	014542		BIT	#B10,@RSR		;IS TIMEOUT SET?
2073	020654	001014				BNE	RF12		
2074	020656					ERROR	\N		;ERROR:CANNOT SET RSR BIT 10
2075	020700					SCOPE	RF11		
2076	020706	032777	100000	014502	RF12:	BIT	#B15,@RSR		;IS ERROR BIT SET?
2077	020714	001014				BNE	RF13		
2078	020716					ERROR	\N		;ERROR:TIMEOUT DIDN'T SET RSR BIT 15
2079	020740					SCOPE	RF11		
2080	020746	032777	020000	014440	RF13:	BIT	#B13,@RCR		;IS RCV WD CLR?
2081	020754	001414				BEQ	RF14		
2082	020756					ERROR	\N		;ERROR:RSR BIT 15 DIDN'T REQUEST INTERRUPT
2083	021000					SCOPE	RF11		
2084	021006	005077	014404		RF14:	CLR	@RSR		;CLEAR RSR
2085	021012	052777	004000	014376		BIS	#B11,@RSR		;SET PAR (PARITY ERROR) BIT
2086	021020	032777	004000	014370		BIT	#B11,@RSR		;IS IT SET?
2087	021026	001014				BNE	RF15		
2088	021030					ERROR	\N		;ERROR:CANNOT SET RSR BIT 11
2089	021052					SCOPE	RF14		
2090	021060	032777	100000	014330	RF15:	BIT	#B15,@RSR		;IS ERROR BIT SET?
2091	021066	001014				BNE	RF16		
2092	021070					ERROR	\N		;ERROR:PAR ERR DIDN'T SET RSR BIT 15
2093	021112					SCOPE	RF14		
2094	021120	005077	014272		RF16:	CLR	@RSR		;CLEAR RSR
2095	021124	052777	010000	014264		BIS	#B12,@RSR		;SET TXM ERR
2096	021132	032777	010000	014256		BIT	#B12,@RSR		;IS IT SET?
2097	021140	001014				BNE	RF17		
2098	021142					ERROR	\N		;ERROR:CANNOT SET RSR BIT 12
2099	021164					SCOPE	RF16		
2100	021172	032777	100000	014216	RF17:	BIT	#B15,@RSR		;IS ERROR BIT SET?
2101	021200	001014				BNE	RF18		
2102	021202					ERROR	\N		;ERROR:TXM ERR DIDN'T SET RSR BIT 15
2103	021224					SCOPE	RF16		
2104	021232	005077	014160		RF18:	CLR	@RSR		;CLEAR RSR
2105	021236	052777	020000	014152		BIS	#B13,@RSR		;SET MEM OFL
2106	021244	032777	020000	014144		BIT	#B13,@RSR		;IS IT SET?
2107	021252	001014				BNE	RF19		
2108	021254					ERROR	\N		;ERROR:CANNOT SET RSR BIT 13
2109	021276					SCOPE	RF18		
2110	021304	032777	100000	014104	RF19:	BIT	#B15,@RSR		;IS ERROR BIT SET?
2111	021312	001014				BNE	RF20		
2112	021314					ERROR	\N		;ERROR:MEM OFL DIDN'T SET RSR BIT 15
2113	021336					SCOPE	RF18		

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2115 ;ERROR GENERATION TESTS
2116
2117 021344 RF20: BDINIT RCVR ;CLEAR THE BOARD
2118 021352 052777 000200 014034 BIS #B07,@RCR ;SET LD SILO BIT
2119 021360 012777 177777 014032 MOV #-1,@Rddb ;LOAD A WORD INTO SILO
2120 021366 032777 000400 014022 RF21: BIT #B08,@RSR ;SILO OUTPUT RDY?
2121 021374 001774 BEQ RF21 ;WAIT FOR IT
2122 021376 042777 000200 014010 BIC #B07,@RCR ;CLEAR LD SILO BIT
2123 021404 012777 177774 014010 MOV #-4,@RDBC ;SET BYTE COUNT FOR 1 WD XFER
2124 021412 012777 164176 014004 MOV #164176,@RDBA ;PUT NON-EXST LOC IN RDBA
2125 021420 052777 040060 013766 BIS #40060,@RCR ;START NPR AND SET EXT ADD BITS
2126 021426 000240 NOP
2127 021430 000240 NOP
2128 021432 005777 013764 TST @RDBC ;IS BYTE COUNT 0?
2129 021436 001014 BNE RF22 ;ERROR:REPLACE #764176 (ABOVE) WITH NON-EXST LOC
2130 021440 ERROR \N
2131 021462 SCOPE RF20 ;IS NON EXST LOC SET?
2132 021470 032777 040000 013720 RF22: BIT #B14,@RSR
2133 021476 001014 BNE RF23 ;ERROR:NPR TO NXM DIDN'T SET NON-EXST LOC
2134 021500 ERROR \N
2135 021522 SCOPE RF20
2136 021530 032777 100000 013660 RF23: BIT #B15,@RSR ;IS ERROR BIT SET?
2137 021536 001014 BNE RF24 ;ERROR:NON-EXST LOC DIDN'T SET RSR BIT 15
2138 021540 ERROR \N
2139 021562 SCOPE RF20
2140 021570 RF24: BDINIT RCVR ;CLR BOARD BEFORE LEAVING
2141 021576 004767 007552 JSR PC,MONIT
2142 021602 032777 010000 010140 BIT #B12,@SR ;IS SW 12 SET?
2143 021610 001402 BEQ RFRT
2144 021612 000167 176206 JMP RSRTST ;YES,REPEAT THIS TEST
2145 021616 000207 RFRT: RTS PC

