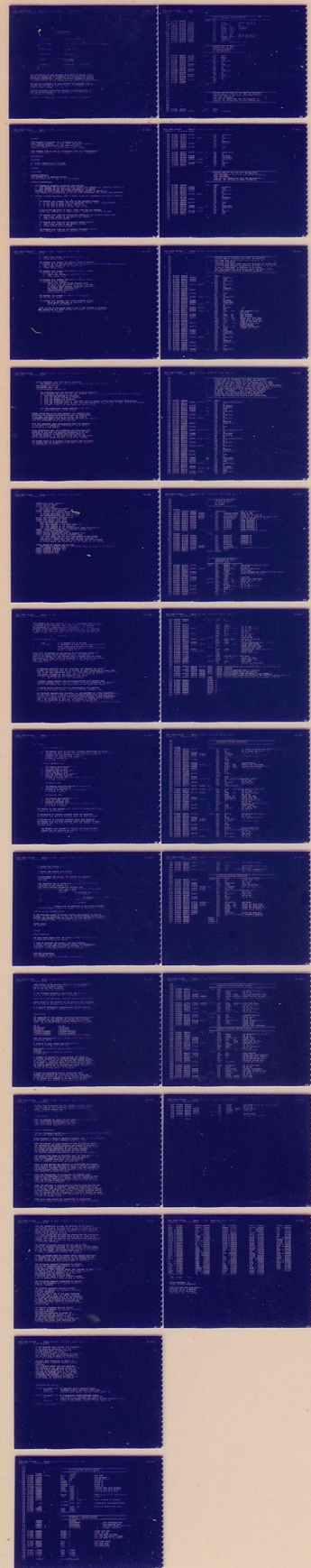


# DC11

OVERLAY FOR INTERPROCESSOR  
MD-11-DZDCO-C  
TEST PROGRAM

EP-DZDCO-C-DL  
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MADE IN USA



IDENTIFICATION

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PRODUCT CODE:            MAINDEC-11-DZDCO-C-D  
PRODUCT NAME:            DC11 OVERLAY FOR INTERPROCESSOR TEST PROGRAM  
PROGRAM DATE:            OCTOBER 1976  
MAINTAINER:              DIAGNOSTICS  
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                            JOHN EGOLF  
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1.0      ABSTRACT.

THIS PROGRAM IS DESIGNED AS A MAINTENANCE AID FOR FIELD SERVICE PERSONEL. IT WILL VERIFY THE PROPER OPERATION OF A COMPLETE COMMUNICATION LINK FROM ONE PDP-11 SYSTEM TO ANOTHER OR TO A COMMUNICATION TEST CENTER.

THIS PROGRAM MUST BE USED IN CONJUNCTION WITH THE INTEPPROCFSSOP TEST PROGRAM(DZITP) ON A PDP-11 SYSTEM WITH A DL-11 INTERFACE.

2.0      REQUIREMENTS.

2.1      EQUIPMENT

- A. PDP-11 SYSTEM WITH 4K OF CORE.
- B. A DC11 COMMUNICATION INTERFACE.

2.2      STORAGE.

4K OF CORE

3.0      LOADING PROCEDURE

THIS PROGRAM IS IN ABSOLUTE FORMAT.  
THE ABS LOADER MUST BE USED TO LOAD THE PROGRAM.

4.0      OPERATING PROCEDURES.

- A. TWO METHODS OF ENTERING PARAMETEPS ARE PROVIDED
    - 1. LOAD ADDRESS 200 AND START TO ENTER PARAMS FROM CONSOLE TTY, PROCEED TO SECTION B.
    - 2. LOAD ADDRESS 200 AND SET SWITCH REGISTER BIT 15 BEFORE STARTING TO ENTER PARAMS FROM CONSOLE SWITCHES, PROCEED TO SECTION C.
- \*THE PROGRAM MAY BE RESTARTED AT LOC 204 (ONCE PARAMETERS HAVE ALREADY BEEN SELECTED)

- B. CONSOLE DIALOGUE PARAMETER INPUT (CURRENT VALUES FOR PARAMETERS ARE FOUND IN OVERLAY)

- 1. THE PROGRAM WILL TYPEOUT THE NAME OF THE VARIABLE OVERLAY.
  - A. IF YOU WISH TO SETUP JUST THE INDICATED OVERLAY, TYPE A CARAGE RETURN
  - B. IF YOU WISH TO SETUP A DN11, TYPE IN DN.
  - C. IF YOU WISH TO SETUP A DM11BB, TYPE IN DMR.

IF DN OR DMB WAS TYPED IN STEP 1 ABOVE THEN THE BUS ADDRESS, VECTOR ETC. REFERED TO IN STEPS 2 THRU 7, PERTAIN TO THE DN11 OR DMBB.

- 2. THE PROGRAM WILL TYPE THE DEFAULT BUS ADDRESS OF THE INTERFACE UNDER TEST.
  - A. TYPE A CAR, RETURN TO USE DEFAULT BUS ADDRESS
  - B. TYPEIN ACTUAL BUS ADDRESS
- 3. THE PROGRAM WILL TYPE OUT THE DEFAULT VECTOR ADDRESS
  - A. TYPE A CAR, RETURN TO USE DEFAULT ADDRESS
  - B. TYPEIN ACTUAL VECTOR ADDRESS
- 4. THE PROGRAM WILL TYPE OUT THE DEFAULT INTERFACE PRIORITY  
NOTE: 200=PRIO 4, 240=PRIO 5, 300=PRIO 6, ETC.

- A. TYPE A CAR, RETURN TO USE DEFAULT VALUE
  - B. TYPEIN ACTUAL VALUE
5. THE PROGRAM WILL TYPEOUT THE DEFAULT VALUE OF PARAM#1  
IF REQUIRED BY THE ISP.(SEE SECT. 10.0 IN OVERLAY LISTING FOR PARAMETFP DESCRIPTION)
- A. TYPE A CAR, RETURN TO USE DEFAULT VALUE
  - B. TYPEIN ACTUAL VALUE
6. THE PROGRAM WILL TYPEOUT THE DEFAULT VALUE OF PARAM#2  
IF REQUIRED BY THE ISP.
- A. TYPE A CAR, RETURN TO USE DEFAULT VALUE
  - B. ENTER ACTUAL VALUE
7. THE PROGRAM WILL TYPEOUT THE DEFAULT VALUE OF PARAM#3  
IF REQUIRED BY THE OVERLAY.
- A. TYPE A CAR, RETURN TO USE DEFAULT VALUE  
THE DN-11 WILL USE PARAM #3 AS THE # TO DIAL.  
IF USING A MODEM WITHOUT AUTOMATIC HANDSHAKING,  
THE NUMBER MUST TERMINATE WITH A  
"END-OF-NUMBER" CHARACTER (#).
  - B. ENTER ACTUAL VALUE.
8. THE PROGRAM WILL RETURN TO STEP B1 IF THIS SETUP  
WAS FOR DN11 OR DN11BB.
9. THE PROGRAM WILL REQUEST THAT SWITCH REGISTER BE SET.
- A. SETUP SWITCH REGISTER AS SPECIFIED IN STEP D.  
AND TYPE A CAR, RETURN.

