

PDP11

INTER TEST PROGRAM
MD-11-DZITA-D

EP DZITA D DL B
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The microfiche card contains a grid of frames. The leftmost column contains text labels for various test parameters. The subsequent columns contain data tables and diagrams. The data tables are organized as follows:

Parameter	Value 1	Value 2	Value 3	Value 4
TEST 1	100	200	300	400
TEST 2	150	250	350	450
TEST 3	200	300	400	500
TEST 4	250	350	450	550
TEST 5	300	400	500	600
TEST 6	350	450	550	650
TEST 7	400	500	600	700
TEST 8	450	550	650	750
TEST 9	500	600	700	800
TEST 10	550	650	750	850

The diagrams include waveforms and circuit-like representations. The right side of the card is mostly blank, with some faint markings and a small vertical label at the bottom right corner.

IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZITA-D-D
PRODUCT NAME: INTERPROCESSOR TEST PROGRAM (ITEP)
PROGRAM DATE: JANUARY 1977
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.

2.0 REQUIREMENTS.

2.1 EQUIPMENT

A. PDP-11 SYSTEM WITH AT LEAST 4K OF CORE.

2.2 STORAGE.

4K OF CORE

3.0 LOADING PROCEDURE

THIS PROGRAM AND ALL OVERLAYS ARE ASSEMBLED IN ABSOLUTE FORMATS. THE ABS LOADER IS USED TO LOAD THE PROGRAM AND OVERLAYS.

LOAD THE ITEP PROGRAM AND THE APPROPRIATE OVERLAY FOR THE TYPE OF INTERFACE YOU WISH TO TEST.

4.0 OPERATING PROCEDURES.

IF RUNNING ITEP ON AN LSI-11 ENVIRONMENT :

1. IF THE LINE CLOCK IS TO BE USED IT SHOULD BE ENABLED PRIOR TO PROGRAM EXECUTION.

- 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)

DN11 AND DM11BB PARAMETERS ARE DISCUSSED IN SECT. 10.0 OF THIS LISTING.

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 OVERLAY. (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 OVERLAY.
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 DM11BB.
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=1 SETUP DM-11BB ISR
SWR13=1 SETUP DN-11 ISR
SWR=000000=SETUP VARIABLE ISR (OVERLAY) (NOT DN-11 OR DM11BB)
SET APPROPRIATE SWITCHES AND HIT CONTINUE.
 2. THE FOLLOWING HALTS ARE REPEATED FOR EACH ISR SPECIFIED.
SETUP SEQUENCE IS: DN11, DM11-BB THEN VARIABLE ISR. (FOR EACH ENTRY SET SWITCHES AND THEN HIT CONT.)
 - A. HALT FOR BUS ADDRESS OF INTERFACE
 - B. HALT FOR VECTOR ADDRESS OF INTERFACE
 - C. HALT FOR PRIORITY OF INTERFACE (200=PRIO 4, 240=PRIO 5, 300=PRIO 6, ETC.)
 - 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 THIS LISTING)
 - 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

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.

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 #1 (\$A QUICK BROWN FOX)
10=1 TEST MESSAGE #2 (\$B NUMERICS)
11=1 TEST MESSAGE #3 (\$C 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

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 #3.

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 (SW8=0) OR
TRANSMIT THE RECEIVED DATA (SW8=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.

F. IF SW04=0 THE OVERLAY WILL CONTINUE TO TRANSMIT/RECEIVE DATA.

IF SW04=1 THE OVERLAY WILL RETURN TO THE MONITOR AND TYPE "END PASS".

IF BOTH SW04=1 AND SW14=1, THE PROGRAM WILL REQUEST NEW INTERFACE PARAMS AFTER ONE PASS OF THE SELECTED TEST MODE.

TEST EXECUTION MAY BE INTERRUPTED BY TYPING THE FOLLOWING CHARACTERS ON THE CONSOLE TTY.

LINE FEED = RESTART PROGRAM AT LOCATION 200.

QUESTION MARK = PRINTOUT FIRST 8 WORDS OF INPUT BUFFER. (ASCII)

THEN TYPE EITHER:

*WXXXXXX TO PRINTOUT THE 8 WORDS AT LOC XXXXXX.

*BXXXXXX TO PRINTOUT THE 16 BYTES AFTER LOC XXXXXX.

*C TO CONTINUE

PROGRAM MUST BE RESTARTED AT 200 AFTER PRINTING.

CARRIAGE RETURN = RESTART AT REQUEST FOR NEW OPERATIONAL SWITCHES.

5.0 PROGRAM AND/OR OPERATOR ACTION

IF THE OPERATOR WISHES TO MANUALLY EXAMINE THE TRANSMIT OR RECEIVE BUFFERS, DO THE FOLLOWING: TO FIND THE STARTING ADDRESS OF THE RECEIVE BUFFER, LOAD ADDRESS 11020 AND EXAMINE. TO FIND THE STARTING ADDRESS OF THE TRANSMIT BUFFER, LOAD ADDRESS 11022 AND EXAMINE.

5.1 NORMAL HALTS SEE SECTION 4.

6.0 ERRORS

6.1 ERROR REPORTING

THE ONLY ERROR REPORT FROM THE CONTROL PROGRAM OCCURS IF THE INTERFACE SPECIFIED IS NOT LOADED.

THE ERROR REPORTS FROM THE VARIOUS INTERFACE SERVICE ROUTINES ARE AS DEFINED IN THEIR DOCUMENTS

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:

NOTE: ONLY ONE MODE MAY BE SELECTED AT A TIME.

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 RESTRICTIONS 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

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

THE INTERPROCESSOR TEST PROGRAM (ITP) PROVIDES THE LINKAGE BETWEEN THE OPERATOR AND THE VARIOUS INTERFACE SERVICE ROUTINES (OVERLAY) WHICH PERFORM THE ACTUAL DATA MOVEMENT AND VERIFICATION TO AND FROM THE COMMUNICATION LINK. IN ADDITION, ITP CONTAINS VARIOUS INTERRUPT AND SUB ROUTINES WHICH ARE USED BY THE OVERLAY'S.

9.1 TRAP CATCHER

THIS IS A SERIES OF JUMP AND HALT INSTRUCTIONS PLACED IN ALL UNUSED VECTORS TO CATCH UNEXPECTED INTERRUPTS.

9.2 SWITCH REGISTER INPUT ROUTINE (MANIN:)

THIS ROUTINE IS ENTERED ONLY WHEN SWITCH 15 IS SET WHEN PROGRAM IS STARTED AT LOCATION 200. IT ACCEPTS PARAMETERS FOR THE ISR'S FROM THE CONSOLE SWITCHES AT A SERIES OF HALTS. AS SPECIFIED IN OPERATING INSTRUCTIONS.

9.3 PARAMETER INPUT ROUTINE (GETIT:)

THIS ROUTINE SOLICITS PARAMETERS FROM THE OPERATOR ON THE CONSOLE DEVICE AND PLACES THEM IN THE SPECIFIED ISR'S PARAMETER TABLE.
NOT USED OPTIONAL PARAMETER WORDS ARE INDICATED BY THE PRESENCE OF A NEGATIVE VALUE IN THE ISR'S TABLE. THIS SECTION OF CODE UTILIZES SUB/ROUTINE 'GETANY' WHICH PRINTS OUT THE WORD POINTED TO BY THE ADDRESS IN REGISTER 0.
IT THEN INPUTS A WORD OR CARRIAGE RETURN FROM THE OPERATOR. IF ONLY A CARRIAGE RETURN IS TYPED, THE PARAMETER IS LEFT AS IT IS, OTHERWISE IT IS REPLACED BY THE OPERATORS TYPE IN AND THE POINTER IN REGISTER 0 IS INCREMENTED TO THE NEXT WORD.

9.4 TTY INTERRUPT (TTYINT:)

THE TTY INTERRUPT IS USED TO INTERRUPT THE EXECUTION OF A TEST IN ORDER TO RESTART (TYPE A LINE FEED) OR TO SPECIFY NEW OPERATIONAL SWITCHES (TYPE A CARRIAGE RETURN)

9.5 SET SWITCH OPTIONS (SWRSET:)

THE PROGRAM WILL HALT (MANUAL PARAMETER ENTRY) OR WAIT FOR A CARRIAGE RETURN (TTY CONTROL) AT THIS POINT TO PERMIT THE OPERATOR TO SETUP THE OPERATIONAL SWITCH SETTINGS. THE TEST MODE(SW00-SW03) AND TEST DATA(SW09-SW11) MAY BE CHANGED ONLY AT THIS POINT. ALL OTHER SWITCHES MAY BE CHANGED WHILE A TEST IS RUNNING. IF NEW VARIABLE DATA IS SPECIFIED, THIS ROUTINE WILL REQUEST THAT THE DATA BE ENTERED AND UTILIZES THE 'GETSTR' SUB/ROUTINE TO INPUT THE DATA FROM THE OPERATOR.

9.6 SETUP TIMER (SUTIME:)

THE PROGRAM LOOKS FOR AND UTILIZES EITHER THE LINE CLOCK OR REAL TIME CLOCK IF EITHER IS PRESENT ON THE SYSTEM. A BUS ERROR(NO RESPONSE) IS USED TO INDICATE THE ABSENCE OF A CLOCK. IF NEITHER EXISTS, THE PROGRAM WILL STILL RUN BUT IS SUBJECT TO WAITING IN UNENDING LOOPS.

9.7 THE INTERFACE SERVICE ROUTINES (ISR'S) ARE ENTERED AT THIS POINT.

9.8 END OF PASS (\$EOP:)

THIS SECTION OF CODE WILL PRINT "END OF PASS XXXXXX" AND THEN SENSE FOR SW14. IF SWITCH 14 IS RESET THE OVERLAY'S ARE REENTERED. IF SWITCH 14 IS SET THE PROGRAM CHECKS TO SEE IF IT WAS LOADED BY A MONITOR (LOCATION 42 NOT EQUAL 0) AND IF IT WAS, CONTROL IS RETURNED TO THE MONITOR. OTHERWISE THE PROGRAM REQUESTS NEW PARAMETERS.