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2147 .SBTTL INTERRUPT TEST
2148
2149 ;RECEIVER INTERRUPT TEST
2150
2151 RINTST: MTPS #P7 ;DIS-ALLOW INTERRUPT
2152 BDINIT RCVR ;CLEAR THE BOARD
2153 MOV RCVEC,R0
2154 MOV #340,2(R0) ;SET NEW PS = P7
2155 MOV #EROINT,@RCVEC ;SET-UP FOR ERROR INTERRUPT
2156 BIS #B06,@RCR ;SET INTERRUPT ENABLE
2157 MTPS #0 ;ALLOW INTERRUPT
2158 NOP
2159 JMP RH0 ;SKIP ERROR IF NO INTERRUPT
2160 EROINT: MTPS #P7 ;INTERRUPT OFF
2161 CMP (SP)+,(SP)+ ;CORRECT STACK
2162 BIC #B06,@RCR ;CLR INTERRUPT ENABLE
2163 ERROR \N ;ERROR:ERRONEOUS INTERRUPT;NO FLAGS SET
2164 SCOPE RINTST
2165 RH0: CLR TMPRIO ;START WITH CP AT PRIORITY 0
2166 MOV #INTRA,@RCVEC ;SET VECTOR FOR GOOD INTERRUPT
2167 RH1: MTPS #P7 ;INTERRUPT OFF
2168 BIS #B06,@RCR ;ENABLE RCVR INTERRUPT
2169 BIS #B07,@RCR ;SET LD SILO BIT
2170 MOV #-1,@Rddb ;PUT A WORD INTO RCVR SILO
2171 BIC #B07,@RCR ;CLR LD SILO BIT
2172 RH1A: BIT #B08,@RSR ;SILO OUTPUT READY?
2173 BEQ RH1A ;WAIT FOR IT
2174 MTPS TMPRIO ;ALLOW INTERRUPT
2175 NOP
2176 NOP
2177 TST TMPRIO ;NO INTERRUPT;IS PSW = 0?
2178 BNE RH2
2179 ERROR \N ;ERROR:NO INTERRUPT FROM RECEIVER
2180 SCOPE RINTST
2181 RH2: CMP RPRIO,TMPRIO ;HAVE WE REACHED EXPECTED PRIORITY?
2182 BEQ RH3
2183 ERROR \N ;ERROR:DEVICE NOT JUMPERED TO EXPECTED PRIORITY
2184 SCOPE RINTST
2185 RH3: CMP #340,TMPRIO ;IS PSW = 7?
2186 BEQ RH4
2187 BDINIT RCVR
2188 ADD #40,TMPRIO
2189 RH3S: MOV #INTRB,@RCVEC ;SET VECTOR FOR ERROR INTERRUPT
2190 BIS #B06,@RCR ;ENABLE RCVR INTERRUPT
2191 BIS #B07,@RSR ;FORCE INTERRUPT REQUEST
2192 MTPS TMPRIO ;SET CP TO NEXT PRIORITY
2193 NOP
2194 NOP
2195 JMP RH3
2196 RH4: BDINIT RCVR ;CLEAR THE BOARD
2197 JSR PC,MONIT
2198 BIT #B12,@SR ;SW 12 = 1?
2199 BEQ RHRT
2200 JMP RINTST ;YES,DO THIS TEST OVER
2201 RHRT: RTS PC ;NO,EXIT
2202
```

2203	022250				INTRA:	BDINIT	RCVR		:CLR INTERRUPT ETC.
2204	022256	062767	000040	013074		ADD	#40, TMFRIO		:INCR TEMP PRIORITY
2205	022264	022626				CMP	(SP)+, (SP)+		:CORRECT STACK POINTER
2206	022266	000167	177464			JMP	RH1		:TRY AGAIN
2207									
2208	022272	022626			INTRB:	CMP	(SP)+, (SP)+		:POP THE STACK
2209	022274					BDINIT	RCVR		:CLR EVRYTHING
2210	022302					ERROR	\N		:ERROR:GOT INTR WHITH CP AT HIGHER PRIORITY
2211	022324					SCOPE	RH3S		
2212	022332	000167	177576			JMP	RH3		


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2214 .SBTTL C.R.C. CHECK
2215 ;CYCLIC REDUNDANCY CHECK CHARACTER TEST
2216
2217
2218 022336 RCRCTS: BDINIT RCVR ;CLR THE BOARD
2219 022344 052777 000200 013042 BIS #B07,@RCR ;SET LD SILO BIT
2220 022352 012702 033226 MOV #SILCRC,R2 ;R2 POINTS TO GOOD CRC'S
2221 022356 012703 033026 MOV #SILDAT,R3 ;R3 POINTS TO MEM DATA
2222 022362 012704 177700 MOV #-64.,R4 ;R4 IS WORD COUNTER
2223 022366 011367 012764 RJ1: MOV (R3),DATWD ;SAVE INPUT WORD
2224 022372 016777 012760 013020 MOV DATWD,@RDDB ;LOAD SILO
2225 022400 011267 007602 MOV (R2),GOOD ;GET GOOD CRC FOR COMPARISON
2226 022404 017767 013016 007572 MOV @RDCRC,BAD ;GET GENERATED CRC
2227 022412 026767 007570 007564 CMP GOOD,BAD ;IS CRC OK?
2228 022420 001424 BEQ RJ2
2229 022422 PNTM SLIWD ;PRINT 'SILO INPUT WORD WAS ''
2230 022432 016700 012720 MOV DATWD,R0
2231 022436 004767 010064 JSR PC,OCTPNT ;PRINT SILO INPUT WORD
2232 022442 DATERR \N ;ERROR:BAD CRC FOR ABOVE WORD
2233 022464 SCOPE RCRCTS
2234 022472 062702 000002 RJ2: ADD #2,R2 ;UPDATE CRC POINTER
2235 022476 062703 000002 ADD #2,R3 ;UPDATE DATA POINTER
2236 022502 005204 INC R4 ;HAVE WE CHECKED 64 WDS?
2237 022504 001330 BNE RJ1
2238 022506 004767 006642 JSR PC,MONIT
2239 022512 032777 010000 007230 BIT #B12,@SR ;CHECK SW 12
2240 022520 001402 BEQ RJRT ;IF 0, EXIT
2241 022522 000167 177610 JMP RCRCTS ;IF 1, STAY
2242 022526 RJRT: BDINIT RCVR ;CLR BOARD BEFORE EXIT
2243 022534 000207 RTS PC
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2245 .SBTTL XMTR-RCVR LOOP TESTS
2246
2247 ;TEST 3 - XMTR - RCVR LOOP TESTS
2248 ; (00) NPR TESTS SILO TO SILO
2249 ; (01) DATA LOOPS TESTS
2250 ; (02) TXM ERRORS TESTS
2251 ; (03) REJECT & TRUNCATE TESTS
2252
2253 N = 300 ;LOOP TEST ERRORS START AT 300
2254
2255 000300 TEST3: MTPS #P7 ;INITIAL ITERATION OF 10 PER PASS
2256 022544 012767 000010 012550 MOV #10,ITER
2257 022552 004767 006576 JSR PC,MONIT
2258 022556 032777 002000 007164 BIT #B10,@SR ;CHECK SW 10
2259 022564 001424 BEQ LOOPL ;IF CLR, RUN ALL TESTS
2260 022566 017767 007156 012530 MOV @SR,SWI ;IF SET, START AT TEST # IN SW'S <1:0>
2261 022574 042767 177770 012522 BIC #-10,SWI
2262 022602 026727 012516 000003 CMP SWI,#3 ;DON'T ALLOW SWI > 3
2263 022610 003012 BGT LOOPL ;CLR C-BIT BEFORE ROTATE
2264 022612 000241 CLC
2265 022614 006167 012504 ROL SWI
2266 022620 006167 012500 ROL SWI
2267 022624 062767 022636 012472 ADD #LOOPL,SWI ;GENERATE CORRECT OFFSET
2268 022632 000177 012466 JMP @SWI ;GO TO SELECTED TEST
2269 022636 004767 000120 LOOPL: JSR PC,NPRTST ;CHECK NPR ..SILO TO SILO
2270 022642 004767 000710 JSR PC,DATLPS ;DO DATA LOOPS TEST
2271 022646 004767 003236 JSR PC,TXMERS ;CHECK TXM ERRORS
2272 022652 004767 005520 JSR PC,XRC20 ;DO REJECT AND TRUNCATE TEST
2273 022656 032777 004000 007064 BIT #B11,@SR ;CHECK SW 11
2274 022664 001003 BNE TREND ;PRINT END IF SET
2275 022666 005367 012430 DEC ITER ;OTHERWISE, RE-ITERATE
2276 022672 001361 BNE LOOPL
2277 022674 005767 012446 TREND: TST $4FLAG ;TEST END PASS INHIBIT FLAG
2278 022700 001027 BNE REPETL ;CAN'T PRINT, EXIT.
2279 022702 005267 012430 INC PSNO3 ;UPDATE PASS NO.
2280 022706 PNTM PEND ;PRINT 'END PASS # '
2281 022716 016700 012414 MOV PSNO3,R0 ;PRINT PASS NO.
2282 022722 004767 007654 JSR PC,DECPNT
2283 022726 012700 000040 MOV #40,R0 ;PRINT A SPACE
2284 022732 004767 010034 JSR PC,TTO
2285 022736 012700 000102 MOV #'B,R0 ;PRINT 'B' (TO INDICATE 'LOOP TEST)
2286 022742 004767 010024 JSR PC,TTO
2287 022746 005000 CLR R0
2288 022750 004767 010016 JSR PC,TTO ;PRINT NULLS TO ALLOW PRINT
2289 022754 004767 010012 JSR PC,TTO ;OF PASS NO. IN CASE RESET FOLLOWS
2290 022760 000207 REPETL: RTS PC ;RETURN
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2292 .SBTTL NPR TESTS
2293
2294 022762 NPRTST: BDINIT RCVR ;CLEAR RECEIVER
2295 022770 BDINIT XMTR ;CLEAR XMTR
2296 022776 012777 010400 012402 MOV #10400,@TMMR ;SET MASTER AND AUTO ADDR
2297 023004 004767 000424 JSR PC,FILRCV ;FILL RCVR SILO
2298 023010 012777 177600 012404 MOV #-128,@RDBC ;SET UP RCVR TO INITIATE
2299 023016 016777 012356 012400 MOV TSDB,@RDBA ;NPR TO XMTR SILO
2300 023024 012777 040064 012362 MOV #40064,@RCR ;START NPR, INHIB ADDR INCR
2301 023032 016702 006714 MOV DLCON,R2
2302 023036 005003 NPTST1: CLR R3
2303 023040 012704 177777 MOV #-1,R4 ;SET UP FOR DELAY
2304 023044 022777 000200 012330 XRA1: CMP #128,@TSBC ;TRANSFERRED 64 WORDS?
2305 023052 001422 BEQ XRA2 ;NO, KEEP LOOKING FOR A SECOND
2306 023054 005203 INC R3
2307 023056 001372 BNE XRA1
2308 023060 005204 INC R4
2309 023062 001370 BNE XRA1
2310 023064 005302 DEC R2
2311 023066 001363 BNE NPTST1
2312 023070 ERROR \N ;ERROR:RCVR NPR NOT COMPLETE IN TIME
2313 023112 SCOPE NPRTST
2314 023120 004767 000352 XRA2: JSR PC,CHXDAT ;CHECK DATA IN XMTR SILO
2315 023124 000414 BR XRA2A ;DATA O.K., CONTINUE
2316 023126 DATERR \N ;ERROR:BAD DATA NPR'D TO XMTR SILO
2317 023150 SCOPE NPRTST
2318 023156 005777 012240 XRA2A: TST @RDBC ;CHECK THAT RDBC = 0
2319 023162 001421 BEQ XRA3
2320 023164 005067 007016 CLR GOOD
2321 023170 017767 012226 007006 MOV @RDBC,BAD ;ERROR:RCV BYTE COUNT SHD BE 0 AT END OF NPR
2322 023176 DATERR \N
2323 023220 SCOPE NPRTST
2324 023226 XRA3: BDINIT XMTR ;CLR XMTR
2325 023234 BDINIT RCVR ;CLR RCVR
2326 023242 004767 000166 JSR PC,FILRCV ;FILL RECEIVER SILO
2327 023246 012777 177600 012126 MOV #-128,@TSBC ;SET UP FOR XMTR TO INITIATE
2328 023254 016777 012140 012122 MOV RDDB,@TSBA ;NPR FROM RCVR SILO
2329 023262 012777 040064 012104 MOV #40064,@TCR ;SET TX NPR, INHIB ADR INC
2330 023270 016702 006456 MOV DLCON,R2
2331 023274 005003 XRA3A: CLR R3
2332 023276 012704 177777 MOV #-1,R4 ;SET UP FOR 1 SEC DELAY
2333 023302 005777 012074 XRA4: TST @TSBC ;TRANSFERRED 64 WORDS?
2334 023306 001422 BEQ XRA5 ;IF NOT, WATCH FOR A SECOND
2335 023310 005203 INC R3
2336 023312 001373 BNE XRA4
2337 023314 005204 INC R4
2338 023316 001371 BNE XRA4
2339 023320 005302 DEC R2
2340 023322 001364 BNE XRA3A ;ERROR:XMTR NPR NOT COMPLETE IN 1 SEC
2341 023324 ERROR \N
2342 023346 SCOPE XRA3
2343 023354 004767 000116 XRA5: JSR PC,CHXDAT ;CHK DATA IN XMTR SILO
2344 023360 000414 BR XRA6 ;ERROR:BAD DATA NPR'D TO XMTR SILO
2345 023362 DATERR \N
2346 023404 SCOPE XRA3
2347 023412 004767 005736 XRA6: JSR PC,MONIT
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2348	023416	032777	010000	006324		BIT	#B12,@SR	:SW 12 = 1?
2349	023424	001402				BEQ	XRART	:NO, EXIT
2350	023426	000167	177330			JMP	NPRTST	:YES, STAY HERE
2351	023432	000207			XRART:	RTS	PC	
2352	023434	012700	033026		FILRCV:	MOV	#SILDAT,R0	:R0 IS DATA POINTER
2353	023440	012777	000200	011746		MOV	#B07,@RCR	:SET RCVR 'LD SILO'
2354	023446	012701	000100			MOV	#64.,R1	:R1 IS WORD COUNTER
2355	023452	012077	011742		LDLP:	MOV	(R0)+,@Rddb	:MOVE WORDS INTO SILO
2356	023456	004567	160650			JSR	R5,DELAY	:WAIT FOR INPUT RDY
2357	023462	000005				.WORD	5	
2358	023464	005301				DEC	R1	:LOADED ALL 64 WORDS?
2359	023466	001371				BNE	LDLP	:IF NOT, CONTINUE LOADING
2360	023470	005077	011720			CLR	@RCR	:CLR RCR AND EXIT
2361	023474	000207				RTS	PC	
2362								
2363	023476	012702	000100		CHXDAT:	MOV	#64.,R2	:R2 IS WORD COUNTER
2364	023502	012701	033026			MOV	#SILDAT,R1	:R1 POINTS TO GOOD DATA
2365	023506	052777	000200	011660		BIS	#B07,@TCR	:SET 'RD SILO' IN XMTR
2366	023514	017767	011660	006462	XRCNT:	MOV	@TSDB,BAD	:POP SILO WORD INTO BAD
2367	023522	012167	006460			MOV	(R1)+,GOOD	:POP LIST WORD INTO GOOD
2368	023526	026767	006454	006450		CMP	GOOD,BAD	
2369	023534	001005				BNE	XRERXT	:IF DATA BAD, ERROR EXIT
2370	023536	005302				DEC	R2	:DONE CHECKING SILO?
2371	023540	001365				BNE	XRCNT	:NO, CONTINUE
2372	023542	005077	011626		XRLV:	CLR	@TCR	:CLR COMMAND REG
2373	023546	000207				RTS	PC	:EXIT
2374	023550	062716	000002		XRERXT:	ADD	#2,(SP)	:FIX PC FOR ERROR RETURN
2375	023554	000772				BR	XRLV	

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2377          .SBTTL DATA LOOPS TESTS
2378
2379 023556          DATLPS: BDINIT XMTR          ;CLR XMTR
2380 023564          BDINIT RCVR          ;CLR RCVR
2381 023572 012777 177777 011600          MOV #-1,@TSDB ;LOAD A WORD INTO TXM SILO
2382 023600 012777 010400 011600          MOV #10400,@TMMR ;SET MASTER FLOP & SET AUTO ADDR
2383 023606 012777 177776 011606          MOV #-2,@RDBC ;SET BYTE COUNT FOR 1 WORD
2384 023614 016777 011530 011552          MOV RCAD,@TCR ;LOAD DESTINATION CODE
2385 023622 052777 020000 011564          BIS #B13,@RCR ;SET RCV WD
2386 023630 012777 177776 011544          MOV #-2,@TSBC ;SET XMTR BYTE CNT FOR 1 WORD
2387 023636 052777 020000 011530          BIS #B13,@TCR ;SET SEND WORD
2388 023644 016704 006102          MOV DLCON,R4
2389 023650 012703 177500          DTLPS1: MOV #177500,R3 ;SET UP 2 MS DELAY
2390 023654 005777 011536          XRB1: TST @RSR ;ANY ERRORS?
2391 023660 100427          BMI 2$ ;YES
2392 023662 032777 000400 011526          BIT #B08,@RSR ;IS DAT OUTP RDY SET IN RCVR?
2393 023670 001020          BNE 1$
2394 023672 005203          INC R3 ;WAIT A COUPLE OF MS FOR IT
2395 023674 001367          BNE XRB1
2396 023676 005304          DEC R4
2397 023700 001363          BNE DTLPS1
2398 023702          ERROR \N ;ERROR:DAT OUTP RDY IN RCVR NOT SET IN 2 MS.
2399 023724          SCOPE DATLPS
2400 023732 005777 011460          1$: TST @RSR ;ANY HARD ERRORS?
2401 023736 100030          BPL XRB2
2402 023740          2$: ERROR: \N ;ERROR: HARD ERROR ON 1 WD XFER
2403 023762 032777 040000 005760          BIT #B14,@SR ;CHECK FOR PRINT INHIBIT
2404 023770 001013          BNE XRB2 ;SKIP EXT PRINTOUT IF SW 14=1
2405 023772          PNTM RCSTAT ;ELSE PRINT 'RECEIVER STATUS = ''
2406 024002 017700 011410          MOV @RSR,R0
2407 024006 004767 006514          JSR PC,OCTPNT ;PRINT CONTENTS OF RSR
2408 024012          SCOPE DATLPS
2409 024020 105777 011352          XRB2: TSTB @TSR ;IS SUC TXF SET IN XMTR?
2410 024024 100433          BMI XRB3
2411 024026          ERROR \N ;ERROR:SUC TXF IN XMTR NOT SET IN 2 MS.
2412 024050 005777 011322          TST @TSR ;ANY HARD ERRORS?
2413 024054 100014          BPL XRBS2
2414 024056 032777 040000 005664          BIT #B14,@SR ;CHECK IF PRINT ALLOWED
2415 024064 001010          BNE XRBS2 ;IF NOT, SKIP IT.
2416 024066          PNTM TXSTAT ;IF SO, PRINT 'TRANSMITTER STATUS = ''
2417 024076 017700 011274          MOV @TSR,R0
2418 024102 004767 006420          JSR PC,OCTPNT ;PRINT CONTENTS OF TSR
2419 024106          SCOPE DATLPS
2420 024114 012767 177777 006064          XRB2: MOV #-1,GOOD
2421 024122 017767 011272 006054          XRB3: MOV @Rddb,BAD
2422 024130 026767 006052 006046          CMP GOOD,BAD ;CHECK DATA RECEIVED
2423 024136 001414          BEQ XRB4 ;IS IT O.K. ?
2424 024140          DATERR \N ;ERROR:DATA RECEIVED IS WRONG (DROPPED BITS)
2425 024162          SCOPE DATLPS
2426 024170 016767 011156 006010          XRB4: MOV TRAD,GOOD ;GET TRANSMITTER TDM BUS ADDRESS
2427 024176 017767 011212 006000          MOV @RCR,BAD ;READ IDENT BITS IN RCR
2428 024204 042767 160377 005772          BIC #160377,BAD ;IGNORE ALL OTHER BITS
2429 024212 026767 005770 005764          CMP GOOD,BAD ;D.C. RECEIVED OK?
2430 024220 001414          BEQ XRB4C
2431 024222          DATERR \N ;ERROR:XMTR IDENT BITS NOT REC'D BY RCVR
2432 024244          SCOPE DATLPS
```

2433	024252				XRB4C:	BDINIT	XMTR		:CLR XMTR
2434	024260					BDINIT	RCVR		:CLR RCVR
2435	024266	012777	000000	011104		MOV	#0,@TSDB		:LOAD A WORD OF 0'S INTO SILO
2436	024274	012777	177776	011100		MOV	#-2,@TSBC		:SET BYTE CNT FOR 1 WORD
2437	024302	012777	177776	011112		MOV	#-2,@RDBC		
2438	024310	016777	011034	011056		MOV	RCAD,@TCR		:POINT XMTR AT RCVR
2439	024316	052777	020000	011070		BIS	#B13,@RCR		:SET RCV WD
2440	024324	052777	020000	011042		BIS	#B13,@TCR		:SET SND WD
2441	024332	016704	005414			MOV	DLCON,R4		
2442	024336	012703	177570		XRB4D:	MOV	#177570,R3		:SET UP 2 MS DELAY
2443	024342	005777	011050		XRB5:	TST	@RSR		:ANY ERRORS?
2444	024346	100427				BMI	2\$:YES, ERROR
2445	024350	032777	000400	011040		BIT	#F08,@RSR		:DATA OUTPUT READY YET?
2446	024356	001020				BNE	1\$		
2447	024360	005203				INC	R3		:WAIT A COUPLE OF MS FOR IT
2448	024362	001367				BNE	XRB5		
2449	024364	005304				DEC	R4		
2450	024366	001363				BNE	XRB4D		
2451	024370					ERROR	\N		:ERROR:DAT OUTP RDY IN RCVR NOT SET IN 2 MS.
2452	024412					SCOPE	XRB4C		
2453	024420	005777	010772		1\$:	TST	@RSR		:ANY HARD ERRORS IN RCVR?
2454	024424	100030				BPL	XRB6		
2455	024426				2\$:	ERROR	\N		:ERROR:HARD ERROR ON 1 WD XFER
2456	024450	032777	040000	005272		BIT	#B14,@SR		:CHECK IF PRINT ALLOWED
2457	024456	001013				BNE	XRB6		:IF NOT, SKIP IT.
2458	024460					PNTM	RCSTAT		:IF SO, PRINT 'RECEIVER STATUS = ''
2459	024470	017700	010722			MOV	@RSR,R0		
2460	024474	004767	006026			JSR	PC,OCTPNT		:PRINT CONTENTS OF RSR
2461	024500					SCOPE	XRB4C		
2462	024506	105777	010664		XRB6:	TSTB	@TSR		:IS SUC TXF SET IN XMTR?
2463	024512	100433				BMI	XRB7		
2464	024514					ERROR	\N		:ERROR:SUC TXF IN XMTR NOT SET IN 2 MS.
2465	024536	005777	010634			TST	@TSR		:ANY HARD ERRORS IN XMTR?
2466	024542	100014				BPL	XRB6S		
2467	024544	032777	040000	005176		BIT	#B14,@SR		:CHECK IF PRINT ALLOWED
2468	024552	001010				BNE	XRB6S		:IF NOT, SKIP IT
2469	024554					PNTM	TXSTAT		:IF SO, PRINT 'TRANSMITTER STATUS = ''
2470	024564	017700	010606			MOV	@TSR,R0		
2471	024570	004767	005732			JSR	PC,OCTPNT		:PRINT CONTENTS OF TSR
2472	024574				XRB6S:	SCOPE	XRB4C		
2473	024602	005067	005400		XRB7:	CLR	GOOD		
2474	024606	017767	010606	005370		MOV	@Rddb,BAD		:CHECK DATA RECEIVED
2475	024614	026767	005366	005362		CMP	GOOD,BAD		:IS IT O.K.?
2476	024622	001414				BEQ	XRB8		
2477	024624					DATERR	\N		:ERROR:DATA RECEIVED IS WRONG (PICKED UP BITS)
2478	024646					SCOPE	XRB4C		
2479	024654	004767	173022		XRB8:	JSR	PC,CLRCBF		:MAKE SURE CMPBUF IS CLEAR
2480	024660					BDINIT	XMTR		:CLR XMTR
2481	024666					BDINIT	RCVR		:CLR RCVR
2482	024674	017777	033026	010502		MOV	#SILDAT,@TSBA		:GET XMTR DATA FROM SILDAT
2483	024702	012777	033426	010514		MOV	#CMPBUF,@RDBA		:PUT RCV'D DATA IN CMPBUF
2484	024710	012777	177600	010464		MOV	#-128,@TSBC		:SET UP TO SEND 64 WORDS
2485	024716	012777	177600	010476		MOV	#-128,@RDBC		:SET UP TO RECEIVE 64 WORDS
2486	024724	016777	010420	010442		MOV	RCAD,@TCR		:POINT XMTR AT RCVR
2487	024732	052777	060001	010454		BIS	#60001,@RCR		:SET RC NPR, RCV WD, & ST TXF IN RCVR
2488	024740	052777	060001	010426		BIS	#60001,@TCR		:AND IN XMTR

