

DH11/VT20

HOST COMPUTER PROGRAM
MD-11-DZVTG-A

EP-DZVTG-A-DL
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IDENTIFICATION

SEC 0001

PRODUCT CODE: MAINDEC-11-DZVTG-A-D
PRODUCT NAME: DM11/VT20 HOST COMPUTER PROGRAM
DATE: OCTOBER, 1975
MAINTAINER: DIAGNOSTIC GROUP
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1. ABSTRACT

THIS PROGRAM IS A COMBINATION DM11 DIAGNOSTIC AND DATA HANDLING ROUTINE. IT IS USED IN CONJUNCTION WITH MAINDEC-11-DBVTA (VT20 SYSTEM DIAGNOSTIC), TEST 21. THE PROGRAM IS COMPLETELY OPERATOR INTERACTIVE BY MEANS OF A CONSOLE DEVICE AND WILL RESPOND TO ANY OPERATOR INPUTS. BY MEANS OF THE CONSOLE DEVICE, TRANSMITTER & RECEIVER LINES CAN BE VERIFIED, SPECIFIED LINES CAN BE HELD FROM TRANSMITTING, RECEIVER BUFFERS CAN BE EXAMINED, DATA CAN BE ORIGINATED AND TRANSMITTED, AND SYSTEM STATUS MONITORED. THE PROGRAM ALSO HAS A PROVISION TO BOOT (TRANSFER) PROGRAMS I.E. VT20 DIAGNOSTIC, FROM THE HOST READER TO ANY SPECIFIED VT20 SYSTEM.

THE PROGRAM HAS BEEN WRITTEN TO EXERCISE ALL 16 DM11 LINES SIMULTANEOUSLY. THE BAUD RATE OF EACH LINE IS USER SELECTABLE AND IS SETUP ON PROGRAM INITIALIZATION.

ALL LINE NUMBERS ARE TO BE ENTERED AS DECIMAL VALUES. THE PROGRAM WILL RESPOND TO ALL ILLEGAL INPUTS BY TYPING '?'. THIS INDICATES THAT THE PREVIOUSLY INPUTTED CHARACTER WAS IGNORED. USE (CR) TO TERMINATE ALL INPUTS. RUBOUT MAY BE USED TO DELETE PREVIOUSLY INPUTTED CHARACTERS WHEN ENTERING ADDRESSES AND LINE NUMBERS. THE RUBOUT WILL HAVE NO EFFECT IN THE SEND MODE (REFER TO 6.J).

2. REQUIREMENTS (EQUIPMENT & MEMORY)

- A. ANY POP-11 FAMILY COMPUTER WITH A KM11 LINE CLOCK, A CONSOLE DEVICE AND AT LEAST 4K OF MEMORY. THIS IS THE MINIMUM CONFIGURATION TO SUPPORT TESTING OF TWO VT20 SYSTEMS. THEREAFTER, AT LEAST 1K OF ADDITIONAL MEMORY IS REQUIRED FOR EACH VT20 SYSTEM TO BE TESTED.

3. LOADING PROCEDURE

- A. USE STANDARD PROCEDURE FOR LOADING BINARY TAPES.

4. STARTING PROCEDURE *****

LOAD AND START PROGRAM AT LOCATION 200. THE PROGRAM WILL RESPOND BY TYPING THE PROGRAM HEADER AND THEN ASK FOR THE DM11 'SCR' ADDRESS.

1. RESPOND WITH (CR) IF . DEFAULT ADDRESS OF 160020 IS TO BE USED.
2. OTHERWISE, RESPOND WITH THE ADDRESS OF THE DM11 'SCR' ADDRESS TO BE USED.

5. PROGRAM ACTION *****

AFTER RECEIVING THE DM11 'SCR' ADDRESS, THE PROGRAM VALIDATES THAT THE 'SCR' ADDRESS IS PRESENT AND THEN MAPS THE DM11 VECTOR ADDRESSES AND SETS UP THE SERVICE ROUTINES. ANY ERRORS ENCOUNTERED WHILE MAPPING THE DM11 WILL RESULT IN AN ERROR PRINTOUT. THESE ARE CONSIDERED 'FATAL ERRORS' AND MUST BE CORRECTED BEFORE THE PROGRAM WILL CONTINUE.

THE PROGRAM ALSO CHECKS THAT THE KM11 LINE CLOCK IS AVAILABLE I.E. RETURNS A SLAVE SYNC WHEN ADDRESSED. IF THE LINE CLOCK DOESN'T RESPOND, THE FOLLOWING MESSAGE WILL BE PRINTED: "NO SLAVE SYNC RETURNED ADDRESSING THE KM11 LINE CLOCK. THIS PROGRAM WILL RUN WITHOUT IT BUT ALL SYSTEM ERRORS MAY NOT BE REPORTED".

