DL11-E

ONLINE TEST

MD-11-DZDLB-B

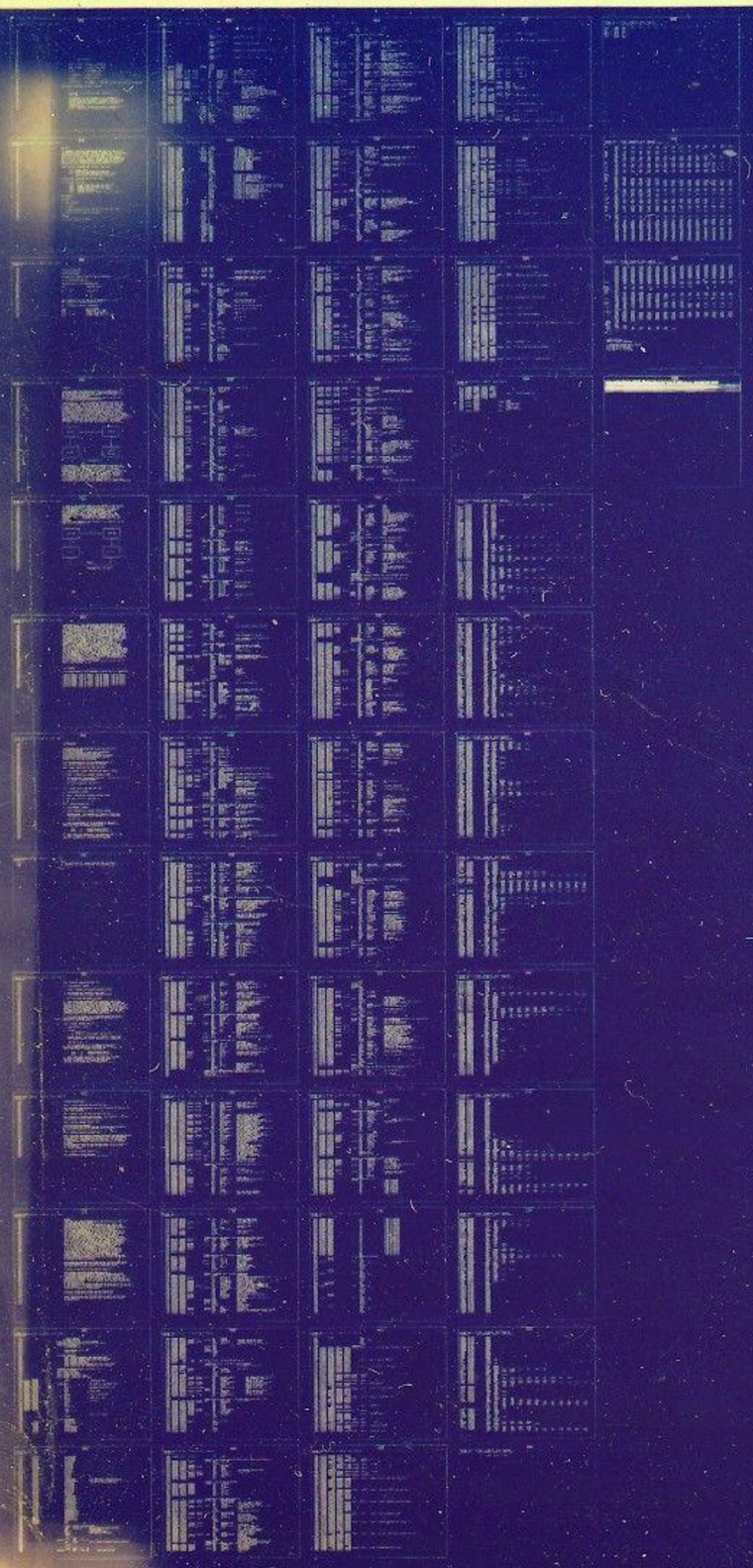
EP-DZDLB-B-DL-A

OCT 1976

FICHE 1 OF 1

digital

Made In U.S.A.



.REPT 3

IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZDLB-B-D
PRODUCT NAME: DL11-E ON LINE TESTS
DATE: 21-DECEMBER-1975
MAINTAINER: DIAGNOSTIC GROUP
AUTHOR: ROBERT WHITTON
REVISED BY: AL LOSCHAK JUN-75
M. MONALLY DEC-75 ;SUPPORT SOFTWARE SWITCH REGISTE

THIS MAINDEC OBSOLETES MAINDEC-11-DZDLBA

1. ABSTRACT

TWO SEPARATE DIAGNOSTIC PROGRAMS ARE PROVIDED FOR THE DL11-E (ASYNCRONOUS LINE INTERFACE), MAINDEC-11-DZDLA (DL11-E OFF LINE TESTS) AND MAINDEC-11-DZDLB (DL11-E ON LINE TESTS). THE OFF LINE TESTS TEST ALL DL11-E LOGIC AND MAY BE USED TO INDIVIDUALLY TEST UP TO 31 DL11-E'S. THE OFF LINE TESTS DO NOT REQUIRE THE USE OF A MODEM, HOWEVER A SPECIAL JUMPER CONNECTOR IS REQUIRED. THE ON LINE TESTS ARE ESSENTIALLY DATA RELIABILITY TESTS REQUIRING THE USE OF MODEMS AND A SUITABLE TERMINAL DEVICE.

THREE STARTING ADDRESSES ARE PROVIDED. THEY ARE:

200 - NORMAL START
210 - REMAP DEVICES PRESENT AND RESTART
220 - MODIFY DEVICE ADDRESSES IF NON STANDARD INSTRUCTIONS TO DO THIS ARE TYPED OUT.

THIS DOCUMENT DESCRIBES THE ON LINE TESTS.

THE AVAILABLE TESTS ARE:

PRG0 SINGLE CHARACTER LINE MODE DATA TEST
PRG1 BINARY COUNT LINE MODE DATA TEST
PRG2 MESSAGE TRANSMIT ONLY W/W.O PARITY
PRG3 RECEIVE DATA TEST
PRG4 MESSAGE TRANSMIT (SPIRAL) ONLY W/W O PARITY.

2. REQUIREMENTS

2.1 EQUIPMENT

A. PDP 11 SYSTEM
B. DL11-E(S)
C. SUITABLE TERMINAL DEVICE (ASR 33, 37, DATA POINT, ETC)
D. MODEM TYPE 103 OR 202 OR EQUIVALENT

2.2 STORAGE

THIS PROGRAM USES 8K OF MEMORY

3. OPERATING PROCEDURE:

3.1 LOADING PROCEDURE

THE ABSOLUTE LOADER IS USED TO LOAD THE PROGRAM.

3.2 DL11-E PARAMETER SELECTION

THE SELECTABLE DL11-E PARAMETERS ARE:

BIT1-0 CHARACTER LENGTH

BIT1	BIT0	CHAR. LENGTH
0	0	8
0	1	7
1	0	6
1	1	5

WHEN A TERMINAL IS INVOLVED DL11-E PARAMETERS SHOULD BE SET ACCORDING TO TERMINAL SPECIFICATIONS.

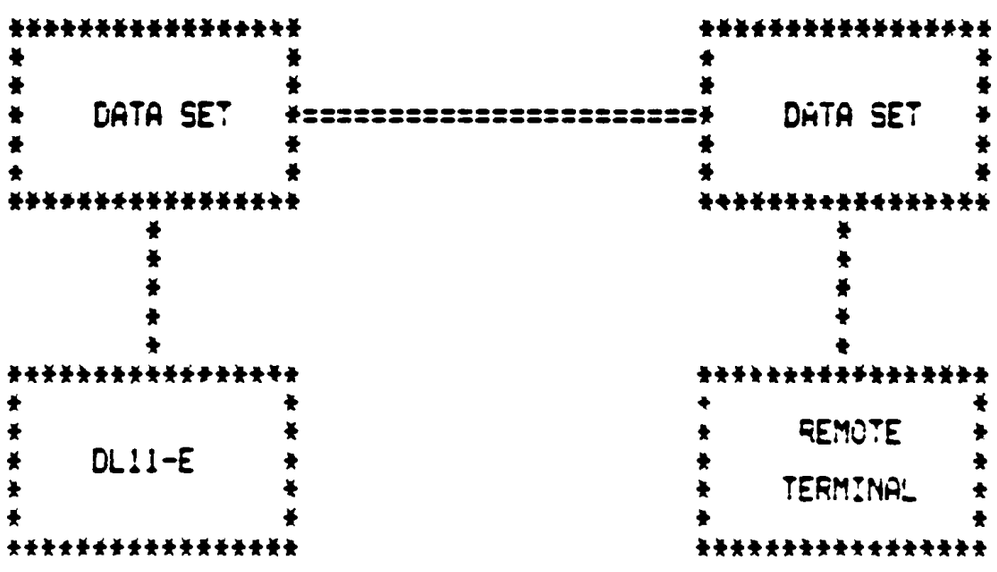
3.3 PDP-11 STANDARD OPERATING PARAMETERS

SW15	1	HALT ON ERROR
SW14	1	SCOPE LOOP (NOT USED)
SW13	1	INHIBIT ERROR PRINTOUT
SW12	1	INHIBIT TRACE TRAP (NOT USED
SW11	1	INHIBIT ITERATION (NOT USED)

3.4 GENERAL

THERE ARE THREE CONFIGURATIONS USING DL11-E/MODEM PAIRS WHICH MAY BE SELECTED BY PRG0 AND PRG1. THESE CONFIGURATIONS ARE SELECTED BY THE USER WHEN REQUESTED BY THE PROGRAM DURING THE LINE CONNECTION ROUTINE.
THE FOLLOWING PROCEEDURES SHOULD BE FOLLOWED TO SELECT ANY OF THE THREE SELECTABLE CONFIGURATIONS:

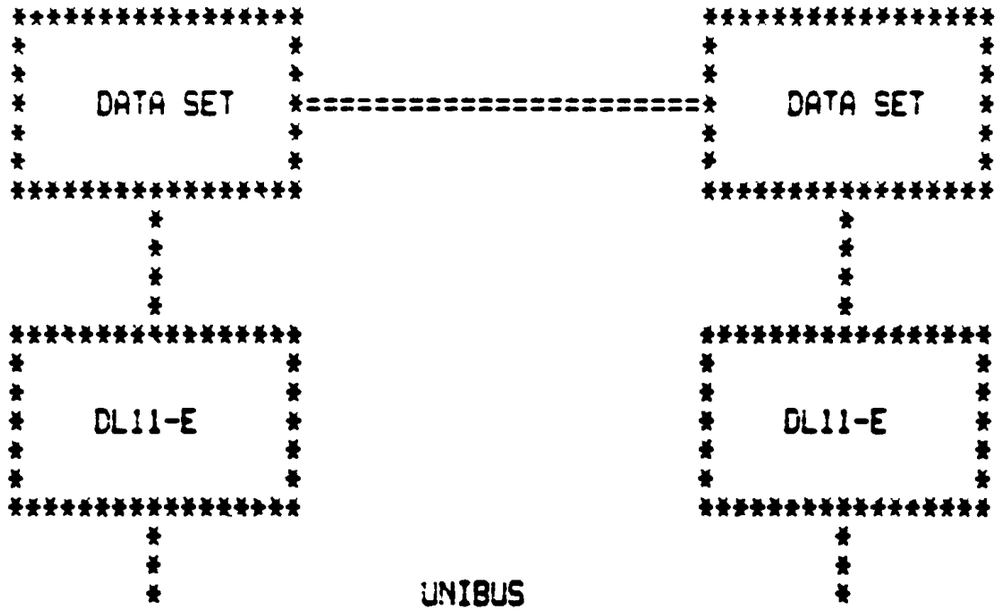
CONFIGURATION 0: THIS CONFIGURATION TRANSMITS DATA FROM THE DL11-E CONNECTED TO THE LINE THAT WAS CALLED TO THE MODEM THAT CALLED (THE CALLER). THIS CONFIGURATION MAY BE USED TO TRANMIT DATA TO A TERMINAL DEVICE. NOTE NO DATA CHECKING IS PERFORMED BY THE PROGRAM,HOWEVER DATA MAY BE VISUALLY CHECKED AT THE TERMINAL DEVICE. TO INITIATE PROGRAM ACTION CALL THE MODEM CONNECTED TO A DL11-E FROM A MODEM CONNECTED TO THE TERMINAL DEVICE. WHEN THE PHONE RINGS AT THE PDP11 THE PROGRAM WILL REQUEST THE CONFIGURATION. SET BITS0-1=00 BY TYPING IN OCTAL FOLLOWED BY A CR. WHEN THE 'HANDSHAKING' IS COMPLETED THE PROGRAM WILL REQUEST DL11-E PARAMETERS. TYPE THE PARAMETERS AS REQUESTED. THE PROGRAM WILL TYPE 'LINE CONNECTION MADE' AND BEGIN DATA TRANSMISSION.



CONFIGURATION 0

CONFIGURATION 1: THIS CONFIGURATION TRANSMITS DATA FROM THE DL11-E CONNECTED TO THE LINE THAT WAS CALLED TO THE DL11-E CONNECTED TO THE LINE THAT CALLED (THE CALLER). TO INITIATE PROGRAM ACTION CALL THE DL11-E YOU WISH TO TRANSMIT ON FROM THE LINE CONNECTED TO THE DL11-E YOU WISH TO RECEIVE THE DATA ON. WHEN THE PHONE RINGS AT THE PDP11 THE PROGRAM WILL REQUEST THE CONFIGURATION AND MODEM TYPE. TYPE BIT0-1=01 & BIT2=0 IF A 103 (OR EQUIV.) AND BIT2=1 IF A 202 (OR EQUIV.).
THE PROGRAM WILL REQUEST THE LINE NUMBER THAT YOU CALLED FROM. TYPE THIS IN OCTAL FOLLOWED BY A CARRIAGE RETURN. WHEN THE CARRIER

IS HEARD IN THE HEADSET PRESS THE DATA BUTTON ON THE DATA SET.
YOU HAVE APPROXIMATLY 10 SECONDS IN WHICH TO DO THIS. WHEN
THE 'HANDSHAKING' IS COMPLETED THE PROGRAM WILL REQUEST
DL11-E PARAMETERS. TYPE THE PARAMETERS AS REQUESTED.
THE PROGRAM WILL TYPE 'LINE CONNECTION MADE' AND
BEGIN DATA TRANSMISSION. WHEN 100. CHARACTERS HAVE BEEN
PROCESSED (TRANSMITTED/RECEIVED AND CHECKED) THE BELL WILL
RING AT THE TTY, AND ANOTHER 100. CHARACTER BLOCK WILL BE
PROCESSED.
NOTE, DL11-E#X REFERS TO THE 'CALLED' DL11-E, AND DL11-E#Y RE-
FERS TO THE CALLING DL11-E.



CONFIGURATION 1 103 OR 202
CONFIGURATION 2 103 ONLY

CONFIGURATION 2: THIS CONFIGURATION TRANSMITS DATA FROM BOTH
THE CALLED TRANSMITTER AND THE TRANSMITTER CONNECTED TO THE
LINE THAT WAS CALLING,I.E. IN ADDITION TO THE DATA TRANSMITTED
AS IN CONFIGURATION 1 DATA IS ALSO TRANSMITTED IN THE REVERSE
DIRECTION. TO INITIATE PROGRAM ACTION CALL THE DL11-E YOU WISH
TO TRANSMIT ON FROM THE DL11-E YOU WISH TO RECEIVE/TRANSMIT ON.
WHEN THE PHONE RINGS AT THE PDP11 THE PROGRAM WILL REQUEST THE
CONFIGURATION AND MODEM TYPE. TYPE BIT0-1 =10 AND BIT2=0. NOTE:
********DO NOT USE MODEM TYPE 202 (OR EQUIV) USING CONFIG #2****
THE PROGRAM WILL REQUEST THE LINE YOU CALLED FROM. TYPE THE
NUMBER IN OCTAL FOLLOWED BY A CR. WHEN THE CARRIER IS
HEARD IN THE HEADSET PRESS THE DATA BUTTON ON THE DATA SET.
NOTE YOU HAVE APPROXIMATLY 10 SECONDS IN WHICH TO DO THIS.
WHEN THE 'HANDSHAKING IS COMPLETED THE PROGRAM WILL REQUEST
TWO SETS OF DL11-E PARAMETERS. THE CHARACTER LENGTH OF BOTH SETS
MUST BE THE SAME AND THE SPEED OF THE SECOND SET MUST BE GREATER
THAN THE SPEED OF THE FIRST. WHEN THE PARAMETERS HAVE BEEN LOAD-
ED THE PROGRAM WILL TYPE 'LINE CONNECTION MADE' AND BEGIN TO
WAY DATA TRANSMISSION. WHEN 100. CHARACTERS HAVE BEEN RECEIVED
AND CHECKED THE BELL WILL RING AT THE TTY, AND ANOTHER BLOCK
OF 100. CHARACTERS WILL BE PROCESSED.
NOTE, DL11-E#X REFERS TO THE 'CALLED' DL11-E, AND DL11-E#Y RE-
FERS TO THE 'CALLING' DL11-E.

3.5 LINE NUMBERS

LINE NUMBER REFERS TO THE ADDRESSES TO WHICH THE DL11-E RESPONDS.

LINE 00	77561X	LINE 10	77571X	LINE 20	77601X	LINE 30	77611X
LINE 01	77562X	LINE 11	77572X	LINE 21	77602X	LINE 31	77612X
LINE 02	77563X	LINE 12	77573X	LINE 22	77603X	LINE 32	77613X
LINE 03	77564X	LINE 13	77574X	LINE 23	77604X	LINE 33	77614X
LINE 04	77565X	LINE 14	77575X	LINE 24	77605X	LINE 34	77615X
LINE 05	77656X	LINE 15	77576X	LINE 25	77606X	LINE 35	77616X
LINE 06	77567X	LINE 16	77577X	LINE 26	77607X	LINE 36	77617X
LINE 07	77570X	LINE 17	77600X	LINE 27	77610X		

4. USE PROCEDURE

THIS PROGRAM HAS BEEN MODIFIED TO RUN WITH OR WITHOUT
A CONSOLE PROCESSOR.
IF A CONSOLE MACHINE IS USED; THEN THE PROGRAM
LOOKS AT THE HARDWARE SWITCH REGISTER.
IF A CONSOLE-LESS MACHINE IS USED;THEN THE PROGRAM
AUTOMATICALLY LOOKS AT THE CONTENTS OF LOCATION
SOFTSR (176) AS A SWITCH REGISTER.

IT'S THE RESPONSIBILITY OF THE OPERATOR TO SET UP
THIS LOCATION PRIOR TO STARTING THE PROGRAM.

4.1 PRG0 SINGLE CHARACTER LINE MODE DATA TEST

A. LOAD ADDRESS = 000200 (RESTART LOAD ADDR. = 000200)

B. START - PROGRAM WILL REQUEST PROGRAM NUMBER

C. THE PROGRAM WILL NOW REQUEST THE DATA. TYPE THE DATA IN OCTAL
FOLLOWED BY A CARRIAGE RETURN.

D. MAKE LINE CONNECTION. SEE SECT 3.4

4.2 PRG1 - BINARY COUNT LINE MODE DATA TEST

A. LOAD ADDRESS = 000200

B. START - PROGRAM WILL REQUEST PROGRAM NUMBER

C. MAKE LINE CONNECTION SEE SECT 3.4

4.3 PRG2 - SPECIAL MESSAGE XMIT ONLY

A. LOAD ADDRESS = 000200

B. START - PROGRAM WILL REQUEST PROGRAM NUMBER

C. DEPRESS START - THE PROGRAM WILL IDENTIFY ITSELF AND
TYPE INSTRUCTIONS TO SELECT DESIRED DL11-E PARAMETERS

(SEE SECT 3.2)

D. TYPE IN PARAMETERS. IF IT IS DESIRED TO TRANSMIT
DATA WITH PARITY SET BIT6. ALSO SET BIT5 TO TRANSMIT ODD
PARITY AND CLEAR TO TRANSMIT EVEN PARITY.

BIT6	1/0	ENABLE/DISABLE PARITY
BIT5	1/0	TRANSMIT ODD/EVEN PARITY

E. WHEN 'MAKE LINE CONNECTION ' IS TYPED CALL THE DL11-E
YOU WISH TO TRANSMIT ON FROM THE TERMINAL MODEM.
WHEN THE 'HANDSHAKING' IS COMPLETED THE MESSAGE

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308                                     'THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK
309                                     0123456789' WILL BE TRANSMITTED. TO TERMINATE, HANG UP.
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4.4 PRG3 - RECEIVE TRANSMIT MESSAGE TEST

A. LOAD ADDRESS = 000200

B. START - PROGRAM WILL REQUEST PROGRAM NUMBER

C. THE PROGRAM WILL IDENTIFY ITSELF AND
TYPE INSTRUCTIONS TO SELECT DESIRED OPTIONS.

D. SET IN OPTIONS AND PRESS CONTINUE.

E. WHEN 'MAKE LINE CONNECTION' IS TYPED CALL THE DL11-E
YOU WISH TO TRANSMIT ON. WHEN THE 'HANDSHAKING' IS COMPLETED
THE DL11-E WILL TRANSMIT A CRLF TO THE TERMINAL DEVICE. AT THIS
TIME YOU MAY BEGIN TO SEND DATA FROM THE DEVICE TO THE DL11-E
WHERE IT WILL BE ECHOED BACK TO THE TERMINAL. TYPE ANY CHARACTER
TO SIGNAL START OF MESSAGE. THEN TYPE MESSAGE AND THE SAME
CHARACTER TO SIGNAL END OF MESSAGE. CONTROL C WILL CAUSE THE
BUFFERS CONTENTS TO BE TRANSMITTED WHEN TYPED.

