

DUP11

DUP11 SDLC DECMD TST
CZDPDD0

AH-8585D-MC

COPYRIGHT 75-80

FICHE 1 OF 1

JAN 1980

digital

MADE IN USA

IDENTIFICATION

PRODUCT CODE: AC-8584D-MC
PRODUCT NAME: CZDPDDJ DUP11 SDLC DECMD TST
PRODUCT DATE: JULY 1979
MAINTAINER: DIAGNOSTIC ENGINEERING

THE INFORMATION IN THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE AND SHOULD NOT BE CONSTRUED AS A COMMITMENT BY DIGITAL EQUIPMENT CORPORATION. DIGITAL EQUIPMENT CORPORATION ASSUMES NO RESPONSIBILITY FOR ANY ERRORS THAT MAY APPEAR IN THIS DOCUMENT.

NO RESPONSIBILITY IS ASSUMED FOR THE USE OR RELIABILITY OF SOFTWARE ON EQUIPMENT THAT IS NOT SUPPLIED BY DIGITAL OR ITS AFFILIATED COMPANIES.

COPYRIGHT (C) 1975, 1979 BY DIGITAL EQUIPMENT CORPORATION

THE FOLLOWING ARE TRADEMARKS OF DIGITAL EQUIPMENT CORPORATION:

DIGITAL	PDP	UNIBUS	MASSBUSS
DEC	DECUS	DECTAPE	

1.0 ABSTRACT

THE FUNCTION OF THE DUP11 DIAGNOSTICS IS TO VERIFY THAT THE OPTION OPERATES ACCORDING TO SPECIFICATIONS. THE DIAGNOSTICS VERIFY THAT THERE ARE NO MALFUNCTIONS AND THAT ALL OPERATIONS OF THE DUP11 ARE CORRECT IN ITS ENVIRONMENT. PARAMETERS MAY BE SET TO ALERT DIAGNOSTICS AS TO THE DUP11 CONFIGURATION BY ANSWERING THE PARAMETER DIALOG (LOAD ADDRESS=200, START ADDRESS=1). ALL QUESTIONS SHOULD BE ANSWERED AND THEN EACH DIAGNOSTIC WILL 'OVERLAY' THESE PARAMETERS WHICH ARE STORED IN THE 'STATUS TABLE' (SEE SECTION 8.4). THE ALTERNATIVE TO THE PARAMETER DIALOG IS DEFAULT PARAMETERS (SEE SECTION 8.5).

THE DIAGNOSTICS WILL RUN UP TO EIGHT CONSECUTIVELY ADDRESSED AND CONSECUTIVELY VECTORED DUP11'S IN A CHAIN MODE, I.E., RUNNING THE DIAGNOSTIC COMPLETELY FOR ONE DEVICE BEFORE STARTING THE NEXT.

CZDPD TESTS THE ABILITY OF THE DEVICE TO RUN A LIMITED SDLC PROTOCOL AND LONG DATA PATTERNS. SPECIFIC DATA PATTERNS ARE RUN TO PROVE BIT-STUFF CAPABILITY. THE EIA DATA GATES ARE PROVEN AND THE PRIORITY LOGIC FUNCTIONS ARE CHECKED.

CZDPD TESTS ALL THE FUNCTIONS OF DECMODE AND DOES LONG AND SHORT DATA TESTS INTERNALLY AND OVER THE CABLE, IF ATTACHED. BCC, USING THE CRC16 POLYNOMIAL IS CHECKED, AND THE DEVICE IS TESTED RUNNING A LIMITED DDCMP PROTOCOL.

CURRENTLY THERE ARE THREE OFF-LINE DIAGNOSTICS THAT ARE TO BE RUN IN SEQUENCE TO ENSURE THAT IF AN ERROR SHOULD OCCUR IT WILL BE DETECTED AT AN EARLY STAGE AND ESTABLISH THAT DIAGNOSIS OF THE ERROR WILL BE IMMEDIATE TO DISCOVERING THE PROBLEM.

NOTE: ADDITIONAL DIAGNOSTICS MAY BE ADDED IN THE FUTURE.

THE THREE DIAGNOSTICS ARE:

1. CZDPB [REV] BASIC AND OFFLINE TRANSMITTER TESTS
2. CZDPC [REV] OFFLINE RECEIVER AND MODEM CONTROL AND INTERRUPT TESTS
3. CZDPD [REV] OFFLINE SDLC AND DECMODE DATA AND FUNCTION TESTS

NOTE: THERE IS A FOURTH PROGRAM, TAPE CZDPE [REV] WHICH IS A QUICK-VERIFY TAPE THAT REQUIRES ANSWERING A DIALOG. ITS FUNCTION IS TO ENABLE THE OPERATOR TO QUICKLY DETERMINE IF THERE IS A PROBLEM WITH THE DEVICE. SEE THE DOCUMENTATION IN THAT LISTING FOR MORE INFORMATION.

2.0 REQUIREMENTS

2.1 EQUIPMENT

ANY PDP11 FAMILY CPU (WITH MINIMUM 8k MEMORY)
ASR 33 (OR EQUIVALENT)
DUP11

2.2 STORAGE

PROGRAM WILL USE ALL 8k OF MEMORY EXCEPT WHERE ABS AND
BOOTSTRAP LOADER RESIDE. LOCATION 1500 THRU 1560 ARE
ESPECIALLY TO BE NOTED AND LEFT UNTOUCHED BY THE OPERATOR
AFTER THE DUP11 PARAMETER DIALOG HAS BEEN EXECUTED OR AFTER
THE DEFAULT SETUP HAS BEEN DONE.

3.0 LOADING PROCEDURE

3.1 METHOD

ALL PROGRAMS ARE IN ABSOLUTE FORMAT AND ARE LOADED USING THE
ABSOLUTE LOADER. NOTE: IF THE DIAGNOSTICS ARE ON A MEDIA
SUCH AS DISK, MAGTAPE, DECTAPE, OR CASSETTE FOLLOW
INSTRUCTIONS FOR THE MONITOR WHICH HAS BEEN PROVIDED ON THAT
SPECIFIC MEDIA.

ABSOLUTE LOADER STARTING ADDRESS = **500

MEMORY	SIZE
	(*)-
8k	37
12k	57
16k	77
20k	117
24k	137
28k	157

3.1.1 PLACE ADDRESS OF ABS LOADER INTO SWITCH REGISTER. (ALSO PLACE
'HALT' SW UP)

3.1.2 DEPRESS 'LOAD ADDRESS' KEY ON CONSOLE AND RELEASE.

3.1.3 DEPRESS 'START KEY' ON CONSOLE AND RELEASE (PROGRAM SHOULD NOW
BE LOADING INTO CPU)

4.0 STARTING PROCEDURE

- A. SET SWITCH REGISTER TO 000200
- B. DEPRESS 'LOAD ADDRESS' KEY AND RELEASE
- C. SET SWR TO ZERO FOR DEFAULT PARAMETERS ESTABLISHED IN THE TAPE (SEE SECTION 8.5.3 FOR FULL EXPLANATION OF DEFAULT PARAMETERS) OR LEAVE SWR BIT 7=1 TO USE EXISTING PARAMETERS PREVIOUSLY SET UP BY THE DUP11 PARAMETER DIALOG OR A PREVIOUSLY RUN DUP11 DIAGNOSTIC. SET SWR=1 TO GO THROUGH THE PARAMETER DIALOG. (IT IS NOT NECESSARY TO INPUT NEW PARAMETERS FOR EACH TAPE.) (SECTION 7.2, 8.4 AND 8.5 MAY BE HELPFUL)
- D. DEPRESS 'START KEY' AND RELEASE. THE PROGRAM WILL TYPE THE PROGRAM NAME (IF THIS WAS THE FIRST START UP OF THE PROGRAM) AND ALSO THE FOLLOWING:

'EXAMPLE'

'MAP OF DUP11 STATUS'

1500	160050	CSR OF FIRST DUP11
1502	000300	VECTOR OF FIRST DUP11
1504	140026	STATUS AND SYNC FOR FIRST DUP11
1506	160060	CSR OF SECOND DUP11
1510	000310	VECTOR OF SECOND DUP11
1512	140026	STATUS AND SYNC FOR SECOND DUP11

THE ABOVE IS ONLY AN EXAMPLE! THIS WOULD INDICATE THE STATUS TABLE STARTING AT ADDRESS 1500 IN THE PROGRAM. THE STATUS TABLE MUST BE VERIFIED BY THE USER. FOR INFORMATION ON THE STATUS TABLE SEE SECTION 8.4 FOR HELP.

IT IS POSSIBLE FOR THE OPERATOR TO MANUALLY CHANGE (TOGGLE IN) THE INFORMATION IN THE MAP TO SUIT A SPECIFIC CONFIGURATION OF DEVICES, BUT THE RESPONSIBILITY FOR VERIFYING THAT INFORMATION RESTS WITH THE OPERATOR.

THE PROGRAM WILL TYPE 'R' AND PROCEED TO RUN THE DIAGNOSTIC

4.1 CONTROL SWITCH SETTINGS

SW 15	SET:	HALT ON ERROR
SW 14	SET:	LOOP ON CURRENT TEST
SW 13	SET:	INHIBIT ERROR PRINT OUT
SW 12	SET:	INHIBIT TYPE OUT/BELL ON ERROR.
SW 11	SET:	INHIBIT ITERATIONS. (QUICK PASS)
SW 10	SET:	ESCAPE TO NEXT TEST ON ERROR
SW 09	SET:	LOOP WITH CURRENT DATA
SW 08	SET:	CATCH ERROR AND LOOP ON IT
SW 07	SET:	USE PREVIOUS STATUS TABLE.
SW 06	SET:	RESERVED

SW 05 SET: RESERVED

SW 04 SET: RESERVED
SW 03 SET: SELECT DUP11'S DESIRED ACTIVE
SW 02 SET: LOCK ON SELECTED TEST
SW 01 SET: RESTART PROGRAM AT SELECTED TEST
SW 00 SET: ENTER PARAMETERS USING MANUAL DIALOG

SWITCHES 8 THROUGH 15 ARE DYNAMIC AND SHOULD BE USED AS NEEDED IN THE DIAGNOSTIC. SWITCHES 0 THROUGH 3 ARE STATIC (ONLY ARE OPERABLE WHEN THE MONITOR PORTION OF THE TAPE IS RUNNING) AND SHOULD BE SET UP PRIOR TO STARTING OR RESTARTING THE DIAGNOSTIC.

4.1.2 SWITCH REGISTER RESTRICTIONS

SW 03 RESELECT DUP11'S DESIRED ACTIVE. PLEASE NOTE THAT A MESSAGE IS TYPED OUT FOR SETTING THE SWITCH REGISTER EQUAL TO DUP11'S ACTIVE. THIS MEANS IF THE SYSTEM HAS THREE DUP11S BITS 00, 01, 02 WILL BE SET IN LOC 'DUPACTV' FROM THE SWITCH REGISTER. USING THIS SWITCH(SW03) ALTERS THAT LOCATION. THEREFORE, IF THREE DUP11S ARE IN THE SYSTEM ***DO NOT*** SET SWITCHES GREATER THAN SW 02 IN THE UP POSITION. THIS WOULD BE A FATAL ERROR. DO NOT SELECT MORE ACTIVE DUP11S THAN HAS BEEN GIVEN INFORMATION ABOUT IN THE PARAMETER PROGRAM.

AS EXPLAINED IN SECTION 1.0, DEVICES SHOULD BE CONSECUTIVELY ADDRESSED, AND CAN BE SELECTED OR DESELECTED USING THIS SWITCH.

METHOD: A. LOAD ADDRESS 200
B. START WITH SW 03 1
C. PROGRAM WILL TYPE MESSAGE
D. SET THE BINARY NUMBER OF DUP11S DESIRED ACTIVE. EXAMPLE: 1-1 DUP11; 3-2 DUP11; 7-3 DUP11; 17-4 DUP11 37-5 DUP11 ETC. PRESS CONTINUE.
E. NUMBER (IF VALID) WILL BE IN DATA LIGHTS (EXCLUDING 11/05)
F. SET WITH ANY OTHER SWITCH SETTINGS DESIRED. PRESS CONTINUE.

SW 01 RESTART PROGRAM AT SELECTED TEST. IT IS STRONGLY SUGGESTED THAT AT LEAST ONE PASS HAS BEEN MADE BEFORE TRYING TO SELECT A TEST THAT IS NOT IN THE ORDER OF SEQUENCE. THE REASON FOR THIS IS THAT THE PROGRAM HAS TO CLEAR AREAS AND SET UP PARAMETERS IN THE MONITOR PORTION OF THE PROGRAM. IT IS POSSIBLE TO LD200, AND RAISE SW01, THEN START, PROVIDED PARAMETERS HAVE BEEN PREVIOUSLY SET UP AS DESCRIBED IN SECTION 4.0. ALSO, WHEN A TEST IS SELECTED, ALWAYS START AT THE VERY BEGINNING OF THAT TEST.

SW 09 LOOP ON CURRENT DATA. THIS SWITCH WILL ONLY WORK IF CALL 'SCOPI' IS IN THAT TEST. THE REASON IS THAT MOST TESTS DEAL WITH BLOCKS OF DIFFERENT DATA TO BE SENT OR RECEIVED ALL AT ONCE, THUS KNOWN AS BLOCK DATA--ONE PATTERN CAN'T BE SINGLED OUT. (SEE SECTION 4.1.3.B.1)

4.1.3 SWITCH REGISTER PRIORITIES

A) ERROR SWITCHES

1. SW 12 DELETE PRINT OUT/BELL ON ERROR.
2. SW 13 DELETE ERROR PRINTOUT.
3. SW 15 HALT ON THE ERROR.
4. SW 08 GOTO BEGINNING OF THE TEST (ON ERROR).
5. SW 10 GOTO NEXT TEST (ON ERROR).

B) SCOPE SWITCHES

1. SW 09 - (IF ENABLED BY 'SCOPI') ON AN ERROR. IF AN ASTERISK '*' IS PRINTED IN FRONT OF THE TEST NUMBER (EX. *TEST NO. 10), SW09 IS INCORPORATED IN THAT TEST AND THEREFORE SW09 IS USUALLY THE BEST SWITCH FOR THE SCOPE LOOP (SW14=0, SW10=0, SW09=1, SW08=0).

IF SW09 IS NOT ENABLED AND THERE IS A *HARD* ERROR (CONSTANT ERROR) SW08 IS BEST. (SW14=0, SW10=0, SW09=0, SW08=1).

FOR INTERMITTENT ERRORS, SW14=1 WILL LOOP ON TEST REGARDLESS OF ERROR OR NO ERROR. (SW14=1, SW10=0, SW09=0, SW08=1,0)

2. SW 14 - LOOP ON TEST. WILL LOOP ON TEST UNTIL SWITCH IS LOWERED.
3. SW 11 - INHIBIT ITERATIONS (QUICK PASS). ALLOWS ONLY ONE PASS THROUGH A TEST.

4.2 STARTING ADDRESS

STARTING ADDRESS IS AT 000200. THERE ARE NO OTHER STARTING ADDRESSES FOR THE DUP11 DIAGNOSTICS.

NOTE: IF ADDRESS 000042 IS NON-ZERO THE PROGRAM ASSUMES IT IS UNDER ACT11 OR XXDP CONTROL AND WILL ACT ACCORDINGLY. AFTER *ALL* AVAILABLE DUP11'S ARE TESTED THE PROGRAM WILL RETURN TO 'XXDP' OR 'ACT-11'.

5.0 OPERATING PROCEDURE

WHEN THE PROGRAM IS INITIALLY STARTED MESSAGES AS DESCRIBED IN SECTION FOUR WILL BE PRINTED AND PROGRAM WILL BEGIN RUNNING THE DIAGNOSTIC.

5.1 PROGRAM AND/OR OPERATOR ACTION

THE TYPICAL APPROACH SHOULD BE

1. HALT ON ERROR (VIA SW 15 1) WHENEVER AN ERROR OCCURS.
2. CLEAR SW 15.
3. SET SW 14: (LOOP ON THIS TEST)
4. SET SW 13: (INHIBIT ERROR PRINT OUT)

THE TEST NUMBER AND PC WILL BE TYPED OUT AND POSSIBLY AN ERROR MESSAGE (THIS DEPENDS ON THE TEST), TO GIVE THE OPERATOR AN IDEA AS TO THE SOURCE OF THE PROBLEM. IF IT IS NECESSARY TO KNOW MORE INFORMATION CONCERNING THE ERROR REPORT, LOOK IN THE LISTING FOR THAT TEST NUMBER WHICH WAS TYPED OUT AND THEN NOTE THE PC OF THE ERROR REPORT. IN THIS WAY THE EXACT FUNCTIONING OF THE TEST CAN BE INTERPRETED SINCE THE ERROR PC IS THE HLT+2 LOCATION.

IN SOME TESTS, THERE IS A SUBROUTINE CALL THROUGH A REGISTER (E.G., JSR R1,FLAG). THE SUBROUTINE DOES THE DATA CHECKING FOR THE TEST AND WILL REPORT AN ERROR IF ONE OCCURS. THIS MEANS THAT THE FAILING TEST COULD BE IN ONE PART OF THE LISTING WHILE THE SUBROUTINE THAT FOUND THE ERROR IS IN ANOTHER PART. TO DETERMINE THE PC OF THE FAILING TEST, CHECK THE REGISTER USED BY THE SUBROUTINE. IT WILL CONTAIN THE RETURN ADDRESS OF THE FAILING TEST.

6.0 ERRORS

AS DESCRIBED PREVIOUSLY THERE WILL ALWAYS BE A TEST NUMBER AND PC TYPED OUT AT THE TIME OF AN ERROR (PROVIDING SW 13=0 AND SW 12=0). IN MOST CASES ADDITIONAL INFORMATION WILL BE SUPPLIED TO THE ERROR MESSAGE WHICH IS TO GIVE THE OPERATOR AN INDICATION OF THE ERROR.

6.1 ERROR RECOVERY

IF FOR SOME REASON THE DUP11 SHOULD 'HANG THE BUS' (GAIN CONTROL OF BUS SO THAT CONSOLE MANUAL FUNCTIONS ARE INHIBITED) AN INIT OR POWER DOWN/UP IS NECESSARY FOR OPERATOR TO REGAIN CONTROL OF CPU. IF THIS SHOULD HAPPEN LOOK IN LOCATION 'TSTNO' FOR THE NUMBER OF THE TEST THAT WAS RUNNING AT THE TIME OF THE CATASTROPHIC ERROR. THIS GIVES THE OPERATOR SOME IDEA AS TO WHAT THE DUP11 WAS DOING AT THE TIME OF THE ERROR.

7.0 RESTRICTIONS

7.1 STARTING RESTRICTIONS

SEE SECTION 4 (PLEASE). STATUS TABLE SHOULD BE VERIFIED REGARDLESS OF HOW THE PROGRAM WAS STARTED. ALSO, IT IS IMPORTANT TO USE THE LISTING ALONG WITH THE INFORMATION PRINTED ON THE TTY TO COMPLETELY ISOLATE PROBLEMS.

7.2 OPERATING RESTRICTIONS

DUP11 'PARAMETER DIALOG' MUST BE RUN ONLY ONCE PRIOR TO THE FIRST RUNNING OF ANY DUP11 DIAGNOSTIC IF 'DEFAULT PARAMETERS' ARE NOT USED. IF ONLY DUP11 DIAGNOSTICS WERE LOADED AFTER DUP11 PARAMETER SETUP, AND IF CORE MEMORY HAS NOT BEEN CHANGED, I.E., USE OF DIAGNOSTICS OTHER THAN DUP11 DIAGNOSTICS, AND IF THERE WERE NO DUP11 CONFIGURATION CHANGES, THE DUP11 PARAMETER SETUP NEED NEVER BE RUN AGAIN. HOWEVER, IF ANY OF THE ABOVE HAVE BEEN VIOLATED THE DUP11 PARAMETER SETUP MUST BE RUN AGAIN BEFORE RUNNING THE DIAGNOSTICS. UNDER NORMAL OPERATING CONDITIONS IT SHOULD NOT BE NECESSARY TO INPUT NEW PARAMETERS TO SUBSEQUENT DIAGNOSTICS, UNLESS A CHANGE IS REQUIRED.

NOTE: AN ALTERNATIVE TO THE ABOVE IS ATTEMPTING THE DEFAULT PARAMETERS WHEN THE PROGRAM IS INITIALLY STARTED WITH SWR 0.

7.3 HARDWARE CONFIGURATION RESTRICTIONS FOR THE PURPOSE OF RUNNING MULTIPLE DUP11'S IN CHAIN MODE.

1. CSR ADDRESSES MUST BE CONSECUTIVE.
2. VECTORS ARE CONSECUTIVE IF PARAMETER PROGRAM IS USED.
3. ALL JUMPERS ARE ASSUMED TO BE AS SETUP IN PARAMETER DIALOG.
4. PRIORITY LEVEL MUST BE THE SAME FOR ALL DEVICES.

8.1 MISCELLANEOUS

8.1 EXECUTION TIME

ALL DUP11 DEVICE DIAGNOSTICS WILL GIVE AN 'END PASS' MESSAGE (PROVIDING NO ERRORS AND SW12=0) WITHIN 4 MINS. THIS IS ASSUMING SW11=1 (DELETE ITERATIONS) IS SET TO GIVE THE FASTEST POSSIBLE EXECUTION. THE ACTUAL EXECUTION TIME DEPENDS GREATLY ON THE PDP11 CPU CONFIGURATION.

8.2 PASS COMPLETE

NOTE: *EVERY* TIME THE PROGRAM IS STARTED, THE TESTS WILL RUN AS IF SW11 (DELETE ITERATIONS) WAS UP (=1). THIS IS TO VERIFY NO *HARD* ERRORS AS SOON AS POSSIBLE. THEREFORE THE FIRST PASS--EACH TIME PROGRAM IS STARTED--WILL BE A 'QUICK PASS' UNTIL ALL DUP11'S IN SYSTEM ARE TESTED. WHEN THE DIAGNOSTIC HAS COMPLETED A PASS WITH THE NORMAL ITERATION COUNT (ICOUNT 50), THE FOLLOWING IS AN EXAMPLE OF THE PRINT OUT TO BE EXPECTED.

END PASS CZDPD_ CSR:16005C VEC:300 PASSES:000001 ERRORS:000000

NOTE: THE NUMBERS FOR CSR AND VEC ARE NOT NECESSARILY THE VALUES FOR THE DEVICE. THEY ARE ONLY FOR THIS EXAMPLE.

8.3 KEY LOCATIONS

RETURN CONTAINS THE ADDRESS WHERE PROGRAM WILL RETURN WHEN ITERATION COUNT IS REACHED OR IF LOOP ON TEST IS ASSERTED.

NEXT CONTAINS THE ADDRESS OF THE NEXT TEST TO BE PERFORMED.

TSTNO CONTAINS THE NUMBER OF THE TEST NOW BEING PERFORMED.

RUN THE BIT IN 'RUN' ALWAYS POINTS ONE PAST THE DUP11 CURRENTLY BEING TESTED. EXAMPLE: (RUN) /0000000001000000 MEANS THAT DUP11 NO.05 IS THE DUP11 NOW RUNNING.

DUPCR00-DUPCR07
(1500)-(1560) THESE LOCATIONS CONTAIN THE INFORMATION NEEDED TO TEST UP TO 8 (DECIMAL) DUP11S SEQUENTIALY. THEY CONTAIN THE CSR, VECTOR AND STATUS CONCERNING THE CONFIGURATION OF EACH DUP11.

DUPACTV EACH BIT SET IN THIS LOCATION INDICATES THAT THE ASSOCIATED DUP11 WILL BE TESTED IN TURN. EXAMPLE: (DUPACTV) /0000000000011111 MEANS THAT DUP11 NO. 00,01,02,03,04 WILL BE TESTED.

EXAMPLE: (DUPACTV) /0000000000010001 MEANS
THAT DUP11 NO. 00,04 WILL BE TESTED.

RXCSR CONTAINS THE RECEIVER CSR OF THE CURRENT DUP11
UNDER TEST.

8.4 MORE ON THAT 'STATUS TABLE' (1500-1560)

'MAP OF DUP11 STATUS'

1500	160050
1502	000300
1504	140000

THE ABOVE INFORMATION WILL BE REPEATED FOR EACH OF UP TO 8
DUP11'S IN THE SYSTEM (THESE WILL FOLLOW UNDER THIS TABLE).
EXPLANATION:

1500 160050 THIS IS THE SYSTEM CONTROL REGISTER FOR THE
1ST DUP11 IN THE SYSTEM.

1502 000300 THIS IS VECTOR 'A' FOR THE FIRST DUP11 IN THE
SYSTEM.

1504 140026 THIS REPRESENTS SYNC AND SOFTWARE STATUS FOR
THE FIRST DUP.

THE BITS ARE AS FOLLOWS:

BIT 15	SET:	OPTIONAL CLEAR JUMPER IN
BIT 14	SET:	TURNAROUND CONNECTOR ON
BIT 13	SET:	
BIT 12	SET:	
BIT 11	SET:	
BIT 10	SET:	
BIT 09	SET:	
BIT 08	SET:	
BIT 07-00		SYNC CHARACTER FOR DECMODE TESTS.

THE ABOVE IS REPEATED FOR EACH DUP11 IN THE SYSTEM. THE TABLE
IS FILLED BY DEFAULT PARAMETERS OR BY THE MANUAL PARAMETER
INPUT AS DESCRIBED PREVIOUSLY. ALSO, IF DESIRED BY THE
USER - THE LOCATIONS MAY BE ALTERED BY HAND (TOGGLED IN) TO
SUIT THE SPECIFIC CONFIGURATION, THUS MAKING EACH DEVICE MAP
DIFFERENT. IT IS THE RESPONSIBILITY OF THE OPERATOR TO VERIFY
THE DATA IN THE MAP.

8.5 METHOD OF DEVELOPING DEFAULT PARAMETERS

8.5.1 DEFAULT PARAMETER ASSUMPTIONS

TOO MUCH HARDWARE WOULD HAVE TO BE ANALYZED TO SIZE THE THE
PARAMETERS. THE PROGRAM MUST ASSUME THE VARIATIONS. THE
RESULT, IF NOT TO YOUR SPECIFIC CONFIGURATION, MAY BE ALTERED
BY HAND (TOGGLE IN) AS DESIRED. IN THIS WAY 95% OF THE

PARAMETER SETUP WAS DONE BY THE PROGRAM AND 5% BY YOU.
THEREFORE:

1) ALL JUMPERS ARE ASSUMED TO BE IN THE FOLLOWING
CONFIGURATION.

	IN	OUT
W1=SECONDARY REC ENABLE	X	
W2=SEC REC DISABLE		X
W3=CLEAR OPTION	X	
W4=SEC TX ENABLE	X	
W5=DSC A CONTROL		X
W6=A+B DS CONTROL	X	
W7=BUS GRANT CONTROL	X	

2) THE H325 TURN AROUND CONNECTOR IS ASSUMED TO BE ON.

3) THE MANUFACTURING OPTION CSR OF 160050 AND VECTOR OF 770
ARE USED.

4) THE BR LEVEL IS ASSUMED TO BE 5.

IN ALL ADJUSTMENTS PLEASE REFER TO SECTION 8.4 FOR GREATER
DETAIL.