;

2489	024746	016702	005000			MOV	DLCON,R2		
2490	024752	005003				XRBA8:	CLR R3		
2491	024754	012704	177777				MOV #-1,R4		;SET UP 1 SEC DELAY
2492	024760	105777	010412			XRBA9:	TSTB @TSR		;IS SUC TXF SET IN XMTR?
2493	024764	100447					BMI XRB10		;YES, GO CHECK RECEIVER
2494	024766	005777	010404				TST @TSR		;ERROR BIT SET?
2495	024772	100411					BMI \$2\$		
2496	024774	005777	010416				TST @RSR		;RCVR ERROR BIT SET?
2497	025000	100444					BMI \$3\$		
2498	025002	005203					INC R3		;NO, WATCH FOR A SECOND
2499	025004	001365					BNE XRB9		
2500	025006	005204					INC R4		
2501	025010	001363					BNE XRB9		
2502	025012	005302					DEC R2		
2503	025014	001356					BNE XRB8A		
2504	025016					\$2\$:	ERROR \N		;ERROR:NO SUC TXF IN XMTR IN 1 SEC
2505	025040	005777	010332				TST @TSR		;ANY HARD ERRORS IN XMTR?
2506	025044	100014					BPL XRB9S		
2507	025046	032777	040000	004674			BIT #B14,@SR		;CHECK IF PRINT ALLOWED
2508	025054	001010					BNE XRB9S		;IF NOT, SKIP IT
2509	025056						PNTM TXSTAT		;IF SO, PRINT 'TRANSMITTER STATUS = ''
2510	025066	017700	010304				MOV @TSR,R0		
2511	025072	004767	005430				JSR PC,OCTPNT		;PRINT CONTENTS OF TSR
2512	025076					XRBA9S:	SCOPE XRB8		
2513	025104	105777	010306			XRBA10:	TSTB @RSR		;IS SUC TXF SET IN RCVR?
2514	025110	100433					BMI XRB11		;YES, GO CHECK DATA
2515	025112					\$3\$:	ERROR \N		;ERROR:NO SUC TXF IN RCVR IN 1 SEC
2516	025134	005777	010256				TST @RSR		;ANY HARD ERRORS IN RCVR?
2517	025140	100014					BPL XRB10S		
2518	025142	032777	040000	004600			BIT #B14,@SR		;CHECK IF PRINT ALLOWED
2519	025150	001010					BNE XRB10S		;IF NOT, SKIP IT
2520	025152						PNTM RCSTAT		;IF SO, PRINT 'RECEIVER STATUS = ''
2521	025162	017700	010230				MOV @RSR,R0		
2522	025166	004767	005334				JSR PC,OCTPNT		;PRINT CONTENTS OF RSR
2523	025172					XRBA10S:	SCOPE XRB8		
2524	025200	012703	000100			XRBA11:	MOV #64.,R3		;R3 IS WORD COUNTER
2525	025204	012701	033026				MOV #SILDAT,R1		;R1 IS GOOD DATA POINTER
2526	025210	012702	033426				MOV #CMPBUF,R2		;R2 IS 'BAD' DATA POINTER
2527	025214	012167	004766			XRBA11L:	MOV (R1)+,GOOD		
2528	025220	012267	004760				MOV (R2)+,BAD		
2529	025224	026767	004756	004752			CMP GOOD,BAD		;DATA WORD OK?
2530	025232	001420					BEQ XRB11C		;IF SO, CONTINUE
2531	025234						DATERR \N		;ERROR:BAD DATA RECEIVED FROM XMTR
2532	025256	005303					DEC R3		;CHECKED ALL WORDS?
2533	025260	001355					BNE XRB11L		
2534	025262						SCOPE XRB8		;RE-TRY BECAUSE OF ERROR
2535	025270	000167	000004				JMP XRB12		
2536	025274	005303				XRBA11C:	DEC R3		;CHECKED ALL WORDS?
2537	025276	001346					BNE XRB11L		
2538	025300					XRBA12:	BDINIT XMTR		;CLR XMTR
2539	025306						BDINIT RCVR		;CLR RCVR
2540	025314	012777	035442	010062			MOV #TSTWRD,@TSBA		;POINT XMTR AT LOC WITH TEST WORD
2541	025322	012777	177200	010052			MOV #-600,@TSBC		;SET UP FOR 300 WORD XFR
2542	025330	016777	010014	010036			MOV RCAD,@TCR		;POINT XMTR AT RCVR
2543	025336	012777	020001	010050			MOV #20001,@RCR		;SET RCV WD, RCV DAT, IN RCVR
2544	025344	052777	060005	010022			BIS #60005,@TCR		;SET TX NPR, INH ADR INC, ST TXM,&SND WD

2601	025760	004767	004542		JSR	PC,OCTPNT		:PRINT CONTENTS OF TSR
2602	025764				XRB13S: SCOPE	XRB12		:START OVER
2603	025772	105777	007420		XRB14: TSTB	@RSR		:RCVR SUC TXF SET?
2604	025776	100433			BMI	XRB15		:YES, ALL DONE
2605	026000				ERROR	\N		:ERROR:RCVR SUC TXF NOT SET
2606	026022	005777	007370		TST	@RSR		:ANY HARD ERRORS IN RCVR?
2607	026026	100014			BPL	XRB14S		
2608	026030	032777	040000	003712	BIT	#B14,@SR		:CHECK IF PRINT ALLOWED
2609	026036	001010			BNE	XRB14S		:IF NOT, SKIP IT.
2610	026040				PNTM	RCSTAT		:IF SO, PRINT 'RECEIVER STATUS = ''
2611	026050	017700	007342		MOV	@RSR,RO		
2612	026054	004767	004446		JSR	PC,OCTPNT		:PRINT CONTENTS OF RSR
2613	026060				XRB14S: SCOPE	XRB12		:START OVER
2614	026066	004767	003262		XRB15: JSR	PC,MONIT		
2615	026072	032777	010000	003650	BIT	#B12,@SR		:SW 12 = 1?
2616	026100	001402			BEQ	XRBRT		:NO, EXIT
2617	026102	000167	175450		JMP	DATLPS		:YES, DON'T EXIT
2618	026106	000207			XRBRT: RTS	PC		

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2620 .SBTTL TRANSMISSION ERRORS TESTS
2621
2622 ;TEST TO CHECK FOR RCVR TIMEOUT.
2623 ;OPEN CHANNEL, THEN DON'T SEND ANY DATA FOR
2624 ; 3 SECONDS.
2625
2626
2627 026110 TXMERS: BDINIT XMTR ;CLR XMTR
2628 026116 BDINIT RCVR ;CLR RCVR
2629 026124 052777 010400 007254 BIS #10400,@TMMR ;SET MASTER & AUTO ADDR
2630 026132 012777 177774 007242 MOV #-4,@TSBC ;INDICATE 2 WD XFR
2631 026140 012777 177777 007232 MOV #-1,@TSDB ;PUT 1 WD IN XMTR SILO
2632 026146 016777 007176 007220 MOV RCAD,@TCR ;POINT XMTR AT RCVR
2633 026154 052777 020000 007232 BIS #B13,@RCR ;SET RCV WD
2634 026162 052777 020000 007204 BIS #B13,@TCR ;SET SND WD
2635 026170 016702 003556 MOV DLCON,R2
2636 026174 005003 TXMR1: CLR R3
2637 026176 012704 177775 MOV #-3,R4 ;SET UP 1 SEC DELAY
2638 026202 032777 002000 007206 XRC1: BIT #B10,@RSR ;IS RCVR TIMEOUT SET?
2639 026210 001022 BNE XRC2 ;IF NOT, WAIT 3 SEC FOR IT
2640 026212 005203 INC R3
2641 026214 001372 BNE XRC1
2642 026216 005204 INC R4
2643 026220 001370 BNE XRC1
2644 026222 005302 DEC R2
2645 026224 001363 BNE TXMR1
2646 026226 ERROR \N ;ERROR:NO TIMEOUT IN 3 SEC WITH NULL ON INPUT
2647 026250 SCOPE TXMERS
2648
2649 ;TEST TO DETERMINE THAT ADDRESSING RCVR AND GENERATING A NULL
2650 ;CYCLE FIRST PROPERLY GENERATES CORRECT RESPONSE CODES
2651 ;AND THAT THE RECEIVER DOES NOT RESPOND.
2652 ;CHANNEL IS OPENED BY POPPING A WORD FROM XMTR SILO.
2653
2654 026256 XRC2: BDINIT XMTR ;CLR XMTR
2655 026264 BDINIT RCVR ;CLR RCVR
2656 026272 012777 177774 007102 MOV #-4,@TSBC ;SET UP FOR 1 WD XFR
2657 026300 016777 007044 007066 MOV RCAD,@TCR ;POINT XMTR AT RCVR
2658 026306 012777 177777 007064 MOV #-1,@TSDB ;PUT 1 WD INTO TXM SILO
2659 026314 052777 000200 007052 BIS #B07,@TCR ;SET RD SILO
2660 026322 052777 020001 007064 BIS #B13+B00,@RCR ;SET RCV WD AND RCV DATA
2661 026330 004567 155776 JSR R5,DELAY ;WAIT FOR WORD TO HIT BOTTOM
2662 026334 000010 .WORD 10
2663 026336 005777 007036 TST @TSDB ;POP WORD OUT
2664 026342 042777 000200 007024 BIC #B07,@TCR ;CLR RD SILO
2665 026350 016704 003376 MOV DLCON,R4
2666 026354 012703 177757 XRC2D: MOV #177757,R3 ;SET UP TO STALL 100 US.
2667 026360 005203 XRC2A: INC R3 ;STALL (WAIT FOR TIME SLICE)
2668 026362 001376 BNE XRC2A
2669 026364 005304 DEC R4
2670 026366 001372 BNE XRC2D
2671 026370 012767 000000 003610 MOV #0,GOOD
2672 026376 017767 007014 003600 MOV @RSR,BAD ;CHK RESPONSE CODES IN RCVR
2673 026404 042767 177760 003572 BIC #177760,BAD
2674 026412 026767 003570 003564 CMP GOOD,BAD ;RSP CODES = 00 & 00 ?
2675 026420 001414 BEQ XRC3
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2676 026422          DATERR  \N          ;ERROR:RESPONSE CODES AT RECEIVER WRONG
2677 026444          SCOPE    XRC2
2678 026452 012767 000001 003526 XRC3:  MOV      #1,GOOD
2679 026460 017767 006712 003516      MOV      @TSR,BAD          ;CHECK RESPONSE CODES IN XMTR
2680 026466 042767 177760 003510      BIC      #177760,BAD
2681 026474 026767 003506 003502      CMP      GOOD,BAD          ;RSP CODES = 00 & 01 ?
2682 026502 001414          BEQ      XRC4
2683 026504          DATERR  \N          ;ERROR:RSP CODES AT XMTR WRONG
2684 026526          SCOPE    XRC2
2685 026534 032777 010000 006654 XRC4:  BIT      #B12,@RSR          ;IS RSR BIT 12 (TXM ERR) SET?
2686 026542 001414          BEQ      XRC5          ;ERROR:RCVR SHOULD NOT BE ADDRESSED
2687 026544          ERROR   \N          ;UPON OPENING A CHANNEL WITH INVALID WORD
2688 026566          SCOPE    XRC2
2689
2690          ;TEST TO DETERMINE THAT CHANNEL OPEN CAN BE ACHEIVED LEGALLY
2691          ;AND THAT, ONCE ACHIEVED, KNOCKING DOWN THE TRANSMITTER BY
2692          ;FAKING A XMTR TXM ERROR CAUSES THE CORRECT RESPONSES AND
2693          ;CAUSES A RECVR TXM ERROR.
2694
2695 026574          XRC5:  BDINIT  XMTR          ;CLR XMTR
2696 026602          BDINIT  RCVR          ;CLR RCVR
2697 026610 012777 177774 006564      MOV      #-4,@TSBC        ;SET UP FOR 2 WD XFR
2698 026616 012777 177777 006554      MOV      #-1,@TSDB        ;LOAD A WORD INTO XMTR SILO
2699 026624 016777 006520 006542      MOV      RCAD,@TCR        ;POINT XMTR AT RCVR
2700 026632 012777 177777 006540      MOV      #-1,@TSDB        ;LOAD 2ND WORD
2701 026640 052777 020000 006546      BIS      #B13,@RCR        ;SET RCV WORD
2702 026646 052777 020000 006520      BIS      #B13,@TCR        ;SET SND WORD
2703 026654 016704 003072          MOV      DLCON,R4
2704 026660 012703 177500          XRC5A: MOV      #177500,R3          ;SET UP FOR DELAY
2705 026664 132777 000010 006516 XRC6:  BITB   #B03,@TMMRH        ;CHECK FOR CHANNEL OPEN
2706 026672 001020          BNE     XRC6A
2707 026674 005203          INC     R3          ;WAIT A BIT
2708 026676 001372          BNE     XRC6
2709 026700 005304          DEC     R4
2710 026702 001366          BNE     XRC5A
2711 026704          ERROR   \N          ;ERROR:CANNOT GET 'CHAN OPEN' IN XMTR
2712 026726          SCOPE    XRC5
2713 026734 132777 000020 006454 XRC6A: BITB   #B04,@RSR          ;CHECK FOR CHANNEL OPEN IN RCVR
2714 026742 001014          BNE     XRC7
2715 026744          ERROR   \N          ;ERROR:CANNOT GET 'CHANNEL OPEN' IN RCVR
2716 026766          SCOPE    XRC5
2717
2718 026774 052777 010000 006374 XRC7:  BIS      #B12,@TSR          ;KNOCK DOWN THE XMTR
2719 027002 016704 002744          MOV      DLCON,R4
2720 027006 012703 177757          XRC7D: MOV      #177757,R3          ;SET UP TO STALL 100 US,
2721 027012 005203          XRC7A: INC     R3          ;STALL (WAIT FOR TIME SLICE)
2722 027014 001376          BNE     XRC7A
2723 027016 005304          DEC     R4
2724 027020 001372          BNE     XRC7D
2725 027022 012767 000004 003156      MOV      #4,GOOD
2726 027030 017767 006362 003146      MOV      @RSR,BAD
2727 027036 042767 177760 003140      BIC      #177760,BAD          ;ARE RESPONSE CODES = 01 & 00 ?
2728 027044 026767 003136 003132      CMP      GOOD,BAD
2729 027052 001414          BEQ      XRC8
2730 027054          DATERR  \N          ;ERROR:RCVR RSP CODES WRONG
2731 027076          SCOPE    XRC5
  