F. IF NO ECHO IS DESIRED (ON A CHARACTER BASIS FOR EXAMPLE
WHEN USING A TERMINAL THAT PRODUCES ITS OWN LOCAL COPY)
SET BIT7 OF SWITCH REGISTER.

4.5 PRG4 - SPECIAL MESSAGE XMIT ONLY

A. LOAD ADDRESS = 000200

B. OPTIONS
1. BITS 0-2 = 4
2. BITS 3-6 = LINE NUMBER (SEE SECT 3.5)

C. DEPRESS START - THE PROGRAM WILL IDENTIFY ITSELF AND
TYPE INSTRUCTIONS TO SELECT DESIRED DL11-E PARAMETERS

(SEE SECT 3.2)

D. SET IN PARAMETERS IF IT IS DESIRED TO TRANSMIT
DATA WITH PARITY RAISE SR6. ALSO RAISE SR5 TO TRANSMIT ODD
PARITY AND LOWER TO TRANSMIT EVEN PARITY.

BIT6	1/0	ENABLE/DISABLE PARITY
BIT5	1/0	TRANSMIT ODD/EVEN PARITY

E. WHEN 'MAKE LINE CONNECTION ' IS TYPED CALL THE DL11-E
YOU WISH TO TRANSMIT ON FROM THE TERMINAL MODEM.
WHEN THE 'HANDSHAKING' IS COMPLETED A SPIRAL
PATTERN WILL BE TRANSMITTED. TO TERMINATE, HANG UP.

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                                5.      PROGRAM DESCRIPTIONS

                                5.1     PRG0 - SINGLE CHARACTER LINE MODE DATA TEST

                                        PRG0 TRANSMITS USER SPECIFIED DATA AND A CARRIAGE RETURN/LINE FEED
                                        EVERY 72ND CHARACTER.

                                5.2     PRG1 - BINARY COUNT PATTERN LINE MODE DATA TEST

                                        PRG1 TRANSMITS A BINARY COUNT PATTERN.  THIS PROGRAM IS THE SAME
                                        AS PRG0 EXCEPT FOR THE DATA TRANSMITTED.

                                5.3     PRG2 - SPECIAL MESSAGE TRANSMIT ONLY

                                        PRG2 TRANSMITS THE MESSAGE
                                        THE QUICk BROWN FOX JUMPED OVER THE LAZY DOGS BACK 0123456789.
                                        NO DATA ERROR CHECKING IS PERFORMED BY THE PROGRAM.

                                5.4     PRG3 - RECEIVE/TRANSMIT MESSAGE TEST

                                        PRG3 - RECEIVES DATA FROM A TERMINAL AND READS THE RECEIVED MESSAGE
                                        BACK, AND TYPES THE MESSAGE ON THE PDP-11 TTY WHEN THE MESSAGE
                                        IS TERMINATED.  CHARACTERS MAY BE ECHOED BACK (IF REQUIRED) ON
                                        A CHARACTER BASIS THEREBY CREATING LOCAL COPY AS THE MESSAGE
                                        IS TYPED.
                                        TRANSMISSION MAY BEGIN AT THE TERMINAL WHEN A CR/LF IS RECEIVED
                                        AT THE TERMINAL.  THIS PROGRAM IS RESTRICTED TO USE BY ONLY
                                        FULL DUPLEX MODEMS.

                                5.5     PRG4 - SPECIAL MESSAGE TRANSMIT ONLY

                                        PRG4 TRANSMITS A SPIRAL PATTERN.
                                        NO DATA CHECKING IS PERFORMED BY THE PROGRAM.
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                                5.0     ERRORS
                                        THERE ARE TWO TYPES OF ERRORS WHICH ARE DETECTED BY THESE TESTS
                                        LINE FAILURE,AND DATA ERRORS.
                                        LINE FAILURES ARE DETECTED AND REPORTED BY ALL TESTS, AND
                                        DATA ERRORS ARE DETECTED ONLY IN PRG 0 &1 WHEN USING CONFI-
                                        URATIONS 1 OR 2. DATA ERRORS IN THE OTHER TESTS MAY BE DETECT-
                                        ED BY VISUAL INSPECTION OF THE DATA AT THE TERMINAL.
                                        LINE FAILURES ARE REPORTED BY TYPING THE PC,THE RECEIVER CON-
                                        TROL STATUS REGISTER ADDRESS, AND ITS CONTENTS. SEE THE PRO-
                                        GRAM LISTING FOR A DETAILED DESCRIPTION OF THE ERROR.
                                        THE MOST FREQUENTLY ENCOUNTERED ERROR WILL PROBABLY BE THE
                                        LOSS OF CARRIER. THIS ERROR WILL BE REPORTED IF AFTER A LINE
                                        CONNECTION IS MADE THE CARRIER IS LOST, EITHER BY 'HANGING UP'
                                        OR A 'GLITCH' ON THE LINE CAUSING THE CARRIER TO MOMENTARILY
                                        DROP. IN EITHER INSTANCE THE PROGRAM DISCONNECTS THE DL11-E
                                        FROM THE MODEM (BY CLEARING DATA TERMINAL READY) AND THE
                                        LINE WILL HAVE TO BE RECONNECTED TO RESUME TESTING.
                                        IF IT IS PHYSICALLY IMPOSSIBLE TO GET TO THE DATA BUTTON
                                        WITHIN THE TIME ALLOTTED (APPROX. 10 SECONDS) TO MAKE THE
                                        LINE CONNECTION, THIS TIME MAY BE INCREASED BY PUTTING A
                                        LARGER NUMBER INTO THE DELAY. PATCH THE LARGER NUMBER
                                        INTO THE ADDRESS FOLLOWING THE DELAY EMT (BETWEEN RINTBG AND
                                        RINTBH).FOR EXAMPLE PATCHING IN 72460 WILL ALLOW APPROXIMATELY
                                        30 SECONDS IN WHICH TO RESPOND.

                                        DATA ERRORS ARE REPORTED BY TYPING THE PC, THE RECEIVER CONTROL
                                        REGISTER ADDRESS OF THE LINE THAT FAILED,WHAT THE DATA SHOULD
                                        HAVE BEEN,WHAT THE DATA WAS,AND THE CHARACTER NUMBER.

                                        PC=XXXXXX 174010 DATA S/B 301 WAS 321 CHAR NO 23

                                        THIS TYPEOUT INDICATES A DATA ERROR ON LINE 1
                                        IF CONFIGURATION 2 IS SELECTED TWO ERROR TYPOUTS MAY OCCUR
                                        FOR A SINGLE ERROR DEPENDING ON WHERE THE ERROR OCCURED. CON-
                                        FIGURATION 2 COMPARES THE DATA RECEIVED AT THE CALLED DL11-E
                                        WITH THE DATA TRANSMITTED BY THE CALLED DL11-E, AND ALSO THE DATA
                                        RECEIVED AT THE CALLING DL11-E (CALLER) WITH THE DATA TRANSMITTED
                                        BY THE CALLED DL11-E.
                                        IF FOR EXAMPLE A DATA ERROR OCURRED AT THE RECEIVER OF THE CALLING
                                        DL11-E CAUSING IT TO TRANSMIT INCORRECT DATA TO THE CALLED DL11-E TWO
                                        TYPEOUTS WILL OCCUR AS SHOWN BELOW:

                                        PC=XXXXXX 174010 DATA S/B 301 WAS 321 CHAR NO 23
                                        PC=XXXXXX 174000 DATA S/B 301 WAS 321 CHAR NO 23

                                        THESE TYPEOUTS SHOW THAT THE RECEIVER ON LINE 0 WAS THE CAUSE
                                        OF THE ERROR AND THE RECEIVER ON LINE 1 RECEIVED THE CORRECT
                                        INCORRECT DATA.

                                        .ENDR
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                                        .TITLE  DZDLBB
                                        .ENABLE ABS,AMA
                                ;THIS TEST CHECKS THE DL11-E USING MODEMS
                                ;REFER ALSO TO TEST DZDLA (DL11-E OFF LINE TESTS)
                                ;STARTING PROCEEDURE
                                ;       LOAD ADDRESS 200
                                ;
                                ;       STACK POINTER IS AT 1200
                                ;       PRESS START
                                ;
                                ;AVAILABLE PROGRAMS
                                ;       PRG0- SINGLE CHARACTER LINE MODE DATA TEST.
                                ;       PRG1- SPECIAL BINARY COUNT LINE MODE DATA TEST.
                                ;       PRG2- SPECIAL MESSAGE XMIT ONLY W/W/O PARITY
                                ;       PRG3- RECEIVE DATA TEST
                                ;       PRG4- SPIRAL PATTERN MESSAGE XMIT ONLY W/W/O PARITY
                                ;       PRG5- DATA ECHO TEST (USES FACILITY AT MAYNARD)

                                ;STANDARD SR SWITCH OPTIONS (SWITCH SET TO A 1 )
                                ;SR15- HALT ON ERROR.
                                ;SR14- SCOPE (NOT USED)
                                ;SR13- INHIBIT PRINTOUT
                                ;SR12- INHIBIT TRACE (NOT USED)
                                ;SR11- INHIBIT ITERATION (NOT USED)
000000                                  .=0
000000  004520                          ERTP                    ;UNASSIGNED TRAP
000002  000000                          0
000004  004520                  MACHER: ERTP                    ;SP OVERFLOW, BUS ERROR TRAP
000006  000040                          40
000010  004520                          ERTP                    ;RESERVED INSTRUCTION TRAP
000012  000100                          100
000014  004520                          ERTP                    ;TRACE TRAP
000016  000140                          140
000020  004626                          MAPVEC                  ;TRAP TO MAP VECTOR
000022  000340                          PRTY7
000024  002646                          PFAIL                   ;POWER FAIL TRAP
000026  000340                          PRTY7
000030  002222                          EMTINT                  ;EMT TRAP
000032  000340                          PRTY7
000034  004520                          ERTP
000036  000340                          340
000040  000042                          .+2
000042  000000                          HALT
                                        .REPT   119.
                                        .+2
                                        4                       ;TRAP TO MAP MAKER
                                        .ENDR

                                ;EQUATE STATEMENTS
177776                                  PSW=177776
001200                                  STKPTR=1200
000000                                  OPEN=0
100000                                  MANUAL=BIT15
100000                                  BIT15=100000
040000                                  BIT14=40000
020000                                  BIT13=20000
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                    010000          BIT12=10000
                    004000          BIT11=4000
                    002000          BIT10=2000
                    001000          BIT9=1000
                    000400          BIT8=400
                    000200          BIT7=200
                    000100          BIT6=100
                    000040          BIT5=40
                    000020          BIT4=20
                    000010          BIT3=10
                    000004          BIT2=4
                    000002          BIT1=2
                    000001          BIT0=1
                    005726          POPSP=5726              ;POP THE STACK. SAME AS TST (6)+
                    022626          POPSP2=022626           ;POP STACK TWICE. SAME AS CMP (6)+,(6)+
                    000340          PRTY7=340               ;PRIORITY LEVEL DEFINITIONS
                    000300          PRTY6=300
                    000240          PRTY5=240
                    000200          PRTY4=200
                    000140          PRTY3=140
                    000100          PRTY2=100
                    000040          PRTY1=40
                    000000          PRTY0=0
                    104000          TYPE=EMT+0
                    104001          TYPES=EMT+1
                    104002          STALL=EMT+2
                    104003          ERROR=EMT+3
                    104004          DATCHK=EMT+4
                    104005          CHALT=EMT+5
                    104006          STRXV=EMT+6
                    104007          STTXV=EMT+7
                    104010          EHALT=EMT+10
                    104011          SAVREG=EMT+11
                    104012          RSTREG=EMT+12
                    104013          ERROR1=EMT+13
                    104014          ERRTX=EMT+14
                    104015          ERRRX=EMT+15
                    104016          DELAY=EMT+16
                    000000          N=0
                    000000          A=0

                                    .MACR   CNVOA   SRC,DST,COUNT
                                    JSR     %5,OACNV        ;GO TO OCTAL TO ASCII CONVERT.
                                    SRC                     ;SOURCE ADDR.
                                    DST                     ;DESTINATION ADDR.
                                    COUNT                   ;#OF DIGITS TO CONVERT.
                                    .ENDM

                                    .MACR   ISR     N
                    RISR'N':        MOV     #'N',%0
                                    JMP     RISR            ;GO TO COMMON INTERRUPT SERVICE ROUTINE

                                    .ENDM

                                    .MACR   ISRT    N
                    TISR'N':        MOV     #'N',%0         ;PUT LINE # IN R0
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                                        JMP     TISR            ;GO TO COMMON INTERRUPT SERVICE

                                        .ENDM

                                        .MACR   RRCV    N,A
                                        175610+N                ;ADDRESS OF RECEIVER LINE # 'A'
                                        .ENDM

                                        .MACR   RBUFF   N,A
                                        175612+N                ;ADDRESS OF RECEIVER BUFFER LINE # 'A'
                                        .ENDM

                                        .MACR   TXMT    N,A
                                        175614+N                ;ADDRESS OF TRANSMITTER CSR LINE # 'A'
                                        .ENDM

                                        .MACR   TBUFF   N,A
                                        175616+N                ;ADDRESS OF TRANSMIT BUFFER LINE # 'A'
                                        .ENDM

000174                                  .=174
000174  177570                  SRPTR:  177570
000176  000000                  SOFTSR: 000000
000200                                  .=200
000200  012737  001422  000300          MOV     #START,STAD     ;SET UP FOR NORMAL START
000206  000407                          BR      STCONT          ;CONTINUE
000210  012737  001416  000300          MOV     #REMAP,STAD     ;SET FOR A REMAP START
000216  000403                          BR      STCONT
000220  012737  002024  000300          MOV     #MODEV,STAD     ;SET TO MODIFY ON START
000226                          STCONT:
000226  012706  001200                  MOV     #STKPTR,%6      ;SET BOTTOM OF STACK
000232  013746  000006                  MOV     6,-(SP)         ;SAVE CURRENT VECTOR
000236  013746  000004                  MOV     4,-(SP)
000242  012737  000254  000004          MOV     #1$,4                   ;SET UP TIME OUT VECTOR
000250  005777  177720                  TST     @SRPTR                  ;TRY TO REFERENCE THE
                                                                        ;HARDWARE SWITCH REGISTER
000254  000404                          BR      2$                      ;BRANCH IF NO TIME OUT TRAP OCCURRS
000256  012737  000176  000174  1$:     MOV     #SOFTSR,SRPTR           ;CHANGE THE SWITCH REGISTER POINTER
                                                                        ;TO POINT TO A SOFTWARE  SWITCH REGISTER
000264  022626                          CMP     (6)+,(6)+               ;RESTORE THE STACK
000266  012637  000004          2$:     MOV     (6)+,4                  ;RESTORE TIME OUT VECTOR
000272  012637  000006                  MOV     (6)+,6
000276  000137                          JMP     @(PC)+          ;JUMP TO SELECTED START
000300  000000                  STAD:   0
001200                                  .=1200
001200  000000                  RXCSR:  0               ;RECEIVER CSR UNDER TEST
001202  000000                  RXBUF:  0               ;RECEIVER BUFFER UNDER TEST
001204  000000                  TXCSR:  0               ;TRANSMITTER CSR UNDER TEST
001206  000000                  TXBUF:  0               ;TRANSMITTER BUFFER UNDER TEST
001210  000000                  RXVTR:  OPEN            ;RECEIVER VECTOR
001212  000200                  RXLVL:  PRTY4           ;RECEIVER PRIORITY LEVEL
001214  000000                  TXVTR:  OPEN            ;TRANSMITTER VECTOR
001216  000200                  TXLVL:  PRTY4           ;TRANSMITTER PRIORITY LEVEL
001220  177560                  TKS:    177560          ;KSR CSR
001222  177562                  TKB:    177562          ;KSR BUFFER
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                                TPS:    177564          ;LSP CSR
                                TPB:    177566          ;LSP BUFFER
                                TKVTR:  60              ;LSR INTERRUPT VECTOR
                                TKLVL:  PRTY4           ;LSR PRIORITY LEVEL
                                TPVTR:  64              ;LSP INTERRUPT VECTOR
                                TPLVL:  PRTY4           ;LSP PRIORITY LEVEL
                                PRGNUM: OPEN            ;CONTAINS CURRENT PROGRAM#
                                PRGID:  OPEN            ;CONTAINS PROGRAM INDICATORS
                                PRGTAB: PRG0            ;PRG0 START ADDRESS
                                        PRG1            ;PRG1 START ADDRESS
                                        PRG2            ;PRG2 START ADDRESS
                                        PRG3            ;PRG3 START ADDRESS
                                        PRG4            ;PRG4 START ADDRESS
                                        PRG5            ;PRG5 START ADDRESS
                                        INCPRG
                                        INCPRG
                                EMTTAB: TYP             ;POINTER TO TYPEOUT ROUTINE
                                        TYPS            ;POINTER TO CHAINED MESSAGES ROUTINE
                                        OPEN            ;POINTER TO RANDOM STALL ROUTINE
                                        ERR             ;POINTER TO ERROR ROUTINE
                                        DTCHK           ;POINTER TO DATA CHECK ROUTINE
                                        CHLT            ;COMMON HALT
                                        STRVRV          ;POINTER TO ROUTINE TO SET RCVR VECTOR AND PRIORITY
                                        STXMTV          ;POINTER TO ROUTINE TO SET XMIT VECTOR AND PRIORITY
                                        EHLT            ;POINTER TO ERROR HALT ROUTINE.
                                        SAVRG           ;POINTER TO SAVE REGISTERS ROUTINE
                                        RSTRG           ;POINTER TO RESTORE REGISTERS ROUTINE
                                        ERR1            ;POINTER TO ERROR ROUTINE
                                        TXERR           ;POINTER TO XMIT ERROR ROUTINE
                                        RXERR           ;POINTER TO RCVR ERROR ROUTINE
                                        DLY             ;POINTER TO DELAY ROUTINE
                                PARBIT: OPEN
                                COUNT:  OPEN
                                SAVE:   OPEN
                                LINE:   OPEN
                                CONFIG: OPEN
                                NUMBER: OPEN

                                OLDPS:  0
                                TOPC:   0
                                FROMPC: 0
                                FTITLE: 0
                                FNONE:  0
                                FMAP:   0
                                TEMP1:  0
                                LINENO: 0
                                RECDAT: OPEN
                                XMTDAT: OPEN
                                CARMSK: OPEN
                                CTRD:   OPEN
                                TXCSRT: OPEN
                                RXCSRT: OPEN
                                TEMP:   OPEN
                                SRT:    OPEN
                                INBUFP: OPEN
                                BUFFP:  OPEN
```

```
   665  001402  000000                    CALLER: OPEN
   666  001404  000000                    CALLED: OPEN
   667  001406  000000                    OTBUFP: OPEN                    ;CONTAINS ADDRESS FROM WHERE NEXT TRAN-
   668                                                                    ;SMITTED CHAR. (IN OUTBUF) IS TO COME
   669  001410  000000                    TBUFFP: OPEN
   670  001412  000000                    MODEM:  OPEN                    ;CONTAINS MODEM TYPE 0=103,4=202
   671  001414  000000                            OPEN            ;CONTAINS ADDRESS FROM WHERE NEXT TRANS-
   672                                                                    ;MITTED CHAR. (CALLER'S LINE) IS TO COME
   673                                            .
   674  001416  005037  001344           REMAP:  CLR     FTITLE
   675  001422  012706  001200           START:  MOV     #STKPTR,%6      ;SET BOTTOM OF SP STACK.
   676  001426  000005                           RESET
   677  001430  005037  177776                   CLR     PSW
   678  001434  012737  004520  000004           MOV     #ERTP,MACHER
   679  001442  012737  000040  000006           MOV     #40,MACHER+2
   680  001450  005737  001344                   TST     FTITLE          ;TITLE PRINTED
   681  001454  001145                           BNE     START1          ;YES, SKIP THIS
   682  001456  104000                           TYPE
   683  001460  012012                           MTITLE
   684  001462  005237  001344                   INC     FTITLE          ;SET TITLE PRINTED FLAG
   685  001466  005037  001346                   CLR     FNONE           ;CLEAR NO DEVICE FLAG
   686  001472  012737  177777  001354           MOV     #-1,LINENO
   687  001500  012737  001550  000004           MOV     #MAPNE,MACHER   ;SET UP FOR NO DEVICE ANSWER
   688  001506  012737  000340  000006           MOV     #PRTY7,MACHER+2
   689  001514  012704  010432                   MOV     #RCSR,%4        ;SET UP DEVICE POINTER
   690  001520  005237  001354           MAPA:   INC     LINENO
   691  001524  020427  010530                   CMP     %4,#RBUF        ;LAST DEVICE
   692  001530  001477                           BEQ     MAPEND          ;YES
   693  001532  005037  177776                   CLR     PSW
   694  001536  005774  000000                   TST     @(4)            ;TEST DEVICE
   695  001542  000240                           NOP
   696  001544  000240                           NOP
   697  001546  000404                           BR      MAPOK
   698  001550  062704  000002           MAPNE:  ADD     #2,%4
   699  001554  022626                           POPSP2
   700  001556  000760                           BR      MAPA
   701  001560  011437  001352           MAPOK:  MOV     (4),TEMP1       ;SAVE DEVICE FOR TYPING
   702  001564  004537  003530                   JSR     %5,DACNV
   703  001570  001352                           TEMP1
   704  001572  012154                           MDADR
   705  001574  000006                           6
   706  001576  004537  003530                   JSR     %5,DACNV
   707  001602  001354                           LINENO
   708  001604  012146                           MLINE
   709  001606  000002                           2
   710  001610  011401                           MOV     (4),%1          ;GET RXCSR DEVICE ADDRESS
   711  001612  004737  004704                   JSR     %7,FORMAD
   712  001616  052737  000001  001350           BIS     #BIT0,FMAP
   713  001624  042777  000100  177352           BIC     #BIT6,@TXCSR
   714  001632  052777  000100  177344           BIS     #BIT6,@TXCSR
   715  001640  000240                           NOP
   716  001642  012737  000340  177776           MOV     #PRTY7,PSW
   717  001650  005737  001210                   TST     RXVTR
   718  001654  001406                           BEQ     MAPOKA
   719  001656  013701  001354                   MOV     LINENO,%1
   720  001662  006301                           ASL     %1
```