THE PROGRAM THEN REQUESTS AND SETS UP THE BAUD RATE FOR EACH LINE. IF AN ILLEGAL BAUD RATE IS ENTERED, IT WILL BE IGNORED AND THE LINE NUMBER WILL BE PRINTED AGAIN. ALL UNUSED LINES SHOULD BE ENTERED AS '0' BAUD TO AVOID ERRONEOUS ERRORS.

AFTER ACCEPTING THE LINE BAUD RATES, EACH ACTIVE LINE, DEFINED BY THE USER, IS THEN TESTED. THIS TESTING INVOLVES SETTING THE MAINTAINANCE BIT (9) AND THEN TRANSMITTING A '125'. A CHECK IS THEN MADE THAT A TRANSMITTER AND RECEIVER INTERRUPT OCCURRED AND THAT THE '125' WAS RECEIVED CORRECTLY. THE PROGRAM THEN PRINTS A 'DOT' THIS INDICATES THAT THE PROGRAM HAS ENTERED THE MONITOR MODE.

IN THE MONITOR MODE, THE PROGRAM IS READY TO AUTOMATICALLY RECEIVE AND TRANSMIT DATA RECEIVED FROM ANY INITIALIZED VT20 SYSTEM. ALSO IN THE MONITOR MODE, THE PROGRAM RUNS BACKGROUND JOBS OF PRINTING ERRORS, KEEPING ACCOUNT OF SYSTEM STATUS AND EXECUTING OPERATOR REQUESTS.

6. MONITOR COMMANDS *****

THERE ARE SEVERAL MONITOR COMMANDS WHICH ENABLE THE OPERATOR TO CONTROL AND COMMAND THE PROGRAM. THERE ARE TWO TYPES OF COMMANDS: MONITOR RESPONSE COMMANDS I.E. "A,"C,"D,"E,"O&T AND 8 LINE DEPENDANT COMMANDS. I.E. "B,"M,"L,"R,"S & "X. ON RECEIPT OF A MONITOR RESPONSE COMMAND, THE PROGRAM WILL IMMEDIATELY EXECUTE THE COMMAND. ON RECEIPT OF A LINE DEPENDENT COMMAND THE PROGRAM WILL WAIT FOR A LINE NUMBER AND A CARRIAGE RETURN (CR) BEFORE EXECUTING THE COMMAND. THE FORM OF THIS TYPE OF COMMAND IS "COMMAND & LINE NO. (CR)". IN SOME CASES, THE COMMAND WILL ALLOW FOR MULTIPLE LINE NUMBERS TO BE ACCEPTED. IN THESE CASES THE LINE NUMBERS ARE TO BE SEPERATED BY COMMAS AND TERMINATED BY (CR). AN EXAMPLE WOULD BE: "VB,4,6,7(CR)". ON RECEIPT OF THIS COMMAND, LINES 0,4,6 & 7 WOULD BE VERIFIED (REFER TO THE "V COMMAND SECTION 6.V).

THE OMISSION OF A LINE NUMBER I.E. (CR) ONLY, WILL RESULT IN LINE '0' BEING SERVICED. IN ALL CASES, THE LINE NUMBERS MAY BE INPUTTED IN ANY ORDER. ALL CONTROL CHARACTERS I.E. "A,"B ETC. ARE OBTAINED BY TYPING THE 'CNTRL & CHARACTER SPECIFIED' KEYS SIMULTANEOUSLY.

A. "A (ABSOLUTE SYSTEM RESTART)•

ONE RECEIPT OF THIS COMMAND, THE PROGRAM WILL BE RESTARTED. THIS WILL ENABLE FOR A NEW DM11 'SCR' DEVICE ADDRESS AND NEW BAUD RATES TO BE ENTERED.

B. "B (BOOT SELECTED LINES)•

THE PURPOSE OF THIS COMMAND IS TO BOOT A ROUTINE FROM THE READER OF THE HOST COMPUTER TO SELECTED VT20 SYSTEMS. UPON RECEIPT OF THE ("B), THE PROGRAM WILL WAIT FOR THE LINE OR LINES NUMBERS OVER WHICH THE PROGRAM IS TO BE TRANSFERED. AFTER RECEIVING THE LINE NUMBER(S), THE PROGRAM WILL REQUEST THE READER DEVICE & VECTOR ADDRESSES. THIS QUESTION WILL ONLY BE ASKED ON THE INITIAL USE OF THE BOOT ROUTINE, HOWEVER THESE ADDRESSES CAN BE CHANGED BY TYPING A ("E). THEN ON THE NEXT OCCURANCE OF THE ("B) COMMAND, A NEW READER DEVICE ADDRESS WILL BE REQUESTED.