9.0 CHANGE HISTORY

NOTE: HISTORY STARTS WITH REV. D0

(ZDPDDO - IN RECEIVER INT. SERVICE ROUTINE OF TEST 12, LOC. 013174
CONTAINED 032715, SHOULD BE 32705.


```
541      : *CZDPDDO /<377>/DUP11 SDLC DECMD TST
542      : *COPYRIGHT(C) 1975,1979, DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
543      : -----
544
545      : STARTING PROCEDURE
546      : LOAD PROGRAM
547      : LOAD ADDRESS 000200
548      : PRESS START
549      : PROGRAM WILL TYPE 'CZDPDDO /<377>/DUP11 SDLC DECMD TST '
550      : PROGRAM WILL TYPE 'R' TO INDICATE THAT TESTING HAS STARTED
551      : AT THE END OF A PASS, PROGRAM WILL TYPE PASS COMPLETE MESSAGE
552      : AND THEN RESUME TESTING
553
554
555      : SWITCH REGISTER OPTIONS
556      : -----
557
558      100000      SW15=100000      :=1,HALT ON ERROR
559      040000      SW14=40000      :=1,LOOP ON CURRENT TEST
560      020000      SW13=20000      :=1,INHIBIT ERROR TYPEOUT
561      010000      SW12=10000      :=1,DELETE TYPEOUT/BELL ON ERROR.
562      004000      SW11=4000       :=1,INHIBIT ITERATIONS
563      002000      SW10=2000       :=-1,ESCAPE TO NEXT TEST ON ERROR
564      001000      SW09=1000       :=1,LOOP WITH CURRENT DATA
565      000400      SW08=400        :=1,LOOP ON ERROR
566      000200      SW07=200
567      000100      SW06=100
568      000040      SW05=40
569      000020      SW04=20
570      000010      SW03=10
571
572      000004      SW02=4
573      000002      SW01=2
574      000001      SW00=1
                    : SELECT DUP'S DESIRED ACTIVE
                    : NOTE:THIS MUST NOT EXCEED ORIGINAL COUNT
                    : LOCK ON TEST SELECT
                    : RESTART PROGRAM AT SELECTED TEST
                    : ENTER PARAMETERS
```

575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605
606
607
608
609
610
611
612
613
614
615
616
617
618
619
620
621
622
623
624

000000
000001
000002
000003
000004
000005
000006
000007

177776
001150

005746
005726
010046
012600
024646
022626

100000
040000
020000
010000
004000
002000
001000
000400
000200
000100
000040
000020
000010
000004
000002
000001
000000

:REGISTER DEFINITIONS

R0=%0 ;GENERAL REGISTER
R1=%1 ;GENERAL REGISTER
R2=%2 ;GENERAL REGISTER
R3=%3 ;GENERAL REGISTER
R4=%4 ;GENERAL REGISTER
R5=%5 ;GENERAL REGISTER
SP=%6 ;PROCESSOR STACK POINTER
PC=%7 ;PROGRAM COUNTER

:LOCATION EQUIVALENCIES

PS=177776 ;PROCESSOR STATUS WORD
STACK=1150 ;START OF PROCESSOR STACK

:INSTRUCTION DEFINITIONS

PUSH1SP=5746 ;DECREMENT PROCESSOR STACK 1 WORD
POP1SP=5726 ;INCREMENT PROCESSOR STACK 1 WORD
PUSHR0=10046 ;SAVE R0 ON STACK
POP R0=12600 ;RESTORE R0 FROM STACK
PUSH2SP=24646 ;DECREMENT STACK TWICE
POP2SP=22626 ;INCREMENT STACK TWICE
.EQUIV EMT,HLT ;BASIC DEFINITION OF ERROR CALL

BIT15=100000
BIT14=40000
BIT13=20000
BIT12=10000
BIT11=4000
BIT10=2000
BIT9=1000
BIT8=400
BIT7=200
BIT6=100
BIT5=40
BIT4=20
BIT3=10
BIT2=4
BIT1=2
BIT0=1

```

625 :*****
626 :-----
627 : TRAPCATCHER FOR ILLEGAL INTERRUPTS
628 : THE STANDARD 'TRAP CATCHER' IS PLACED
629 : BETWEEN ADDRESS 0 TO ADDRESS 776.
630 : IT LOOKS LIKE 'PC+2 HALT'.
631 :-----
632 :*****
633
634      000000      . 0
635      : STANDARD INTERRUPT VECTORS
636      :-----
637
638      000024      . 24
639      000024 005050      .PFAIL      ;POWER FAIL HANDLER
640      000026 000340      340      ;SERVICE AT LEVEL 7
641      000030 004350      .HLT      ;ERROR HANDLER
642      000032 000340      340      ;SERVICE AT LEVEL 7
643      000034 004316      .TRPSRV      ;GENERAL HANDLER DISPATCH SERVICE
644      000036 000340      340      ;SERVICE AT LEVEL 7
645      000040      .=40
646      000040 000000      0      ;SAVE FOR ACT-11 OR DDP2
647      000042 000000      0      ;RETURN ADDRESS IF UNDER ACT-11 OR DDP2
648      000044 000000      0      ;SAVE FOR ACT-11 OR DDP2
649      000046 003104      $ENDAD      ;FOR USE WITH ACT-11 OR DDP2
650      000052      .-52
651      000052 000000      0      ;ACT-11 PROGRAM CHARACTERISTICS
652
653      000174      . 174
654      000174 000000      DISPREG:0      ;SOFTWARE DISPLAY REGISTER
655      000176 000000      SWREG: 0      ;SOFTWARE SWITCH REGISTER
656      000200      .=200
657      000200 000137 001562      JMP .START      ;GO TO START OF PROGRAM
658
659
660      001000      .-1000
661      001000 005377 055103 050104      MTITLE: .ASCIZ <377><12>/CZDPDD0 /<377>/DUP11 SDLC DECMD TST /<377>
662      001200      .=1200
663      : SWR AND LIGHTS
664      :-----
665
666      001200 177570      DISPLAY: 177570      ;11/45 CONSOLE LIGHTS
667      001202 177570      SWR: 177570      ;INDIRECT POINTER TO SWITCH REGISTER
668
669      : INDIRECT POINTERS TO TELETYPE VECTORS AND REGISTERS
670      :-----
671
672      001204 177560      TKCSR: 177560      ;TELETYPE KEYBOARD CONTROL REGISTER
673      001206 177562      TKDBR: 177562      ;TELETYPE KEYBOARD DATA BUFFER
674      001210 177564      TPCSR: 177564      ;TELEPRINTER CONTROL REGISTER
675      001212 177566      TPDBR: 177566      ;TELEPRINTER DATA BUFFER
676
677      : PROGRAM CONTROL PARAMETERS
678      :-----
679

```

680	001214	000000	RETURN: 0	;SCOPE ADDRESS FOR LOOP ON TEST
681	001216	000000	NEXT: 0	;ADDRESS OF NEXT TEST TO BE EXECUTED
682	001220	000000	LOCK: 0	;ADDRESS FOR LOCK ON CURRENT DATA
683	001222	000001	ICOUNT: 1	;NUMBER OF ITERATIONS THAT CURRENT TEST WILL BE EXECUTED
684	001224	000000	LPCNT: 0	;NUMBER OF ITERATIONS COMPLETED
685	001226	000000	TSTNO: 0	;NUMBER OF TEST IN PROGRESS
686	001230	000000	PASCNT: 0	;NUMBER OF PASSES COMPLETED
687	001232	000000	ERRCNT: 0	;TOTAL NUMBER OF ERRORS
688	001234	000000	LSTERR: 0	;PC OF LAST ERROR CALL
689				
690			;PROGRAM VARIABLES	
691			-----	
692				
693	001236	000000	TEMP1: 0	;TEMPORARY STORAGE
694	001240	000000	TEMP2: 0	;TEMPORARY STORAGE
695	001242	000000	TEMP3: 0	;TEMPORARY STORAGE
696	001244	000000	TEMP4: 0	;TEMPORARY STORAGE
697	001246	000000	TEMP5: 0	;TEMPORARY STORAGE
698	001250	000000	SAVR0: 0	;R0 STORAGE
699	001252	000000	SAVR1: 0	;R1 STORAGE
700	001254	000000	SAVR2: 0	;R2 STORAGE
701	001256	000000	SAVR3: 0	;R3 STORAGE
702	001260	000000	SAVR4: 0	;R4 STORAGE
703	001262	000000	SAVR5: 0	;R5 STORAGE
704	001264	000000	SAVSP: 0	;STACK POINTER STORAGE
705	001266	000000	SAVPC: 0	;PROGRAM COUNTER STORAGE
706				
707	001270	000000	SAVR0A: 0	;R0 STORAGE
708	001272	000000	SAVR1A: 0	;R1 STORAGE
709	001274	000000	SAVR2A: 0	;R2 STORAGE
710	001276	000000	SAVR3A: 0	;R3 STORAGE
711	001300	000000	SAVR4A: 0	;R4 STORAGE
712	001302	000000	SAVR5A: 0	;R5 STORAGE
713	001304	000000	SAVSPA: 0	;STACK POINTER STORAGE
714	001306	000000	SAVPCA: 0	;PROGRAM COUNTER STORAGE
715				
716	001310	000001	DUPACTV: .BLKB 1	;DUP11'S SELECTED ACTIVE.
717	001311	000001	DUPNUM: .BLKB 1	;OCTAL NUMBER OF DUP11'S.
718	001312	000001	SAVACT: .BLKB 1	;ORIGINAL ACTV. DEVICES.
719	001313	000001	SAVNUM: .BLKB 1	;WORKABLE NUMBER.
720	001314	000001	RUN: .BLKB 1	;POINTER ONE PAST RUNNING DEVICE.
721		001316	.EVEN	
722	001316	001500	CREAM: DUP.MAP	;TABLE POINTER.


```

723
724                                     ;CONTROL REGISTER DEFINITIONS
725                                     :-----
726                                     ;RXCSR BIT DEFINITIONS
727      100000      DSCA=BIT15      ;DATA SET CHANGE A
728      040000      RING=BIT14      ;RING
729      020000      CTS=BIT13      ;CLR TO SEND
730      010000      CARDET=BIT12     ;CARRIER DETECT
731      004000      REACT=BIT11     ;REC ACTIVE
732      002000      SRD=BIT10      ;SEC REC DATA
733      001000      DSR=BIT9       ;DATA SET RDY
734      000400      STPSYN=BIT8     ;STRIP SYNC
735      000200      RXDONE=BIT7     ;REC DONE
736      000100      RINTEN=BIT6    ;REC INTR ENABLE
737      000040      DSINTE=BIT5    ;DSC INTR ENABLE
738      000020      RCVEN=BIT4     ;REC ENABLE
739      000010      STD=BIT3       ;SEC XMIT DATA
740      000004      RTS=BIT2       ;REQ TO SEND
741      000002      DTR=BIT1      ;DATA TERM RDY
742      000001      DSCB=BIT0     ;DATA SET CHANGE R
743                                     ;RXDBUF BIT DEFINITIONS
744      100000      RXDERR=BIT15    ;REC DATA ERROR
745      040000      OVRRUN=BIT14   ;OVERRUN ERROR
746      010000      CRCERR=BIT12   ;CRC ERROR
747      002000      RABORT=BIT10   ;REC ABORT
748      001000      REOM=BIT9      ;REC END OF MESSAGE
749      000400      RSOM=BIT8     ;REC START OF MESSAGE
750                                     ;PARCSR BIT DEFINITIONS
751      100000      DECMOD=BIT15    ;DEC MODE (DDCMP)
752      001000      CRCEN=BIT9     ;CRC ENABLE
753      010000      PRISEC=BIT12   ;PRI/SEC SELECT
754                                     ;TXCSR BIT DEFINITIONS
755      100000      TXDLAT=BIT15    ;TX DATA LATE
756      040000      MTDATA=BIT14   ;MAINT DATA OUT
757      020000      CLK=BIT13     ;CLK
758      010000      MMODEB=BIT12   ;MAINT MODE B
759      004000      MMODEA=BIT11   ;MAINT MODE A
760      002000      BITW=BIT10    ;BIT WINDOW INPUT
761      001000      TXACT=BIT9    ;TX ACTIVE
762      000400      MRESET=BIT8   ;MASTER RESET
763      000200      TXDONE=BIT7   ;XMIT DONE
764      000100      TXINTE=BIT6   ;XMIT DONE INTR ENABLE
765      000020      SEND=BIT4     ;SEND
766      000010      HDXEN=BIT3    ;HDX/FDX
767                                     ;TXCSR WRD DEFINITIONS
768      000000      USER=0         ;USER MODE
769      014000      MMODE=14000   ;MAINT INT MODE
770      010000      MEXT=10000   ;MAINT EXT MODE
771      004000      SYSTST=4000  ;SYSTEM TEST MODE
772
773                                     ;TXDBUF BIT DEFINITIONS
774                                     :-----
775      100000      RCRC7T=BIT15   ;
776      040000      RCRCIN=BIT14  ;
777      020000      TCRC7T=BIT13  ;
778      010000      TCRCIN=BIT12  ;

```

CZDPD-DO
CZDPDD.P11

MACY11 30A(1052)
25-JUL-79 15:01

25-JUL-79 15:19 PAGE 18

PROGRAM PARAMETERS, VARIABLES, AND TRAP CALLS.

SEQ 0017

```

779          004000          TIMER=BIT11          ;MAINTENANCE TIMER
780          002000          TABORT=BIT10         ;TRANSMIT ABORT
781          001000          TEOM=BIT9           ;TRANSMIT END OF MESSAGE
782          000400          TSOM=BIT8           ;TRANSMIT START OF MESSAGE
783
784          ;MISC. PROGRAM DEFINITIONS
785          -----
786 001320 000000          PRTY: .WORD 0
787 001322 000001          TCNFG: .BLKB 1
788 001323 000001          OPCLRJ: .BLKB 1
789 001324 000000          DATA: .WORD 0
790 001326 000000          SHIFTS: .WORD 0
791 001330 000000          MIND: .WORD 0
792 001332 000000          FLAG: .WORD 0
793 001334 000001          STJMFL: .BLKW 1
794 001336 000001          SRJMFL: .BLKW 1
795
796

```

797
798
799
800
801
802
803
804
805
806
807
808
809
810
811
812
813
814
815
816
817
818
819
820
821
822
823
824
825
826
827
828
829
830
831
832
833
834
835
836
837
838
839
840
841
842
843

001340 000
001341 000
001342 000
001343 000

000000

001344 104400
001344 003160
001346 104401
001346 003312
001350 104402
001350 003336
001352 104403
001352 003412
001354 104404
001354 003516
001356 104405
001356 003536
001360 104406
001360 003736
001362 104407
001362 003776
001364 104410
001364 004030
001364 104411
001366 004034
001366 104412
001370 005006
001372 104413
004242

```

;PROGRAM CONTROL FLAGS
-----
INIFLG: .BYTE 0 ;PROGRAM INITIALIZATION FLAG
ERRFLG: .BYTE 0 ;ERROR OCCURED FLAG
LOKFLG: .BYTE 0 ;LOCK ON CURRENT TEST FLAG
QV.FLG: .BYTE 0 ;QUICK VERIFY FLAG.
;ON FIRST PASS OF EACH DUP11 ITERATIONS
;WILL BE SUPPRESSED

.EVEN
SY 0

;DEFINITIONS FOR TRAP SUBROUTINE CALLS
;POINTERS TO SUBROUTINES CAN BE FOUND
;IN THE TABLE IMMEDIATLY FOLLOWING THE DEFINITIONS

:*****
:-----
:TRPTAB:
SCOPE=TRAP+0 ;CALL TO SCOPE LOOP AND ITERATION HANDLER
.SCOPE
SCOPI=TRAP+1 ;CALL TO LOOP ON CURRENT DATA HANDLER
.SCOPI
TYPE=TRAP+2 ;CALL TO TELETYPE OUTPUT ROUTINE
.TYPE
INSTR=TRAP+3 ;CALL TO ASCII STRING INPUT ROUTINE
.INSTR
INSTER=TRAP+4 ;CALL TO INPUT ERROR HANDLER
.INSTER
PARAM=TRAP+5 ;CALL TO NUMERICAL DATA INPUT ROUTINE
.PARAM
SAV05=TRAP+6 ;CALL TO REGISTER SAVE ROUTINE
.SAV05
RES05=TRAP+7 ;CALL TO REGISTER RESTORE ROUTINE
.RES05
CONVRT=TRAP+10 ;CALL TO DATA OUTPUT ROUTINE
.CONVRT
CNVRT=TRAP+11 ;CALL TO DATA OUTPUT ROUTINE WITHOUT CR/LF.
.CNVRT
PKCLK=TRAP+12 ;CALL TO CLOCK ROUTINE
.PKCLK
SETFLG=TRAP+13 ;CALL TO TELETYPE INPUT ROUTINE
.SETFLG
:-----
:*****

```

```

844                                     ;DUP11 VECTOR AND REGISTER INDIRECT POINTERS
845
846 001374 000000   DUPRVC: 0           ;POINTER TO DUP11 RECEIVER INTERRUPT VECTOR
847 001376 000000   DUPRPS: 0           ;POINTER TO DUP11 RECEIVER INTERRUPT SERVICE PS
848 001400 000000   DUPTVC: 0           ;POINTER TO DUP11 TRANSMITTER INTERRUPT VECTOR
849 001402 000000   DUPTPS: 0           ;POINTER TO DUP11 TRANSMITTER INTERRUPT SERVICE PS
850 001404 000000   RXCSR: 0           ;POINTER TO DUP11 RECEIVER STATUS REGISTER
851 001406 000000   RXDBUF: 0          ;POINTER TO DUP11 RECEIVER DATA BUFFER
852 001410 000000   PARCSR: 0          ;POINTER TO DUP11 PARAMETER STATUS REGISTER
853 001412 000000   TXCSR: 0           ;POINTER TO DUP11 TRANSMITTER STATUS REGISTER
854 001414 000000   TXDBUF: 0          ;POINTER TO DUP11 TRANSMITTER DATA BUFFER
855 001416 000000   DUPSEC: 0          ;POINTER TO DUP11 SECONDARY REGISTER SELECT REGISTER
856 001420 000000   HUPPSR: 0          ;POINTER TO PARAMETER STATUS HIGH BYTE
857 001422 000000   HUPRBF: 0          ;POINTER TO RECEIVER BUFFER HIGH BYTE
858 001424 000000   HUPRCR: 0          ;POINTER TO RECEIVER CONTROL REG HIGH BYTE
859 001426 000000   HUPTBF: 0          ;POINTER TO TRANSMITTER BUFFER HIGH BYTE
860 001430 000000   HUPTCR: 0          ;POINTER TO TRANSMITTER CONTROL REG HIGH BYTE

```

```

861
862
863                                     ;DUP11 CONTROL INDICATORS FOR CURRENT DUP11 UNDER TEST
864                                     ;-----
865
866 001432 000      MASK.A: .BYTE 000      ;LAST CHAR TO TEST AND PARITY MASK
867
868 001433 010      CLK.A: .BYTE 8.         ;NUMBER OF CLOCKS NEEDED FOR ONE CHAR
869
870 001434 000000   L00.00: 000000          ;PARAMETERS
871

```



```
872                                     ;DUP11 STATUS TABLE AND ADDRESS ASSIGNMENTS
873                                     ;-----;
874
875                                     .=1500
876 001500 DUP.MAP:
877 001500 000001 DUPCR0: .BLKW 1      ;CONTROL STATUS REGISTER FOR DUP11 NUMBER 0
878 001502 000001 DUPTR0: .BLKW 1      ;VECTOR 'A' FOR DUP11 NUMBER 0
879 001504 000001 DUPO.A: .BLKW 1      ;PARAMETER FOR DUP11 NUMBER 0
880
881 001506 000001 DUPCR1: .BLKW 1      ;CONTROL STATUS REGISTER FOR DUP11 NUMBER 1
882 001510 000001 DUPTR1: .BLKW 1      ;VECTOR 'A' FOR DUP11 NUMBER 1
883 001512 000001 DUP1.A: .BLKW 1      ;PARAMETER FOR DUP11 NUMBER 1
884
885 001514 000001 DUPCR2: .BLKW 1      ;CONTROL STATUS REGISTER FOR DUP11 NUMBER 2
886 001516 000001 DUPTR2: .BLKW 1      ;VECTOR 'A' FOR DUP11 NUMBER 2
887 001520 000001 DUP2.A: .BLKW 1      ;PARAMETER FOR DUP11 NUMBER 2
888
889 001522 000001 DUPCR3: .BLKW 1      ;CONTROL STATUS REGISTER FOR DUP11 NUMBER 3
890 001524 000001 DUPTR3: .BLKW 1      ;VECTOR 'A' FOR DUP11 NUMBER 3
891 001526 000001 DUP3.A: .BLKW 1      ;PARAMETER FOR DUP11 NUMBER 3
892
893 001530 000001 DUPCR4: .BLKW 1      ;CONTROL STATUS REGISTER FOR DUP11 NUMBER 4
894 001532 000001 DUPTR4: .BLKW 1      ;VECTOR 'A' FOR DUP11 NUMBER 4
895 001534 000001 DUP4.A: .BLKW 1      ;PARAMETER FOR DUP11 NUMBER 4
896
897 001536 000001 DUPCR5: .BLKW 1      ;CONTROL STATUS REGISTER FOR DUP11 NUMBER 5
898 001540 000001 DUPTR5: .BLKW 1      ;VECTOR 'A' FOR DUP11 NUMBER 5
899 001542 000001 DUP5.A: .BLKW 1      ;PARAMETER FOR DUP11 NUMBER 5
900
901 001544 000001 DUPCR6: .BLKW 1      ;CONTROL STATUS REGISTER FOR DUP11 NUMBER 6
902 001546 000001 DUPTR6: .BLKW 1      ;VECTOR 'A' FOR DUP11 NUMBER 6
903 001550 000001 DUP6.A: .BLKW 1      ;PARAMETER FOR DUP11 NUMBER 6
904
905 001552 000001 DUPCR7: .BLKW 1      ;CONTROL STATUS REGISTER FOR DUP11 NUMBER 7
906 001554 000001 DUPTR7: .BLKW 1      ;VECTOR 'A' FOR DUP11 NUMBER 7
907 001556 000001 DUP7.A: .BLKW 1      ;PARAMETER FOR DUP11 NUMBER 7
908
909 001560 000000 DUP.END:          000000
910
911
912
913
914
```

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	C	O	N	T	R	O	L	I	R	E	G	I	S	T	E
I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	A	B	C	D	E	F	G	H	I	I	I	S	Y	N	C
I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I

DEFINITIONS

- A- OPTIONAL CLEAR JUMPER IN 1
- B- TURNAROUND CONNECTOR ON 1
- C-
- D-

```

934
935      ;PROGRAM INITIALIZATION
936      ;LOCK OUT INTERRUPTS
937      ;SET UP PROCESSOR STACK
938      ;SET UP POWER FAIL VECTOR
939      ;CLEAR PROGRAM CONTROL FLAGS AND COUNTS
940      ;TYPE TITLE MESSAGE
941
942 001562 012737 000340 177776 .START: MOV #340,PS      ;LOCK OUT INTERRUPTS
943 001570 012706 001150      MOV #STACK,SP      ;SET UP STACK
944 001574 012737 005050 000024 MOV #.PFAIL,@#24    ;SET UP POWER FAIL VECTOR
945 001602 113737 001311 001313 MOVVB DUPNUM,SAVNUM ;SAVE NUMBER OF DEVICES IN SYSTEM
946 001610 005037 001230      CLR PASCNT         ;CLEAR PASS COUNT
947 001614 105037 001341      CLRB ERRFLG        ;CLEAR ERROR FLAG
948 001620 105037 001343      CLRB QV.FLG        ;ZERO QUICK VERIFY FLAG
949 001624 012737 001500 001316 MOV #DUP.MAP,CREAM  ;GET MAP POINTER.
950 001632 112737 000001 001314 MOVVB #1,RUN        ;POINT POINTER TO FIRST DEVICE.
951 001640 005037 001232      CLR ERRCNT         ;CLEAR ERROR COUNT
952 001644 005037 001234      CLR LSTERR        ;CLEAR LAST ERROR POINTER
953 001650 012737 000001 001226 MOV #1,TSTNO       ;SET UP FOR TEST 1
954 001656 012737 001562 001214 MOV #.START,RETURN ;SET UP FOR POWER FAIL BEFORE
955                                     ;TESTING STARTS
956 001664 013746 000006      MOV @#6,-(SP)       ;SAVE CURRENT VECTORS
957 001670 013746 000004      MOV @#4,-(SP)
958 001674 012737 001710 000004 MOV #12$,@#4       ;SETUP FOR TIMEOUT
959 001702 005777 177274      TST @SWR          ;REFERENCE HARDWARE SWITCH REG
960 001706 000407      BR 13$           ;BR IF IT EXISTS
961 001710 012737 000176 001202 12$: MOV #SWREG,SWR      ;POINT TO SOFT SWR
962 001716 012737 000174 001200 MOV #DISPREG,DISPLAY ;POINT TO SOFT DISPLAY REG
963 001724 022626      CMP (SP)+,(SP)+   ;ADJUST STACK
964 001726 012637 000004 13$: MOV (SP)+,@#4       ;RESTORE VECTORS
965 001732 012637 000006      MOV (SP)+,@#6
966 001736 105737 001340      TSTB INIFLG      ;HAS INITIALIZATION BEEN PERFORMED
967 001742 001401      BEQ 11$
968 001744 000410      BR 6$
969 001746 022737 003104 000042 11$: CMP #SENDAD,@#42  ;IF ACT-11 AUTO MODE,
970 001754 001404      BEQ 6$             ;DON'T TYPE ID
971 001756 104402 001000      TYPE ,MTITLE     ;TYPE TITLE MESSAGE
972 001762 105137 001340      COMB INIFLG      ;IF NOT SET FLAG AND DO
973 001766 105777 177210 6$: TSTB @SWR           ;BIT7=1??
974 001772 100002      BPL 10$
975 001774 000137 002520      JMP 1$
976 002000
977 002000 032777 000001 177174 10$: BIT #SW00,@SWR   ;ENTER PARAMETERS
978 002006 001002      BNE .+6          ;YES
979 002010 000137 002360      JMP 21$         ;NO
980 002014 105137 001332      COMB FLAG
981 002020 112737 000001 001340 MOVVB #1,INIFLG    ;SET TO MANUAL ENTRY
982 002026 012700 001500      MOV #DUP.MAP,RO  ;CLR MAP
983 002032 005020 68$: CLR (RO)+
984 002034 020027 001560      CMP RO,#DUP.END ;DONE WITH MAP?
985 002040 001374      BNE 68$         ;BR IF NO
986 002042 104403      INSTR ;OUTPUT MESSAGE & GET INPUT STRING
987 002044 005473      MCSR ;MESSAGE
988 002046 104405      PARAM ;CONVERT STRING
989 002050 160000      ;LOW LIMIT

```

990	002052	175500			175500	:HIGH LIMIT
991	002054	001500			DUPCRO	:STORE AT THIS LOCATION
992	002056	001			.BYTE 1	:MASK
993	002057	001			.BYTE 1	:HOW MANY TIMES + 2
994	002060	104403			INSTR	:OUTPUT MESSAGE & GET INPUT STRING
995	002062	005512			MVEC	:MESSAGE
996	002064	104405			PARAM	:CONVERT STRING
997	002066	000300			300	:LOW LIMIT
998	002070	000770			770	:HIGH LIMIT
999	002072	001502			DUPTRO	:STORE AT THIS LOCATION
1000	002074	001			.BYTE 1	:MASK
1001	002075	001			.BYTE 1	:HOW MANY TIMES + 2
1002	002076	104403			INSTR	:OUTPUT MESSAGE & GET INPUT STRING
1003	002100	005702			MPAR	:MESSAGE
1004	002102	104405			PARAM	:CONVERT STRING
1005	002104	000004			4	:LOW LIMIT
1006	002106	000007			7	:HIGH LIMIT
1007	002110	001240			TEMP2	:STORE AT THIS LOCATION
1008	002112	000			.BYTE 0	:MASK
1009	002113	001			.BYTE 1	:HOW MANY TIMES + 2
1010	002114	013737	001240	001320	MOV	TEMP2,PRIITY :SAVE PRIORITY
1011	002122	104403			INSTR	:OUTPUT MESSAGE & GET INPUT STRING
1012	002124	005647			MTOTAL	:MESSAGE
1013	002126	104405			PARAM	:CONVERT STRING
1014	002130	000001			1	:LOW LIMIT
1015	002132	000010			8	:HIGH LIMIT
1016	002134	001236			TEMP1	:STORE AT THIS LOCATION
1017	002136	000			.BYTE 0	:MASK
1018	002137	001			.BYTE 1	:HOW MANY TIMES + 2
1019	002140	104403			INSTR	:OUTPUT MESSAGE & GET INPUT STRING
1020	002142	005525			MJMPR	:MESSAGE
1021	002144	104413			SETFLG	:SET FLAG BASED UPON INPUT STRING
1022	002146	001323			OPCLRJ	:THIS FLAG
1023	002150	104403			INSTR	:OUTPUT MESSAGE & GET INPUT STRING
1024	002152	005600			MTCN	:MESSAGE
1025	002154	104413			SETFLG	:SET FLAG BASED UPON INPUT STRING
1026	002156	001322			TCNFLG	:THIS FLAG
1027	002160	105737	001322		TSTB	TCNFLG
1028	002164	001410			BEQ	71\$
1029	002166	104403			INSTR	:OUTPUT MESSAGE & GET INPUT STRING
1030	002170	005726			MSIJM	:MESSAGE
1031	002172	104413			SETFLG	:SET FLAG BASED UPON INPUT STRING
1032	002174	001334			STJMFL	:THIS FLAG
1033	002176	104403			INSTR	:OUTPUT MESSAGE & GET INPUT STRING
1034	002200	005761			MSRJM	:MESSAGE
1035	002202	104413			SETFLG	:SET FLAG BASED UPON INPUT STRING
1036	002204	001336			SRJMFL	:THIS FLAG
1037	002206	105737	001323		71\$: TSTB	OPCLRJ
1038	002212	001403			BEQ	69\$
1039	002214	052737	100000	001504	BIS	#BIT15,DUPO.A
1040	002222	105737	001322		69\$: TSTB	TCNFLG
1041	002226	001403			BEQ	70\$
1042	002230	052737	040000	001504	BIS	#BIT14,DUPO.A
1043	002236	112737	000001	001312	70\$: MOVB	#1,SAVACT
1044	002244	113737	001236	001311	MOVB	TEMP1,DUPNUM
1045	002252	113737	001236	001313	MOVB	TEMP1,SAVNUM

```

1046 002260 005337 001236      65$: DEC    TEMP1
1047 002264 001404              BEQ    64$
1048 002266 000261              SEC
1049 012270 106137 001312      ROLB  SAVACT
1050 002274 000771              BR    65$
1051 002276 113737 001312 001240 64$: MOVB  SAVACT,TEMP2    ;# OF TIMES
1052 002304 113737 001312 001310 MOVB  SAVACT,DUPACTV
1053 002312 000241              CLC
1054 002314 106037 001240      RORB  TEMP2
1055 002320 012700 001500      MOV  #DUPCRO,R0
1056 002324 012701 001506      MOV  #DUPCR1,R1
1057 002330 000241              CLC
1058 002332 106037 001240      RORB  TEMP2
1059 002336 103051              BCC  66$
1060 002340 012011              MOV  (R0)+,(R1)
1061 002342 062721 000010      ADD  #10,(R1)+    ;CSR
1062 002346 012011              MOV  (R0)+,(R1)
1063 002350 062721 000010      ADD  #10,(R1)+    ;VECTOR
1064 002354 012021              MOV  (R0)+,(R1)+  ;PARAMETERS
1065 002356 000764              BR    67$
1066 002360 012700 001500      21$: MOV  #DUP.MAP,R0    ;SETUP TO CLEAR MAP
1067 002364 005020      20$: CLR  (R0)+          ;CLEAR
1068 002366 020027 001560      CMP  R0,#DUP.END  ;CHECK FOR FINISH
1069 002372 001374              BNE  20$          ;BR IF MORE TO GO
1070 002374 012700 001500      MOV  #DUP.MAP,R0  ;SETUP TO DEFAULT
1071 002400 012710 160050      MOV  #160050,(R0) ;LOAD CSR
1072 002404 012760 000770 000002 MOV  #770,2(R0)    ;LOAD VECTOR
1073 002412 012760 140026 000004 MOV  #140026,4(R0) ;LOAD PARAMETERS AND SYNC
1074 002420 112737 000005 001320 MOVB  #5,PRTY      ;LOAD PRIORITY
1075 002426 012700 000001      MOV  #1,R0        ;SAVE CORE THIS WAY
1076 002432 110037 001310      MOVB  R0,DUPACTV  ;PRESET PROGRAM CONTROLS
1077 002436 110037 001311      MOVB  R0,DUPNUM   ;DITTO
1078 002442 110037 001312      MOVB  R0,SAVACT   ;DITTO
1079 002446 110037 001313      MOVB  R0,SAVNUM   ;DITTO
1080 002452 110037 001322      MOVB  R0,TCNFLG   ;DITTO
1081 002456 110037 001323      MOVB  R0,OPCLRJ   ;DITTO
1082 002462
1083 002462 104402 006014      66$: TYPE  ,XHEAD      ;TYPE HEADER
1084 002466 012737 001500 001236 16$: MOV  #DUP.MAP,TEMP1 ;SET POINTER
1085 002474 017737 176536 001240 5$: MOV  @TEMP1,TEMP2  ;SET DATA
1086 002502 001406              BEQ  1$           ;ALL DONE WITH DATA
1087 002504 104410              CONVRT
1088 002506 006042              XSTATQ
1089 002510 062737 000002 001236 ADD  #2,TEMP1      ;UPDATE POINTER
1090 002516 000766              BR    5$
1091 002520 032777 000001 176454 1$: BIT  #SW00,@SWR
1092 002526 001405              BEQ  7$
1093 002530 005737 001332      TST  FLAG
1094 002534 001002              BNE  7$
1095 002536 000137 002000      JMP  10$
1096 002542 005037 001332      7$: CLR  FLAG
1097 002546 005737 000042      TST  @#42
1098 002552 001030              BNE  3$           ;IS PROGRAM RUNNING UNDER MONITOR
1099 002554 032777 000010 176420 BIT  #SW03,@SWR   ;BR IF YES
1100 002562 001404              BEQ  3$           ;SELECT SPECIFIC DEVICES??
1101 002564 104402 005413      TYPE  ,MNEW      ;BR IF NO.
                          ;TYPE THE MESSAGE.