```
721  001664  013761  001210  010334          MOV     RXVTR,VECTAB(1) ;STORE VECTOR
722  001672  042777  000100  177304  MAPOKA: BIC     #BIT6,@TXCSR
723  001700  004537  003530                  JSR     %5,OACNV
724  001704  001210                          RXVTR
725  001706  012166                          MTRAP
726  001710  000004                          4
727  001712  104000                          TYPE
728  001714  012146                          MLINE
729  001716  005237  001346                  INC     FNONE
730  001722  062704  000002                  ADD     #2,%4
731  001726  000674                          BR      MAPA
732  001730  012737  004520  000004  MAPEND: MOV     #ERTP,MACHER
733  001736  012737  000040  000006          MOV     #40,MACHER+2
734  001744  005737  001346                  TST     FNONE
735  001750  001007                          BNE     START1
736  001752  104000                  MAPERR: TYPE
737  001754  012176                          MNONE
738  001756  005037  001344                  CLR     FTITLE
739  001762  000000                          HALT
740  001764  000137  001422                  JMP     START
741  001770  005037  177776          START1: CLR     PSW
742  001774  104000                          TYPE
743  001776  012213                          MSWSEL
744  002000  004737  003314                  JSR     PC,RDOCT        ;GET INPUT
745  002004  012600                          MOV     (SP)+,%0                ;(SR) TO R0
746  002006  042700  177770                  BIC     #177770,%0      ;LIMIT (SR) TO BITS 2-0
747  002012  010037  001240                  MOV     %0,PRGNUM       ;SAVE PROGRAM #
748  002016  006300                          ASL     %0              ;R0X2
749  002020  000170  001244                  JMP     @PRGTAB(0)      ;GO TO SELECTED PROGRAM.
750
751  002024  012706  001200          MODEV:  MOV     #STKPTR,%6
752  002030  000005                          RESET
753  002032  005037  177776                  CLR     PSW
754  002036  104000                  MODEV1: TYPE
755  002040  014435                          MMOD1
756  002042  004737  003314                  JSR     PC,RDOCT        ;GET INPUT
757  002046  011600                          MOV     (SP),%0
758  002050  042700  177740                  BIC     #177740,%0
759  002054  006300                          ASL     %0
760  002056  022627  000036                  CMP     (SP)+,#35
761  002062  101403                          BLOS    MODEV2          ;BRANCH IF > 36
762  002064  104000                          TYPE
763  002066  014363                          MMODX
764  002070  000762                          BR      MODEV1
765  002072  104000                  MODEV2: TYPE
766  002074  014553                          MMOD2
767  002076  004737  003314          JSR     PC,RDOCT                ;GET INPUT
768  002102  032716  000001                  BIT     #BIT0,(SP)
769  002106  001403                          BEQ     MODEV3
770  002110  104000                          TYPE
771  002112  014473                          MMODD
772  002114  000756                          BR      MODEV2
773  002116  012601                  MODEV3: MOV     (SP)+,%1                ;SAVE DEV ADR
774  002120  010003                          MOV     %0,%3
775  002122  062703  010432                  ADD     #RCSR,%3
776  002126  010113                          MOV     %1,(3)
```

```
777  002130  062701  000002                ADD     #2,%1           ;UPDATE DEV ADR
778  002134  010003                        MOV     %0,%3
779  002136  062703  010530                ADD     #RBUF,%3
780  002142  010113                        MOV     %1,(3)
781  002144  062701  000002                ADD     #2,%1           ;UPDATE DEV ADR
782  002150  010003                        MOV     %0,%3
783  002152  062703  010626                ADD     #TCSR,%3
784  002156  010113                        MOV     %1,(3)
785  002160  062701  000002                ADD     #2,%1           ;UPDATE DEV ADR
786  002164  010003                        MOV     %0,%3
787  002166  062703  010724                ADD     #TBUF,%3
788  002172  010113                        MOV     %1,(3)
789  002174  104000                        TYPE
790  002176  014621                        MMOD3
791  002200  004737  003314                JSR     PC,RDOCT        ;GET INPUT
792  002204  022627  177777                CMP     (SP)+,#177777
793  002210  001712                        BEQ     MODEV1
794  002212  005037  001344                CLR     FTITLE
795  002216  000137  001422                JMP     START
796                                ;
797                                ;EMT TRAP INTERPRETER
798  002222  011646                EMTINT: MOV     @%6,-(6)        ;GET SAVED PC.
799  002224  162716  000002                SUB     #2,@%6          ;DECREMENT PC BY 2.
800  002230  017616  000000                MOV     @(6),@%6
801  002234  006116                EMTA:   ROL     @%6             ;EMT ARG X 2.
802  002236  042716  177001                BIC     #177001,@%6     ;REMOVE 7 MSB.
803  002242  062716  001264                ADD     #EMTTAB,@%6     ;FORM EMT RTN ADDR.
804  002246  017616  000000                MOV     @(6),@%6
805  002252  000136                        JMP     @(6)+           ;GO TO EMT ROUTINE.
806                                ;
807                                ;SAVE REGS 0 TO 4 SUBROUTINE.
808  002254  012637  002310        SAVRG:  MOV     (6)+,SVRPC      ;SAVE PC AND PSW.
809  002260  012637  002312                MOV     (6)+,SVRPSW
810  002264  010446                        MOV     %4,-(6)         ;SAVE REGS 0 - 4
811  002266  010346                        MOV     %3,-(6)         ;IN STACK.
812  002270  010246                        MOV     %2,-(6)
813  002272  010146                        MOV     %1,-(6)
814  002274  010046                        MOV     %0,-(6)
815  002276  013746  002312                MOV     SVRPSW,-(6)     ;RESTORE PC AND PSW.
816  002302  013746  002310                MOV     SVRPC,-(6)
817  002306  000002                        RTI                     ;EXIT.
818  002310  000000                SVRPC:  OPEN
819  002312  000000                SVRPSW: OPEN
820                                ;
821                                ;RESTORE REGS 0 TO 4 SUBROUTINE.
822  002314  012637  002350        RSTRG:  MOV     (6)+,RSTPC      ;SAVE PC AND PSW.
823  002320  012637  002352                MOV     (6)+,RSTPSW
824  002324  012600                        MOV     (6)+,%0         ;RESTORE REGS 0 - 4
825  002326  012601                        MOV     (6)+,%1         ;FROM STACK.
826  002330  012602                        MOV     (6)+,%2
827  002332  012603                        MOV     (6)+,%3
828  002334  012604                        MOV     (6)+,%4
829  002336  013746  002352                MOV     RSTPSW,-(6)     ;RESTORE PC AND PSW.
830  002342  013746  002350                MOV     RSTPC,-(6)
831  002346  000002                        RTI                     ;EXIT
832  002350  000000                RSTPC:  OPEN
```

```
                                RSTPSW: OPEN
                                INCPRG: TYPE                    ;TYPE INCORRECT PROGRAM SELECTED.
                                        AINPRG
                                        HALT
                                        JMP     START
                                ;COMMON HALT ROUTINE
                                CHLT:   MOV     @%6,%0          ;DEVELOP ADDRESS OF CALLER.
                                        SUB     #2,%0
                                        HALT                    ;HALT. ADDRESS OF CALL INSTRUCTION
                                        RTI                     ;IN DATA LIGHTS.
                                ;
                                ;CONDITIONAL ERROR HALT ROUTINE.
                                EHLT:   TST     @SRPTR          ;CHECK FOR HALT ON ERROR.
                                        BPL     EHLTA           ;BRANCH IF NO HALT DESIRED.
                                        HALT                    ;HALT.
                                EHLTA:  RTI                     ;IN DATA LIGHTS.
                                ;
                                ;DATA CHECK ROUTINE.
                                DTCHK:  BIC     CARMSK,XMTDAT   ;CLEAR UNTRANSMITTED BITS
                                        CMPB    RECDAT,XMTDAT   ;COMPARE TRANSMITTED AND RECEIVED
                                        BEQ     DTCHKA          ;CHARS. BRANCH IF SAME.
                                        CNVOA   RECDAT,CWAS,3
                                        CNVOA   XMTDAT,CSB,3
                                        CNVOA   RXCSR,CSRADD,6
                                        ERROR
                                        CSRADD
                                        JSR     5,BDCNV         ;CONVERT
                                        CTRD                    ;CHAR #
                                        CRNUM                   ;TO DECIMAL
                                        4                       ;4 BITS
                                        ERROR1
                                        CERDAT
                                DTCHKA: RTI                     ; EXIT.
                                ;
                                ERR:    MOV     #-1,ERRB        ;SET UP ONE MESSAGE CALL.
                                        MOV     #240,ERRB+2
                                        CLR     ERRE
                                        BR      ERRA
                                ERR1:   MOV     @%6,ERRB        ;DEVELOP ADDT'L MESSAGE ADDR.
                                        MOV     @ERRB,ERRB      ;STORE AT ERRB.
                                        MOV     #-1,ERRB+2
                                        MOV     #2,ERRE
                                ERRA:   BIT     #BIT13,@SRPTR   ;INHIBIT ERROR PRINT?
                                        BNE     ERRC            ;BRANCH TO INHIBIT PRINT.
                                        MOV     @%6,ERRD        ;DEVELOP CALLING ADDR.
                                        SUB     #2,ERRD
                                        CNVOA   ERRD,APC,6      ;CONVERT CALL ADDR TO ASCII.
                                        SAVREG
                                        TYPES                   ;TYPE:
                                        EMD                     ;ERROR HEADER,
                                ERRB:   OPEN                    ;ADDT'L ERROR MESSAGE IF ANY.
                                        -1
                                        RSTREG
                                ERRC:   EHALT                   ;GO ERR HALT IF DESIRED.
                                        ADD     ERRE,@%6
                                        RTI                     ;EXIT.
```

```
889  002642  000000                  ERRD:   OPEN
890  002644  000000                  ERRE:   OPEN
891                                  ;
892                                  ;POWER FAIL SERVICE
893  002646  012737  002656  000024 PFAIL:  MOV     #PWRUP,@#24
894  002654  000000                         HALT
895  002656  012737  002646  000024 PWRUP:  MOV     #PFAIL,@#24
896  002664  000005                         RESET
897  002666  012706  001200                 MOV     #STKPTR,%6
898  002672  104000                         TYPE
899  002674  014325                         MPWRF
900  002676  013700  001240         RESTRT: MOV     PRGNUM,%0
901  002702  006300                         ASL     %0
902  002704  000170  001244                 JMP     @PRGTAB(0)
903                                  ;
904  002710                         TXERR:  CNVOA   TXCSRT,ATXWAS,6 ;CONVERT CONTENTS OF TXCSR TO ASCII.
905  002722  012737  012445  003026         MOV     #ATXCSR,CRXTXB
906  002730  000410                         BR      CRXTX
907  002732                         RXERR:  CNVOA   RXCSRT,ARXWAS,6 ;CONVERT CONTENTS OF RXCSR TO ASCII.
908  002744  012737  012466  003026         MOV     #ARXCSR,CRXTXB
909  002752  011637  003024         CRXTX:  MOV     @%6,CRXTXA      ;DEVELOP ADDR OF ADDTT'L ERROR MESSAGE.
910  002756  017737  000042  003024         MOV     @CRXTXA,CRXTXA
911  002764  032777  020000  175502         BIT     #BIT13,@SRPTR   ;INHIBIT PRINT?
912  002772  001017                         BNE     CRXTXC          ;BRANCH TO INHIBIT PRINT.
913  002774  011637  002642                 MOV     @%6,ERRD        ;DEVELOP CALLING ADDR.
914  003000  162737  000002  002642         SUB     #2,ERRD
915  003006                                 CNVOA   ERRD,APC,6      ;CONVERT CALLING ADDR TO ASCII.
916  003020  104001                         TYPES                   ;TYPE ERROR MESSAGE.
917  003022  012427                         EMO                     ;ERR HEADER
918  003024  000000                 CRXTXA: OPEN                    ;ADDT'L ERR MESSAGE
919  003026  000000                 CRXTXB: OPEN                    ;TXCSR OR RXCSR CONTENTS.
920  003030  177777                         -1
921  003032  104010                 CRXTXC: EHALT                   ;GO HALT IF DESIRED.
922  003034  062716  000002                 ADD     #2,@%6
923  003040  000002                         RTI                     ;EXIT.
924                                  ;
925                                  ;ROUTINE TO SET RECEIVER INTERRUPT VECTOR AND PRIORITY
926  003042  017637  000000  003062 STRVRV: MOV     @(6),STPRA+2    ;MOVE VECTOR ADDR TO STPRA+2
927  003050  062716  000002                 ADD     #2,@%6          ;SET UP EXIT
928  003054  013701  001210                 MOV     RXVTR,%1
929  003060  012721  000000         STPRA:  MOV     #OPEN,(1)+      ;SET VECTOR ADDRESS
930  003064  013721  001212                 MOV     RXLVL,(1)+      ;SET PRIORITY
931  003070  000002                         RTI                     ;EXIT
932                                  ;
933                                  ;ROUTINE TO SET TRANSMITTER INTERRUPT VECTOR AND PRIORITY.
934  003072  017637  000000  003112 STXMTV: MOV     @(6),STPPA+2    ;MOVE VECTOR ADDR TO STPPA+2
935  003100  062716  000002                 ADD     #2,@%6          ;SET UP EXIT
936  003104  013701  001214                 MOV     TXVTR,%1
937  003110  012721  000000         STPPA:  MOV     #OPEN,(1)+      ;SET VECTOR ADDRESS.
938  003114  013721  001216                 MOV     TXLVL,(1)+      ;SET PRIORITY
939  003120  000002                         RTI                     ;EXIT.
940                                  ;
941                                  ;SUBROUTINE TO OUTPUT ASCII MESSAGE ON TELETYPE PRINTER.
942  003122  010037  003312         TYP:    MOV     %0 ,SAVR0               ;SAVE R0
943  003126  011600                         MOV     @%6,%0          ;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS.
944  003130  062716  000002                 ADD     #2,@%6          ;SET UP EXIT.
```

```
  945  003134  011000                          MOV     @%0,%0          ;ADDRESS OF MESSAGE TO R0.
  946  003136  112037  003242          TYPA:   MOVB    (0)+,TYPDAT     ;GET CHARACTER
  947  003142  122737  000100  003242          CMPB    #100,TYPDAT     ;CHECK FOR"@"CHARACTER
  948  003150  001003                          BNE     TYPC            ;BRANCH IF NOT"@".
  949  003152  013700  003312                  MOV     SAVR0,%0                ;RESTORE R0
  950  003156  000002                          RTI                     ;TERMINATOR CHAR. DONE. EXIT.
  951  003160  122737  000045  003242  TYPC:   CMPB    #45,TYPDAT      ;CHECK FOR"%".
  952  003166  001412                          BEQ     TYPF            ;BRANCH IF"%"
  953  003170  004737  003176                  JSR     %7,TYPD         ;TYPE CHAR IN TYPDAT
  954  003174  000760                          BR      TYPA
  955  003176  113777  003242  176022  TYPD:   MOVB    TYPDAT,@TPB     ;OUTPUT CHARACTER TO PRINTER
  956  003204  105777  176014                  TSTB    @TPS            ;WAIT FOR DONE FLAG.
  957  003210  100375                          BPL     .-4
  958  003212  000207                          RTS     %7              ;EXIT
  959  003214  112737  000015  003242  TYPF:   MOVB    #15,TYPDAT      ;MOVE CARRIAGE RETURN CODE TO TYPDAT
  960  003222  004737  003176                  JSR     %7,TYPD         ;GO TYPE CHAR.
  961  003226  112737  000012  003242          MOVB    #12,TYPDAT      ;MOVE LF CODE TO TYPDAT.
  962  003234  004737  003176                  JSR     %7,TYPD         ;GO TYPE CHAR.
  963  003240  000736                          BR      TYPA
  964  003242  000000                  TYPDAT: OPEN
  965                                   ;SUBROUTINE TO OUTPUT A SERIES OF ASCII MESSAGES ON TELETYPE PRINTER
  966  003244  010037  003312          TYPS:   MOV     %0,SAVR0
  967  003250  011600                  TYPSAA: MOV     @%6,%0          ;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS
  968  003252  062716  000002                  ADD     #2,@%6          ;UPDATE TO NEXT MESSAGE ADDRESS
  969  003256  011037  003306                  MOV     @%0,TYPSB       ;ADDRESS OF MESSAGE TO TYPSB
  970  003262  022737  177777  003306          CMP     #-1,TYPSB       ;CHECK FOR TERMINATOR
  971  003270  001003                          BNE     TYPSA           ;BRANCH IF NOT TERMINATOR.
  972  003272  013700  003312                  MOV     SAVR0,%0                ;RESTORE R0
  973  003276  000002                          RTI                     ;TERMINATOR, EXIT
  974  003300  013700  003312          TYPSA:  MOV     SAVR0,%0
  975  003304  104000                          TYPE                    ;CALL ON TYP SUB TO TYPE MESSAGE
  976  003306  000000                  TYPSB:  OPEN                    ;ADDRESS OF MESSAGE GOES HERE
  977  003310  000757                          BR      TYPSAA          ;GO PROCESS NEXT MESSAGE
  978  003312  000000                  SAVR0:  OPEN
  979                                   ;
  980                                   ;SUBROUTINE TO READ OCTAL DATA FROM THE TELETYPE PRINTER
  981  003314  011646                  RDOCT:  MOV     (SP),-(SP)      ;MAKE ROOM FOR DATA WORD
  982  003316  010046                          MOV     %0,-(SP)        ;SAVE R0
  983  003320  010146                          MOV     %1,-(SP)        ;SAVE R1
  984  003322  005001                  INDAT:  CLR     %1              ;CLEAR DATA WORD
  985  003324  005037  001324                  CLR     COUNT           ;SET NO. OF DIGITS = 0
  986  003330  105777  175664          RDDAT:  TSTB    @TKS            ;TEST TTY READ STATUS
  987  003334  100375                          BPL     RDDAT           ;WAIT
  988  003336  117746  175660                  MOVB    @TKB,-(SP)      ;PUSH DIGIT ON STACK
  989  003342  042716  000200                  BIC     #BIT7,(SP)
  990  003346  105777  175652          ECDAT:  TSTB    @TPS            ;TEST TTY PRINT STATUS
  991  003352  100375                          BPL     ECDAT           ;WAIT
  992  003354  111677  175646                  MOVB    (SP),@TPB       ;ECHO CHARACTER
  993  003360  122716  000015                  CMPB    #15,(SP)        ;IS IT A TERMINATOR?
  994  003364  001432                          BEQ     RETRN           ;BR IF YES
  995  003366  122716  000177                  CMPB    #177,(SP)       ;IS IT A RUBOUT?
  996  003372  001423                          BEQ     RREAD           ;BR IF YES
  997  003374  122716  000060                  CMPB    #60,(SP)        ;IS IT AN OCTAL DIGIT?
  998  003400  003020                          BGT     RREAD           ;BR IF NO
  999  003402  122716  000067                  CMPB    #67,(SP)        ;TEST AGAIN
 1000  003406  002415                          BLT     RREAD           ;BR IF NO
```