IN ORDER FOR PROGRAMS TO BE BOOTED TO A SELECTED VT20 SYSTEM, THE BOOTSTRAP LOADER (SEE NOTE 2) IN THE PDP-11/05 OF THE VT20 MUST BE MODIFIED. THIS WILL ENABLE THE PDP-11 TO ACCEPT THE BOOTED PROGRAM. TO DO THIS, SIMPLY REPLACE THE PC11 OR TTY 'CSR' ADDRESS IN LOCATION '37776' WITH A DL11 'CSR' ADDRESS OF EITHER '175610 OR 175620'. THE ABSOLUTE LOADER WILL BE THE FIRST PROGRAM BOOTED (UNLESS A B792YL IS PRESENT) AND AFTER THE SUCCESSFUL COMPLETION OF THE ABSOLUTE BOOT (37500 FOR AN 0K COMPUTER, ETC). THE BOOT ROUTINE IS CAPABLE OF BOOTING ALL '16' DM LINES SIMULTANEOUSLY. IF A BHT92YK BOOT IS UTILIZED ONLY THE EVEN# LINES (175610 ADDRESS) CAN BE UTILIZED FOR THE BOOT OPERATION, HOWEVER NO PROGRAM MODIFICATION IS REQUIRED.

NOTE1: BEFORE BOOTING ANY PROGRAMS, INCLUDING THE ABSOLUTE LOADED, NOTE2: SUCCESSFUL BOOT OPERATION WILL BE INDICATED BY A HALT THE VT20 BOOTED. THE LINE (S) TO BE BOOTED SHOULD FIRST BE VERIFIED (REFER TO "V COMMAND).

C. "C (CLEAR SOFTWARE SWITCHES EXIT PRESENT MODE)•

THIS COMMAND CAN BE EXECUTED AT ANYTIME TO TERMINATE OPERATOR REQUESTS I.E. SEND, HOLD, BOOT MODES ETC., AND RESET THE SYSTEM STATUS TO A KNOWN STATE. THE ("C) WILL NOT EFFECT THE STATE OF ACTIVE RECEIVERS AND TRANSMITTERS. HOWEVER, ALL LINES THAT WERE BEING HELD, REMAIN HELD UNTIL RELEASED BY THE ("R) COMMAND.

D. "D (PRINT RECEIVED DATA)

THIS COMMAND ENABLES ALL DATA BEING RECEIVED BY THE HOST PROGRAM, REGARDLESS OF LINE NUMBER, TO BE PRINTED. THIS IS A DOUBLE FUNCTION COMMAND WHICH ON THE FIRST RECEIPT OF ("D) WILL ENABLE THE DIAGNOSTIC MODE. THIS WILL RESULT IN THE MESSAGE "DIAGNOSTIC MODE ENABLE" TO BE TYPED. ON THE SECOND RECEIPT OF A "D", THE DIAGNOSTIC MODE WILL BE DISABLED.

THE USE OF THIS COMMAND SHOULD BE RESTRICTED TO RUNNING ONE LINE AND THEN ONLY IF THERE ARE NO ERRORS BEING REPORTED BY THAT LINE. IT IS RECOMMENDED THAT THE ("P) FEATURE BE USED IN LIEU OF THE DIAGNOSTIC MODE IF MULTIPLE LINES ARE BEING EXERCISED.

E. "E (ESCAPE RESTART/REINITIALIZE HARDWARE AND SOFTWARE)•

THIS COMMAND IS TO BE USED IF MULTIPLE RECEIVER AND/OR TRANSMITTER ERRORS ARE BEING REPORTED AND THE USE OF ("C) HAS NO APARENT EFFECT. ON RECEIPT OF A ("E), ALL SYSTEM SOFTWARE AND HARDWARE FLAGS ARE RESET. THIS WILL RESULT IN TERMINATING THE OPERATION OF ANY LINES WHICH WERE ACTIVE UPON THE RECEIPT OF THE ("E). HENCEFORTH, ALL VT20 SYSTEMS WILL HAVE TO BE REINITIALIZED. THIS COMMAND WILL ALSO RE-INITIALIZE THE DM11 AND RESET THE MONITOR TRANSFER AND ERRORS COUNTERS. THESE ARE THE COUNTS DISPLAYED WHEN LISTING MONITOR STATUS (REFER TO "L).