9.10 HALT HANDLER (\$HLT:)

THIS ROUTINE IS USED TO SENSE THE OPERATIONAL SWITCHES AND PROVIDE ERROR CONTROL. IT WILL PRINTOUT THE ADDRESS OF THE ERROR HLT IF SWITCH 13 (DELETE ERROR TYPEOUTS) IS DOWN (NOT SET)

- 9.11 READ A CHARACTER ROUTINE (\$READC:)
THIS ROUTINE GETS A CHARACTER FROM THE TTY AND PLACES IT ON THE STACK
- 9.12 READ A STRING ROUTINE (\$READS)
THIS ROUTINE GETS A STRING OF CHARACTERS FROM THE TTY AND PLACES THEM IN A BUFFER SPECIFIED BY THE ADDRESS FOLLOWING THE SUB/ROUTINE CALL.
THE ROUTINE WILL ALSO ACCEPT OCTALLY REPRESENTED CHARACTERS WHEN THEY ARE PRECEDED AND FOLLOWED BY UP ARROWS, AND SPERATED BY SPACES OR COMMAS.
- 9.13 OCTAL INPUT ROUTINE(\$ACCEPT:)
THIS ROUTINE READS AN OCTALLY REPRESENTED WORD FROM THE TTY AND PLACES IT IN THE LOCATION INDICATED BY THE ADDRESS FOLLOWING THE SUB/ROUTINE CALL.
- 9.14 CLOCK INTERRUPT ROUTINE (TIMER:)
THIS ROUTINE IS ENTERED ON INTERUPTS FROM EITHER THE LINE CLOCK OR REAL TIME CLOCK EVERY 16 MILLISECONDS IF EITHER IS PRESENT.
IT WILL INCREMENT LOCATION 'TIME:' IN THE OVERLAY'S PARAMETER TABLE EVERY SECOND.
- 9.15 BINARY TO OCTAL ROUTINE (\$B2O16)
THIS ROUTINE WILL PRINTOUT THE OCTAL REPRESENTATION OF A WORD ON THE STACK.
- 9.16 POWER DOWN ROUTINE (\$PWRDN:)
THIS ROUTINE SAVES THE STATUS OF THE MACHINE WHEN POWER IS LOST.
- 9.17 POWER UP ROUTINE (\$PWRUP:)
THIS ROUTINE RESTORES THE STATE OF THE MACHINE WHEN POWER IS RESTORED AND RESTARTS AT ADDRESS 200.
- 9.18 VARIABLE INTERFACE SERVICE ROUTINE (VISR:)
THESE LOCATIONS ARE RESERVED FOR AND WILL BE OVERLAID BY THE VARIABLE ISR'S.
THE FIRST 2 WORDS CONTAIN A 3 CHARACTER ISR NEMONIC FOLLOWED BY A ZERO CHARACTER.
THE NEXT 3 WORDS CONTAIN THE BUS ADDRESS, VECTOR ADDRESS AND PRIORITY.
THE NEXT 2 WORDS MAY CONTAIN OPTIONAL PARAMETERS. THEY WILL CONTAIN ALL ONES IF THEY ARE NOT REQUIRED
THE NEXT WORD MAY CONTAIN THE ADDRESS OF AN INPUT BUFFER IF THE ISR REQUIRES AN ASCII PARAMETER. IT WILL CONTAIN

ALL ONES IF THE PARAMETER IS NOT REQUIRED.
LOCATION 'CLOCK:' WILL BE INCREMENTED EVERY SECOND WHILE
THE TEST IS BEING RUN IF THERE IS A LINE CLOCK OR REAL TIME CLOCK
ON THE SYSTEM. IT MAY BE USED AS A ELAPSED TIMER BY THE ISR.

10.0 PARAMETERS FOR THE DM11BB AND THE DN11

10.1 DM11BB PARAMETERS

PARAM#1 IS LOADED INTO THE CONTROL AND STATUS REGISTER OF THE DM11BB
TO SELECT THE LINE NUMBER IN OCTAL (BITS 0-3). ALL OTHER BITS MUST BE 0'S.
THIS IS THE ONLY PARAMETER USED BY THE DM11BB.

10.2 DN11 PARAMETERS

ONLY PARAM#3 IS USED BY THE DN11, IT CONTAINS THE NUMBER THE DN WILL DIAL.

NO1

MAINDEC-11-DZITA-D INTERPROCESSOR TEST PROGRAM MACY11 27(1006) 01-DEC-76 11:01 PAGE 13
DZITAD.F11 01-DEC-76 11:00

SEQ 0013

000300
000340

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

000004
000010
000014
000014
000014
000020
000024
000030
000034

000000

000024
000026
000030
000032
000034
000036

PRTY6= 300
PRTY7= 340

: MISCELLANEOUS BIT ASSIGNMENT

BIT15= 100000
BIT14= 40000
BIT13= 20000
BIT12= 10000
BIT11= 4000
BIT10= 2000
BIT09= 1000
BIT08= 400
BIT07= 200
BIT06= 100
BIT05= 40
BIT04= 20
BIT03= 10
BIT02= 4
BIT01= 2
BIT00= 1
.EQUIV BIT09,BIT9
.EQUIV BIT08,BIT8
.EQUIV BIT07,BIT7
.EQUIV BIT06,BIT6
.EQUIV BIT05,BIT5
.EQUIV BIT04,BIT4
.EQUIV BIT03,BIT3
.EQUIV BIT02,BIT2
.EQUIV BIT01,BIT1
.EQUIV BIT00,BIT0

: VECTOR ADDRESSES

ERRVEC= 4
RESVEC= 10
TBITVEC= 14
TRTVEC= 14
BPTVEC= 14
IOTVEC= 20
PWRVEC= 24
EMTVEC= 30
TRAPVEC= 34
.EQUIV R4,CSR
.EQUIV R4,RCSR

: =0
: TRAP CATCHER IN UNUSED LOCATIONS FROM 0 - 776
: LOCATION 0 WILL CATCH IMPROPERLY LOADED VECTORS

: =24
\$PWRDN
340
\$HLT
340
\$TRAP
340

```

647      000100      000100      . = 100
648      000100      006312      TIMER
649      000102      000340      340
650
651      000174      000174      . = 174
652      000174      000000      DISPREG: 0
653      000176      000000      SWREG: 0
654
655      000200      000200      . = 200
656
657      000200      000137      003254      JMP      @#BEGIN      ; JUMP TO STARTING ADDRESS OF PROGRAM
658      000204      000137      004116      JMP      @#SWPRT      ; RESTART AT 204. DO THE RESTART.

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659                                     ;*****
660         001100                       .=1100
661
662                                     ;ROUTINE TO TYPE ASCII MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
663                                     ;THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
664                                     ;NOTE1: NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
665                                     ;NOTE2: $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
666
667                                     ;CALL:
668                                     ;1) USING A TRAP INSTRUCTION
669                                     ;      TYPE      ,MESADR      ;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
670                                     ;OR
671                                     ;      TYPE
672                                     ;      MESADR
673
674 001100 010046 $TYPE: MOV      RD, -(SP)      ;SAVE RD
675 001102 017600 MOV      @2(SP), RD      ;GET ADDRESS OF ASCIZ STRING
676 001106 062766 ADD      #2, 2(SP)      ;ADJUST RETURN PC
677 001114 112046 1$:  MOVB   (RD)+, -(SP)      ;PUSH CHARACTER TO BE TYPED ONTO STACK
678 001116 001003 BNE     2$      ;BR IF IT ISN'T THE TERMINATOR
679 001120 005726 TST     (SP)+      ;IF TERMINATOR POP IT OFF THE STACK
680 001122 012600 MOV      (SP)+, RD      ;RESTORE RD
681 001124 000002 RTI
682 001126 004737 2$:  JSR     PC, 5$      ;RETURN
683 001132 122726 3$:  CMPB   #12, (SP)+      ;GO TYPE THIS CHARACTER
684 001136 001366 BNE     1$      ;CHECK IF THE CHAR. TYPED WAS A LINE FEED
685 001140 013746 4$:  MOV     NULL, -(SP)      ;GO GET NEXT CHAR. IF NOT LINE FEED
686                                     ;GET # OF FILLER CHARS. NEEDED
687 001144 105366 4$:  DECB   1(SP)      ;AND THE NULL CHAR.
688 001150 002770 BLT     3$      ;DOES A NULL NEED TO BE TYPED?
689 001152 004737 5$:  JSR     PC, 5$      ;BR IF NO--GO POP THE NULL OFF OF STACK
690 001156 000772 BR      4$      ;GO TYPE A NULL
691 001160 105777 5$:  TSTB   @TPS      ;LOOP
692 001164 100375 BPL     5$      ;WAIT UNTIL PRINTER IS READY
693 001166 116677 MOVB   2(SP), @TPB      ;LOAD CHAR TO BE TYPED INTO DATA REG.
694 001174 000207 RTS      PC
695

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696 :*****
697 :      DEBUG DUMP ROUTINE
698 :*****
699      001200      . = 1200
700 001200 013746 011042 DMPHLT: MOV     FLAG, -(SP)
701 001204 042737 000070 011042 BIC     #70, FLAG      ; INIT FLAGS
702 001212 104400 001532      TYPE     ,ASTRK      ; TYPE *
703 001216 104402      GETCHR
704 001220 012637 001314      MOV     (SP)+, 6$
705 001224 104400 001314      TYPE     6$
706 001230 122737 000127 001542 CMPB    #127, $CHAR    ; W? FOR WORD
707 001236 001004      BNE     1$
708 001240 052737 000010 011042 BIS     #BIT3, FLAG    ; SET FLAG BIT
709 001246 000430      BR      3$
710 001250 122737 000102 001542 1$:  CMPB    #102, $CHAR    ; B? FOR BYTE
711 001256 001004      BNE     2$
712 001260 052737 000020 011042 BIS     #BIT4, FLAG
713 001266 000420      BR      3$
714 001270 122737 000103 001542 2$:  CMPB    #103, $CHAR    ; C? FOR CONTINUE
715 001276 001014      BNE     3$
716 001300 012637 011042      MOV     (SP)+, FLAG
717 001304 052737 000040 011042 BIS     #BITS, FLAG
718 001312 000413      BR      DUMP
719 001314 000000      6$:  000000
720 001316 104400 001526      4$:  TYPE     ,QUES
721 001322 104400 001536      TYPE     ,CRLF
722 001326 000724      BR      DMPHLT
723 001330 005037 001544      3$:  CLR     WORK
724 001334 005726      TST    (SP)+
725 001336 104406 001544      ACCEPT  ,WORK
726 001342 012700 001476 DUMP:  MOV     #DMPLST, R0    ; INIT DUMP LIST
727 001346 062710 000020      ADD     #20, (R0)     ; BUMP ADDRESS
728 001352 032737 000040 011042 BIT     #BITS, FLAG
729 001360 001005      BNE     L1
730 001362 013737 001544 001476 MOV     WORK, DMPLST
731 001370 001001      BNE     L1
732 001372 022020      CMP     (R0)+, (R0)+ ; SKIP 1ST TWO ENTRIES
733
734 001374 012001      L1:  MOV     (R0)+, R1    ; GET ADDR OF DATA FROM LIST
735 001376 001700      BEQ     DMPHLT      ; BR IF END OF LIST
736 001400 104400 001536      TYPE     ,CRLF
737 001404 010146      MOV     R1, -(SP)    ; PUSH ADDR ON STACK
738 001406 004037 006350      JSR     R0, $B2016  ; PRINT OUT ADDRESS
739
740 001412 032737 000010 011042 BIT     #BIT3, FLAG
741 001420 001014      BNE     L3
742 001422 012702 000020      MOV     #20, R2      ; SET WORD COUNTER = 8
743 001426 005046      L2:  CLR     -(SP)
744 001430 112116      MOVB    (R1)+, (SP)
745 001432 104400 007152      TYPE     ,MSG00
746 001436 004037 006336      JSR     R0, $B200T
747 001442      .BYTE  3
748 001443      .BYTE  1
749 001444 005302      DEC     R2          ; DECREMENT WORD COUNTER
750 001446 001367      BNE     L2          ; BR IF NOT = 0
751 001450 000751      BR      L1          ; GET NEXT ENTRY

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752								
753	001452	012702	000010	L3:	MOV	#10,R2		
754	001456	012146		1\$:	MOV	(R1)+,-(SP)		
755	001460	104400	007152		TYPE	MSG00		
756	001464	004037	006350		JSR	R0,\$B2016		
757	001470	005302			DEC	R2		;DECREMENT THE WORD COUNT
758	001472	001371			BNE	1\$		
759	001474	000737			BR	L1		;GET NEXT ENTRY
760	001476	000000		DMP1ST:	0			;RESERVED FOR SW. REG
761	001500	000000			0			;END OF TABLE FOR SW. REG
762	001502	000001		.RX:	.BLKW	1		
763	001504	000001		.TX:	.BLKW	1		
764	001506	000000			0			
765	001510	000000			0			
766	001512	000000			0			
767	001514	177560		TKS:	177560			;TTY KEYBOARD STATUS REG. ADDRESS
768	001516	177562		TKB:	177562			;TTY KEYBOARD DATA BUFFER REG. ADDRESS
769	001520	177564		TPS:	177564			;TTY PRINTER STATUS REG. ADDRESS
770	001522	177566		TPB:	177566			;TTY PRINTER BUFFER REG. ADDRESS
771	001524	000000		NULL:	.WORD	0		;CONTAINS NULL CHARACTER FOR FILLS

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001526 037440 000040
001532 005015 000052
001536 015
001537 012 000
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001542 000000
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001550 000000
001552 000000
001554 000000
001556 000000
001560 000000
001562 000000
001564 002604
001566 003004
001570 003076
001572 003126
001574 002604
001576 003004
001600 003076
001602 003126
001604 000400
002604
002604 000100
003004 177 177
003006 040444 052040 042510
003076 177 177
003100 041044 030040 031061
003126 003126
003126 177 177
003130 041444 041440 046517
003230 030040 031061 032063
003254
002604
003004
003076
003126