```
1001  003410  005237  001324          INC     COUNT           ;INC NO. OF DIGITS
1002  003414  022737  000067  001324  CMP     #67,COUNT       ;MORE THAN SIX DIGITS?
1003  003422  003407                  BLE     RREAD           ;BR IF YES
1004  003424  006301                  ASL     %1              ;CLEAR LOWEST THREE BITS
1005  003426  006301                  ASL     %1              ;OF DATA WORD
1006  003430  006301                  ASL     %1
1007  003432  162716  000060          SUB     #60,(SP)        ;CONVERT TO BINARY
1008  003436  062601                  ADD     (SP)+,%1        ;ADD DIGIT TO DATA WORD
1009  003440  000733                  BR      RDDAT           ;GET NEXT DIGIT
1010  003442  104000          RREAD:  TYPE                    ;TELL USER ABOUT ILLEGAL CHARACTER
1011  003444  013232                  DTERR
1012  003446  005726                  TST     (SP)+           ;GET RID OF ILLEGAL CHARACTER
1013  003450  000724                  BR      INDAT           ;START SUBROUTINE AGAIN
1014  003452  010166  000010  RETRN:  MOV     %1,10(SP)       ;STORE DATA WORD ON STACK
1015  003456  005726                  TST     (SP)+           ;INC STACK POINTER
1016  003460  012601                  MOV     (SP)+,%1        ;RESTORE R1
1017  003462  012600                  MOV     (SP)+,%0        ;RESTORE R0
1018  003464  000207                  RTS     PC              ;RETURN
1019                          ;
1020                          ;SUBROUTINE TO DELAY A SPECIFIED NUMBER OF MILLISECONDS
1021  003466  011637  003526  DLY:    MOV     @%6,DLCNT       ;GET DELAY COUNT ADDRESS.
1022  003472  062716  000002          ADD     #2,@%6          ;SET UP EXIT ADDRESS
1023  003476  017746  000024          MOV     @DLCNT,-(6)     ;DELAY COUNT TO STACK
1024  003502  001407                  BEQ     DLYC
1025  003504  012746  000226  DLYA:   MOV     #226,-(6)       ;1 MSEC COUNT TO STACK
1026  003510  005316          DLYB:   DEC     @%6             ;DECREMENT 1 MSEC COUNT
1027  003512  001376                  BNE     DLYB            ;BRANCH IF NOT 0.
1028  003514  005726                  POPSP                   ;ZERO. UNCOVER MSECS. COUNT.
1029  003516  005316                  DEC     @%6             ;DECREMENT IT
1030  003520  001371                  BNE     DLYA            ;BR IF NOT DONE DELAYING
1031  003522  005726          DLYC:   POPSP                   ;DONE
1032  003524  000002                  RTI                     ;EXIT.
1033  003526  000000          DLCNT:  OPEN                    ;CONTAINS MILLISECONDS COUNT ADDRESS.
1034                          ;
1035                          ;OCTAL TO ASCII CONVERT ROUTINE
1036  003530  104011          OACNV:  SAVREG                  ;SAVE REGS.
1037  003532  013500                  MOV     @(5)+,%0        ;GET OCTAL VALLE.
1038  003534  012501                  MOV     (5)+,%1         ;GET DESTINATION ADDR.
1039  003536  012502                  MOV     (5)+,%2         ;GET CONVERT COUNT.
1040  003540  060201                  ADD     %2,%1           ;DEVELOP ADDR TO STORE 1ST CHAR.
1041  003542  010003          OACNVA: MOV     %0,%3
1042  003544  042703  177770          BIC     #177770,%3      ;ISOLATE LEAST SIGNIFICANT DIGIT.
1043  003550  062703  000060          ADD     #60,%3          ;CONVERT DIGIT TO ASCII.
1044  003554  110341                  MOVB    %3,-(1)         ;STORE ASCII CHARACTER.
1045  003556  042700  000007          BIC     #7,%0
1046  003562  006000                  ROR     %0
1047  003564  006000                  ROR     %0
1048  003566  006000                  ROR     %0
1049  003570  005302                  DEC     %2              ;DONE ALL DIGITS?
1050  003572  001363                  BNE     OACNVA          ;BRANCH IF NOT DONE.
1051  003574  104012                  RSTREG                  ;RESTORE REGS.
1052  003576  000205                  RTS     %5              ;DONE. EXIT.
1053                          ;SUBROUTINE TO GENERATE PARITY ON DATA FOR 5,6,7,8 LEVEL CODE.
1054                          ;PARITY BIT IS THE MSB OF THE CHARACTER PARITY CAN BE EITHER
1055                          ;EVEN OR ODD
1056                          ;GENERATES ODD/EVEN PARITY.
```

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1057
1058  003600  032737  000200  001362  GENPAR: BIT     #BIT7,CARMSK    ;TEST LSB CHAR LENGTH
1059  003606  001411                          BEQ     EIGHT           ;CHAR IS 8
1060  003610  032737  000100  001362          BIT     #BIT6,CARMSK    ;TEST MSB CHAR LENGTH
1061  003616  001427                          BEQ     SEVEN           ;CHAR LENGTH IS 7
1062  003620  032737  000040  001362          BIT     #BIT5,CARMSK
1063  003626  001412                          BEQ     SIX
1064  003630  000433                          BR      FIVE
1065  003632  012737  000200  001322  EIGHT:  MOV     #BIT7,PARBIT    ;PLACE PARITY BIT IN PROPER POSITION
1066  003640  012737  000007  001324          MOV     #7,COUNT        ;SET UP ROTATE COUNTER=7
1067  003646  042701  177600                  BIC     #177600,%1      ;MASK OFF UNUSED BITS
1068  003652  000433                          BR      DOIT            ;GO AND GENERATE PARITY FOR 8
1069  003654  012737  000040  001322  SIX:    MOV     #BIT5,PARBIT    ;PLACE PARITY BIT IN PROPER POSITION
1070  003662  012737  000005  001324          MOV     #5,COUNT        ;SET UP ROTATE COUNTER=5
1071  003670  042701  177740                  BIC     #177740,%1      ;MASK OFF UNUSED BITS
1072  003674  000422                          BR      DOIT            ;GO AND GENERATE PARITY FOR
1073  003676  012737  000100  001322  SEVEN:  MOV     #BIT6,PARBIT    ;PLACE PARITY BIT IN PROPER POSITION
1074  003704  012737  000006  001324          MOV     #6,COUNT        ;SET UP ROTATE COUNTER=6
1075  003712  042701  177700                  BIC     #177700,%1      ;MASK OFF UNUSED BITS
1076  003716  000411                          BR      DOIT            ;GO AND GENERATE PARITY FOR 7
1077  003720  012737  000020  001322  FIVE:   MOV     #BIT4,PARBIT    ;PLACE PARITY BIT IN PROPER POSITION
1078  003726  012737  000004  001324          MOV     #4,COUNT        ;SET UP ROTATE COUNTER=4
1079  003734  042701  177760                  BIC     #177760,%1      ;MASK OFF UNUSED BITS
1080  003740  000400                          BR      DOIT            ;GO AND GENERATE PARITY FOR
1081  003742  010137  001326          DOIT:   MOV     %1,SAVE         ;SAVE DATA
1082  003746  006001                  AGAIN:  ROR     %1              ;ROTATE DATA
1083  003750  103415                          BCS     ADD1            ;IF CARRY SET ADD IN PARBIT
1084  003752  005337  001324          RTN:    DEC     COUNT           ;DECREMENT COUNTER
1085  003756  001373                          BNE     AGAIN           ;NOT DONE DO IT AGAIN
1086  003760  032737  000040  001374          BIT     #BIT5,SRT       ;DONE EVEN OR ODD PARITY?
1087  003766  001403                          BEQ     DONE            ;IF EVEN FINISHED
1088  003770  063737  001322  001326          ADD     PARBIT,SAVE     ;IF ODD ADD IN ANOTHER 1
1089  003776  013701  001326          DONE:   MOV     SAVE,%1         ;PLACE DATA + PARITY BACK IN R1
1090  004002  000207                          RTS     7               ;AND EXIT
1091  004004  063737  001322  001326  ADD1:   ADD     PARBIT,SAVE     ;ADD PARBIT TO DATA
1092  004012  000757                          BR      RTN             ;RETURN TO COUNTER
1093
1094                                  ;SUBROUTINE TO SELECT LINE AND LOAD VECTOR ASSIGNMENT
1095  004014  104000                  LINSEL: TYPE
1096  004016  014256                          LDLINE
1097  004020  004737  003314                  JSR     PC,RDOCT        ;GET INPUT
1098  004024  012601                          MOV     (SP)+,%1                ;LOAD R1
1099  004026  042701  177407                  BIC     #177407,%1      ;MASK OFF ALL BUT LINE BITS
1100  004032  006201                          ASR     %1
1101  004034  006201                          ASR     %1
1102  004036  010137  001372                  MOV     %1,TEMP         ;SAVE LINE #
1103  004042  012703  001200                  MOV     #RXCSR,%3       ;LOAD ADDRESS OF REGISTERS
1104  004046  012704  000004                  MOV     #4,%4           ;SET UP COUNTER
1105  004052  016102  010432                  MOV     RCSR(1),%2
1106  004056  010223                  LINSA:  MOV     %2,(3)+
1107  004060  062702  000002                  ADD     #2,%2
1108  004064  005304                          DEC     %4
1109  004066  001373                          BNE     LINSA
1110  004070  016101  010334                  MOV     VECTAB(1),%1    ;GET LINE VECTOR ADDRESS
1111  004074  010123                          MOV     %1,(3)+         ;LOAD INTO PROG. RXVTR
1112  004076  022121                          CMP     (1)+,(1)+       ;ADD +4 TO RXVTR TO = TXVTR
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1113  004100  005723                          TST     (3)+            ;POINT TO PROG TXVTR
1114  004102  010113                          MOV     %1,(3)          ;LOAD INTO PROG TXVTR
1115  004104  022737  000005  001240          CMP     #5,PRGNUM       ;RUNNING PROGRAM # 5
1116  004112  001001                          BNE     .+4
1117  004114  000205                          RTS     5               ;RETURN TO PROG 5
1118  004116  006237  001372                  ASR     TEMP            ;POSITION
1119  004122                                  CNVOA   TEMP,TLINEX,2
1120  004134  104000                          TYPE                    ;TYPE LINE # THAT
1121  004136  013665                          ALINEX                  ;WAS CALLED
1122  004140  000205                          RTS     5
1123
1124                                  ;
                                      ;SUBROUTINE TO LOAD BINARY COUNT PATTERN INTO OUTPUT BUFFER
1125  004142  105037  001334          INFIL:  CLRB    NUMBER          ;INITIALIZE BINARY COUNT
1126  004146  012500                  FILL:   MOV     (5)+,%0         ;GET ADDRESS
1127  004150  012537  001364                  MOV     (5)+,CTRD       ;GET COUNT
1128  004154  113720  001334          FILLA:  MOVB    NUMBER,(0)+     ;LOAD ADDRESS WITH BINARY COUNT
1129  004160  105237  001334                  INCB    NUMBER          ;INC. BINARY COUNT
1130  004164  005337  001364                  DEC     CTRD            ;DEC. COUNT
1131  004170  001371                          BNE     FILLA
1132  004172  000205                          RTS     5               ;EXIT
1133
1134                                  ;SUBROUTINE TO MOVE A VARIABLE NUMBER OF BYTES.
1135  004174  104011                  BMOVE:  SAVREG                  ;SAVE REGS.
1136  004176  012501                          MOV     (5)+,%1         ;GET"FROM"ADDRESS
1137  004200  012502                          MOV     (5)+,%2         ;GET"TO"ADDRESS
1138  004202  012503                          MOV     (5)+,%3         ;GET COUNT
1139  004204  112122                  BMOVA:  MOVB    (1)+,(2)+       ;MOVE BYTE
1140  004206  005303                          DEC     %3              ;DECREMENT COUNT
1141  004210  001375                          BNE     BMOVA           ;BRANCH IF NOT DONE.
1142  004212  104012                          RSTREG                  ;RESTORE REGS.
1143  004214  000205                          RTS     %5              ;DONE EXIT
1144
1145                                  ;BINARY TO DECIMAL ASCII CONVERT SUBROUTINE.
1146  004216  104011                  BDCNV:  SAVREG                  ;SAVE REGS.
1147  004220  012700  004374                  MOV     #DECVAL,%0      ;SET UP ADDR TO STORE DECIMAL ASCII IN R0
1148  004224  013501                          MOV     @(5)+,%1        ;BINARY VALUE TO R1.
1149  004226  012537  004304                  MOV     (5)+,BDCNVC     ;DESTINATION ADDR TO BDCNVC.
1150  004232  012537  004306                  MOV     (5)+,BDCNVD     ;COUNT TO BDCNVD.
1151  004236  012702  004362                  MOV     #ADTENP,%2      ;ADDR OF TEN POWER STRING TO R2.
1152  004242  012737  000005  004354          MOV     #5,CNVCTR       ;SET UP FOR 5 POWER CONVERSIONS.
1153  004250  012237  004360          BDCNVA: MOV     (2)+,TENPWR     ;MOVE POWER OF TEN VALUE TO TENPWR.
1154  004254  004737  004314                  JSR     %7,SUBTEN       ;PERFORM CONVERSION
1155  004260  005337  004354                  DEC     CNVCTR          ;DONE 5 CONVERSIONS?
1156  004264  001371                          BNE     BDCNVA          ;BRANCH IF NOT YET 5.
1157  004266  163700  004306                  SUB     BDCNVD,%0       ;SET UP ADDR TO MOVE DECIMAL
1158  004272  010037  004302                  MOV     %0,BDCNVB       ;DATA FROM.
1159  004276  004537  004174                  JSR     %5,BMOVE        ;MOVE DECIMAL DATA TO DESTINATION.
1160  004302  000000          BDCNVB: OPEN                            ;SRC ADDR.
1161  004304  000000          BDCNVC: OPEN                            ;DEST ADDR.
1162  004306  000000          BDCNVD: OPEN                            ;COUNT.
1163  004310  104012                  RSTREG                          ;RESTORE REGS.
1164  004312  000205                  RTS     %5                      ;YES, EXIT.
1165  004314  005037  004356  SUBTEN: CLR     DIGIT                   ;CLEAR DIGIT
1166  004320  163701  004360  SUBTNA: SUB     TENPWR,%1               ;SUBTRACT TEN POWER FROM BINARY VALUE.
1167  004324  103403                  BCS     SUBTNB                  ;BRANCH IF UNSUCCESSFUL SUBTRACTION.
1168  004326  005237  004356          INC     DIGIT
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 1169  004332  000772                          BR      SUBTNA
 1170  004334  063701  004360          SUBTNB: ADD     TENPWR,%1       ;RESTORE SUBTRACTED VALUE.
 1171  004340  062737  000060  004356          ADD     #60,DIGIT       ;CONVERT (DIGIT) TO ASCII
 1172  004346  113720  004356                  MOVB    DIGIT,(0)+      ;MOVE ASCII CHAR TO DECVAL FIELD.
 1173  004352  000207                          RTS     %7              ;EXIT.
 1174  004354  000000          CNVCTR: OPEN
 1175  004356  000000          DIGIT:  OPEN
 1176  004360  000000          TENPWR: OPEN
 1177  004362  023420          ADTENP: 10000.
 1178  004364  001750                  1000.
 1179  004366  000144                  100.
 1180  004370  000012                  10.
 1181  004372  000001                  1
 1182  004374     040     040     040  DECVAL: .BYTE   040,040,040,040,040,040
 1183  004377     040     040     040
 1184                                  ;SUBROUTINE TO SET  CHARACTER LENGTH PARAMETER
 1185  004402  104000          SETPAR: TYPE                    ;TYPE: SELECT PARAMETERS.
 1186  004404  013055                  SELPAR
 1187  004406  004737  003314          JSR     PC,RDOCT        ;GET INPUT
 1188  004412  012637  001374          MOV     (SP)+,SRT
 1189  004416                          CNVOA   SRT,APARM,3
 1190  004430  104000                  TYPE
 1191  004432  013355                  PARMTS
 1192  004434  012737  177400  001362  TBIT1:  MOV     #177400,CARMSK          ;SET CHARACTER MASK TO 8 BITS.
 1193  004442  032737  000002  001374          BIT     #BIT1,SRT               ;SEE IF SR BIT 1 IS SET.
 1194  004450  001413                          BEQ     STPARA                  ;BRANCH IF NOT SET.
 1195  004452  012737  177700  001362          MOV     #177700,CARMSK          ;CHANGE CHAR MASK TO 6 BITS.
 1196  004460  032737  000001  001374          BIT     #BIT0,SRT               ;SEE IF SR BIT0 IS SET.
 1197  004466  001403                          BEQ     PAREX                   ;BRANCH IF NOT SET.
 1198  004470  012737  177740  001362          MOV     #177740,CARMSK          ;CHANGE CHAR MASK TO 5 BITS.
 1199  004476  000207          PAREX:  RTS     %7                      ;EXIT.
 1200  004500  032737  000001  001374  STPARA: BIT     #BIT0,SRT               ;SEE IF SR BIT0 IS SET.
 1201  004506  001773                          BEQ     STPARA-2                ;BRANCH IF NOT SET.
 1202  004510  012737  177600  001362          MOV     #177600,CARMSK          ;CHANGE CHAR MASK TO 7 BITS.
 1203  004516  000767                          BR      PAREX
 1204                                  ;
 1205                                  ;ERROR TRAP HANDLER - TYPE TO AND FROM WHERE ERROR TRAP OCCURS
 1206  004520  013737  177776  001336  ERTP:   MOV     PSW,OLDPS       ;SAVE OLDPS
 1207  004526  012737  000340  177776          MOV     #PRTY7,PSW
 1208  004534  006237  001336                  ASR     OLDPS
 1209  004540  006237  001336                  ASR     OLDPS
 1210  004544  006237  001336                  ASR     OLDPS
 1211  004550  042737  177740  001336          BIC     #177740,OLDPS
 1212  004556  013737  001336  001340          MOV     OLDPS,TOPC
 1213  004564  011637  001342                  MOV     @%6,FROMPC
 1214  004570  004537  003530  ERTPA:  JSR     %5,OACNV
 1215  004574  001340                  TOPC
 1216  004576  012314                  MTO
 1217  004600  000006                  6
 1218  004602  004537  003530          JSR     %5,OACNV
 1219  004606  001342                  FROMPC
 1220  004610  012346                  MFROM
 1221  004612  000006                  6
 1222  004614  104000                  TYPE
 1223  004616  012247                  MTERR
 1224  004620  000000                  HALT
```

```
1225  004622  000137  001422                  JMP     START
1226
1227                                  ;
1228  004626  011637  001340         ;MAPVEC - MAP VECTOR VECTOR OR REPORT ERROR DEPENDING ON FMAP FLAG
1229  004632  022626                 MAPVEC: MOV     @%6,TOPC
1230  004634  011637  001342                 POPSP2
1231  004640  162737  000004  001340       MOV     @%6,FROMPC
1232  004646  005737  001350               SUB     #4,TOPC
1233  004652  001746                       TST     FMAP
1234  004654  013737  001340  001214       BEQ     ERTPA           ;NOT MAPPING, REPORT ERROR
1235  004662  162737  000004  001340       MOV     TOPC,TXVTR      ;STORE VECTOR
1236  004670  013737  001340  001210       SUB     #4,TOPC
1237  004676  005037  001350               MOV     TOPC,RXVTR
1238  004702  000002                       CLR     FMAP
1239                                       RTI
1240                                  ;
1241  004704  010137  001200         ;FORMAD - FORM DEVICE AT ADDRESS
1242  004710  062701  000002         FORMAD: MOV     %1,RXCSR
1243  004714  010137  001202                 ADD     #2,%1
1244  004720  062701  000002                 MOV     %1,RXBUF
1245  004724  010137  001204                 ADD     #2,%1
1246  004730  062701  000002                 MOV     %1,TXCSR
1247  004734  010137  001206                 ADD     #2,%1
1248  004740  000207                         MOV     %1,TXBUF
1249                                         RTS     %7
1250                                  ;
1251  004742  017737  174232  001370  ;SUBROUTINE TO MAKE LINE CONNECTION.
1252  004750  032737  020000  001370 LINCON: MOV     @RXCSR,RXCSRT
1253  004756  001046                       BIT     #BIT13,RXCSRT   ;YES. IS CLEAR TO SEND UP
1254  004760  042777  000146  174212       BNE     LINEUP          ;YES CONNECTION IS MADE.
1255  004766  005777  174210         LINCA:  BIC     #146,@RXCSR     ;CLEAR IE BIT AND DTR, RQ TO SND
1256  004772  104000                       TST     @RXBUF          ;CLEAR DONE FLAG
1257  004774  013251                       TYPE                    ;TYPE
1258  004776  017737  174176  001370       MAKCON                  ;'MAKE LINE CONNECTION'
1259  005004  032737  040000  001370 LINCB:  MOV     @RXCSR,RXCSRT
1260  005012  001771                       BIT     #BIT14,RXCSRT   ;DID YOU RING
1261  005014  052777  000006  174156       BEQ     LINCB           ;GO WAIT FOR RING
1262  005022  104016                       BIS     #6,@RXCSR       ;SET DTR, RQ TO SND
1263  005024  023420                       DELAY                   ;WAIT 10 SECONDS FOR
1264  005026  017737  174146  001370       10000.                  ;CLEAR TO SEND
1265  005034  005777  174142               MOV     @RXCSR,RXCSRT
1266  005040  032737  020000  001370       TST     @RXBUF          ;CLEAR DONE
1267  005046  001003                       BIT     #BIT13,RXCSRT   ;IS CLEAR TO SEND UP?
1268  005050  104015                       BNE     LINCF           ;YES.  GO TO LINCF
1269  005052  013377                       ERRRX                   ;NO.  PRINT ERROR MESSAGE
1270  005054  000741                       LINCHM                  ;'CLEAR TO SEND NOT SET'
1271  005056  017737  174116  001370       BR      LINCA           ;START OVER AGAIN
1272  005064  005777  174112         LINCF:  MOV     @RXCSR,RXCSRT   ;CLEAR ALL FLAGS
1273  005070  104000                       TST     @RXBUF          ;AND DONE
1274  005072  013427                       TYPE                    ;TYPE MESSAGE
1275  005074  000205                       LINMAD                  ;CONNECTION IS MADE'
1276                                 LINEUP: RTS     5               ;EXIT LINE CONNECTION ROUTINE WITH
1277  005076  012701  014710         ;SUBROUTINE TO OVERLAY <CRLF> IN DATA PATTERN (EVERY 72.ND CHAR)
1278  005102  012702  000016         OVRLAY: MOV     #OUTBUF,%1      ;GET OUTBUF ADDRESS
1279  005106  012711  105215               MOV     #14.,%2         ;GET COUNTER
1280  005112  062701  000110         OVRLYA: MOV     #105215.(1)     ;INSERT CR&LF
                                            ADD     #72.,%1         ;ADD OFFSET
```

```
                                        DEC     R2                      ;DONE?
                                        BNE     OVRLYA
                                        RTS     PC                      ;EXIT
                                ;
                                ;RECEIVER INTERRUPTS COMMON HANDLER
                                RISR:   NOP
                                        MOV     R0,LINE
                                        ASL     R0
                                        MOV     RCSR(R0),RXCSR  ;GET ADDRESS OF INTERRUPTING DL11-E'S RCSR
                                        MOV     @RXCSR,RXCSR    ;GET CSR CONTENTS
                                        BMI     DCERR           ;CHECK INT
                                        TSTB    RXCSRT          ;TEST DONE
                                        BNE     RISRA
                                        ERROR                   ;FALSE INTERRUPT
                                        RTI                     ;EXIT
                                RISRA:  CMP     R0,CALLED       ;DID CALLED LINE INTERRUPT?
                                        BNE     RISRB           ;BRANCH IF CALLER INTERRUPTED
                                        TST     MODEM           ;CHECK MODEM TYPE
                                        BEQ     RISRAA          ;BRANCH IF 103
                                        TST     @RBUF(R0)       ;READ CALLED LINES DATA
                                        RTI
                                RISRAA: MOVB    @RBUF(R0),@INBUFP;STORE CHARACTER IN INPUT BUFFER
                                        INC     INBUFP          ;INCREMENT POINTER
                                        CMP     #INBUF+100.,INBUFP;HAVE 100. CHARACTERS BEEN RECEIVED?
                                        BEQ     RISRC           ;GO CHECK DATA IF YES
                                        RTI                     ;EXIT IF NO
                                RISRB:  MOVB    @RBUF(R0),@BUFFP ;STORE CHARACTER IN INTERMEDIATE DATA BUFFER
                                        INC     BUFFP           ;INCREMENT POINTER
                                        CMP     #BUFF+10.,BUFFP ;HAVE 10 CHARACTERS BEEN RECEIVED
                                        BLT     .+4
                                        RTI                     ;EXIT
                                        CMP     #2,CONFIG       ;RUNNING CONFIGURATION 2?
                                        BEQ     RISRBB
                                        CMP     #BUFF+100.,BUFFP;HAVE 100. CHARACTERS BEEN RECEIVED?
                                        BEQ     RISRC           ;GO CHECK DATA IF YES,OTHERWISE
                                        RTI                     ;EXIT
                                RISRBB: BIS     #BIT6,@TCSR.0   ;START CALLERS TRANSMITTER
                                        RTI                     ;EXIT
                                ;CHECK DATA CONFIGURATION #1
                                RISRC:  NOP
                                        MOV     #1,CTRD         ;INITIALIZE CHARACTER COUNT
                                        MOV     #BUFF,R2        ;POINT R2 TO CALLERS RECEIVED DATA BUFFER
                                        MOV     #OUTBUF,R3      ;R3 = FIRST ADDRESS OF OUTPUT DATA BUFFER
                                        MOV     R2,BUFFP        ;RESTORE CALLERS RCVD DATA BUFFER PTR
                                        CMP     #1,CONFIG       ;CHECK CONFIGURATION
                                        BNE     RISRD
                                RISRCA: MOVB    (R3)+,XMTDAT    ;GET TRANSMITTED CHARACTER
                                        MOVB    (R2)+,RECDAT    ;GET RECEIVED CHARACTER
                                        DATCHK                  ;CHECK DATA
                                        INC     CTRD            ;INCREMENT CHARACTER COUNT
                                        CMP     #101,CTRD       ;HAS ALL DATA BEEN CHECKED
                                        BNE     RISRCA
                                        JMP     FINISH
                                ;
                                ;CHECK DATA CONFIGURATION #2
                                RISRD:  NOP
```