```

1102	002570	005000			CLR	R0		:ZERO DATA LIGHTS
1103	002572	000000			HALT			:WAIT FOR USER TO TELL WHAT DEVICES TO RUN
1104	002574	127737	176402	001312	CMPB	@SWR,SAVACT		:IS THE NUMBER VALID?
1105	002602	101404			BLOS	2\$:BR IF NUMBER IS OK.
1106	002604	104402	005254		TYPE	,MERR3		:TELL USER OF INVALID NUMBER.
1107	002610	000000			HALT			:STOP EVERY THING.
1108	002612	000776			BR	.-2		:RESTART THE PROGRAM AGAIN.
1109	002614	117737	176362	001310	2\$:	MOV	@SWR,DUPACTV	:GET NEW DEVICE PATTERN
1110	002622	113700	001310		MOV	DUPACTV,R0		:SHOW THE USER WHAT HE SELECTED.
1111	002626	042700	177400		BIC	#^C<377>,R0		:USE ONLY LOW BYTE.
1112	002632	000000			HALT			:CONTINUE DYNAMIC SWITCHES.
1113	002634	012700	000300		3\$:	MOV	#300,R0	:PREPARE TO CLEAR THE FLOATING
1114	002640	012701	000302		MOV	#302,R1		:VECTOR AREA. 300-776
1115	002644	010120			4\$:	MOV	R1,(R0)+	:START PUTTING 'PC+2 - HALT'
1116	002646	005021			CLR	(R1)+		:IN VECTOR AREA.
1117	002650	022021			CMP	(R0)+,(R1)+		:POP POINTERS
1118	002652	022700	001000		CMP	#1000,R0		:ALL DONE??
1119	002656	001372			BNE	4\$:BR IF NO.
1120								
1121								
1122								
1123								
1124	002660	012737	000340	177776	.BEGIN:	MOV	#340,PS	:LOCK OUT INTERRUPTS
1125	002666	012706	001150		MOV	#STACK,SP		:SET UP STACK
1126	002672	005737	000042		TST	@#42		:IS PROGRAM UNDER MONITOR CONTROL
1127	002676	001023			BNE	2\$:BR IF YES
1128	002700	032777	000004	176274	BIT	#BIT2,@SWR		:CHECK FOR LOCK ON TEST
1129	002706	001411			BEQ	1\$:BR IF NO LOCK DES. RED.
1130	002710	104402	005312		TYPE	,MLOCK		:TYPE LOCK SELECTED.
1131	002714	012737	000240	003174	MOV	#NOP,TTST		:ADJUST SCOPE ROUTINE.
1132	002722	012737	000240	003176	MOV	#NOP,TTST+2		:SET UP TO LOCK
1133	002730	000406			BR	2\$:CONTINUE ALONG.
1134	002732	013737	003306	003174	1\$:	MOV	BRW,TTST	:PREPARE NORMAL SCOPE ROUTINE
1135	002740	013737	003310	003176	MOV	BRX,TTST+2		:LOCK NOT SELECTED, SET UP FOR NORMAL SCOPE LOOP
1136	002746	012737	006224	001214	2\$:	MOV	#CYCLE,RETURN	:START AT 'CYCLE' FIND WHICH DEVICE TO TEST
1137	002754	104402	005202		TYPE	,MR		:TYPE R
1138	002760	000177	176230		JMP	@RETURN		:START TESTING

```

1139                                     :END OF PASS
1140                                     :TYPE NAME OF TEST
1141                                     :UPDATE PASS COUNT
1142                                     :CHECK FOR EXIT TO ACT-11
1143                                     :RESTART TEST
1144
1145 002764 005037 001234      .EOP: CLR      LSTERR      :CLEAR LAST ERROR PC
1146 002770 105037 001341      CLR      ERRFLG      :CLEAR ERROR FLAG
1147 002774 005237 001230      INC      PASCNT      :UPDATE PASS COUNT
1148 003000 013777 001230      MOV      PASCNT,@DISPLAY :DISPLAY PASS COUNT
1149 003006 104402 005157      TYPE    ,MEPASS      :TYPE END PASS
1150 003012 104402 005341      TYPE    ,MCSRX       :TYPE CSR
1151 003016 104411 003130      CNVRT   ,XCSR        :SHOW IT
1152 003022 104402 005347      TYPE    ,MVECX       :TYPE VECTOR
1153 003026 104411 003136      CNVRT   ,XVEC        :SHOW IT
1154 003032 104402 005355      TYPE    ,MPASSX      :TYPE PASSES
1155 003036 104411 003144      CNVRT   ,XPASS       :SHOW IT
1156 003042 104402 005366      TYPE    ,MERRX       :TYPE ERRORS
1157 003046 104411 003152      CNVRT   ,XERR        :SHOW IT
1158 003052 105337 001313      DECB    SAVNUM       :ARE ALL DEVICES TESTED?
1159 003056 001017              BNE     RESTRT      :BR IF NO.
1160 003060 112737 000377      MOV     #377,@V.FLG  :SET THE QUICK VERIFY FLAG.
1161 003066 113737 001311      MOV     DUPNUM,SAVNUM :RESTORE THE COUNT
1162 003074 013701 000042      MOV     @#42,R1     :CHECK FOR ACT-11 OR DDP
1163 003100 001406              BEQ     RESTRT      :IF NOT, CONTINUE TESTING
1164 003102 000005              RESET    :STOP THE SHOW--CLEAR THE WORLD
1165 003104
1166 003104 004711      $ENDAD: JSR     PC,(R1)
1167 003106 000240      NOP
1168 003110 000240      NOP
1169 003112 000240      NOP
1170 003114 000240      NOP
1171 003116 012737 006224      RESTRT: MOV     #CYCLE,RETURN
1172 003124 000137 006224      JMP     CYCLE
1173 003130 000001      XCSR:  1
1174 003132      006      .BYTE  6.2
1175 003134 001404      RXCSR
1176 003136 000001      XVEC:  1
1177 003140      003      .BYTE  3.2
1178 003142 001374      DUPRVC
1179 003144 000001      XPASS: 1
1180 003146      006      .BYTE  6.2
1181 003150 001230      PASCNT
1182 003152 000001      XERR:  1
1183 003154      006      .BYTE  6.2
1184 003156 001232      ERRCNT
1185
1186                                     :SCOPE LOOP AND INTERATION HANDLER
1187
1188 003160 005037 001234      .SCOPE: CLR      LSTERR      :CLEAR LAST ERROR PC
1189 003164 010016      MOV     RO,(SP)     :SAVE RO ON STACK
1190 003166 032777 040000      BIT     #BIT14,@SWR  :LOOP ON TEST?
1191 003174 001407      TTST:  BEQ     1$      :BR IF NO (IF LOCK SW01 = 1;THIS LOCATION - 240)
1192 003176 000437      BR      3$          :GO TO 3$ (DITTO)
1193 003200 105777 176000      TSTB   @TKCSR      :KYBD DONE?
1194 003204 100034      BPL     3$          :BR IF NO (LOCK: HIT A KEY ON TTY TO GO TO NEXT TEST)

```



```

1195 003206 017700 175774      MOV      @TKDBR,R0      ;CLR DONE BIT
1196 003212 000415              BR      2$             ;CONTINUE
1197 003214 032777 004000 175760 1$:  BIT      #SW11,@SWR    ;DELETE ITERATION (QUICK PASS)?
1198 003222 001011              BNE     2$             ;BR IF YES
1199 003224 105737 001343      TSTB   QV.FLG         ;HAS FIRST PASS BEEN COMPLETED?
1200 003230 001406              BEQ     2$             ;BR IF QUICK VERIFY
1201 003232 005237 001224      INC     LPCNT          ;UPDATE ITERATION COUNTER
1202 003236 023737 001224 001222  CMP     LPCNT,ICOUNT   ;ALL ITERATIONS DONE?
1203 003244 001014              BNE     3$             ;BR IF NOT YET
1204 003246 105037 001341      CLRB   ERRFLG         ;PREPARE FOR NEW TEST
1205 003252 005037 001224      CLR     LPCNT          ;START ICOUNT AT ZERO
1206 003256 005037 001220      CLR     LOCK           ;
1207 003262 012737 000050 001222  MOV     #50,ICOUNT     ;RESET ITERATIONS
1208 003270 013737 001216 001214  MOV     NEXT,RETURN    ;GET NEXT TEST
1209 003276 011600      3$:  MOV     (SP),R0        ;POP R0 OFF STACK
1210 003300 022626      PUP2<P                ;FAKE AN RTI
1211 003302 000177 175706      JMP     @RETURN        ;GO DO THE TEST
1212 003306 001407      BRW:  1407
1213 003310 000437      BRX:  437
1214
1215      ;CHECK FOR FREEZE ON CURRENT DATA
1216      -----
1217
1218 003312 032777 001000 175662 .SCOPI: BIT      #SW09,@SWR    ;IS SW09=1(SET)?
1219 003320 001405              BEQ     1$             ;BR IF NOT SET.
1220 003322 005737 001220      TST    LOCK           ;
1221 003326 001402              BEQ     1$             ;
1222 003330 013716 001220      MOV     LOCK,(SP)     ;GOTO THE ADDRESS IN LOCK.
1223 003334 000002      1$:  RTI                ;GO BACK.
1224
1225      ;TELETYPE OUTPUT ROUTINE
1226      -----
1227
1228 003336 010546      .TYPE: MOV     R5,-(SP)   ;SAVE R5 ON THE STACK.
1229 003340 017605 000002      MOV     @2(SP),R5     ;GET ADDRESS OF MESSAGE.
1230 003344 062766 000002 000002  ADD     #2,2(SP)       ;POP OVER ADDRESS.
1231 003352 032777 010000 175622 1$:  BIT      #SW12,@SWR    ;INHIBIT ALL PRINT OUT??
1232 003360 001012              BNE     3$             ;BR IF NO PRINT OUT WANTED (SW12-1)
1233 003362 105715      TSTB   (R5)           ;IS NUMBER MINUS? (MSB=1(BIT7))
1234 003364 100002              BPL     2$             ;BR IF NUMBER IS PLUS
1235 003366 104402 005136      TYPE   ,MCRLF         ;TYPE A CR/LF!
1236 003372 105777 175612      2$:  TSTB   @TPCSR      ;TTY READY?
1237 003376 100375              BPL     2$             ;BR IF NO.
1238 003400 112577 175606      MOVB   (R5)+,@TPDBR   ;PRINT CURRENT CHAR.
1239 003404 001362              BNE     1$             ;IF NOT ZERO KEEP PRINTING!
1240 003406 012605      3$:  MOV     (SP)+,R5     ;END OF OUTPUT. RESTORE R5
1241 003410 000002      RTI                ;GO HOME
1242
1243      -----
1244 003412 010346      .INSTR: MOV     R3,-(SP) ;SAVE R3 ON STACK
1245 003414 010446      MOV     R4,-(SP)     ;SAVE R4 ON STACK
1246 003416 017637 000004 003434      MOV     @4(SP),.MSG
1247 003424 062766 000002 000004      ADD     #2,4(SP)
1248 003432 104402      .INST1: TYPE
1249 003434 000000      .MSG:  0
1250 003436 012704 006160      MOV     #INBUF,R4

```

```

1251 003442 012703 000007      MOV      #7,R5
1252 003446 105777 175532      1$:     TSTB   @TKCSR
1253 003452 100375          BPL      1$
1254 003454 117714 175526      MOVB    @TKDBR,(R4)
1255 003460 142714 000200      BICB    #200,(R4)
1256 003464 122427 000015      CMPB    (R4)+,#15
1257 003470 001417          BEQ     INSTR2
1258 003472 105777 175512      2$:     TSTB   @TPCSR
1259 003476 100375          BPL      2$
1260 003500 017777 175502 175504      MOV     @TKDBR,@TPDBR
1261 003506 005303          DEC     R3
1262 003510 001356          BNE     1$
1263 003512 012604          MOV     (SP)+,R4
1264 003514 012603          MOV     (SP)+,R3
1265 003516 010346      .INSTE: MOV     R3,-(SP)
1266 003520 010446          MOV     R4,-(SP)
1267 003522 104402 005132          TYPE   ,MQM
1268 003526 000741          BR      .INST1
1269 003530 012604      INSTR2: MOV     (SP)+,R4      :RSTORE R4
1270 003532 012603          MOV     (SP)+,R3      :RESTORE R3
1271 003534 000002          RTI
1272
1273          :CONVERT ASCII STRING TO OCTAL
1274          :-----
1275
1276 003536 010546      .PARAM: MOV     R5,-(SP)
1277 003540 010446          MOV     R4,-(SP)
1278 003542 016605 000004          MOV     4(SP),R5
1279 003546 012537 003726          MOV     (R5)+,LOLIM
1280 003552 012537 003730          MOV     (R5)+,HILIM
1281 003556 012537 003732          MOV     (R5)+,DEVADR
1282 003562 112537 003734          MOVB    (R5)+,LOBITS
1283 003566 112537 003735          MOVB    (R5)+,ADRCNT
1284 003572 010566 000004          MOV     R5,4(SP)
1285 003576 005005      PARAM1: CLR     R5
1286 003600 012704 006160          MOV     #INBUF,R4
1287 003604 122714 000015          CMPB    #15,(R4)
1288 003610 001420          BEQ     PARERR
1289 003612 121427 000060      1$:     CMPB    (R4),#60
1290 003616 002415          BLT     PARERR
1291 003620 121427 000067          CMPB    (R4),#67
1292 003624 003012          BGT     PARERR
1293 003626 142714 000060          BICB    #60,(R4)
1294 003632 152405          BISB    (R4)+,R5
1295 003634 122714 000015          CMPB    #15,(R4)
1296 003640 001406          BEQ     LIMITS
1297 003642 006305          ASL     R5
1298 003644 006305          ASL     R5
1299 003646 006305          ASL     R5
1300 003650 000760          BR      1$
1301 003652 104404      PARERR: INSTER
1302 003654 000750          BR      PARAM1
1303
1304          :TEST TO SEE IF NUMBER IS WITHIN LIMITS
1305          :-----
1306

```

```

1307 003656 020537 003730      LIMITS: CMP      R5,HILIM
1308 003662 101373              BHI      PARERR
1309 003664 020537 003726      CMP      R5,LOLIM
1310 003670 103770              BLO      PARERR
1311 003672 133705 003734      BITB     LOBITS,R5
1312 003676 001365              BNE      PARERR
1313
1314                          ;STORE NUMBER AT SPECIFIED ADDRESS
1315
1316 003700 013704 003732      1$:     MOV      DEVADR,R4
1317 003704 010524              MOV      R5,(R4)+
1318 003706 062705 000002      ADD      #2,R5
1319 003712 105337 003735      DECB     ADRCNT
1320 003716 001372              BNE      1$
1321 003720 012604              MOV      (SP)+,R4
1322 003722 012605              MOV      (SP)+,R5
1323 003724 000002              RTI
1324 003726 000000      LOLIM:  0
1325 003730 000000      HILIM:  0
1326 003732 000000      DEVADR: 0
1327 003734 000000      LOBITS: 0
1328                          ADRCNT=LOBITS+1
1329
1330                          ;SAVE PC OF TEST THAT FAILED AND R0-R5
1331                          -----
1332
1333 003736 016637 000004 001266 .SAV05: MOV      4(SP),SAVPC      ;SAVE R7 (PC)
1334
1335                          ;SAVE R0-R5
1336
1337 003744 010537 001262      SV05:  MOV      R5,SAVR5      ;SAVE R5
1338 003750 010437 001260      MOV      R4,SAVR4      ;SAVE R4
1339 003754 010337 001256      MOV      R3,SAVR3      ;SAVE R3
1340 003760 010237 001254      MOV      R2,SAVR2      ;SAVE R2
1341 003764 010137 001252      MOV      R1,SAVR1      ;SAVE R1
1342 003770 010037 001250      MOV      R0,SAVR0      ;SAVE R0
1343 003774 000002              RTI                      ;LEAVE.
1344
1345                          ;RESTORE R0-R5
1346
1347 003776 013700 001250      .RES05: MOV      SAVR0,R0      ;RESTORE R0
1348 004002 013701 001252      MOV      SAVR1,R1      ;RESTORE R1
1349 004006 013702 001254      MOV      SAVR2,R2      ;RESTORE R2
1350 004012 013703 001256      MOV      SAVR3,R3      ;RESTORE R3
1351 004016 013704 001260      MOV      SAVR4,R4      ;RESTORE R4
1352 004022 013705 001262      MOV      SAVR5,R5      ;RESTORE R5
1353 004026 000002              RTI                      ;LEAVE
1354
1355
1356                          ;CONVERT OCTAL NUMBER TO ASCII AND OUTPUT TO TELEPRINTER
1357                          -----
1358
1359 004030 104402 005136      .CONVR: TYPE     ,MCRLF
1360 004034 010046      .CNVRT: MOV      R0,-(SP)
1361 004036 010146      MOV      R1,-(SP)
1362 004040 010346      MOV      R3,-(SP)

```

1363	004042	010446			MOV	R4,-(SP)
1364	004044	010546			MOV	R5,-(SP)
1365	004046	017601	000012		MOV	@12(SP),R1
1366	004052	062766	000002	000012	ADD	#2,12(SP)
1367	004060	012137	004234		MOV	(R1)+,WRDCNT
1368	004064	112137	004236	1\$:	MOVB	(R1)+,CHRCNT
1369	004070	112137	004237		MOVB	(R1)+,SPACNT
1370	004074	013137	004240		MOV	@(R1)+,BINWRD
1371	004100	013704	004240	2\$:	MOV	BINWRD,R4
1372	004104	113705	004236		MOVB	CHRCNT,R5
1373	004110	012700	006054		MOV	#TEMP,R0
1374	004114	010403		3\$:	MOV	R4,R3
1375	004116	042703	177770		BIC	#177770,R3
1376	004122	062703	000060		ADD	#060,R3
1377	004126	110320			MOVB	R3,(R0)+
1378	004130	000241			CLC	
1379	004132	006004			ROR	R4
1380	004134	000241			CLC	
1381	004136	006004			ROR	R4
1382	004140	000241			CLC	
1383	004142	006004			ROR	R4
1384	004144	005305			DEC	R5
1385	004146	001362			BNE	3\$
1386	004150	012703	006116		MOV	#MDATA,R3
1387	004154	114023		4\$:	MOVB	-(R0),(R3)+
1388	004156	105337	004236		DECB	CHRCNT
1389	004162	001374			BNE	4\$
1390	004164	105737	004237		TSTB	SPACNT
1391	004170	001405			BEQ	6\$
1392	004172	112723	000040	5\$:	MOVB	#040,(R3)+
1393	004176	105337	004237		DECB	SPACNT
1394	004202	001373			BNE	5\$
1395	004204	105013		6\$:	CLRB	(R3)
1396	004206	104402	006116		TYPE	,MDATA
1397	004212	005337	004234		DEC	WRDCNT
1398	004216	001322			BNE	1\$
1399	004220	012605			MOV	(SP)+,R5
1400	004222	012604			MOV	(SP)+,R4
1401	004224	012603			MOV	(SP)+,R3
1402	004226	012601			MOV	(SP)+,R1
1403	004230	012600			MOV	(SP)+,R0
1404	004232	000002			RTI	
1405	004234	000000			WRDCNT:	0
1406	004236	000000			CHRCNT:	0
1407		004237			SPACNT-CHRCNT+1	
1408	004240	000000			BINWRD:	0
1409						
1410						
1411						
1412						
1413						
1414						
1415						
1416	004242	017605	000000		.SETFLG:MOV	@(SP),R5
1417	004246	042737	000040	006160	BIC	#40,INBUF
1418	004254	122737	000116	006160	CMPS	#'N',INBUF ;IS IT 'N'?

```

;COMPARE THE FIRST CHARACTER IN THE TELETYPE INPUT
;BUFFER TO THE CHARACTERS 'N' AND 'Y'.
;IF THE CHARACTER IS 'N' CLEAR THE FLAG
;IF THE CHARACTER IS 'Y' SET THE FLAG

```

```

1419 004262 001002          BNE      1$
1420 004264 105015          CLRB    (R5)      ;000
1421 004266 000406          BR      2$
1422 004270 122737 000131 006160 1$:  CMPB    #'Y',INBUF      ,IS IT 'Y' ?
1423 004276 001005          BNE     3$
1424 004300 112715 177777          MOVB    #-1,(R5)      ;377
1425 004304 062716 000002          2$:  ADD     #2,(SP)
1426 004310 000002          RTI
1427 004312 104404          3$:  INSTER ;RETRY
1428 004314 000752          BR      .SETFLG
1429
1430
1431
1432          ;TRAP DISPATCH SERVICE
1433          ;ARGUMENT OF TRAP IS EXTRACTED
1434          ;AND USED AS OFFSET TO OBTAIN POINTER
1435          ;TO SELECTED SUBROUTINE
1436 004316 011646          .TRPSR: MOV    (SP),-(SP)      ;GET PC OF RETURN
1437 004320 162716 000002          SUB     #2,(SP)      ;=PC OF TRAP
1438 004324 017616 000000          MOV     @ (SP),(SP)   ;GET TRP
1439 004330 006316          TRPOK: ASL    (SP)      ;MULTIPLY TRAP ARG BY 2
1440 004332 042716 177001          BIC     #177001,(SP)  ;CLEAR UNWANTED BITS
1441 004336 062716 001344          ADD     #.TRPTAB,(SP) ;POINTER TO SUBROUTINE ADDRESS
1442 004342 017616 000000          MOV     @ (SP),(SP)   ;SUBROUTINE ADDRESS
1443 004346 000136          JMP     @ (SP)+       ;GO TO SUBROUTINE
1444
1445          ;ERROR HANDLER
1446          ;-----
1447
1448 004350 032777 010000 174624 .HLT:  BIT     #SW12,@SWR      ;BELL ON ERROR?
1449 004356 001406          BEQ     XBX           ;BR IF NO BELL
1450 004360 105777 174624          TSTB   @TPCSR        ;TTY READY.
1451 004364 100003          BPL     XBX           ;DON'T WAIT IF TTY NOT READY.
1452 004366 112777 000207 174616          MOVB   #207,@TPDBR   ;PUSH A BELL AT THE TTY.
1453 004374 032777 020000 174600 XBX:  BIT     #SW13,@SWR      ;DELETE ERROR PRINT OUT?
1454 004402 001105          BNE     HALTS        ;BR IF NO PRINT OUT WANTED.
1455 004404 021637 001234          CMP     (SP),LSTERR   ;WAS THIS ERROR FOUND LAST TIME?
1456 004410 001404          BEQ     1$           ;BR IF YES
1457 004412 011637 001234          MOV     (SP),LSTERR   ;RECORD BEING HERE
1458 004416 105037 001341          CLRB   ERRFLG        ;PREPARE HEADER
1459 004422 104406          1$:  SAVO5          ;SAVE ALL PROC REGISTERS
1460 004424 011605          MOV     (SP),R5       ;GET THE PC OF ERROR
1461 004426 162705 000002          SUB     #2,R5         ;GET ADDRESS OF TRAP CALL
1462 004432 011504          MOV     (R5),R4       ;GET HLT INSTRUCTION
1463 004434 006304          ASL     R4            ;MULT BY TWO
1464 004436 061504          ADD     (R5),R4       ;DOUBLE IT
1465 004440 006304          ASL     R4            ;MULT AGAIN
1466 004442 042704 177001          BIC     #177001,R4    ;CLEAR JUNK
1467 004446 062704 023274          ADD     #.ERRTAB,R4   ;GET POINTER
1468 004452 012437 004566          MOV     (R4)+,ERRMSG  ;GET ERROR MESSAGE
1469 004456 012437 004600          MOV     (R4)+,DATAHD  ;GET DATA HEADRER
1470 004462 011437 004612          MOV     (R4),DATABP   ;GET DATA TABLE
1471 004466 105737 001341          TSTB   ERRFLG        ;TYPE HEADREER
1472 004472 001403          BEQ     TYPMSG        ;BR IF YES
1473 004474 005737 004612          TST    DATABP        ;DOES DATA TABLE EXIST?
1474 004500 001040          BNE     TYPDAT        ;BR IF YES.

```

```

1475 004502 104402 005136      TYPMSG: TYPE      ,MCRLF
1476 004506 104402 005136      TYPE      ,MCRLF
1477 004512 005737 001220      TST      LOCK
1478 004516 001402              BEQ      1$
1479 004520 104402 005411      TYPE      ,MASTEK
1480 004524 104402 005377      1$:      TYPE      ,MTSTN
1481 004530 104411 005000      CNVRT     ,XTSTN      ;SHOW IT
1482 004534 104402 005466      TYPE      ,MERRPC     ;TYPE PC.
1483 004540 104411 004772      CNVRT     ,ERTABO     ;SHOW IT
1484 004544 104402 005136      TYPE      ,MCRLF      ;GIVE A CR/LF
1485 004550 112737 177777      001341  MOVB     #-1,ERRFLG     ;NO MORE HEADER UNLESS NO DATA TABLE.
1486 004556 005737 004566      TST      ERRMSG      ;IS THERE AN ERROR MESSAGE?
1487 004562 001402              BEQ      WRKO.FM     ;SR IF NO.
1488 004564 104402              TYPE
1489 004566 000000      ERRMSG: 0          ;TYPE
1490 004570      WRKO.FM:          ;      ERROR MESSAGE
1491 004570 005737 004600      TST      DATAHD     ;DATA HEADER?
1492 004574 001402              BEQ      TYPDAT     ;BR IF NO
1493 004576 104402              TYPE
1494 004600 000000      DATAHD: 0        ;      DATA HEADER
1495 004602 005737 004612      TYPDAT: TST      DATABP     ;DATA TABLE?
1496 004606 001402              BEQ      RESREG     ;BR IF NO.
1497 004610 104410              CNVRT
1498 004612 000000      DATABP: 0        ;      DATA TABLE
1499 004614 104407      RESREG: RES05     ;RESTORE PROC REGISTERS
1500 004616 022737 003104      000042  HALTS:  CMP      #SENDAD,@#42 ;IF ACT-11 AUTO MODE--HALT..
1501 004624 001403              BEQ      1$
1502 004626 005777 174350      TST      @SWR        ;HALT ON ERROR?
1503 004632 100035              BPL      EXITER      ;BR IF NO HALT ON ERROR
1504 004634 010046      1$:      PUSHRO     ;SAVE RO
1505 004636 016600 000002      MOV      2(SP),RO    ;SHOW ERROR PC IN DATA LIGHTS
1506 004642 013746 000004      MOV      4,-(SP)     ;SAVE OLD TRAP
1507 004646 013746 000006      MOV      6,-(SP)
1508 004652 012737 004710      000004  MOV      #22$,4      ;FORCE HALT IF TIME-OUT
1509 004660 012737 000340      000006  MOV      #340,5      ;WHEN REFFRENCING TXCSR
1510 004666 042777 014000      174516  BIC      #SYSTST.MEXT,@TXCSR
1511 004674 000000      HALT
1512 004676 012637 000006      MOV      (SP)+,6     ;RESTORE TRAP
1513 004702 012637 000004      MOV      (SP)+,4
1514 004706 000406      BR      33$
1515 004710 000000      22$:      HALT
1516 004712 022626      CMP      (SP)+,(SP)+ ;POP STACK
1517 004714 012637 000006      MOV      (SP)+,6     ;RESTORE TRAP
1518 004720 012637 000004      MOV      (SP)+,4
1519 004724 012600      33$:      POPRO
1520 004726 005237 001232      EXITER: INC      ERRCNT     ;GET RO
1521 004732 032777 000400      174242  BIT      #SW08,@SWR   ;UPDATE ERROR COUNT
1522 004740 001007              BNE      1$          ;GOTO TOP OF TEST?
1523 004742 032777 002000      174232  BIT      #SW10,@SWR   ;BR IF YES
1524 004750 001407              BEQ      2$          ;GOTO NEXT TEST?
1525 004752 013737 001216      001214  MOV      NEXT,RETURN  ;BR IF NO
1526 004760 012706 001150      1$:      MOV      #STACK,SP    ;SET FOR NEXT TEST
1527 004764 000177 174224      JMP      @RETURN     ;RESET SP
1528 004770 000002      2$:      RTI                ;GOTO SPECIFIED TEST
1529 004772 000001      ERTABO: 1          ;RETURN
1530 004774      006      002      .BYTE      6,2

```

```

1531 004776 001266          SAVPC
1532 005000 000001          XTSTN: 1
1533 005002 003 002          .BYTE 3,2
1534 005004 001226          TSTNO
1535 005006 017600 000000    .PKCLK: MOV @ (SP),R0      ;GET THE # OF TICKS TO POKE
1536 005012 062716 000002    ADD #2,(SP)              ;POP OVER THE #
1537 005016
1538 005016 052777 020000 174366 1$: BIS #CLK,@TXCSR      ;POKE CLOCK UP
1539 005024 005300          DEC R0                  ;ARE WE DONE?
1540 005026 001405          BEQ 2$                 ;YES-GO TO 2$
1541 005030 042777 020000 174354 B!C #CLK,@TXCSR        ;POKE CLOCK DOWN
1542 005036 005300          DEC R0                  ;ARE WE DONE?
1543 005040 001366          BNE 1$                 ;NO-REPEAT
1544 005042 000002          2$: RTI                ;RETURN
1545
1546
1547          ;WAIT ROUTINE
1548 005044 000240          SMALL: NOP              ;STALL
1549 005046 000207          RTS PC                 ;RETURN
1550
1551          ;POWER FAIL ROUTINE
1552
1553 005050 012737 005060 000024 .PFAIL: MOV #PWRUP,24    ;LOAD PFAIL VECTOR FOR POWER UP
1554 005056 000000          HALT
1555 005060 000005          PWRUP: RESET           ;WAIT TTY TO COME UP
1556 005062 012706 001150          MOV #STACK,SP         ;REINIT STACK POINTER
1557 005066 012737 005050 000024    MOV #.PFAIL,24        ;LOAD PFAIL VECTOR FOR POWER DOWN
1558 005074 104402          TYPE
1559 005076 005141          MPOWER
1560 005100 000177 174110          JMP @RETURN
1561          ;CLRVEC ROUTINE TO FILL COMMUNICATION VECTOR AREA WITH .+2,HALT
1562
1563 005104 012702 000300          CLRVEC: MOV #300,R2     ;R2 COMM VECTOR AREA ADRS
1564 005110 012701 000302          MOV #302,R1           ;INIT R1 WITH ADRS OF HALT
1565 005114 010122          1$: MOV R1,(R2)+      ;MOV .+2 TO PC
1566 005116 005022          CLR (R2)+            ;MOV HALT TO PC
1567 005120 022121          CMP (R1)+,(R1)+      ;INC TO NEXT VECTOR AREA
1568 005122 022701 000776          CMP #776,R1          ;END OF VECTOR AREA
1569 005126 001372          BNE 1$                ;NO
1570 005130 000207          RTS PC                ;RETURN
1571
1572
1573
1574 005132 020040 000077          MQM: .ASCIZ / ?/
(2) 005136 005015 000          MCRLF: .ASCIZ <15><12>
(2) 005141 377 053520 020122    MPOWER: .ASCIZ <377>/PWR FAILED. /
(2) 005157 015 042777 042116    MEPASS: .ASCIZ <15><377>/END PASS CZDPDC /
(2) 005202 051377 000          MR: .ASCIZ <377>/R/
(2) 005205 377 051120 043517    MERR2: .ASCIZ <377>/PROGRAM INDICATES NO DEVICES PRESENT./
(2) 005254 044777 051516 043125    MERR3: .ASCIZ <377>/INSUFFICIENT DATA!/
(2) 005300 052377 051505 020124    MTSTPC: .ASCIZ <377>/TEST PC-/
(2) 005312 046377 041517 020113    MLOCK: .ASCIZ <377>/LOCK ON SELECTED TEST/
(2) 005341 103 051123 020072    MCSRX: .ASCIZ /CSR: /
(2) 005347 126 041505 020072    MVECX: .ASCIZ /VEC: /
(2) 005355 120 051501 042523    MPASSX: .ASCIZ /PASSES: /
(2) 005366 051105 047522 051522    MERRX: .ASCIZ /ERRORS: /