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2732 027104 032777 010000 006304 XRC8: BIT #B12,@RSR ;IS RSR BIT 12 (TXM ERR) SET?
2733 027112 001014 BNE XRC9 ;ERROR:XMTR OFF LINE WHILE CHAN OPEN
2734 027114 ERROR \N ;DIDN'T SET RCVR TXM ERR
2735 027136 SCOPE XRC5
2736
2737 ;TEST TO DETERMINE IF INCORRECT CRC WILL CAUSE A CHECK-FAIL
2738 ;AND GENERATE CORRECT RESPONSES IN RCVR AND XMTR THEREBY CAUSING
2739 ;TRANSMISSION ERRORS IN BOTH.
2740
2741 027144 XRC9: BDINIT XMTR ;CLR XMTR
2742 027152 BDINIT RCVR ;CLR RCVR
2743 027160 012777 177772 006214 MOV #-6,@TSBC ;SET UP FOR 3 WD XFR
2744 027166 012777 177777 006204 MOV #-1,@TSDB ;LOAD A WORD INTO XMTR SILO
2745 027174 012777 000002 006176 MOV #2,@TSDB ;LOAD 2ND WORD INTO XMTR SILO
2746 027202 012777 177772 006212 MOV #-6,@RDBC
2747 027210 012777 177775 006162 MOV #-3,@TSDB ;LOAD 3RD WORD INTO XMTR SILO
2748 027216 016777 006126 006150 MOV RCAD,@TCR ;POINT XMTR AT RCVR
2749 027224 052777 020000 006162 BIS #B13,@RCR ;SET RCV WD
2750 027232 052777 020000 006134 BIS #B13,@TCR ;SET SND WD
2751 027240 105777 006132 XRC10: TSTB @TSR ;WAIT FOR SUC TXF
2752 027244 100375 BPL XRC10
2753 027246 052777 000200 006120 BIS #B07,@TCR ;SET XMTR RD SILO
2754 027254 005777 006120 TST @TSDB ;POP A WORD FROM SILO
2755 027260 042777 000200 006106 BIC #B07,@TCR ;CLR RD SILO
2756 027266 052777 000200 006120 BIS #B07,@RCR ;SET RCVR LD SILO
2757 027274 012777 000014 006116 MOV #14,@RDDDB ;LOAD DIFFERENT 2ND WORD
2758 027302 042777 000200 006104 BIC #B07,@RCR ;CLR LD SILO
2759 027310 042777 000200 006060 BIC #B07,@TSR ;CLR SUC TXF
2760 027316 042777 000200 006072 BIC #B07,@RSR
2761 027324 052777 000001 006062 BIS #B00,@RCR ;SET RCV DATA
2762 027332 052777 000001 006034 BIS #B00,@TCR ;SET ST TXM
2763 027340 016704 002406 MOV DLCON,R4
2764 027344 012703 177000 XRC10B: MOV #177000,R3 ;SET UP TO STALL
2765 027350 005203 XRC10A: INC R3
2766 027352 001376 BNE XRC10A ;STALL (WAIT FOR LAST 2 WORDS)
2767 027354 005304 DEC R4
2768 027356 001372 BNE XRC10B
2769 027360 012767 000013 002620 MOV #13,GOOD
2770 027366 017767 006024 002610 MOV @RSR,BAD ;CHECK RCVR RSP CODES
2771 027374 042767 177760 002602 BIC #177760,BAD ;ARE RSP CODES = 10 & 11 ?
2772 027402 026767 002600 002574 CMP GOOD,BAD
2773 027410 001414 BEQ XRC11
2774 027412 DATERR \N ;ERROR:RCVR RSP CODES WRONG
2775 027434 SCOPE XRC9
2776 027442 017767 005730 002534 XRC11: MOV @TSR,BAD ;CHK XMTR RSP CODES
2777 027450 042767 177760 002526 BIC #177760,BAD ;ARE THEY 10 & 11 ?
2778 027456 026767 002524 002520 CMP GOOD,BAD
2779 027464 001414 BEQ XRC12
2780 027466 DATERR \N ;ERROR:XMTR RSP CODES WRONG
2781 027510 SCOPE XRC9
2782 027516 032777 010000 005652 XRC12: BIT #B12,@TSR ;IS TXM ERR SET IN THE XMTR ?
2783 027524 001014 BNE XRC13
2784 027526 ERROR \N ;ERROR:XMTR TXM ERR NOT SET WITH INVALID DATA
2785 027550 SCOPE XRC9
2786 027556 032777 010000 005632 XRC13: BIT #B12,@RSR ;IS TXM ERR SET IN THE RCVR?
2787 027564 001014 BNE XRC14
```

```
2788 027566          ERROR  \N          ;ERROR:RCVR TXM ERR NOT SET WITH INVALID DATA
2789 027610          SCOPE  XRC9
2790
2791                ;TEST THAT IF THE CHANNEL IS OPENED AND THE RECEIVER RESPONDS
2792                ;TO THE FIRST VALID WORD WITH A NULL, A XMTR TXM ERR RESULTS
2793                ; NULL ON FIRST WORD IS ACHEIVED BY MANUALLY FILLING UP THE
2794                ;RECVR SILO, THEN TRYING TO SEND A WORD FROM XMTR TO RCVR.
2795
2796 027616          XRC14: BDINIT  XMTR
2797 027624          BDINIT  RCVR
2798 027632 052777 000200 005554  BIS      #B07,@RCR      ;SET LD SILO IN RCVR
2799 027640 012703 000100          MOV      #64.,R3      ;R3 IS WORD COUNTER
2800 027644 012704 033026          MOV      #SILDAT,R4    ;R4 IS CURRENT ADDRESS
2801 027650 012477 005544          XRC15: MOV      (R4)+,@Rddb ;FILL UP RCVR SILO
2802 027654 005303          DEC      R3          ;FULL?
2803 027656 001374          BNE      XRC15
2804 027660 016777 005464 005506  MOV      RCAD,@TCR    ;POINT XMTR AT RCVR
2805 027666 042777 000200 005520  BIC      #B07,@RCR    ;CLR LD SILO IN RCVR
2806 027674 012777 177777 005476  MOV      #-1,@TSDB    ;LOAD A WORD INTO XMTR SILO
2807 027702 012777 177774 005472  MOV      #-4,@TSBC    ;SET UP TO XFR 2 WDS
2808 027710 012777 177777 005462  MOV      #-1,@TSDB    ;LOAD 2ND WORD INTO XMTR SILO
2809 027716 052777 020001 005470  BIS      #B13+B00,@RCR ;SET RCV WD & RCV DATA
2810 027724 052777 020001 005442  BIS      #B13+B00,@TCR ;SET SND WD & ST TXM
2811 027732 016704 002014          MOV      DLCON,R4
2812 027736 012703 177000          XRC15B: MOV     #177000,R3 ;SET UP TO STALL
2813 027742 005203          XRC15A: INC      R3
2814 027744 001376          BNE      XRC15A      ;STALL (WAIT FOR TIME SLICE)
2815 027746 005304          DEC      R4
2816 027750 001372          BNE      XRC15B
2817 027752 012767 000006 002226  MOV      #6,GOOD      ;CHK TXM RSP CODES
2818 027760 017767 005412 002216  MOV      @TSR,BAD
2819 027766 042767 177760 002210  BIC      #177760,BAD
2820 027774 026767 002206 002202  CMP      GOOD,BAD     ;ARE THEY 01 & 10 ?
2821 030002 001414          BEQ      XRC16
2822 030004          DATERR  \N          ;ERROR:XMTR RSP CODES WRONG
2823 030026          SCOPE  XRC14
2824 030034 032777 010000 005334  XRC16: BIT      #B12,@TSR ;IS XMTR TXM ERR SET?
2825 030042 001014          BNE      XRC17      ;ERROR:XMISSION TO FULL RCVR SILO
2826 030044          ERROR  \N          ;DID NOT SET TXM ERR IN XMTR
2827 030066          SCOPE  XRC14
2828
2829                ;TEST TO DETERMINE IF , WITH CHANNEL OPEN, THE RECVR IS KNOCKED DOWN
2830                ;THE CORRECT RESPONSE CODES ARE GENERATED AND THE XMTR
2831                ;GETS A TXM ERROR.
2832                ; THE RECVR IS KNOCKED DOWN VIA FORCING A TIMEOUT IN THE RCVR.
2833
2834 030074          XRC17: BDINIT  XMTR
2835 030102          BDINIT  RCVR
2836 030110 012777 177777 005262  MOV      #-1,@TSDB    ;LOAD A WORD INTO XMTR SILO
2837 030116 012777 177774 005256  MOV      #-4,@TSBC    ;SETUP FOR 2 WD XFR
2838 030124 012777 177777 005246  MOV      #-1,@TSDB    ;LOAD 2ND WD INTO XMTR SILO
2839 030132 016777 005212 005234  MOV      PCAD,@TCR    ;POINT XMTR AT RCVR
2840 030140 052777 020000 005246  BIS      #B13,@RCR    ;SET RCV WD
2841 030146 052777 020000 005220  BIS      #B13,@TCR    ;SET SND WD
2842 030154 132777 000010 005226  XRC18: BITB     #B03,@TMMRH ;IS CHANNEL OPEN SET?
2843 030162 001774          BEQ      XRC18      ;WAIT FOR IT
```

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2844 030164 016704 001562          MOV      DLCON,R4
2845 030170 012703 177000          XRC18X: MOV    #17700C,R3          ;DELAY FOR SYNC
2846 030174 005203          XRC18L: INC    R3
2847 030176 001376          BNE      XRC18L
2848 030200 005304          DEC     R4
2849 030202 001372          BNE     XRC18X
2850 030204 052777 002000 005204          BIS     #B10,@RSR          ;KNOCK DOWN RCVR WITH TIMEOUT
2851 030212 016704 001534          MOV     DLCON,R4
2852 030216 012703 177000          XRC18Y: MOV    #177000,R3          ;SET UP FOR STALL
2853 030222 005203          XRC18A: INC    R3
2854 030224 001376          BNE     XRC18A          ;STALL (WAIT FOR T'ME SLICE)
2855 030226 005304          DEC     R4
2856 030230 001372          BNE     XRC18Y
2857 030232 012767 000001 001746          MOV     #1,GOOD
2858 030240 017767 005132 001736          MOV     @TSR,BAD          ;CHECK TXM RESP CODES
2859 030246 042767 177760 001730          BIC     #177760,BAD
2860 030254 026767 001726 001722          CMP     GOOD,BAD          ;ARE THEY 00 & 01 ?
2861 030262 001414          BEQ     XRC19
2862 030264          DATERR  \N          ;ERROR:XMTR RSP CODES WRONG
2863 030306          SCOPE  XRC17
2864 030314 032777 010000 005054 XRC19: BIT     #B12,@TSR          ;IS TX ERR SET IN XMTR
2865 030322 001014          BNE     XRC19A          ;ERROR:XMTR TO OFFLINE RCVR DIDN'T
2866 030324          ERROR  \N          ;CAUSE TXM ERR IN XMTR
2867 030346          SCOPE  XRC17
2868 030354 004767 000774          XRC19A: JSR   PC,MONIT
2869 030360 032777 010000 001362          BIT     #B12,@SR          ;IS SW 12 SET?
2870 030366 001402          BEQ     XRCRET          ;NO, EXIT
2871 030370 000167 175514          JMP     TXMERS          ;YES, STAY HERE
2872 030374 000207          XRCRET: RTS    PC
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.SBTTL REJECT TEST

;TEST OF THE REJECT-RELATED HARDWARE
; CAUSE A REJECT IN THE RCVR AND CHECK ALL RELATED
;RESPONSES IN RCVR AND XMTR