NOTE: IF ANY OF THE ABOVE ITEMS 2 THRU 7 WERE CHANGED BY ENTERING  
NEW VALUES,THE NEW VALUE BECOMES THE DEFAULT VALUE FOR SUBSEQUENT  
RESTARTS OF THE PROGRAM.

- C. MANUAL PARAMETER INPUT FROM SWITCH REGISTER
1. THE PROGRAM HALTS FOR ISR (INTERFACE SERVICE ROUTINE) SPECIFICATION  
SWR14=SETUP DN-11B ISP  
SWR13=SETUP DN-11 ISP  
SWR000000=SETUP VARIABLE ISP
  2. THE FOLLOWING HALTS ARE REPEATED FOR EACH ISR SPECIFIED.  
SETUP SEQUENCE IS: DN11, DM11-BR THEN VARIABLE OVERLAY. (EACH ENTRY SET SWITCHES THEN HIT CONTINUE.)
    - A. HALT FOR BUS ADDRESS OF INTERFACE
    - B. HALT FOR VECTOR ADDRESS OF INTERFACE
    - C. HALT FOR PRIORITY OF INTERFACE
    - D. HALT FOR INTERFACE PARAM #1 (SEE SECT. 10.0 IN OVERLAY LISTING FOR PARAMETER DESCRIPTION)
    - E. HALT FOR INTERFACE PARAM #2 (DN11 AND DM11 PARAMETERS ARE DISCUSSED IN SECT. 10.0 OF THE MONITOR.)
    - F. GO BACK TO STEP A IF THIS SETUP WAS FOR DN OR DM.
  3. HALT FOR OPERATIONAL SWITCH SETTINGS. (SEE STEP D.)
    - A. PRESS CONTINUE TO START TESTING

BEFORE ATTEMPTING TO RUN THIS PROGRAM, THE OPERATOR MUST ACCERTAIN THE COMPLETE COMMUNICATION LOOP AND PROCEDURES TO BE USED, INCLUDING THE TYPE OF MODEMS, THE TYPE OF INTERFACE BEING USED AT THE OTHER CPU AND THE MODES OF OPERATION, DATA AND PARAMETERS TO BE USED AT EACH CPU.

THIS WILL REQUIRED VOCAL COMMUNICATION WITH THE OPERATOR AT THE OTHER CPU UNLESS ITS CONFIGURATION AND OPERATION ARE FIXED AS A TEST CENTER.

AFTER DETERMINING THAT THE EQUIPMENTS ARE COMPATIBLE AND AGREEING ON THE MODE AND VARIABLE PARAMETERS TO BE USED, THE SYSTEM WHICH IS TO RECEIVE DATA FIRST SHOULD BE LOADED AND STARTED. IF THE MODEM BEING USED ON THIS SYSTEM HAS AN AUTOMATIC ANSWER FEATURE, IT SHOULD BE ENABLED.

THE SYSTEM WHICH IS TO TRANSMIT FIRST SHOULD THEN BE LOADED AND STARTED AND THE CONNECTION ESTABLISHED EITHER MANUALLY OR AUTOMATICALLY (VIA DN-11).

DL

D. OPERATIONAL SWITCH SETTINGS.

S#15#1 HALT ON ERROR  
S#14#1 SINGLE PASS  
    S#14 HAS NO EFFECT IF S#04#0  
S#13#1 INHIBIT ERROR TIMEOUTS  
S#12#1 INHIBIT ALL TIMEOUTS EXCEPT ERRORS  
    IF S#12#0 AND S#04#1 END PASS IS TYPED  
    AND TRANSMITTED/RECEIVED DATA IS TYPED.  
S#11#1 USE PREVIOUSLY SPECIFIED DATA  
S#10#1 DATA SELECT (WITH S#09)  
S#09#1 DATA SELECT (WITH S#10)  
    00#1 GET DATA FROM OPERATOR  
    01#1 TEST MESSAGE 01 (0A QUICK BROWN FOX)  
    10#1 TEST MESSAGE 02 (0B NUMERICS)  
    11#1 TEST MESSAGE 03 (0C CONTEST/QUICK BROWN FOX/NUMERICS)  
S#08#1 TRANSMIT RECEIVED DATA (INTERNAL LOOPBACK MODE)  
S#07#1 DO NOT TEST RECEIVED DATA  
S#06#1 MONITOR TRANSMITTED DATA ON CONSOLE TTY.\*  
S#05#1 MONITOR RECEIVED DATA ON CONSOLE TTY.\*  
    \* IN MANY CASES, NOT ALL DATA WILL APPEAR ON THE CONSOLE  
    TTY. THIS IS ESPECIALLY TRUE WHEN THE COMM INTERFACE IS  
    RUNNING AT A FASTER BAUD THAN THE CONSOLE, BUT EVEN AT EQUAL  
    OR SLOWER BAUDS, ALL CHARACTERS MAY NOT APPEAR ON THE CONSOLE.  
  
S#04#1 RETURN TO MONITOR FOR END PASS  
    WHEN S#04#0 PROGRAM LOOPS IN THE OVERLAY NEVER RETURNING TO THE MONITOR.  
S#03#1 INTERNAL LOOPBACK MODE  
S#02#1 EXTERNAL LOOPBACK MODE  
S#01#1 ONE-WAY-IN MODE  
S#00#1 ONE-WAY-OUT MODE

THIS PROGRAM HAS BEEN MODIFIED TO RUN ON A PROCESSOR WITH OR WITHOUT A HARDWARE SWITCH REGISTER. WHEN FIRST EXECUTED THE PROGRAM TESTS THE EXISTENCE OF A HARDWARE SWITCH REGISTER. IF NOT FOUND A SOFTWARE SWITCH REGISTER LOCATION (SWREG=LOC, 176 ) IS DEFAULTED TO. IF THIS IS THE CASE, UPON EXECUTION THE CONTENTS OF THE SWREG ARE DUMPED IN OCTAL ON THE CONSOLE TTY AND ANY CHANGES ARE REQUESTED

(IE)      SWR=XXXXXX NFW

POSSIBLE RESPONSES ARE:

1.      <CR>      IF NO CHANGES ARE TO BE MADE
2.      6 DIGITS 0-7      TO REPRESENT IN OCTAL THE NFW SWITCH REGISTER VALUE ;LAST DIGIT FOLLOWED BY <CR>.
3.      ^U      TO ALLOW REENTERING VALUE IF ERROR IS COMMITTED KEYING IN SWREG VALUE.