```


(2)	005377	124	051505	020124	MTSTN:	.ASCIZ	/TEST NO: /
(2)	005411	052	000		MASTEK:	.ASCIZ	/* /
(2)	005413	377	042523	020124	MNEW:	.ASCIZ	<377>/SET SWITCH REG TO DUP11'S DESIRED ACTIVE./
(2)	005466	041520	020072	000	MERRPC:	.ASCIZ	/PC: /
(2)	005473	377	042522	020103	MCSR:	.ASCIZ	<377>/REC CSR ADRS /
(2)	005512	053377	041505	040440	MVEC:	.ASCIZ	<377>/VEC ADRS /
(2)	005525	377	051511	052040	MJMPR:	.ASCIZ	<377>/IS THE OPTIONAL CLR JMPR IN? (Y OR N) /
(2)	005600	044777	020123	044124	MTCN:	.ASCIZ	<377>/IS THE H325 CONNECTOR ON? (Y OR N) /
(2)	005647	377	020043	043117	MTOTAL:	.ASCIZ	<377>/# OF DUP'S (IN OCTAL) /
(2)	005702	050377	044522	051117	MPAR:	.ASCIZ	<377>/PRIORITY (4 TO 7) /
(2)	005726	051777	041505	052040	MSTJM:	.ASCIZ	<377>/SEC TX JMPR IN? (Y OR N) /
(2)	005761	377	042523	020103	MSRJM:	.ASCIZ	<377>/SEC RX JMPR IN? (Y OR N) /
(2)	006014	046777	050101	047440	XHEAD:	.ASCIZ	<377>/MAP OF DUP11 STATUS/<377>
(2)					.EVEN		
(2)	006042	000002			XSTATQ:	2	
1575	006044	006	003		.BYTE	6.3	
1576	006046	001236			TEMP1		
1577	006050	006	002		.BYTE	6.2	
1578	006052	001240			TEMP2		
1579					.EVEN		
1580					TEMP:	0	
1581	006054	000000			-.+40		
1582		006116			MDATA:	0	
1583	006116	000000			-.+40		
1584		006160			INBUF:	0	
1585	006160	000000			-.+40		
1586		006222			TRP.PC:	.BLKW 1	
1587	006222	000001					
1588							

```

1589
1590
1591
1592
1593
1594
1595
1596
1597
1598 006224 105737 001310      CYCLE:  TSTB   DUPACTV   ;ARE ANY DUP11'S TO BE TESTED?
1599 006230 001004                BNE     1$          ;BR IF OK.
1600 006232 104402 005205      TYPE    ,MERR2     ;NO DUP11'S SELECTED
1601 006236 000000                HALT                    ;STOP THE SHOW.
1602 006240 000776                BR      -2          ;DISQUALIFY CONT. SW.
1603 006242 133737 001314 001310 1$:  BITB    RUN,DUPACTV ;IS THIS ONE 'ACTIVE'
1604 006250 001020                BNE     2$          ;BR IF GOOD ONE FOUND.
1605 006252 000241                CLC                      ;CLEAR PROC. CARRY BIT.
1606 006254 106137 001314      ROLB    RUN        ;UPDATE POINTER
1607 006260 105537 001314      ADCB    RJN        ;CATCH CARRY FROM RUN
1608 006264 062737 000006 001316  ADC     #6,CREAM    ;UPDATE ADDRESS POINTER.
1609 006272 022737 001560 001316  CMP     #DUP.END,CREAM
1610 006300 001360                BNE     1$          ;KEEP GOING; NOT ALL TESTED FOR.
1611 006302 012737 001500 001316  MOV     #DUP.MAP,CREAM ;RESET ADDRESS POINTER.
1612 006310 000754                BR      1$          ;KEEP LOOKING FOR ACTIVE DUP11
1613 006312 000241                CLC                      ;CLEAR PROC. CARRY.
1614 006314 106137 001314      ROLB    RUN        ;UPDATE POINTER.
1615 006320 105537 001314      ADCB    RUN        ;CATCH CARRY.
1616 006324 013700 001316      MOV     CREAM,RO     ;GET ADDRESS POINTER.
1617 006330 062737 000006 001316  ADD     #6,CREAM    ;UPDATE.
1618 006336 022737 001560 001316  CMP     #DUP.END,CREAM
1619
1620 006344 001003                BNE     3$          ;ALL DONE?
1621 006346 012737 001500 001316  MOV     #DUP.MAP,CREAM ;BR IF NO.
1622 006354 012037 001404      3$:  MOV     (RO)+,RXCSR  ;RESTORE POINTER.
1623 006360 012037 001374      MOV     (RO)+,DUPRVC ;LOAD SYSTEM CTRL. REG
1624 006364 012037 001434      MOV     (RO)+,LOO.00 ;LOAD VECTOR
1625 006370 012700 000002      MOV     #2,RO       ;GET PARAMETERS
1626 006374 013737 001404 001424  MOV     RXCSR,HUPRCR ;SAVE CORE THIS WAY.
1627 006402 005237 001424      INC     HUPRCR      ;GET CONTROL REG HIGH BYTE
1628 006406 013737 001424 001406  MOV     HUPRCR,RXDBUF ;GOT IT
1629 006414 005237 001406      INC     RXDBUF     ;GET RX CONTROL REG BUFFER
1630 006420 013737 001406 001416  MOV     RXDBUF,DUPSEC ;GOT IT
1631 006426 013737 001406 001410  MOV     RXDBUF,PARCSR ;GOT SECONDARY REG SELECT REG
1632 006434 013737 001406 001422  MOV     RXDBUF,HUPRBF ;GOT PARAMETER STATUS REGISTER
1633 006442 005237 001422      INC     HUPRBF     ;GET RX BUFFER HIGH BYTE
1634 006446 013737 001422 001420  MOV     HUPRBF,HUPPSR ;GOT IT
1635 006454 013737 001420 001412  MOV     HUPPSR,TXCSR ;GOT PAR STATUS REG HIGH BYTE
1636 006462 005237 001412      INC     TXCSR      ;GET TX CONTROL REGISTER
1637 006466 013737 001412 001430  MOV     TXCSR,HUPTCR ;GOT IT
1638 006474 005237 001430      INC     HUPTCR     ;GET TX CONTROL REG HIGH BYTE
1639 006500 013737 001430 001414  MOV     HUPTCR,TXDBUF ;GOT IT
1640 006506 005237 001414      INC     TXDBUF     ;BET TX BUFFER
1641 006512 013737 001414 001426  MOV     TXDBUF,HUPTBF ;GOT IT
1642 006520 005237 001426      INC     HUPTBF     ;GET TX BUFFER HIGH BYTE
1643
1644 006524 013737 001374 001376  MOV     DUPRVC,DUPRPS ;GOT IT
;RX VECTOR

```

1645	006532	060037	001376		ADD	RO,DUPRPS	;RX PRIORITY LEVEL	
1646	006536	013737	001376	001400	MOV	DUPRPS,DUPTVC		
1647	006544	060037	001400		ADD	RO,DUPTVC	;TX VECTOR	
1648	006550	013737	001400	001402	MOV	DUPTVC,DUPTPS		
1649	006556	060037	001402		ADD	RO,DUPTPS	;TX PRIORITY LEVEL	
1650								
1651								
1652	006562	012700	001434		MOV	#L00.00,R0	;LOAD STAUS 00-00	
1653	006566	012701	001432		MOV	#MASK.A,R1	;PREPARE MASK.	
1654	006572	012702	001433		MOV	#CLK.A,R2	;PREPARE CLOCKS	
1655	006576	004737	006742		JSR	PC,FIX.00	;GO AND CALCULATE CONFIGURATION.	
1656	006602	005737	000042		TST	@#42		
1657	006606	001050			BNE	4\$		
1658	006610	032777	000002	172364	BIT	#SW01,@SWR	;IF SW01=1,GET STARTING TEST #	
1659	006616	001444			BEQ	4\$		
1660	006620	104402	005136		7\$:	TYPE	,MCRLF	
1661	006624	104403			INSTR		;OUTPUT MESSAGE & GET INPUT STRING	
1662	006626	005377			MTSTN		;MESSAGE	
1663	006630	104405			PARAM		;CONVERT STRING	
1664	006632	000001			1		;LOW LIMIT	
1665	006634	001000			1000		;HIGH LIMIT	
1666	006636	001226			TSTNO		;STORE AT THIS LOCATION	
1667	006640	000			.BYTE	0	;MASK	
1668	006641	001			.BYTE	1	;HOW MANY TIMES + 2	
1669	006642	012700	007160		MOV	#TST1,R0		
1670	006646	022710	012737		5\$:	CMP	#12737,(R0)	
1671	006652	001017			BNE	6\$		
1672	006654	023760	001226	000002	CMP	TSTNO,2(R0)		
1673	006662	001013			BNE	6\$		
1674	006664	022760	001226	000004	CMP	#TSTNO,4(R0)		
1675	006672	001007			BNE	6\$		
1676	006674	010037	001214		MOV	R0,RETURN	;SAVE PC	
1677	006700	104402	005136		TYPE	,MCRLF		
1678	006704	104402	005202		TYPE	,MR		
1679	006710	000412			BR	8\$		
1680	006712	005720			6\$:	TST	(R0)+	
1681	006714	020027	021464		CMP	R0,#TLAST+10		
1682	006720	001352			BNE	5\$		
1683	006722	104402	005132		TYPE	,MQM		
1684	006726	000734			BR	7\$		
1685								
1686	006730	012737	007160	001214	4\$:	MOV	#TST1,RETURN	;PREPARE RETURN ADDRESS
1687	006736	000177	172252		8\$:	JMP	@RETURN	;GO START TESTING.
1688								
1689	006742	011003			FIX.00:	MOV	(R0),R3	;GET PARAMETERS.
1690	006744	000207			5\$:	RTS	PC	;

1691					
1692					
1693					
1694					
1695	006746	012577	172422	SETVEC:	MOV (R5)+, @DUPRVC
1696	006752	012577	172422		MOV (R5)+, @DUPTVC
1697	006756	112577	172414		MOVB (R5)+, @DUPRPS
1698	006762	112577	172414		MOVB (R5)+, @DUPTPS
1699	006766	000205			RTS R5
1700	006770			NO.ATRAP:	
1701	006770	104012			HLT 12
1702	006772	000002			RTI
1703					
1704	006774			NO.BTRAP:	
1705	006774	104013			HLT 13
1706	006776	000002			RTI
1707					
1708	007000	010046		SIMBCC:	MOV R0, -(SP)
1709	007002	010146			MOV R1, -(SP)
1710	007004	010246			MOV R2, -(SP)
1711	007006	012537	001236		MOV (R5)+, TEMP1
1712	007012	012537	001240		MOV (R5)+, TEMP2
1713	007016	012537	001242		MOV (R5)+, TEMP3
1714	007022	005037	007154	1\$:	CLR BCCFBK
1715	007026	013700	001242		MOV TEMP3, R0
1716	007032	006037	001240		ROR TEMP2
1717	007036	005500			ADC R0
1718	007040	032700	000001		BIT #BIT0, R0
1719	007044	001402			BEQ 2\$
1720	007046	005137	007154		COM BCCFBK
1721	007052	013700	007152	2\$:	MOV XPOLY, R0
1722	007056	005100			COM R0
1723	007060	040037	007154		BIC R0, BCCFBK
1724	007064	000241			CLC
1725	007066	006037	001242		ROR TEMP3
1726	007072	013700	007154		MOV BCCFBK, R0
1727	007076	013701	001242		MOV TEMP3, R1
1728	007102	010102			MOV R1, R2
1729	007104	040100			BIC R1, R0
1730	007106	043702	007154		BIC BCCFBK, R2
1731	007112	050200			BIS R2, R0
1732	007114	043737	007152 001242		BIC XPOLY, TEMP3
1733	007122	050037	001242		BIS R0, TEMP3
1734	007126	005337	001236		DEC TEMP1
1735	007132	001333			BNE 1\$
1736	007134	013737	001242 007156		MOV TEMP3, CALBCC
1737	007142	012602			MOV (SP)+, R2
1738	007144	012601			MOV (SP)+, R1
1739	007146	012600			MOV (SP)+, R0
1740	007150	000205			RTS R5
1741	007152	000000		XPOLY:	0
1742	007154	000000		BCCFBK:	0
1743	007156	000000		CALBCC:	0
1744		120001		CRC16=	120001
1745		102010		CRC.CCITT=	102010
1746					

1747
1748
1749
1750
1751
1752
1753
1754
1755
1756
1757
1758
1759
1760
1761
1762
1763
1764
1765
1766
1767
1768
1769
1770
1771
1772
1773
1774
1775
1776
1777
1778
1779
1780
1781
1782
1783
1784
1785
1786
1787
1788
1789
1790
1791
1792
1793
1794
1795
1796
1797
1798
1799
1800
1801
1802

007160	012737	000001	001226
007166	012737	007264	001216
007174	012737	000340	177776
007202	052777	000400	172202
007210	004737	005044	
007214	004537	006746	
007220	006770		
007222	006774		
007224	340	340	
007226	012777	004100	172156
007234	012737	000340	177776
007242	000240		
007244	000240		
007246	000240		
007250	005077	172136	
007254	104400		
007256	012716	007250	
007262	000002		
007264	012737	000002	001226
007272	012737	007400	001216
007300	122737	000005	001320
007306	001026		
007310	012737	000340	177776
007316	052777	000400	172066
007324	004737	005044	
007330	004537	006746	
007334	006770		
007336	006774		
007340	340	340	

```

***** TEST 1 *****
*PRIORITY INTERRUPT TEST.
*SET PROCESSOR STATUS TO PRIORITY 7
*AND VERIFY THAT THE DUP11 WILL NOT INTERRUPT.
*****

```

```

*****
*
TEST 1
*
*****

```

```

*****
TST1:  MOV    #1,@TSTNO
      MOV    #TST2,NEXT
      MOV    #340,PS          ;LOCK OUT INTERRUPTS
      BIS    #MRESET,@TXCSR  ;RESET THE DEVICE
      JSR    PC,SMALL        ;WAIT FOR RESET TO FINISH
      JSR    R5,SETVEC       ;SET UP VECTORS
      NO.ATRAP                ;VECTOR 'A'
      NO.BTRAP                ;VECTOR 'B'
      .BYTE  340,340          ;LVEL
      MOV    #TXINTE!SYSTST,@TXCSR ;TURN ON DUP TX INT. ENABLEAND ENTER SYSTST MODE
      MOV    #340,PS          ;SET CPU PRIORITY--CHANGE HERE IF NOT 5
      NOP                    ;STALL
      NOP                    ;DITTO
      NOP                    ;DITTO
1$:   CLR    @TXCSR          ;DISABLE THE DUP11
      SCOPE                ;SCOPE THIS TEST
2$:   MOV    #1$,(SP)       ;SETUP FOR RETURN
      RTI                    ;RETURN

```

```

***** TEST 2 *****
*PRIORITY INTERRUPT TEST.
*SET PROCESSOR STATUS TO PRIORITY 6
*AND VERIFY THAT THE DUP11 WILL NOT INTERRUPT.
*****

```

```

*****
*
TEST 2
*
*****

```

```

*****
TST2:  MOV    #2,@TSTNO
      MOV    #TST3,NEXT
      CMPB   #5,PRIRTY       ;COMPARE REAL WITH NORMAL
      BNE    1$              ;BR IF NOT A MATCH
      MOV    #340,PS          ;LOCK OUT INTERRUPTS
      BIS    #MRESET,@TXCSR  ;RESET THE DEVICE
      JSR    PC,SMALL        ;WAIT FOR RESET TO FINISH
      JSR    R5,SETVEC       ;SET UP VECTORS
      NO.ATRAP                ;VECTOR 'A'
      NO.BTRAP                ;VECTOR 'B'
      .BYTE  340,340          ;LEVEL

```

```

1803 007342 012777 004100 172042      MOV    #TXINTE.SYSTST,@TXCSR ;TURN ON DUP TX INT. ENABLEAND ENTER SYSTST MODE
1804 007350 012737 000300 177776      MOV    #300,PS                ;SET CPU PRIORITY--CHANGE HERE IF NOT - 5
1805 007356 000240                    NOP                            ;STALL
1806 007360 000240                    NOP                            ;DITTO
1807 007362 000240                    NOP                            ;DITTO
1808 007364 005077 172022      1$:   CLR    @TXCSR              ;DISABLE THE DUP11
1809 007370 104400                    SCOPE                          ;SCOPE THIS TEST
1810 007372 012716 007364      2$:   MOV    #1$,(SP)          ;SETUP FOR RETURN
1811 007376 000002                    RTI                           ;RETURN

```

```

:***** TEST 3 *****
:*PRIORITY INTERRUPT TEST.
:*SET PROCESSOR STATUS TO PRIORITY 5
:*AND VERIFY THAT THE DUP11 WILL NOT INTERRUPT.
:*****

```

```

:*****
: *
: TEST 3
: *
:*****

```

```

1826 007400 012737 000003 001226      TST3: MOV    #3,@TSTNO
1827 007406 012737 007514 001216      MOV    #TST4,NEXT
1828 007414 122737 000005 001320      CMPB   #5,PRTY              ;COMPARE REAL WITH NORMAL
1829 007422 001026                    BNE    1$                   ;BR IF NOT A MATCH
1830 007424 012737 000340 177776      MOV    #340,PS              ;LOCK OUT INTERRUPTS
1831 007432 052777 000400 171752      BIS    #MRESET,@TXCSR      ;RESET THE DEVICE
1832 007440 004737 005044                    JSR    PC,SMALL             ;WAIT FOR RESET TO FINISH
1833 007444 004537 006746                    JSR    R5,SETVEC           ;SET UP VECTORS
1834 007450 006770                    NO.ATRAP                   ;VECTOR 'A'
1835 007452 006774                    NO.BTRAP                   ;VECTOR 'B'
1836 007454          340          340      .BYTE 340,340              ;LEVEL
1837 007456 012777 004100 171726      MOV    #TXINTE!SYSTST,@TXCSR ;TURN ON DUP TX INT. ENABLEAND ENTER SYSTST MODE
1838 007464 012737 000240 177776      MOV    #240,PS              ;SET CPU PRIORITY--CHANGE HERE IF NOT - 5
1839 007472 000240                    NOP                            ;STALL
1840 007474 000240                    NOP                            ;DITTO
1841 007476 000240                    NOP                            ;DITTO
1842 007500 005077 171706      1$:   CLR    @TXCSR              ;DISABLE THE DUP11
1843 007504 104400                    SCOPE                          ;SCOPE THIS TEST
1844 007506 012716 007500      2$:   MOV    #1$,(SP)          ;SETUP FOR RETURN
1845 007512 000002                    RTI                           ;RETURN

```

```

:***** TEST 4 *****
:*PRIORITY INTERRUPT TEST.
:*SET PROCESSOR STATUS TO PRIORITY 4
:*AND VERIFY THAT THE DUP11 WILL INTERRUPT.
:*****

```

```

:*****
: *
: TEST 4
: *
:*****

```

1846
1847
1848
1849
1850
1851
1852
1853
1854
1855
1856
1857
1858

```

1859
1860 007514 012737 000004 001226 TST4: MOV #4,@TSTNO
1861 007522 012737 007632 001216 MOV #TST5,NEXT
1862 007530 122737 000005 001320 CMPB #5,PRTY ;COMPARE REAL WITH NORMAL
1863 007536 001027 BNE 1$ ;BR IF NOT A MATCH
1864 007540 012737 000340 177776 MOV #340,PS ;LOCK OUT INTERRUPTS
1865 007546 052777 000400 171636 BIS #MRESET,@TXCSR ;RESET THE DEVICE
1866 007554 004737 005044 JSR PC,SMALL ;WAIT FOR RESET TO FINISH
1867 007560 004537 006746 JSR R5,SETVEC ;SET UP VECTORS
1868 007564 006770 NO.ATRAP ;VECTOR 'A'
1869 007566 007624 2$ ;VECTOR 'B'
1870 007570 340 340 .BYTE 340,340 ;LEVEL
1871 007572 012777 004100 171612 MOV #TXINTE!SYSTST,@TXCSR ;TURN ON DUP TX INT. ENABLEAND ENTER SYSTST MODE
1872 007600 012737 000200 177776 MOV #200,PS ;SET CPU PRIORITY--CHANGE HERE IF NOT - 5
1873 007606 000240 NOP ;STALL
1874 007610 000240 NOP ;DITTO
1875 007612 000240 NOP ;DITTO
1876 007614 104013 HLT 1$ ;DUP FAILED TO INTERRUPT-POSSB!LY WRONG PRIORITY-CHANGE IF NOT 5
1877 007616 005077 171570 1$. CLR @TXCSR ;DISABLE THE DUP11
1878 007622 104400 SCOPE ;SCOPE THIS TEST
1879 007624 012716 007616 2$. MOV #1$, (SP) ;SETUP FOR RETURN
1880 007630 000002 RTI ;RETURN

```

```

1881
1882 ;***** TEST 5 *****
1883 ;*TEST TO PROVE THE HALF-DUPLEX FUNCTION
1884 ;*PROVE THAT THE RECEIVER WILL NOT RECOGNIZE
1885 ;*DATA IF SEND IS ASSERTED.
1886 ;*****

```

```

1887
1888 ;*****
1889 ;
1890 ; TEST 5
1891 ;
1892 ;*****
1893 ;*****

```

```

1894 007632 012737 000005 001226 TST5: MOV #5,@TSTNO
1895 007640 012737 010172 001216 MOV #TST6,NEXT
1896 007646 105737 001322 TSTB TCN!LG
1897 007652 001530 BEQ 1$
1898 007654 012737 000340 177776 MOV #340,PS ;LOCK OUT INTERRUPTS
1899 007662 052777 000400 171522 BIS #MRESET,@TXCSR ;RESET THE DEVICE
1900 007670 004737 005044 JSR PC,SMALL ;WAIT FOR RESET TO FINISH
1901 007674 052777 010010 171510 BIS #MEXT!HDXEN,@TXCSR ;ENTER MAINT EXT AND HALF-DUPLEX MODES
1902 007702 004537 006746 JSR R5,SETVEC ;SET UP VECTORS
1903 007706 010162 2$ ;RECEIVER
1904 007710 006774 NO.BTRAP ;TRANSMITTER
1905 007712 340 340 .BYTE 340,340 ;LEVEL
1906 007714 005037 177776 CLR PS ;LOWER PROC. STATUS
1907 007720 052777 000020 171456 BIS #RCVEN,@RXCSR ;TURN ON RECEIVER
1908 007726 052777 000100 171450 BIS #RINTEN,@RXCSR ;TURN ON INT. ENABLE
1909 007734 052777 000020 171450 BIS #SEND,@TXCSR ;TURN ON TRANSMITTER
1910 007742 012737 000005 007772 MOV #5,68$ ;LOAD THE NUMBER
1911 007750 032777 004000 171436 66$: BIT #TIMER,@TXDBUF ;CHECK THE TIMER BIT
1912 007756 001374 BNE 66$ ;BR IF SET
1913 007760 032777 004000 171426 67$: BIT #TIMER,@TXDBUF ;CHECK THE BIT
1914 007766 001774 BEQ 67$ ;BR IF CLEAR

```



```

1915 007770 005327          DEC      (PC)+          ;DECREMENT THE NUMBER
1916 007772 000005          68$:    5              ;OF TIMES TO REPEAT
1917 007774 001365          BNE      66$           ;BR IF MORE TO GO
1918 007776 105777 171410  TSTB    @TXCSR
1919 010002 100401          BMI      3$
1920 010004 104005          HLT      5              ;TXDONE FAILED TO SET
1921 010006 012777 000400 171400 3$:    MOV    #TSM,@TXDBUF    ;LOAD TX BUFFER
1922 010014 012737 000005 010044  MOV    #5,73$         ;LOAD THE NUMBER
1923 010022 032777 004000 171364 71$:    BIT    #TIMER,@TXDBUF  ;CHECK THE TIMER BIT
1924 010030 001374          BNE      71$           ;BR IF SET
1925 010032 032777 004000 171354 72$:    BIT    #TIMER,@TXDBUF  ;CHECK THE BIT
1926 010040 001774          BEQ      72$           ;BR IF CLEAR
1927 010042 005327          DEC      (PC)+          ;DECREMENT THE NUMBER
1928 010044 000005          73$:    5              ;OF TIMES TO REPEAT
1929 010046 001365          BNE      71$           ;BR IF MORE TO GO
1930 010050 105777 171336  TSTB    @TXCSR
1931 010054 100401          BMI      4$
1932 010056 104000          HLT
1933
1934
1935 010060 005077 171330  4$:    CLR    @TXDBUF        ;LOAD A CHARACTER
1936 010064 105777 171322  TSTB    @TXCSR        ;CHECK FOR DONE
1937 010070 100375          BPL      -4            ;BR IF NOT SET
1938 010072 012777 001000 171314  MOV    #TEOM,@TXDBUF  ;END THE MESSAGE
1939 010100 012737 000050 010130  MOV    #40,78$        ;LOAD THE NUMBER
1940 010106 032777 004000 171300 76$:    BIT    #TIMER,@TXDBUF  ;CHECK THE TIMER BIT
1941 010114 001374          BNE      76$           ;BR IF SET
1942 010116 032777 004000 171270 77$:    BIT    #TIMER,@TXDBUF  ;CHECK THE BIT
1943 010124 001774          BEQ      77$           ;BR IF CLEAR
1944 010126 005327          DEC      (PC)+          ;DECREMENT THE NUMBER
1945 010130 000050          78$:    0              ;OF TIMES TO REPEAT
1946 010132 001365          BNE      76$           ;BR IF MORE TO GO
1947 010134 012737 000340 177776 1$:    MOV    #340,PS        ;RAISE PROCESSOR STATUS
1948 010142 012706 001150  MOV    #STACK,SP      ;RESET STACK
1949 010146 052777 000400 171236  BIS    #MRESET,@TXCSR ;RESET THE DEVICE
1950 010154 004737 005044  JSR     PC,SMALL      ;WAIT FOR RESET TO FINISH
1951 010160 104400          SCOPE
1952
1953 010162 104007          2$:    HLT      7              ;RECEIVER INTERRUPTED AND SHOULD
1954 010164 012716 010134  MOV    #1$, (SP)     ;NOT HAVE--THIS IS HALF
1955 010170 000002          RTI
1956
1957
1958
1959
1960
1961
1962
1963
1964
1965
1966
1967
1968 010172 012737 000006 001226  TST6:  MOV    #6,@TSTNO
1969 010200 012737 010632 001216  MOV    #TST7,NEXT
1970 010206 052777 000400 171176  BIS    #MRESET,@TXCSR ;RESET THE DEVICE

```

```

:***** TEST 6 *****
:*TEST OF THE DUP RUNNING A BINARY COUNT
:*PATTERN WITHOUT A CRC CALCULATION
:*****

```

```

:*****
:TEST 6
:*****
:*****

```

```

1971 010214 004737 005044 JSR PC,SMALL ;WAIT FOR RESET TO FINISH
1972 010220 012737 000001 001236 MOV #1,TEMP1 ;LOAD DATA
1973 010226 005037 001240 CLR TEMP2 ;CLEAR EXPECTED
1974 010232 012737 000340 177776 MOV #340,PS ;PS = 7
1975 010240 052777 004000 171144 BIS #SYSTST,@TXCSR ;ENTER SYSTEM TEST MODE
1976 010246 004537 006746 JSR R5,SETVEC ;LOAD INTERRUPT VECTORS
1977 010252 010446 11$ ;RECEIVER
1978 010254 010526 12$ ;TRANSMITER
1979 010256 340 340 .BYTE 340,340 ;LEVEL
1980 010260 052777 001000 171122 BIS #CRCEN,@PARCSR ;TURN OFF CRC
1981 010266 052777 000020 171110 BIS #RCVEN,@RXCSR ;TURN ON THE RECEIVER
1982 010274 052777 000100 171102 BIS #RINTEN,@RXCSR ;TURN ON REC INTERRUPT ENABLE
1983 010302 105777 171104 1$: TSTB @TXCSR ;TEST FOR TX DONE
1984 010306 100375 BPL 1$ ;BR IF NOT SET
1985 010310 052777 000020 171074 2$: BIS #SEND,@TXCSR ;TURN ON SEND
1986 010316 012777 000400 171070 MOV #TSOM,@TXDBUF ;TURN ON START OF MESSAGE
1987 010324 012737 000005 010354 MOV #5,68$ ;LOAD THE NUMBER
1988 010332 032777 004000 171054 66$: BIT #TIMER,@TXDBUF ;CHECK THE TIMER BIT
1989 010340 001374 BNE 66$ ;BR IF SET
1990 010342 032777 004000 171044 67$: BIT #TIMER,@TXDBUF ;CHECK THE BIT
1991 010350 001774 BEQ 67$ ;BR IF CLEAR
1992 010352 005327 DEC (PC)+ ;DECREMENT THE NUMBER
1993 010354 000005 68$: 5 ;OF TIMES TO REPEAT
1994 010356 001365 BNE 66$ ;BR IF MORE TO GO
1995 010360 105777 171026 3$: TSTB @TXCSR ;WAIT FOR DONE
1996 010364 100401 BMI 4$ ;BR IF SET
1997 010366 104000 HLT ;EXTERNAL CLOCKING STOPPED
1998 010370 005077 171020 4$: CLR @TXDBUF ;PUSH OUT DATA
1999 010374 052777 000100 171010 BIS #TXINTE,@TXCSR ;TURN ON TRANSMITTER INT ENABLE
2000 010402 005037 177776 CLR PS ;LOWER PROCESOR STATUS
2001 010406 5$:
2002 010406 012737 000040 010436 MOV #32.,73$ ;LOAD THE NUMBER
2003 010414 032777 004000 170772 71$: BIT #TIMER,@TXDBUF ;CHECK THE TIMER BIT
2004 010422 001374 BNE 71$ ;BR IF SET
2005 010424 032777 004000 170762 72$: BIT #TIMER,@TXDBUF ;CHECK THE BIT
2006 010432 001774 BEQ 72$ ;BR IF CLEAR
2007 010434 005327 DEC (PC)+ ;DECREMENT THE NUMBER
2008 010436 000040 73$: 32. ;OF TIMES TO REPEAT
2009 010440 001365 BNE 71$ ;BR IF MORE TO GO
2010 010442 104001 HLT 1 ;FAILED TO INTERRUPT IN TIME
2011 010444 104400 6$: SCOPE ;SCOPE THIS TEST
2012
2013
2014 ;INTERRUPT SERVICE ROUTINES
2015 -----
2016
2017 ;RECEIVER:
2018 010446 017737 170734 001324 11$: MOV @RXDBUF,DATA ;GET THE REGISTER AND DATA
2019 010454 123737 001240 001324 CMPB TEMP2,DATA ;CHECK IT
2020 010462 001401 BEQ .+4 ;BR IF OK
2021 010464 104002 HLT 2 ;COMPARISON ERROR
2022 010466 105237 001240 INCB TEMP2 ;COUNT UP EXPECTED
2023 010472 105737 001240 TSTB TEMP2 ;CHECK TO SEE IF DONE
2024 010476 001012 BNE 7$ ;BR IF NO
2025 010500 105777 170700 10$: TSTB @RXCSR ;CHECK FOR DONE
2026 010504 100375 BPL 10$ ;BR IF NOT YET