```
*****  
: CONSTANTS AND WORKING STORAGE  
*****  
QUES: .ASCIZ " ? "  
ASTRK: .ASCIZ <15><12>"*"  
CRLF: .ASCII <15>  
LF: .ASCIZ <12>  
 .EVEN  
 $WORK=WORK  
$CHAR: 0  
WORK: 0  
WORK1: 0  
WORK2: 0  
WORK3: 0  
WORK4: 0  
WORK5: 0  
WORK6: 0  
FLAGS: 0  
:DATA PATTERN ADDRESS TABLE AND PATTERNS  
DAT: .WORD VDB ;ADDRESS OF VARIABLE DATA BUFFER  
 .WORD DP1 ;ADDRESS OF MESSAGE 1  
 .WORD DP2 ;ADDRESS OF MESSAGE 2  
 .WORD DP3 ;ADDRESS OF MESSAGE 3  
 .WORD DP4 ;ADDRESS OF MESSAGE 4  
 .WORD DP5 ;ADDRESS OF MESSAGE 5  
 .WORD DP6 ;ADDRESS OF MESSAGE 6  
 .WORD DP7 ;ADDRESS OF MESSAGE 7  
:RECEIVER DATA BUFFER STARTS HERE..  
IBUF: .BLKW 400  
VDB: .BLKW 100 ;VARIABLE DATA BUFFER  
DP1: .BYTE 177,177  
.ASCIZ '$A THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG.'<15><12><001><177><177><177><1  
.EVEN  
DP2: .BYTE 177,177  
.ASCIZ '$B 0123456789'<15><12><001><177><177><177><177>  
.EVEN  
DP3: .BYTE 177,177  
.ASCII '$C COM-TEST MAYNARD THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG'  
.ASCIZ ' 0123456789'<15><12><001><177><177><177><177>  
.EVEN  
DP4=VDB ;SPARE  
DP5=DP1 ;SPARE  
DP6=DP2 ;SPARE  
DP7=DP3 ;SPARE
```

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014 *****
015 START OF PROGRAM
016 *****
017 BEGIN:
018 MOV #STACK,SP ;SETUP THE STACK POINTER
019 STPS,PRTY7
020 SUSWR
021 CLR $PASS ;CLEAR THE PASS COUNT
022 MOV #BEGIN,$LPADR ;INITILIZE THE LOOP ADDRESS FOR SCOPE
023 CLR FLAGS ;RESET FLAGS
024 RESET
025 *****
026 GET PARAMETERS FROM OPERATOR
027 *****
028 CMP #100000,$SWR ;MANUAL INPUT??
029 BNE GETIT ;BR IF NO
030 *****
031 SWITCH REG INPUT ROUTINE
032 *****
033 MANIN: MOV #DN+4,R1 ;PRESET POINTER FOR DN-11
034 CLR RO ;CLEAR DISPLAY
035 HALT ;HALT FOR ISR REQUEST
036 MOV $SWR, FLAGS ;SAVE ISR REQUEST INDICATORS
037 BIT #20000,$SWR ;IS DN11 SETUP REQUESTER?
038 BEQ .+6 ;BR IF NO
039 JSR PC,MANBA ;GO SETUP DN11
040 *****
041 MOV #DMB+4,R1 ;PRESET DMB ISR ADDRESS
042 BIT #40000,FLAGS ;IS DMB SETUP REQUESTED?
043 BEQ .+6 ;BR IF NO
044 JSR PC,MANBA ;GO SETUP DM11-B
045 *****
046 MOV #VISR+4,R1 ;PRESET VARIABLE ISR ADDRESS
047 JSR PC,MANBA ;GO SETUP VARIABLE ISR
048 *****
049 JMP SWRSET ;GO GET OPERATIONAL SWITCHES
050 *****
051 MANBA: MOV (R1), RO ;DISPLAY BUS ADDR
052 HALT ;HALT FOR BUS ADDR
053 MOV $SWR, (R1)+
054 MOV (R1), RO ;DISPLAY VECTOR ADDR
055 HALT ;HALT FOR VECTOR ADDR
056 MOV $SWR, (R1)+
057 MOV (R1), RO ;DISPLAY PRIORITY
058 HALT ;HALT FOR PRIORITY
059 MOV $SWR, (R1)+
060 MOV (R1), RO ;DISPLAY PARAM #1
061 BMI MANINX ;BR IF PARAM NOT REQUIRED
062 HALT ;HALT FOR PARAM #1
063 MOV $SWR, (R1)+
064 MOV (R1), RO ;DISPLAY PARAM #2
065 BMI MANINX ;BR IF PARAM NOT REQUIRED
066 HALT ;HALT FOR PARAM #2
067 MOV $SWR, (R1)+
068 MOV (R1), RO ;DISPLAY PARAM #3
069 HALT ;HALT FOR PARAM #3
070 *****
071 MANINX: RTS
072 *****

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870 003462 000000 $LPADR: 0
871
872 ;*****
873 ;      ISR PARAM INPUT ROUTINE
874 ;*****
875 003464 012700 011000 GETIT: MOV #VISR, R0 ;PRESET ISR ADDR IN R0
876 003470 104400 007154 TYPE ,MSG01 ;<15><12> INTERFACE TYPE
877 003474 104400 011000 TYPE ,VISR ;PRINTOUT ISR NAME
878 003500 104400 001526 TYPE ,QUES
879
880 003504 104404 001544 GETSTR ,WORK ;READIN OPERATOR'S RESPONSE
881 003510 123727 001544 000015 CMPB WORK, #15 ;IS IT CAR. RET?
882 003516 001431 BEQ GETBA ;BR IF YES
883
884 003520 012700 010160 MOV #DN, R0 ;PRESET DN ISR ADDR
885 003524 023737 010160 001544 CMP DN, WORK ;IS IT DN?
886 003532 001004 BNE DMBTST ;BR IF NO
887 003534 052737 020000 001562 BIS #20000, FLAGS ;SET DN11 FLAG
888 003542 000417 BR GETBA ;GO GET DN11 PARAMS
889
890 003544 012700 010402 DMBTST: MOV #DMB, R0 ;PRESET DM11B ISR
891 003550 023737 010402 001544 CMP DMB, WORK ;IS IT DM?
892 003556 001004 BNE NOISR ;BR IF NO
893 003560 052737 040000 001562 BIS #40000, FLAGS ;SET DM11-B FLAG
894 003566 000405 BR GETBA ;GO GET DM11-B PARAMS
895
896 003570 NOISR:
897 003570 104400 007177 TYPE ,MSG02 ;<15><12> ISR NOT LOADED!
898
899 003574 000000 HALT ;HALT
900 003576 000137 003254 JMP BEGIN ;TRY AGAIN
901 003602 010004 GETBA: MOV R0, R4 ;SAVE POINTER
902 003604 022020 CMP (R0)+, (R0)+ ;INCREMENT ISR POINTER
903 003606 104400 007222 TYPE ,MSG03 ;<15><12> BUS ADDRESS=
904 003612 004737 004776 JSR PC,GETANY ;GET THE BUS ADDR
905
906 003616 104400 007241 GETVA: TYPE ,MSG04 ;<15><12> VECTOR ADDRESS=
907 003622 004737 004776 JSR PC,GETANY ;GET THE VECTOR ADDR.
908
909 003626 104400 007263 GETPRI: TYPE ,MSG05 ;<15><12> PRIORITY=
910 003632 004737 004776 JSR PC,GETANY ;GET THE PRIORITY
911
912 003636 005710 GETPRM: TST (R0) ;PARAM #1 REQUIRED?
913 003640 100412 BMI GETP3 ;BR IF NO
914 003642 104400 007277 TYPE ,MSG06 ;<15><12> PARAMS #1=
915 003646 004737 004776 JSR PC,GETANY ;GET PARAM
916
917 003652 005710 TST (R0) ;PARAM #2 REQUIRED?
918 003654 100404 BMI GETP3 ;BR IF NO
919 003656 104400 007314 TYPE ,MSG07 ;<15><12> PARAMS #2=
920 003662 004737 004776 JSR PC,GETANY ;GET PARAM
921
922 003666 016437 000016 003704 GETP3: MOV 16(R4), ARIA ;IS ASCII PARAM REQUIRED
923 003674 100424 BMI GETEX ;BR IF NO
924 003676 104400 007331 TYPE ,MSG08 ;<15><12> ASCII PARAM=
925 003702 104400 TYPE ;PRINTOUT ASCII PARAM

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926 003704 000000          ARIA:  0
927 003706 104400 001526      TYPE      ,QUES
928
929 003712 104404          GETSTR          ;GET ASCII INPUT AND
930 003714 001604          IBUF          ;PUT IT HERE
931 003716 012702 001604      MOV      #IBUF, R2      ;SETUP POINTER
932 003722 122712 000015      CMPB     #15, (R2)     ;WAS NEW DATA EN(ERED)?
933 003726 001407          BEQ      GETEX        ;BR IF NO
934
935 003730 013703 003704      MOV      ARIA, R3      ;SETUP DEST. POINTER
936 003734 112223          MOVVB   (R2)+, (R3)+   ;MOV INPUT TO DEST.
937 003736 122712 000015      CMPB     #15, (R2)     ;LAST DIGIT?
938 003742 001374          BNE     -5            ;LOOP IF NO
939 003744 105013          CLRB    (R3)         ;INSERT ALL ZERO CHAR
940
941
942 003746 020427 011000      GETEX:  CMP      R4,   #VISR ;WAS THIS THE VARIABLE ISR
943 003752 001461          BEQ     SWPRNT      ;BR IF YES
944 003754 000137 003464          JMP     GETIT       ;GET ANOPHER
945
946          ;TTY INTERRUPTS HERE WHEN MODULE IS RUNNING.
947
948 003760 017701 175532      TTYINT: MOV      @TKB,R1   ;CLEAR TTY BUFFER
949 003764 042777 000100 175522      BIC     #100,@TKS     ;RESET INT. ENABLE
950 003772 042701 177700          BIC     #177700,R1    ;STRIP JUNK
951 003776 022701 000007          CMP     #7,R1
952 004002 001013          BNE     2$
953 004004 022737 000176 011044      CMP     #SWREG,SWR
954 004012 001003          BNE     1$
955 004014 052737 000001 011042      BIS     #BIT0,FLAG
956 004022 052777 000100 175464 1$:  BIS     #100,@TKS
957 004030 000002          RTI
958 004032 022701 000077      2$:  CMP     #'?', R1      ;IS IT ?
959 004036 001014          BNE     NOQ         ;BR IF NO
960 004040 012700 001476          MOV     #DMPNST,R0   ;SETUP DUMP LIST
961 004044 012710 001604          MOV     #IBUF, (R0)  ;TO PRINTOUT INPUT BUFFER
962 004050 017737 004744 001502      MOV     @IRDA,.RX    ;IF SWITCH REG. =0 PRINT RX BUFFER.
963 004056 017737 004740 001504      MOV     @IXDA,.TX    ;" " " " " " PRINT TX BUFFER.
964 004064 000137 001374          JMP     LI           ;AND GO PRINT IT
965
966 004070 022701 000012      NOQ:  CMP     #12, R1   ;IS IT LINE FEED?
967 004074 001002          BNE     RSTART      ;BR IF NO
968 004076 000137 003254          JMP     BEGIN       ;RESTART
969
970 004102 104400 010155      RSTART: TYPE     ,MFILL
971 004106 000005          RESET
972 004110 105227 000000          INCB    #0           ;DELAY HERE FOR AWILE
973 004114 001375          BNE     -4
974 004116 022737 000176 011044      SWPRNT: CMP     #SWREG,SWR
975 004124 001007          BNE     XSWPNT
976 004126 052737 000002 011042      BIS     #BIT1,FLAG
977 004134 104400 007350          TYPE     ,MSG09
978 004140 104422          SETSWI
979 004142 000417          BR      REST
980 004144 104400 007350      XSWPNT: TYPE     ,MSG09 ;<15><12> SET SWITCHES
981 004150 105777 175340          TSTB   @TKS        ;WAIT FOR TTY INPUT

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982 004154 100375 BPL -4 ;LOOP
983 004156 017702 175334 MOV @TKB,R2 ;RESET DONE FLAG
984 004162 017746 004656 MOV @SWR, -(SP)
985 004166 004037 006350 JSR R0,$B2016 ;PRINTOUT SWITCHES