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1337  005400  012704  016660                  MOV     #INBUF,R4       ;POINT R4 TO CALLED LINES RECEIVER
1338  005404  010437  001376                  MOV     R4,INBUFP       ;DATA BUFFER & INIT. POINTER
1339  005410  012737  015054  001410          MOV     #BUFF,TBUFFP
1340  005416  013701  001404          RISRDA: MOV     CALLED,R1
1341  005422  016137  010432  001200          MOV     RCSR(1),RXCSR
1342  005430  112337  001360                  MOVB    (3)+,XMTDAT
1343  005434  112237  001356                  MOVB    (2)+,RECDAT     ;COMPARE TRANSMITTED DATA WITH DATA
1344  005440  104004                          DATCHK                  ;RECEIVED BY CALLED LINE
1345  005442  013701  001402                  MOV     CALLER,R1
1346  005446  016137  010432  001200          MOV     RCSR(1),RXCSR
1347  005454  112437  001356                  MOVB    (4)+,RECDAT     ;COMPARE TRANSMITTED DATA WITH DATA
1348  005460  104004                          DATCHK                  ;RECEIVED BY CALLER
1349  005462  005237  001364                  INC     CTRD
1350  005466  022737  000101  001364          CMP     #101,CTRD
1351  005474  001350                          BNE     RISRDA
1352  005476  000240          FINISH: NOP
1353  005500  013701  001404                  MOV     CALLED,R1
1354  005504  004537  004146                  JSR     5,FILL
1355  005510  014710                          OUTBUF
1356  005512  000144                          100.
1357  005514  104000                          TYPE
1358  005516  013350                          ENDPAS
1359  005520  052777  000100  010626          BIS     #BIT6,@TCSR(1
1360  005526  000240                          NOP
1361  005530  000002                          RTI
1362                          ;ERROR SERVICE ROUTINE
1363  005532  032770  100000  010530  DCERR:  BIT     #BIT15,@RBUF(0) ;TEST ERROR
1364  005540  001402                          BEQ     RISRF
1365  005542  104015                          ERRRX
1366  005544  012357                          CSRADD
1367  005546  012737  014710  001406  RISRF:  MOV     #OUTBUF,OTBUFP  ;SET OUTPUT BUFFER POINTER
1368  005554  012737  016660  001376          MOV     #INBUF,INBUFP   ;SET INPUT BUFFER POINTER
1369  005562  012737  015054  001400          MOV     #BUFF,BUFFP     ;SET INTERMEDIATE BUFFER POINTER
1370  005570  012737  015054  001410          MOV     #BUFF,TBUFFP    ;SET POINTER FOR CONFIG #2 TRANSMITTER
1371  005576  032737  040000  001370          BIT     #BIT14,RXCSRT   ;CHECK RING INDICATOR
1372  005604  001005                          BNE     RISREX          ;BRANCH IF RING
1373  005606  004737  006234                  JSR     7,DISCON        ;ERROR SET - NO RING
1374  005612  104015                          ERRRX
1375  005614  012357                          CSRADD
1376  005616  000002                          RTI
1377  005620                  RISREX: CNVDA   LINE,TLINE,2
1378  005632  104000                          TYPE
1379  005634  013715                          ALINE
1380  005636  010037  001404                  MOV     R0,CALLED
1381  005642  004737  003314                  JSR     PC,RDOCT        ;GET INPUT
1382  005646  011637  001412                  MOV     (SP),MODEM      ;GET MODEM TYPE
1383  005652  042737  177773  001412          BIC     #177773,MODEM   ;0=103,4=202
1384  005660  012637  001332                  MOV     (SP)+,CONFIG
1385  005664  042737  177774  001332          BIC     #177774,CONFIG
1386  005672  001042                          BNE     RISRFC          ;GO TO SERVICE FOR CONFIG 1 OR 2
1387  005674  004737  006250                  JSR     7,CONN          ;CONNECT LINE IF CONFIGURATION 0
1388  005700  104000                          TYPE                    ;TYPE MESSAGE TO PRESS DATA
1389  005702  014215                          BUTTON                  ;BUTTON ON DATA PHONE
1390  005704  104016                          DELAY                   ;WAIT FOR CARRIER
1391  005706  023420                          10000.                  ;10 SECONDS
1392  005710  005770  010530                  TST     @RBUF(0)        ;READ BUFFER TO CLEAR DONE
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 1393  005714  032770  020000  010432          BIT     #BIT13,@RCSR(0) ;TEST FOR CLEAR TO SEND
 1394  005722  001004                          BNE     RISRFB
 1395  005724  104003                          ERROR                   ;ERROR! DID NOT RECEIVE CLEAR TO SEND
 1396                                                                  ;WITHIN TIME ALLOTTED (10 SEC.
 1397  005726  004737  006234                  JSR     7,DISCON        ;DISCONNECT LINE
 1398  005732  000002                          RTI                     ;AND EXIT
 1399  005734  016037  010626  001304  RISRFB: MOV     TCSR(0),TXCSR   ;GET CALLED LINES TXCSR ADDRESS
 1400  005742  004737  004402                  JSR     7,SETPAR        ;LOAD USER PARAMETERS
 1401  005746  104000                          TYPE                    ;TYPE 'LINE CONNECTION
 1402  005750  013427                          LINMAD                  ;MADE'
 1403  005752                                  CNVOA   CONFIG,TCONFIG,2
 1404  005764  104000                          TYPE
 1405  005766  013456                          ACONFIG
 1406  005770  052770  000100  010626          BIS     #BIT6,@TCSR(0)
 1407  005776  000002                          RTI                     ;AND EXIT
 1408                                  ;
 1409                                  ;HERE IF CONFIGURATION 1 OR 2
 1410  006000  104000                  RISRFC: TYPE                    ;ASK USER WHICH LINE HE IS
 1411  006002  014065                          WRU                     ;DIALING ON
 1412  006004  004737  003314                  JSR     PC,RDOCT        ;GET INPUT
 1413  006010  012601                          MOV     (SP)+,%1                ;GET LINE #
 1414  006012  042701  177740                  BIC     #177740,%1      ;MASK UNUSED BITS
 1415  006016  010137  001330                  MOV     %1,LINE
 1416  006022                                  CNVOA   LINE,URA,2
 1417  006034  104000                          TYPE                    ;REPORT LINE # ON TTY
 1418  006036  014162                          UR
 1419  006040  006301                          ASL     %1
 1420  006042  010137  001402                  MOV     %1,CALLER       ;SAVE CALLERS LINE #
 1421  006046  004737  006250                  JSR     7,CONN          ;CONNECT CALLED LINE
 1422  006052  052771  000002  010432          BIS     #BIT1,@RCSR(1   ;SET DTR ON CALLERS LINE
 1423  006060  104000                          TYPE                    ;TYPE MESSAGE TO PRESS DATA
 1424  006062  014215                          BUTTON                  ;ON DATA PHONE
 1425  006064  104016                          DELAY                   ;WAIT 10 SECONDS FOR CLEAR TO SEND
 1426  006066  023420                          10000.                  ;SET AT CALLED LINE
 1427  006070  027071  010530  010530          CMP     @RBUF(0),@RBUF(1)       ;READ BUFFERS
 1428  006076  032770  020000  010432          BIT     #BIT13,@RCSR(0) ;TEST FOR CLEAR TO SEND AT CALLED LINE
 1429  006104  001007                          BNE     RISRFF
 1430  006106  104003                          ERROR                   ;ERROR! CLEAR TO SEND NOT SET AT CALLED LINE
 1431  006110  004737  006234          RISRFD: JSR     7,DISCON        ;DISCONNECT
 1432  006114  042771  000006  010432          BIC     #6,@RCSR(1)     ;LINE
 1433  006122  000002                          RTI                     ;AND EXIT
 1434  006124  022737  000002  001332  RISRFF: CMP     #2,CONFIG
 1435  006132  001414                          BEQ     RISRFG
 1436  006134  022771  010000  010432          CMP     #BIT12,@RCSR(1) ;CHECK CARRIER AT CALLERS LINE
 1437  006142  001003                          BNE     RISRFE
 1438  006144  104003                          ERROR                   ;ERROR! NO CARRIER AT CALLERS LINE
 1439  006146  000137  006110                  JMP     RISRFD          ;GO DISCONNECT LINES
 1440  006152  016137  010432  001200  RISRFE: MOV     RCSR(1),RXCSR
 1441  006160  000137  005734                  JMP     RISRFB                  ;GO GET PAREMETERS AND ENABLE
 1442                                                                  ;CALLED TRANSMITTER AND EXIT
 1443                                  ;
 1444                                  ;HERE IF CONFIGURATION 2
 1445  006164  032771  020000  010432  RISRFG: BIT     #BIT13,@RCSR(1) ;TEST CALLERS CLEAR TO SEND
 1446  006172  001003                          BNE     RISRFH
 1447  006174  104003                          ERROR                   ;ERROR! NO CTS AT CALLERS LINE
 1448  006176  000137  006110                  JMP     RISRFD          ;GO DISCONNECT LINE AND EXIT
```

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 1449  006202  016037  010432  001200  RISRFH: MOV     RCSR(0),RXCSR
 1450  006210  016137  010626  001204          MOV     TCSR(1),TXCSR
 1451  006216  004737  004402                  JSR     7,SETPAR        ;GO GET PARAMETERS FOR CALLERS
 1452                                                                  ;TRANSMITTER AND CALLED RECEIVE
 1453  006222  016137  010432  001200          MOV     RCSR(1),RXCSR
 1454  006230  000137  005734                  JMP     RISRFB
 1455                                  ;
 1456                                  ;SUBROUTINE TO DISCONNECT LINE R0 HAS LINE #
 1457  006234  042770  000006  010432  DISCON: BIC     #6,@RCSR(0)
 1458  006242  005770  010432                  TST     @RCSR(0)
 1459  006246  000207                          RTS     7
 1460                                  ;
 1461                                  ;SUBROUTINE TO CONNECT LINE R0 HAS LINE #
 1462  006250  052770  000006  010432  CONN:   BIS     #6,@RCSR(0)     ;SET DTR, RQ TO SND
 1463  006256  000207                          RTS     7
 1464                                  ;TRANSMITTER INTERRUPT COMMON HANDLER
 1465  006260  000240                  TISR:   NOP
 1466  006262  006300                          ASL     %0              ;R0 HAS LINE #
 1467  006264  105770  010626                  TSTB    @TCSR(0)        ;CHECK FOR DONE
 1468  006270  100402                          BMI     TISRA           ;BRANCH IF DONE
 1469  006272  104003                          ERROR                   ;ERROR! FALSE INTERRUPT
 1470  006274  000002                  TISRAA: RTI                     ;EXIT
 1471  006276  005737  001332          TISRA:  TST     CONFIG          ;THIS CONFIGURATIO 0?
 1472  006302  001420                          BEQ     TISRC           ;BRANCH IF YES
 1473  006304  020027  001402                  CMP     %0,CALLER       ;DID CALLER INTERRUPT
 1474  006310  001015                          BNE     TISRC
 1475  006312  117770  173072  010724          MOVB    @TBUFFP,@TBUF(0)        ;TRANSMIT
 1476  006320  005237  001410                  INC     TBUFFP          ;STEP POINTER
 1477  006324  022737  015220  001410          CMP     #BUFF+100.,TBUFFP
 1478  006332  001003                          BNE     .+10
 1479  006334  042770  000100  010626          BIC     #BIT6,@TCSR(0)
 1480  006342  000002                          RTI
 1481  006344  117770  173036  010724  TISRC:  MOVB    @OTBUFP,@TBUF(0)        ;TRANSMIT THE NEXT CHARACTER
 1482  006352  005237  001406                  INC     OTBUFP          ;STEP POINTER TO NEXT CHAR.
 1483  006356  005737  001332                  TST     CONFIG          ;WAS CONFIGURATION 0 SELECTED
 1484  006362  001010                          BNE     TISRB           ;BRANCH IF CONFIG #1 OR #2
 1485  006364  022737  016660  001406          CMP     #OUTBUF+1000.,OTBUFP;HAVE 1000. CHARS. BEEN SENT
 1486  006372  001340                          BNE     TISRAA          ;EXIT IF NOT
 1487  006374  012737  014710  001406  TISRBS: MOV     #OUTBUF,OTBUFP  ;RESET POINTER
 1488  006402  000002                          RTI                     ;AND EXIT
 1489
 1490  006404  022737  015054  001406  TISRB:  CMP     #OUTBUF+100.,OTBUFP;HAVE 100. CHARS. BEEN SENT?
 1491  006412  001330                          BNE     TISRAA          ;EXIT IF NOT
 1492  006414  042770  000100  010626          BIC     #BIT6,@TCSR(0)  ;DISABLE TRANSMITTER INTERRUPT
 1493  006422  000764                          BR      TISRBB          ;RESET POINTER AND EXIT
 1494
 1495                                  ;**********
 1496                                  ;PRGO - SINGLE CHARACTER LINE MODE TEST.
 1497                                  ;**********
 1498  006424  000240                  PRGO:   NOP                     ;BEGIN PRGO
 1499  006426  104000                          TYPE                    ;TYPE
 1500  006430  012507                          POTIT                   ;PROGRAM TITLE
 1501  006432  104000                          TYPE
 1502  006434  013143                          SELCAR
 1503  006436  004737  003314                  JSR     PC,RDOCT        ;GET INPUT
 1504  006442  112601                          MOVB    (SP)+,%1                ;GET USER SPECIFIED  DATA
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 1505  006444  010137  014710                MOV     %1,OUTBUF       ;AND
 1506  006450  004537  004174                JSR     5,$MOVE         ;LOAD
 1507  006454  014710                        OUTBUF                  ;INTO
 1508  006456  014711                        OUTBUF+1                ;OUTPUT
 1509  006460  001747                        999.                    ;BUFFER
 1510  006462  004737  005076                JSR     7,OVRLAY        ;OVER LAY CR,LF'S IN DATA
 1511  006466  004737  010274                JSR     7,LDPRI         ;LOAD PRIORITY LEVEL IN VECTOR+2
 1512  006472  004737  010226                JSR     7,LDTVEC        ;LOAD TRANSMITTER VECTORS
 1513  006476  004737  010162                JSR     7,LDVECS        ;LOAD RECEIVER VECTORS
 1514  006502  012737  000340  177776        MOV     #PRTY7,PSW      ;SET PROCESSOR PRIORITY=7
 1515  006510  012702  000140                MOV     #140,%2         ;SET IE
 1516  006514  012701  010432                MOV     #RCSR,%1                ;BIT IN
 1517  006520  004537  010116                JSR     5,MOVIT         ;ALL RECEIVERS
 1518  006524  104000                        TYPE                    ;TYPE
 1519  006526  013251                        MAKCON                  ;'MAKE LINE CONNECTION'
 1520  006530  005037  177776                CLR     PSW             ;SET PROCESSOR PRIORITY=0
 1521  006534  000001            PRGOA:      WAIT                    ;WAIT
 1522  006536  000776                        BR      PRGOA           ;HERE
 1523                            ;**********
 1524                            ;PRG1 - SPECIAL BINARY COUNT PATTERN LINE MODE TEST.
 1525                            ;**********
 1526  006540  104000            PRG1:       TYPE                    ;TYPE PROGRAM TITLE.
 1527  006542  012553                        P1TIT
 1528  006544  012737  105215  014710        MOV     #105215,OUTBUF  ;LOAD CRLF
 1529  006552  004537  004142                JSR     5,INFIL         ;LOAD OUTPUT
 1530  006556  014712                        OUTBUF+2                ;WITH BINARY
 1531  006560  001750                        1000.                   ;COUNT PATTERN
 1532  006562  012737  000100  001334        MOV     #100,NUMBER
 1533  006570  004737  010274                JSR     7,LDPRI         ;LOAD PRIORITY LEVEL IN VECTOR +2
 1534  006574  004737  010226                JSR     7,LDTVEC        ;LOAD TRANSMITTER VECTORS
 1535  006600  004737  010162                JSR     7,LDVECS        ;LOAD RECEIVER VECTORS
 1536  006604  012737  000340  177776        MOV     #PRTY7,PSW      ;SET PROCESSOR PRIORITY=7
 1537  006612  012702  000140                MOV     #140,%2         ;GET IE BIT
 1538  006616  012701  010432                MOV     #RCSR,%1                ;GET FIRST CSR ADDRESS
 1539  006622  004537  010116                JSR     5,MOVIT         ;AND MOVE IT
 1540  006626  104000                        TYPE                    ;TYPE
 1541  006630  013251                        MAKCON                  ;'MAKE LINE CONNECTION'
 1542  006632  005037  177776                CLR     PSW             ;SET PROCESSOR PRIORITY=0
 1543  006636  000001            PRG1C:      WAIT                    ;WAIT
 1544  006640  000776                        BR      PRG1C           ;HERE
 1545                            ;**********
 1546                            ;PRG2-SPECIAL MESSAGE TRANSMIT ONLY THIS PROGRAM TRANSMITS
 1547                            ;**********
 1548                            ;THE MESSAGE 'A QUICK BROWN FOX JUMPED OVER THE LAZY DOGS
 1549                            ;BACK  1234567890.'
 1550                            ;
 1551  006642  104000            PRG2:       TYPE                    ;TYPE PROGRAM
 1552  006644  012622                        P2TIT                   ;TITLE
 1553  006646  004537  004014                JSR     5,LINSEL
 1554  006652  004737  004402                JSR     7,SETPAR        ;GO SET PARAMETERS
 1555  006656  052777  000004  172314        BIS     #BIT2,@RXCSR    ;SET REQUEST TO SEND
 1556  006664  004537  004742    PRG2A:      JSR     5,LINCON        ;GO MAKE LINE CONNECTION
 1557  006670  012702  013504    PRG2B:      MOV     #PRG2M,%2       ;GET ADDRESS OF MESSAGE
 1558  006674  112201    PRG2C:      MOVB    (2)+,%1         ;GET FIRST CHARACTER
 1559  006676  020127  000045                CMP     %1,#'%          ;TERMINATOR CHARACTER
 1560  006702  001772                        BEQ     PRG2B           ;RESEND MESSAGE
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1561  006704  032737  000100  001374          BIT     #BIT6,SRT       ;PARITY ENABLED
1562  006712  001402                          BEQ     .+6
1563  006714  004737  003600                  JSR     7,GENPAR        ;GENERATE PARITY
1564  006720  004537  004742                  JSR     5,LINCON        ;CHECK LINE CONNECTION
1565  006724  010177  172256                  MOV     %1,@TXBUF       ;LOAD BUFFER
1566  006730  105777  172250                  TSTB    @TXCSR          ;AND WAIT FOR CHARACTER
1567  006734  100375                          BPL     .-4             ;TO BE TRANSMITTED
1568  006736  000756                          BR      PRG2C           ;GET NEXT CHARACTER.
1569                                  ;**********
1570                                  ;PRG3-PROGRAM TO RECEIVE A MESSAGE.
1571                                  ;**********
1572  006740  104000                  PRG3:   TYPE                    ;TYPE PROGRAM
1573  006742  012672                          P3TIT                   ;TITLE
1574  006744  004537  004014                  JSR     5,LINSEL
1575  006750  004737  004402                  JSR     7,SETPAR        ;GET PARAMETERS
1576  006754  012706  001176          PRG3A:  MOV     #STKPTR-2,%6    ;REPOSITION STACK POINTER
1577  006760  052777  000004  172212          BIS     #BIT2,@RXCSR    ;SET REQUEST TO SEND
1578  006766  004537  004742                  JSR     5,LINCON        ;MAKE LINE CONNECTION
1579  006772  104006                          STRXV                   ;SET RECEIVER INTERUPT
1580  006774  007056                          RINT3                   ;TO THIS ADDRESS
1581  006776  104007                          STTXV                   ;SET TRANSMITTER INTERRUPT
1582  007000  007270                          TINT3                   ;TO THIS ADDRESS
1583  007002  005037  007470                  CLR     WORDS
1584  007006  013700  001234                  MOV     TPVTR,%0
1585  007012  012720  007422                  MOV     #TPINT,(0)+     ;LOAD TELEPRINTER VECTOR
1586  007016  013710  001236                  MOV     TPLVL,(0)       ;AND PRIORITY
1587  007022  012701  014710                  MOV     #OUTBUF,%1      ;GET BUF ADD
1588  007026  052737  100000  007466          BIS     #BIT15,TFLAG    ;SET BIT 15
1589  007034  004737  007654                  JSR     7,TCRLF         ;SEND CRLF
1590  007040  052777  000140  172132          BIS     #140,@RXCSR     ;ENABLE RECEIVER INTERRUPTS
1591  007046  005037  177776                  CLR     PSW
1592  007052  000001                          WAIT                    ;DO
1593  007054  000776                          BR      .-2             ;NOTHING
1594  007056  017737  172116  001370  RINT3:  MOV     @RXCSR,RXCSRT   ;GET RXCSR DATA
1595  007064  100461                          BMI     ERR3A           ;BRANCH IF ERROR
1596  007066  105737  001370                  TSTB    RXCSRT          ;TEST
1597  007072  100064                          BPL     ERR3B
1598  007074  005237  007470                  INC     WORDS
1599  007100  017737  172076  007472          MOV     @RXBUF,RXBUFT   ;GET DATA
1600  007106  113711  007472                  MOVB    RXBUFT,(1)
1601  007112  005737  007472                  TST     RXBUFT
1602  007116  100455                          BMI     ERR3C
1603  007120  105777  171050                  TSTB    @SRPTR          ;ECHO OPTION SELECTED
1604  007124  100405                          BMI     RINT3A
1605  007126  105777  172052                  TSTB    @TXCSR
1606  007132  100375                          BPL     .-4
1607  007134  111177  172046                  MOVB    (1),@TXBUF      ;ECHO CHARACTER
1608  007140  023727  007470  001604  RINT3A: CMP     WORDS,#900.     ;END OF BUFFER ALLOWED
1609  007146  001411                          BEQ     RINT3B          ;YES EXIT
1610  007150  005737  007466                  TST     TFLAG           ;IS THIS THE FIRST
1611  007154  100441                          BMI     RINT3E          ;CHARACTER BRANCH IF YES.
1612  007156  121103                          CMPB    (1),%3          ;LAST CHARACTER RECEIVED
1613  007160  001404                          BEQ     RINT3B
1614  007162  122127  000203                  CMPB    (1)+,#203       ;CONTROL C
1615  007166  001401                          BEQ     RINT3B
1616  007170  000002                          RTI                     ;EXIT
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 1617  007172  005037  007470          RINT3B: CLR     WORDS
 1618  007176  042777  000140  171774          BIC     #140,@RXCSR     ;DISABLE RECEIVER
 1619  007204  012701  014711                  MOV     #OUTBUF+1,%1    ;INITIALIZE BUFFER POINTER
 1620  007210  010102                          MOV     %1,%2
 1621  007212  052777  000100  171764          BIS     #BIT6,@TXCSR    ;ENABLE TRANSMITTER
 1622  007220  052777  000100  171776          BIS     #BIT6,@TPS      ; ENABLE TELEPRINTER
 1623  007226  000002                          RTI                     ;EXIT
 1624  007230  104015                  ERR3A:  ERRRX                   ;TYPE ERROR MESSAGE
 1625  007232  013605                          LFAIL                   ;
 1626  007234  042777  000140  171736          BIC     #140,@RXCSR     ;DISABLE RECEIVER
 1627  007242  000644                          BR      PRG3A
 1628  007244  104015                  ERR3B:  ERRRX                   ;TYPE
 1629  007246  012366                          RINTM                   ;ERROR MESSAGE
 1630  007250  000002                          RTI                     ;EXIT
 1631  007252  104015                  ERR3C:  ERRRX
 1632  007254  013623                          ROVER
 1633  007256  000002                          RTI
 1634                                  ;
 1635  007260  005037  007466          RINT3E: CLR     TFLAG
 1636  007264  112103                          MOVB    (1)+,%3
 1637  007266  000002                          RTI
 1638                                  ;
 1639  007270  017737  171710  001366  TINT3:  MOV     @TXCSR,TXCSRT   ;GET TXCSR DATA
 1640  007276  105737  001366                  TSTB    TXCSRT          ;TEST
 1641  007302  100016                          BPL     TINT3B
 1642  007304  112177  171676                  MOVB    (1)+,@TXBUF     ;TRANSMIT CHARACTER
 1643  007310  005237  007470                  INC     WORDS
 1644  007314  121103                          CMPB    (1),%3          ;ALL CHARACTERS TRANSMITTED
 1645  007316  001431                          BEQ     TINT3C
 1646  007320  023727  007470  001604          CMP     WORDS,#900.
 1647  007326  001425                          BEQ     TINT3C
 1648  007330  121127  000203                  CMPB    (1),#203        ;= CONTROL C
 1649  007334  00.  ?2                         BEQ     TINT3C
 1650  007336  000002                          RTI                     ;RETURN TO MAIN PROGRAM
 1651  007340  017737  171660  001372  TINT3B: MOV     @TPS,TEMP       ;SAVE TELEPRINTER STATUS
 1652  007346  005077  171652                  CLR     @TPS            ;DISABLE INTERRUPT
 1653  007352  105777  171646                  TSTB    @TPS            ;WAIT FOR
 1654  007356  100375                          BPL     .-4             ;TELEPRINTER TO FINISH
 1655  007360  104014                          ERRTX                   ;TYPE
 1656  007362  012407                          TINTM                   ;ERROR MESSAGE
 1657  007364  105777  171634                  TSTB    @TPS            ;WAIT FOR TELEPRINTER
 1658  007370  100375                          BPL     .-4             ;TO FINISH
 1659  007372  013777  001372  171624          MOV     TEMP,@TPS       ;RESTORE TELEPRINTER STATUS
 1660  007400  000002                          RTI                     ;EXIT
 1661                                  ;
 1662  007402  042777  000100  171574  TINT3C: BIC     #BIT6,@TXCSR    ;DISABLE INTERRUPT
 1663  007410  032777  000100  171606          BIT     #BIT6,@TPS      ;IS TTY ACTIVE
 1664  007416  001421                          BEQ     PRG3EX
 1665  007420  000002                          RTI
 1666                                  ;
 1667                                  ;
 1668  007422  112277  171600          TPINT:  MOVB    (2)+,@TPB       ;TYPE CHARACTER
 1669  007426  121203                          CMPB    (2),%3          ;WAS THIS THE LAST CHAR.
 1670  007430  001404                          BEQ     TPINTA
 1671  007432  121227  000203                  CMPB    (2),#203        ;= CONTROL C
 1672  007436  001401                          BEQ     TPINTA
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  1673  007440  000002                          RTI
  1674  007442  042777  000100  171554  TPINTA: BIC     #BIT6,@TPS      ;DISABLE INTERRUPT
  1675  007450  032777  000100  171526          BIT     #BIT6,@TXCSR    ;IS TRANSMITTER ACTIVE
  1676  007456  001401                          BEQ     .+4
  1677  007460  000002                          RTI                     ;EXIT
  1678  007462  000137  006754          PRG3EX: JMP     PRG3A
  1679  007466  000000                  TFLAG:  0
  1680  007470  000000                  WORDS:  0
  1681  007472  000000                  RXBUFT: 0
  1682                                  ;**********
  1683                                  ;PRG4-SPECIAL MESSAGE TRANSMIT ONLY THIS PROGRAM TRANSMITS
  1684                                  ;**********
  1685                                  ;MESSAGE SPIRAL PATTERN
  1686                                  ;
  1687  007474  104000                  PRG4:   TYPE                    ;TYPE PROGRAM
  1688  007476  012730                          P4TIT                   ;TITLE
  1689  007500  004537  004014                  JSR     5,LINSEL
  1690  007504  004737  004402                  JSR     7,SETPAR        ;GO SET PARAMETERS
  1691  007510  052777  000004  171462          BIS     #BIT2,@RXCSR    ;SET REQUEST TO SEND
  1692  007516  012737  000110  007652          MOV     #72.,COLMN      ;INIT PAGE WIDTH
  1693  007524  012703  000040                  MOV     #40,%3          ;SET LINE START CHAR
  1694  007530  004537  004742          PRG4A:  JSR     5,LINCON        ;GO MAKE LINE CONNECTION
  1695  007534  004737  007654                  JSR     7,TCRLF
  1696  007540  010302                  PRG4B:  MOV     %3,%2           ;GET FIRST CHARACTER
  1697  007542  110201                  PRG4C:  MOVB    %2,%1           ;GET CHARACTER
  1698  007544  120127  000136                  CMPB    %1,#136         ;TERMINATOR CHARACTER
  1699  007550  001003                          BNE     PRG4D           ;RESEND MESSAGE
  1700  007552  012702  000040                  MOV     #40,%2
  1701  007556  000771                          BR      PRG4C
  1702  007560  032737  000100  001374  PRG4D:  BIT     #BIT6,SRT       ;PARITY ENABLED
  1703  007566  001402                          BEQ     .+6
  1704  007570  004737  003600                  JSR     7,GENPAR        ;GENERATE PARITY
  1705  007574  004537  004742                  JSR     5,LINCON        ;CHECK LINE CONNECTION
  1706  007600  010177  171402                  MOV     %1,@TXBUF       ;LOAD BUFFER
  1707  007604  105777  171374                  TSTB    @TXCSR          ;AND WAIT FOR CHARACTER
  1708  007610  100375                          BPL     .-4             ;TO BE TRANSMITTED
  1709  007612  005202                          INC     %2              ;SET FOR NEXT CHAR
  1710  007614  005337  007652                  DEC     COLMN           ;ALL COLUMNS PRINTED?
  1711  007620  001350                          BNE     PRG4C           ;NO, GET NEXT CHAR
  1712  007622  012737  000110  007652          MOV     #72.,COLMN      ;RESET COLUMN COUNTER
  1713  007630  004737  007654                  JSR     7,TCRLF
  1714  007634  005203                          INC     %3              ;UPDATE LINE START CHAR
  1715  007636  120327  000136                  CMPB    %3,#136         ;LAST IN SET
  1716  007642  001336                          BNE     PRG4B           ;NO
  1717  007644  012703  000040                  MOV     #40,%3          ;YES, RESET
  1718  007650  000733                          BR      PRG4B           ;GET NEXT CHARACTER.
  1719  007652  000000                  COLMN:  0
  1720                                  ;
  1721                                  ;SEND CR LF
  1722                                  ;
  1723  007654  112777  000015  171324  TCRLF:  MOVB    #15,@TXBUF      ;SEND CR,LF
  1724  007662  105777  171316                  TSTB    @TXCSR
  1725  007666  100375                          BPL     .-4
  1726  007670  112777  000012  171310          MOVB    #12,@TXBUF
  1727  007676  105777  171302                  TSTB    @TXCSR
  1728  007702  100375                          BPL     .-4
```

```
1729  007704  000207                          RTS     %7
1730
1731                                  ;**********
1732                                  ;PROGRAM 5
1733                                  ;**********
1734  007706  104000                  PRG5:   TYPE
1735  007710  012777                          PSTIT
1736  007712  004537  004014                  JSR     5,LINSEL
1737  007716  000005                          RESET
1738  007720  004737  004402                  JSR     7,SETPAR
1739  007724  052777  000006  171246        BIS     #6,@RXCSR       ;SET DTR RQ TO SND
1740  007732  104000                  PRG5A:  TYPE                    ;TYPE MESSAGE TO MAKE
1741  007734  013251                          MAKCON                  ;LINE CONNECTION
1742  007736  000000                          HALT                    ;WAIT FOR USER TO MAKE LINE CONNECTION
1743  007740  005777  171236                  TST     @RXBUF          ;READ BUFFER
1744  007744  032777  020000  171226          BIT     #BIT13,@RXCSR   ;TEST FOR CLEAR TO SEND
1745  007752  001003                          BNE     PRG5B
1746  007754  104000                  PRG5AA: TYPE                    ;TYPE ERROR MESSAGE
1747  007756  013377                          LINCHM
1748  007760  000764                          BR      PRG5A           ;AND TRY AGAIN
1749  007762  104000                  PRG5B:  TYPE
1750  007764  013427                          LINMAD
1751  007766  005037  010114                  CLR     ERRCNT
1752  007772  012702  013504          PRG5BB: MOV     #PRG2M,%2       ;GET BASE ADDRESS OF DATA TO BE TRANSMITTED
1753  007776  112201                  PRG5C:  MOVB    (2)+,%1         ;GET A CHARACTER
1754  010000  020127  000045                  CMP     %1,#'%          ;WAS IT THE TERMINATOR?
1755  010004  001440                          BEQ     PRG5E
1756  010006  032737  000100  001374          BIT     #BIT6,SRT       ;WAS PARITY OPTION SELECTED?
1757  010014  001402                          BEQ     .+6             ;BRANCH IF NO PARITY DESIRED
1758  010016  004737  003600                  JSR     7,GENPAR        ;GENERATE PARITY ON CHAR. IN R1
1759  010022  032777  020000  171150          BIT     #BIT13,@RXCSR   ;CHECK CLEAR TO SEND
1760  010030  001751                          BEQ     PRG5AA          ;TYPE ERROR MSG. IF NOT SET
1761  010032  010177  171150                  MOV     %1,@TXBUF       ;TRANSMIT THE CHARACTER
1762  010036  005777  171140                  TST     @RXBUF          ;ANY ERROR FLAGS?
1763  010042  100001                          BPL     .+4             ;BRANCH IF NO ERROR FLAGS
1764  010044  104003                          ERROR                   ;ERROR! SOME ERROR FLAG IS SET
1765  010046  105777  171126                  TSTB    @RXCSR          ;WAIT FOR THE RECEIVER TO RECEIVE
1766  010052  100375                          BPL     .-4             ;THE TRANSMITTED CHARACTER
1767  010054  117703  171122                  MOVB    @RXBUF,%3       ;SAVE IT IN R3
1768  010060  043701  001362                  BIC     CARMSK,%1       ;CLEAR NON- TRANSMITTED BITS
1769  010064  120103                          CMPB    %1,%3           ;WAS RECEIVED & TRANSMITTED DATA THE SAME
1770  010066  001403                          BEQ     PRG5D
1771  010070  104003                          ERROR                   ;ERROR! DATA ERROR
1772  010072  005237  010114                  INC     ERRCNT
1773  010076  105777  171102          PRG5D:  TSTB    @TXCSR          ;WAIT FOR TRANSMITTER TO FINISH
1774  010102  100375                          BPL     .-4
1775  010104  000734                          BR      PRG5C
1776  010106  104000                  PRG5E:  TYPE
1777  010110  013350                          ENDPAS
1778  010112  000727                          BR      PRG5BB
1779  010114  000000                  ERRCNT: OPEN
1780                                  ;THIS ROUTINE MOVES THE CONTENTS OF R2 TO THE ADDRESS SPECIFIED
1781                                  ;BY R1
1782  010116  012737  000006  000004  MOVIT:  MOV     #6,4            ;SET UP FOR RETURN
1783  010124  012737  000002  000006          MOV     #2,6
1784  010132  012700  000037                  MOV     #31.,%0         ;GET COUNTER
1785  010136  010231                  MOVITA: MOV     %2,@(1)+                ;MOVE THE DATA
```

```
                                                        DEC     %0              ;ALL DATA MOVED?
                                                        BNE     MOVITA          ;NO.  RETURN
                                                        MOV     #ERTP,MACHER
                                                        MOV     #40,MACHER+2
                                                        RTS     5               ;RETURN
                                                ;
                                                ;SUBROUTINE TO LOAD ALL VECTORS
                                                LDVECS: MOV     #RISR0,%1
                                                        MOV     #VECTAB,%2
                                                        MOV     #10,%3
                                                        MOV     #31.,%4
                                                LDVECB: BIT     #BIT0,@(2)              ;DOES THIS VECTOR EXIST
                                                        BNE     LDVEC1          ;NO, SKIP LOADING
                                                        MOV     %1,@(2)         ;LOAD VECTOR
                                                LDVEC1: ADD     %3,%1
                                                        TST     (2)+
                                                        DEC     %4
                                                        BNE     LDVECB
                                                        RTS     5
                                                ;
                                                LDTVEC: MOV     #TISR0,%1
                                                        MOV     #VECTAB,%2
                                                        MOV     #10,%3
                                                        MOV     #31.,%4
                                                LDTVED: BIT     #BIT0,@(2)              ;DOES THIS VECTOR EXIST
                                                        BNE     LDVEC2          ;NO, SKIP LOADING
                                                        MOV     @(2),%0
                                                        MOV     %1,4(0)
                                                LDVEC2: ADD     %3,%1
                                                        TST     (2)+
                                                        DEC     %4
                                                        BNE     LDTVED
                                                        RTS     7
                                                ;
                                                ;ROUTINE TO LOAD PRIORITY LEVEL 7 IN VECTOR +2
                                                LDPRI:  MOV     #VECTAB,%1      ;GET BASE VECTOR
                                                        MOV     #340,%2         ;GET LEVEL 7
                                                        MOV     #31.,%3         ;LOAD COUNTER
                                                LDPRIA: BIT     #BIT0,@(1)              ;DOES THIS VECTOR EXIST
                                                        BNE     LDPRIX          ;NO SKIP LOADING
                                                        MOV     @(1),%4         ;LOAD VECTOR +2
                                                        MOV     %2,2(4)
                                                LDPRIX: TST     (1)+            ;POINT TO NEXT VECTOR
                                                        DEC     %3              ;DECREMENT COUNTER
                                                        BNE     LDPRIA
                                                        RTS     7
                                                ;VECTOR ASSIGNMENT TABLE
                                                VECTAB: 301                     ;LINE 0 VECTOR
                                                        311                     ;LINE 1 VECTOR
                                                        321                     ;LINE 2 VECTOR
                                                        331                     ;LINE 3 VECTOR
                                                        341                     ;LINE 4 VECTOR
                                                        351                     ;LINE 5 VECTOR
                                                        361                     ;LINE 6 VECTOR
                                                        371                     ;LINE 7 VECTOR
                                                        401                     ;LINE 10 VECTOR
```

```
  1841  010356  000411                          411                     ;LINE 11 VECTOR
  1842  010360  000421                          421                     ;LINE 12 VECTOR
  1843  010362  000431                          431                     ;LINE 13 VECTOR
  1844  010364  000441                          441                     ;LINE 14 VECTOR
  1845  010366  000451                          451                     ;LINE 15 VECTOR
  1846  010370  000461                          461                     ;LINE 16 VECTOR
  1847  010372  000471                          471                     ;LINE 17 VECTOR
  1848  010374  000501                          501                     ;LINE 20 VECTOR
  1849  010376  000511                          511                     ;LINE 21 VECTOR
  1850  010400  000521                          521                     ;LINE 22 VECTOR
  1851  010402  000531                          531                     ;LINE 23 VECTOR
  1852  010404  000541                          541                     ;LINE 24 VECTOR
  1853  010406  000551                          551                     ;LINE 25 VECTOR
  1854  010410  000561                          561                     ;LINE 26 VECTOR
  1855  010412  000571                          571                     ;LINE 27 VECTOR
  1856  010414  000601                          601                     ;LINE 30 VECTOR
  1857  010416  000611                          611                     ;LINE 31 VECTOR
  1858  010420  000621                          621                     ;LINE 32 VECTOR
  1859  010422  000631                          631                     ;LINE 33 VECTOR
  1860  010424  000641                          641                     ;LINE 34 VECTOR
  1861  010426  000651                          651                     ;LINE 35 VECTOR
  1862  010430  000661                          661                     ;LINE 36 VECTOR
  1863                                ;DL11-E REGISTER ADDRESSES
  1864          000000                        N=0
  1865          000000                        A=0
  1866  010432                        RCSR:   .REPT   31.
  1867                                        RRCV    \N,\A
  1868                                        N=N+10
  1869                                        A=A+1
  1870                                        .ENDR
  1871          000000                        N=0
  1872          000000                        A=0
  1873  010530                        RBUF:   .REPT   31.
  1874                                        RBUFF   \N,\A
  1875                                        N=N+10
  1876                                        A=A+1
  1877                                        .ENDR
  1878          000000                        N=0
  1879          000000                        A=0
  1880  010626                        TCSR:   .REPT   31.
  1881                                        TXMT    \N,\A
  1882                                        N=N+10
  1883                                        A=A+1
  1884                                        .ENDR
  1885          000000                        N=0
  1886          000000                        A=0
  1887  010724                        TBUF:   .REPT   31.
  1888                                        TBUFF   \N,\A
  1889                                        N=N+10
  1890                                        A=A+1
  1891                                        .ENDR
  1892          000000                        N=0
  1893                                        .REPT   31.
  1894                                        ISR     \N
  1895                                        N=N+1
  1896                                        .ENDR
```

```
 1897            000000                          N=0
 1898                                            .REPT   32.
 1899                                            ISRT    \N
 1900                                            N=N+1
 1901                                            .ENDR
 1902                                    ;MESSAGES
 1903  012012  042045  030514  026461  MTITLE: .ASCII  '%DL11-E ON LINE TEST - MAINDEC-11-DZDLB-B%'
 1904  012020  020105  047117  046040
 1905  012026  047111  020105  042524
 1906  012034  052123  026440  046440
 1907  012042  044501  042116  041505
 1908  012050  030455  026461  055104
 1909  012056  046104  026502  022502
 1910  012064  046445  050101  047440          .ASCII  '%MAP OF DEVICES PRESENT%'
 1911  012072  020106  042504  044526
 1912  012100  042503  020123  051120
 1913  012106  051505  047105  022524
 1914  012114  046045  047111  020105          .ASCII  '%LINE  D-ADR     TRAP AT%@'
 1915  012122  042040  040455  051104
 1916  012130  020040  020040  052040
 1917  012136  040522  020120  052101
 1918  012144  040045
 1919  012146  020040  020040  020040  MLINE:  .ASCII  '       '
 1920  012154  020040  020040  020040  MDADR:  .ASCII  '           '
 1921  012162  020040  020040
 1922  012166  020040  020040  020040  MTRAP:  .ASCII  '      %@'
 1923  012174  040045
 1924  012176  047045  047117  020105  MNONE:  .ASCII  '%NONE FOUND%@'
 1925  012204  047506  047125  022504
 1926  012212     100
 1927  012213     045  054524  042520  MSWSEL: .ASCII  '%TYPE IN PROGRAM NUMBER    @'
 1928  012220  044440  020116  051120
 1929  012226  043517  040522  020115
 1930  012234  052516  041115  051105
 1931  012242  020040  020040     100
 1932  012247     045  051105  047522  MTERR:  .ASCII  '%ERROR - UNEXPECTED TRAP'
 1933  012254  020122  020055  047125
 1934  012262  054105  042520  052103
 1935  012270  042105  052040  040522
 1936  012276     120
 1937  012277     045  051124  050101          .ASCII  '%TRAPPED TO  '
 1938  012304  042520  020104  047524
 1939  012312  020040
 1940  012314  020040  020040  020040  MTO:    .ASCII  '        '
 1941  012322  020040
 1942  012324  052045  040522  050120          .ASCII  '%TRAPPED FROM PC  '
 1943  012332  042105  043040  047522
 1944  012340  020115  041520  020040
 1945  012346  020040  020040  020040  MFROM:  .ASCII  '        @'
 1946  012354  020040     100
 1947  012357     040  020040  020040  CSRADD: .ASCII  '      @'
 1948  012364  040040
 1949  012366  043045  046101  042523  RINTM:  .ASCII  '%FALSE INT. RCVR@'
 1950  012374  044440  052116  020056
 1951  012402  041522  051126     100
 1952  012407     045  040506  051514  TINTM:  .ASCII  '%FALSE INT XMIT@'
```