BUILT INTO THE PROGRAM IS THE ABILITY TO DYNAMICALLY CHANGE THE CONTENTS OF SWREG DURING PROGRAM EXECUTION. BY STRIKING ^G (CNTRL G) ON CONSOLE TTY THE OPERATOR SETS A REQUEST FLAG TO CHANGE THE CONTENTS OF SWREG, WHICH IS PROCESSED IN KEY AREAS OF THE PROGRAM CODE (IE) ERROR ROUTINES, AFTER HALTS END OF PASS, AND OTHER APPLICABLE AREAS.

IF OPERATOR SPECIFIED DATA WAS INDICATED, THE PROGRAM WILL TYPE A REQUEST FOR THE DATA. DATA MAY BE ENTERED AS ASCII CHARACTERS OR OCTAL CODE. TYPE IN THE DATA TERMINATED WITH A CR. OCTAL CODE MAY BE ENTERED BY TYPING AN ^ (UP ARROW) FOLLOWED BY THE OCTAL CODE (IN THE RANGE 000 TO 377) SEPERATED BY SPACES AND TERMINATED BY ^ (UP ARROW).  
I.E.      ABCD^ 000 123 377^ EFG (CAR,RETURN)

A TYPICAL SWITCH SETTING FOR HALF-DUPLEX=003150 THIS SETTING USES INTERNAL LOOPBACK MODE, LOOPS IN OVERLAY, MONITORS TRANSMITTED AND RECEIVED DATA ON THE CONSOLE TTY, AND TESTS RECEIVED DATA USING TEST MESSAGE 03.

A TYPICAL SWITCH SETTING FOR FULL-DUPLEX=003144 THIS SETTING IS THE SAME AS ABOVE EXCEPT IT USES THE EXTERNAL LOOPBACK MODE.

ALL STANDARD MESSAGES (TEST MESSAGES 1-3) ARE PRECEDED BY 2 FILL CHARACTERS(177), AND ARE FOLLOWED BY A CR(015), LF(012), RECEIVE TERMINATING CHARACTER(001), 4 FILLS(177), AND A TRANSMIT TERMINATING CHARACTER(000). DURING TRANSMISSION, WHEN A 000 CHARACTER IS SEEN THE TRANSMISSION IS STOPPED. DURING RECEPTION, WHEN A 001 CHARACTER IS RECEIVED, THE RECEIVER IS SHUT OFF. IF THE MESSAGE WAS INPUTED BY THE OPERATER, THE TERMINATING CHARACTERS ARE ADDED.

TFST MODES

INTERNAL LOOPBACK MODE

1. THE OVERLAY WAITS TO RECEIVE A MESSAGE (TERMINATED BY <M01>)
2. VERIFIES THE DATA AGAINST THE DATA SELECTED BY SW09 AND SW10(SW7=0)
3. TRANSMIT THE DATA SELECTED BY SW09 AND SW10 (SW0=0) OR  
TRANSMIT THE RECEIVED DATA (SW0=1)
4. RETURNS TO MONITOR FOR "END PASS" (SW4=1) OR  
GO TO STEP 1. (SW4=0)

EXTERNAL LOOPBACK MODE

1. THE OVERLAY SETS REQUEST TO SEND
2. WAIT FOR CLEAR TO SEND
3. TRANSMITS THE SELECTED DATA
4. RESETS REQUEST TO SEND
5. WAIT FOR MESSAGE TO BE RECEIVED
6. VERIFIES THE DATA (SW07=0)
7. RETURNS TO MONITOR FOR "END PASS". (SW04=1) OR  
GO TO STEP 1(SW04=0)

ONE-WAY-IN MODE

1. THE OVERLAY WAITS FOR MESSAGE TO BE RECEIVED.
2. VERIFIES THE DATA(SW07=0)
3. RETURNS TO MONITOR FOR "END PASS"(SW04=1) OR  
GO TO STEP 1 (SW04=0)

ONE-WAY-OUT MODE

1. THE OVERLAY SETS REQUEST TO SEND
2. WAITS FOR CLEAR TO SEND
3. TRANSMITS SELECTED DATA
4. RETURNS TO MONITOR FOR "END PASS". (SW04=1) OR  
GO TO STEP 1 (SW04=0)

E. THE OVERLAY IS THEN ENTERED AND A CONNECTION ESTABLISHED EITHER  
MANUALLY OR AUTOMATICALLY.

IF ONE-WAY-IN OR INTERNAL LOOPBACK MODES ARE SELECTED,  
THE OVERLAY WILL SET DATA TERMINAL READY AND WAIT FOR DATA.

IF ONE-WAY-OUT OR EXTERNAL LOOPBACK MODES WERE SELECTED,  
THE OVERLAY WILL SET DATA TERMINAL READY AND REQUEST TO SEND.  
THE OVERLAY WILL THEN WAIT FOR CLEAR TO SEND BEFORE ATTEMPTING TO  
TRANSMIT DATA.

THE PROGRAM WILL PRINTOUT A "WAITING FOR CLEAR TO SEND"  
MESSAGE AND THE CONTENTS OF THE XMIT CSR EVERY 60 SECS.  
UNTIL CLEAR TO SEND IS ASSERTED.

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WHERE RRRRRP IS THE RECEIVE BUFFER (UP TO 512 CHARACTERS)  
TTTTT IS THE TRANSMIT BUFFER (UP TO 512 CHARACTERS)  
BBB IS THE BAD DATA CHARACTER  
GGG IS THE GOOD DATA CHARACTER

IF THE INTERFACE DETECTS A DATA ERROR, THE FOLLOWING  
WILL BE PRINTED BEFORE THE DATA IS COMPARED:

THERE WAS A RECEIVER ERROR, RECEIVER DATA REGISTER =XXXXXX

WHERE XXXXXX IS THE CONTENTS OF THE RECEIVER DATA REGISTER  
THE LOW BYTE IS THE DATA, AND THE HIGH BYTE IS THE ERROR BITS.

IF A RECEIVE TERMINATING CHARACTER<001> IS NOT DETECTED  
WITHIN 512 CHARACTERS A "BUFFER FULL" PRINTOUT WILL OCCUR.