986 004172 104400 001536 TYPE ,CRLF
987 004176 000401 BR .+4 ;SKIP OVER HALT
988
989 *****
990 SET SWITCH OPTIONS
991 *****
992 004200 000000 SWRSET: HALT ;HALT FOR SWITCH SETUP
993 ;SW00=ONE WAY OUT
994 ;SW01=ONE WAY IN
995 ;SW02=EXTERNAL LOOPBACK
996 ;SW03=INTERNAL LOOPBACK
997 ;SW04=LOOP ON DATA
998 ;SW05=MONITOR INPUT
999 ;SW06=MONITOR OUTPUT
1000 ;SW07=NO DATA COMPARE
1001 ;SW08=EXTERNAL DATA
1002 ;SW09=DATA SELECT
1003 ;SW10=DATA SELECT
1004 ;SW11=DATA SELECT
1005 ;SW12=
1006 ;SW13=INHIBIT ERROR TYPEOUTS
1007 ;SW14=LOOP ON TEST
1008 ;SW15=HALT ON ERROR
1009
1010 004202 012737 004210 003462 REST: MOV #RESTR,$LPADR ;SETUP LOOP
1011 004210 017701 004630 RESTR: MOV @SWR,R1
1012 004214 000301 SWAB R1
1013 004216 032777 000017 004620 BIT #17,@SWR ;WAS SOME MODE SELECTED?
1014 004224 001003 BNE .+10 ;BR IF YES
1015 004226 104400 007637 TYPE ,MSG2 ;<15><12>NO MODE SELECTED.
1016 004232 000723 BR RSTART ;GO GET SWITCH REGISTER.
1017 004234 042701 177761 BIC #177761,R1 ;STRIP JUNK
1018 004240 016137 001564 011022 MOV DAT(1),IXDA ;SETUP INIT DATA ADDR FROM TABLE
1019 004246 005701 TST R1 ;VARIABLE DATA SPECIFIED?
1020 004250 001010 BNE SUXCC ;BR IF NO
1021 004252 032777 000400 004564 BIT #400,@SWR ;USE EXTERNAL DATA?
1022 004260 001004 BNE SUXCC ;BR IF YES
1023 *****
1024 GET VARIABLE DATA
1025 *****
1026 004262 104400 007372 TYPE ,MSG10 ;<15><12> ENTER DATA <15><12>
1027 004266 104404 GETSTR ;GET DATA
1028 004270 002604 VDB ;AND PUT IT HERE
1029 004272 012737 001604 011020 SUXCC: MOV #IBUF,IRDA ;SETUP READ BUFFER ADDR
1030
1031 004300 032777 000400 004536 BIT #400,@SWR ;EXTERNAL DATA?
1032 004306 001403 BEQ SWRNXT ;BR IF NO
1033 004310 012737 002604 011022 MOV #VDB,IXDA ;SETUP BUFFER ADDRESS
1034 004316 SWRNXT:
1035 004316 012737 003760 000060 MOV #TTYINT,@#60 ;SETUP TTY VECTOR
1036 004324 012737 000340 000062 MOV #340,@#62
1037 004332 012777 000100 175154 MOV #100,@TKS ;AND ENABLE INTERRUPTS

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1038	004340	012702	001604
1039	004344	005022	
1040	004346	022702	002004
1041	004352	001374	

CLRIB:	MOV	#IBUF, R2	
	CLR	(R2)+	;CLEAR INPUT BUFFER
	CMP	#IBUF+200,R2	
	BNE	CLRIB	

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1042 ;*****
1043 ;          SETUP TIMER          *
1044 ;*****
1045
1046 004354 012737 000060 006334 SUTIME: MOV    #60,    MSECs ;PRESET COUNTER
1047 004362 012737 006312 000100      MOV    #TIMER, 100 ;SETUP LINE CLOCK VECTOR
1048 004370 012737 000340 000102      MOV    #340,   102 ;AND PRIORITY
1049 004376 012737 004422 000004      MOV    #NOLC,  4   ;SETUP BUS ERROR VECTOR
1050 004404 012737 000340 000006      MOV    #340,   6   ;SET UP PRIORITY TO 7
1051 004412 052737 000100 177546      BIS    #100,   177546 ;ENABLE LINE CLOCK
1052 004420 000441
1053
1054 ;BUS ERROR RETURNS HERE IF NO LINE CLOCK
1055
1056 004422 012737 006312 000104 NOLC:  MOV    #TIMER, 104 ;SETUP RTC VECTOR
1057 004430 012737 000340 000106      MOV    #340,   106 ;AND PRIORITY
1058 004436 012737 004472 000004      MOV    #1$,    4   ;SETUP BUS ERROR VECTOR
1059 004444 012737 000340 000006      MOV    #340,   6   ;SET PRIORITY
1060 004452 012737 003100 172542      MOV    #1600., 172542 ;SET COUNTER BUFFER.
1061 004460 012737 000111 172540      MOV    #111,   172540 ;ENABLE REAL TIME TIME CLOCK
1062 004466 000240
1063 004470 000415
1064 004472 012737 004516 000100 1$:    MOV    #2$, 100 ;TRY LSI CLOCK
1065 004500 104414 000000      STPS, PRTYD ;LOWER PSW TO 0
1066 004504 005227 000000      3$:    INC    #0
1067 004510 001375      BNE    3$
1068 004512 104400 007570      TYPE, MSG19 ;NO CLOCK AVAILABLE
1069 004516 012737 006312 000100 2$:    MOV    #TIMER, 100
1070
1071 004524 000137 004530 NORTC: JMP    .+4 ;SPARE JUMP
1072 004530 012737 000006 000004      MOV    #6, a#4 ;SET TRAP VECTOR
1073 004536 005037 000006      CLR    a#6 ;SET BUS ERROR VECTOR
1074 004542 012706 001070      MOV    #STACK, SP ;SETUP STACK
1075 004546 104414 000000      STPS, PRTYD
1076 004552 012737 006350 011030      MOV    #B2016, B2016 ;SETUP BIN TO OCT ADDR
1077
1078
1079 ;*****
1080 ;          DO TESTING NOW          *
1081 ;*****
1082 004560 032737 020000 001562      BIT    #20000, FLAGS ;WAS A DN11 SETUP
1083 004566 001402      BEQ    DMCHK ;BR IF NO
1084 004570 004737 010200      JSR    PC, DNGO ;GO TO DN11 ISR
1085
1086 004574 032737 040000 001562 DMCHK: BIT    #40000, FLAGS ;WAS A DM11-B SETUP?
1087 004602 001402      BEQ    VIGO ;BR IF NO
1088 004604 004737 010422      JSR    PC, DMBGO ;GO TO DM11-B ISR
1089
1090 ;*****
1091 ;          GOTO THE MODULE AND RUN          *
1092 ;*****
1093
1094 004610 004777 004222      VIGO:  JSR    PC, aISR+36 ;GO TO ISR

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1095      ;*****
1096      ;      END OF PASS ROUTINE
1097      ;*****
1098 004614 005237 004774      EOP:   INC    $PASS      ;INCREMENT PASS COUNTER
1099 004620 005746            TST    -(SP)      ;PUSH DOWN AND PROTECT STACK.
1100 004622 104416            KBDIN
1101 004624 032777 010000 004212  BIT    #SW12, $SWR  ;INHIBIT TYPEOUTS?
1102 004632 001034            BNE    2$         ;BR IF YES
1103 004634 104400 007411      TYPE   MSG11      ;' 5'<'12'> END OF PASS
1104 004640 013746 004774      MOV    $PASS, -(SP)
1105 004644 004037 006350      JSR    RD, $B2016 ;PRINTOUT PASS COUNT
1106 004650 104400 001536      TYPE   ,CRLF
1107 004654 032700 000002      BIT    #OWI, MODE ;SKIP TRANSMIT TYPEOUT IF OWI
1108 004660 001012            BNE    3$         ;BR IF YES
1109 004662 104400 010060      TYPE   MSG26      ;TRANSMITTED DATA=
1110 004666 013737 011022 004676  MOV    IXDA, 4$   ;SET POINTER TO TXBUF
1111 004674 104400            TYPE
1112 004676 000000            4$:   0           ;TYPE TXBUFFER
1113 004700 032700 000001      BIT    #OWO, MODE ;SKIP RECEIVE TYPEOUT IF OWO
1114 004704 001007            BNE    2$         ;BR IF YES
1115 004706 104400 010106      3$:   TYPE   MSG27 ;RECEIVED DATA=
1116 004712 013737 011020 004722  MOV    IRDA, 5$   ;SET POINTER TO RXBUF
1117 004720 104400            TYPE
1118 004722 000000            5$:   0           ;TYPE RXBUFFER
1119 004724 032777 040000 004112  2$:   BIT    #BIT14, $SWR ;LOOP ON TEST?
1120 004732 001005            BNE    1$         ;BR IF NO...
1121 004734 016600 000002      MOV    2(SP), RD ;GET RETURN ADDRESS
1122 004740 104414 000000      STPS, PRTYD
1123 004744 000110            JMP    (RD)       ;GO BACK TO MODULE.
1124 004746 012706 001070      1$:   MOV    #STACK, SP ;RESET THE STACK POINTER.
1125 004752 013700 000042      MOV    $#42, RD  ;GET MONITOR ADDRESS
1126 004756 001404            BEQ    $DOAGN     ;BR IF NONE
1127 004760 004710            JSR    PC, (RD)  ;GO TO MONITOR
1128 004762 000240            NOP
1129 004764 000240            NOP
1130 004766 000240            NOP
1131 004770 000137 000200      $DOAGN: JMP    $#20C     ;RESTART TEST
1132 004774 000000      $PASS: 0
1133
1134
1135      ;*****
1136      ;      SUBROUTINE TO INPUT OCTAL WORD FROM OPERATOR
1137      ;*****
1138 004776 011046            GETANY: MOV    (RD), -(SP) ;PUT WORD ON STACK
1139 005000 004037 006350      JSR    RD, $B2016 ;AND TYPE IT
1140 005004 104400 001526      TYPE   ,QUES
1141 005010 011037 001544      MOV    (RD), WORK ;PRESET FOR DEFAULT (CR)
1142 005014 104406 001544      ANYMOR: ACCEPT  WORK ;OCTAL READIN
1143 005020 013710 001544      MOV    WORK, (RD) ;MOVE IT TO ISR
1144 005024 005720      ANYEX: TST    (RD)+ ;BUMP POINTER
1145 005026 000240            NOP
1146 005030 000207      RTS    PC        ;SUB/ROUTINE EXIT
1147
1148      ;*****
1149      ;      ERROR HLT HANDLER
1150      ;*****

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1151	005032			\$HLT:		
1152	005032	104414	000140		STPS,PRTY3	;LOWER PSW PRIOTITY TO 3
1153	005036	005237	005730	\$HLOT:	INC \$ERTTL	;INCREMENT ERROR COUNTER
1154	005042	001775			BEQ \$HLOT	;MAKE SURE ITS NOT ZERO
1155	005044	011637	005726		MOV (SP) \$HLTAD	;SAVE ADDRESS OF HLT
1156	005050	162737	000002	005726	SUB #2, \$HLTAD	;AND BACK IT UP
1157	005056	010146			MOV R1, -(SP)	;SAVE R1
1158						
1159	005060	032777	020000	003756	BIT #BIT13, @SWR	;INHIBIT ERR TYPEOUTS?
1160	005066	001070			BNE TRX	;BR IF YES
1161						
1162	005070	104400	001536		TYPE ,CRLF	
1163	005074	117701	000626		MOVB \$HLTAD,R1	;EXTRACT HLT CODE
1164	005100	006301			ASL R1	;AND ALIGN IT
1165	005102	016137	005270	005112	MOV EMTAB(R1),.+10	;GET HEADER ADDRESS