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 1953  012414  020105  047111  020124
 1954  012422  046530  052111     100
 1955  012427     045  041520  020075  EMO:    .ASCII  '%PC= '
 1956  012434  020040  020040  020040  APC:    .ASCII  '        @'
 1957  012442  020040     100
 1958  012445     040  052040  041530  ATXCSR: .ASCII  '  TXCSR = '
 1959  012452  051123  036440     040
 1960  012457     040  020040  020040  ATXWAS: .ASCII  '      @'
 1961  012464  040040
 1962  012466  020040  054122  051503  ARXCSR: .ASCII  '  RXCSR = '
 1963  012474  020122  020075
 1964  012500  020040  020040  020040  ARXWAS: .ASCII  '      @'
 1965  012506     100
 1966  012507     045  050045  043522  POTIT:  .ASCII  '%%PRG0 - SINGLE CHAR LINE MODE TEST@'
 1967  012514  020060  020055  044523
 1968  012522  043516  042514  041440
 1969  012530  040510  020122  044514
 1970  012536  042516  046440  042117
 1971  012544  020105  042524  052123
 1972  012552     100
 1973  012553     045  050045  043522  P1TIT:  .ASCII  '%%PRG1 - SPEC BIN COUNT LINE MODE TEST@'
 1974  012560  020061  020055  050123
 1975  012566  041505  041040  047111
 1976  012574  041440  052517  052116
 1977  012602  046040  047111  020105
 1978  012610  047515  042504  052040
 1979  012616  051505  040124
 1980  012622  022445  051120  031107  P2TIT:  .ASCII  '%%PRG2 - SPECIAL MESSAGE LINE MODE TEST@'
 1981  012630  026440  051440  042520
 1982  012636  044503  046101  046440
 1983  012644  051505  040523  042507
 1984  012652  046040  047111  020105
 1985  012660  047515  042504  052040
 1986  012666  051505  040124
 1987  012672  022445  051120  031507  P3TIT:  .ASCII  '%%PRG3 - RECEIVE MESSAGE TEST@'
 1988  012700  026440  051040  041505
 1989  012706  044505  042526  046440
 1990  012714  051505  040523  042507
 1991  012722  052040  051505  040124
 1992  012730  022445  051120  032107  P4TIT:  .ASCII  '%%PRG4 - SPECIAL MESSAGE TEST (SPIRAL)@'
 1993  012736  026440  051440  042520
 1994  012744  044503  046101  046440
 1995  012752  051505  040523  042507
 1996  012760  052040  051505  020124
 1997  012766  051450  044520  040522
 1998  012774  024514     100
 1999  012777     045  051120  032507  P5TIT:  .ASCII  '%PRG5 - DATA ECHO TEST USING MAYNARD FACILITY@'
 2000  013004  026440  042040  052101
 2001  013012  020101  041505  047510
 2002  013020  052040  051505  020124
 2003  013026  051525  047111  020107
 2004  013034  040515  047131  051101
 2005  013042  020104  040506  044503
 2006  013050  044514  054524     100
 2007  013055     045  054524  042520  SELPAR: .ASCII  '%TYPE IN PARAMETERS AS FOLLOWS:'
 2008  013062  044440  020116  040520
```