7.2

#### RESTRICTIONS

THE OPERATION OF THIS PROGRAM REQUIRES COORDINATION BETWEEN  
THE OPERATOR AND THE OPERATOR OF ANOTHER PDP-11 SYSTEM  
UNLESS ONE OF THE SYSTEMS IS ALWAYS OPERATING IN A FIXED  
MODE. THE FOLLOWING TABLE LISTS THE VALID COMBINATIONS:

CPU #1	CPU #2
ONE-WAY-OUT	ONE-WAY-IN
ONE-WAY-IN	ONE-WAY-OUT
EXTERNAL-LOOPBACK	INTERNAL-LOOPBACK
INTERNAL-LOOPBACK	EXTERNAL-LOOPBACK
EXTERNAL-LOOPBACK	EXTERNAL-LOOPBACK (FULL DUPLEX)

WHEN THE COMMUNICATION LINK INVOLVES MODEMS THE FOLLOWING  
RESTRICTION APPLY:

IF RUNNING IN FULL DUPLEX MODE BOTH SYSTEMS  
MUST BE IN EXTERNAL LOOP BACK MODE.

BOTH SYSTEMS SHOULD BE RUNNING IDENTICAL ROUTINES.  
EXAMPLE:  
SWITCHES 14,13,7,4 SHOULD BE THE SAME  
ON BOTH CPU S

IF PROGRAM IS WAITING IN A SCAN ROUTINE AND TYPES OUT  
A "WAITING MESSAGE", IF AN INCOMING MESSAGE STARTS DURING  
THE TYPE OUT, IT WILL BE LOST BECAUSE THE TYPEOUT PRIORITY  
IS AT LEVEL 7. THIS WILL RESULT IN OVERRUN OR SILO OVER-  
RUN ERRORS, DEPENDING ON THE DEVICE. TO AVOID THIS SITUATION  
RUN WITH SWITCH 13 UP. IF OVERRUN DOES OCCURE DURING A  
TYPEOUT THE PROGRAM SHOULD BE RESTARTED.

IF USING AN ASYNCPONOUS DEVICE, MODEMS AND THE  
MAYNARD TEST STATION AND INITIALIZE DOES NOT CLEAR THE  
CONNECTION (EXAMPLE THE DJ11) IF THE PROGRAM IS RESTARTED  
IN THE MIDDLE OF A MESSAGE AT LOC 204 OR BY HITTING CR  
AN IMMEDIATE ERPROR MESSAGE FROM MAYNARD WILL BE RE-

11

CEIVED, THIS IS BECAUSE THE TEST STATION IS STILL LOOKING FOR THE REST OF THE INTERRUPTED MESSAGE. TO AVOID THIS ERROR, RESTART PROGRAM ONLY AT THE END OF THE MESSAGE CURRENTLY BEING TRANSMITTED.

8.0 MISCELLANEOUS

ITEP WAS CHECKED OUT USING THE FOLLOWING BELL TELEPHONE MODEMS.  
201A (HALF-DUPLEX SYNCHRONOUS 2000 BAUD)  
202C (HALF-DUPLEX ASYNCHRONOUS 1200 BAUD)  
103A (FULL-DUPLEX ASYNCHRONOUS 110 BAUD)

9.0 PROGRAM DESCRIPTION

9.1 THE DC11 INTERFACE SERVICE PARAMS ARE SETUP, AS SPECIFIED BY THE OPERATOR, BY THE ITEP CONTROL PROGRAM.

TIME: PROVIDES A MEANS OF MEASURING ELAPSED TIME, IT IS INCREMENTED EVERY SECOND BY A CLOCK INTERRUPT ROUTINE IN ITEP.

9.2 WHEN THE OVERLAY IS FIRST ENTERED BY ITEP AT LOCATION START:, THE CONTENTS OF THE SWITCH REGISTER ARE STORED IN REGISTER P. THE MODE AND DATA SELECTIONS ARE FIXED AT THIS TIME AND CANNOT BE ALTERED WITHOUT RETURNING TO THE CONTROL PROGRAM. THE INTERRUPT VECTORS AND VARIABLES ARE THEN SETUP. THE SELECTED ROUTINE DETERMINED BY THE MODE IS THEN ENTERED

9.3 THE OVERLAY THEN LOOPS IN ROUTINES: SOWI, IF "ONE WAY IN" MODE WAS SELECTED. SOWO, IF "ONE WAY OUT" MODE WAS SELECTED. SILB, IF "INTERNAL LOOP BACK" MODE WAS SELECTED. SXLB, IF "EXTERNAL LOOP BACK" WAS SELECTED.

9.31 SOWI: IN THIS ROUTINE THE RECEIVER IS INITIALIZED AND PROGRAM LOOPS WAITING FOR THE RECEIVER TO FINISH. IF NOTHING IS RECEIVED FOR 60 SECS A "WAITING" MESSAGE IS TYPED. WHEN THE RECEIVER IS DONE, THE PROGRAM CHECKS DATA IF SWITCHES PERMIT, AND TYPES END PASS DEPENDING ON SWITCH SETTINGS.

9.32 SOWO: THE TRANSMITTER IS INITIALIZED AND PROGRAM LOOPS WAITING FOR TRANSMITTER TO FINISH, A "WAITING" MESSAGE IS TYPED EVERY 60 SECS IF THERE IS NO ACTION. WHEN THE TRANSMITTER IS DONE, THE PROGRAM EITHER LOOPS BACK TO SOWO OR TYPES END PASS DEPENDING ON SWITCH SETTINGS.

9.33 SILB: THE RECEIVER IS INITIALIZED AND PROGRAM LOOPS WAITING FOR RECEIVER TO FINISH, A "WAITING" MESSAGE IS TYPED EVERY 60 SEC IF NO ACTION. WHEN RECEIVER IS DONE PROGRAM CHECKS DATA IF SWITCH SETTINGS PERMIT, AND END PASS IS TYPED IF SWITCH SETTINGS PERMIT. THEN THE TRANSMITTER IS INITIALIZED, A "WAITING" MESSAGE IS TYPED EVERY 60 SEC IF NO ACTION. WHEN TRANSMITTER IS DONE PROGRAM RETURNS TO START OF ROUTINE. (SILB)

9.34 SXLB: IF IN HALF DUPLEX THE TRANSMITTER IS INITIALIZED, A "WAITING" MESSAGE IS TYPED EVERY 60 SEC IF THERE IS NO ACTION

WHEN THE TRANSMITTER IS DONE THE RECEIVER IS INITIALIZED  
, A "WAITING" MESSAGE IS TYPED EVERY 60 SEC IF THERE IS NO ACTION.  
WHEN THE RECEIVER IS DONE, DATA IS CHECKED IF SWITCH SETTINGS  
PERMIT AND END PASS IS TYPED IF SWITCHES ALLOW, THE PROGRAM NOW  
REPEATS CYCLE STARTING AT 8XLB.  
IF IN FULL DUPLEX THE RECEIVER AND TRANSMITTER ARE INITIALIZED  
, A "WAITING" MESSAGE IS TYPED EVERY 60 SEC IF THERE IS NO  
ACTION, WHEN BOTH THE RECEIVER AND TRANSMITTER ARE DONE, DATA IS  
CHECKED, END PASS IS TYPED AND PROGRAM LOOPS TO 8XLB DEPENDING  
ON THE SWITCH SETTINGS.