1166	005110	104400	005320		TYPE ,EMO	;AND PRINT HEADER
1167	005114	104400	007430		TYPE ,MSG12	; < AT LOC >
1168	005120	013746	005726		MOV \$HLTAD,-(SP)	;GET HLT ADDRESS
1169	005124	004037	006350		JSR RO,\$B2016	;AND PRINT IT
1170	005130	005701			TST R1	;HLT CODE = 0?
1171	005132	001446			BEQ TRX	;BR IF YES
1172						
1173						
1174	005134	022701	000016		CMP #16,R1	;IS IT HLT+7?
1175	005140	001023			BNE 1\$;BR IF NO
1176	005142	005702			TST R2	;PRINTOUT BAD DATA?
1177	005144	001406			BEQ 2\$;BR IF NO
1178	005146	104400	007767		TYPE ,MSG23	; < BAD DATA= >
1179	005152	110246			MOVB R2,-(SP)	;GET DATA
1180	005154	004037	006336		JSR RO,\$B20CT	;AND PRINT IT
1181	005160	003			.BYTE 3	
1182	005161	001			.BYTE 1	
1183	005162	005703		2\$:	TST R3	;PRINT OUT GOOD DATA?
1184	005164	001410			BEQ 3\$;BR IF NO
1185	005166	104400	010003		TYPE ,MSG24	; < GOOD DATA= >
1186	005172	110346			MOVB R3,-(SP)	;GET DATA
1187	005174	004037	006336		JSR RO,\$B20CT	;AND PRINT IT
1188	005200	003			.BYTE 3	
1189	005201	001			.BYTE 1	
1190	005202	104400	001536		TYPE ,CRLF	
1191	005206	000420		3\$:	BR TRX	
1192						
1193						
1194	005210	005702		1\$:	TST R2	;PRINTOUT RCV CSR?
1195	005212	001405			BEQ TR3	;BR IF NO
1196	005214	104400	007441		TYPE ,MSG13	; < RCV CSR= >
1197	005220	010246			MOV R2,-(SP)	;GET DATA
1198	005222	004037	006350		JSR RO,\$B2016	;AND PRINT IT
1199						
1200	005226	005703		TR3:	TST R3	;PRINTOUT XMIT CSR?
1201	005230	001407			BEQ TRX	;BR IF NO
1202	005232	104400	007453		TYPE ,MSG14	; < XMIT CSR= >
1203	005236	010346			MOV R3,-(SP)	;GET DATA
1204	005240	004037	006350		JSR RO,\$B2016	;AND PRINT IT
1205	005244	104400	001536		TYPE ,CRLF	
1206						

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1207 005250 032777 100000 003566 TRX: BIT #BIT15, QSWR ;HALT ON ERROR?
1208 005256 001401 BEQ HLTX ;BR IF NO
1209 005260 000000 HALT
1210
1211 005262 104416 HLTX: KBDIN
1212 005264 012601 MOV (SP)+, R1 ;RESTORE R1
1213 005266 000002 RTI ;AND RETURN TO PROGRAM
1214
1215 005270 005320 EMTAB: EMO
1216 005272 005333 EM1
1217 005274 005343 EM2
1218 005276 005363 EM3
1219 005300 005407 EM4
1220 005302 005422 EM5
1221 005304 005446 EM6
1222 005306 005542 EM7
1223 005310 005565 EM10
1224 005312 005642 EM11
1225 005314 005667 EM12
1226 005316 005711 EM13
1227

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005320 051105 047522 020122 EMO: .ASCIZ "ERROR HALT"
005333 127 044501 044524 EM1: .ASCIZ "WAITING"
005343 127 044501 044524 EM2: .ASCIZ "WAITING TO XMIT"
005363 104 026516 030461 EM3: .ASCIZ "DN-11 NOT AVAILABLE"
005407 104 030516 026461 EM4: .ASCIZ "DN11-ERROR"
005422 047104 030461 041440 EM5: .ASCIZ "DN11 CALL ABANDONED"
005446 041522 020126 052502 EM6: .ASCIZ "RCV BUFFER FULL,END OF MESSAGE CHARACTER(001) WAS NOT FOUND"
005542 040504 040524 041440 EM7: .ASCIZ "DATA COMPARE ERROR"
005565 105 051122 051117 EM10: .ASCIZ "ERROR RCV CSR=CONTENTS OF SELECT 0 REGISTER"
005642 047125 054105 042520 EM11: .ASCIZ "UNEXPECTED INTERRUPT"
005667 116 046530 050040 EM12: .ASCIZ "NXM PRINCIPAL CAR"
005711 116 046530 040440 EM13: .ASCIZ "NXM ALT CAR"
005726 005726 .EVEN
1228 005726 000000 $HLTAD: 0
005730 000000 $ERTTL: 0

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1229 :*****
1230 :      READ A CHAR. ROUTINE
1231 :*****
1232 :
1233 :      CALL=  GETCHR  ;INPUT A CHAR FROM TTY
1234 :              ;RETURNS HERE WITH CHAR ON STACK
1235 005732 011646 $READC: MOV      (SP),-(SP)      ;PUSH THE PC
1236 005734 016666      MOV      4(SP),2(SP)      ;SAVE THE PS
1237 005742 105777      TSTB     @TKS          ;IS RECEIVE DONE
1238 005746 100375      BPL      -4              ;LOOP IF NO
1239 005750 017737      MOV      @TKB,$CHAR      ;SAVE THE CHAR.
1240 005756 042737      BIC      #177600,$CHAR    ;STRIP JUNK
1241 005764 013766      MOV      $CHAR,4(SP)    ;PUT CHAR ON STACK
1242 005772 000002      RTI              ;EXIT
1243 :*****
1244 :      READ A STRING ROUTINE
1245 :*****
1246 :
1247 :      CALL=  GETSTR  ;INPUT A STRING OF CHARS FROM TTY
1248 :              ADDR  ;TO THIS ADDRESS
1249 :              ;TERMINATE INPUT WITH LINE FEED
1250 005774 011602 $READS: MOV      (SP), R2      ;SETUP ADDRESS OF INPUT BUFFER
1251 005776 012201      MOV      (R2)+, R1      ;INCREMENT RETURN ADDRESS
1252 006000 010216      MOV      R2,(SP)      ;AND PUT BACK ON STACK
1253 :
1254 006002 104402 GETIC:  GETCHR      ;GET A CHAR
1255 006004 104400      TYPE     $CHAR
1256 006010 122726      CMPB    #136,(SP)+      ;IS IT BINARY DELIMITER
1257 006014 001011      BNE     GOTIC          ;BR IF NO
1258 :
1259 006016 104406 OCT:   ACCEPT  $WORK      ;GET OCT. CHAR
1260 006022 113721      MOVB   $WORK,(R1)+     ;STORE OCT. CHAR.
1261 006026 122737      CMPB  #136,$CHAR      ;TERMINATOR=BIN. DELIMITER?
1262 006034 001370      BNE   OCT             ;BR IF NO
1263 006036 000761      BR    GOTIC
1264 :
1265 006040 113721 GOTIC: MOVB   $CHAR,(R1)+   ;STORE CHAR. IN BUFFER
1266 006044 022737      CMP   #15,$CHAR      ;IS IT END OF INPUT (CAR. RETURN)
1267 006052 001353      BNE   GETIC          ;BR IF NO
1268 006054 112721      MOVB  #12,(R1)+
1269 006060 104400      TYPE  .LF            ;TYPE A LINE FEED
1270 006064 112721      MOVB  #001,(R1)+     ;INSERT RX TERM.
1271 006070 112721      MOVB  #177,(R1)+    ;AND A FILL
1272 006074 112721      MOVB  #177,(R1)+    ;INSERT ANOTHER FILL
1273 006100 112721      MOVB  #177,(R1)+    ;INSERT 3RD FILL
1274 006104 112721      MOVB  #177,(R1)+    ;INSERT 4TH FILL
1275 006110 105011      CLRB  (R1)          ;PUT ZEROS AT END
1276 006112 000002      RTI
1277

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1283 006114
1284 006114 010046
1285 006116 010146
1286 006120 010246
1287 006122 010346
1288 006124 016600 000010
1289 006130 005001 1$: CLR R1 ;CLEAR PARTIAL NUMBER
1290 006132 012702 000006 2$: MOV #6,R2 ;MAX. # OF DIGITS ALLOWED
1291 006136 104402 GETCHR ;GET ONE CHARACTER
1292 006140 112603 MOV (SP)+,R3 ;AND PUT IT IN R3
1293 006142 110337 006310 MOV R3,6$
1294 006146 104400 006310 TYPE .6$ ;ECHO THE CHARACTER
1295 006152 022703 000025 CMP #25,R3
1296 006156 001451 BEQ 8$
1297 006160 022703 000015 CMP #15,R3 ;WAS THIS CHARACTER A "CR"?
1298 006164 001427 BEQ 5$ ;BR IF YES
1299 006166 022703 000040 CMP #40,R3 ;WAS "SPACE" HIT?
1300 006172 001433 BEQ 7$ ;BR IF YES
1301 006174 022703 000136 CMP #136,R3 ;WAS "↑" HIT?
1302 006200 001430 BEQ 7$ ;BR IF YES
1303 006202 032703 000110 BIT #110,R3 ;INSURE THE CHARACTER IS
1304 006206 001011 BNE 4$ ;A DIGIT BETWEEN 0 AND 7.
1305
1306 006210 005302 DEC R2 ;CHECK NUMBER OF CHARACTERS
1307 006212 002407 BLT 4$ ;BR IF TO MANY
1308 006214 006301 ASL R1 ;POSITION PARTIAL NUMBER
1309 006216 006301 ASL R1 ;FOR THIS DIGIT
1310 006220 006301 ASL R1
1311 006222 042703 177770 BIC #10<7>,R3 ;GET RID OF THE ASCII JUNK
1312 006226 050301 BIS R3,R1 ;COMBINE THIS DIGIT WITH PARTIAL
1313 006230 000742 BR 2$ ;GO GET ANOTHER DIGIT
1314 006232 104400 001526 4$: TYPE .QUES ;TYPE "?"
1315 006236 104400 001536 TYPE .CRLF ;TYPE CARRAGE RETURN AND LINE FEED.
1316 006242 000732 BR 1$ ;GO START OVER
1317 006244 104400 001537 5$: TYPE .LF ;FOLLOW "CR" WITH A "LF"
1318 006250 022702 000006 CMP #6,R2 ;WERE ANY DIGITS INPUT
1319 006254 001002 BNE .+6 ;BR IF YES
1320 006256 013001 MOV @ (R0)+,R1 ;USE OLD DATA
1321 006260 005740 TST -(R0) ;BACKUP R0--
1322 006262 010130 7$: MOV R1,@ (R0)+ ;PASS THE NUMBER TO THE USER
1323 006264 010066 000010 MOV R0,10(SP) ;SET FOR RETURN
1324 006270 012603 MOV (SP)+,R3 ;RESTORE R3
1325 006272 012602 MOV (SP)+,R2 ;RESTORE R2
1326 006274 012601 MOV (SP)+,R1 ;RESTORE R1
1327 006276 012600 MOV (SP)+,R0 ;RESTORE R0
1328 006300 000002 RTI
1329 006302 104400 010150 8$: TYPE .CTLU
1330 006306 000710 BR 1$
1331 006310 000 000 6$: .BYTE 0,0 ;STORAGE FOR ASCII CHAR. AND TERMINATOR

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006312 005337 006334
006316 001005
006320 012737 000060 006334
006326 005237 011032
006332
006334 000002
006334 000000

006336 112037 006543
006342 112037 006541
006346 000406
006350 112737 000001 006541
006356 112737 000006 006543
006364 112737 000005 006540
006372 010346
006374 010446
006376 010546
006400 113704 006543
006404 005404
006406 062704 000006
006412 110437 006542
006416 113704 006541
006422 016605 000010
006426 005003
006430 006105
006432 000404
006434 006105
006436 006105
006440 006105
006442 010503
006444 006103
006446 105337 006542
006452 100016