```
XRC20: BDINIT XMTR ;CLR XMTR
        BDINIT RCVR ;CLR RCVR
        MOV #-1,@TSDB ;LOAD A WORD INTO SILO
        MOV #-4,@TSBC ;BYTE COUNT FOR 2 WD XFR
        MOV #-1,@TSDB ;LOAD 2ND WD INTO SILO
        MOV #-4,@RDBC
        MOV RCAD,@TCR ;POINT XMTR AT RCVR
        BIS #B13,@RCR ;SET RCV WD
        BIS #B13+B00,@TCR ;SET SND WD & ST TXM
XRC21: BIT #B08,@RSR ;DAT OUTP RDY IN XMTR?
        BEQ XRC21
        BIS #B15,@RCR ;SET R E J E C T
        MOV DLCON,R4
XRC21A: MOV #177500,R3
XRC22: BIT #B05,@RSR ;CHECK FOR RECOM IN RCVR
        BNE XRC23
        INC R3
        BNE XRC22 ;WAIT A COUPLE OF MS FOR IT
        DEC R4
        BNE XRC21A
        ERROR \N ;ERROR:REJECT DID NOT RESULT IN SETTING RSR-05
        SCOPE XRC20 ;IS ST TXM CLR (CLR'D BY INTR REQ)?
XRC23: BIT #B00,@TCR
        BEQ XRC24
        ERROR \N ;ERROR: SORE DID NOT INTERRUPT XMTR
        SCOPE XRC20 ;CHECK IF REJECT GOT CLR'D
XRC24: BIT #B15,@RCR
        BEQ XRC25
        ERROR \N ;ERROR:RECOM DID NOT CLR REJECT
        SCOPE XRC20 ;CHECK IF REJECT SET SORE IN XMTR
XRC25: BIT #B05,@TSR
        BNE XRC26
        ERROR \N ;ERROR:REJECT DID NOT SET SORE IN XMTR
        SCOPE XRC20
XRC26: BDINIT RCVR
        BDINIT XMTR
        BIS #B13,@RCR ;SET RCV WD IN RCVR
        BIS #B05,@RSR ;SET RECOM
        BIT #B13,@RCR ;CHECK IF RCV WD GOT CLR'D
        BEQ XRC27
        ERROR \N ;ERROR:RECOM DID NOT INTERRUPT RCVR
        SCOPE XRC26
```

.SBTTL TRUNCATION TEST

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031012
031020
031026 012777 177754 004346
031034 012777 177770 004360
031042 012777 033026 004334
031050 012777 033426 004346
031056 016777 004266 004310
031064 052777 060001 004322
031072 052777 060001 004274
031100 032777 001000 004310
031106 001774
031110 052777 100000 004276
031116 016704 000630
031122 012703 175000
031126 105777 004244
031132 100420
031134 005203
031136 001373
031140 005304
031142 001367
031144
031166
031174 032777 000040 004174
031202 001014
031204
031226
031234 105777 004156
031240 100414
031242
031264
031272 032777 000040 004116
031300 001014
031302
031324
031332 004767 000016
031336 032777 010000 000404
031344 001402
031346 000167 177024
031352 000207

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:TEST OF THE TRUNCATE-RELATED HARDWARE
: CAUSE A TRUNCATE IN THE RCVR AND CHECK ALL RELATED
:RESPONSES IN RCVR AND XMTR.

XRC27: BDINIT XMTR ;CLR XMTR
        BDINIT RCVR ;CLR RCVR
        MOV #-20.,@TSBC ;SET TXM BYTE CNT FOR 10 WORD XFR
        MOV #-8.,@RDEC ;SET RCVR BYTE CNT FOR 4 WORDS
        MOV #SILDAT,@TSEA ;POINT XMTR SILO AT DATA BUFFER
        MOV #CMFBUF,@RDBA ;POINT RCVR SILO TO DATA BUFFER
        MOV RCAD,@TCR ;POINT XMTR AT RCVR
        BIS #B14+B13+B00,@RCR ;SET RCV WD & RCV DATA &START NPR
        BIS #B14+B13+B00,@TCR ;SET SND WD & ST TXM & START NPR

XRC29: BIT #309,@RSR
        BEQ XRC29 ;WAIT FOR BYTE COUNT OVERFLOW
        BIS #B15,@RCR ;SET REJECT (TRUNCATE MESSAGE)
        MOV DLCON,R4

XRC29A: MOV #175000,R3
XRC30: TSTB @TSR ;LOOK FOR XMTR SUC TXF
        BMI XRC31
        INC R3
        BNE XRC30 ;WAIT ABOUT 20 MS
        DEC R4
        BNE XRC29A
        ERROR \N ;ERROR:NO SUC TXF AFTER TRUNCATION
        SCOPE XRC27
XRC31: BIT #B05,@TSR ;IS SORE SET?
        BNE XRC32
        ERROR \N ;ERROR:SORE NOT SET BY TRUNCATION
        SCOPE XRC27
XRC32: TSTB @RSR ;IS RCVR SUC TXF SET?
        BMI XRC33
        ERROR \N ;ERROR:NO RCVR SUC TXF AFTER TRUNCATION
        SCOPE XRC27
XRC33: BIT #B05,@RSR ;IS RECOM SET?
        BNE XRC34
        ERROR \N ;ERROR:RECOM NOT SET BY TRUNCATION
        SCOPE XRC27
XRC34: JSR PC,MONIT
        BIT #B12,@SR ;IS SW 12 SET?
        BEQ XRCRT ;NO, EXIT
        JMP XRC20 ;YES, STAY HERE
XRCRT: RTS PC
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2981 031354 005000
2982 031356 105777 004046
2983 031362 100402
2984 031364 000167 000270
2985 031370 017700 004036
2986 031374 042700 177600
2987 031400 020027 000023
2988 031404 001056
2989 031406
2990 031416 017700 000326
2991 031422 004767 001100
2992 031426
2993 031436 017767 000306 001060
2994 031444 004767 000602
2995 031450 016777 001050 000272
2996 031456
2997 031466 105777 003736
2998 031472 100375
2999 031474 017700 003732
3000 031500 042700 177600
3001 031504 020027 000023
3002 031510 001736
3003 031512 020027 000020
3004 031516 001363
3005 031520 012700 000015
3006 031524 004767 001242
3007 031530 005000
3008 031532 004767 001234
3009 031536 004767 001230
3010 031542 020027 000024
3011 031546 001004
3012 031550 012706 002000
3013 031554 000167 151352
3014 031560 020027 000004
3015 031564 001026
3016 031566
3017 031576 016767 000150 000720
3018 031604 016700 000142
3019 031610 004767 000712
3020 031614
3021 031624 004767 000422
3022 031630 016767 000670 000114
3023 031636 000167 177614
3024
3025 031642 020027 000003
3026 031646 001004

.SBTTL "SWITCH" MONITOR ROUTINE

:ENTER AT MONIT FROM EVERY SUB-TEST TO SEE IF CNTRL-S OR CNTRL-C WAS TYPED
:ENTER AT SWDMP FROM ERROR HALTS IF SW 15 = 0
:ALSO MONITORS THE FOLLOWING CONTROL FUNCTIONS:
: CNTRL-T RESTART TEST SELECTOR
: CNTRL-D ALLOW CHANGING OF DELAY
: CNTRL-P CONTINUE (PROCEED)

MONIT: CLR R0
TSTB @KBS ;CHECK KEYBOARD FLAG
BMI MONIC ;IF SET, CHECK WHAT CHAR.
JMP EX5 ;OTHERWISE, EXIT
MONIC: MOV @KBD,R0
MONCH: BIC #177600,R0 ;TRIM OFF PARITY BIT
CMP R0,#23 ;WAS IT ^S?
BNE EX1 ;NO, EXIT
SWDMP: PNTM SWRMSG ;PRINT "SWR = "
MOV @SR,R0 ;GET CONTENTS OF SR
JSR PC,OCTPNT ;PRINT IT
PNTM TWOSP ;SPACE AND PROMPT (:)
MOV @SR,KBBUF ;LOAD OLD SWITCHES
JSR PC,INPKB ;GET KBD INPUT
MOV KBBUF,@SR ;LOAD NEW SWITCHES
CCRTN: PNTM TYPCTP ;PRINT "CNTRL-P TO CONTINUE"
CONTW1: TSTB @KBS
BPL CONTW1
MOV @KBD,R0
BIC #177600,R0 ;TRIM OFF PARITY BIT
CMP R0,#23 ;^S?
BEQ SWDMP ;YES, GET SWR AGAIN
CMP R0,#20 ;^P?
BNE CONTW1 ;NO, KEEP LOOKING
MOV #15,R0 ;RETURN LINE
JSR PC,TTO
CLR R0 ;FILL CHARACTERS
JSR PC,TTO
JSR PC,TTO
EX1: CMP R0,#24 ;WAS A ^T TYPED?
BNE EX2 ;NO, EXIT
MOV #ISP,SP ;YES, RENEW STACK
JMP BCONT ;BACK TO DISPATCHER
EX2: CMP R0,#4 ;CNTRL-D TYPED?
BNE EX3 ;NO, KEEP LOOKING
EX2A: PNTM DELYMG ;PRINT "DELAY CONSTANT = "
MOV DLCON,KBBUF ;DEFAULT OLD VALUE
MOV DLCON,R0 ;GET CONSTANT
JSR PC,OCTPNT ;PRINT IT
PNTM TWOSP ;SPACE AND PROMPT
JSR PC,INPKB ;GET KBD INPUT
EX2B: MOV KBBUF,DLCON ;LOAD NEW CONSTANT
JMP CCRTN ;NOW WAIT FOR CNTRL-P
EX3: CMP R0,#3 ;WAS CNTRL-C TYPED?
BNE EX5 ;NO, EXIT

```
3027 031650 012706 002000      MOV   #ISP,SP      ;YES, REFRESH STACK
3028 031654 000167 151036      JMP   RESTRT      ;AND RESTART
3029
3030 031660 000207      EX5:  RTS   PC
3031
3032
3033
3034      ;ASSOCIATED ASCII FOR THIS MODULE:
3035
3036 031662 051446 051127 036440  SWRMSG: .ASCII /&SWR = @/
      031670 040040
3037 031672 042046 046105 054501  DELYMG: .ASCII /&DELAY CONSTANT = @/
      031700 041440 047117 052123
      031706 047101 020124 020075
      031714      100
3038 031715      046 047103 051124  TYPCTP: .ASCII /&CNTRL-P TO CONTINUE@/
      031722 026514 020120 047524
      031730 041440 047117 044524
      031736 052516 040105
3039 031742 020040 040072  TWOSP: .ASCII / :@/
3040
3041
3042      .EVEN
3043      ;OTHER VARIABLES:
3044
3045 031746 000000  SWREG: .WORD 0      ; SOFTWARE SWITCH REGISTER
3046
3047 031750 000000  SR: .WORD 0      ; SWITCH REGISTER POINTER
3048
3049 031752 000006  DLCON: .WORD 6      ;DELAY CONSTANT
```

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3051                                     .SBTTL COMMON SUBROUTINES
3052
3053                                     ;ERROR ROUTINE
3054
3055 031754 011667 000220 000212 ERR:   MOV   (SP),ERRAD      ;GET ADDRESS OF ERROR CALL
3056 031760 162767 000022          SUB   #22,ERRAD      ;OFFSET IT
3057 031766          ERR1:  PNTM  ERRM          ;PRINT '**ERROR '
3058 031776 016700 000200          MOV   ERRNUM,RO
3059 032002 004767 000520          JSR  PC,OCTPNT      ;PRINT ERROR NUMBER (P)
3060 032006          PNTM  WDAT          ;PRINT 'AT LOCATION '
3061 032016 016700 000156          MOV   ERRAD,RO
3062 032022 004767 000500          JSR  PC,OCTPNT      ;PRINT ADDRESS OF ERROR
3063 032026 004767 177322          JSR  PC,MONIT
3064 032032 004767 000602          JSR  PC,NULLS      ;PRINT NULLS IN CASE OF 'RESET'
3065 032036 000207          RTS    PC          ;RETURN
3066
3067                                     ;DATA ERROR ROUTINE
3068
3069 032040 011667 000134 000126 DERR:  MOV   (SP),ERRAD      ;GET ADDRESS OF ERROR CALL
3070 032044 162767 000022          SUB   #22,ERRAD      ;OFFSET IT
3071 032052 004767 177710          JSR  PC,ERR1        ;PRINT '**ERROR (P) AT LOCATION XXX
3072 032056          PNTM  WDSDB        ;PRINT 'SHOULD BE '
3073 032066 016700 000114          MOV   GOOD,RO
3074 032072 004767 000430          JSR  PC,OCTPNT      ;PRINT GOOD DATA
3075 032076          PNTM  WDWAS        ;PRINT ', WAS '
3076 032106 016700 000072          MOV   BAD,RO
3077 032112 004767 000410          JSR  PC,OCTPNT      ;PRINT BAD DATA
3078 032116 004767 000516          JSR  PC,NULLS      ;PRINT NULLS IN CASE OF 'RESET'
3079 032122 000207          RTS    PC
3080
3081
3082
3083                                     ;ASSOCIATED ASCII FOR THIS MODULE:
3084
3085 032124 023046 025052 051105 ERRM:  .ASCII /&&**ERROP @/
3086 032132 047522 020122          100
3087 032137 040 052101 046040 WDAT:  .ASCII / AT LOCATION @/
3088 032144 041517 052101 047511
3089 032152 020116          100
3090 032155 046 044123 052517 WDSDB:  .ASCII /&SHOULD BE @/
3091 032162 042114 041040 020105
3092 032170          100
3093 032171 054 053440 051501 WDWAS:  .ASCII /, WAS @/
3094 032176 040040
3095
3096
3097                                     .EVEN
;OTHER VARIABLES:
ERRAD:  .WORD  0
ERRNUM: .WORD  0
BAD:    .WORD  0
GOOD:   .WORD  0

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3113 032210 010046
3114 032212 117600 000000
3115 032216 022700 000100
3116 032222 001411
3117 032224 022700 000046
3118 032230 001002
3119 032232 012700 000015
3120 032236 004767 000530
3121 032242 005216
3122 032244 000762
3123 032246 005726
3124 032250 000207
3125

```
.SBTTL MESSAGE PRINT ROUTINE

:MESSAGE TYPDUT ROUTINE (CALLED BY MACRO PNTM A)
:MESSAGES ARE IN THE FORMAT:
:  MSG:      .ASCII      /&MESSAGE&a/
:
:WHERE: & IS TRANSLATED INTO CR. AND LF.
:
:USES THE SUBROUTINE 'TTO'
:WHICH PRINTS CR. & LF. UPON SEEING A CR. CODE.
:AND  @ IS MESSAGE TERMINATOR
:
:ENTER WITH ADDRESS OF MESSAGE IN RO

TYPDUT: MOV      RO,-(SP)           ;STACK ADDRESS OF MESSAGE
TPOFCH: MOVB    @ (SP),RO         ;FETCH ASCII BYTE
        CMP     #100,RO          ;IS IT @ (TERMINATOR)?
        BEQ    TPOUTX           ;YES-EXIT
        CMP     #46,RO          ;IS IT CRLF FLAG?
        BNE    TPCONT           ;NO-TYPE CHARACTER
        MOV     #15,RO          ;YES, CHANGE DATA TO CR
TPCONT: JSR    PC,TTO           ;TYPE IT
        INC    (SP)            ;MOVE POINTER TO NEXT BYTE
        BR     TPOFCH          ;FETCH NEXT CHARACTER
TPOUTX: TST    (SP)+            ;POP STACK TO REACH RETURN VECTOR
        RTS     PC
```

.SBTTL KEYBOARD INPUT ROUTINE

```

3127
3128
3129      ;KEYBOARD INPUT ROUTINE CALLED BY JSR PC,INPKB
3130      ;ENTERED WITH OLD CONTENTS IN KBBUF
3131      ;IF JUST <CR> TYPED, EXIT WITH SAME CONTENTS IN KBBUF
3132      ;IF NEW NUMBER TYPED, EXIT WITH NEW CONTENTS IN KBBUF
3133
3134 032252 005067 000244      INPKB: CLR      NOKEFL      ;CLEAR NO NUMBER FLAG
3135 032256 010146              MOV      R1,-(SP)      ;STACK OLD R1
3136 032260 016746 000240      MOV      KBBUF,-(SP)  ;STACK 'OLD CONTENTS'
3137 032264 005067 000234      CLR      KBBUF        ;CLEAR INPUT BUFFER
3138 032270 004767 000206      GETCHR: JSR     PC,KBRD ;FETCH A CHARACTER IN R0
3139 032274 004767 000472      JSR     PC,TTO        ;ECHO IT
3140 032300 020027 000012      CMP     R0,#12        ;WAS IT A <CR> OR <LF>?
3141 032304 001002              BNE     1$            ;NO
3142 032306 000167 000144      JMP     NRTRN         ;YES, RETURN WITH PROPER KBBUF
3143 032312 010001      1$:  MOV     R0,R1        ;SET UP TO CHECK FOR A NUMBER
3144 032314 042701 177407      BIC     #177407,R1    ;MASK ALL BUT # CODE
3145 032320 020127 000060      CMP     R1,#60        ;IS IT A # FROM 0-7?
3146 032324 001435              BEQ     3$            ;YES, PACK IT
3147 032326 020027 000177      CMP     R0,#177       ;WAS IT A DELETE/RUBOUT?
3148 032332 001024              BNE     2$            ;NO, MUST BE GARBAGE
3149 032334 012700 000057      MOV     #57,R0        ;YES, BUT PRINT '\
3150 032340 004767 000426      JSR     PC,TTO
3151 032344 000241              CLC
3152 032346 006067 000152      ROR     KBBUF         ;CLEAR THE C-BIT
3153 032352 000241              CLC
3154 032354 006067 000144      ROR     KBBUF         ;DELETE LAST DIGIT
3155 032360 000241              CLC
3156 032362 006067 000136      ROR     KBBUF         ; THAT WAS STUFFED
3157 032366 005767 000132      TST     KBBUF         ; INTO KBBUF
3158 032372 001002              BNE     11$           ;HAVE WE DELETED EVERYTHING?
3159 032374 005067 000122      CLR     NOKEFL        ;NO
3160 032400 000167 177664      11$:  JMP     GETCHR       ;YES, BACK TO NO NUMBER INPUT
3161 032404 012700 000077      2$:  MOV     #77,R0      ;GO FOR MORE INPUT
3162 032410 004767 000356      JSR     PC,TTO        ;ECHO '?' FOR ERRONEOUS INPUT
3163 032414 000167 177650      JMP     GETCHR
3164 032420 012767 177777 000074 3$:  MOV     #-1,NOKEFL    ;AND GET ANOTHER CHARACTER
3165 032426 042700 177770      BIC     #177770,R0    ;GOT A DIGIT. SET FLAG
3166 032432 006367 000066      ASL     KBBUF         ;GET THE DIGIT PART OF THE CHARACTER
3167 032436 006367 000062      ASL     KBBUF         ;SHIFT KBBUF BUFFER
3168 032442 006367 000056      ASL     KBBUF         ; TO ACCEPT THE
3169 032446 050067 000052      BIS     R0,KBBUF     ; NEW DIGIT.
3170 032452 000167 177612      JMP     GETCHR       ;ADD THE NEW DIGIT
3171
3172 032456 005767 000040      NRTRN: TST     NOKEFL  ;GO FOR MORE INPUT
3173 032462 001004              BNE     NEK          ;WAS THERE NEW DATA?
3174 032464 012667 000034      MOV     (SP)+,KBBUF  ;YES, GO BACK WITH IT
3175 032470 012601              MOV     (SP)+,R1    ;NO, RETRIEVE OLD DATA
3176 032472 000207              RTS     PC          ;RESTORE R1
3177 032474 005726      NEK:  TST     (SP)+   ;AND RETURN
3178 032476 012601              MOV     (SP)+,R1    ;DUMP OLD DATA
3179 032500 000207              RTS     PC          ;RESTORE R1
3180
3181 032502 105777 002722      KBRD:  TSTB    @KBS   ;AND RETURN
3182 032506 100375              BPL     KBRD        ;WAIT FOR INPUT FROM CONSOLE

```

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KEYBOARD INPUT ROUTINE

SEQ 0077

3183 032510 017700 002716
3184 032514 042700 177600
3185 032520 000207

KBRET: MOV @KBD,RO
BIC #17760C,RO
RTS PC

;PUT THE CHAR INTO RO
;TRIM PARITY

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KEYBOARD INPUT ROUTINE

SEQ 0078

3187
3188
3189 032522 000000
3190 032524 000000

;ASSOCIATED VARIABLE STORAGE:
NOKEFL: .WORD 0
KBBUF: .WORD 0