- 9.4 THE RETURN TO MONITOR ROUTINE FOR END PASS AT EOP;  
LOCKS OUT INTERRUPTS AND SAVES THE TRANSMITTER INTERRUPT ENABLE  
BIT AND ALL GENERAL REGISTERS. IT THEN RETURNS TO THE MONITOR  
TO TYPE "END PASS". THE MONITOR CHECKS SW14 IF UP IT RETURNS  
TO ENTERI, OTHERWISE IT RESTARTS THE PROGRAM.
- 9.5 ENTERI IS ENTERED FROM THE MONITOR AFTER TYPEING "END PASS",  
IT RESTORES THE GENERAL REGISTERS AND THE TRANSMITTER CSR  
AS SAVED IN EOP. THE DELAY FLAG IS SET AND PROGRAM RETURNS TO  
THE SCAN ROUTINE(OWO,OWI,ILB,XLB) WHERE IT CAME FROM.
- 9.6 THE INITIALIZE TRANSMIT SUBROUTINE AT STARTXI;  
SETS UP THE INTERFACE AND POINTERS NECESSARY TO  
INITIATE A TRANSMIT OPERATION.  
AFTER SETTING "DATA TERMINAL READY" AND "REQUEST TO SEND" A CHECK  
IS MADE ON PARAM2 TO DETERMINE IF HALF DUPLEX OPERATION  
WAS SELECTED BY THE OPERATOR. IF IT WAS, THE  
SUBROUTINE WAITS FOR CLEAR TO SEND.  
A "WAITING FOR CLEAR TO SEND" PRINTOUT OCCURS  
EVERY 30 SECONDS UNTIL CLEAR TO SEND IS ASSERTED.
- 9.7 THE INITIALIZE RECEIVED SUBROUTINE AT STARTRI;  
SETS UP THE INTERFACE AND POINTERS NECESSARY TO  
RECEIVE A MESSAGE.
- 9.8 THE TRANSMIT INTERRUPT SERVICE ROUTINE,  
AT XISR1, IS ENTERED VIA TRANSMIT INTERRUPTS  
FROM THE INTERFACE.  
A TEST IS MADE TO SEE IF THE LAST CHARACTER  
TRANSMITTED WAS A NULL (ALL ZEROS) CHARACTER.  
IF IT WAS, THE TRANSMIT LOGIC IN THE INTERFACE  
IS RESET AND THE TRANSMIT COMPLETE FLAG IS SET.  
AT XISR1, THE NEXT CHARACTER IS TRANSMITTED  
AND PRINTED ON THE TTY IF THE MONITOR TRANSMIT  
SWITCH IS SET.
- 9.9 THE RECEIVE INTERRUPT SERVICE ROUTINE  
,AT RISRI, IS ENTERED VIA RECEIVER INTERRUPTS  
FROM THE INTERFACE.  
THE RECEIVED CHARACTER IS STORED IN  
THE INPUT BUFFER AND PRINTED ON THE TTY IF  
THE MONITOR RECEIVER SWITCH IS SET.  
IF THE INPUT BUFFER IS FULL, A "BUFFER FULL"  
PRINTOUT WILL OCCUR. THIS INDICATES THAT A  
LINE FEED CHARACTER WAS NOT RECOGNIZED

IN THE RECEIVED DATA (WITHIN 1000 CHARACTERS).  
IF THE RECEIVED CHARACTER IS A LINE FEED,  
THE RECEIVED LOGIC IS RESET AND THE  
RECEIVE COMPLETE FLAG IS SET.  
IF A 'RECEIVE ERROR' IS DETECTED AT RISR1, THE  
CSR AND DBR WILL BE SAVED AND PRINTED OUT  
AFTER THE COMPLETE MESSAGE HAS BEEN RECEIVED.

9.10    THE DATA TEST SUBROUTINE AT TESTD1 IS  
ENTERED AFTER A COMPLETE MESSAGE HAS BEEN  
RECEIVED.  
IF A 'RECEIVE ERROR' HAD BEEN DETECTED,  
THE CONTENTS OF THE 'RECEIVE BUFFER' AT THE  
TIME THE ERROR OCCURRED WILL BE PRINTED.  
THE DATA IS COMPARED UNTIL A 'ALL ZEROS'  
CHARACTER IS RECOGNIZED. 'FILL' (ALL ONES)  
CHARACTERS ARE IGNORED. IF A MISMATCH  
IS DETECTED, THE COMPLETE CONTENTS OF THE  
INPUT BUFFER AND GOOD DATA IS PRINTED.

10.0    PARAMETERS FOR THE DC11

PARAM#1 IS LOADED INTO THE RECEIVER STATUS REGISTER (RCR).  
BITS 3,4      CHARACTER LENGTH, DEFAULT= 8 BITS (00)  
BITS 9,10     RECEIVER SPEED SELECT, DEFAULT= LOWEST SPEED (00)

PARAM#2 IS LOADED INTO THE TRANSMITTER STATUS REGISTER (TSCR).  
BIT 0      FULL DUPLEX (1), DEFAULT= HALF DUPLEX (0)  
            (BIT 0 IS NOT LOADED INTO THE TSCR, IT IS ONLY A SOFTWARE FLAG.)  
BITS 3,4     TRANSMIT SPEED SELECT, DEFAULT= LOWEST SPEED (00)

PARAM#3 IS NOT USED(177777).

```

577
578
579
580
581
582 011000 041504 000040
583 011004 174000
584 011006 000300
585 011010 000240
586 011012 000001
587 011014 000000
588 011016 177777
589 011020 000000
590 011022 000000
591 011024 000000
592 011026 000000
593 011030 000000
594 011032 000000
595 011034 000000
596 011036 011102
597 011040
598 011040 000
599 011041
600 011041 001
601 011042 000000
602 011044 177570
603 011046 177570
604
605
606
607
608 000000
609 100000
610 040000
611 020000
612 020000
613
614 011050 000000
615 011052 000000
616 011054 000000
617 011056 000000
618 011060 000000
619
620 011062 000000
621 011064 000000
622 011066 000000
623 011070 000000
624
625 011072 177560
626 011074 177562
627 011076 177564
628 011100 177566
629
630 000001