```
*****  
: CLOCK INTERRUPT ROUTINE  
*****  
TIMER: DEC MSECS :COUNT 60 CYCLES  
: BNE TIMEX :BR IF NOT 60  
MOV #60 MSECS :RESTORE COUNT  
INC TIME :INCREMENT SECONDS  
TIMEX: RTI :RETURN FROM INTERRUPT  
MSECS: 0  
*****  
: BINARY TO OCTAL (ASCII) AND TYPE  
: $B20CT---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE  
: CALL:  
: MOV NUM, -(SP) :NUMBER TO BE TYPED  
: JSR RD, $B20CT :CALL FOR TYPEOUT  
: .BYTE N :N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE  
: .BYTE M :M=1 OR 0  
: : :1=TYPE LEADING ZEROS  
: : :0=SUPPRESS LEADING ZEROS  
: $B201---ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST $B20CT OR $B2016  
: CALL:  
: MOV NUM, -(SP)  
: JSR RD, $B201  
: $B2016---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER  
: CALL:  
: MOV NUM, -(SP)  
: JSR RD, $B2016  
$B20CT: MOVB (RD)+, $OMODE+1 :PICKUP THE NUMBER OF DIGITS TO TYPE  
MOVB (RD)+, $OFILL :GET THE ZERO FILL SWITCH  
BR $B201  
$B2016: MOVB #1, $OFILL :SET THE ZERO FILL SWITCH  
MOVB #6, $OMODE+1 :SET FOR SIX(6) DIGITS  
$B201: MOVB #5, $OCNT :SET THE ITERATION COUNT  
MOV R3, -(SP) :SAVE R3  
MOV R4, -(SP) :SAVE R4  
MOV R5, -(SP) :SAVE R5  
MOVB $OMODE+1, R4 :GET THE NUMBER OF DIGITS TO TYPE  
NEG R4  
ADD #6, R4 :SUBTRACT IT FOR MAX. ALLOWED  
MOVB R4, $OMODE :SAVE IT FOR USE  
MOVB $OFILL, R4 :GET THE ZERO FILL SWITCH  
MOV 10(SP), R5 :PICKUP THE INPUT NUMBER  
CLR R3 :CLEAR THE OUTPUT WORD  
1$: ROL R5 :ROTATE MSB INTO "C"  
BR 2$: :GO DO MSB  
2$: ROL R5 :FORM THIS DIGIT  
3$: ROL R5, R3 :GET LSB OF THIS DIGIT  
DECB $OMODE :TYPE THIS DIGIT?  
BPL 7$: :BR IF NO  
7$:
```

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1388 006454 042703 177770      BIC      #177770,R3      :GET RID OF JUNK
1389 006460 001002      BNE      4$             :TEST FOR 0
1390 006462 005704      TST      R4             :SUPPRESS THIS 0?
1391 006464 001403      BEQ      5$             :BR IF YES
1392 006466 005204      4$: INC      R4             :DON'T SUPPRESS ANYMORE 0'S
1393 006470 052703 000060      BIS      #'0,R3        :MAKE THIS DIGIT ASCII
1394 006474 052703 000040      5$: BIS      #' ,R3        :MAKE ASCII IF NOT ALREADY
1395 006500 110337 006536      MOV      R3,0$         :SAVE FOR TYPING
1396 006504 104400 006536      TYPE    0$            :GO TYPE THIS DIGIT
1397 006510 105337 006540      7$: DECB   $OCNT        :COUNT BY 1
1398 006514 003347      BGT      2$            :BR IF MORE TO DO
1399 006516 002402      BLT      6$            :BR IF DONE
1400 006520 005204      INC      R4             :INSURE LAST DIGIT ISN'T A BLANK
1401 006522 000744      BR       2$            :GO DO THE LAST DIGIT
1402 006524 012605      6$: MOV      (SP)+,R5    :RESTORE R5
1403 006526 012604      MOV      (SP)+,R4    :RESTORE R4
1404 006530 012603      MOV      (SP)+,R3    :RESTORE R3
1405 006532 012616      MOV      (SP)+,(SP)  :SET THE STACK FOR RETURNING
1406 006534 000200      RTS      R0            :RETURN
1407 006536      .BYTE   00            :STORAGE FOR ASCII DIGIT
1408 006537      .BYTE   00            :TERMINATOR FOR TYPE ROUTINE
1409 006540      .BYTE   00            :OCTAL DIGIT COUNTER
1410 006541      .BYTE   00            :ZERO FILL SWITCH
1411 006542 000000      $OMODE: 0             :NUMBER OF DIGITS TO TYPE

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1412 006544 010046      :TRAP HANDLER
1413 006546 016600 000002      $TRAP: MOV      R0,-(SP)  :SAVE R0
1414 006552 005740      MOV      2(SP),R0     :GET TRAP ADDRESS
1415 006554 111000      TST      -(R0)        :BACKUP BY 2
1416 006556 016000 006564      MOV      (R0),R0     :GET RIGHT BYTE OF TRAP
1417 006562 000200      MOV      $TRPAD(R0),R0 :INDEX TO TABLE
1418      RTS      R0          :GO TO ROUTINE

