

DC11

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

EP-DZDCO-C-DL

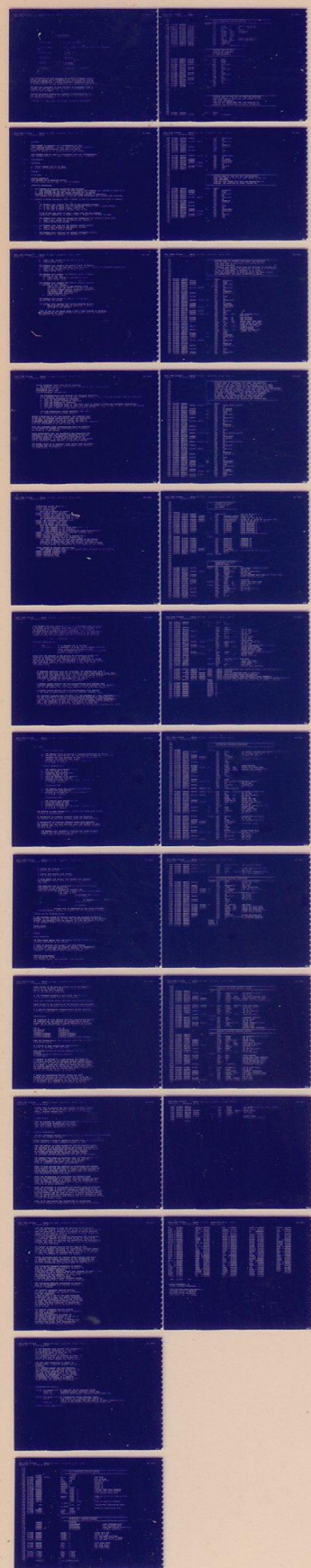
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IDENTIFICATION

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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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 INTERPROCESSOR 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 PARAMETERS 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 DMB.

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 DM11BB.

- 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 ISR.(SEE SECT. 10.0 IN OVERLAY LISTING FOR PARAMETER 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 ISR.
- 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 ISR
SWR13=SETUP DN-11 ISR
SWR=000000=SETUP VARIABLE ISR
 2. THE FOLLOWING HALTS ARE REPEATED FOR EACH ISR SPECIFIED.
SETUP SEQUENCE IS: DN11,DM11-BB THEN VARIABLE OVERLAY. (EACH ENTRY SET SWICHES 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 DMBB PARAMETERS ARE DISCUSSED IN SECT. 10.0 OF THE MONITOR.
 - F. GO BACK TO STEP A IF THIS SETUP WAS FOR DN OR DMB.
 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 PROCEEDURES 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).

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D. OPERATIONAL SWITCH SETTINGS.

SW15=1 HALT ON ERROR

SW14=1 SINGLE PASS

SW14 HAS NO EFFECT IF SW04=0

SW13=1 INHIBIT ERROR TYPEOUTS

SW12=1 INHIBIT ALL TYPEOUTS EXCEPT ERRORS

IF SW12=0 AND SW04=1 END PASS IS TYPED

AND TRANSMITTED/RECEIVED DATA IS TYPED.

SW11=1 USE PREVIOUSLY SPECIFIED DATA

SW10=1 DATA SELECT (WITH SW09)

SW09=1 DATA SELECT (WITH SW10)

00=1 GET DATA FROM OPERATOR

01=1 TEST MESSAGE 01 (8A QUICK BROWN FOX)

10=1 TEST MESSAGE 02 (8B NUMERICS)

11=1 TEST MESSAGE 03 (8C COMTEST/QUICK BROWN FOX/NUMERICS)

SW08=1 TRANSMIT RECEIVED DATA (INTERNAL LOOPBACK MODE)

SW07=1 DO NOT TEST RECEIVED DATA

SW06=1 MONITOR TRANSMITTED DATA ON CONSOLE TTY.*

SW05=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.

SW04=1 RETURN TO MONITOR FOR END PASS

WHEN SW04=0 PROGRAM LOOPS IN THE OVERLAY NEVER RETURNING TO THE MONITOR.