```
013070  040522  042515  042524
013076  051522  040440  020123
013104  047506  046114  053517
013112  035123
013114  041045  052111  026461          .ASCII  '%BIT1-0 = CHAR LENGTH%@'
013122  020060  020075  044103
013130  051101  046040  047105
013136  052107  022510     100
013143     045  054524  042520  SELCAR: .ASCII  '%TYPE TEST CHAR CODE IN BIT7-BIT0 OF AN OCTAL BYTE    @'
013150  052040  051505  020124
013156  044103  051101  041440
013164  042117  020105  047111
013172  041040  052111  026467
013200  044502  030124  047440
013206  020106  047101  047440
013214  052103  046101  041040
013222  052131  020105  020040
013230  040040
013232  044445  046114  043505  DTEPR:  .ASCII  '%ILLEGAL DATA%@'
013240  046101  042040  052101
013246  022501     100
013251     045  040515  042513  MAKCON: .ASCII  '%MAKE LINE CONNECTION.@'
013256  046040  047111  020105
013264  047503  047116  041505
013272  044524  047117  040056
013300  042040  052101  020101  CERDAT: .ASCII  ' DATA S/B: '
013306  027523  035102     040
013313     040  020040  020040  CSB:    .ASCII  '     WAS: '
013320  040527  035123     040
013325     040  020040  020040  CWAS:   .ASCII  '     CHAR NO. '
013332  044103  051101  047040
013340  027117     040
013343     040  020040  040040  CRNUM:  .ASCII  '    @'
013350     007                  ENDPAS: .BYTE   007
013351     100                          .ASCII  '@'
013352  037445     100          AINPRG: .ASCII  '%?@'
013355     045  040520  040522  PARMTS: .ASCII  '%PARAMETERS = '
013362  042515  042524  051522
013370  036440     040
013373     040  020040     100  APARM:  .ASCII  '    @'
013377     040  046103  040505  LINCHM: .ASCII  ' CLEAR TO SEND NOT SET.@'
013404  020122  047524  051440
013412  047105  020104  047516
013420  020124  042523  027124
013426     100
013427     045  044514  042516  LINMAD: .ASCII  '%LINE CONNECTION MADE.@'
013434  041440  047117  042516
013442  052103  047511  020116
013450  040515  042504  040056
013456  041445  047117  044506  ACONFIG:        .ASCII  '%CONFIGURATION # '
013464  052507  040522  044524
013472  047117  021440     040
013477     040  020040     100  TCONFIG:        .ASCII  '    @'
        013504                          .EVEN
013504     015     012          PRG2M:  .BYTE   015,012
013506  044124  020105  052521          .ASCII  'THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK'
```

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 2065  013514  041511  020113  051102
 2066  013522  053517  030116  047506
 2067  013530  020130  052512  050115
 2068  013536  042105  047440  042526
 2069  013544  020122  044124  020105
 2070  013552  040514  054532  042040
 2071  013560  043517  020123  040502
 2072  013566  045503
 2073  013570  030040  031061  032063          .ASCII  ' 0123456789.%'
 2074  013576  033065  034067  027071
 2075  013604     045
 2076  013605     045  044514  042516  LFAIL:  .ASCII  '%LINE FAILED%@'
 2077  013612  043040  044501  042514
 2078  013620  022504     100
 2079  013623     045  053117  051105  ROVER:  .ASCII  '%OVERRUN, FRAME, OR PARITY ERROR'@'
 2080  013630  052522  026116  043040
 2081  013636  040522  042515  020054
 2082  013644  051117  050040  051101
 2083  013652  052111  020131  051105
 2084  013660  047522  022522     100
 2085  013665     045  044514  042516  ALINEX: .ASCII  '%LINE # '
 2086  013672  021440     040
 2087  013675     040  020040  040527  TLINEX: .ASCII  '   WAS SELECTED@'
 2088  013702  020123  042523  042514
 2089  013710  052103  042105     100
 2090  013715     045  044514  042516  ALINE:  .ASCII  '%LINE # '
 2091  013722  021440     040
 2092  013725     040  020040  040527  TLINE:  .ASCII  '   WAS CALLED'
 2093  013732  020123  040503  046114
 2094  013740  042105
 2095  013742  052045  050131  020105          .ASCII  '%TYPE IN OCTAL: CONFIGURATION IN BIT0-1 & MODEM TYPE'
 2096  013750  047111  047440  052103
 2097  013756  046101  020072  047503
 2098  013764  043116  043511  051125
 2099  013772  052101  047511  020116
 2100  014000  047111  041040  052111
 2101  014006  026460  020061  020046
 2102  014014  047515  042504  020115
 2103  014022  054524  042520
 2104  014026  044445  020116  044502          .ASCII  '%IN BIT2  (0=103, 1=202)      @'
 2105  014034  031124  020040  030050
 2106  014042  030475  031460  020054
 2107  014050  036461  030062  024462
 2108  014056  020040  020040  020040
 2109  014064     100
 2110  014065     345  054524  042520  WRL:    .ASCII  '%TYPE IN OCTAL IN BIT0-4 THE LINE # YOU ARE CALLING FROM    @'
 2111  014072  044440  020116  041517
 2112  014100  040524  020114  047111
 2113  014106  041040  052111  026460
 2114  014114  020064  044124  020105
 2115  014122  044514  042516  021440
 2116  014130  054440  052517  040440
 2117  014136  042522  041440  046101
 2118  014144  044514  043516  043040
 2119  014152  047522  020115  020040
 2120  014160  040040
```

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 2121  014162  054445  052517  041440  JR:     .ASCII  '%YOU CALLED FROM LINE # '
 2122  014170  046101  042514  020104
 2123  014176  051106  046517  046040
 2124  014204  047111  020105  020043
 2125  014212  020040     100          URA:    .ASCII  ' @'
 2126  014215     045  051120  051505  BUTTON: .ASCII  '%PRESS DATA BUTTON ON DATA PHONE@'
 2127  014223  020123  040504  040524
 2128  014230  041040  052125  047524
 2129  014236  020116  047117  042040
 2130  014244  052101  020101  044120
 2131  014252  047117  040105
 2132  014256  052045  050131  020105  LDLINE: .ASCII  '%TYPE LINE NO. IN OCTAL IN BIT 3-7    @'
 2133  014264  044514  042516  047040
 2134  014272  027117  044440  020116
 2135  014300  041517  040524  020124
 2136  014306  047111  041040  052111
 2137  014314  031440  033455  020040
 2138  014322  020040     100
 2139  014325     045  042522  047503  MPWRF:  .ASCII  '%RECOVERED FROM POWER FAILURE@'
 2140  014332  042526  042522  020104
 2141  014340  051106  046517  050040
 2142  014346  053517  051105  043040
 2143  014354  044501  052514  042522
 2144  014362     100
 2145  014363     045  046111  042514  MMODX:  .ASCII  '%ILLEGAL LINE NO.@'
 2146  014370  040507  020114  044514
 2147  014376  042516  047040  027117
 2148  014404     100
 2149  014405     045  046111  042514  MMODD:  .ASCII  '%ILLEGAL DEVICE ADDRESS@'
 2150  014412  040507  020114  042504
 2151  014420  044526  042503  040440
 2152  014426  042104  042522  051523
 2153  014434     100
 2154  014435     045  054524  042520  MMOD1:  .ASCII  '%TYPE IN OCTAL : BIT 0-5 THE LINE NUMBER OF DEVICE ADDRESS TO BE'
 2155  014442  044440  020116  041517
 2156  014450  040524  020114  020072
 2157  014456  044502  020124  026460
 2158  014464  020065  044124  020105
 2159  014472  044514  042516  047040
 2160  014500  046525  042502  020122
 2161  014506  043117  042040  053105
 2162  014514  041511  020105  042101
 2163  014522  051104  051505  020123
 2164  014530  047524  041040     105
 2165  014535     040  047515  044504          .ASCII  ' MODIFIED    @'
 2166  014542  044506  042105  020040
 2167  014550  020040     100
 2168  014553     045  054524  042520  MMOD2:  .ASCII  '%TYPE IN NEW RXCSR DEVICE ADDRESS    @'
 2169  014560  044440  020116  042516
 2170  014566  020127  054122  051503
 2171  014574  020122  042504  044526
 2172  014602  042503  040440  042104
 2173  014610  042522  051523  020040
 2174  014616  020040     100
 2175  014621     045  054524  042520  MMOD3:  .ASCII  '%TYPE IN 177777  TO CHANGE ANOTHER'
 2176  014626  044440  020116  033461
```

E04


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  2177  014634  033467  033467  020040
  2178  014642  047524  041440  040510
  2179  014650  043516  020105  047101
  2180  014656  052117  042510     122
  2181  014663     040  042504  044526          .ASCII  ' DEVICE ADDRESS    ?'
  2182  014670  042503  040440  042104
  2183  014676  042522  051523  020040
  2184  014704  020040     100
  2185          014710                         .EVEN
  2186  014710  000000                 OUTBUF: OPEN
  2187          016660                         .=OUTBUF+1000.
  2188  016660  000000                 INBUF:  OPEN
  2189          020630                         .=INBUF+1000.
  2190          015054                         BUFF=OUTBUF+100.
  2191  020630  000001                 DEND:   .END
```

```
A     = 000037            536*   1865*  1871*  1872*  1878*  1879*  1895*  1886*  1892*
ACONFI  013456           1405    2058*
ADD1    004004           1063    1091*
ADTENP  004362           1151    1177*
AGAIN   003746           1082*   1085
AINPRG  013352            835    2044*
ALINE   013715           1379    2090*
ALINEX  013665           1121    2085*
APARM   013373           1190    2048*
APC     012434            880     916   1956*
ARXCSR  012466            908    1962*
ARXWAS  012500            908    1964*
ATXCSR  012445            905    1958*
ATXWAS  012457            905    1960*
BDCNV   004216            859    1146*
BDCNVA  004250           1153*   1155
BDCNVB  004302           1158*   1160*
BDCNVC  004304           1149*   1161*
BDCNVD  004306           1150*   1157   1162*
BIT0  = 000001            509*    712    758   1196   1200   1796   1809   1823
BIT1  = 000002            508*   1193   1422
BIT10 = 002000            499*
BIT11 = 004000            498*
BIT12 = 010000            497*   1436
BIT13 = 020000            496*    875    911   1252   1266   1393   1428   1445   1743   1758
BIT14 = 040000            495*   1259   1371
BIT15 = 100000            493     494*  1363   1588
BIT2  = 000004            507*   1555   1577   1691
BIT3  = 000010            506*
BIT4  = 000020            505*   1077
BIT5  = 000040            504*   1062   1069   1086
BIT6  = 000100            503*    713    714    722   1060   1073   1317   1359   1406   1479   1492   1561   1621
                         1622    1662   1663   1674   1675   1702   1755
BIT7  = 000200            502*    989   1058   1065
BIT8  = 000400            501*
BIT9  = 001000            500*
BMOVA   004204           1139*   1141
BMOVE   004174           1135*   1159   1506
BUFF  = 015054           1309    1314   1322   1339   1369   1370   1477   2190*
BUFFP   001400            664*   1307*  1308*  1309   1314   1324*  1369*
BUTTON  014215           1389    1424   2126*
CALLED  001404            666*   1296   1340   1353   1380*
CALLER  001402            665*   1345   1420*  1473
CARMSK  001362            657*    851   1058   1060   1062   1192*  1195*  1198*  1202*  1767
CERDAT  013300            864    2034*
CHALT = 104005            525*
CHLT    002366            630     839*
CNVCTR  004354           1152*   1155*  1174*
COLMN   007652           1692*   1710*  1712*  1719*
CONFIG  001332            644*   1312   1325   1384*  1385*  1404   1434   1471   1483
CONN    006250           1387    1421   1462*
COUNT   001324            641*    985*  1001*  1002   1066*  1070*  1074*  1078*  1084*
CRNUM   013343            861    2041*
CRXTX   002752            906     909*
CRXTXA  003024            909*    910*   918*
CRXTXB  003026            905*    913*   919*
```

```
CRXTXC  003032            912     921#
CSB     013313            856    2036#
CSRADD  012357            857     858    1366    1375    1947#
CTRD    001364            658#    860    1127*   1130*   1321*   1330*   1331    1349*   1350
CWAS    013325            855    2038#
DATCHK= 104004            524#   1329    1344    1348
DTERR   005532           1291    1363#
DECVAL  004374           1147    1182#
DELAY = 104016            534#   1262    1390    1425
DEND    020630           2191#
DIGIT   004356           1165*   1168*   1171*   1172    1175#
DISCON  006234           1373    1397    1431    1457#
DLCNT   003526           1021*   1023    1033#
DLY     003466            639    1021#
DLYA    003504           1025#   1030
DLYB    003510           1026#   1027
DLYC    003522           1024    1031#
DOIT    003742           1068    1072    1076    1080    1081#
DONE    003776           1087    1089#
DTCHK   002412            629     851#
DTCHKA  002510            853     865#
DTERR   013232           1011    2027#
ECDAT   003346            990#    991
EHALT = 104010            528#    886     921
EHLT    002400            633     845#
EHLTA   002410            846     848#
EIGHT   003632           1059    1065#
EMTA    002234            801#
EMTINT  002222            478     798#
EMTTAB  001264            625#    803
EMO     012427            882     917    1955#
ENDPAS  013350           1358    1776    2042#
ERR     002512            628     867#
ERRA    002562            870     875#
ERRB    002624            867*    868*    871*    872*    873*    883#
ERRC    002632            876     886#
ERRCNT  010114           1750*   1771*    778#
ERRD    002642            877*    878*    880     889#    913*    914*    916
ERRE    002644            863*    874*    887     890#
ERROR = 104003            523#   1294    1395    1430    1438    1447    1469    1763    1770
ERROR1= 104013            531#    857     863
ERRRX = 104015            533#   1268    1365    1374    1624    1628    1631
ERRTX = 104014            532#   1655
ERR1    002534            636     871#
ERR3A   007230           1595    1624#
ERR3B   007244           1597    1628#
ERR3C   007252           1602    1631#
ERTP    004520            466     468     470     472     480     678     732    1206#   1787
ERTPA   004570           1214#   1233
FILL    004146           1126#   1354
FILLA   004154           1128#   1131
FINISH  005476           1333    1352#
FIVE    003720           1064    1077#
FMAP    001350            652#    712*   1232    1237*
FNONE   001346            651#    685*    729*    734
FORMAD  004734            711    1241#
```

```
FROMPC  001342            649*   1213*   1219    1230*
FTITLE  001344            650*    674*    680     684*    738*    794*
GENPAR  003600           1058*   1563    1704    1757
INBUF   016550           1304    1337    1368    2188*   2189
INBUFP  001776            663*   1302*   1303*   1304    1338*   1368*
INCPRG  002354            623     624     834*
INDAT   003322            984*   1013
INFIL   004142           1125*   1529
LDLINE  014256           1096    2132*
LDPRI   010274           1511    1533    1820*
LDPRIA  010310           1823*   1829
LDPRIX  010324           1824    1827*
LDTVEC  010226           1512    1534    1805*
LDTVED  010246           1809*   1816
LDVEC0  010202           1796*   1802
LDVEC5  010162           1513    1535    1792*
LDVEC1  010214           1797    1799*
LDVEC2  010262           1810    1813*
LFAIL   013605           1625    2076*
LINCA   004760           1254*   1270
LINCB   004776           1258*   1260
LINCF   005056           1267    1271*
LINCHM  013377           1269    1746    2049*
LINCON  004742           1251*   1556    1564    1578    1694    1705
LINE    001330            643*   1287*   1378    1415*   1417
LINENO  001354            654*    686*    690*    707     715
LINEJP  005074           1253    1275*
LINMAC  013427           1274    1402    1749    2054*
LINSA   004056           1106*   1109
LINSEL  004014           1095*   1553    1574    1689    1735
MACHER  000004            468*    678*    679*    687*    688*    732*    733*    1787*   1788*
MAKCON  013251           1257    1519    1541    1740    2030*
MANJAL= 100000            493*
MAPA    001520            690*    700     731
MAPEND  001730            692     732*
MAPERR  001752            736*
MAPNE   001550            687     698*
MAPOK   001560            697     701*
MAPOKA  001672            718     722*
MAPVEC  004626            474    1228*
MDADR   012154            704    1920*
MFRCM   012346           1220    1945*
MLINE   012146            708     728    1919*
MMODD   014405            771    2149*
MMODX   014363            763    2145*
MMOD1   014435            755    2154*
MMOD2   014553            766    2168*
MMOD3   014621            790    2175*
MNONE   012176            737    1924*
MODEM   001412            670*   1298    1382*   1383*
MODEV   002024            582     751*
MODEV1  002036            754*    764     793
MODEV2  002072            761     765*    772
MODEV3  002116            769     773*
MOVIT   010116           1517    1539    1781*
MOVITA  010136           1784*   1786
```