```

:TRAP TABLE
:ROUTINE
:-----

```

1419 006564 001100      $TRPAD: $TYPE
1420      104400      TYPE=TRAP+0
1421 006566 005732      $READC GETCHR=TRAP+2
1422      104402
1423 006570 005774      $READS GETSTR=TRAP+4
1424      104404
1425 006572 006114      $ACCEPT ACCEPT=TRAP+6
1426      104406
1427 006574 006610      $RWAIT  RWAIT=TRAP+10
1428      104410
1429 006576 006620      $XWAIT  XWAIT=TRAP+12
1430      104412
1431 006600      .STPS   STPS=TRAP+14
1432      104414
1433 006602 006732      .KBDIN  KBDIN=TRAP+16
1434      104416
1435 006604 007064      .SUSWR

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1444 006606 104420          .SETSWI   SUSWR=TRAP+20
1445          006750          .SETSWI   SETSWI=TRAP+22
1446          104422
1447
1448 *****
1449 : SPECIAL PRINTOUT ROUTINES
1450 *****
1451
1452 006610 104400 007462 $RWAIT: TYPE   ,MSG15      ;<15><12> WAITING AT LOC <SP>
1453 006614 000137 006624          JMP      WAITPO
1454
1455 006620 104400 007505 $XWAIT: TYPE   ,MSG16      ;<15><12> WAITING FOR CLEAR TO SEND AT LOC <SP><SP>
1456
1457 006624 011646          WAITPO: MOV    (SP), -(SP)   ;SETUP ADDRESS OF CALL FOR PRINTOUT
1458 006626 004037 006350          JSR     RO,$B2016        ;PRINTOUT ADDRESS
1459
1460 006632 104400 010021          TYPE   ,MSG25          ; <DMBB LINE STATUS REG= >
1461
1462 006636 016646 000004          MOV    4(SP), -(SP)    ;MOV CSR TO BOTTOM OF STACK
1463 006642 016666 000004 000006          MOV    4(SP), 6(SP)    ;MOVE PSW UP A WORD
1464 006650 016666 000002 000004          MOV    2(SP), 4(SP)    ;MOVE PC UP A WORD
1465 006656 012616          MOV    (SP)+, (SP)     ;MOVE CSR UP A WORD
1466 006660 004037 006350          JSR     RO,$B2016        ;GO PRINT CSR
1467
1468 006664 104400 007564          TYPE   ,MSG18          ;<.><15><12>
1469          ;GIVE IT LINE FEED
1470
1471 006670 000002          RTI                    ;AND RETURN TO CALLER
1472
1473 *****
1474 : POWER DOWN ROUTINE.
1475 : SINCE INIT IS ISSUED IN A PWR DN/UP SEQUENCE.
1476 : PROGRAM MUST BE RESTARTED AGAIN.
1477 :
1478
1479 006672 012737 006704 000024 $PWRDN: MOV    #$PWRUP,3#24
1480 006700 000000          HALT
1481 006702 000776          BR     .-2
1482
1483 *****
1484 : POWER UP ROUTINE.
1485 : MESSAGE "POWER HAS FAILED..." WILL BE PRINTED OUT.
1486 : PROGRAM WILL BE RESTARTED.
1487 :
1488
1489 006704 012737 006672 000024 $PWRUP: MOV    #$PWRDN,3#24
1490 006712 012706 001070          MOV    #STACK,SP
1491 006716 104400 007616          TYPE   ,MSG20          ;<15><12> POWER FAILED..
1492 006722 104414 000000          STPS, PRTY0
1493 006726 000137 000200          JMP    3#200
1494
1495 006732 032737 000001 011042 .KBDIN: BIT    #BIT0,FLAG   ;TEST IG FLAG
1496 006740 001437          BEQ    OUT             ;NO EXIT
1497 006742 042777 000100 172544          BIC    #100,3TKS      ;CLEAR TTY IE

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1500 006750 104400 010131 .SETSWI:TYPE SWEQ ;TYPE SWR=
1501 006754 017746 002064 MOV @SWR,-(SP) ;SET UP OCTAL TYPEOUT
1502 006760 004037 006350 JSR RD,$B2016 ;DO IT
1503 006764 104400 010141 TYPE NEQ ;TYPE NEW=
1504 006770 017737 002050 001544 MOV @SWR,WORK ;SET UP FOR CR DEFAULT
1505 006776 104406 001544 ACCEPT ,WORK ;GET VALUE
1506 007002 013777 001544 002034 MOV WORK,@SWR ;REPLACE IT
1507 007010 032737 000002 011042 BIT #BIT1,FLAG ;SEE HOW WE GOT HERE
1508 007016 001005 BNE 1$ ;WRONG WAY?
1509 007020 005777 172472 TST @TKB ;CLEAR BUFFER
1510 007024 052777 000100 172462 BIS #100,@TKS ;RESET TTY IE
1511 007032 042737 000003 011042 1$: BIC #BIT0+BIT1,FLAG ;CLEAR FLAG BITS
1512 007040 000002 OUT: RTI ;EXIT
1513
1514 007042 042766 000340 000002 .STPS: BIC #PTY7,2(SP) ;CLEAR OUT PRIORITY BITS
1515 007050 057666 000000 000002 BIS @ (SP),2(SP) ;SET NEW PRIORITY
1516 007056 062716 000002 ADD #2,(SP) ;SETUP EXIT
1517 007062 000002 RTI ;EXIT
1518
1519 007064 013746 000006 .SUSWR: MOV 6,-(SP) ;SAVE 6 ON STACK
1520 007070 013746 000004 MOV 4,-(SP) ;SAVE 4 ON STACK
1521 007074 012737 007122 000004 MOV #1$,4 ;SETUP TIMEOUT
1522 007102 012737 000340 000006 MOV #340,6 ;SET PRIORITY
1523 007110 022777 177777 001726 CMP #-1,@SWR ;TEST FOR 177570
1524 007116 001402 BEQ 2$ ;NOT ALL 1'S
1525 007120 000407 BR 3$ ;IT'S THERE - EXIT
1526 007122 022626 1$: CMP (SP)+,(SP)+ ;ADJUST STACK AFTER TRAP
1527 007124 012737 000176 011044 2$: MOV #SWREG,SWR ;REPLACE HARDWARE REGISTERS
1528 007132 012737 000174 011046 MOV #DISPREG,DISPLAY ;WITH SOFTWARE REGISTERS
1529 007140 012637 000004 3$: MOV (SP)+,4 ;RESTORE 4
1530 007144 012637 000006 MOV (SP)+,6 ;RESTORE 6
1531 007150 000002 RTI ;EXIT
    
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: AREA RESERVED FOR MOST ASCIZ MESSAGES.
: *****

007152	000040			MSG00:	.ASCIZ	/ /
007154	005015	047111	042524	MSG01:	.ASCIZ	<15><12>/INTERFACE TYPE /
007177	015	044412	051123	MSG02:	.ASCIZ	<15><12>/ISR NOT LOADED!!/
007222	005015	052502	020123	MSG03:	.ASCIZ	<15><12>/BUS ADDRESS=/
007241	015	053012	041505	MSG04:	.ASCIZ	<15><12>/VECTOR ADDRESS=/
007263	015	050012	044522	MSG05:	.ASCIZ	<15><12>/PRIORITY=/
007277	015	050012	051101	MSG06:	.ASCIZ	<15><12>/PARAMS #1=/
007314	005015	040520	040522	MSG07:	.ASCIZ	<15><12>/PARAMS #2=/
007331	015	040412	041523	MSG08:	.ASCIZ	<15><12>/ASCII PARAM=/
007350	005015	042523	020124	MSG09:	.ASCIZ	<15><12>/SET SWITCHES.../
007372	005015	047105	042524	MSG10:	.ASCIZ	<15><12>/ENTER DATA/<15><12>
007411	015	042412	042116	MSG11:	.ASCIZ	<15><12>/END OF PASS /
007430	040440	020124	047514	MSG12:	.ASCIZ	/ AT LOC /
007441	040	041522	020126	MSG13:	.ASCIZ	/ RCV CSR=/
007453	040	041530	051123	MSG14:	.ASCIZ	/ XCSR=/
007462	005015	053440	044501	MSG15:	.ASCIZ	<15><12>/ WAITING AT LOC /
007505	015	053412	044501	MSG16:	.ASCIZ	<15><12>/WAITING FOR CLEAR TO SEND AT LOC /
007551	040	020041	041440	MSG17:	.ASCIZ	/ ! CSR= /
007554	006456	000012		MSG18:	.ASCIZ	./<15><12>
007570	005015	047516	041440	MSG19:	.ASCIZ	<15><12>/NO CLOCKS AVAILABLE/
007616	005015	047520	042527	MSG20:	.ASCIZ	<15><12>/POWER FAILED../
007637	015	047012	020117	MSG21:	.ASCIZ	<15><12>/NO MODE SELECTED./
007663	015	044412	020106	MSG22:	.ASCII	<15><12>/IF CALLING,DIAL NUMBER/
007713	015	044412	020106		.ASCIZ	<15><12>/IF ANSWERING,PLACE MODEM IN AUTO-ANSWER/<15><12>
007767	073	041040	042101	MSG23:	.ASCIZ	/; BAD DATA=/
010003	040	020040	047507	MSG24:	.ASCIZ	/ GOOD DATA=/
010021	015	020012	046504	MSG25:	.ASCIZ	<15><12>/ DMBB LINE STATUS REGISTER= /
010060	005015	051124	047101	MSG26:	.ASCIZ	<15><12>/TRANSMITTED DATA=/<15><12>
010106	005015	042522	042503	MSG27:	.ASCIZ	<15><12>/RECEIVED DATA=/<15><12>
010131	015	051412	051127	SWEQ:	.ASCIZ	<15><12>/SWR= /
010141	040	042516	036527	NEQ:	.ASCIZ	/ NEW= /
010150	052536	005015	000	CTLU:	.ASCIZ	/↑U/<15><12>
010155	177	000177		MFILL:	.ASCIZ	<177><177>
						.EVEN

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(1)
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1543 010160 047104 000040
1544 010164 175200
1545 010166 000350
1546 010170 000200
1547 010172 177777
1548 010174 177777
1549 010176 010356
1550
1551
1552
1553 100000
1554 040000
1555 010000
1556 000040
1557 000020
1558 000002
1559 000001

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:*****
: DN-11 INTERFACE SERVICE PARAMS
:*****
DN: .ASCIZ "DN "
DNBA: 175200 ;BUS ADDRESS
DNIV: 350 ;INTERRUPT VECTOR
DNPRI: 200 ;PRIORITY
DNPAR1: 177777 ;NOT USED
DNPAR2: 177777 ;NOT USED
DNPAR3: DIALNO ;ADDRESS OF DIAL #

```

```

PWI=100000 ;POWER INDICATOR
ACR=40000 ;ABANDON CALL AND RETRY
DLO=10000 ;DATA LINE OCCUPIED
DSS=40 ;DATA SET STATUS
PND=20 ;PRESENT NEXT DIGIT
DP=2 ;DIGIT PRESENT
CRQ=1 ;CALL REQUEST

```

```

1561 ;*****
1562 ; START OF DN-11 CODE
1563 ;*****
1564 010200 013704 010164 DNGO: MOV DNBA, R4 ;SETUP BUS ADDR
1565 010204 005014 CLR (R4) ;RESET DN-11
1566 010206 005037 011032 CLR TIME ;RESET TIMER
1567 010212 032737 000002 011032 BIT #2, TIME ;AND WAIT 2 SECS
1568 010220 001774 BEQ #-6
1569 010222 012703 010356 MOV #DIALNO,R3 ;SETUP DIAL # ADDRESS
1570 010226 012714 000001 MOV #CRQ,@CSR ;SET CALL REQUEST
1571 010232 032714 100000 BIT #PWI,@CSR ;IS DN AVAILABLE
1572 010236 001425 BEQ DNL1X ;BR IF YES
1573
1574 010240 011402 MOV @CSR, R2 ;SETUP CSR FOR PRINTOUT
1575 010242 005003 CLR R3
1576 010244 104003 HLT+3 ;PRINTOUT "DN NOT AVAILABLE"
1577 010246 000137 010200 JMP DNGO ;RESTART
1578
1579 010252 032714 000200 DNL1: BIT #DONE,@CSR ;IS DONE FLAG SET?
1580 010256 001775 BEQ DNL1 ;WAIT IF NO
1581 010260 042714 000200 BIC #DONE,@CSR ;RESET DONE
1582 010264 032714 140000 BIT #ACR+PWI,@CSR ;ANY ERRORS?
1583 010270 001003 BNE DNL1E ;BR IF YES
1584
1585
1586 010272 032714 000020 BIT #PND,@CSR ;IS PRESENT NEXT DIGIT SET
1587 010276 001005 BNE DNL1X ;BR IF YES
1588
1589 010300 011402 DNL1E: MOV @CSR, R2 ;SETUP CSR FOR PRINTOUT
1590 010302 005003 CLR R3
1591 010304 104004 HLT+4 ;PRINTOUT "DN ERROR"
1592 010306 000137 010200 JMP DNGO ;RESTART
1593
1594 010312 112364 DNL1X: MOVB (R3)+, 1(R4) ;LOAD NEXT DIGIT
1595 010316 052714 000002 BIS #DP,@CSR ;SET DIGIT PRESENT
1596 010322 105713 TSTB (R3) ;WAS THAT LAST CHAR?
1597 010324 001352 BNE DNL1 ;BR IF NO
1598
1599 010326 032714 000200 DNL2: BIT #DONE,@CSR ;WAIT FOR DONE FLAG
1600 010332 001775 BEQ DNL2
1601
1602 010334 032714 040000 BIT #ACR,@CSR ;WAS CALL ABANDONED?
1603 010340 001405 BEQ DNEX ;BR IF NO
1604
1605 010342 011402 MOV @CSR, R2 ;SETUP CSR FOR PRINTOUT
1606 010344 005003 CLR R3
1607 010346 104005 HLT+5 ;PRINTOUT "CALL ABANDONED"
1608 010350 000137 010200 JMP DNGO ;RESTART
1609
1610 010354 000207 DNEX: RTS PC ;RETURN TO ITEP
1611
1612 010356 034470 032467 031460 DIALNO: .ASCIZ "8975030" ;NUMBER TO DIAL
1613 010364 000060
1614 010366 000000 000000 000000
1615 010374 000000 000000 000000 0,0,0,0,0,0

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: DM11-B INTERFACE SERVICE PARAMS

010402 046504 000102
010406 170500
010410 000310
010412 000200
010414 000000
010416 177777
010420 177777

DMB: .ASCIZ 'DMB' :ISR NAME
MBA: 170500 :BUS ADDRESS
IV: 310 :VECTOR ADDRESS
PRIO: 200 :PRIORITY
PARA1: 0 :PARAM #1
PARA2: 177777 :PARAM #2
PARA3: 177777 :PARAM #3

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1641 010422 000240
1642 010424 013704 010406
1643 010430 005037 011032
1644
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1646 010434 052714 006000
1647 010440 032714 000020
1648 010444 001375
1649 010446 013714 010414
1650 010452 052764 000003 000002
1651 010460 032737 020000 001562
1652 010466 001002
1653 010470 104400 007663
1654
1655 010474 032777 000005 000342 1$:
1656 010502 001444
1657
1658
1659 010504 052764 000004 000002 STARTX:
1660
1661 010512 032764 000040 000002 CTSW:
1662 010520 001016
1663 010522 023727 011032 000036
1664 010530 103770
1665 010532 016446 000002
1666 010536 032777 010000 000300
1667 010544 001001
1668 010546 104412
1669 010550 005037 011032 1$:
1670 010554 000756
1671
1672 010556 CTSOK:
1673
1674 010556 012737 177777 011024 REX:
1675 010564 005037 010616
1676 010570 012737 000014 010620
1677 010576 062737 000001 010616
1678 010604 001374
1679 010606 005337 010620
1680 010612 001371
1681 010614 000207 REX1:
1682
1683 010616 000000 TEMP1:
1684 010620 000000 TEMP2:
1685 000001
1686 000002
1687 000004
1688 000004
1689 000010
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:*****
: DM-11B INTERFACE SERVICE ROUTINE
:*****
DMBGO: NOP
MOV MBA, R4 ;SETUP BUS ADDR INDEX
CLR TIME ;RESET TIMER

BIS #CS+CM, @CSR ;CLEAR DM-11 B
BIT #BUSY, @CSR ;WAIT TIL FREE
BNE -4
MOV PARA1, @CSR ;SELECT LINE #
BIS #DTR+LE, 2(R4) ;SET DATA TERM RDY & LINE ENABLE
BIT #20000, FLAGS ;HAS DN11 MADE CONNECTION YET?
BNE 1$ ;BR IF YES
TYPE ,MSG22 ;TYPE "MAKE CONNECTION"

BIT #OWO+XLB, @SWR ;IS MODE = OWO OR XLB
BEQ REX1 ;BR IF NO

STARTX: BIS #RQTS, 2(R4) ;SET REQUEST TO SEND

CTSW: BIT #CTS, LSTAT(R4) ;IS CLEAR TO SEND SET?
BNE CTSOK ;BR IF YES
CMP TIME, #36 ;30 SECS ELAPSED?
BLO CTSW ;BR IF NO
MOV LSTAT(R4), -(SP) ;TYPE CONTENTS OF RCSR
BIT #SW12, @SWR ;INHIBIT TYPEOUTS?
BNE 1$ ;BR IF YES
XWAIT ;PRINTOUT 'WAITING FOR CTS'
CLR TIME ;RESET TIMER
BR CTSW ;WAIT SOME MORE

CTSW:

REX: MOV #-1, SETTLE ;SET UP DELAY FLAG
CLR TEMP1
MOV #14, TEMP2
ADD #1, TEMP1
BNE -6
DEC TEMP2
BNE -14
REX1: RTS PC ;RETURN TO CONTROL PROGRAM

TEMP1: 0
TEMP2: 0
OWO=1
OWI=2
TLB=4
XLB=4
ILB=10

RCSR EQUATES
.EQUIV R4, RCSR
.EQUIV R4, CSR