F. "H (HOLD SELECTED LINES)

THIS COMMAND WILL ENABLE FOR A SELECTED LINES' BUFFER TO BE HELD FROM BEING TRANSMITTED. THE COMMAND MAY BE USED SOLELY TO HOLD LINE TRANSMISSION OR USED IN CONJUNCTION WITH THE ("S) FEATURE. THIS WILL ENABLE A USER TO CREATE A BUFFER WHICH CAN BE RELEASED, ON COMMAND, IN A BURST AT TRANSMITTER BAUD RATE. REFER TO THE MONITOR COMMAND ("S) FOR INSTRUCTIONS ON CREATING THIS BUFFER. THIS COMMAND WILL FACILITATE HOLDING UP TO '16' DM LINES SIMULTANEOUSLY IN ANY ORDER. THE LINES CAN THEN BE RELEASED (REFER TO "R) INDIVIDUALLY OR SIMULTANEOUSLY.

G. "L (LIST SELECTED LINE STATUS)

THIS COMMAND WILL ENABLE FOR THE CURRENT SYSTEM STATUS TO BE MONITORED. THE ("L) OPTION CAN BE USED IN ONE OF TWO WAYS: (1) TYPE "L(CR)" TO PRINT THE STATUS OF ALL DM11 LINES. (2) TYPE "L & LINE NO., LINE NO....(CR)" TO PRINT THE STATUS OF SPECIFIED LINE(S). THE FOLLOWING IS AN EXAMPLE AND EXPLANATION OF THE MONITOR PRINTOUT. REFER TO SECTION 7.(ERRORS) FOR A FURTHER EXPLANATION OF THE ERROR DATA.

EXAMPLE:

LINE	IN	OUT	OR	PAR.	FRAM	TRAN	ST.	HELD	PEND	BAUD
A	B	C	D	E	F	G	H	I	J	K

A# NO. OF LINE BEING MONITORED
 B# NO. OF BLOCKS OF DATA RECEIVED
 C# NO. OF BLOCKS OF DATA TRANSMITTED
 D# NO. OF OVERRUN ERRORS INCURRED
 E# NO. OF PARITY ERRORS INCURRED
 F# NO. OF FRAMING ERRORS INCURRED
 G# NO. OF ILLEGAL TRANSMITTER INTERRUPTS INCURRED.
 H# NO. OF ILLEGAL START CODES INCURRED.
 I# TO '1' IF LINE IS CURRENTLY BEING HELD.
 J# TO '1' IF A HELD LINE HAS DATA PENDING
 K# TO THE LINE BUAD RATE SELECTED BY THE USER

H. "P (PRINT SELECTED LINE BUFFER)

THIS COMMAND IS USED TO PRINT THE CONTENTS OF A SELECTED LINES' BUFFER. IT SHOULD BE NOTED THAT THE START CODE (377) IS DETECTED AND PRINTED AS AN UP-ARROW (^). THE EOP CODE (14) IS ALSO DETECTED AND IS PRINTED AS "(EOP)". UPON COMPLETION OF PRINTING A BUFFER OR IF THE BUFFER IS EMPTY, A DOT WILL BE PRINTED INDICATING A RETURN TO THE MONITOR. THIS COMMAND SUPERCEDES "D AND AUTOMATICALLY EXITS THE 'PRINT RECEIVED DATA MODE.'

I. "R (RELEASE SELECTED LINES)*

THIS COMMAND IS USED TO RELEASE LINES THAT WERE HELD USING THE ("H) FEATURE. LINES MAY BE RELEASED IN ANY ORDER AND EITHER INDIVIDUALLY OR COLLECTIVELY. THE ("L) COMMAND CAN BE USED TO DETERMINE IF A SELECTED LINE IS BEING HELD. THE ("R) COMMAND WILL FACILITATE RELEASING UP TO 16 LINES SIMULTANEOUSLY.