SW03=1 INTERNAL LOOPBACK MODE

SW02=1 EXTERNAL LOOPBACK MODE

SW01=1 ONE-WAY-IN MODE

SW00=1 ONE-WAY-OUT MODE

ELC

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 NEW=

POSSIBLE RESPONSES ARE:

1. <CR> IF NO CHANGES ARE TO BE MADE
2. 6 DIGITS 0-7 TO REPRESENT IN OCTAL THE NEW 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.

TEST MODES

INTERNAL LOOPBACK MODE

1. THE OVERLAY WAITS TO RECEIVE A MESSAGE (TERMINATED BY <001>)
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.

RECEIVED DATA=RRRRRR
DATA SHOULD BE TTTTTT
DATA COMPARE ERROR; BAD DATA=BBB GOOD DATA=GGG

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.

7.0

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 ASYNCRONOUS 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 ERROR 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 0. 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 STARTX:
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 XISRi, 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 XISRi, 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
- K1

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 RISR, THE
CSR AND DBR WILL BE SAVED AND PRINTED OUT
AFTER THE COMPLETE MESSAGE HAS BEEN RECEIVED.

9.10 THE DATA TEST SUBROUTINE AT TESTD: 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      011000
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
;.....
DC11:  ,=11000
BA:    ,ASCIZ  /DC /
RIV:   ,174000
PRIOR: ,300
PARAM1: 1
PARAM2: 0
PARAM3: 177777
IRDA:   ,WORD  0
IXDA:   ,WORD  0
SETTLE: ,WORD  0
B2016:  ,WORD  0
TIME:   ,WORD  0
TX,TERM: ,WORD  START
RX,TERM: ,WORD  000
FLAG:   ,WORD  001
SWR:    ,177570
DISPLAY:177570

;.....
;      CONSTANTS + WORKING STORAGE
;.....
STAT=R0
XFLG=100000
RFLG=40000
DSFLG=20000
BIT13=20000

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

SXCSR: 0
SRCR: 0
EPCSR: 0
EPDBR: 0
DSSTAT: 0

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

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

;XMIT CHAR COUNT
;RCV CHAR COUNT
;RCV DATA ADDR.
;XMIT DATA ADDR.

TKS: 177560
TKB: 177562
TPS: 177564
TPB: 177566

FULL,DUPLEX=000001

```

631
 632
 633
 634 011102 000240
 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

```

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

647
 648
 649
 650
 651
 652
 653
 654 011164 005037 011032
 655 011170 005037 013054
 656 011174 005037 013060
 657 011200 032700 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

```

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

```

GO:     CLR     TIME
        CLR     DELAY
        CLR     STOP
        BIT     0OWO, MODE
        BEQ     18
        JMP     0OWO
18:     BIT     0OWI, MODE
        BEQ     28
        JMP     0OWI
28:     BIT     0ILB, MODE
        BEQ     38
        JMP     0ILB
38:     BIT     0XLB, MODE
        BEQ     48
        JMP     0XLB
48:     HALT
        BR      -2
  
```

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 682
 683
 684
 685 011254 104416
 686 011256 004737 013376

```

;.....
;      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".
;.....
  
```

```

0OWI:   KBDIN
        JSR    PC, STARTR
  
```

687	011262	032700	040000		18:	BIT	0RFLG,STAT
688	011266	001013				BNE	28
689	011270	023727	011032	000100		CMP	TIME,0100
690	011276	103771				BLO	18
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	18

696							
697	011316	032777	000200	177520	28:	BIT	0NODAT,0SWR
698	011324	001002				BNE	38
699	011326	004737	012300			JSR	PC,TESTD
700	011332	042700	040000		38:	BIC	0RFLG,STAT
701	011336	032777	000020	177500		BIT	0LOOP,0SWR
702	011344	001405				BEG	48
703	011346	012737	011360	013056		MOV	048,BACK
704	011354	000137	012140			JMP	EOP
705	011360	000735			48:	BR	0OWI

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715