DZDLBB.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
MPWRF   014325            899    2139#
MSWSEL  012213            743    1927#
MTERR   012247           1223    1932#
MTITLE  012012            683    1903#
MTO     012214           1216    1940#
MTRAP   012166            725    1922#
N     = 000040            535#   1864#  1871#  1878#  1885#  1892#  1897#  1902#
NUMBER  001334            645#   1125*  1128   1129*  1532*
OACNV   003530            702     706    723    855    856    857    880    905    908    916   1036#  1120   1190
                         1214    1218   1378   1404   1417
OACNVA  003542           1041#   1050
OLDPS   001336            647#   1206*  1208*  1209*  1210*  1211*  1212
OPEN  = 000000            492#    603    605    615    616    627    640    641    642    643    644    645    655
                          656     657    658    659    660    661    662    663    664    665    666    667    669
                          670     671    818    819    832    833    883    889    890    919    919    929    937
                          964     976    978   1033   1160   1161   1162   1174   1175   1176   1778   2186   2198
OTBUFP  001406            667#   1367*  1481   1482*  1485   1487*  1490
OUTBUF  014710           1277    1323   1355   1367   1485   1487   1490   1505*  1507   1508   1528*  1530   1587
                         1613    2186#  2187   2190
OVRLAY  005076           1277#   1510
OVRLYA  005106           1279#   1282
PARBIT  001322            640#   1065*  1069*  1073*  1077*  1088   1091
PAREX   004476           1197    1199#  1203
PARMTS  013355           1191    2045#
PC    =%000007            596     744*   756*   767*   791*  1018*  1097*  1187*  1381*  1412*  1503*
PFAIL   002646            776     893#   895
POPSP = 005726            510#   1028   1031
POPSP2= 022626            511#    699   1229
PRGID   001242            616#
PRGNUM  001240            615#    747*   900   1115
PRGTAB  001244            617#    749    902
PRG0    006424            617    1498#
PRG0A   006534           1521#   1522
PRG1    006540            618    1526#
PRG1C   006636           1543#   1544
PRG2    006642             19    1551#
PRG2A   006664           1556#
PRG2B   006670           1557#   1560
PRG2C   006674           1558#   1568
PRG2M   013504           1557    1751   2063#
PRG3    006740            620    1572#
PRG3A   006754           1576#   1627   1678
PRG3EX  007462           1664    1678#
PRG4    007474            621    1687#
PRG4A   007530           1694#
PRG4B   007540           1696#   1716   1718
PRG4C   007542           1697#   1701   1711
PRG4D   007560           1699    1702#
PRG5    007706            622    1733#
PRG5A   007732           1739#   1747
PRG5AA  007754           1745#   1759
PRG5B   007762           1744    1748#
PRG5BB  007772           1751#   1777
PRG5C   007776           1752#   1774
PRG5D   010076           1769    1772#
PRG5E   010106           1754    1775#
```

DZDLBB.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
PRTY0 = 000000            519#
PRTY1 = 000040            518#
PRTY2 = 000100            517#
PRTY3 = 000140            516#
PRTY4 = 000200            515#    604     606     612     614
PRTY5 = 000240            514#
PRTY6 = 000300            513#
PRTY7 = 000340            475     477     479     512#    688     716     1207    1514    1536
PSW   = 177776            490#    677*    693*    716*    741*    753*    1206    1207*   1514*   1520*   1536*   1542*   1591*
PWRUP   002656            893     895#
POTIT   012507           1500    1966#
P1TIT   012553           1527    1973#
P2TIT   012622           1552    1980#
P3TIT   012672           1573    1987#
P4TIT   012730           1688    1992#
P5TIT   012777           1734    1999#
RBUF    010530            691     779    1300    1302    1307    1363    1392    1427    1873#
RCSR    010432            689     775    1105    1289    1341    1346    1393    1422*   1428    1432*   1436    1440    1445
                         1449    1453    1457*   1458    1462*   1516    1538    1866#
RCDAT   003330            986#    987    1009
RDOCT   003314            744     756     767     791     981#    1097    1187    1381    1412    1503
RECDAT  001356            655#    852     855    1328*   1343*   1347*
REMAP   001416            580     674#
RESTRT  002676            900#
RETRN   003452            994    1014#
RINTM   012366           1629    1949#
RINT3   007056           1580    1594#
RINT3A  007140           1604    1608#
RINT3B  007172           1609    1613    1615    1617#
RINT3E  007260           1611    1635#
RISR    005124           1286#   1897
RISRA   005164           1293    1296#
RISRAA  005206           1299    1302#
RISRB   005232           1297    1307#
RISRBB  005300           1313    1317#
RISRC   005310           1305    1315    1320#
RISRCA  005344           1327#   1332
RISRD   005376           1326    1336#
RISRDA  005416           1340#   1351
RISREX  005620           1372    1377#
RISRF   005546           1364    1367#
RISRFB  005734           1334    1399#   1441    1454
RISRFC  006000           1386    1410#
RISRFD  006110           1431#   1439    1448
RISRFE  006152           1437    1440#
RISRFF  006124           1429    1434#
RISRFG  006164           1435    1445#
RISRFH  006202           1446    1449#
RISRO   011022           1792    1897#
RISR1   011032           1897#
RISR10  011122           1897#
RISR11  011132           1897#
RISR12  011142           1897#
RISR13  011152           1897#
RISR14  011162           1897#
RISR15  011172           1897#
```

```
RISR16  011202           1897#
RISR17  011212           1897#
RISR2   011042           1897#
RISR20  011222           1897#
RISR21  011232           1897#
RISR22  011242           1897#
RISR23  011252           1897#
RISR24  011262           1897#
RISR25  011272           1897#
RISR26  011302           1897#
RISR27  011312           1897#
RISR3   011052           1897#
RISR30  011322           1897#
RISR31  011332           1897#
RISR32  011342           1897#
RISR33  011352           1897#
RISR34  011362           1897#
RISR35  011372           1897#
RISR36  011402           1897#
RISR4   011062           1897#
RISR5   011072           1897#
RISR6   011102           1897#
RISR7   011112           1897#
ROVER   013623           1632    2079#
RREAD   003442            996     998    1000    1003    1010#
RSTPC   002350            822*    830     832#
RSTPSW  002352            823*    829     933#
RSTREG= 104012            530*    885    1051    1142    1163
RSTRG   002314            635     822#
RTN     003752           1084#   1092
RXBUF   001202            600#   1243*   1255    1265    1272    1599    1742    1761    1766
RXBUFT  002472           1599*   1600    1601    1681#
RXCSR   001200            599#    857    1103    1241*   1251    1254*   1258    1261*   1264    1271    1289*   1290    1341*
                         1346*   1440*   1449*   1453*   1555*   1577*   1593*   1594    1618*   1626*   1691*   1738*   1743
                         1758    1764
RXCSRT  001370            660#    908    1251*   1252    1258*   1259    1264*   1266    1271*   1290*   1292    1371    1594*
                         1596
RXERR   002732            638     907#
RXLVL   001212            604#    930
RXVTR   001210            603#    717     721     724     928    1236*
SAVE    001326            642#   1081*   1088*   1089    1091*
SAVREG= 104011            529#    880    1036    1135    1146
SAVRG   002254            634     808#
SAVRO   003312            942*    949     966*    972     974     978#
SELCAR  013143           1502    2007#
SELPAR  013055           1186    2007#
SETPAR  004402           1185#   1400    1451    1554    1575    1690    1737
SEVEN   003676           1061    1073#
SIX     003654           1063    1069#
SOFTSR  000176            576#    591
SP     =%000006           585*    586*    745     757     760     768     773     732     981*    982*    983*    988*    989*
                          992     993     995     997     999    1007*   1008    1012    1014*   1015    1016    1017    1098
                         1188    1382    1384    1413    1504
SRPTR   000174            575#    588     591*    845     875     911    1603
SRT     001374            662#   1086    1188*   1190    1193    1196    1200    1561    1702    1755
STAD    000300            578*    580*    582*    597#
```

DZDLBB.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
STALL = 104302            522#
START   001422            578     945#    740     795     837     1225
START1  001770            681     735     741#
STCONT  000226            579     581     583#
STKPTR= 001200            491#    584     675     751     897     1576
STPARA  004500           1194    1200#   1201
STPPA   003110            934#    937#
STPRA   003060            926#    929#
STRVRV  003042            631     926#
STRXV = '04006            526#   1579
STTXV = .04007            527#   1581
STXMTV  003072            632     934#
SUBTEN  004314           1154    1165#
SUBTNA  004320           1166#   1169
SUETNB  004334           1167    1170#
SVRPC   002310            808#    816     818#
SVRPSW  002312            809#    815     819#
TBIT1   004434           1192#
TBUF    010724            787    1475#   1481#   1887#
TBUFFP  001410            669#   1339#   1370#   1475    1476#   1477
TCONFI  013477           1404    2061#
TCRLF   007654           1589    1695    1713    1723#
TCSR    010626            783    1317#   1359#   1399    1406#   1450    1467    1479#   1492#   1880#
TEMP    001372            661#   1102#   1118#   1120    1651#   1659
TEMP1   001352            653#    701#    703
TENPWR  004360           1153#   1166    1170    1176#
TFLAG   007466           1588#   1610    1635#   1679#
TINTM   012407           1656    1952#
TINT3   007270           1582    1639#
TINT3B  007340           1641    1651#
TINT3C  007402           1645    1647    1649    1662#
TISR    006260           1465#   1902
TISRA   006276           1468    1471#
TISRAA  006274           1470#   1486    1491
TISRB   006404           1484    1490#
TISRBB  006374           1487#   1493
TISRC   006344           1472    1474    1481#
TISRO   011412           1805    1902#
TISR1   011422           1902#
TISR10  011512           1902#
TISR11  011522           1902#
TISR12  011532           1902#
TISR13  011542           1902#
TISR14  011552           1902#
TISR15  011562           1902#
TISR16  011572           1902#
TISR17  011602           1902#
TISR2   011432           1902#
TISR20  011612           1902#
TISR21  011622           1902#
TISR22  011632           1902#
TISR23  011642           1902#
TISR24  011652           1902#
TISR25  011662           1902#
TISR26  011672           1902#
TISR27  011702           1902#
```

```
TISR3   011442           1902#
TISR30  011712           1902#
TISR31  011722           1902#
TISR32  011732           1902#
TISR33  011742           1902#
TISR34  011752           1902#
TISR35  011762           1902#
TISR36  011772           1902#
TISR37  012002           1902#
TISR4   011452           1902#
TISR5   011462           1902#
TISR6   011472           1902#
TISR7   011502           1902#
TKB     001222            608#    988
TKLVL   001232            612#
TKS     001220            607#    986
TKVTR   001230            611#
TLINE   013725           1378    2092#
TLINEX  013675           1120    2087#
TCPC    001342            648#   1212*   1215    1228*   1231*   1234    1235*   1236
TPB     001226            610#    955*    992*   1668*
TPINT   007422           1585    1668#
TPINTA  007442           1670    1672    1674#
TPLVL   001236            614#   1586
TPS     001224            609#    956     990    1622*   1651    1652*   1653    1657    1659*   1663    1674*
TPVTR   001234            613#   1584
TXBUF   001206            602#   1247*   1565*   1607*   1642*   1706*   1723*   1726*   1760*
TXCSR   001204            601#    713*    714*    722*   1245*   1399*   1450*   1566    1605    1621*   1639    1662*   1675
                         1707    1724    1727    1772
TXCSRT  001366            659#    905    1639*   1640
TXEPR   002710            637     904#
TXLVL   001216            606#    938
TXVTR   001214            605#    936    1234*
TYP     003122            625     942#
TYPA    003136            946#    954     963
TYPC    003160            948     951#
TYPD    003176            953     955#    960     962
TYPDAT  003242            946*    947     951     955     959*    961*    964#
TYPE  = 104000            520#    682     727     736     742     754     762     765     770     789     934     998     975
                         1010    1095    1120    1185    1190    1222    1256    1273    1357    1378    1388    1401    1404
                         1410    1417    1423    1499    1501    1518    1526    1540    1551    1572    1687    1733    1739
                         1745    1748    1775
TYPES = 104001            521#    881     916
TYPF    003214            952     959#
TYPS    003244            626     966#
TYPSA   003300            971     974#
TYPSAA  003250            967#    977
TYPSB   003306            969*    970     976#
UR      014162           1418    2121#
URA     014212           1417    2125#
VECTAB  010334            721#   1110    1793    1806    1920    1832#
WORDS   007470           1583*   1598*   1608    1617*   1643*   1646    1680#
WRU     014065           1411    2110#
XMTDAT  001360            656#    851*    852     856    1327*   1342*
.     = 020630            465#    482     488     574#    577#    598#    957    1116    1310    1478    1562    1567    1593
                         1606    1654    1658    1676    1703    1708    1725    1728    1756    1762    1765    1773    2063#
```

2185# 2187# 2189#

[illegible] 538# 854 855 856 879 904 907 915 1119 1189 1377 1403 1416
[illegible] [illegible] 1
[illegible] [illegible]
[illegible] [illegible]
[illegible] [illegible]
[illegible] [illegible]
[illegible] [illegible]

```
            1106  1110  1111  1114  1126  1127  1136  1137  1138  1147  1148  1149  1150  1151  1152
            1153  1158  1188  1192  1195  1198  1202  1206  1207  1212  1213  1228  1230  1234  1236
            1241  1243  1245  1247  1251  1258  1264  1271  1277  1278  1279  1287  1289  1290  1321
            1322  1323  1324  1337  1338  1339  1340  1341  1345  1346  1353  1367  1368  1369  1370
            1380  1382  1384  1399  1413  1415  1420  1440  1449  1450  1453  1487  1505  1514  1515
            1516  1528  1532  1536  1537  1538  1557  1565  1576  1584  1585  1586  1587  1594  1599
            1619  1620  1639  1651  1659  1692  1693  1696  1700  1706  1712  1717  1751  1760  1781
            1782  1783  1784  1787  1788  1792  1793  1794  1795  1798  1805  1806  1807  1808  1811
            1812  1820  1821  1822  1825  1826  1897  1902
MOVS         946   955   959   981   988   992  1044  1128  1139  1172  1302  1307  1327  1328  1342
            1343  1347  1475  1481  1504  1558  1600  1607  1636  1642  1668  1697  1723  1726  1752
            1765
NOP          695   696   715  1286  1320  1336  1352  1360  1465  1498
RESET        676   752   896  1736
ROL          801
ROR         1046  1047  1048  1082
RTI          817   831   842   846   865   888   923   931   939   950   973  1032  1038  1295  1301
            1306  1311  1316  1318  1361  1376  1398  1407  1433  1470  1480  1488  1616  1623  1630
            1633  1637  1650  1660  1665  1673  1677
RTS          958  1018  1052  1090  1117  1122  1132  1143  1164  1173  1199  1248  1275  1293  1459
            1463  1729  1789  1803  1817  1830
SOB          799   840   878   914  1007  1157  1166  1231  1235
TST          588   680   694   717   734   845  1012  1015  1113  1232  1255  1265  1272  1298  1300
            1392  1458  1471  1483  1601  1610  1742  1761  1800  1814  1827
TSTB         956   986   990  1292  1467  1566  1598  1603  1635  1640  1653  1657  1707  1724  1727
            1764  1772
WAIT        1521  1543  1592
.ASCII      1903  1910  1914  1919  1920  1922  1924  1927  1932  1937  1940  1942  1945  1947  1949
            1952  1955  1956  1958  1960  1962  1964  1966  1973  1980  1987  1992  1995  2007  2013
            2017  2027  2030  2034  2036  2038  2041  2043  2044  2045  2048  2049  2054  2058  2061
            2064  2073  2076  2079  2085  2087  2090  2092  2095  2104  2110  2121  2125  2126  2132
            2139  2145  2149  2154  2165  2168  2175  2181
.BYTE       1192  2042  2063
.ENABL       442
.END        2191
.EVEN       2062  2185
.WORD        538   545   551   557   561   565   569
.REPT          1   484  1866  1873  1880  1887  1893  1898
.TITLE       441
```

ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

```
*,DZDLBB.SEQ/SOL/CRF/PAGE:1=DZDLBB
RUN-TIME:  9 15 3 SECONDS
RUN-TIME RATIO:  93/30=3.0
CORE USED:  11K  (21 PAGES)
```

E05

Spooler runtime 8 Seconds, 249 KCS, 220 disk reads, 4 disk writes, 55 pages