J. "S (SEND FOLLOWING DATA TO SELECTED LINES VT20 SW00=1)*

THIS COMMAND IS USED TO SEND DATA, ORIGINATED ON THE HOST CONSOLE DEVICE, TO SELECTED TRANSMITTER LINE(S). IN THIS MODE, AS EACH CHARACTER IS RECEIVED IT IS STORED IN THE RESPECTIVE LINE(S) DATA BUFFER. UP TO 384 CHARACTERS MAY BE INPUTTED. AFTER THE DESIRED BUFFER HAS BEEN CREATED, TYPE (ALT). THIS WILL RESULT IN THE SEND MODE BEING TERMINATED AND THE RESPECTIVE LINE(S) TRANSMITTERS BEING ACTIVATED. AN ALTERNATE TO THIS IS TO HOLD SELECTED LINES AND THEN RELEASE THEM ON COMMAND. THIS IS DONE USING THE ("H) FEATURE TO HOLD SELECTED LINE(S) AND THEN ENTERING THE ("S) MODE. WHEN THE DESIRED BUFFER HAS BEEN CREATED, EXIT THE ("S) MODE BY TYPING (ALT). THE PROGRAM WILL RESPOND BY A DOT, INDICATING A RETURN TO THE MONITOR. THE DATA BUFFER(S) CAN THEN BE PRINTED (REFER TO "P) AND/OR RELEASED (REFER TO "R).

WHEN USING THE ("S) FEATURE. SW00 MUST BE SET TO A "1" (UP) ON THE VT20 SYSTEM RECEIVING THE DATA. OTHERWISE, THE DATA WILL LOOK AND BE HANDLED AS DATA, OR RECEIVER ERRORS. THIS SWITCH SHOULD BE RESET (DOWN) WHEN NOT USING THE SEND MODE.

K. "V(VERIFY SELECTED LINES IF VT20 IS CYCLING TST21, SW00,01=1)*

THIS COMMAND IS DEFINITELY THE MOST USEFUL AND BENEFICIAL COMMAND THAT THE OPERATOR CAN USE TO BRING UP A VT20 SYSTEM. IT IS USED TO VERIFY THAT A SELECTED DL11 LINE OR LINES ARE FUNCTIONING (I.E. TRANSMITTING & RECEIVING). TO USE THIS ROUTINE, TYPE "V LINE NO., LINE NO.,....(CR). THE SELECTED LINE(S) WILL THEN HAVE A CODE OF '125' TRANSMITTED OVER THEM (REFER TO NOTE). A CHECK IS THEN MADE THAT ALL LINE RECEIVERS RESPONDED WITH THE CORRECT DATA. THIS CODE IS TRANSMITTED '5' TIMES PER LINE AND THEN THE MESSAGE: "LINE XXX VERIFIED OK" IS PRINTED. IF A LINE FAILS TO RESPOND, THE MESSAGE: "LINE XXX NO VERIFY DATA RETURNED" IS PRINTED. IF A LINE RESPONDS BUT THE DATA IS INVALID, THE MESSAGE: "LINE XXX VERIFY DATA ERROR, SENT=125 RECV'D -XXX" IS PRINTED. THE DATA IS THEN RE-TRANSMITTED AND AGAIN VERIFIED. THIS WILL CONTINUE UNTIL A "C" IS TYPED BY THE OPERATOR TO TERMINATE THE TEST, OR '5' SUCCESSFUL DATA CODES ARE RECEIVED.

NOTE: IN ORDER FOR THIS TEST TO FUNCTION, EITHER "TST21" OF THE VT20 DIAGNOSTIC (MAINDEC=11-DBVTA) MUST BE LOADED AND RUNNING WITH "SW00 & SW01" SET OR THE FOLLOWING DL11 ECHO PATCH ROUTINE MUST BE TOGGLED INTO THE VT20 SYSTEM UNDER TEST.

1000/	105737 1756X0	TSTB @DLRCR	;	WAIT FOR DATA
1004/	100375	BPL .-4		
1006/	113737 1756Y2 1756N6	MOVB @DLRBUF,@DLXBUF	;	ECHO CHAR.
1014/	771	BR .-14	;	WAIT NEXT CHAR.

WHERE: X= ADDRESS OF SELECTED DL11 RECEIVER CONTROL STATUS REGISTER
Y= ADDRESS OF SELECTED DL11 RECEIVER DATA BUFFER REGISTER
N= ADDRESS OF SELECTED DL11 TRANSMITTER DATA BUFFER REGISTER

NOTE: IF TEST 21 IS USED, ALL TUBES TO BE VERIFIED MUST BE CLEARED OF ANY PRIOR ACTIVITY (CONTROL C OR CONTROL E).