```

```

2027 010506 032777 001000 170672 BIT #REOM,@RXDBUF ;CHECK FOR END OF MSG
2028 010514 001001 BNE .+4 ;BR IF SET
2029 010516 104003 HLT 3 ;END OF MSG FAILED TO SET
2030 010520 012716 010444 MOV #6$, (SP) ;CRUNCH STACK
2031
2032 010524 000002 7$: RTI ;RETURN
2033
2034
2035 ;TRANSMITTER:
2036 010526 113777 001236 170660 12$: MOVB TEMP1,@TXDBUF ;LOAD THE TRANSMITTER BUFFER
2037 010534 105237 001236 INCB TEMP1 ;UP THE COUNT
2038 010540 122737 000377 001236 CMPB #377,TEMP1 ;ARE WE DONE
2039 010546 001026 BNE 13$ ;BR IF NO
2040 010550 012777 010560 170622 MOV #21$,@DUPTVC ;SETUP FOR NEXT PART
2041 010556 000422 BR 13$ ;LEAVE
2042 010560 012777 000377 170626 21$: MOV #377,@TXDBUF ;LOAD BUFFER
2043 010566 012777 010576 170604 MOV #22$,@DUPTVC ;SETUP NEXT PART
2044 010574 000413 BR 13$ ;LEAVE
2045 010576 012777 001000 170610 22$: MOV #TEOM,@TXDBUF ;SET END OF MSG
2046 010604 000240 NOP ;STALL
2047 010606 000240 NOP ;DITTO
2048 010610 042777 000120 170574 BIC #SEND!TXINTE,@TXCSR ;TURN OFF TRANSMITTER
2049 010616 012777 006774 170554 MOV #NO.BTRAP,@DUPTVC ;LOAD VECTOR
2050 010624 012716 010406 13$: MOV #5$, (SP) ;CRUNCH STACK
2051 010630 000002 RTI ;RETURNS
2052
2053

```

```

:***** TEST 7 *****
:*TEST OF THE DUP RUNNING A BINARY COUNT
:*PATTERN WITH A CRC CALCULATION
:*****

```

```

:*****
: TEST 7
:*****

```

```

2065 010632 012737 000007 001226 TST7: MOV #7,@TSTNO
2066 010640 012737 011432 001216 MOV #TST10,NEXT
2067 010646 052777 000400 170536 BIS #MRESET,@TXCSR ;RESET THE DEVICE
2068 010654 004737 005044 JSR PC,SMALL ;WAIT FOR RESET TO FINISH
2069 010660 005001 CLR R1 ;CLEAR OUT DATA
2070 010662 012737 102010 007152 MOV #CRC.CCITT,XPOLY ;SET UP THE POLYNOMIAL
2071 010670 012737 177777 007156 MOV #-1,CALBCC ;SETUP FOR THE FIRS' TIME
2072 010676 013737 007156 010720 16$: MOV CALBCC,20$ ;ALLOW FOR THE NEXT CHARACTER
2073 010704 010137 010716 MOV R1,17$ ;LOAD DATA
2074 010710 004537 007000 JSR R5,SIMBCC ;GO CALCULATE SOFTWARE BCC
2075 010714 000010 8. ;BASED ON THESE PARAMETERS
2076 010716 000001 17$: .BLKW 1 ;DATA
2077 010720 000001 20$: .BLKW 1 ;PREVIOUS BCC
2078 010722 105201 INCB R1 ;INCREMENT DATA
2079 010724 001364 BNE 10$ ;BR IF MORE TO GO
2080 010726 012737 000001 001236 MOV #1,TEMP1 ;LOAD DATA
2081 010734 005037 001240 CLR TEMP2 ;CLEAR EXPECTED
2082 010740 012737 000340 177776 MOV #340,PS ;PS - 7

```

```

2083 010746 052777 004000 170436      BIS      #SYSTST,@TXCSR  ;ENTER SYSTEM TEST MODE
2084 010754 004537 006746                JSR      R5,SETVEC    ;LOAD INTERRUPT VECTORS
2085 010760 011146                11$     ;RECEIVER
2086 010762 011214                12$     ;TRANSMITTER
2087 010764      340      340      .BYTE    340,340      ;LEVEL
2088 010766 052777 000020 170410      BIS      #RCVEN,@RXCSR ;TURN ON THE RECEIVER
2089 010774 052777 000100 170402      BIS      #RINTEN,@RXCSR ;TURN ON REC INTERRUPT ENABLE
2090 011002 105777 170404      1$:     TSTB     @TXCSR      ;TEST FOR TX DONE
2091 011006 100375                BPL      1$          ;BR IF NOT SET
2092 011010 052777 000020 170374      2$:     BIS      #SEND,@TXCSR ;TURN ON SEND
2093 011016 012777 000400 170370      MOV      #TSM,@TXDBUF ;TURN ON START OF MESSAGE
2094 011024 012737 000005 011054      MOV      #5,68$     ;LOAD THE NUMBER
2095 011032 032777 004000 170354      66$:    BIT      #TIMER,@TXDBUF ;CHECK THE TIMER BIT
2096 011040 001374                BNE      66$        ;BR IF SET
2097 011042 032777 004000 170344      67$:    BIT      #TIMER,@TXDBUF ;CHECK THE BIT
2098 011050 001774                BEQ      67$        ;BR IF CLEAR
2099 011052 005327                DEC      (PC)+      ;DECREMENT THE NUMBER
2100 011054 000005                68$:    5           ;OF TIMES TO REPEAT
2101 011056 001365                BNE      66$        ;BR IF MORE TO GO
2102 011060 105777 170326      3$:     TSTB     @TXCSR      ;WAIT FOR DONE
2103 011064 100401                BMI      4$          ;BR IF SET
2104 011066 104000                HLT                     ;EXTERNAL CLOCKING STOPPED
2105 011070 005077 170320      4$:     CLR      @TXDBUF ;PUSH OUT DATA
2106 011074 052777 000100 170310      BIS      #TXINTE,@TXCSR ;TURN ON TRANSMITTER INT ENABLE
2107 011102 005037 177776                CLR      PS          ;LOWER PROCESOR STATUS
2108 011106                5$:
2109 011106 012737 000040 011136      MOV      #32,,73$    ;LOAD THE NUMBER
2110 011114 032777 004000 170272      71$:    BIT      #TIMER,@TXDBUF ;CHECK THE TIMER BIT
2111 011122 001374                BNE      71$        ;BR IF SET
2112 011124 032777 004000 170262      72$:    BIT      #TIMER,@TXDBUF ;CHECK THE BIT
2113 011132 001774                BEQ      72$        ;BR IF CLEAR
2114 011134 005327                DEC      (PC)+      ;DECREMENT THE NUMBER
2115 011136 000040                73$:    32          ;OF TIMES TO REPEAT
2116 011140 001365                BNE      71$        ;BR IF MORE TO GO
2117 011142 104001                HLT      1           ;FAILED TO INTERRUPT IN TIME
2118 011144 104400                6$:     SCOPE        ;SCOPE THIS TEST
2119
2120
2121                ;INTERRUPT SERVICE ROUTINES
2122                -----
2123
2124                ;RECEIVER:
2125 011146 017737 170234 001324      11$:    MOV      @RXDBUF,DATA ;GET THE REGISTER AND DATA
2126 011154 123737 001240 001324      CMPB     TEMP2,DATA  ;CHECK IT
2127 011162 001401                BEQ      .+4        ;BR IF OK
2128 011164 104002                HLT      2          ;COMPARISON ERROR
2129 011166 105237 001240      INCB     TEMP2      ;COUNT UP EXPECTED
2130 011172 105737 001240      TSTB     TEMP2      ;CHECK TO SEE IF DONE
2131 011176 001005                BNE      7$         ;BR IF NO
2132 011200 004537 006746      JSR      R5,SETVEC  ;YES--RESET THE VECTORS
2133 011204 011320                14$     ;RECEIVER
2134 011206 011214                12$     ;TRANSMITTER
2135 011210      340      340      .BYTE    340,340      ;LEVEL
2136
2137 011212 000002      7$:     RTI          ;RETURN
2138

```

```

2139
2140
2141 011214 113777 001236 170172 :TRANSMITTER:
2142 011222 105237 001236 12$: MOVB TEMP1,@TXDBUF ;LOAD THE TRANSMITTER BUFFER
2143 011226 122737 000377 001236 INCB TEMP1 ;UP THE COUNT
2144 011234 001026 000377 001236 CMPB #377,TEMP1 ;ARE WE DONE
2145 011236 012777 011246 170134 BNE 13$ ;BR IF NO
2146 011244 000422 011246 170134 MOV #21$,@DUPTVC ;SETUP FOR NEXT PART
2147 011246 012777 000377 170140 21$: BR 13$ ;LEAVE
2148 011254 012777 011264 170116 MOV #377,@TXDBUF ;LOAD BUFFER
2149 011262 000413 011264 170116 MOV #22$,@DUPTVC ;SETUP NEXT PART
2150 011264 012777 001000 170122 22$: BR 13$ ;LEAVE
2151 011272 000240 001000 170122 MOV #TEOM,@TXDBUF ;SET END OF MSG
2152 011274 000240 001000 170122 NOP ;STALL
2153 011276 042777 000120 170106 BIC #SEND!TXINTE,@TXCSR ;TURN OFF TRANSMITTER
2154 011304 012777 006774 170066 MOV #NO.BTRAP,@DUPTVC ;LOAD VECTOR
2155 011312 012716 011106 13$: MOV #5$, (SP) ;CRUNCH STACK
2156 011316 000002 011106 13$: RTI ;RETURNS
2157
2158 011320 117737 170062 001324 14$: MOVB @RXDBUF,DATA ;GET FIRST PART OF CRC
2159 011326 105777 170052 001324 TSTB @RXCSR ;WAIT FOR SECOND PART
2160 011332 100375 170052 001324 BPL -4 ;DITTO
2161 011334 017737 170046 001242 MOV @RXDBUF,TEMP3 ;GET THE REST OF THE CRC
2162 011342 113737 001242 001325 MOVB TEMP3,DATA+1 ;SET UP CRC CHARACTER
2163 011350 012716 011356 001325 MOV #15$, (SP) ;SETUP FOR RETURN
2164 011354 000002 011356 001325 RTI ;RETURN
2165 011356 012737 000340 177776 15$: MOV #340,PS ;RAISE PS
2166 011364 005137 007156 001324 COM CALBCC ;INVERT BCC
2167 011370 023737 007156 001324 CMP CALBCC,DATA ;COMPARE SOFTWARE AND HARDWARE BCC
2168 011376 001401 007156 001324 BFQ +4 ;BR IF OK
2169 011400 104004 007156 001324 HLT 4 ;BCC COMPARISON ERROR
2170 011402 032737 010000 001242 BIT #CRCERR,TEMP3 ;CHECK THE ERROR BIT
2171 011410 001401 010000 001242 BEQ +4 ;BR IF NO ERROR
2172 011412 104004 010000 001242 HLT 4 ;BCC ERROR--RECEIVER DOESN'T
2173 ;AGREE WITH WHAT TX SENT
2174 011414 052777 000400 167770 BIS #MRESET,@TXCSR ;RESET THE DEVICE
2175 011422 004737 005044 167770 JSR PC,SMALL ;WAIT FOR RESET TO FINISH
2176 011426 000137 011144 167770 JMP 6$ ;LEAVE
2177

```

```

:***** TEST 10 *****
:*TEST OF THE DUP RUNNING A BINARY COUNT
:*PATTERN WITH A CRC CALCULATION
:*****

```

```

:*****
: *
: TEST 10
: *
:*****

```

```

2188
2189 011432 012737 000010 001226 TST10: MOV #10,@TSTNO
2190 011440 012737 012240 001216 MOV #TST11,NEXT
2191 011446 052777 000400 167736 BIS #MRESET,@TXCSR ;RESET THE DEVICE
2192 011454 004737 005044 167736 JSR PC,SMALL ;WAIT FOR RESET TO FINISH
2193 011460 105737 001322 167736 TSTB TCNFLG
2194 011464 001532 001322 167736 BEQ 6$

```

```
2195 011466 005001          CLR      R1          ;CLEAR OUT DATA
2196 011470 012737 102010 007152  MOV      #CRC.CCITT,XPOLY ;SET UP THE POLYNOMIAL
2197 011476 012737 177777 007156  MOV      #-1,CALBCC    ;SETUP FOR THE FIRST TIME
2198 011504 013737 007156 011526 16$:  MOV      CALBCC,20$    ;ALLOW FOR THE NEXT CHARACTER
2199 011512 010137 011524          MOV      R1,17$      ;LOAD DATA
2200 011516 004537 007000          JSR      R5,SIMBCC    ;GO CALCULATE SOFTWARE BCC
2201 011522 000010          8.          ;BASED ON THESE PARAMETERS
2202 011524 000001          17$: .BLKW 1          ;DATA
2203 011526 000001          20$: .BLKW 1          ;PREVIOUS BCC
2204 011530 105201          INCB     R1          ;INCREMENT DATA
2205 011532 001364          BNE     16$         ;BR IF MORE TO GO
2206 011534 012737 000001 001236  MOV      #1,TEMP1     ;LOAD DATA
2207 011542 005037 001240          CLR     TEMP2        ;CLEAR EXPECTED
2208 011546 012737 000340 177776  MOV      #340,PS      ;PS = 7
2209 011554 052777 010000 167630  BIS      #MEXT,@TXCSR
2210 011562 004537 006746          JSR      R5,SETVEC   ;LOAD INTERRUPT VECTORS
2211 011566 011754          11$      ;RECEIVER
2212 011570 012022          12$      ;TRANSMITTER
2213 011572          340 340 .BYTE 340,340 ;LEVEL
2214 011574 052777 000020 167602  BIS      #RCVEN,@RXCSR ;TURN ON THE RECEIVER
2215 011602 052777 000100 167574  BIS      #RINTEN,@RXCSR ;TURN ON REC INTERRUPT ENABLE
2216 011610 105777 167576          1$: TSTB   @TXCSR      ;TEST FOR TX DONE
2217 011614 100375          BPL     1$         ;BR IF NOT SET
2218 011616 052777 000020 167566  2$: BIS   #SEND,@TXCSR ;TURN ON SEND
2219 011624 012777 000400 167562  MOV      #TSOM,@TXDBUF ;TURN ON START OF MESSAGE
2220 011632 012737 000005 011662  MOV      #5,68$      ;LOAD THE NUMBER
2221 011640 032777 004000 167546  66$: BIT   #TIMER,@TXDBUF ;CHECK THE TIMER BIT
2222 011646 001374          BNE     66$       ;BR IF SET
2223 011650 032777 004000 167536  67$: BIT   #TIMER,@TXDBUF ;CHECK THE BIT
2224 011656 001774          BEQ     67$       ;BR IF CLEAR
2225 011660 005327          DEC     (PC)+     ;DECREMENT THE NUMBER
2226 011662 000005          68$: 5          ;OF TIMES TO REPEAT
2227 011664 001365          BNE     66$       ;BR IF MORE TO GO
2228 011666 105777 167520          3$: TSTB   @TXCSR      ;WAIT FOR DONE
2229 011672 100401          BMI     4$         ;BR IF SET
2230 011674 104000          HLT     ;EXTERNAL CLOCKING STOPPED
2231 011676 005077 167512          4$: CLR   @TXDBUF    ;PUSH OUT DATA
2232 011702 052777 000100 167502  BIS      #TXINTE,@TXCSR ;TURN ON TRANSMITTER INT ENABLE
2233 011710 005037 177776          CLR     PS        ;LOWER PROCESOR STATUS
2234 011714          5$:
2235 011714 012737 000040 011744          MOV      #32.,73$    ;LOAD THE NUMBER
2236 011722 032777 004000 167464  71$: BIT   #TIMER,@TXDBUF ;CHECK THE TIMER BIT
2237 011730 001374          BNE     71$       ;BR IF SET
2238 011732 032777 004000 167454  72$: BIT   #TIMER,@TXDBUF ;CHECK THE BIT
2239 011740 001774          BEQ     72$       ;BR IF CLEAR
2240 011742 005327          DEC     (PC)+     ;DECREMENT THE NUMBER
2241 011744 000040          73$: 32.         ;OF TIMES TO REPEAT
2242 011746 001365          BNE     71$       ;BR IF MORE TO GO
2243 011750 104001          HLT     1          ;FAILED TO INTERRUPT IN TIME
2244 011752 104400          6$: SCOPE ;SCOPE THIS TEST
2245
2246
2247 ;INTERRUPT SERVICE ROUTINES
2248 ;-----
2249
2250 ;RECEIVER:
```

```

2251 011754 017737 167426 001324 11$: MOV @RXDBUF,DATA ;GET THE REGISTER AND DATA
2252 011762 123737 001240 001324 CMPB TEMP2,DATA ;CHECK IT
2253 011770 001401 BEQ .+4 ;BR IF OK
2254 011772 104002 HLT 2 ;COMPARISON ERROR
2255 011774 105237 001240 INCB TEMP2 ;COUNT UP EXPECTED
2256 012000 105737 001240 TSTB TEMP2 ;CHECK TO SEE IF DONE
2257 012004 001005 BNE 7$ ;BR IF NO
2258 012006 004537 006746 JSR R5,SETVEC ;YES--RESET THE VECTORS
2259 012012 012126 14$ ;RECEIVER
2260 012014 012022 12$ ;TRANSMITTER
2261 012016 340 340 .BYTE 340,340 ;LEVEL
2262
2263 012020 000002 7$: RTI ;RETURN
2264
2265
2266 ;TRANSMITTER:
2267 012022 113777 001236 167364 12$: MOVB TEMP1,@TXDBUF ;LOAD THE TRANSMITTER BUFFER
2268 012030 105237 001236 INCB TEMP1 ;UP THE COUNT
2269 012034 122737 000377 001236 CMPB #377,TEMP1 ;ARE WE DONE
2270 012042 001026 BNE 13$ ;BR IF NO
2271 012044 012777 012054 167326 MOV #21$,@DUPTVC ;SETUP FOR NEXT PART
2272 012052 000422 BR 13$ ;LEAVE
2273 012054 012777 000377 167332 21$: MOV #377,@TXDBUF ;LOAD BUFFER
2274 012062 012777 012072 167310 MOV #22$,@DUPTVC ;SETUP NEXT PART
2275 012070 000413 BR 13$ ;LEAVE
2276 012072 012777 001000 167314 22$: MOV #TEOM,@TXDBUF ;SET END OF MSG
2277 012100 000240 NOP ;STALL
2278 012102 000240 NOP ;DITTO
2279 012104 042777 000120 167300 BIC #SEND!TXINTE,@TXCSR ;TURN OFF TRANSMITTER
2280 012112 012777 006774 167260 MOV #NO.BTRAP,@DUPTVC ;LOAD VECTOR
2281 012120 012716 011714 13$: MOV #5$, (SP) ;CRUNCH STACK
2282 012124 000002 RTI ;RETURNS
2283
2284 012126 117737 167254 001324 14$: MOVB @RXDBUF,DATA ;GET FIRST PART OF CRC
2285 012134 105777 167244 TSTB @RXCSR ;WAIT FOR SECOND PART
2286 012140 100375 BPL -4 ;DITTO
2287 012142 017737 167240 001242 MOV @RXDBUF,TEMP3 ;GET THE REST OF THE CRC
2288 012150 113737 001242 001325 MOVB TEMP3,DATA+1 ;SET UP CRC CHARACTER
2289 012156 012716 012164 MOV #15$, (SP) ;SETUP FOR RETURN
2290 012162 000002 RTI ;RETURN
2291 012164 012737 000340 177776 15$: MOV #340,PS ;RAISE PS
2292 012172 005137 007156 COM CALBCC ;INVERT BCC
2293 012176 023737 007156 001324 CMP CALBCC,DATA ;COMPARE SOFTWARE AND HARDWARE BCC
2294 012204 001401 BEQ .+4 ;BR IF OK
2295 012206 104004 HLT 4 ;BCC COMPARISON ERROR
2296 012210 032737 010000 001242 BIT #CRCERR,TEMP3 ;CHECK THE ERROR BIT
2297 012216 001401 BEQ .+4 ;BR IF NO ERROR
2298 012220 104004 HLT 4 ;BCC ERROR--RECEIVER DOESN'T
2299 ;AGREE WITH WHAT TX SENT
2300 012222 052777 000400 167162 BIS #MRESET,@TXCSR ;RESET THE DEVICE
2301 012230 004737 005044 JSR PC,SMALL ;WAIT FOR RESET TO FINISH
2302 012234 000137 011752 JMP 6$ ;LEAVE
2303
2304 ;***** TEST 11 *****
2305 ;*THIS TEST WILL CHECK FOR ABORT SEQUENCE
2306 ;*OF THE DUP IN A DATA STREAM

```



```

2307
2308
2309
2310
2311
2312
2313
2314 012240 012737 000011 001226
2315 012246 012737 012554 001216
2316 012254 052777 000400 167130
2317 012262 004737 005044
2318 012266 004537 006746
2319 012272 012452
2320 012274 006774
2321 012276 340 340
2322 012300 005000
2323 012302 005003
2324 012304 012737 000340 177776
2325 012312 052777 010377 167070
2326 012320 052777 000120 167056
2327 012326 052777 004020 167056
2328 012334 005037 177776
2329 012340 105777 167046
2330 012344 100375
2331 012346 052777 000400 167040
2332 012354 105777 167032
2333 012360 100375
2334 012362 012777 000377 167024
2335 012370 005200
2336 012372 022700 000005
2337 012376 001366
2338 012400 052777 002000 167006
2339 012406 012737 000310 012436
2340 012414 032777 004000 166772
2341 012422 001374
2342 012424 032777 004000 166762
2343 012432 001774
2344 012434 005327
2345 012436 000310
2346 012440 001365
2347 012442 104001
2348 012444 012706 001150
2349 012450 104400
2350
2351 012452 017701 166726
2352 012456 017702 166724
2353 012462 032701 000200
2354 012466 001001
2355 012470 104007
2356 012472 122702 000377
2357 012476 001401
2358 012500 104002
2359 012502 005203
2360 012504 022703 000003
2361 012510 001020
2362 012512 105777 166666

```

```

:*****
:*****
: TEST 11
:*****
:*****
TST11: MOV #11,@TSTNO
MOV #TST12,NEXT
BIS #MRESET,@TXCSR ;RESET THE DEVICE
JSR PC,SMALL ;WAIT FOR RESET TO FINISH
JSR R5,SETVEC ;SET UP INTERRUPT VECTORS
4$ ;BASED ON THESE
NO.BTRAP ;PARAMETERS
.BYTE 340,340 ;LEVEL
CLR R0 ;CLEAR
CLR R3 ;DITTO
MOV #340,PS ;PS=7
BIS #PRISEC.377,@PARCSR ;LOAD SEC STATION AND ADRS
BIS #RCVEN!RINTEN,@RXCSR ;TURN ON THE RECEIVER
BIS #SEND!SYSTST,@TXCSR ;TURN ON TRANSMITTER
CLR PS
1$: TSTB @TXCSR ;CHECK FOR TXDONE
BPL 1$ ;BR IF NOT SET
BIS #TSOM,@TXDBUF ;TURN ON START OF MSG
2$: TSTB @TXCSR ;WAIT FOR DONE
BPL 2$ ;AND THEN
3$: MOV #377,@TXDBUF ;LOAD A CHARACTER
INC R0 ;UPDATE CHARACTER COUNTER
CMP #5,R0 ;ARE ALL CHARACTERS LOADED?
BNE 2$ ;BR IF NO
BIS #TABORT,@TXDBUF ;TURN ON ABORT
MOV #200.,68$ ;LOAD THE NUMBER
66$: BIT #TIMER,@TXDBUF ;CHECK THE TIMER BIT
BNE 66$ ;BR IF SET
67$: BIT #TIMER,@TXDBUF ;CHECK THE BIT
BEQ 67$ ;BR IF CLEAR
DEC (PC)+ ;DECREMENT THE NUMBER
68$: 200. ;OF TIMES TO REPEAT
BNE 66$ ;BR IF MORE TO GO
HLT 1 ;RECEIVER DID NOT INTERRUPT IN TIME
11$: MOV #STACK,SP ;RESET STACK
SCOPE ;SCOPE THIS TEST
;RECEIVER INTERRUPT SERVICE ROUTINE
4$: MOV @RXCSR,R1 ;GET THE CONTROL REGISTER
MOV @RXDBUF,R2 ;GET THE BUFFER
BIT #RXDONE,R1 ;CHECK FOR DONE
BNE 5$ ;BR IF DONE SET
HLT 7 ;FALSE INTERRUPT
5$: CMPB #377,R2 ;CHECK DATA CHARACTER
BEQ 6$ ;BR IF A MATCH
HLT 2 ;DATA ERROR
6$: INC R3 ;INC THE # OF CHARS TO DO
CMP #3,R3 ;CHECK TO SEE IF DONE
BNE 10$ ;BR IF MORE TO GO
12$: TSTB @RXCSR ;CHECK FOR

```

```

2363 012516 100375          BPL      12$          ;DONE
2364 012520 017702 166662  MOV      @RXDBUF,R2    ;READ THE BUFFER
2365 012524 032702 002000  BIT      #RABORT,R2    ;TEST ABORT
2366 012530 001001          BNE      7$          ;BR IF SET
2367 012532 104010          HLT      10          ;FAILED TO RECEIVE ABORT
2368 012534 012716 012444 7$:      MOV      #11$(SP)    ;SET UP FOR RETURN
2369 012540 052777 000400 166644  BIS      #MRESET,@TXCSR ;RESET THE DEVICE
2370 012546 004737 005044  JSR      PC,SMALL      ;WAIT FOR RESET TO FINISH
2371 012552 000002          RTI          ;RETURN

```

2372
2373

2374
2375

2376
2377

2378
2379

2380
2381

2382
2383

2384
2385

2386
2387

2388
2389

2390
2391

2392
2393

2394
2395

2396
2397

2398
2399

2400
2401

2402
2403

2404
2405

2406
2407

2408
2409

2410
2411

2412
2413

2414
2415

2416
2417

2418

```

:***** TEST 12 *****
:*THIS TEST PROVES THE RECEIVER WILL STOP
:*ACCEPTING DATA IF SHUT OFF IN THE MIDDLE
:*OF A MESSAGE, AND THAT IT WILL NOT
:*RESTART UNTIL IT RECEIVES A FLAG
:*****

```

```

:*****
: TEST 12
:*****

```

```

TST12: MOV      #12,@TSTNO
        MOV      #TST13,NEXT
        BIS      #MRESET,@TXCSR ;RESFT THE DEVICE
        JSR      PC,SMALL      ;WAIT FOR RESET TO FINISH
        CLR      R0          ;CLEAR FOR SOFTWARE
        JSR      R5,SETVEC     ;SET UP THE VECTORS
        3$          ;RECEIVER
        14$         ;TRANSMITTER
        .BYTE   340,340      ;LEVEL
        MOV      #340,PS     ;PROC STATUS=7
        BIS      #CRCEN,@PARCSR
        BIS      #RCVEN!RINTEN,@RXCSR ;TURN ON RECEIVER
        BIS      #SEND!SYSTST,@TXCSR ;START TRANSMITTER
        CLR      PS          ;LOWER PS
        1$:      TSTB      @TXCSR ;CHECK FOR DONE
        BPL      1$          ;BR IF NOT YET
        BIS      #TSOM,@TXDBUF ;TURN ON START OF MSG
        BIS      #TXINTE,@TXCSR ;TURN ON INT. ENABLE
        MOV      #500,,68$    ;LOAD THE NUMBER
        66$:      BIT      #TIMER,@TXDBUF ;CHECK THE TIMER BIT
        BNE      66$         ;BR IF SET
        67$:      BIT      #TIMER,@TXDBUF ;CHECK THE BIT
        BEQ      67$         ;BR IF CLEAR
        DEC      (PC)+       ;DECREMENT THE NUMBER
        68$:      500.      ;OF TIMES TO REPEAT
        BNE      66$         ;BR IF MORE TO GO
        HLT      1          ;DEVICE FAILED TO INTERRUPT IN TIME
        2$:      MOV      #STACK,SP ;RESET THE STACK
        SCOPE      ;SCOPE THIS TEST
        20$:      JSR      R5,SETVEC ;SET UP VECTORS
        23$          ;RECEIVER
        NO.BTRAP ;TRANSMITTER