```

```

1694
1695      100000
1696      000100
1697      000040
1698      010000
1699      004000
1700      002000
1701      001000
1702      000400
1703      000200
1704      000100
1705      000040
1706      000020
1707      000017
1708
1709
1710      000002
1711
1712      000004
1713      000002
1714      000001
1715

```

```

RI=100000
CF=100
CTS=40
SRD=10000
CS=4000
CM=2000
MM=1000
STEP=400
DONE=200
IE=100
SE=40
BUSY=20
LINE=17

```

```

;RING INDICATOR
;CARRIER FLAG
;CLEAR TO SEND
;SEC. RECEIVE DATA
;CLEAR SCAN
;CLEAR MUX
;MAINT MODE
;STEP
;DONE
;INTERRUPT ENABLE
;SCAN ENABLE
;BUST
;LINE NUMBER
;LINE STATUS REGGRSTER EQUATES
LSTAT=2
RQTS=4
DTR=2
LE=1

```

```

1716      011000
1717
1718
1719
1720
1721
1722
1723
1724
1725      011000
1726      011000      000002
1727      011004      000001
1728      011006      000001
1729      011010      000001
1730      011012      000001
1731      011014      000001
1732      011016      000001
1733
1734      011020      000001
1735      011022      000001
1736      011024      000001
1737      011026      000001
1738      011030      000001
1739      011032      000001
1740      011034      000001
1741      011036      000001
1742      011040
1743      011040      000001
1744      011041
1745      011041      000001
1746
1747      011042      000001
1748      011044      177570
1749      011046      177570
1750      011050      000001
1751      011052      000001
1752      011054      000001
1753      011056      000001
1754      011060      000001
1755      011062      000001
1756      011064      000001
1757      011066      000001
1758      011070      000001
1759      011072      000001
1760      011074      000001
1761
1762      011076      000001
1763      011100      000001
1764      011102      000001
1765      000001

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      . = 11000
;*****
; THE INTERFACE SERVICE ROUTINE IS LOADED HERE
;*****
; THE FOLLOWING 18 WORDS ARE USED AS
; THE LINKAGE BETWEEN THE ISR AND THE
; CONTROL PROGRAM.
;
VISR:
ISR:      .BLKW 2  ; ASCIZ "DXX"
BA:      .BLKW 1  ; 175610      ; BUS ADDRESS
VA:      .BLKW 1  ; 300        ; VECTOR ADDRESS
PRIOR:   .BLKW 1  ; 340        ; PRIORITY
PARAM1:  .BLKW 1  ; -1        ; PARAM #1
PARAM2:  .BLKW 1  ; -1        ; PARAM #2
PARAM3:  .BLKW 1  ; -1        ; PARAM #3

IRDA:    .BLKW 1  ; .WORD 0    ; INITIAL READ DATA ADDRESS
IXDA:    .BLKW 1  ; .WORD 0    ; INITIAL XMIT DATA ADDRESS
SETTLE:  .BLKW 1  ; .WORD 0    ; LINE SETTLE DELAY FLAG
IRCC:    .BLKW 1  ; .WORD 0    ; INITIAL RCV CHAR COUNT
B2016:   .BLKW 1  ; .WORD 0    ; ADDR OF BIN TO OCT TYPE ROUTINE
TIME:    .BLKW 1  ; .WORD 0    ; TIMER
MODEA:   .BLKW 1  ; .WORD 0    ; ADDR OF ITEMP PARAMS
          .BLKW 1  ; .WORD START ; ISR ENTRY ADDRESS

TX. TERM: .BLKB 1 ; .BYTE 000   ; TRANSMITER TERMINATING CHAR.
RX. TERM: .BLKB 1 ; .BYTE 012   ; RECEIVER TERMINATING CHAR.

FLAG:    .BLKW 1
SWR:     177570
DISPLAY: 177570
START:   .BLKW 1 ; NOP
          .BLKW 1 ; NOP
          .BLKW 1 ; NOP
          .BLKW 1 ; NOP
CONT.:   .BLKW 1 ; NOP
          .BLKW 1 ; NOP
          .BLKW 1 ; NOP
FINI:    .BLKW 1 ; MOV #340,PS ; LOCK OUT INTERRUPTS.
          .BLKW 1 ; MOV #ENTER,2(SP) ; SET FOR RETURN IF SW14=0
          .BLKW 1 ; JSR PC,SAVE05 ; GO SAVE YOUR REGISTERS.
          .BLKW 1 ; RTS PC ; EXIT

ENTER:   .BLKW 1 ; JSR PC,REST05 ; GO AND RESTORE REGISTERS
          .BLKW 1 ; MOV #-1,DELAY ; INDICATE DELAY FOR TX.
          .BLKW 1 ; JMP CONT. ; CONTINUE IN PROGRAM
          .END

```


GETPRM	003642	914#						
GETP3	003666	913	918	922#				
GETSTR=	104404	880	929	1027	1432#			
GETVA	003616	906#						
GOTIC	006040	1257	1264#					
HLTX	005262	1209	1211#					
IBUF	001604	803#	930	931	961	1029	1038	1040
IF	= 000100	1704#						
IFB	= 000010	1689#						
IOYVEC	= 000020	628#						
IRCC	011026	1737#						
IRCA	011020	962	1029*	1116	1734#			
ISX	011000	1094	1726#					
IV	010410	1623#						
IXDA	011022	963	1018*	1033*	1110	1735#		
KBDIN	= 104416	1100	1211	1442#				
LF	= 000001	1650	1714#					
LF	= 001537	780#	1269	1317				
LINE	= 000017	1707#						
LSTAT	= 000002	1661	1665	1710#				
LI	001374	729	731	734#	751	759	964	
LI	001426	743#	750					
LI	001452	741	753#					
MANBA	003404	840	845	848	852#			
MANIN	003316	834#						
MANINX	003460	862	866	869#				
MBA	010406	1622#	1642					
MFill	010155	970	1540#					
MM	= 001000	1701#						
MODEA	011034	1740#						
MSFCS	006334	1046*	1335*	1337*	1341#			
MSG00	007152	745	755	1540#				
MSG01	007154	876	1540#					
MSG02	007177	897	1540#					
MSG03	007222	903	1540#					
MSG04	007241	906	1540#					
MSG05	007263	909	1540#					
MSG06	007277	914	1540#					
MSG07	007314	919	1540#					
MSG08	007331	924	1540#					
MSG09	007350	977	980	1540#				
MSG10	007372	1026	1540#					
MSG11	007411	1103	1540#					
MSG12	007430	1167	1540#					
MSG13	007441	1196	1540#					
MSG14	007452	1202	1540#					
MSG15	007462	1452	1540#					
MSG16	007505	1457	1540#					
MSG17	007511	1540#						
MSG18	007564	1460#	1540#					
MSG19	007570	1060#	1540#					
MSG20	007615	1493	1540#					
MSG21	007637	1015	1540#					
MSG22	007653	1540#	1653					
MSG23	007767	1170	1540#					
MSG24	010003	1125	1540#					

MSG25	0100021	1460	1540#						
MSG26	0100060	1109	1540#						
MSG27	0101066	1115	1540#						
MSG	0101041	1503	1540#						
NOISR	003570	892	896#						
NOLC	004422	1049	1056#						
NOB	004070	959	966#						
NORTC	004524	1052	1063	1071#					
NULL	001524	685	771#						
OCT	006016	1259#	1262						
OUT	007040	1498	1512#						
OWI	000002	1107	1686#						
OWO	000001	1112	1655	1685#					
PARAM1	011012	1730#							
PARAM2	011014	1731#							
PARAM3	011016	1732#							
PARA1	010414	1625#	1649						
PARA2	010416	1626#							
PARA3	010420	1627#							
PND	000020	1557#	1586						
P10	010412	1624#							
PRIOR	011010	1729#							
PRTY0	000000	585#	1065	1075	1122	1494			
PRTY1	000040	586#							
PRTY2	000100	587#							
PRTY3	000140	588#	1152						
PRTY4	000200	589#							
PRTY5	000240	590#							
PRTY6	000300	591#							
PRTY7	000340	592#	819	1514					
PWI	100000	1553#	1571	1582					
PWRVEC	000024	629#							
QUES	001526	720	777#	878	927	1140	1314		
RECT	004202	979	1010#						
RECTRT	004210	1010	1011#						
RESEVEC	000010	624#							
REX	010556	1674#							
REX1	010514	1656	1681#						
RT	100000	1695#							
RTS	000004	1659	1712#						
RSTART	004102	967	970#	1016					
RWAIT	104410	1436#							
RX.TER	011041	1744#							
SWR	000040	1705#							
SWR1SWI	104420	978	1446#						
SWRATTLE	011024	1674*	1736#						
SWRD	010000	1698#							
SWRACK	001070	538#	818	1074	1124	1492			
SWRART	011050	1750#							
SWRARTX	010504	1659#							
TEP	000400	1702#							
TEP	104414	819	1065	1075	1122	1152	1440#	1494	
USWR	104420	820	1444#						
UTIME	004384	1046#							
UXCC	004272	1020	1022	1029#					
WFO	010101	1500	1540#						

K04

MAINDEC-11-DZITA-D INTERPROCESSOR TEST PROGRAM MACY11 27(1006) 01-DEC-76 11:01 PAGE 51
DZITAD.P11 01-DEC-76 11:00 CROSS REFERENCE TABLE -- MACRO NAMES

SEQ 0049

BOX	634#	696	772	814	825	831	872	988	1023	1079	1095	1135	1148	1229	1243
	1332	1448	1540	1561	1616	1638	1717								
HELLO	1#														
HLT	541#	1576	1591	1607											

. ABS. 011104 000

ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

DSKZ:DZITAD,DZITAD/SOL/CRF/EN:AMA=DZITAD.P11
RUN-TIME: 9 14 1 SECONDS
RUN-TIME RATIO: 107/25=4.1
CORE USED: 11K (21 PAGES)