```
.SBTTL BINARY TO ASCII CONVERSION ROUTINES

3192
3193
3194 :CONVERTS BINARY TO BINARY, BINARY TO
3195 :OCTAL, AND BINARY TO DECIMAL; EITHER
3196 :UNJUSTIFIED WITH LEADING ZERO'S SUPPRESSED
3197 :OR RIGHT JUSTIFIED WITH LEADING 0'S
3198 :SUPPRESSED
3199
3200
3201 :REGULAR BIN-OCTAL UNJUSTIFIED:
3202
3203 032526 005067 000270 OCTPNT: CLR RJFLG ;CLEAR RIGHT JUSTIFY FLAG
3204 032532 012701 000010 MOV #10,R1 ;SET RADIX FOR OCTAL
3205 032536 004767 000122 JSR PC,NUMPNT ;CONVERT & PRINT
3206 032542 000207 RTS PC ;RETURN
3207
3208 :BIN-OCTAL JUSTIFIED:
3209
3210 032544 012767 177777 000250 OCTJSP: MOV #-1,RJFLG ;SET RIGHT JUSTIFY FLAG
3211 032552 012701 000010 MOV #10,R1 ;SET RADIX FOR OCTAL
3212 032556 004767 000102 JSR PC,NUMPNT ;CONVERT & PRINT
3213 032562 000207 RTS PC
3214
3215 :BIN-BIN
3216
3217 032564 005067 000232 BINPNT: CLR RJFLG ;CLEAR RIGHT JUSTIFY FLAG
3218 032570 012701 000002 MOV #2,R1 ;SET RADIX FOR BINARY
3219 032574 004767 000064 JSR PC,NUMPNT ;CONVERT & PRINT
3220 032600 000207 RTS PC
3221
3222 :BIN-DECIMAL UNJUSTIFIED:
3223
3224 032602 005067 000214 DECPNT: CLR RJFLG ;CLEAR RIGHT JUSTIFY FLAG
3225 032606 012701 000012 MOV #12,R1 ;SET RADIX FOR DECIMAL
3226 032612 004767 000046 JSR PC,NUMPNT ;CONVERT & PRINT
3227 032616 000207 RTS PC
3228
3229 :BIN-DECIMAL JUSTIFIED (6 PLACES)
3230
3231 032620 012767 177777 000174 DECJSP: MOV #-1,RJFLG ;SET RIGHT JUSTIFY FLAG
3232 032626 012701 000012 MOV #12,R1 ;SET RADIX FOR DECIMAL
3233 032632 004767 000026 JSR PC,NUMPNT ;CONVERT & PRINT
3234 032636 000207 RTS PC
3235
3236
3237 032640 032777 040000 177102 NULLS: BIT #B14,@SR ;O.K. TO PRINT?
3238 032646 001005 BNE NULOUT ;NO, FORGET IT
3239 032650 005000 NULL1: CLR RO
3240 032652 004767 000114 JSR PC,TTO
3241 032656 004767 000110 JSR PC,TTO
3242 032662 000207 NULOUT: RTS PC
```



```
3244 ;UNSIGNED CONVERT-PRINT ROUTINE (BIN - ASCII)
3245
3246 032664 010167 000134 NUMPNT: MOV R1,RADIX ;SAVE RADIX
3247 032670 005002 CLR R2 ;CLEAR TAB COUNTER
3248 032672 005001 DIVSET: CLR R1 ;CLEAR WORK REGISTER
3249 032674 020067 000124 DIVID: CMP R0,RADIX ;IS NUMBER BELOW RADIX?
3250 032700 103404 BLO GETDG ;IF YES, STORE DIGIT
3251 032702 166700 000116 SUB RADIX,R0 ;ELSE, KEEP SUBTRACTING
3252 032706 005201 INC R1 ;AND KEEP COUNT
3253 032710 000771 BR DIVID
3254 032712 010046 GETDG: MOV R0,-(SP) ;STACK REMAINDER
3255 032714 010100 MOV R1,R0
3256 032716 001403 BEQ PNTEXT ;PRINT IF HIGHEST ORDER STACKED
3257 032720 005202 INC R2 ;ELSE COUNT DIGITS FOR R. JUSTIFY
3258 032722 004767 177744 JSR PC,DIVSET
3259
3260 032726 012703 000006 PNTEXT: MOV #6,R3 ;GET DIGIT COUNT CONSTANT
3261 032732 160203 SUB R2,R3 ;HAVE WE PRODUCED 6 DIGITS?
3262 032734 003413 BLE PNT ;YES, JUSTIFICATION UNNECESSARY
3263 032736 005767 000060 TST RJFLG ;IS THE JUSTIFY FLAG SET?
3264 032742 001410 BEQ PNT ;NO-DON'T JUSTIFY
3265 032744 012700 000040 JUST: MOV #40,R0 ;YES, PRINT LEADING SPACES
3266 032750 004767 000016 JSR PC,TTO
3267 032754 005303 DEC R3
3268 032756 001372 BNE JUST
3269 032760 005067 000036 CLR RJFLG ;CLEAR JUSTIFY FLG WHEN DONE
3270 032764 012600 PNT: MOV (SP)+,R0 ;GET REST OF DIGITS OFF STACK
3271 032766 052700 000060 BIS #'0,R0 ;MAKE THEM ASCII
3272 ;TYPE OUT ROUTINE
3273 ;PRINTS A CHARACTER WHICH IS IN R0
3274 ;IF THE CHARACTER IS 'CR.', ALSO PRINT A 'LF.'.
3275
3276
3277 032772 010077 002440 TTO: MOV R0,@TTB ;PRINT CONTENTS OF R0
3278 032776 105777 002432 TTOLP: TSTB @TTS ;WAIT TILL PRINT DONE
3279 033002 100375 BPL TTOLP
3280 033004 022700 000015 CMP #15,R0 ;WAS IT A <CR>?
3281 033010 001401 BEQ TTOLF ;YES, ECHO A LF AS WELL
3282 033012 000207 RTS PC ;NO, JUST RETURN
3283 033014 012700 000012 TTOLF: MOV #12,R0
3284 033020 000764 BR TTO
3285
3286
3287 ;ASSOCIATED VARIABLE STORAGE:
3288
3289 033022 000000 RJFLG: .WORD 0
3290 033024 000000 RADIX: .WORD 0
```

```
3292 .SBTTL TEST BUFFERS
3293
3294 ;DATA SILO DATA-BUFFER
3295
3296 033026 125252 SILDAT: 125252
3297 033030 052525 052525
3298 033032 125252 125252
3299 033034 052525 052525
3300 033036 125252 125252
3301 033040 052525 052525
3302 033042 125252 125252
3303 033044 052525 052525
3304 033046 125252 125252
3305 033050 052525 052525
3306
3307 033052 177400 177400
3308 033054 000377 000377
3309 033056 177400 177400
3310 033060 000377 000377
3311 033062 177400 177400
3312 033064 000377 000377
3313 033066 177400 177400
3314 033070 000377 000377
3315 033072 177400 177400
3316 033074 000377 000377
3317
3318 033076 000000 000000
3319 033100 177777 177777
3320 033102 000000 000000
3321 033104 177777 177777
3322 033106 000000 000000
3323 033110 177777 177777
3324 033112 000000 000000
3325 033114 177777 177777
3326 033116 000000 000000
3327 033120 177777 177777
3328
3329 033122 010421 010421
3330 033124 021042 021042
3331 033126 031463 031463
3332 033130 042104 042104
3333 033132 052525 052525
3334 033134 063146 063146
3335 033136 076567 076567
3336 033140 104210 104210
3337 033142 114631 114631
3338 033144 125252 125252
3339
3340 033146 000001 000001
3341 033150 177776 177776
3342 033152 000002 000002
3343 033154 177775 177775
3344 033156 000003 000003
3345 033160 177774 177774
3346 033162 000004 000004
3347 033164 177773 177773
```


Line	Code	Value	SILCRC
3367			
3368			
3369	033226	125252	SILCRC: 125252
3370	033230	050521	050521
3371	033232	124200	124200
3372	033234	000665	000665
3373	033236	141436	141436
3374	033240	164003	164003
3375	033242	075106	075106
3376	033244	027371	027371
3377	033246	002562	002562
3378	033250	135105	135105
3379			
3380	033252	002640	002640
3381	033254	045405	045405
3382	033256	060152	060152
3383	033260	013403	013403
3384	033262	153756	153756
3385	033264	072577	072577
3386	033266	164176	164176
3387	033270	025435	025435
3388	033272	111272	111272
3389	033274	052673	052673
3390			
3391	033276	157140	157140
3392	033300	102461	102461
3393	033302	066234	066234
3394	033304	016141	016141
3395	033306	175726	175726
3396	033310	121477	121477
3397	033312	036420	036420
3398	033314	122203	122203
3399	033316	045272	045272
3400	033320	016435	016435
3401			
3402	033322	010703	010703
3403	033324	103142	103142
3404	033326	177121	177121
3405	033330	016654	016654
3406	033332	033047	033047
3407	033334	042734	042734
3408	033336	046205	046205
3409	033340	014300	014300
3410	033342	024677	024677
3411	033344	103302	103302
3412			
3413	033346	106245	106245
3414	033350	124160	124160
3415	033352	132304	132304
3416	033354	015025	015025
3417	033356	017305	017305
3418	033360	044754	044754
3419	033362	044406	044406
3420	033364	061203	061203
3421	033366	140621	140621
3422	033370	054620	054620

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TEST BUFFERS

H 7

SEQ 0085

3440
3441
3442 033426 000100

;RECEIVER DATA COMPARE BUFFER
.EVEN
CMPBUF: .BLKW 64.

CZ
PC
RF
RF
RF
RF
RF
RF
RF
RF
RF
RF
RF
RH
RH
RH
RH
RH
RH
RH
RH
RI
RI
RI
RJ
RJ
RJ
RJ
RP
RS
RS
SB
SC
SC
SC
SI
SI
SI