```

```

2419 012750      340      340      .BYTE 340,340      ;LEVEL
2420 012752 052777 000020 166424  BIS   #RCVEN,@RXCSR
2421 012760 105777 166426      21$:  TSTB @TXCSR      ;TEST DONE
2422 012764 100375      BPL   21$      ;BR IF NOT SET
2423 012766 012777 000070 166420  MOV   #70,@TXDBUF  ;PUSH OUT DATA CHARACTER
2424 012774 012737 000062 013024  MOV   #50,73$      ;LOAD THE NUMBER
2425 013002 032777 004000 166404  71$:  BIT   #TIMER,@TXDBUF ;CHECK THE TIMER BIT
2426 013010 001374      BNE   71$      ;BR IF SET
2427 013012 032777 004000 166374  72$:  BIT   #TIMER,@TXDBUF ;CHECK THE BIT
2428 013020 001774      BEQ   72$      ;BR IF CLEAR
2429 013022 005327      DEC   (PC)+      ;DECREMENT THE NUMBER
2430 013024 000062      73$:  50.      ;OF TIMES TO REPEAT
2431 013026 001365      BNE   71$      ;BR IF MORE TO GO
2432 013030 104001      HLT   1      ;FAILED TO INTERRUPT IN TIME
2433 013032 000737      BR    2$      ;FINISH
2434      ;INTERRUPT SVC ROUTINES
2435
2436      ;RECEIVER
2437 013034 017704 166344  3$:  MOV   @RXCSR,R4      ;GET THE CONTROL REGISTER
2438 013040 017705 166342      MOV   @RXDBUF,R5      ;GET THE BUFFER
2439 013044 032705 000400      BIT   #RSOM,R5      ;CHECK FOR START OF MSG
2440 013050 001001      BNE   4$      ;BR IF SET
2441 013052 104011      HLT   11      ;FAILED TO RECEIVE SOM
2442 013054 032704 000200      4$:  BIT   #RXDONE,R4      ;CHECK FOR DONE
2443 013060 001001      BNE   5$      ;BR IF SET
2444 013062 104007      HLT   7      ;FALSE INTERRUPT
2445 013064 122705 000377      5$:  CMPB  #377,R5      ;CHECK DATA
2446 013070 001401      BEQ   6$      ;BR IF A MATCH
2447 013072 104002      HLT   2      ;DATA ERROR
2448 013074 012777 013104 166272  6$:  MOV   #10$,@DUPRVC  ;RELOAD THE VECTOR
2449 013102 000002      7$:  RTI      ;RETURN
2450 013104 017705 166276      10$: MOV   @RXDBUF,R5      ;GET THE BUFFER
2451 013110 122705 000377      CMPB  #377,R5      ;CHECK THE CHARACTER
2452 013114 001401      BEQ   11$      ;BR IF A MATCH
2453 013116 104002      HLT   2      ;DATA ERROR
2454 013120 042777 000020 166256 11$:  BIC   #RCVEN,@RXCSR  ;TURN OFF THE RECEIVER
2455 013126 012777 013136 166240  MOV   #12$,@DUPRVC  ;RELOAD THE VECTOR
2456 013134 000762      BR    7$      ;RETURN
2457 013136 017704 166242      12$: MOV   @RXCSR,R4      ;GET THE CONTROL REGISTER
2458 013142 017705 166240      MOV   @RXDBUF,R5      ;GET THE BUFFER
2459 013146 122705 000252      CMPB  #252,R5      ;CHECK THE CHARACTER
2460 013152 001402      BEQ   13$      ;BR IF A MATCH
2461 013154 104007      HLT   7      ;FALSE INTERRUPT
2462 013156 000751      BR    7$
2463 013160 104007      13$: HLT   7      ;DEVICE INTERRUPTED AFTER RX ENABLE
2464 013162 000747      BR    7$      ;WAS CLEARED
2465 013164 017704 166214      23$: MOV   @RXCSR,R4      ;GET THE CONTROL REG
2466 013170 017705 166212      MOV   @RXDBUF,R5      ;GET THE BUFFER
2467 013174 032705 000400      BIT   #RSOM,R5      ;CHECK START OF MSG      (REV. D0)
2468 013200 001001      BNE   24$      ;BR IF SET
2469 013202 104011      HLT   11      ;SOM FAILED TO SET
2470 013204 122705 000070      24$: CMPB  #70,R5      ;CHECK DATA
2471 013210 001401      BEQ   25$      ;BR IF A MATCH
2472 013212 104002      HLT   2      ;DATA FAILED TO MATCH AFTER
2473      ;RESTARTING RECEIVER
2474 013214      25$:

```

```

2475 013214 052777 000400 166170      BIS      #MRESET,@TXCSR  ;RESET THE DEVICE
2476 013222 004737 005044      JSR      PC,SMALL     ;WAIT FOR RESET TO FINISH
2477 013226 012716 012732      MOV      #2$, (SP)    ;CRUNCH STACK
2478 013232 000002      RTI                     ;RETURN
2479                                     ;TRANSMITTER
2480 013234 105777 166152      14$:    TSTB     @TXCSR      ;CHECK DONE
2481 013240 100401      BMI     30$           ;BR IF SET
2482 013242 104007      HLT     7             ;FALSE INTERRUPT
2483 013244 012777 000377 166142 30$:    MOV      #377,@TXDBUF  ;LOAD A CHARACTER
2484 013252 005200      INC     R0           ;IN THE # TO DO
2485 013254 022700 000002      CMP     #2,R0        ;CHECK TO SEE IF ALL ARE SENT
2486 013260 001030      BNE     15$         ;BR IF MORE TO GO
2487 013262 012777 013274 166110      MOV      #16$,@DUPTVC ;RELOAD THE VECT
2488 013270 005000      CLR     R0           ;CLEAR CHAR COUNT
2489 013272 000423      BR      15$
2490 013274 105777 166112      16$:    TSTB     @TXCSR      ;TEST DONE
2491 013300 100401      BMI     17$         ;BR IF SET
2492 013302 104007      HLT     7             ;FALSE INTERRUPT
2493 013304 012777 000252 166102 17$:    MOV      #252,@TXDBUF  ;LOAD A DATA CHARACTER
2494 013312 005200      INC     R0           ;INC THE # TO DO
2495 013314 022700 000003      CMP     #3,R0        ;CHECK FOR ALL DONE
2496 013320 001010      BNE     15$         ;BR IF MORE TO GO
2497 013322 012777 001400 166064      MOV      #TEOM!TSOM,@TXDBUF ;END MSG
2498 013330 042777 000100 166054      BIC     #TXINTE,@TXCSR
2499 013336 012716 012740      MOV      #20$, (SP)   ;CRUNCH STACK
2500 013342 000002      15$:    RTI

```

```

2501
2502                                     ;***** TEST 13 *****
2503                                     ;*THIS TEST WILL TRANSMIT CONTIGUOUS ONES CHARACTERS
2504                                     ;*IN SECONDARY MODE WITH A BCC CHECK.
2505                                     ;*****

```

```

2506                                     ;*****
2507                                     ;
2508                                     ; TEST 13
2509                                     ;
2510                                     ;*****
2511                                     ;*****

```

```

2512 013344 012737 000013 001226  TST13: MOV      #13,@TSTNO
2513 013352 012737 014004 001216      MOV      #TST14,NEXT
2514 013360 052777 000400 166024      BIS      #MRESET,@TXCSR ;RESET THE DEVICE
2515 013366 004737 005044      JSR      PC,SMALL     ;WAIT FOR RESET TO FINISH
2516 013372 012737 000340 177776      MOV      #340,PS     ;SET STATUS=7
2517 013400 005000      CLR     R0
2518 013402 005002      CLR     R2           ;SETUP FOR SOFTWARE
2519 013404 012701 000377      MOV      #377,R1     ;CALCULATION OF BCC
2520 013410 012737 102010 007152      MOV      #CRC.CCITT,XPOLY ;LOAD THE POLYNOMIAL
2521 013416 012737 177777 007156      MOV      #-1,CALBCC  ;SETUP FOR FIRST TIME
2522 013424 013737 007156 013446 1$:    MOV      CALBCC,3$   ;ALLOW FOR THE NEXT CHARACTER
2523 013432 010137 013444      MOV      R1,2$      ;LOAD DATA
2524 013436 004537 007000      JSR      R5,SIMBCC   ;GO CALCULATE SOFTWARE BCC
2525 013442 000010      8.           ;BASED ON THOSE PARAMETERS
2526 013444 000001      2$:    .BLKW 1           ;DATA
2527 013446 000001      3$:    .BLKW 1           ;PREVIOUS BCC
2528 013450 005200      INC     R0           ;INC THE # OF CHARS TO DO
2529 013452 022700 000005      CMP     #5,R0        ;ARE WE DONE?
2530 013456 001362      BNE     1$          ;BR IF NO

```

```
2531 013460 005000 CLR R0 ;CLEAR OUT HOLD
2532 013462 004537 006746 JSR R5,SETVEC ;LOAD INTERRUPT VECTORS
2533 013466 013616 6$ ;RECEIVER
2534 013470 013722 11$ ;TRANSMITTER
2535 013472 340 340 .BYTE 340,340 ;LEVEL
2536 013474 052777 010377 165706 BIS #PRISEC!377,@PARCSR ;ENTER SECONDARY MODE
2537 013502 052777 000120 165674 BIS #RCVEN!RINTEN,@RXCSR ;TURN ON RECEIVER AND INTERRUPTS
2538 013510 052777 004020 165674 BIS #SEND!SYSTST,@TXCSR ;TURN ON TRANSMITTER
2539 013516 105777 165670 20$: TSTB @TXCSR
2540 013522 100375 BPL 20$
2541 013524 012777 000400 165662 MOV #TSOM,@TXDBUF ;START MESSAGE
2542 013532 052777 000100 165652 BIS #TXINTE,@TXCSR ;TURN ON INTERRUPT ENABLE
2543 013540 005037 177776 CLR PS ;LOWER PS
2544 013544 4$:
2545 013544 012737 000040 013574 MOV #32,68$ ;LOAD THE NUMBER
2546 013552 032777 004000 165634 66$: BIT #TIMER,@TXDBUF ;CHECK THE TIMER BIT
2547 013560 001374 BNE 66$ ;BR IF SET
2548 013562 032777 004000 165624 67$: BIT #TIMER,@TXDBUF ;CHECK THE BIT
2549 013570 001774 BEQ 67$ ;BR IF CLEAR
2550 013572 005327 DEC (PC)+ ;DECREMENT THE NUMBER
2551 013574 000040 68$: 32. ;OF TIMES TO REPEAT
2552 013576 001365 BNE 66$ ;BR IF MORE TO GO
2553 013600 104001 HLT 1 ;FAILED TO INTERRUPT IN TIME
2554 013602 5$:
2555 013602 052777 000400 165602 BIS #MRESET,@TXCSR ;RESET THE DEVICE
2556 013610 004737 005044 JSR PC,SMALL ;WAIT FOR RESET TO FINISH
2557 013614 104400 SCOPE ;SCOPE THIS TEST
2558
2559 ;INTERRUPT SERVICE ROUTINES.
2560
2561 ;RECEIVER
2562 013616 017737 165564 001324 6$: MOV @RXDBUF,DATA ;GET THE DATA
2563 013624 120137 001324 CMPB R1,DATA ;CHECK IT
2564 013630 001401 BEQ .+4 ;BR IF A MATCH
2565 013632 104002 HLT 2 ;DATA ERROR
2566 013634 005200 INC R0 ;UPDATE THE # OF CHARS TO DO
2567 013636 022700 000004 CMP #4,R0 ;CHECK FOR ALL CHARS DONE
2568 013642 001003 BNE 7$ ;BR IF MORE TO GO
2569 013644 012777 013654 165522 MOV #10$,@DUPRVC ;SETUP TO GET BCC
2570 013652 000002 7$: RTI ;RETURN
2571
2572 013654 117737 165526 001324 10$: MOVB @RXDBUF,DATA ;GET THE FIRST HALF OF BCC
2573 013662 105777 165516 TSTB @RXCSR ;WAIT FOR
2574 013666 100375 BPL .-4 ;THE SECOND HALF
2575 013670 117737 165512 001325 MOVB @RXDBUF,DATA+1 ;GET THE SECOND HALF
2576 013676 005137 007156 COM CALBCC ;INVERT BCC
2577 013702 023737 007156 001324 CMP CALBCC,DATA ;CHECK IT
2578 013710 001401 BEQ .+4 ;BR IF OK
2579 013712 104004 HLT 4 ;BCC COMPARE ERROR
2580 013714 012716 013602 MOV #5$, (SP) ;FINISH TEST
2581 013720 000002 RTI ;RETURN
2582
2583 ;TRANSMITTER
2584 013722 012777 000377 165464 11$: MOV #377,@TXDBUF ;LOAD A DATA CHARACTER
2585 013730 005202 INC R2 ;INC THE # OF CHARS TO DO
2586 013732 022702 000005 CMP #5,R2 ;CHECK TO SEE OF DONE
```

(ZDPD-DO
CZDPDD.P11

MACY11 30A(1052)
25-JUL-79 15:01

25-JUL-79 15:19 PAGE 54
CONTIGUOUS ONES OUTPUT TEST

SEQ 0053

```

2587 013736 001017          BNE      13$          ;BR IF MORE TO GO
2588 013740 012777 013750 165432    MOV      #12$,@DUPTVC ;SETUP NEXT VECTOR
2589 013746 000413          BR       13$          ;RETURN
2590 013750 012777 001000 165436 12$:  MOV      #TEOM,@TXDBUF ;END MSG
2591 013756 000240          NOP             ;WAIT
2592 013760 000240          NOP             ;DITTO
2593 013762 042777 000120 165422    BIC      #SEND!TXINTE,@TXCSR ;TURN OFF TRANSMITTER
2594 013770 012777 006774 165402    MOV      #NO.BTRAP,@DUPTVC ;RESET THE VECTOR
2595 013776 012716 013544 13$:  MOV      #4$, (SP)    ;GO BACK TO WAIT LOOP
2596 014002 000002          RTI            ;RETURN

```

```

2597
2598
2599
2600
2601
2602
2603
2604
2605
2606
2607
2608

```

***** TEST 14 *****
 *THIS TEST PROVES THE INTERACTION OF DEC MODE,
 *TSOM, SYNC, TXACT, TXDONE

```

:*****
:
: TEST 14
:
:*****

```

```

2609 014004 012737 000014 001226 TST14: MOV      #14,@TSTNO
2610 014012 012737 014156 001216    MOV      #TST15,NEXT
2611 014020 052777 000400 165364    BIS      #MRESET,@TXCSR ;RESET THE DEVICE
2612 014026 004737 005044          JSR      PC,SMALL     ;WAIT FOR RESET TO FINISH
2613 014032 012777 101026 165350    MOV      #DECMOD!26!CRCEN,@PARCSR
2614 014040 052777 004000 165344    BIS      #SYSTST,@TXCSR ;ENTER SYSTEM TEST MODE
2615 014046 052777 000020 165336    BIS      #SEND,@TXCSR  ;TURN ON TRANSMITTER
2616 014054 012777 000426 165332    MOV      #TSOM!26,@TXDBUF ;OUTPUT A SYNC CHAR
2617 014062 012737 000005 014112    MOV      #5,68$      ;LOAD THE NUMBER
2618 014070 032777 004000 165316 66$:  BIT      #TIMER,@TXDBUF ;CHECK THE TIMER BIT
2619 014076 001374          BNE      66$          ;BR IF SET
2620 014100 032777 004000 165306 67$:  BIT      #TIMER,@TXDBUF ;CHECK THE BIT
2621 014106 001774          BEQ      67$          ;BR IF CLEAR
2622 014110 005327          DEC      (PC)+       ;DECREMENT THE NUMBER
2623 014112 000005 68$:  5              ;OF TIMES TO REPEAT
2624 014114 001365          BNE      66$          ;BR IF MORE TO GO
2625 014116 017704 165270    MOV      @TXCSR,R4   ;GET THE CSR
2626 014122 032704 000200    BII     #TXDONE,R4  ;CHECK TRANSMITTER DONE
2627 014126 001001          BNE      1$          ;BR IF SET
2628 014130 104016          HLT     16           ;TXDONE FAILED TO SET
2629 014132 032704 001000 1$:  BIT      #TXACT,R4  ;TEST ACTIVE
2630 014136 001001          BNE      2$          ;BR IF SET
2631 014140 104017          HLT     17           ;ACTIVE FAILED TO SET
2632 014142 2$:
2633 014142 052777 000400 165242    BIS      #MRESET,@TXCSR ;RESET THE DEVICE
2634 014150 004737 005044          JSR      PC,SMALL     ;WAIT FOR RESET TO FINISH
2635 014154 104400          SCOPE              ;SCOPE THIS TEST
2636
2637
2638
2639
2640
2641
2642

```

```

***** TEST 15 *****
*THIS TEST PROVES THE INTERACTION OF TEOM,
*SEND, TXACT AND TXDONE IN DEC MODE.
*****

```

```

2643
2644
2645
2646
2647
2648
2649 014156 012737 000015 001226
2650 014164 012737 014352 001216
2651 014172 052777 000400 165212
2652 014200 004737 005044
2653 014204 012777 101026 165176
2654 014212 052777 004000 165172
2655 014220 052777 000020 165164
2656 014226 012777 000426 165160
2657 014234 105777 165152
2658 014240 100375
2659 014242 012777 000426 165144
2660 014250 105777 165136
2661 014254 100375
2662 014256 012777 001000 165130
2663 014264 042777 000020 165120
2664 014272 012737 000025 014322
2665 014300 032777 004000 165106
2666 014306 001374
2667 014310 032777 004000 165076
2668 014316 001774
2669 014320 005327
2670 014322 000025
2671 014324 001365
2672 014326 105777 165060
2673 014332 100401
2674 014334 104016
2675 014336 032777 001000 165046
2676 014344 001401
2677 014346 104020
2678 014350 104400

```

```

:*****
:
: TEST 15
:
:*****
:*****
TST15:  MOV    #15,@TSTNO
        MOV    #TST16,NEXT
        BIS    #MRESET,@TXCSR ;RESET THE DEVICE
        JSR    PC,SMALL ;WAIT FOR RESET TO FINISH
        MOV    #DECMOD!26!CRCEN,@PARCSR
        BIS    #SYSTST,@TXCSR ;ENTER SYSTEM TEST MODE
        BIS    #SEND,@TXCSR ;TURN ON TRANSMITTER
        MOV    #TSOM!26,@TXDBUF ;OUTPUT A SYNC CHAR
1$:     TSTB   @TXCSR ;CHECK FOR DONE
        BPL    1$ ;BR IF NOT YET
        MOV    #TSOM!26,@TXDBUF ;LOAD A SECOND SYNC
2$:     TSTB   @TXCSR ;AND NOW WAIT
        BPL    2$ ;FOR DONE AGAIN
        MOV    #TEOM,@TXDBUF ;SET END OF MSG
        BIC    #SEND,@TXCSR ;TURN OFF TRANSMITTER
        MOV    #25,68$ ;LOAD THE NUMBER
66$:    BIT    #TIMER,@TXDBUF ;CHECK THE TIMER BIT
        BNE    66$ ;BR IF SET
67$:    BIT    #TIMER,@TXDBUF ;CHECK THE BIT
        BEQ    67$ ;BR IF CLEAR
        DEC    (PC)+ ;DECREMENT THE NUMBER
68$:    25 ;OF TIMES TO REPEAT
        BNE    66$ ;BR IF MORE TO GO
        TSTB   @TXCSR ;CHECK DONE
        BMI    3$ ;BR IF SET
        HLT    16 ;DONE FAILED TO SET AFTER TURNING OFF TX.
3$:     BIT    #TXACT,@TXCSR ;CHECK ACTIVE
        BEQ    4$ ;BR IF OFF
        HLT    20 ;ACTIVE IS STILL SET-SHOULD BE RESET
4$:     SCOPE ;SCOPE FOR THIS TEST.

```

```

:***** TEST 16 *****
:*THIS TEST PROVES THAT THE DUP WILL NOT
:*SYNC UP IN LESS THAN TWO SYNCs
:*****

```

```

2679
2680
2681
2682
2683
2684
2685
2686
2687
2688
2689
2690
2691
2692 014352 012737 000016 001226
2693 014360 012737 014720 001216
2694 014366 052777 000400 165016
2695 014374 004737 005044
2696 014400 012777 101026 165002
2697 014406 052777 004000 164776
2698 014414 052777 000020 164762

```

```

:*****
:
: TEST 16
:
:*****
:*****
TST16:  MOV    #16,@TSTNO
        MOV    #TST17,NEXT
        BIS    #MRESET,@TXCSR ;RESET THE DEVICE
        JSR    PC,SMALL ;WAIT FOR RESET TO FINISH
        MOV    #DECMOD!26!CRCEN,@PARCSR
        BIS    #SYSTST,@TXCSR ;ENTER SYSTEM TEST MODE
        BIS    #RCVEN,@RXCSR ;LOAD RCVEN

```

```

2699 014422 052777 000020 164762 BIS #SEND,@TXCSR ;TURN ON TRANSMITTER
2700 014430 012777 000426 164756 MOV #TSOM!26,@TXDBUF ;OUTPUT A SYNC CHAR
2701 014436 105777 164750 1$: TSTB @TXCSR ;CHECK TRANSMITTER DONE
2702 014442 100375 BPL 1$ ;WAIT TILL SET
2703 014444 012777 000125 164742 MOV #125,@TXDBUF ;LOAD DATA
2704 014452 012737 000005 014502 MOV #5,68$ ;LOAD THE NUMBER
2705 014460 032777 004000 164726 6$: BIT #TIMER,@TXDBUF ;CHECK THE TIMER BIT
2706 014466 001374 BNE 66$ ;BR IF SET
2707 014470 032777 004000 164716 67$: BIT #TIMER,@TXDBUF ;CHECK THE BIT
2708 014476 001774 BEQ 67$ ;BR IF CLEAR
2709 014500 005327 DEC (PC)+ ;DECREMENT THE NUMBER
2710 014502 000005 68$: 5 ;OF TIMES TO REPEAT
2711 014504 001365 BNE 66$ ;BR IF MORE TO GO
2712 014506 105777 164672 TSTB @RXCSR ;CHECK FOR RECEIVER DONE
2713 014512 100002 BPL 2$ ;BR IF NOT SET
2714 014514 104021 HLT 21 ;DEVICE SYNC'S UP IN LESS THAN 2 SYNC'S..
2715 014516 000472 BR 5$ ;LEAVE
2716 014520 2$:
2717 014520 052777 000400 164664 BIS #MRESET,@TXCSR ;RESET THE DEVICE
2718 014526 004737 005044 JSR PC,SMALL ;WAIT FOR RESET TO FINISH
2719 014532 012777 101026 164650 MOV #CRCEN!DECMOD.26,@PARCSR ;LOAD THE MODE AND SYNC CHAR
2720 014540 052777 000020 164636 BIS #RCVEN,@RXCSR ;TURN ON RECEIVER
2721 014546 052777 004000 164636 BIS #SYSTST,@TXCSR ;ENTER SYSTEM TEST MODE
2722 014554 052777 000020 164630 BIS #SEND,@TXCSR ;TURN ON TRANSMITTER
2723 014562 012777 000426 164624 MOV #TSOM!26,@TXDBUF ;OUTPUT A SYNC CHAR
2724 014570 105777 164616 69$: TSTB @TXCSR ;CHECK DONE
2725 014574 100375 BPL 69$ ;BR IF NOT SET
2726 014576 012777 000426 164610 MOV #TSOM!26,@TXDBUF ;SEND SYNC
2727 014604 105777 164602 3$: TSTB @TXCSR ;CHECK DONE
2728 014610 100375 BPL 3$ ;WAIT
2729 014612 012777 000125 164574 MOV #125,@TXDBUF ;LOAD DATA
2730 014620 012737 000020 014650 MOV #20,74$ ;LOAD THE NUMBER
2731 014626 032777 004000 164560 72$: BIT #TIMER,@TXDBUF ;CHECK THE TIMER BIT
2732 014634 001374 BNE 72$ ;BR IF SET
2733 014636 032777 004000 164550 73$: BIT #TIMER,@TXDBUF ;CHECK THE BIT
2734 014644 001774 BEQ 73$ ;BR IF CLEAR
2735 014646 005327 DEC (PC)+ ;DECREMENT THE NUMBER
2736 014650 000020 74$: 20 ;OF TIMES TO REPEAT
2737 014652 001365 BNE 72$ ;BR IF MORE TO GO
2738 014654 105777 164524 TSTB @RXCSR ;CHECK FOR DONE
2739 014660 100401 BMI 4$ ;BR IF SET
2740 014662 104022 HLT 22 ;FAILED TO RECEIVE DATA
2741 014664 017737 164516 001236 4$: MOV @RXDBUF,TEMP1 ;READ DATA
2742 014672 122737 000125 001236 CMPB #125,TEMP1 ;CHECK IT
2743 014700 001401 BEQ 5$ ;BR IF MATCH
2744 014702 104022 HLT 22 ;DATA COMPARE ERROR
2745 014704 5$:
2746 014704 052777 000400 164500 BIS #MRESET,@TXCSR ;RESET THE DEVICE
2747 014712 004737 005044 JSR PC,SMALL ;WAIT FOR RESET TO FINISH
2748 014716 104400 SCOPE ;SCOPE THIS TEST

```

2749
2750
2751
2752
2753
2754

```

:***** TEST 17 *****
:*THIS TEST PROVES THE RECEIVER WILL STRIP THE FIRST
:*TWO SYNC'S AND WILL PRESENT ALL SUBSEQUENT SYNC'S.
:*****

```


2755
2756
2757
2758
2759
2760
2761
2762
2763
2764
2765
2766
2767
2768
2769
2770
2771
2772
2773
2774
2775
2776
2777
2778
2779
2780
2781
2782
2783
2784
2785
2786
2787
2788
2789
2790
2791
2792
2793
2794
2795
2796
2797
2798
2799
2800
2801
2802
2803
2804
2805
2806
2807
2808
2809
2810

014720 012737 000017 001226
014726 012737 015142 001216
014734 052777 000400 164450
014742 004737 005044
014746 012777 101026 164434
014754 052777 004000 164430
014762 052777 000020 164414
014770 052777 000020 164414
014776 012777 000426 164410
015004 032777 004000 164402
015012 001374
015014 032777 004000 164372
015022 001774
015024 105777 164362
015030 100375
015032 012777 000426 164354
015040 105777 164346
015044 100375
015046 012777 000426 164340
015054 012737 000020 015104
015062 032777 004000 164324
015070 001374
015072 032777 004000 164314
015100 001774
015102 005327
015104 000020
015106 001365
015110 105777 164270
015114 100401
015116 104021
015120 117737 164262 001236
015126 122737 000026 001236
015134 001401
015136 104022
015140 104400

```

:*****
: TEST 17
:*****
:*****
TST17:  MOV    #17,@TSTNO
        MOV    #TST20,NEXT
        BIS    #MRESET,@TXCSR ;RESET THE DEVICE
        JSR    PC,SMALL      ;WAIT FOR RESET TO FINISH
        MOV    #DECMOD!26!CRCEN,@PARCSR
        BIS    #SYSTST,@TXCSR ;ENTER SYSTEM TEST MODE
        BIS    #RCVEN,@RXCSR  ;LOAD RCVEN
        BIS    #SEND,@TXCSR   ;TURN ON TRANSMITTER
        MOV    #TSOM!26,@TXDBUF ;OUTPUT A SYNC CHAR
64$:    BIT    #TIMER,@TXDBUF ;CHECK THE TIMER BIT
        BNE    64$           ;BR IF SET
65$:    BIT    #TIMER,@TXDBUF ;CHECK THE TIMER BIT
        BEQ    65$           ;BR IF CLEAR
69$:    TSTB   @TXCSR        ;CHECK DONE
        BPL    69$           ;BR IF NOT SET
70$:    MOV    #TSOM!26,@TXDBUF ;SEND SYNC
        TSTB   @TXCSR        ;CHECK DONE
        BPL    70$           ;BR IF NOT SET
73$:    MOV    #TSOM!26,@TXDBUF ;SEND SYNC
        MOV    #20,75$      ;LOAD THE NUMBER
        BIT    #TIMER,@TXDBUF ;CHECK THE TIMER BIT
        BNE    73$           ;BR IF SET
74$:    BIT    #TIMER,@TXDBUF ;CHECK THE BIT
        BEQ    74$           ;BR IF CLEAR
75$:    DEC    (PC)+        ;DECREMENT THE NUMBER
        20                ;OF TIMES TO REPEAT
        BNE    73$         ;BR IF MORE TO GO
        TSTB   @RXCSR        ;CHECK FOR DONE
        BMI    1$           ;BR IF SET
        HLT    21            ;DONE NOT SET-DEVICE FAILED TO SYNC UP
1$:    MOVB   @RXDBUF,TEMP1 ;READ BUFFER
        CMPB   #26,TEMP1    ;CHECK FOR SYNC
        BEQ    2$           ;BR IF OK
        HLT    22            ;DATA ERROR
2$:    SCOPE ;SCOPE THIS TEST

```

:***** TEST 20 *****
: *THIS TEST PROVES THE DUP11 WILL
: *IDLE SYNC. IDLE 64. SYNC
:*****

```

:*****
: TEST 20
:*****
:*****
TST20:  MOV    #20,@TSTNO

```

```

2811 015150 012737 015406 001216      MOV      #TST21,NEXT
2812 015156 052777 000400 164226      BIS      #MRESET,@TXCSR      ;RESET THE DEVICE
2813 015164 004737 005044      JSR      PC,SMALL           ;WAIT FOR RESET TO FINISH
2814 015170 012777 101026 164212      MOV      #DECMOD!26!CRCEN,@PARCSR
2815 015176 052777 004000 164206      BIS      #SYSTST,@TXCSR      ;ENTER SYSTEM TEST MODE
2816 015204 052777 000020 164172      BIS      #RCVEN,@RXCSR      ;LOAD RCVEN
2817 015212 052777 000020 164172      BIS      #SEND,@TXCSR      ;TURN ON TRANSMITTER
2818 015220 012777 000426 164166      MOV      #TSOM!26,@TXDBUF    ;OUTPUT A SYNC CHAR
2819 015226 105777 164160      64$:    TSTB     @TXCSR          ;CHECK DONE
2820 015232 100375      BPL      64$                ;BR IF NOT SET
2821 015234 012777 000426 164152      MOV      #TSOM!26,@TXDBUF    ;SEND SYNC
2822 015242 105777 164144      65$:    TSTB     @TXCSR          ;CHECK DONE
2823 015246 100375      BPL      65$                ;BR IF NOT SET
2824 015250 012777 000426 164136      MOV      #TSOM!26,@TXDBUF    ;SEND SYNC
2825 015256 005037 001236      CLR      TEMP1
2826 015262 005037 001240      CLR      TEMP2
2827 015266 012737 000100 001236      MOV      #64.,TEMP1          ;LOAD # OF SYNCs
2828 015274 012737 000010 015324      MOV      #10,70$            ;LOAD THE NUMBER
2829 015302 032777 004000 164104      68$:    BIT      #TIMER,@TXDBUF ;CHECK THE TIMER BIT
2830 015310 001374      BNE      68$                ;BR IF SET
2831 015312 032777 004000 164074      69$:    BIT      #TIMER,@TXDBUF ;CHECK THE BIT
2832 015320 001774      BEQ      69$                ;BR IF CLEAR
2833 015322 005327      DEC      (PC)+              ;DECREMENT THE NUMBER
2834 015324 000010      70$:    10                  ;OF TIMES TO REPEAT
2835 015326 001365      BNE      68$                ;BR IF MORE TO GO
2836 015330 105777 164056      1$:    TSTB     @TXCSR          ;CHECK DONE
2837 015334 100401      BMI      2$                  ;BR IF SET
2838 015336 104016      HLT      16                  ;DONE FAILED TO SET
2839 015340 012777 000426 164046      2$:    MOV      #TSOM!26,@TXDBUF ;LOAD A SYNC
2840 015346 005337 001236      DEC      TEMP1              ;LOWER THE # OF SYNCs TO DO
2841 015352 001001      BNE      4$                  ;BR IF MORE TO GO
2842 015354 104400      3$:    SCOPE                ;SCOPE THIS TEST
2843
2844 015356 105777 164022      4$:    TSTB     @RXCSR          ;CHECK RECEIVER DONE
2845 015362 100375      BPL      4$                  ;WAIT TILL SET
2846 015364 017737 164016 001240      MOV      @RXDBUF,TEMP2      ;GET THE BUFFER
2847 015372 122737 000026 001240      CMPB    #26,TEMP2          ;CHECK IT FOR SYNC
2848 015400 001753      BEQ      1$                  ;BR IF OK
2849 015402 104021      HLT      21                  ;CHARACTER IS TEMP2 NOT A SYNC.
2850 015404 000763      BR      3$                  ;LEAVE TEST