```

;*****
; 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."
;*****

```

716	011362	104416				8OWO:	KBDIN
717	011364	004737	013062			JSR	PC,STARTX
718	011370	005037	011032			CLR	TIME
719	011374	032700	100000		18:	BIT	0XFLG,STAT
720	011400	001013				BNE	28
721	011402	023727	011032	000100		CMP	TIME,0100
722	011410	103771				BLO	18
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	18
728	011430	042700	100000		28:	BIC	0XFLG,STAT
729	011434	032777	000020	177402		BIT	0LOOP,0SWR
730	011442	001405				BEG	38
731	011444	012737	011456	013056		MOV	038,BACK
732	011452	000137	012140			JMP	EOP
733	011456	000741			38:	BR	8OWO

734

735

736

```

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 RECEIVER 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 ENABLED, AFTER THE WHOLE MESSAGE
745 ; IS TRANSMITTED; THE CYCLE IS REPETED AS ABOVE.
746 ;.....
747
748 011460 104416      6ILB:  KBDIN
749 011462 004737 013376      JSR  PC,STARTR
750 011466 005037 011032      CLR  TIME
751 011472 032700 040000      10:  BIT  @RFLG,STAT
752 011476 001013      BNE  20
753 011500 023727 011032 000100  CMP  TIME,@100
754 011506 103771      BLO  10
755 011510 011402      MOV  @RCSR,R2
756 011512 016403 000004      MOV  XCSR(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  @NODAT,@SWR
761 011534 001002      BNE  30
762 011536 004737 012300      JSR  PC,TESTD
763 011542 042700 040000      30:  BIC  @RFLG,STAT
764 011546 032777 000020 177270  BIT  @LOOP,@SWR
765 011554 001405      BEQ  40
766 011556 012737 011570 013056  MOV  @40,BACK
767 011564 000137 012140      JMP  EOP
768 011570 032777 000400 177246 40:  BIT  @400, @SWR      ;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      MOVB  (R2)+, (R3)+ ;MOVE INPUT TO OUTPUT
774 011616 001376      BNE  -2      ;LOOP IF NOT ZERO CHAR
775 011620 112743 000177      MOVB  @177, -(R3) ;INSERT A FILL CHAR
776 011624 005203      INC  R3      ;BUMP ADDRESS
777 011626 112723 000177      MOVB  @177, (R3)+ ;INSERT ANOTHER FILL
778 011632 105023      CLRB  (R3)+ ;INSERT ZERO CHAR
779 011634 005037 011032      70:  CLR  TIME
780 011640 004737 013062      JSR  PC,STARTX
781 011644 032700 100000      50:  BIT  @XFLG,STAT
782 011650 001013      BNE  60
783 011652 023727 011032 000100  CMP  TIME,@100
784 011660 103771      BLO  50
785 011662 011402      MOV  @RCSR,R2
786 011664 016403 000004      MOV  XCSR(R4),R3
787 011670 104001      HLT  1
788 011672 005037 011032      CLR  TIME
789 011676 000762      BR  50
790 011700 042700 100000      60:  BIC  @XFLG,STAT
791 011704 000137 011460      JMP  6ILB

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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 0RCSR,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 00
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 0RCSR,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
  
```

```

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 CSR
057 012152 042737 177677 012276 BIC 0<C<TIE>,OTPIE ;CLEAR ALL BUT TX IE,
058 012160 042764 000100 000004 BIC 0TIE,XCSR(R4) ;CLEAR TX IE (EVEN IF IT WASN'T SET)
059 012166 012766 012226 000002 MOV 0ENTER,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 0-1,DELAY
076 012264 053764 012276 000004 BIS OTPIE,XCSR(R4) ;IF ORIGINALLY SET; SET TX IE
077 012272 000177 000560 JMP 0BACK
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 0BIT13,0SWR ;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 R0,0B2016 ;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 0002,-(R2)
101 012362 001005 BNE 28
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)	
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			SCAN5:	NOP		;DATA ERROR
915	012422	032777	020000	176414		BIT	0BIT13,0SWR	;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			RDAX:	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)					.EVEN			
(1)	013040	000000			SAVR0:	0		
932	013042	000000			SAVR1:	0		
933	013044	000000			SAVR2:	0		
934	013046	000000			SAVR3:	0		
935	013050	000000			SAVR4:	0		
936	013052	000000			SAVR5:	0		
937	013054	000000			DELAY:	0		
938	013056	000000			BACK:	0		
939	013060	000000			STOP:	0		
940								