```
3444 .SBTTL ASCII STORAGE
3445
3446 033626 023046 044523 047514 SLOWD: .ASCII /&&SILO OUTPUT WORD WAS @/
      033634 047440 052125 052520
      033642 020124 047527 042122
      033650 053440 051501 040040
3447 033656 023046 044523 047514 SLIWD: .ASCII /&&SILO INPUT WORD WAS @/
      033664 044440 050116 052125
      033672 053440 051117 020104
      033700 040527 020123 100
3448 033705 046 047105 020104 PEND: .ASCII /&END PASS #@/
      033712 040520 051523 021440
      033720 100
3449 033721 046 041523 050117 SCSEC: .ASCII /&SCOPE SECTION FOR SLICE TIMING&SET SW 09 TO EXIT THIS LOOP.@/
      033726 020105 042523 052103
      033734 047511 020116 047506
      033742 020122 046123 041511
      033750 020105 044524 044515
      033756 043516 051446 052105
      033764 051440 020127 034460
      033772 052040 020117 054105
      034000 052111 052040 044510
      034006 020123 047514 050117
      034014 040056
3450 034016 052046 040522 051516 TXSTAT: .ASCII /&TRANSMITTER STATUS REG = @/
      034024 044515 052124 051105
      034032 051440 040524 052524
      034040 020123 042522 020107
      034046 020075 100
3451 034051 046 042522 042503 RCSTAT: .ASCII /&RECEIVER STATUS REG = @/
      034056 053111 051105 051440
      034064 040524 052524 020123
      034072 042522 020107 020075
      034100 100
3452 034101 046 047516 020056 RCBTCN: .ASCII /&NO. OF WORDS RECEIVED = @/
      034106 043117 053440 051117
      034114 051504 051040 041505
      034122 044505 042526 020104
      034130 020075 100
3453 034133 046 041520 030514 TXHDR: .ASCII /&PCL11 TRANSMITTER TEST & @/
      034140 020061 051124 047101
      034146 046523 052111 042524
      034154 020122 042524 052123
      034162 023040 020040 100
3454 034167 046 041520 030514 RCHDR: .ASCII /&PCL11 RECEIVER TEST& @/
      034174 020061 042522 042503
      034202 053111 051105 052040
      034210 051505 023124 020040
      034216 040040
3455 034220 052046 040522 051516 XRHDR: .ASCII /&TRANSMITTER - RECEIVER LOOP TESTS& @/
      034226 044515 052124 051105
      034234 026440 051040 041505
      034242 044505 042526 020122
      034250 047514 050117 052040
      034256 051505 051524 020046
      034264 020040 100
```

CZ
PCI
SL
SLC
SLC
SR

SR
SSI
SW
SW
SW
SW
SW
TCI

TC
TDI
TEI
TE
TE
TE
TE
TM
TM

TM
TM

3456 034267 046 041520 030514 ALTHDR: .ASCII /&PCL11 TESTS 1 - 3 SEQUENCE& @/
034274 020061 042524 052123
034302 020123 020061 020055
034310 020063 042523 052521
034316 047105 042503 020046
034324 020040 100
3457 034327 046 046530 051124 TMTR: .ASCII /&XMTR @/
034334 040040
3458 034336 051046 053103 020122 RECVR: .ASCII /&RCVR @/
034344 100
3459 034345 061 052123 052440 FRAD: .ASCII /1ST UNIBUS ADDR...@/
034352 044516 052502 020123
034360 042101 051104 027056
034366 040056
3460 034370 052046 040510 020124 TOOLW: .ASCII /&THAT WAS TOO LOW! I'LL GIVE YOU ANOTHER CHANCE...&@/
034376 040527 020123 047524
034404 020117 047514 020527
034412 044440 046047 020114
034420 044507 042526 054440
034426 052517 040440 047516
034434 044124 051105 041440
034442 040510 041516 027105
034450 027056 040046
3461 034454 052046 040510 020124 AGAIN: .ASCII /&THAT WON'T DO. TRY AGAIN!&@/
034462 047527 023516 020124
034470 047504 020056 051124
034476 020131 043501 044501
034504 020516 040046
3462 034510 042526 052103 051117 VCTR: .ASCII /VECTOR...@/
034516 027056 040056
3463 034522 051120 047511 044522 PRIOTY: .ASCII /PRIORITY (4-7)..@/
034530 054524 020040 032050
034536 033455 027051 040056
3464 034544 042124 020115 052502 TDMA: .ASCII /TDM BUS ADDR (1-37)..@/
034552 020123 042101 051104
034560 024040 026461 033463
034566 027051 040056
3465 034572 044446 053116 046101 INVLAD: .ASCII /&INVALID DEVICE ADDRESS...(IT'S NOT THERE)@/
034600 042111 042040 053105
034606 041511 020105 042101
034614 051104 051505 027123
034622 027056 044450 023524
034630 020123 047516 020124
034636 044124 051105 024505
034644 100
3466 034645 046 051124 050101 TRAP4: .ASCII /&TRAPPED TO LOCATION 4 FROM LOCATION @/
034652 042520 020104 047524
034660 046040 041517 052101
034666 047511 020116 020064
034674 051106 046517 046040
034702 041517 052101 047511
034710 020116 100
3467 034713 046 050046 046103 TSTHDR: .ASCII /&&PCL11 STANDALONE TESTS V02A CZPLBBO 8-SEP-78&@/
034720 030461 051440 040524
034726 042116 046101 047117
034734 020105 042524 052123

CZI
PCI
TO
TPI
TP
TR
TRI
TS
TS
TS
TS
TS
TS
TT
TT
TT
TW
TX
TX
TX
TX
TY
TY
VC
WD
WD
WD
XA
XA
XA
XA

3475
3476 035312
3477
3478
3479
3480
3481 035312 000000
3482 035314 000000
3483 035316 000000
3484 035320 000000
3485 035322 000000
3486 035324 000000
3487 035326 000000
3488 035330 000000
3489 035332 000000
3490 035334 000000
3491 035336 000000
3492 035340 000000
3493 035342 000000
3494 035344 000000
3495 035346 000000
3496 035350 000000
3497 035352 000000
3498 035354 000000
3499 035356 000000
3500 035360 000000
3501
3502
3503
3504
3505 035362 000005
3506 035364 000170
3507 035366 000174
3508 035370 000240
3509 035372 000240
3510 035374 164200
3511 035376 164202
3512 035400 164204
3513 035402 164206
3514 035404 164210
3515 035406 164212
3516 035410 164213
3517 035412 164214
3518 035414 164220
3519 035416 164222
3520 035420 164224
3521 035422 164226
3522 035424 164230
3523 035426 164234
3524 035430 177560
3525 035432 177562
3526 035434 177564
3527 035436 177566
3528 035440 035440
3529 035442 177777
3530

.SBTTL CONSTANTS AND VARIABLE STORAGE
.EVEN

;VARIABLES

DILLY: .WORD 0
DLY: .WORD 0
SWRFLG: .WORD 0
PNTFLG: .WORD 0
ITER: .WORD 0
SWI: .WORD 0
PAT: .WORD 0
MASK: .WORD 0
PSNO1: .WORD 0
PSNO2: .WORD 0
PSNO3: .WORD 0
PSNO4: .WORD 0
TEMP: .WORD 0
TESTNO: .WORD 0
\$4FLAG: .WORD 0
RCAD: .WORD 0
TRAD: .WORD 0
COUNT: .WORD 0
DATWD: .WORD 0
TMPRIO: .WORD 0

;RECEIVER ADDRESS
;TRANSMITTER ADDRESS

;CONSTANTS:

FKPRIO: .WORD 5
TXVEC: .WORD 170
RCVEC: .WORD 174
XPRIOR: .WORD 240
RPRIOR: .WORD 240
TCR: .WORD 164200
TSR: .WORD 164202
TSDB: .WORD 164204
TSBC: .WORD 164206
TSBA: .WORD 164210
TMMR: .WORD 164212
TMMRH: .WORD 164213
TSCRC: .WORD 164214
RCR: .WORD 164220
RSR: .WORD 164222
RDDB: .WORD 164224
RDDB: .WORD 164226
RDBA: .WORD 164230
RDCRC: .WORD 164234
KBS: .WORD 177560
KBD: .WORD 177562
TTS: .WORD 177564
TTB: .WORD 177566
MEM: .WORD MEM
TSTWRD: .WORD 177777

Symbol	Value	660	663#	620	624	638	642	657	661	670	674	3461#	920*	922	926*
ADGD	003016	660	663#												
ADOK	002772	656	659#												
ADRGD	003124	673	676#												
ADROK	003100	669	672#												
AGAIN	034454	603	612	620	624	638	642	657	661	670	674	3461#	920*	922	926*
ALTHDR	034267	717	3456#												
BAD	032204	893*	895	899*	901	905*	906*	908	910	914*	916		920*	922	926*
		928	945*	946	952*	953*	954	962*	963	972*	974		978*	979	983*
		984	988*	990	1009*	1010	1034*	1035	1140*	1142*	1144		1168*	1200*	1201*
		1203	1246*	1248	1267*	1269	1303*	1305	1320*	1321	1376*		1634*	1637	1715*
		1717	1721*	1723	1727*	1729	1733*	1735	1739*	1741	1758*		1759	1765*	1766*
		1767	1776*	1778	1782*	1784	1788*	1790	1794*	1796	1815*		1816	1840*	1841
		1881*	1883	1901*	1903	1939*	1940	2052*	2053	2226*	2227		2321*	2366*	2368
		2421*	2422	2427*	2428*	2429	2474*	2475	2528*	2529	2573*		2574	2672*	2673*
		2674	2679*	2680*	2681	2726*	2727*	2728	2770*	2771*	2772		2776*	2777*	2778
		2818*	2819*	2820	2858*	2859*	2860	3076	3096#						
BATST	005772	765	1029#	1047											
BCONT	003132	561	677#	686	869	3013									
BCTST	005616	764	1004#	1022											
BEGIN	002000	468	554	565#											
BHLPMG	003176	681	683	685#											
BINPNT	032564	3217#													
B00	= 000001	464#	1006	1031	1334	1812	1837	2660	2761	2762	2809	2810	2889	2903	
		2938	2939												
B01	= 000002	463#	1004	1029	1054	1227	1244	1251	1272	1274	1313	1324	1333	1350	
		1386	1397	1442	1491	1509	1520	1535	1547	1559	1590	1599	1606	1620	
		1651	1775	1810	1835	1860	1879	1886	1906	1909	1957	1972	2013	2033	
		2069	2117	2140	2152	2187	2196	2203	2209	2218	2242	2294	2295	2324	
		2325	2379	2380	2433	2434	2480	2481	2538	2539	2627	2628	2654	2655	
		2695	2696	2741	2742	2796	2797	2834	2835	2881	2882	2915	2916	2931	
		2932													
B02	= 000004	462#	2042												
B03	= 000010	461#	1230	1241	1255	1265	1296	1346	1399	1867	1892	1916	1968	2705	
		2842													
B04	= 000020	460#	1405	2713											
B05	= 000040	459#	2895	2911	2918	2953	2961								
B06	= 000100	458#	1413	1423	1563	1569	1575	1593	2015	2156	2162	2168	2190		
B07	= 000200	457#	1139	1167	1199	1206	1213	1253	1263	1300	1308	1310	1374	1379	
		1387	1388	1392	1393	1576	1594	1630	1871	1873	1896	1898	1910	1920	
		1987	1992	2019	2020	2028	2029	2118	2122	2169	2171	2191	2219	2353	
		2365	2659	2664	2753	2755	2756	2758	2759	2760	2798	2805			
B08	= 000400	456#	1234	1259	1292	1513	1863	1876	1888	1899	1946	2047	2120	2172	
		2392	2445	2548	2890										
B09	= 001000	455#	1061	1070	1429	1430	1444	1516	2057	2940					
B10	= 002000	454#	751	1449	1450	1525	1673	2071	2072	2258	2638	2850			
B11	= 004000	453#	771	1459	1460	1543	1690	2085	2086	2273					
B12	= 010000	452#	933	995	1020	1045	1218	1353	1469	1470	1549	1601	1648	1746	
		1801	1826	1851	1974	2095	2096	2142	2198	2239	2348	2615	2685	2718	
		2732	2782	2786	2824	2864	2869	2966							
B13	= 020000	451#	808	1419	1438	1479	1480	2014	2024	2065	2070	2080	2105	2106	
		2385	2387	2439	2440	2633	2634	2660	2701	2702	2749	2750	2809	2810	
		2840	2841	2888	2889	2917	2919	2938	2939						
B14	= 040000	450#	897	903	912	918	924	930	948	956	965	976	981	986	
		992	1012	1037	1058	1075	1080	1085	1091	1096	1101	1109	1113	1119	
		1127	1131	1135	1146	1154	1158	1166	1173	1187	1194	1205	1212	1232	
		1236	1243	1250	1257	1261	1271	1277	1278	1280	1290	1294	1298	1307	

		1323	1348	1362	1390	1395	1411	1415	1421	1425	1432	1436	1440	1446
		1452	1456	1462	1466	1472	1476	1482	1486	1499	1501	1503	1507	1518
		1533	1545	1570	1582	1586	1612	1623	1626	1628	1642	1719	1725	1731
		1737	1743	1761	1769	1780	1786	1792	1798	1818	1843	1865	1869	1878
		1885	1890	1894	1905	1918	1923	1932	1934	1942	1948	1970	1999	2017
		2022	2026	2031	2044	2049	2055	2059	2063	2067	2074	2078	2082	2088
		2092	2098	2102	2108	2112	2130	2132	2134	2138	2163	2179	2183	2210
		2232	2312	2316	2322	2341	2345	2398	2402	2403	2411	2414	2424	2431
		2451	2455	2456	2464	2467	2477	2504	2507	2515	2518	2531	2554	2557
		2576	2577	2594	2597	2605	2608	2646	2676	2683	2687	2711	2715	2730
		2734	2774	2780	2784	2788	2822	2826	2862	2866	2901	2905	2909	2913
		2921	2938	2939	2951	2955	2959	2963	3237					
B15	= 100000	449#	1014	1039	1417	1434	1454	1464	1474	1484	1505	1820	1845	2061
		2076	2090	2100	2110	2136	2892	2907	2942					
CCRTN	031456	2996#	3023											
CHXDAT	023476	2314	2343	2363#										
CLRCBF	017702	1908	1978#	2479										
CMPBUF	033426	1922	1936	1979	1998	2043	2051	2483	2526	2936	3442#			
CONTW1	031466	2997#	2998	3004										
COUNT	035354	1631*	1645*	3498#										
CRCTST	014364	770	1620#	1629	1643	1650								
DATLPS	023556	2270	2379#	2399	2408	2419	2425	2432	2617					
DATWD	035356	2223*	2224	2230	3499#									
DECJSP	032620	3231#												
DECPNT	032602	724	780	1699	2282	3224#								
DELAY	004332	876#	1162	1190	1196	1208	1228	1239	1538	1541	1861	1874	2356	2661
DELYMG	031672	3016	3037#											
DERR	032040	897	903	912	918	924	930	948	956	965	976	981	986	992
		1012	1037	1146	1205	1250	1271	1307	1323	1642	1719	1725	1731	1737
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		2780	2822	2862	3060#									
DEVGEN	004050	650	819#											
DILLY	035312	876*	883*	3481#										
DIVID	032674	3249#	3253											
DIVSET	032672	3248#	3258											
DLCON	031752	877	879*	880	1179	1282	1363	1403	1522	1924	2000	2301	2330	2388
		2441	2489	2546	2586	2635	2665	2703	2719	2763	2811	2844	2851	2893
		2943	3017	3018	3022*	3049#								
DLWT	004352	878	880#	884										
DLWT1	004360	881#	882											
DLY	035314	880*	881*	3482#										
DTLPS1	023650	2389#	2397											
DVATST	004242	583	854#											
EROINT	021676	2155	2160#											
ERR	031754	1058	1075	1080	1085	1091	1096	1101	1109	1113	1119	1127	1131	1135
		1154	1158	1166	1173	1187	1194	1212	1232	1236	1243	1257	1261	1280
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		1533	1545	1570	1582	1586	1612	1628	1628	1628	1642	1719	1725	1731
		1932	1948	1970	2017	2022	2026	2031	2049	2059	1878	1890	1894	1918
		2082	2088	2092	2098	2102	2108	2031	2049	2063	2067	2074	2078	2088
		2210	2312	2341	2398	2402	2411	2112	2130	2134	2138	2163	2179	2183
		2605	2646	2687	2711	2715	2734	2451	2455	2464	2504	2515	2554	2594
		2913	2921	2951	2955	2959	2963	2784	2788	2826	2866	2901	2905	2909
ERRAD	032200	3055*	3056*	3061	3069*	3070*	3094#	3055#						

PRMT8	002524	623	626#														