```

```

2851
2852
2853      ;***** TEST 21 *****
2854      ;*THIS TEST PROVES THE STRIP SYNC
2855      ;*FUNCTION OF THE RECEIVER. SYNC UP
2856      ;*THE RECEIVER, SEND DATA WITH A SYNC
2857      ;*CHARACTER IMBEDDED AND CHECK FOR
2858      ;*THE SYNC TO BE RECEIVED.
2859      ;*****
2860      ;*****
2861      ;*
2862      ;* TEST 21
2863      ;*
2864      ;*****
2865      ;*****
2866 015406 012737 000021 001226 TST21: MOV      #21,@TSTNO

```

```

2867 015414 012737 016126 001216      MOV      #TST22,NEXT
2868 015422 012737 000340 177776      MOV      #340,PS          ;RAISE STATUS
2869 015430 004537 006746      JSR      R5,SETVEC       ;SET UP VECTORS
2870 015434 015714                S$                ;BASED ON
2871 015436 006774                NO.BTRAP          ;THESE
2872 015440      340      340      .BYTE 340,340          ;PARAMETERS
2873
2874 015442 052777 000400 163742      BIS      #MRESET,@TXCSR ;RESET THE DEVICE
2875 015450 004737 005044      JSR      PC,SMALL        ;WAIT FOR RESET TO FINISH
2876 015454 012777 101026 163726      MOV      #DECMOD!26!CRCEN,@PARCSR
2877 015462 052777 004000 163722      BIS      #SYSTST,@TXCSR ;ENTER SYSTEM TEST MODE
2878 015470 052777 000420 163706      BIS      #RCVEN!STPSYN,@RXCSR ;LOAD RCVEN!STPSYN
2879 015476 052777 000020 163706      BIS      #SEND,@TXCSR   ;TURN ON TRANSMITTER
2880 015504 012777 000426 163702      MOV      #TSOM!26,@TXDBUF ;OUTPUT A SYNC CHAR
2881 015512 105777 163674      64$: TSTB   @TXCSR          ;CHECK DONE
2882 015516 100375                BPL      64$           ;BR IF NOT SET
2883 015520 012777 000426 163666      MOV      #TSOM!26,@TXDBUF ;SEND SYNC
2884 015526 105777 163660      65$: TSTB   @TXCSR          ;CHECK DONE
2885 015532 100375                BPL      65$           ;BR IF NOT SET
2886 015534 012777 000426 163652      MOV      #TSOM!26,@TXDBUF ;SEND SYNC
2887 015542 105777 163644      66$: TSTB   @TXCSR          ;CHECK DONE
2888 015546 100375                BPL      66$           ;BR IF NOT SET
2889 015550 012777 000426 163636      MOV      #TSOM!26,@TXDBUF ;SEND SYNC
2890 015556 005037 177776      CLR      PS            ;LOWER PS
2891 015562 052777 000100 163614      BIS      #RINTEN,@RXCSR  ;TURN ON INTERRUPTS
2892 015570 105777 163616      1$: TSTB   @TXCSR          ;CHECK TX DONE
2893 015574 100375                BPL      1$            ;WAIT FOR SET
2894 015576 012777 000252 163610      MOV      #252,@TXDBUF    ;LOAD A CHARACTER
2895 015604 105777 163602      2$: TSTB   @TXCSR          ;CHECK TX DONE
2896 015610 100375                BPL      2$            ;WAIT TO BE SET
2897 015612 012777 000026 163574      MOV      #26,@TXDBUF     ;LOAD THE SYNC CHAR
2898 015620 105777 163566      3$: TSTB   @TXCSR          ;CHECK DONE AGAIN
2899 015624 100375                BPL      3$            ;WAIT
2900 015626 012777 000125 163560      MOV      #125,@TXDBUF    ;LOAD ANOTHER CHARACTER
2901 015634 105777 163552      4$: TSTB   @TXCSR          ;CHECK DONE
2902 015640 100375                BPL      4$            ;WAIT
2903 015642 012777 001000 163544      MOV      #TEOM,@TXDBUF   ;SET END OF MESSAGE
2904 015650 042777 000020 163534      BIC      #SEND,@TXCSR    ;TURN OFF TRANSMITTER
2905 015656 012737 000050 015706      MOV      #40,,71$        ;LOAD THE NUMBER
2906 015664 032777 004000 163522      69$: BIT    #TIMER,@TXDBUF ;CHECK THE TIMER BIT
2907 015672 001374                BNE      69$           ;BR IF SET
2908 015674 032777 004000 163512      70$: BIT    #TIMER,@TXDBUF ;CHECK THE BIT
2909 015702 001774                BEQ      70$           ;BR IF CLEAR
2910 015704 005327                DEC      (PC)+          ;DECREMENT THE NUMBER
2911 015706 000050                71$: 40.              ;OF TIMES TO REPEAT
2912 015710 001365                BNE      69$           ;BR IF MORE TO GO
2913 015712 104023                HLT      23            ;FAILED TO TAKE A RECEIVER INTERRUPT
2914
2915                ;RECEIVER INTERRUPT SERVICE ROUTINE
2916 015714 017700 163464      5$: MOV    @RXCSR,R0      ;READ CSR
2917 015720 017701 163462      MOV    @RXDBUF,R1       ;READ BUFFER
2918 015724 032700 000200      BIT    #RXDONE,R0       ;CHECK FOR DONE
2919 015730 001001                BNE      6$            ;BR IF SET
2920 015732 104024                HLT      24            ;RX DONE FAILED TO SET-ERRONEOUS INTERRUPT
2921 015734 032700 004000      6$: BIT    #REACT,R0     ;CHECK FOR ACTIVE
2922 015740 001001                BNE      7$            ;BR IF SET

```

```

2923 015742 104025          HLT      25          ;RX ACTIVE FAILED TO SET
2924 015744                7$:          TST      R1          ;CHECK FOR ERROR
2925 015744 005701          BPL     10$         ;BR IF NO ERROR
2926 015746 100001          HLT     26          ;RECEIVER ERROR
2927 015750 104026          CMPB   #252,R1     ;CHECK FOR CORRECT DATA
2928 015752 122701 000252 10$:          BEQ     11$         ;BR IF OK
2929 015756 001401          HLT     22          ;DATA FAILED TO MATCH
2930 015760 104022          MOV     #12$,@DUPRVC ;LOAD VECTOR
2931 015762 012777 015772 163404 11$:        BR      20$         ;CONTINUE
2932 015770 000455          MOV     @RXCSR,R0  ;READ CSR
2933 015772 017700 163406 12$:        MOV     @RXDBUF,R1 ;READ BUFFER
2934 015776 017701 163404          BIT     #RXDONE,R0 ;CHECK FOR DONE
2935 016002 032700 000200          BNE     13$         ;BR IF OK
2936 016006 001001          HLT     24          ;RX DONE FAILED TO SET-ERRONEOUS INTERRUPT
2937 016010 104024          TST     R1          ;TEST FOR ERROR
2938 016012 005701          BPL     14$         ;BR IF NO ERROR
2939 016014 100001          HLT     26          ;ERROR SET
2940 016016 104026          CMPB   #26,R1     ;CHECK CHARACTER
2941 016020 122701 000026 14$:          BEQ     16$         ;BR IF OK-IF NOT, THEN
2942 016024 001422          CMPB   #125,R1    ;CHECK FOR CLEARING SYNC
2943 016026 122701 000125          BEQ     15$         ;BR IF A NEXT CHARACTER
2944 016032 001402          HLT     22          ;ERRONEOUS CHARACTER
2945 016034 104022          BR      16$         ;BR TO END OF TEST
2946 016036 000415          HLT     21          ;STRIPPED OUT THE SYNC CHAR
2947 016040 104021          MOV     #21$,@DUPRVC ;SET UP VECTOR
2948 016042 012777 016052 163324 15$:        BR      20$         ;LEAVE
2949 016050 000425          MOV     @RXCSR,R0  ;GET CSR
2950 016052 017700 163326 21$:        MOV     @RXDBUF,R1 ;GET BUFFER
2951 016056 017701 163324          CMPB   #125,R1    ;CHECK DATA
2952 016062 122701 000125          BEQ     16$         ;BR IF A MATCH
2953 016066 001401          HLT     22          ;DATA COMPARE ERROR
2954 016070 104022          BIT     #REACT,@RXCSR ;TEST ACTIVE
2955 016072 032777 004000 163304 16$:        BNE     17$         ;BR IF ON
2956 016100 001001          HLT     25          ;ACTIVE SHOULD BE ON
2957 016102 104025          BIS     #MRESET,@TXCSR ;RESET THE DEVICE
2958 016104          JSR     PC,SMALL   ;WAIT FOR RESET TO FINISH
2959 016104 052777 000400 163300          MOV     #STACK,SP  ;RESET STACK
2960 016112 004737 005044          SCOPE          ;SCOPE THIS TEST
2961 016116 012706 001150          RTI           ;RETURN
2962 016122 104400
2963 016124 000002
2964
2965
2966
2967
2968
2969
2970
2971
2972
2973
2974
2975
2976
2977 016126 012737 000022 001226 TST22: MOV     #22,@TSTNO
2978 016134 012737 016610 001216      MOV     #TST23,NEXT

```

```

***** TEST 22 *****
*THIS TEST PROVES THAT A BINARY COUNT
*PATTERN CAN BE RUN IN DEC MODE
*WITHOUT A BCC CALCULATION
*****

```

```

*****
:
: TEST 22
:
: *****
: *****

```

```

2979 016142 012737 000340 177776      MOV      #340,PS
2980 016150 005000                      CLR      R0                ;CLR OUT DATA POINTER
2981 016152 005001                      CLR      R1                ;DITTO
2982 016154 004537 006746      JSR      R5,SETVEC        ;SET UP INTERRUPTS
2983 016160 016370                      4$      ;RECEIVER
2984 016162 016542                      17$     ;TRANSMITTER
2985 016164      340      340      .BYTE   340,340          ;LEVEL
2986
2987 016166 052777 000400 163216      BIS      #MRESET,@TXCSR  ;RESET THE DEVICE
2988 016174 004737 005044      JSR      PC,SMALL        ;WAIT FOR RESET TO FINISH
2989 016200 012777 101026 163202      MOV      #DECMOD!26!CRCFN,@PARCSR
2990 016206 052777 004000 163176      BIS      #SYSTST,@TXCSR  ;ENTER SYSTEM TEST MODE
2991 016214 052777 000020 163162      BIS      #RCVEN,@RXCSR   ;LOAD RCVEN
2992 016222 052777 000020 163162      BIS      #SEND,@TXCSR    ;TURN ON TRANSMITTER
2993 016230 012777 000426 163156      MOV      #TSOM!26,@TXDBUF ;OUTPUT A SYNC CHAR
2994 016236 032777 004000 163150 64$:    BIT      #TIMER,@TXDBUF  ;CHECK THE TIMER BIT
2995 016244 001374                      BNE     64$              ;BR IF SET
2996 016246 032777 004000 163140 65$:    BIT      #TIMER,@TXDBUF  ;CHECK THE TIMER BIT
2997 016254 001774                      BEQ     65$              ;BR IF CLEAR
2998 016256 105777 163130 69$:    TSTB   @TXCSR           ;CHECK DONE
2999 016262 100375                      BPL     69$              ;BR IF NOT SET
3000 016264 012777 000426 163122      MOV      #TSOM!26,@TXDBUF ;SEND SYNC
3001 016272 005037 177776      CLR      PS
3002 016276 052777 000100 163100      BIS      #RINTEN,@RXCSR  ;TURN ON INT ENABLES
3003 016304 052777 000100 163100      BIS      #TXINTE,@TXCSR  ;DITTO
3004 016312
3005 016312 012737 000310 016342 30$:    MOV      #200.,74$      ;LOAD THE NUMBER
3006 016320 032777 004000 163066 72$:    BIT      #TIMER,@TXDBUF  ;CHECK THE TIMER BIT
3007 016326 001374                      BNE     72$              ;BR IF SET
3008 016330 032777 004000 163056 73$:    BIT      #TIMER,@TXDBUF  ;CHECK THE BIT
3009 016336 001774                      BEQ     73$              ;BR IF CLEAR
3010 016340 005327                      DEC     (PC)+            ;DECREMENT THE NUMBER
3011 016342 000310 74$:    200.    ;OF TIMES TO REPEAT
3012 016344 001365                      BNE     72$              ;BR IF MORE TO GO
3013 016346 104023                      HLT     23                ;FAILED TO FINISH TEST
3014 016350 3$:
3015 016350 052777 000400 163034      BIS      #MRESET,@TXCSR  ;RESET THE DEVICE
3016 016356 004737 005044      JSR      PC,SMALL        ;WAIT FOR RESET TO FINISH
3017 016362 012706 001150      MOV      #STACK,SP      ;RESET THE STACK
3018 016366 104400                      SCOPE   ;SCOPE THIS TEST
3019
3020
3021                      ;RECEIVER INT SVC ROUTINE
3022 016370 017702 163010 4$:    MOV      @RXCSR,R2        ;SAVE CSR
3023 016374 017703 163006      MOV      @RXDBUF,R3     ;SAVE BUFFER
3024 016400 032702 004000      BIT      #REACT,R2      ;TEST RX ACTIVE
3025 016404 001004                      BNE     5$              ;BR IF OK
3026 016406 104025                      HLT     25                ;ACTIVE NOT SET
3027 016410 012716 016350      MOV      #3$, (SP)      ;SETUP FOR RETURN
3028 016414 000432                      BR      12$
3029 016416 032702 000200 5$:    BIT      #RXDONE,R2     ;TEST DONE
3030 016422 001004                      BNE     6$              ;BR IF OK
3031 016424 104024                      HLT     24                ;FALSE INTERRUPT
3032 016426 012716 016350      MOV      #3$, (SP)      ;SETUP FOR RETURN
3033 016432 000423                      BR      12$
3034 016434 005703 6$:    TST    R3                ;CHECK FOR ERROR

```

```

3035 016436 100004          BPL      7$          ;BR IF NO ERROR
3036 016440 104026          HLT      26          ;DATA ERROR
3037 016442 012716 016350  MOV      #3$, (SP)  ;SET UP RETURN
3038 016446 000415          BR       12$
3039 016450 120103          7$:      CMPB     R1,R3  ;CHECK DATA
3040 016452 001404          BEQ      10$        ;BR IF OK
3041 016454 104022          HLT      22          ;BAD DATA
3042 016456 012716 016350  MOV      #3$, (SP)  ;SETUP RETURN
3043 016462 000407          BR       12$
3044 016464 005201          10$:     INC      R1      ;UPDATE DATA
3045 016466 001002          BNE      11$        ;BR IF MORE TO GO
3046 016470 012716 016350  MOV      #3$, (SP)  ;SETUP RETURN
3047 016474 012777 016504 162672 11$:     MOV      #22$, @DUPRVC ;SETUP NEW RETURN FOR INTERRUPT
3048 016502 000002          12$:     RTI
3049 016504 017702 162674 22$:     MOV      @RXCSR,R2
3050 016510 017703 162672  MOV      @RXDBUF,R3
3051 016514 005703          TST      R3
3052 016516 100001          BPL      23$
3053 016520 104026          HLT      26          ;ERROR
3054 016522 120103          23$:     CMPB     R1,R3
3055 016524 001401          BEQ      24$
3056 016526 104022          HLT      22          ;DATA COMPARE ERROR
3057 016530 105201          24$:     INCB     R1
3058 016532 001363          BNE      12$
3059 016534 012716 016350  MOV      #3$, (SP)
3060 016540 000760          BR       12$
3061
3062          ;TRANSMITTER
3063 016542 010077 162646 17$:     MOV      R0,@TXDBUF  ;PUSH OUT DATA
3064 016546 105200          INCB     R0          ;UPDATE IT
3065 016550 001014          BNE      21$        ;BR IF MORF
3066 016552 105777 162634 20$:     TSTB     @TXCSR     ;CHECK FOR NEXT DONE
3067 016556 100375          BPL      20$        ;WAIT
3068 016560 052777 001000 162626  BIS      #TEOM,@TXDBUF ;END MSG
3069 016566 042777 000120 162616  BIC      #SEND!TXINTE,@TXCSR ;SHUT OF TRANSMITTER
3070 016574 012777 006774 162576  MOV      #NO.BTRAP,@DUPTVC ;RESET VECTOR ADRS
3071 016602 012716 016312 21$:     MOV      #30$, (SP)
3072 016606 000002          RTI          ;RETURN
3073
3074
3075
3076          ;***** TEST 23 *****
3077          ;*THIS TEST PROVES THAT A BINARY COUNT
3078          ;*PATTERN CAN BE RUN IN DEC MODE
3079          ;*WITH A BCC CALCULATION USING
3080          ;*THE CRC16 POLYNOMIAL
3081          ;*****
3082          ;*****
3083          ;*
3084          ;* TEST 23
3085          ;*
3086          ;*****
3087          ;*****
3088 016610 012737 000023 001226 TST23:  MOV      #23,@TSTNO
3089 016616 012737 017432 001216      MOV      #TST24,NEXT
3090 016624 012737 000340 177776      MOV      #340,PS

```

```

3091 016632 005000          CLR      R0
3092 016634 012737 120001 007152  MOV     #CRC16,XPOLY      ;SET THE POLYNOMIAL
3093 016642 005037 007156          CLR     CALBCC           ;CLEAR OUT OLD BCC
3094 016646 013737 007156 016670 1$:  MOV     CALBCC,35$      ;LOAD BCC
3095 016654 010037 016666          MOV     R0,2$           ;LOAD DATA
3096 016660 004537 007000          JSR     R5,SIMBCC       ;CALCULATE A SOFTWARE BCC
3097 016664 000010          8.                ;BASED
3098 016666 000000          2$: .WORD 0           ;ON THESE
3099 016670 000000          35$: .WORD 0          ;PARAMETERS
3100 016672 105200          INCB    R0             ;UPDATE DATA
3101 016674 001364          BNE     1$            ;BR IF MORE TO GO
3102 016676 005000          CLR     R0             ;CLR OUT DATA POINTER
3103 016700 005001          CLR     R1             ;DITTO
3104 016702 004537 006746          JSR     R5,SETVEC      ;SET UP INTERRUPTS
3105 016706 017116          4$                ;RECEIVER
3106 016710 017364          17$               ;TRANSMITTER
3107 016712          340 340          .BYTE 340,340        ;LEVEL
3108
3109 016714 052777 000400 162470  BIS     #MRESET,@TXCSR  ;RESET THE DEVICE
3110 016722 004737 005044          JSR     PC,SMALL       ;WAIT FOR RESET TO FINISH
3111 016726 012777 100026 162454  MOV     #DFCMOD!26,@PARCSR ;LOAD THE MODE AND SYNC CHARACTER
3112 016734 052777 004000 162450  BIS     #SYSTST,@TXCSR  ;ENTER SYSTEM TEST MODE
3113 016742 052777 000020 162434  BIS     #RCVEN,@RXCSR   ;LOAD RCVEN
3114 016750 052777 000020 162434  BIS     #SEND,@TXCSR    ;TURN ON TRANSMITTER
3115 016756 012777 000426 162430  MOV     #TSOM!26,@TXDBUF ;OUTPUT A SYNC CHAR
3116 016764 032777 004000 162422 64$: BIT     #TIMER,@TXDBUF ;CHECK THE TIMER BIT
3117 016772 001374          BNE     64$          ;BR IF SET
3118 016774 032777 004000 162412 65$: BIT     #TIMER,@TXDBUF ;CHECK THE TIMER BIT
3119 017002 001774          BEQ     65$          ;BR IF CLEAR
3120 017004 105777 162402          69$: TSTB  @TXCSR      ;CHECK DONE
3121 017010 100375          BPL     69$          ;BR IF NOT SET
3122 017012 012777 000426 162374  MOV     #TSOM!26,@TXDBUF ;SEND SYNC
3123 017020 005037 177776          CLR     PS
3124 017024 052777 000'00 162352  BIS     #RINTEN,@RXCSR   ;TURN ON INT ENABLES
3125 017032 052777 000100 162352  BIS     #TXINTE,@TXCSR  ;DITTO
3126 017040          30$:
3127 017040 012737 000310 017070  MOV     #200.,74$      ;LOAD THE NUMBER
3128 017046 032777 004000 162340 72$: BIT     #TIMER,@TXDBUF ;CHECK THE TIMER BIT
3129 017054 001374          BNE     72$          ;BR IF SET
3130 017056 032777 004000 162330 73$: BIT     #TIMER,@TXDBUF ;CHECK THE BIT
3131 017064 001774          BEQ     73$          ;BR IF CLEAR
3132 017066 005327          DEC     (PC)+         ;DECREMENT THE NUMBER
3133 017070 000310          74$: 200.           ;OF TIMES TO REPEAT
3134 017072 001365          BNE     72$          ;BR IF MORE TO GO
3135 017074 104023          HLT     23            ;FAILED TO FINISH TEST
3136 017076          3$:
3137 017076 052777 000400 162306  BIS     #MRESET,@TXCSR  ;RESET THE DEVICE
3138 017104 004737 005044          JSR     PC,SMALL       ;WAIT FOR RESET TO FINISH
3139 017110 012706 001150          MOV     #STACK,SP      ;RESET THE STACK
3140 017114 104400          SCOPE                ;SCOPE THIS TEST
3141
3142
3143          ;RECEIVER INT SVC ROUTINE
3144 017116 017702 162262          4$: MOV     @RXCSR,R2      ;SAVE CSR
3145 017122 017703 162260          MOV     @RXDBUF,R3     ;SAVE BUFFER
3146 017126 032702 004000          BIT     #REACT,R2      ;TEST RX ACTIVE

```

```
3147 017132 001004      BNF      5$      ;BR IF OK
3148 017134 104025      HLT      25      ;ACTIVE NOT SET
3149 017136 012716 017076  MOV      #3$, (SP) ;SETUP FOR RETURN
3150 017142 000433      BR      12$
3151 017144 032702 000200  5$:     BIT      #RXDONE,R2 ;TEST DONE
3152 017150 001004      BNE      6$      ;BR IF OK
3153 017152 104024      HLT      24      ;FALSE INTERRUPT
3154 017154 012716 017076  MOV      #3$, (SP) ;SETUP FOR RETURN
3155 017160 000424      BR      12$
3156 017162 005703      6$:     TST      R3      ;CHECK FOR ERROR
3157 017164 100004      BPL      7$      ;BR IF NO ERROR
3158 017166 104026      HLT      26      ;DATA ERROR
3159 017170 012716 017076  MOV      #3$, (SP) ;SET UP RETURN
3160 017174 000416      BR      12$
3161 017176 120103      7$:     CMPB     R1,R3     ;CHECK DATA
3162 017200 001404      BEQ      10$     ;BR IF OK
3163 017202 104022      HLT      22      ;BAD DATA
3164 017204 012716 017076  MOV      #3$, (SP) ;SETUP RETURN
3165 017210 000410      BR      12$
3166 017212 005201      10$:    INC      R1      ;UPDATE DATA
3167 017214 001003      BNE      11$     ;BR IF MORE TO GO
3168 017216 012716 017234  MOV      #13$, (SP) ;SETUP TO FINISH TEST
3169 017222 000403      BR      12$
3170 017224 012777 017324 162142 11$:    MOV      #22$, @DUPRVC ;SETUP NEW RETURN FOR INTERRUPT
3171 017232 000002      12$:    RTI      ;RETURN
3172 017234 105777 162144 13$:    TSTB     @RXCSR     ;TEST DONE
3173 017240 100375      BPL      13$     ;WAIT
3174 017242 017737 162140 001236  MOV      @RXDBUF,TEMP1 ;GET DATA
3175 017250 105777 162130 14$:    TSTB     @RXCSR     ;CHECK DONE FOR HALF OF CRC
3176 017254 100375      BPL      14$     ;WAIT
3177 017256 017737 162124 001240  MOV      @RXDBUF,TEMP2 ;MOVE IT
3178 017264 113737 001240 001237  MOVB     TEMP2,TEMP1+1 ;COMBINE BCC CHARACTER
3179 017272 023737 007156 001236  CMP      CALBCC,TEMP1 ;BR IF A MATCH
3180 017300 001401      BEQ      15$     ;AFTER CHECKING IT
3181 017302 104027      HLT      27      ;CRC COMPARE ERROR--THE
3182      ;SOFTWARE DOESN'T AGREE
3183      ;WITH WHAT THE TRANSMITTER
3184      ;SENT. SEE THE FRONT OF
3185      ;THE LISTING FOR SPECIAL
3186      ;CRC DEBUG AID TEST.
3187 017304 032737 010000 001240 15$:    BIT      #CRCERR,TEMP2 ;CHECK FOR ERROR
3188 017312 001001      BNE      16$     ;BR IF OK
3189 017314 104030      HLT      30      ;HARDWARE DETECTED CRC ERROR
3190      ;RECEIVER DOESN'T AGREE WITH
3191      ;WHAT THE TRANSMITTER SENT
3192      ;SEE FRONT OF LISTING FOR
3193      ;SPECIAL CRC DEBUG AID
3194 017316 012716 017076 16$:    MOV      #3$, (SP) ;LOAD END OF TEST
3195 017322 000743      BR      12$     ;RETURN
3196 017324 017702 162054 22$:    MOV      @RXCSR,R2
3197 017330 017703 162052  MOV      @RXDBUF,R3
3198 017334 005703      TST      R3
3199 017336 100001      BPL      23$
3200 017340 104026      HLT      26      ;ERROR
3201 017342 120103      23$:    CMPB     R1,R3
3202 017344 001401      BEQ      24$
```



```

3203 017346 104022          HLT      22          ;DATA COMPARE ERROR
3204 017350 105201          24$:    INCB     R1
3205 017352 001327          BNE     12$
3206 017354 012777 017234 162012  MOV     #13$,@DUPRVC
3207 017362 000723          BR      12$
3208
3209          ;TRANSMITTER
3210 017364 0.0077 162024          17$:    MOV     R0,@TXDBUF ;PUSH OUT DATA
3211 017370 105200          INCB     R0          ;UPDATE IT
3212 017372 001014          BNE     21$          ;BR IF MORE
3213 017374 105777 162012          20$:    TSTB    @TXCSR    ;CHECK FOR NEXT DONE
3214 017400 100375          BPL     20$          ;WAIT
3215 017402 052777 001000 162004  BIS     #TEOM,@TXDBUF ;END MSG
3216 017410 042777 000120 161774  BIC     #SEND!TXINTE,@TXCSR ;SHUT OF TRANSMITTER
3217 017416 012777 006774 161754  MOV     #NO.BTRAP,@DUPTVC ;RESET VECTOR ADRS
3218 017424 012716 017040          21$:    MOV     #30$, (SP)
3219 017430 000002          RTI
3220
3221
3222
3223
3224          ;***** TEST 24 *****
3225          ;*TEST TO PROVE THE DEVICE IDLES SYNCs AND
3226          ;*WILL SHIFT OUT DATA AT THE APPROPRIATE TIME
3227          ;:*****
3228
3229          ;:*****
3230          ;*
3231          ;* TEST 24
3232          ;*
3233          ;:*****
3234          ;:*****
3235 017432 012737 000024 001226  TST24:  MOV     #24,@TSTNO
3236 017440 012737 017630 001216  MOV     #TST25,NEXT
3237 017446 052777 000400 161736  BIS     #MRESET,@TXCSR ;RESET THE DEVICE
3238 017454 004737 005044          JSR     PC,SMALL    ;WAIT FOR RESET TO FINISH
3239 017460 052777 014000 161724  BIS     #MODE,@TXCSR ;ENTER MAINT MODE
3240 017466 012777 000020 161710  MOV     #RCVEN,@RXCSR ;TURN ON RECEIVER
3241 017474 012777 100026 161706  MOV     #DECMOD!26,@PARCSR ;ENTER DECMODE AND SYNC CHAR
3242 017502 052777 000020 161702  BIS     #SEND,@TXCSR ;TURN ON TRANSMITTER
3243 017510 012777 000426 161676  MOV     #TSOM!26,@TXDBUF ;PUSH OUT SYNCs
3244 017516 104412 000044          PKCLK    ,36.
3245 017522 012777 000252 161664  MOV     #252,@TXDBUF ;LOAD DATA
3246 017530 104412 000024          PKCLK    ,20. ;PUSH OUT ANOTHER SYNC
3247 017534 105777 161644          TSTB    @RXCSR    ;CHECK TO SEE IF SYNC ARRIVED
3248 017540 100401          BMI     1$          ;BR IF YES
3249 017542 104021          HLT     21
3250 017544 017737 161636 001324 1$:    MOV     @RXDBUF,DATA ;GET THE REC CHAR
3251 017552 122737 000026 001324  CMPB   #26,DATA    ;CHECK FOR SYNC
3252 017560 001401          BEQ     2$          ;BR IF MATCH
3253 017562 104021          HLT     21          ;FAILED TO RECEIVE THIRD SYNC
3254 017564 042777 000020 161620 2$:    BIC     #SEND,@TXCSR ;TURN OFF TRANSMITTER
3255 017572 104412 000016          PKCLK    ,14. ;PUSH OUT DATA
3256 017576 105777 161602          TSTB    @RXCSR    ;CHECK FOR REC DATA
3257 017602 100401          BMI     3$          ;BR IF YES
3258 017604 104026          HLT     26          ;FAILED TO GET A DATA DONE

```

```

3259 017606 017737 161574 001324 3$:  MOV @RXDBUF,DATA ;GET THE DATA
3260 017614 122737 000252 001324  CMPB #252,DATA ;COMPARE IT
3261 017622 001401  BEQ 4$ ;BR IF A MATCH
3262 017624 104022  HLT 22 ;DATA ERROR
3263 017626 104400 4$:  SCOPE ;SCOPE THIS TEST
3264
3265
3266 ;***** TEST 25 *****
3267 ;*TEST TO PROVE THE DEVICE WILL
3268 ;*WORK WITH EVERY POSSIBLE SYNC CHARACTER
3269 ;*****
3270 ;*****
3271 ;*
3272 ; TEST 25
3273 ;*
3274 ;*****
3275 ;*****
3276 017630 012737 000025 001226 TST25: MOV #25,@TSTNO
3277 017636 012737 020110 001216  MOV #TST26,NEXT
3278 017644 012737 000340 177776  MOV #340,PS
3279 017652 012702 000003  CLR R2 ;SET UP # OF SYNC
3280 017656 005037 001236  CLR TEMP1
3281 017662 005037 001240  CLR TEMP2
3282 017666 005000  CLR R0 ;CLEAR OUT DATA
3283 017670 005001  CLR R1 ;CLEAR SYNC
3284 017672 052737 000400 001236  BIS #TSOM,TEMP1 ;LOAD TSOM
3285 017700 052737 101000 001240  BIS #DECMODE.CRCEN,TEMP2 ;LOAD DEC MODE
3286 017706 1$:  BIS #MRESET,@TXCSR ;RESET THE DEVICE
3287 017706 052777 000400 161476  JSR PC,SMALL ;WAIT FOR RESET TO FINISH
3288 017714 004737 005044  BIS #RCVEN,@RXCSR
3289 017720 052777 000020 161456  MOV TEMP2,@PARCSR ;LOAD THE MODE AND SYNC CHARACTER
3290 017726 013777 001240 161454  BIS #SYSTST!SEND,@TXCSR ;TURN ON MODE AND TRANSMITTER
3291 017734 052777 004020 161450 2$:  TSTB @TXCSR ;TEST FOR DONE
3292 017742 105777 161444  BPL 2$ ;WAIT
3293 017746 100375  MOV TEMP1,@TXDBUF ;LOAD TSOM AND SYNC CHAR
3294 017750 013777 001236 161436  DEC R2 ;DECREMENT # OF SYNC TO SEND
3295 017756 005302  BNE 2$ ;BR IF MORE TO GO
3296 017760 001370
3297 017762 7$:
3298 017762 032777 004000 161424 64$:  BIT #TIMER,@TXDBUF ;CHECK THE TIMER BIT
3299 017770 001374  BNE 64$ ;BR IF SET
3300 017772 032777 004000 161414 65$:  BIT #TIMER,@TXDBUF ;CHECK THE TIMER BIT
3301 020000 001774  BEQ 65$ ;BR IF CLEAR
3302 020002 105777 161376  TSTB @RXCSR
3303 020006 100405  BMI 3$
3304 020010 005200  INC R0
3305 020012 022700 000040  CMP #40,R0
3306 020016 001361  BNE 7$
3307 020020 104015  HLT 15 ;DONE FAILED TO SET AFTER THIRD SYNC
3308 020022 017737 161360 001244 3$:  MOV @RXDBUF,TEMP4 ;GET THE BUFFER
3309 020030 032737 004000 001242  BIT #REACT,TEMP3 ;TEST ACTIVE
3310 020036 001001  BNE 4$ ;BR IF SET
3311 020040 104025  HLT 25 ;ACTIVE FAILED TO SET
3312 020042 005737 001244 4$:  TST TEMP4 ;TEST FOR ERROR
3313 020046 100001  BPL 5$ ;BR IF NO ERROR
3314 020050 104026  HLT 26 ;HARDWARE ERROR