L. "X (TRANSMIT ON SELECTED LINES)

THIS COMMAND FORCES A CONTINUOUS TRANSMISSION OF THE CODE 125 OCTAL ON THE LINES SPECIFIED. ALL DATA ERRORS INTO THE HOST ARE IGNORED ALTHOUGH, IF TEST 21 OF DBVTA IS RUNNING WITH SW0 & 1 SET, IN THE VT200° CONNECTED TO THE LINES SELECTED, ALL TRANSMISSION ERRORS WILL BE COUNTED AND RECEIVE DATA DISPLAYED. THIS COMMAND IS DESIGNED TO BE A TOOL TO AID IN THE INSTALLATION AND INITIAL LINE CHECK-OUT AND TROUBLE-SHOOTING. THIS COMMAND MUST BE EXITED VIA "E ONLY!

M. AUXILIARY COMMANDS

"O (INHIBIT A PRINTOUT) - INHIBITS THE PRINTING OF ONE MESSAGE ONLY. THIS WOULD EITHER BE THE MESSAGE CURRENTLY PRINTING OR THE NEXT MESSAGE WHICH WAS TO BE PRINTED.

"T (INHIBIT ALL ERROR PRINTOUTS) - ALLOWS CONTROL OF THE

PRINTING OF ERRORS. FIRST CONTROL T DISABLES ERROR PRINTOUT AND SECOND CONTROL T RE-ENABLED ERROR PRINTOUTS. CONTROL A AND CONTROL C WILL BOTH CAUSE RE-ENTRY INTO THE ERROR PRINTING MODE.

- THESE COMMANDS SHOULD BE PRECEDED BY A CONTROL C OR E AT THE VT20'S TO BE TESTED TO AVOID MISLEADING ERROR PRINTOUTS.

7. ERROR REPORTER

THE PROGRAM HANDLES ERRORS IN TWO PHASES (1) FATAL ERRORS (INCURRED WHILE MAPPING THE DM11 ADDRESS AND VECTORS) AND (2) NON-FATAL SYSTEM ERRORS (INCURRED WHILE RECEIVING AND TRANSFERRING DATA). FATAL ERRORS MUST BE CORRECTED BEFORE THE PROGRAM WILL CONTINUE.

A. FATAL ERRORS

THESE ERRORS CAN RESULT FROM THE USER ENTERING ILLEGAL DEVICE ADDRESS OR SIMPLY BY HAVING A BAD DM11 PRESENT. FATAL ERRORS OF THIS NATURE WILL RESULT IN ONE OF TWO TYPEOUTS:

1. "THAT DM11 ADDRESS IS NOT PRESENT"

THIS PRINTOUT WILL RESULT IF THE ADDRESS ENTERED BY THE USER DIDN'T RETURN A 'SLAVE SYNC' WHEN ADDRESSED.

2. "NO INTERRUPT RESPONSE FROM DEVICE NNNNNN"

THIS PRINTOUT WILL RESULT AFTER MAPPING IF THE DM11 RECEIVER FAILS TO INTERRUPT WHEN ENABLED.

B. SYSTEM ERRORS

SYSTEM ERRORS ARE MAN' ED AS BACKGROUND JOBS. WHEN AN ERROR IS INCURRED IT IS CATEGORIZED BY GIVING IT A UNIQUE NUMBER AND PUSHED INTO AN ERROR BUFFER.

THESE ERRORS ARE THEN PRINTED (IN THE ORDER OF INCURRENCE) BY THE MONITOR. A MAXIMUM OF SIX(6) ERRORS PER/LINE, REGARDLESS OF TYPE, ARE SAVED IN THE ERROR BUFFER AND PRINTED. THE SYSTEM DOES, HOWEVER, KEEP A RUNNING COUNT OF ALL ERRORS. THIS INFORMATION CAN BE ACCESSED BY USE OF THE (L) COMMAND. THESE ERROR COUNTERS ARE RESET ONLY ON SYSTEM START UP AND BY THE (E) & (A) COMMANDS. EACH ERROR PRINTOUT WILL CONSIST OF THE LINE NUMBER AND A MESSAGE DESCRIBING THE ERROR TYPE.

FOLLOWING IS A LIST AND DESCRIPTION OF THE POSSIBLE ERROR MESSAGES THAT MAY OCCUR:

1. ILLEGAL NON-EX MEMORY INTERRUPT

THIS ERROR WILL RESULT IF THE NPR HARDWARE PLACES THE ADDRESS OF A MEMORY LOCATION ON THE UNIBUS AND NO SLAVE SYN IS RECEIVED IN 20USEC.

2. "ILLEGAL TRANS. INTERRUPT"

THIS ERROR WILL RESULT IS THE LINE RECEIVER IS ACTIVE AND A TRANSMITTER INTERRUPT IS SERVICED.