```

```

;.....
; DC11 INTERFACE SERVICE PARAMS
;.....
          =11000
DC11:    ,ASCIZ  /DC /
BA:      174000
RIV:     300
PRIOR:   240
PARAM1:  1
PARAM2:  0
PARAM3:  177777
IPDA:    ,WORD  0
IXDA:    ,WORD  0
SETTLE:  ,WORD  0
          ,WORD  0
B2016:   ,WORD  0
TIME:    ,WORD  0
          ,WORD  0
          ,WORD  START
TX,TERM: ,BYTE  000
RX,TERM: ,BYTE  001
FLAG:    ,WORD  0
SWR:     177570
DISPLAY: 177570

;.....
; CONSTANTS + WORKING STORAGE
;.....
STAT=0
XFLG=100000
RFLG=40000
DSFLG=20000
BIT13=20000

;XMIT COMPLETE FLAG
;RCV COMPLETE FLAG
;DATA SET STATUS CHANGE FLAG
;INHIBIT PRINTOUTS

SXCBS:  0
SRCBS:  0
EPCBS:  0
EPDBR:  0
DSSTAT: 0

;SAVED XMIT CSR
;SAVED RCV CSR
;RCV CSR SAVED ON ERROR
;RCV DATA RFG SAVED ON ERROR
;RCV CSR SAVED ON DS CHANGE

XCC:    0
RCC:    0
RDA:    0
XDA:    0

TKB:    177562
TPB:    177564
FULL.DUPLEX=000001

```

```

631
632
633
634 011102 000200
635 011104 017700 177734
636 011110 042700 177400
637 011114 013702 011006
638 011120 012722 013660
639 011124 013722 011010
640 011130 012722 013540
641 011134 013722 011010
642 011140 013704 011004
643 011144 013714 011012
644 011150 013702 011014
645 011154 042702 000001
646 011160 010264 000004
647
648
649
650
651
652
653
654 011164 005037 011032
655 011170 005037 013054
656 011174 005037 013060
657 011200 032702 000001
658 011204 001402
659 011206 000137 011362
660 011212 032700 000002
661 011216 001402
662 011220 000137 011254
663 011224 032700 000010
664 011230 001402
665 011232 000137 011460
666 011236 032700 000004
667 011242 001402
668 011244 000137 011710
669 011250 000000
670 011252 000776
671
672
673
674
675
676
677
678
679
680
681
682
683
684
685 011254 104416
686 011256 004737 013376
  
```

```

;.....
; DC11-X INTERFACE SERVICE ROUTINE
;.....
START: NOP
      MOV     0500, R0      ;SETUP MODE IN R0
      BIC     0177400, R0   ;STRIP JUNK
      MOV     R1V, R2      ;SETUP
      MOV     0R1SR, (R2)+ ;INTERRUPT
      MOV     PRIOR, (R2)+ ;VECTORS
      MOV     0X1SR, (R2)+ ;
      MOV     PRIOR, (R2)+ ;
      MOV     BA, R4       ;SETUP BUS ADDR INDEX
      MOV     PARAM1, 0RCSR ;SETUP VARIABLES
      MOV     PARAM2, R2   ;
      BIC     00001, R2    ;
      MOV     R2, XCSR(R4); IN CSR'S
  
```

```

;.....
; ROUTINE USED TO GOTO
; SUBROUTINE DEPENDENT
; ON MODE SELECTED.
;.....
  
```

```

GO:   CLR     TIME
      CLR     DELAY
      CLR     STOP
      BIT     0000, MODE
      BEQ    18
      JMP    0000
18:   BIT     0001, MODE
      BEQ    28
      JMP    0001
28:   BIT     0100, MODE
      BEQ    38
      JMP    0100
38:   BIT     0100, MODE
      BEQ    48
      JMP    0100
48:   HALT
      BR     -2
  
```

```

;.....
; ROUTINE USED IF "ONE WAY IN" MODE WAS SELECTED.
; NOTE THAT WHEN IN THIS MODE HALF DUPLEX IS THE
; ONLY MODE AVAILABLE.
; "ONE WAY IN" MEANS THAT ONLY THE RECEIVER IS
; ENABLED. THE TRANSMITTER IS NEVER "TURNED ON".
;.....
  
```

```

0001:  KBDIN
      JSR   PC, STARTR
  
```

```

607 011262 032700 040000      101  BIT      0RFLG,STAT
608 011266 001013              BNE      20
609 011270 023727 011032 000100  CMP      TIME,#100
690 011276 103771              BLO      10
691 011300 011402              MOV      0PCSR,R2
692 011302 016403 000004              MOV      XCSR(R4),R3
693 011306 104001              HLT      1
694 011310 005037 011032              CLR      TIME
695 011314 000762              BR       10
696
697 011316 032777 000200 177520 201  BIT      0NODAT,#SWR
698 011324 001002              BNE      30
699 011326 004737 012300              JSR      PC,TESTD
700 011332 042700 040000      301  BIC      0RFLG,STAT
701 011336 032777 000020 177500  BIT      0LOOP,#SWR
702 011344 001405              BEQ      40
703 011346 012737 011360 013056  MOV      040,BACK
704 011354 000137 012140              JMP      EOP
705 011360 000735      401  BR       00WI
706
707
708
709
710
711
712
713
714
715
716 011362 104416      00WI:  KBDIN
717 011364 004737 013062              JSR      PC,STARTX
718 011370 005037 011032              CLR      TIME
719 011374 032700 100000      101  BIT      0XFLG,STAT
720 011400 001013              BNE      20
721 011402 023727 011032 000100  CMP      TIME,#100
722 011410 103771              BLO      10
723 011412 011402              MOV      0PCSR,R2
724 011414 016403 000004              MOV      XCSR(R4),R3
725 011420 104001              HLT      1
726 011422 005037 011032              CLR      TIME
727 011426 000762              BR       10
728 011430 042700 100000      201  BIC      0XFLG,STAT
729 011434 032777 000020 177402  BIT      0LOOP,#SWR
730 011442 001405              BEQ      30
731 011444 012737 011456 013056  MOV      030,BACK
732 011452 000137 012140              JMP      EOP
733 011456 000741      301  BR       00WI
734
735
736

```

```

;.....
; ROUTINE USED IF "ONE WAY OUT" WAS SELECTED.
; NOTE THAT WHEN IN THIS MODE HALF DUPLEX IS THE ONLY
; MODE AVAILABLE.
; "ONE WAY OUT" MEANS THAT ONLY THE TRANSMITTER IS
; ENABLED. THE RECEIVER IS NEVER "TURNED ON."
;.....