```

```

3315 020052 123737 001236 001244 5$: CMPB TEMP1,TEMP4 ;COMPARE SYNCs
3316 020060 001401 BEQ 6$ ;BR IF OK
3317 020062 104022 HLT 22 ;SYNC CHAR DOES NOT MATCH SENT
3318 020064 6$:
3319 020064 012702 000003 MOV #3,R2 ;SET UP FOR NEXT SYNC
3320 020070 005000 CLR R0 ;DITTO
3321 020072 105201 INCB R1 ;DITTO
3322 020074 110137 001236 MOVB R1,TEMP1
3323 020100 110137 001240 MOVB R1,TEMP2
3324 020104 001300 BNE 1$ ;BR IF MORE TO GO
3325 020106 104400 SCOPE ;SCOPE THIS TEST
3326
3327
3328
3329
3330 ;***** TEST 26 *****
3331 ;*THIS TEST PROVES THAT THE CRC ERROR BIT FUNCTIONS
3332 ;*CORRECTLY. FORCE AN ERROR AND VERIFY THE BIT.
3333 ;*****
3334 ;*****
3335 ; TEST 26
3336 ;*****
3337 ;*****
3338 ;*****
3339 020110 012737 000026 001226 TST26: MOV #26,@TSTNO
3340 020116 012737 020450 001216 MOV #TST27,NEXT
3341 020124 012737 000340 177776 MOV #340,PS ;RAISE PROCESSOR STATUS
3342 020132 004537 006746 JSR R5,SETVEC ;SETUP VECTORS
3343 020136 020412 6$ ;RECEIVER
3344 020140 020344 3$ ;TRANSMITTER
3345 020142 340 340 .BYTE 340,340 ;LEVEL
3346 020144 005001 CLR R1 ;CLEAR CHAR COUNT
3347
3348 020146 052777 000400 161236 BIS #MRESET,@TXCSR ;RESET THE DEVICE
3349 020154 004737 005044 JSR PC,SMALL ;WAIT FOR RESET TO FINISH
3350 020160 012777 100026 161222 MOV #DECMOD!26,@PARCSR ;LOAD THE MODE AND SYNC CHARACTER
3351 020166 052777 004000 161216 BIS #SYSTST,@TXCSR ;ENTER SYSTEM TEST MODE
3352 020174 052777 000020 161202 BIS #RCVEN,@RXCSR ;LOAD RCVEN
3353 020202 052777 000020 161202 BIS #SEND,@TXCSR ;TURN ON TRANSMITTER
3354 020210 012777 000426 161176 MOV #TSOM!26,@TXDBUF ;OUTPUT A SYNC CHAR
3355 020216 105777 161170 64$: TSTB @TXCSR ;CHECK DONE
3356 020222 100375 BPL 64$ ;BR IF NOT SET
3357 020224 012777 000426 161162 MOV #TSOM!26,@TXDBUF ;SEND SYNC
3358 020232 105777 161154 65$: TSTB @TXCSR ;CHECK DONE
3359 020236 100375 BPL 65$ ;BR IF NOT SET
3360 020240 012777 000426 161146 MOV #TSOM!26,@TXDBUF ;SEND SYNC
3361 020246 005037 177776 CLR PS ;LOWER PROCESSOR STATUS
3362 020252 052777 000100 161124 BIS #RINTEN,@RXCSR ;TURN ON INTERRUPT ENABLES
3363 020260 052777 000100 161124 BIS #TXINTE,@TXCSR ;DITTO
3364 020266 1$:
3365 020266 012737 000040 020316 MOV #32,70$ ;LOAD THE NUMBER
3366 020274 032777 004000 161112 68$: BIT #TIMER,@TXDBUF ;CHECK THE TIMER BIT
3367 020302 001374 BNE 68$ ;BR IF SET
3368 020304 032777 004000 161102 69$: BIT #TIMER,@TXDBUF ;CHECK THE BIT
3369 020312 001774 BEQ 69$ ;BR IF CLEAR
3370 020314 005327 DEC (PC)+ ;DECREMENT THE NUMBER

```

```

3371 020316 000040      70$: 32.           ;OF TIMES TO REPEAT
3372 020320 001365      BNE      08$         ;BR IF MORE TO GO
3373 020322 104023      HLT      23         ;FAILED TO FINISH TEST
3374 020324
3375 020324 052777 000400 161060 2$:  BIS      #MRESET,@TXCSR ;RESET THE DEVICE
3376 020332 004737 005044      JSR      PC,SMALL   ;WAIT FOR RESET TO FINISH
3377 020336 012706 001150      MOV      #STACK,SP  ;RESET THE STACK
3378 020342 104400      SCOPE
3379
3380
3381

```

: INTERRUPT SERVICE ROUTINES

: TRANSMITTER

```

3382
3383 020344 005000      3$:  CLR      R0         ;CLEAR DATA
3384 020346 010077 161042      MOV      R0,@TXDBUF ;LOAD DATA TO BUFFER
3385 020352 012777 020362 161020      MOV      #4$,@DUPTVC ;SETUP FOR NEXT INTERRUPT
3386 020360 000411      BR       5$         ;LEAVE
3387 020362 012777 001000 161024 4$:  MOV      #TEOM,@TXDBUF ;END OF MSG--OUTPUT CRC
3388 020370 042777 000120 161014      BIC      #SEND!TXINTE,@TXCSR ;TRUN OFF THE
3389 020376 012777 006774 160774      MOV      #NO.BTRAP,@DUPTVC ;TRANSMITTER AND TXINTEN
3390 020404 012716 020266      5$:  MOV      #1$, (SP)   ;SETUP TO RETURN
3391 020410 000002      RTI          ;RETURN
3392
3393

```

: RECEIVER

```

3394 020412 017737 160770 001324 6$:  MOV      @RXDBUF,DATA ;GET THE DATA
3395 020420 005201      INC      R1         ;CHECK FOR LAST CHAR
3396 020422 022701 000004      CMP      #4,R1      ;AND BRANCH IF
3397 020426 001007      BNE     10$        ;NOT YET
3398 020430 032737 010000 001324      BIT      #CRCERR,DATA ;CHECK FOR CRC ERROR
3399 020436 001401      BEQ     7$         ;BR IF CRC ERROR SEEN
3400 020440 104014      HLT     14         ;FAILED TO CATCH CRC ERROR
3401 020442 012716 020324      7$:  MOV      #2$, (SP)   ;FINISH TEST
3402 020446 000002      10$: RTI          ;RETURN
3403
3404
3405

```

```

:***** TEST 27 *****
: *THIS TEST PROVES THE DEVICE WILL HANDLE THE
: *DDCMP PROTOCOL. SEND AND RECEIVE SYNCs,
: *FOLLOWED BY DATA,BCC,DATA AND FINAL BCC.
:*****

```

```

:*****
: *
: TEST 27
: *
:*****

```

```

3416
3417 020450 012737 000027 001226 TST27: MOV      #27,@TSTNO
3418 020456 012737 021454 001216      MOV      #TST30,NEXT
3419 020464 012737 000340 177776      MOV      #340,PS
3420 020472 004537 006746      JSR      R5,SETVEC  ;RAISE PROCESSOR STATUS
3421 020476 021104      10$:      ;SET UP VECTORS
3422 020500 020726      2$:      ;BASED ON
3423 020502      340      340      ;THESE
3424 020504 005037 001236      .BYTE   340,340    ;PARAMETERS
3425 020510 005037 001240      CLR     TEMP1
3426 020514 005037 001242      CLR     TEMP2

```

```

3427 020520 005037 001244 CLR TEMP4
3428 020524 005037 001246 CLR TEMP5
3429
3430 020530 052777 000400 160654 BIS #MRESET,@TXCSR ;RESET THE DEVICE
3431 020536 004737 005044 JSR PC,SMALL ;WAIT FOR RESET TO FINISH
3432 020542 012777 100026 160640 MOV #DECMOD!26,@PARCSR ;LOAD THE MODE AND SYNC CHARACTER
3433 020550 052777 004000 160634 BIS #SYSTST,@TXCSR ;ENTER SYSTEM TEST MODE
3434 020556 052777 000420 160620 BIS #RCVEN!STPSYN,@RXCSR ;LOAD RCVEN!STPSYN
3435 020564 052777 000020 160620 BIS #SEND,@TXCSR ;TURN ON TRANSMITTER
3436 020572 012777 000426 160614 MOV #TSOM!26,@TXDBUF ;OUTPUT A SYNC CHAR
3437 020600 105777 160606 64$: TSTB @TXCSR ;CHECK DONE
3438 020604 100375 BPL 64$ ;BR IF NOT SET
3439 020606 012777 000426 160600 MOV #TSOM!26,@TXDBUF ;SEND SYNC
3440 020614 105777 160572 65$: TSTB @TXCSR ;CHECK DONE
3441 020620 100375 BPL 65$ ;BR IF NOT SET
3442 020622 012777 000426 160564 MOV #TSOM!26,@TXDBUF ;SEND SYNC
3443 020630 052777 000100 160546 BIS #RINTEN,@RXCSR ;TURN ON INTERRUPTS
3444 020636 052777 000100 160546 BIS #TXINTE,@TXCSR ;DITTO
3445 020644 005037 177776 CLR PS ;LOWER PROCESSOR STATUS
3446 020650 100$.
3447 020650 012737 000144 020700 MOV #100.,70$ ;LOAD THE NUMBER
3448 020656 032777 004000 160530 68$: BIT #TIMER,@TXDBUF ;CHECK THE TIMER BIT
3449 020664 001374 BNE 68$ ;BR IF SET
3450 020666 032777 004000 160520 69$: BIT #TIMER,@TXDBUF ;CHECK THE BIT
3451 020674 001774 BEQ 69$ ;BR IF CLEAR
3452 020676 005327 DEC (PC)+ ;DECREMENT THE NUMBER
3453 020700 000144 70$: 100. ;OF TIMES TO REPEAT
3454 020702 001365 BNE 68$ ;BR IF MORE TO GO
3455 020704 104023 HLT 23 ;FAILED TO FINISH TEST
3456 020706 1$.
3457 020706 052777 000400 160476 BIS #MRESET,@TXCSR ;RESET THE DEVICE
3458 020714 004737 005044 JSR PC,SMALL ;WAIT FOR RESET TO FINISH
3459 020720 012706 001150 MOV #STACK,SP ;RESET THE STACK
3460 020724 104400 SCOPE ;SCOPE THIS TEST
3461
3462 ;INTERRUPT SERVICE ROUTINES
3463 ;TRANSMITTER
3464
3465 020726 012777 000252 160460 2$: MOV #252,@TXDBUF ;LOAD FIRST DATA CHAR
3466 020734 012737 000026 001236 MOV #26,TEMP1 ;LOAD DATA
3467 020742 012777 020752 160430 MOV #3$,@DUPTVC ;RELOAD VECTOR
3468 020750 000452 BR 7$ ;LEAVE
3469 020752 013777 001236 160434 3$: MOV TEMP1,@TXDBUF ;MOV DATA TO BUFFER
3470 020760 105237 001236 INCB TEMP1 ;UPDATE DATA
3471 020764 122737 000032 001236 CMPB #32,TEMP1 ;CHECK FOR DONE
3472 020772 001041 BNE 7$ ;BR IF MORE TO SEND
3473 020774 012777 021004 160376 MOV #4$,@DUPTVC ;RELOAD VECTOR
3474 021002 000435 BR 7$ ;RETURN
3475 021004 012777 001000 160402 4$: MOV #TEOM,@TXDBUF ;PUT OUT BCC
3476 021012 012777 021022 160360 MOV #5$,@DUPTVC ;RELOAD VECTOR
3477 021020 000426 BR 7$ ;RETURN
3478 021022 013777 001240 160364 5$: MOV TEMP2,@TXDBUF ;LOAD DATA
3479 021030 105237 001240 INCB TEMP2 ;UPDATE DATA
3480 021034 122737 000100 001240 CMPB #100,TEMP2 ;CHECK FOR FINISH
3481 021042 001015 BNE 7$ ;BR IF MORE TO GO
3482 021044 012777 021054 160326 MOV #6$,@DUPTVC ;RELOAD VECTOR

```

```

3483 021052 000411          BR      7$          ;RETURN
3484 021054 012777 001000 160332 6$:  MOV     #TEOM,@TXDBUF ;PUSH OUT DATA BCC
3485 021062 042777 000120 160322    BIC     #SEND!TXINTE,@TXCSR ;SHUT DOWN TRANSMITTER
3486 021070 012777 006774 160302    MOV     #NO.BTRAP,@DUPTVC ;RESET VECTOR
3487 021076 012716 020650    7$:  MOV     #100$,(SP) ;SETUP RETURN
3488 021102 000002          RTI          ;RETURN
3489
3490          ;RECEIVER
3491
3492 021104 017737 160274 001242 10$:  MOV     @RXCSR,TEMP3 ;SAVE CSR
3493 021112 017737 160270 001244    MOV     @RXDBUF,TEMP4 ;SAVE BUFFER
3494 021120 105737 001242    TSTB   TEMP3 ;CHECK FOR DONE
3495 021124 100401    BMI    11$ ;BR IF SET
3496 021126 104024    HLT    24 ;FALSE INTERRUPT
3497 021130 005737 001244    11$:  TST    TEMP4 ;CHECK FOR ERROR
3498 021134 100001    BPL    12$ ;BR IF NO ERROR
3499 021136 104026    HLT    26 ;RECEIVER ERROR
3500 021140 122737 000252 001244 12$:  CMPB   #252,TEMP4 ;CHECK DATA
3501 021146 001401    BEQ    13$ ;BR IF A MATCH
3502 021150 104022    HLT    22 ;DATA COMPARE ERROR
3503 021152 012737 000026 001246 13$:  MOV     #26,TEMP5 ;LOAD NEXT EXPECTED
3504 021160 012777 021170 160206    MOV     #14$,@DUPRVC ;RELOAD VECTOR
3505 021166 000531    BR     26$ ;LEAVE
3506 021170 017737 160212 001244 14$:  MOV     @RXDBUF,TEMP4 ;GET DATA
3507 021176 005737 001244    TST    TEMP4 ;CHECK FOR ERROR
3508 021202 100001    BPL    15$ ;BR IF NO ERROR
3509 021204 104026    HLT    26 ;DATA ERROR
3510 021206 123737 001246 001244 15$:  CMPB   TEMP5,TEMP4 ;CHECK DATA
3511 021214 001401    BEQ    16$ ;BR IF A MATCH
3512 021216 104022    HLT    22 ;DATA COMPARE ERROR
3513 021220 105237 001246    16$:  INCB   TEMP5 ;UPDATE DATA
3514 021224 122737 000032 001246    CMPB   #32,TEMP5 ;CHECK FOR FIRST PART FINISH
3515 021232 001107    BNE    26$ ;BR IF MORE TO GO
3516 021234 012777 021244 160132    MOV     #17$,@DUPRVC ;SET UP NEXT VECTOR
3517 021242 000503    BR     26$ ;LEAVE
3518 021244 017737 160136 001244 17$:  MOV     @RXDBUF,TEMP4 ;GET THE BUFFER
3519 021252 005737 001244    TST    TEMP4 ;TEST FOR ERROR
3520 021256 100001    BPL    .+4 ;BR IF OK
3521 021260 104026    HLT    26 ;RECEIVER ERROR
3522 021262 012777 021272 160104    MOV     #18$,@DUPRVC ;RELOAD THE VECTOR
3523 021270 000470    BR     26$ ;LEAVE
3524 021272 017737 160110 001324 18$:  MOV     @RXDBUF,DATA ;GET DATA
3525 021300 032737 010000 001324    BIT    #CRCERR,DATA ;CHECK FOR CRC ERROR
3526 021306 001001    BNE    19$ ;BR IF OK
3527 021310 104014    HLT    14 ;CRC ERROR...!!!
3528 021312 012777 021326 160054 19$:  MOV     #20$,@DUPRVC ;SET UP VECTOR
3529 021320 005037 001330    CLR    MIND ;SETUP FOR NEXT DATA
3530 021324 000452    BR     26$ ;LEAVE
3531 021326 017737 160054 001244 20$:  MOV     @RXDBUF,TEMP4 ;GET DATA
3532 021334 005737 001244    TST    TEMP4 ;CHECK FOR ERROR
3533 021340 100001    BPL    21$ ;BR IF NO ERROR
3534 021342 104026    HLT    26 ;RECEIVER ERROR
3535 021344 123737 001330 001244 21$:  CMPB   MIND,TEMP4 ;CHECK DATA
3536 021352 001401    BEQ    22$ ;BR IF A MATCH
3537 021354 104022    HLT    22 ;DATA ERROR
3538 021356 105237 001330    22$:  INCB   MIND ;UPDATE SOFTWARE DATA

```

```

3539 021362 122737 000100 001330      CMPB    #100,MIND          ;CHECK FOR FINISH
3540 021370 001030          BNE     26$              ;BR IF MORE TO GO
3541 021372 012777 021402 157774      MOV     #23$,@DUPRVC     ;RELOAD FINAL VECTOR
3542 021400 000424          BR      26$              ;LEAVE
3543 021402 017737 160000 001244 23$:  MOV     @RXDBUF,TEMP4    ;GET DATA
3544 021410 005737 001244          TST     TEMP4           ;CHECK FOR ERROR
3545 021414 100001          BPL     24$              ;BR IF OK
3546 021416 104026          HLT     26               ;RECEIVER ERROR ON FIRST OCTET
3547                                ;OF SECOND BCC
3548 021420 105777 157760          24$:  TSTB   @RXCSR         ;TEST DONE
3549 021424 100375          BPL     24$              ;BR IF NOT SET
3550 021426 017737 157754 001324      MOV     @RXDBUF,DATA    ;GET SECOND BCC OCTET
3551 021434 032737 010000 001324      BIT     #CRCERR,DATA    ;CHECK FOR BCC ERROR
3552 021442 001001          BNE     25$              ;BR IF OK
3553 021444 104014          HLT     14               ;BCC ERROR ON SECOND PART OF MSG
3554 021446 012716 020706          25$:  MOV     #1$, (SP)     ;SETUP TO FINISH TEST
3555 021452 000002          26$:  RTI                    ;RETURN
3556
3557
3558
3559

```

```

:***** TEST 30 *****
: *THIS TEST IS AN AID FOR DEBUGGING CRC
: *ERRORS. A CHARACTER IS LOADED INTO THE
: *DUP AND PUSHED OUT BIT BY BIT WHILE
: *ALLOWING THE OPERATOR TO MONITOR THE CRC
: *CHARACTER AS IT IS GENERATED. THE DATA CHARACTER
: *CAN ALSO BE CHANGED BY THE OPERATOR.
: *PUT SW09=1 TO LOCK ON BITS. TO CONTINUE HIT
: *ANY KEY ON THE TTY. AFTER 16 TIMES PUT DOWN SW09 TO LEAVE
:*****

```

```

:*****
: *
: * TEST 30
: *
:*****

```

```

3575 021454 012737 000030 001226  TST30: MOV     #30,@TSTNO
3576 021462 012737 002764 001216      MOV     #.EOP,NEXT
3577 021470 052777 000400 157714      BIS     #MRESET,@TXCSR ;RESET THE DEVICE
3578 021476 004737 005044          JSR     PC,SMALL        ;WAIT FOR RESET TO FINISH
3579 021502 012737 120001 007152      MOV     #CRC16,XPOLY   ;LOAD THE POLYNOMIAL
3580 021510 012737 000125 021656      MOV     #125,3$        ;LOAD DATA TO SOFTWARE BCC-CHANGE CHARACTER HERE
3581 021516 013737 021656 001252      MOV     3$,SAVR1
3582 021524 005037 007156          CLR     CALBCC          ;CLEAR FOR SOFTWARE BCC
3583 021530 013737 007156 021660      MOV     CALBCC,4$
3584 021536 005037 001242          CLR     TEMP3
3585 021542 005037 001244          CLR     TEMP4          ;CLEAR BIT COUNTER
3586 021546 005037 001246          CLR     TEMP5
3587 021552 012777 100026 157630      MOV     #DEC:MOD!26,@PARCSR ;LOAD MODE AND SYNC CHARACTER
3588 021560 052777 014000 157624      BIS     #MODE,@TXCSR   ;ENTER MAINT MODE-PROGRAM CLOCKING
3589 021566 052777 000420 157610      BIS     #RCVEN!STPSYN,@RXCSR ;TURN ON RECEIVER
3590 021574 052777 000020 157610      BIS     #SEND,@TXCSR   ;TURN ON TRANSMITTER
3591 021602 012777 000426 157604      MOV     #TSOM!26,@TXDBUF ;LOAD A SYNC
3592 021610 104412 000044          PKCLK   36             ;PUSH OUT 2 SYNCs
3593 021614 013777 021656 157572      MOV     3$,@TXDBUF    ;LOAD DATA
3594 021622 104412 000020          PKCLK   ,16           ;PUSH OUT ANOTHER SYNC

```


3042

```

( ) 022056 042377 050125 043040 EM1: .ASCIZ <377>/DUP FAILED TO INTERRUPT IN TIME /
(1) 022120 042377 052101 020101 EM2: .ASCIZ <377>/DATA COMPARE ERROR /
(1) 022145 377 047105 020104 EM3: .ASCIZ <377>/END OF MESSAGE /
(1) 022166 041377 041503 042440 EM4: .ASCIZ <377>/BCC ERROR /
(1) 022202 052377 040522 051516 EM5: .ASCIZ <377>/TRANSMITTER DONE /
(1) 022225 106 044501 042514 EM6: .ASCIZ /FAILED TO SET /
(1) 022244 051377 041505 044505 EM7: .ASCIZ <377>/RECEIVER INTERRUPT IN HALF-DUPLEX /
( ) 022310 043377 046101 042523 EM10: .ASCIZ <377>/FALSE INTERRUPT /
( ) 022332 040777 047502 052122 EM11: .ASCIZ <377>/ABORT SEQUENCE ERROR /
(1) 022361 377 052123 051101 EM12: .ASCIZ <377>/START OF MESSAGE /
(1) 022404 052777 042516 050130 EM13: .ASCIZ <377>/UNEXPECTED RECEIVER INTERRUPT /
( ) 022444 052777 042516 050130 EM14: .ASCIZ <377>/UNEXPECTED TRANSMITTER INTERRUPT /
(1) 022507 377 051124 047101 EM20: .ASCIZ <377>/TRANSMITTER DONE /
(1) 022532 051377 041505 044505 EM21: .ASCIZ <377>/RECEIVER DONE /
(1) 022552 052377 040522 051516 EM22: .ASCIZ <377>/TRANSMITTER ACTIVE /
( ) 022577 377 042522 042503 EM23: .ASCIZ <377>/RECEIVER ACTIVE /
( ) 022621 106 044501 042514 EM24: .ASCIZ /FAILED TO SET. /
(1) 022641 106 044501 042514 EM25: .ASCIZ /FAILED TO CLEAR. /
(1) 022663 377 054523 041516 EM26: .ASCIZ <377>/SYNC ERROR /
(1) 022700 042377 052101 020101 EM27: .ASCIZ <377>/DATA ERROR /
( ) 022715 377 042504 044526 EM30: .ASCIZ <377>/DEVICE FAILED TO INTERRUPT IN TIME /
(1) 022762 043377 046101 042523 EM31: .ASCIZ <377>/FALSE INTERRUPT /
(1) 023004 052377 040522 051516 EM32: .ASCIZ <377>/TRANSMITTER BCC ERROR IN DEC MODE /
(1) 023051 377 042522 042503 EM33: .ASCIZ <377>/RECEIVER BCC ERROR IN DEC MODE /
(1) 023113 377 042522 042503 EM15: .ASCIZ <377>/RECEIVER ERROR /
(1) 023134 041377 041503 042440 EM16: .ASCIZ <377>/BCC ERROR!! /
( ) 023152 041777 041522 043440 EM17: .ASCIZ <377>/CRC GENERATOR STATUS /
( ) 023201 377 040504 040524 MH1: .ASCIZ <377>/DATA CHAR DATA BIT IN CRC GEN. CRC FOR THIS BIT /
( ) .EVEN
(1) .ERRTAB:
(1) 023274 000000 0
(1) 023276 000000 0
(1) 023300 000000 0
(1) 023302 022056 EM1
(1) 023304 000000 0 ;HALT 1
(1) 023306 000000 0
(1) 023310 022120 EM2
(1) 023312 000000 0 ;HALT 2
(1) 023314 000000 0
(1) 023316 022145 EM3
(1) 023320 022225 EM6 ;HALT 3
(1) 023322 000000 0
(1) 023324 022166 EM4
(1) 023326 000000 0 ;HALT 4
(1) 023330 000000 0
(1) 023332 022202 EM5
(1) 023334 022225 EM6 ;HALT 5
(1) 023336 000000 0
( ) 023340 022244 EM7

```

(1)	023342	000000	0		:HALT 6
(1)	023344	000000	0		
(1)	023346	022310	EM10		
(1)	023350	000000	0		:HALT 7
(1)	023352	000000	0		
(1)	023354	022332	EM11		
(1)	023356	000000	0		:HALT 10
(1)	023360	000000	0		
(1)	023362	022361	EM12		
(1)	023364	022225	EM6		:HALT 11
(1)	023366	000000	0		
(1)	023370	022404	EM13		
(1)	023372	000000	0		:HALT 12
(1)	023374	000000	0		
(1)	023376	022444	EM14		
(1)	023400	000000	0		:HALT 13
(1)	023402	000000	0		
(1)	023404	023134	EM16		
(1)	023406	000000	0	:HALT14	
(1)	023410	000000	0		
(1)	023412	022532	EM21		
(1)	023414	022621	EM24	:HALT15	
(1)	023416	000000	0		
(1)	023420	022507	EM20		
(1)	023422	022621	EM24	:HALT16	
(1)	023424	000000	0		
(1)	023426	022552	EM22		
(1)	023430	022621	EM24	:HALT17	
(1)	023432	000000	0		
(1)	023434	022552	EM22		
(1)	023436	022641	EM25	:HALT20	
(1)	023440	000000	0		
(1)	023442	022663	EM26		
(1)	023444	000000	0	:HALT21	
(1)	023446	000000	0		
(1)	023450	022700	EM27		
(1)	023452	000000	0	:HALT22	
(1)	023454	000000	0		
(1)	023456	022715	EM30		
(1)	023460	000000	0	:HALT23	
(1)	023462	000000	0		

(1)	023464	022762			EM31	
(1)	023466	000000			0	;HALT24
(1)	023470	000000			0	
(1)						
(1)	023472	022577			EM23	
(1)	023474	022621			EM24	;HALT25
(1)	023476	000000			0	
(1)						
(1)	023500	023113			EM15	
(1)	023502	000000			0	;HALT26
(1)	023504	000000			0	
(1)						
(1)	023506	023004			EM32	
(1)	023510	000000			0	;HALT 27
(1)	023512	000000			0	
(1)						
(1)	023514	023051			EM33	
(1)	023516	000000			0	;HALT 30
(1)	023520	000000			0	
(1)	023522	000003			3	
(1)	023524	006	021	DT1:	.BYTE	6,17.
(1)	023526	001252			SAVR1	
(1)	023530	006	017		.BYTE	6,15.
(1)	023532	001254			SAVR2	
(1)	023534	006	002		.BYTE	6,2
(1)	023536	001256			SAVR3	
(1)						
(1)	023540					
3643		000001			CORMAX:	
					.END	

CZDPD-DO
CZDPDD.P11

MACV11 30A(1052)
25-JUL-79 15:01

25-JUL-79 15:19 PAGE 85

CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0083

.INSTR	003412	824	1244#		
.INST1	003432	1248#	1268		
.MSG	003434	1246*	1249#		
.PARAM	003536	828	1276#		
.PFAIL	005050	639	944	1553#	1557
.PKCLK	005006	838	1535#		
.RES05	003776	832	1347#		
.SAV05	003736	830	1333#		
.SCOPE	003160	818	1188#		
.SCOP1	003312	820	1218#		
.SETFL	004242	840	1416#	1428	
.START	001562	657	942#	954	
.TRPSR	004316	643	1436#		
.TRPTA	001344	816#	1441		
.TYPE	003336	822	1228#		

SSMALL	1#	1546													
SSYNC	541#	2724	2775	2778	2819	2822	2881	2884	2887	2998	3120	3355	3358	3437	3440
STRPDE	1#	817	819	821	823	825	827	829	831	833	835	837	839		
STSTA	1#	1754	1786	1820	1854	1888	1962	2059	2183	2308	2381	2506	2603	2643	2686
	2756	2804	2860	2971	3082	3229	3270	3333	3411	3569					
SVARIA	1#	659													
SWAIT	1#	1910	1922	1939	1987	2001	2094	2108	2220	2234	2339	2405	2424	2544	2617
	2664	2704	2730	2771	2781	2828	2905	2994	3005	3116	3127	3297	3364	3447	
SKZ	1#	1748	1752	1780	1784	1814	1818	1848	1852	1882	1886	1957	1960	2054	2057
	2178	2181	2304	2307	2374	2379	2502	2505	2598	2601	2638	2641	2681	2684	2751
	2754	2799	2802	2853	2859	2966	2970	3076	3081	3224	3227	3266	3269	3329	3332
	3405	3409	3559	3568											

. ABS. 023540 000

ERRORS DETECTED: 0

CZDDPDD.BIN,CZDPDD.LST/CRF/SOL/NL:TOC-CZDPXX.MAC,CZDPDD.P11
RUN-TIME: 34 47 3 SECONDS
RUN-TIME RATIO: 1396/86-16.1
CORE USED: 25K (49 PAGES)