3. "OVERRUN ERROR"

4. "FRAMING ERROR"

5. "PARITY ERROR"

6. "ILLEGAL START CODE"

THIS ERROR IS A RESULT OF THE FIRST CHARACTER RECEIVED, OTHER THAN A NULL CODE, NOT BEING '377'. (REFER TO DATA FORMAT, SECTION 8., FOR A FURTHER EXPLANATION.)

7. "ILLEGAL READER INTERRUPT"

8. "ATTEMPT TO RECEIVE WHILE IN SEND MODE"

THIS MESSAGE IS PRINTED IF DATA IS RECEIVED FROM THE VT20 ON THE SAME LINE AS THE USER HAS SPECIFIED TO BE USED AS A "SEND" DATA LINE.

9. "VERIFY CHECK OK"

THIS MESSAGE IS PRINTED AFTER 'S' SUCCESSFUL TRANSMIT/RECEIVE OPERATIONS HAVE BEEN COMPLETED WHEN VERIFYING A LINE.

10. "DATA VERIFY ERROR, SENT=125 RECV'D=XXX"

IF THIS ERROR OCCURS, THE VERIFY CODE (125) WILL BE RE-TRANSMITTED. THIS WILL CONTINUE UNTIL EITHER 'S' SUCCESSFUL TRANSMIT/RECEIVE OPERATIONS HAVE BEEN COMPLETED OR A (^C) IS TYPED TO TERMINATE THE VERIFY TEST.

11. "NO VERIFY DATA RETURNED"

IF THIS ERROR OCCURS, NO FURTHER ATTEMPT IS MADE TO RE-TRANSMIT THE DATA, AND THE VERIFY TEST THAT PARTICULAR LINE IS ABORTED.

12. "NO TRANSMITTER INTERRUPTS OCCURRING"

THIS MESSAGE IS PRINTED IF NO TRANSMITTER INTERRUPT IS OCCURRED WHEN THE PROGRAM ATTEMPTS TO CHECK THE RECEIVER TRANSMITTER LOGIC. THIS CHECK IS MADE BY SETTING THE MAINTENANCE BIT (9) AND TRANSMITTING A CHARACTER (129).

IT SHOULD BE NOTED AGAIN, THAT IS CHECK IS AUTOMATICALLY PERFORMED BY THE PROGRAM AFTER THE BAUD RATES HAVE BEEN SET UP, AND ARE NOT OPERATOR DEPENDANT. THIS CHECKING TAKES PLACE EVERYTIME A (E OR A) IS TYPED.

13. "NO RECEIVER INTERRUPTS OCCURRING"

THIS ERROR IS ASSOCIATED WITH THE AUTOMATIC CHECKING OF THE RECEIVER AND TRANSMITTER AS DESCRIBED ABOVE. IN THIS CASE THOUGH, NO RECEIVER INTERRUPT OCCURRED FROM THE DESCRIBED CHECK.

IF THIS ERROR IS DETECTED, THE USER SHOULD TYPE A (E). THIS WILL CAUSE THE SEQUENCE WHICH CAUSED THE ERROR TO BE REPEATED. IF THE ERROR RE-OCCURS, THEN THE DM11 DIAGNOSTICS SHOULD BE LOADED. IF THE USER ATTEMPTS TO CONTINUE RUNNING THE PROGRAM AFTER ENCOUNTERING THIS ERROR, THE PROGRAM MAY HANG.

14. "DATA CHECK ERROR, SENT -129 RECV'D -XXX"

THIS ERROR IS ALSO ASSOCIATED WITH THE AUTOMATIC CHECKING SEQUENCE. ONLY IN THIS CASE, THE DATA RECEIVED ON THE CHECK WAS NOT THE CODE TRANSMITTED (377).

8. DATA FORMAT

ALL DATA RECEIVED FROM THE VT20 SYSTEMS IS SPECIALLY FORMATTED. THIS FORMAT IS CHECKED AND TRANSMITTED EXACTLY AS IT WAS RECEIVED. THE FORMAT OF THIS DATA IS: 4 NULL CHARACTERS (000), A START CODE(377), DATA (UP TO 384 CHARACTERS ORIGINATED BY USER), AND A EOP (END OF PARAGRAPH CODE=14).

NOTE - THE DATA ORIGINATED FROM A VT20 MAY BE IN ONE OF THREE FORMATS:

- A. RANDOM, GENERATED FROM THE KEYBOARD
- B. INCREMENTAL, GENERATED BY "A"
- C. WORST CASE, GENERATED BY "W"

REFER TO MAINDEC-11-DBVTA WRITEUP FOR DETAILS.