PRMT9	002556	632#	639	643													
PROMT	002056	574#	582	856													
PS	= 177776	422#	556*	560*	567*	748*	863*	1558*	1564*	1567*	1574*	1577*	1595*	1670*			
		2151*	2157*	2160*	2167*	2174*	2192*	2255*									
PSNO1	035332	692*	777*	779	3489#												
PSNO2	035334	693*	1696*	1698	3490#												
PSNO3	035336	694*	2279*	2281	3491#												
PSNO4	035340	695*	721*	723	3492#												
P1	= 000040	445#															
P2	= 000100	444#															
P3	= 000140	443#															
P4	= 000200	442#															
P5	= 000240	441#															
P6	= 000300	440#															
P7	= 000340	439#	556	560	567	570	748	863	1558	1567	1574	1670	2151	2160			
		2167	2255														
RADIX	033024	3246*	3249	3251	3290#												
RART	015435	1747	1749#														
RA1	015152	1718	1721#														
RA2	015222	1724	1727#														
RA3	015276	1730	1733#														
RA4	015346	1736	1739#														
RA5	015416	1742	1745#														
RBATST	016320	1685	1835#	1853													
RBCTST	016144	1684	1810#	1828													
RBRT	016316	1827	1829#														
RB1	016166	1813#	1819	1824													
RB2	016250	1817	1820#														
RB3	016276	1821	1825#														
RCAD	035350	676*	2384	2438	2486	2542	2632	2657	2699	2748	2804	2839	2887	2937			
		3496#															
RCBTCN	034101	2567	2579	3452#													
RCHDR	034167	705	3454#														
RCR	035414	837*	1727	1755*	1757*	1758	1764*	1765	1771*	1775*	1776	1810*	1835*	1860*			
		1867	1871*	1873*	1879*	1886*	1892	1896*	1898*	1906*	1909*	1910*	1916	1920*			
		1923*	1934*	1957*	1968	1972*	1987*	1992*	1999*	2004*	2013*	2014*	2024	2033*			
		2034*	2042*	2044*	2065	2069*	2070*	2080	2117*	2118*	2122*	2125*	2140*	2152*			
		2156*	2162*	2168*	2169*	2171*	2187*	2190*	2196*	2203*	2209*	2218*	2219*	2242*			
		2294*	2300*	2325*	2353*	2360*	2380*	2385*	2427	2434*	2439*	2481*	2487*	2539*			
		2543*	2628*	2633*	2655*	2660*	2696*	2701*	2742*	2749*	2756*	2758*	2761*	2797*			
		2798*	2805*	2809*	2835*	2840*	2882*	2888*	2892*	2907	2915*	2917*	2919	2932*			
		2938*	2942*	3518#													
RCRCTS	022336	1689	2218#	2233	2241												
RCRT	016472	1852	1854#														
RCRTST	015440	1683	1755#	1803													
RCSTAT	034051	2405	2458	2520	2564	2610	3451#										
RCVADR	035452	587	589*	590	594	836	3536#										
RCVEC	035366	848*	2153	2155*	2166*	2189*	3507#										
RCVVEC	035446	607	609*	848	3534#												
RC1	016342	1838#	1844	1849													
RC2	016424	1842	1845#														
RC3	016452	1846	1850#														
RDBA	035424	845*	1721	1773*	1794	1839*	1840	1922*	1998*	2043*	2052	2124*	2299*	2483*			
		2936*	3522#														
RDBC	035422	843*	1715	1772*	1788	1814*	1815	1921*	1926	1997*	2041*	2045	2123*	2128			

XA5	004666	917	920#								
XA6	004736	923	926#								
XA7	005006	929	932#								
XBRT	005770	1021	1023#								
XB1	005640	1007#	1013	1018							
XB2	005722	1011	1014#								
XB3	005750	1015	1019#								
XCRT	006144	1046	1048#								
XC1	006014	1032#	1038	1043							
XC2	006076	1036	1039#								
XC3	006124	1040	1044#								
XDRT	005614	996	998#								
XD1	005034	943#	949								
XD2	005116	947	950#	957							
XD3	005202	955	958#	966							
XD4	005274	964	967#	977	982	987	993				
XD5	005404	975	978#								
XD6	005452	980	983#								
XD7	005520	985	988#								
XD8	005534	990#									
XD9	005574	991	994#								
XEND	003704	772	775#								
XERT	010162	1219	1221#								
XE1	006222	1057	1060#								
XE10	007046	1125#									
XE11	007106	1124	1129#								
XE12	007146	1130	1133#								
XE13	007206	1134	1137#								
XE14	007214	1139#	1153								
XE15	007246	1144#									
XE16	007306	1145	1148#								
XE17	007320	1152#									
XE18	007360	1151	1156#								
XE19	007420	1157	1160#	1169							
XE2	006272	1067	1069#	1071							
XE20	007514	1165	1170#	1174	1195	1207	1214				
XE21	007562	1172	1175#								
XE22	007570	1176#	1177								
XE22A	007600	1178#	1188								
XE22B	007612	1180#	1186								
XE23	007616	1181#	1184								
XE24	007666	1182	1189#								
XE25	007742	1193	1196#								
XE26	010054	1204	1208#								
XE27	010130	1211	1215#								
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XE3B	006422	1079	1082#	1086							
XE5A	006470	1084	1087#	1092	1097	1102					
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XE6A	006612	1094	1098#								
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XE8	006766	1112	1115#	1120							
XE9	007034	1118	1121#	1126							
XFEMT	011604	1337	1340	1343	1374#						

XFMTW	011614	1376#	1378				
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XF11	011066	1293	1296#	1299			
XF12	011126	1297	1300#				
XF13	011144	1303#	1312				
XF14	011232	1306	1311#				
XF17	011236	1313#	1325				
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XF20	011504	1351#					
XF3	010362	1242	1246#	1258			
XF3A	010444	1249	1253#				
XF5	010516	1256	1259#	1262			
XF6	010556	1260	1263#	1273			
XF6A	010570	1265#	1266				
XF7	010660	1270	1274#	1281	1291	1309	
XF8	010750	1279	1282#				
XF8A	010754	1283#	1289				
XF9	010760	1284#	1287				
XHRT	013676	1550	1552#				
XH1	011712	1389	1392#	1396			
XH10	012556	1451	1454#				
XH11	012616	1455	1458#	1463	1467		
XH12	012670	1461	1464#				
XH13	012730	1465	1468#	1473	1477		
XH14	013002	1471	1474#				
XH15	013042	1475	1478#	1483	1487		
XH16	013114	1481	1484#				
XH17	013154	1485	1491#	1500	1504	1508	
XH18	013246	1498	1501#				
XH19	013306	1502	1505#				
XH2	011760	1394	1397#	1412	1416	1422	1426
XH2A	012030	1405#	1408				
XH2B	012024	1404#	1410				
XH20	013346	1506	1509#				
XH20L	013354	1510#	1514	1515	1519		
XH21	013444	1517	1520#	1534			
XH21A	013464	1523#	1532				
XH22	013472	1525#	1528	1530			
XH22A	013546	1526	1535#	1546			
XH23	013650	1544	1547#				
XH3	012100	1406	1413#				
XH4	012140	1414	1417#				
XH5	012210	1420	1423#				
XH6	012250	1424	1427#	1433	1437	1441	
XH7	012330	1431	1434#				
XH8	012370	1435	1438#				
XH8A	012430	1439	1442#	1447			
XH9	012504	1445	1448#	1453	1457		

				898	904	913	919	925	931	935
XINIT	004376	762	892#							
XJRT	014302	1602	1604#							
XJO	014024	1566	1572#							
XJ1	014036	1574#	1609							
XJ2	014130	1581	1584#							
XJ3	014170	1585	1588#	1598	1614					
XJ3S	014214	1592#	1613							
XJ4	014254	1589	1599#							
XKRT	014632	1649	1651#							
XK1	014414	1624#	1625							
XK2	014462	1627	1630#							
XK3	014502	1633#	1646							
XK4	014600	1638	1644#							
XPRI0	035370	631*	1584	3508#						
XRART	023432	2349	2351#							
XRA1	023044	2304#	2307	2309						
XRA2	023120	2305	2314#							
XRA2A	023156	2315	2318#							
XRA3	023226	2319	2324#	2342	2346					
XRA3A	023274	2331#	2340							
XRA4	023302	2333#	2336	2338						
XRA5	023354	2334	2343#							
XRA6	023412	2344	2347#							
XRBR7	026106	2616	2618#							
XRBS2	024106	2413	2415	2419#						
XRBI	023654	2390#	2395							
XRBI0	025104	2493	2513#							
XRBI0S	025172	2517	2519	2523#						
XRBI1	025200	2514	2524#							
XRBI1C	025274	2530	2536#							
XRBI1L	025214	2527#	2533	2537						
XRBI2	025300	2535	2538#	2571	2583	2602	2613			
XRBI2K	025362	2547#	2553							
XRBI2L	025356	2546#	2585							
XRBI2M	025366	2548#	2551							
XRBI2R	025466	2556	2562#							
XRBI2S	025536	2558	2571#							
XRBI2T	025514	2563	2567#							
XRBI3	025544	2549	2572#							
XRBI3C	025652	2575	2584#							
XRBI3D	025666	2588#	2589							
XRBI3E	025662	2587#	2593							
XRBI3L	025644	2578	2583#							
XRBI3S	025764	2596	2598	2602#						
XRBI4	025772	2591	2603#							
XRBI4S	026060	2607	2609	2613#						
XRBI5	026066	2604	2614#							
XRBI2	024020	2401	2404	2409#						
XRBI3	024114	2410	2420#							
XRBI4	024170	2423	2426#							
XRBI4C	024252	2430	2433#	2452	2461	2472	2478			
XRBI4D	024336	2442#	2450							
XRBI5	024342	2443#	2448							
XRBI6	024506	2454	2457	2462#						
XRBI6S	024574	2466	2468	2472#						
XRBI7	024602	2463	2473#							

XRBB	024654	2476	2479#	2512	2523	2534			
XRBB8A	024752	2490#	2503						
XRBB9	024760	2492#	2499	2501					
XRBB9S	025076	2506	2508	2512#					
XRCNT	023514	2366#	2371						
XRCRET	030374	2870	2872#						
XRCRT	031352	2967	2969#						
XRC1	026202	2638#	2641	2643					
XRC10	027240	2751#	2752						
XRC10A	027350	2765#	2766						
XRC10B	027344	2764#	2768						
XRC11	027442	2773	2776#						
XRC12	027516	2779	2782#						
XRC13	027556	2783	2786#						
XRC14	027616	2787	2796#	2823	2827				
XRC15	027650	2801#	2803						
XRC15A	027742	2813#	2814						
XRC15B	027736	2812#	2816						
XRC16	030034	2821	2824#						
XRC17	030074	2825	2834#	2863	2867				
XRC18	030154	2842#	2843						
XRC18A	030222	2853#	2854						
XRC18L	030174	2846#	2847						
XRC18X	030170	2845#	2849						
XRC18Y	030216	2852#	2856						
XRC19	030314	2861	2864#						
XRC19A	030354	2865	2868#						
XRC2	026256	2639	2654#	2677	2684	2688			
XRC2A	026360	2667#	2668						
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XRC20	030376	2272	2881#	2902	2906	2910	2914	2968	
XRC21	030464	2890#	2891						
XRC21A	030506	2894#	2900						
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XRC23	030562	2896	2903#						
XRC24	030622	2904	2907#						
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XRC26	030722	2912	2915#	2922					
XRC27	031012	2920	2931#	2952	2956	2960	2964		
XRC29	031100	2940#	2941						
XRC29A	031122	2944#	2950						
XRC3	026452	2675	2678#						
XRC30	031126	2945#	2948						
XRC31	031174	2946	2953#						
XRC32	031234	2954	2957#						
XRC33	031272	2958	2961#						
XRC34	031332	2962	2965#						
XRC4	026534	2682	2685#						
XRC5	026574	2686	2695#	2712	2716	2731	2735		
XRC5A	026660	2704#	2710						
XRC6	026664	2705#	2708						
XRC6A	026734	2706	2713#						
XRC7	026774	2714	2718#						
XRC7A	027012	2721#	2722						
XRC7D	027006	2720#	2724						
XRC8	027104	2729	2732#						

BDINIT	474#	1004	1029	1054	1227	1244	1251	1272	1274	1313	1324	1333	1350	1386	1397
	1442	1491	1509	1520	1535	1547	1559	1550	1599	1606	1620	1651	1810	1835	1860
	1879	1886	1906	1909	1957	1972	2013	2033	2069	2117	2140	2152	2187	2196	2203
	2209	2218	2242	2294	2295	2324	2325	2379	2380	2433	2434	2480	2481	2538	2539
	2627	2628	2654	2655	2695	2696	2741	2742	2796	2797	2834	2835	2881	2882	2915
	2916	2931	2932												
DATERR	500#	897	903	912	918	924	930	948	956	965	976	981	986	992	1012
	1037	1146	1205	1250	1271	1307	1323	1642	1719	1725	1731	1737	1743	1761	1769
	1780	1786	1792	1798	1818	1843	1885	1905	1942	2055	2232	2316	2322	2345	2424
	2431	2477	2531	2576	2676	2683	2730	2774	2780	2822	2862				
ERROR	491#	1058	1075	1080	1085	1091	1096	1101	1109	1113	1119	1127	1131	1135	1154
	1158	1166	1173	1187	1194	1212	1232	1236	1243	1257	1261	1280	1290	1294	1298
	1348	1390	1395	1411	1415	1421	1425	1432	1436	1440	1446	1452	1456	1462	1466
	1472	1476	1482	1486	1499	1503	1507	1518	1533	1545	1570	1582	1586	1612	1628
	1865	1869	1878	1890	1894	1918	1932	1948	1970	2017	2022	2026	2031	2049	2059
	2063	2067	2074	2078	2082	2088	2092	2098	2102	2108	2112	2130	2134	2138	2163
	2179	2183	2210	2312	2341	2398	2402	2411	2451	2455	2464	2504	2515	2554	2594
	2605	2646	2687	2711	2715	2734	2784	2788	2826	2866	2901	2905	2909	2913	2921
	2951	2955	2959	2963											
HLT	509#	805													
MTPS	533#	556	560	567	748	1558	1564	1567	1574	1577	1595	1670	2151	2157	2160
	2167	2174	2192	2255											
PNTM	515#	573	574	575	581	585	586	592	596	597	603	605	606	612	614
	615	620	624	632	633	638	642	651	652	657	661	664	665	670	674
	677	685	699	705	711	717	722	778	855	865	1064	1639	1697	2229	2280
	2405	2416	2458	2469	2509	2520	2559	2564	2567	2579	2599	2610	2989	2992	2996
	3016	3020	3057	3060	3072	3075									
SCOPE	522#	898	904	913	919	925	931	949	957	966	977	982	987	993	1013
	1038	1059	1076	1081	1086	1092	1097	1102	1110	1114	1120	1128	1132	1136	1147
	1155	1159	1169	1174	1188	1195	1207	1214	1233	1237	1245	1252	1258	1262	1273
	1281	1291	1295	1299	1309	1325	1349	1391	1396	1412	1416	1422	1426	1433	1437
	1441	1447	1453	1457	1463	1467	1473	1477	1483	1487	1500	1504	1508	1519	1534
	1546	1571	1583	1587	1613	1629	1643	1720	1726	1732	1738	1744	1762	1770	1781
	1787	1793	1799	1819	1844	1866	1870	1880	1887	1891	1895	1907	1919	1933	1943
	1949	1971	2018	2023	2027	2032	2050	2056	2060	2064	2068	2075	2079	2083	2089
	2093	2099	2103	2109	2113	2131	2135	2139	2164	2180	2184	2211	2233	2313	2317
	2323	2342	2346	2399	2408	2419	2425	2432	2452	2461	2472	2478	2512	2523	2534
	2571	2583	2602	2613	2647	2677	2684	2688	2712	2716	2731	2735	2775	2781	2785
	2789	2823	2827	2863	2867	2902	2906	2910	2914	2922	2952	2956	2960	2964	

. ABS. 035454 000

ERRORS DETECTED: 0

PCLTST,PCLTST/CR/NL:TTM:ME<PCLTST
RUN-TIME: 6 11 2 SECONDS
RUN-TIME RATIO: 75/19=3.8
CORE USED: 12K (23 PAGES)