```



```

737 ;.....
738 ; ROUTINE USED IF INTERNAL LOOP BACK" WAS SELECTED.
739 ; NOTE THAT WHEN IN THIS MODE; HALF DUPLEX IS THE
740 ; ONLY MODE AVAILABLE.
741 ; "INTERNAL LOOP BACK" MEANS THAT THE RECIVER IS "TURNED ON"
742 ; AND A COMPLETE MESSAGE IS RECEIVED. IF DATA IS TO BE CHECKED
743 ; IT IS; IF "END PASS" IS DESIRED; IT IS GIVEN.
744 ; THEN THE TRANSMITTER IS ENARLED, AFTER THE WHOLE MESSAGE
745 ; IS TRANSMITTED; THE CYCLE IS REPETED AS ABOVE.
746 ;.....
747
748 011460 104416 8ILB: KBDIN
749 011462 004737 013376 JSR PC,STARTR
750 011466 005037 011032 CLR TIME
751 011472 032700 040000 10: BIT 0RFLG,STAT
752 011476 001013 BNE 20
753 011500 023727 011032 000100 CMP TIME,0100
754 011506 103771 BLO 10
755 011510 011402 MOV 0RCSR,R2
756 011512 016403 000004 MOV XCSP(R4),R3
757 011516 104001 HLT 1
758 011520 005037 011032 CLR TIME
759 011524 000762 BR 10
760 011526 032777 000200 177310 20: BIT 0NODAT,0SWR
761 011534 001002 BNE 30
762 011536 004737 012300 JSR PC,TESTD
763 011542 042700 040000 30: BIC 0RFLG,STAT
764 011546 032777 000020 177270 BIT 0LOOP,0SWR
765 011554 001405 BEQ 40
766 011556 012737 011570 013056 MOV 040,BACK
767 011564 000137 012140 JMP EOP
768 011570 032777 000400 177246 40: BIT 0400, 0SWR ;USE EXTERNAL DATA?
769 011576 001416 BEQ 70 ;BR IF NO
770 011600 013702 011020 MOV IRDA, R2 ;SET POINTER
771 011604 013703 011022 MOV IXDA, R3 ;SET POINTER
772 011610 010337 011070 MOV R3, XDA ;SETUP XMIT DATA ADDR
773 011614 112223 MOVVB (R2)+, (R3)+ ;MOVE INPUT TO OUTPUT
774 011616 001376 BNE -2 ;LOOP IF NOT ZERO CHAR
775 011620 112743 000177 MOVVB 0177, -(R3) ;INSERT A FILL CHAR
776 011624 005203 INC R3 ;BUMP ADDRESS
777 011626 112723 000177 MOVVB 0177, (R3)+ ;INSERT ANOTHER FILL
778 011632 105023 CLRR (R3)+ ;INSEPT ZERO CHAR
779 011634 005037 011032 70: CLR TIME
780 011640 004737 013062 JSR PC,STARTX
781 011644 032700 100000 50: BIT 0XFLG,STAT
782 011650 001013 BNE 60
783 011652 023727 011032 000100 CMP TIME,0100
784 011660 103771 BLO 50
785 011662 011402 MOV 0RCSR,R2
786 011664 016403 000004 MOV XCSP(R4),R3
787 011670 104001 HLT 1
788 011672 005037 011032 CLR TIME
789 011676 000762 BR 50
790 011700 042700 100000 60: BIC 0XFLG,STAT
791 011704 000137 011460 JMP 8ILB
  
```

```

792 ;.....
793 ; ROUTINE USED IF "EXTERNAL LOOP BACK" WAS SELECTED,
794 ; EITHER HALF OR FULL DUPLEX MAY BE SELECTED IN THIS MODE,
795 ; "EXTERNAL LOOP BACK" MEANS THAT THE TRANSMITTER IS FIRST
796 ; TURNED ON (IF HALF DUPLEX) AND THE WHOLE MESSAGE IS TRANSMITTED;
797 ; THEN THE RECEIVER IS ENABLED. AFTER THE WHOLE MESSAGE IS RECEIVED
798 ; DATA WILL THEN BE CHECKED IF DESIRED AND END PASS WILL
799 ; BE GIVEN IF DESIRED. THEN THE CYCLE IS REPEATED
800 ; AS ABOVE. IF RUNNING IN FULL DUPLEX THE PROGRAM
801 ; WAITS FOR BOTH THE RECEIVER AND TRANSMITTER TO
802 ; FINISH THEN RESTARTS THE RECEIVER AND TRANSMITTER.
803 ;.....
804
805 011710 104416 8XLB: KBDIN
806 011712 032737 000001 011014 BIT 0FULL,DUPLEX,PARAM2
807 011720 001402 BEQ 10
808 011722 004737 013376 JSR PC,STARTR
809 011726 004737 013062 10: JSR PC,STARTX
810 011732 005037 011032 CLR TIME
811 011736 032700 100000 20: BIT 0XFLG,STAT
812 011742 001016 BNE 30
813 011744 032700 040000 70: BIT 0RFLG,STAT
814 011750 001024 BNE 40
815 011752 023727 011032 000100 CMP TIME,0100
816 011760 103766 BLO 20
817 011762 011402 MOV 0PCSR,R2
818 011764 016403 000004 MOV XCSR(R4),R3
819 011770 104001 HLT 1
820 011772 005037 011032 CLR TIME
821 011776 000757 BR 20
822 012000 032737 000001 011014 30: BIT 0FULL,DUPLEX,PARAM2
823 012006 001356 BNE 70
824 012010 042700 100000 BIC 0XFLG,STAT
825 012014 004737 013376 JSR PC,STARTR
826 012020 000746 BR 20
827 012022 032737 000001 011014 40: BIT 0FULL,DUPLEX,PARAM2
828 012030 001420 BEQ 80
829 012032 032700 100000 BIT 0XFLG,STAT
830 012036 001013 BNE 60
831 012040 023727 011032 000100 CMP TIME,0100
832 012046 103765 BLO 40
833 012050 011402 MOV 0PCSR,R2
834 012052 016403 000004 MOV XCSR(R4),R3
835 012056 104001 HLT 1
836 012060 005037 011032 CLR TIME
837 012064 000756 BR 40
838 012066 042700 100000 60: BIC 0XFLG,STAT
839 012072 042700 040000 00: BIC 0RFLG,STAT
840 012076 005037 011032 CLR TIME
841 012102 032777 000200 176734 BIT 0NODAT,0SWR
842 012110 001002 BNE 50
843 012112 004737 012300 JSR PC,TESTD
844 012116 032777 000020 176720 50: BIT 0LOOP,0SWR
845 012124 001671 BEQ 0XLB
846 012126 012737 011710 013056 MOV 00XLB,BACK
847 012134 000137 012140 JMP EOP
  
```

DL

T2

```

048 ;*****
049 ; ROUTINE TO RETURN
050 ; TO MONITOR FOR
051 ; END PASS.
052 ;*****
053
054 EOP:
055 012140 104414 000340 STPS,PRTY7 ;SET PS PRIORITY TO 7
056 012144 016437 000004 012276 MOV XCSR(R4),OTPIE ;SAVE TX CSP
057 012152 042737 177677 012276 RIC *C<TIE>,OTPIE ;CLEAR ALL BUT TX IE.
058 012160 042764 000100 000004 BIC *TIE,XCSR(R4) ;CLEAR TX IE (EVEN IF IT WASN'T SET)
059 012166 012766 012226 000002 MOV *ENTER,2(SP) ;SET FOR RETURN IF SW 14=1
060 012174 010037 013040 MOV R0,SAVR0 ;SAVE REGISTER 0
061 012200 010137 013042 MOV R1,SAVR1 ;SAVE REGISTER 1
062 012204 010237 013044 MOV R2,SAVR2 ;SAVE REGISTER 2
063 012210 010337 013046 MOV R3,SAVR3 ;SAVE REGISTER 3
064 012214 010437 013050 MOV R4,SAVR4 ;SAVE REGISTER 4
065 012220 010537 013052 MOV R5,SAVR5 ;SAVE REGISTER 5
066 012224 000207 RTS PC ;RETURN TO CONTROL PROGRAM
067
068 ENTER:
069 012226 013700 013040 MOV SAVR0,R0 ;RESTORE R0
070 012232 013701 013042 MOV SAVR1,R1 ;RESTORE R1
071 012236 013702 013044 MOV SAVR2,R2 ;RESTORE R2
072 012242 013703 013046 MOV SAVR3,R3 ;RESTORE R3
073 012246 013704 013050 MOV SAVR4,R4 ;RESTORE R4
074 012252 013705 013052 MOV SAVR5,R5 ;RESTORE R5
075 012256 012737 177777 013054 MOV #1,DELAY
076 012264 053764 012276 000004 BIS OTPIE,XCSR(R4) ;IF ORGINALLY SET; SET TX IE
077 012272 000177 000560 JMP *BACK
078 012276 000000 OTPIE: 000000
079
080
081
082 ;*****
083 ; SUBROUTINE TO CHECK
084 ; RECEIVER DATA.
085 ;*****
086 012300 013746 011056 TESTD: MOV ERDBR, -(SP) ;WAS THERE A RECEIVE ERROR?
087 012304 001413 BEQ TSTDAT ;BR IF NO
088 012306 032777 020000 176530 BIT *BIT13,*SWR ;INHIBIT PRINTOUTS?
089 012314 001007 BNE TSTDAT ;BR IF YES
090 012316 104400 012500 TYPE ,MSG0 ;<15><12>THERE WAS A RECEIVE ERROR, RBUF=
091 012322 004077 176502 JSR R0,*B2016 ;PRINT CONTENTS OF RBUF
092 012326 005746 TST -(SP)
093 012330 104400 012561 TYPE ,MSG1 ;<15><12>
094 012334 013701 011022 TSTDAT: MOV IXDA, R1 ;SETUP XMIT DATA ADDR
095 012340 013702 011020 MOV IRDA, R2 ;SETUP RCV DATA ADDR
096 012344 122122 SCAN4: CMPB (R1)+, (R2)+ ;DATA OK ?
097 012346 001776 BEQ SCAN4 ;BR IF OK
098 012350 123741 011040 CMPB TX,TERM,-(R1) ;IS IT END OF DATA
099 012354 001447 BEQ TESTDX ;BR IF YES
100 012356 122742 000002 CMPB *002,-(R2)
101 012362 001005 BNE Z8
102 012364 010237 012372 MOV R2,18
103 012370 104400 TYPE

```

```

904 012372 000000                    18:    .WORD    0
905 012374 000437                    BR        TESTDX
906 012376                            28:
907 012376 105712                    TSTB     (R2)            I
908 012400 001435                    BEQ      TESTDX        ;BR IF YES
909 012402 122721 000177            CMPB     0177,    (R1)+    ;IS IT FILL CHAR?
910 012406 001756                    BEQ      SCAN4        ;BR IF YES
911 012410 005301                    DEC      R1             ;BACKUP
912 012412 122722 000177            CMPB     0177,    (R2)+    ;IS IT FILL?
913 012416 001752                    BEQ      SCAN4        ;BR IF YES
914 012420 000240                    SCANS:  NOP            ;DATA ERROR
915 012422 032777 020000 176414      BIT      0BIT13,08WR    ;INHIBIT PRINTOUTS
916 012430 001016                    BNE      DERP        ;BR IF YES
917 012432 104400 012564            TYPE     ,MSG2           ;<15><12>RECEIVED DATA = <15><12>
918 012436 013737 011020 012446      MOV      IPDA,    RDAX       ;SETUP DATA ADDRESS
919 012444 104400                    TYPE                   ;PRINT RECEIVED DATA
920 012446 000000                    PDAX:    0                    ;RECEIVED DATA ADDR.
921 012450 104400 012611            TYPE     ,MSG3           ;<15><12>DATA SHOULD BE<15><12>
922 012454 013737 011022 012464      MOV      IXDA,    .+10       ;SETUP ADDR.
923 012462 104400                    TYPE                   ;PRINT GOOD DATA
924 012464 011022                    IXDA                   ;
925 012466 111103                    DERR:    MOVB     (R1),R3 ;SETUP XMIT DATA
926 012470 114202                    MOVB     -(R2),R2       ;SETUP RCV DATA
927 012472 104007                    HLT+7                ;DATA ERROR HALT
928 012474 005726                    TESTDX: TST      (SP)+       ;POP STACK
929 012476 000207                    RTS      PC            ;RETURN FROM SUB/ROUT
930
931 012500 005015 044124 051105 MSG0:    .ASCIZ   <15><12>/THERE WAS A RECEIVER ERROR, REGISTER (SEL 2) =/
(1) 012561        015 000012 MSG1:    .ASCIZ   <15><12>
(1) 012564 005015 042522 042503 MSG2:    .ASCIZ   <15><12>/RECEIVED DATA = /<15><12>
(1) 012611        015 042012 052101 MSG3:    .ASCIZ   <15><12>/DATA SHOULD BE/<15><12>
(1) 012634 005015 046120 040505 MSG4:    .ASCIZ   <15><12>/PLEASE MAKE CONNECTION (DIAL NUMBER),/
(1) 012703        015 053412 042510        .ASCIZ   <15><12>/WHEN CONNECTION COMPLETE, HIT CONTINUE SWITCH,/<15><12>
(1) 012766 005015 046120 040505 MSG5:    .ASCIZ   <15><12>/PLEASE MAKE CONNECTION (DIAL NUMBER),/<15><12>
(1)
(1) 013040 000000                    .EVEN
932 013042 000000                    SAVR0:   0
933 013044 000000                    SAVR1:   0
934 013046 000000                    SAVR2:   0
935 013050 000000                    SAVR3:   0
936 013052 000000                    SAVR4:   0
937 013054 000000                    SAVR5:   0
938 013056 000000                    DELAY:   0
939 013060 000000                    BACK:    0
940                                    STOP:    0
  
```