WHEN DATA IS RECEIVED, THE PROGRAM VERIFIES THAT THE FIRST CHARACTER, OTHER THAN NULLS), IS A START CODE. ON RECEIPT OF THE START CODE, THE RECEIVER SERVICE ROUTINE IS INITIALIZED. ALL DATA FROM THIS POINT, UNTIL THE RECEIPT OF AN EOP CODE, IS STORED IN THE APPROPRIATE LINES' BUFFER. ON RECEIPT OF THE EOP, THE RECEIVER SERVICE ROUTINE IS TERMINATED. THE TRANSMITTER SERVICE ROUTINE IS THEN INITIALIZED. THUS, NO DL11 TRANSMITTER AND RECEIVER ARE ACTIVE SIMULTANEOUSLY. THE RECEIVED DATA IS THEN TRANSMITTED, EXACTLY AS IT WAS RECEIVED.

IT SHOULD BE NOTED THAT WHEN A LINES' BUFFER IS PRINTED, THE START CODE CHARACTER IS DETECTED AND PRINTED AS AN UP-ARROW ("^"). THIS ALSO HOLDS TRUE ON THE VT20 END, WHERE THE START CODE IS DISPLAYED AS AN ("^") ON THE SCREEN.

9. DISPLAY REGISTER OPTION

IF THIS PROGRAM IS BEING RUN ON A PDP-11/45 THE ACTIVITY OF THE DM11 LINES MAY BE VISUALLY MONITORED. THIS IS DONE BY SETTING THE DATA DISPLAY SELECT SWITCH, ON THE /45 CONSOLE, TO THE "DISPLAY REGISTER" POSITION. THEN EVERY TIME A DM11 TRANSMITTER BECOMES ACTIVE, IT'S CORRESPONDING LINE NUMBER WILL BE REFLECTED BY LIGHTING A LIGHT IN THE DATA LIGHT REGISTER. IT CAN BE NOTED, THAT IF A SELECTED LINE IS HELD, THE LIGHT REFLECTING THAT LINE WILL BE LIT IF THAT LINE IS READY TO BE RELEASED.

10. LISTING

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1          .TITLE DM11/VT20 MOST DIAGNOSTIC PROGRAM
2          .ABS
3          .ENABLE AMA
4          JMAINDEC=11-DZVTG-A-D
5          JCOPYRIGHT APRIL 30, 1975
6          JREVISED OCTOBER, 1975
7          JDIGITAL EQUIPMENT CORP, MAYNARD, MASS. 01754
8          JPROGRAMMER: EARL L. ROUSE
9
10         JREGISTER DEFINITIONS
11
12         000000      R0=X0
13         000001      R1=X1
14         000002      R2=X2
15         000003      R3=X3
16         000004      R4=X4
17         000005      R5=X5
18         000006      SP=X6
19         000007      PC=X7
20
21         JINSTRUCTION DEFINITION
22
23         005726      POP1SP=05726
24         022626      POP2SP=22626
25         024646      PUSH2SP=24646
26         000240      NOP=240
27         001100      STACK=1100
28         000014      EOP=14
29
30         JLOAD TRAP CATCHER INTO LOC 0-1000
31
32         000000
33         .REPT      .00
34         .+2
35         4
36         .ENDR
37
38         .020
39         000020      010664      MAPVEC      JMAPPER TRAP ROUTINE
40         000022      000340
41         000024      010460      PWRPAL      JPOWER FAIL HANDLER
42         000026      000340
43         000030      010564      EMTSRV      JEMT SERVICE ROUTINE
44         000032      000340
45         000060
46         000060      003150      KEYSRV      JTTY KEYBOARD SERVICE ROUTINE
47         000062      000200
48         000200
49         000200      000137      001342      JMP      START      JPROGRAM STARTING ADDRESS
50
51         JREGISTER ADDRESSES
52         001200
53         001200      177776      PSW1      JADDRESS OF PROCESSOR STATUS REG.
54         001202      177560      TKS1      JADDRESS OF KEYBOARD STATUS REG.

```

A2

55 001204 177562
56 001206 177564
57 001210 177566
58 001212 177570

TKBI 177562
TPBI 177564
TPDI 177566
SWRI 177570

1 " " " BUFFER "
1 " " " PRINTER STATUS REG.
1 " " " PRINTER BUFFER REG.
1 " " " SWITCH REG.

59
60
61
62 104000
63 104001
64 104002
65 104003

ITRAP EQUIVALENCE TABLE:

PRINT=EMT
PRTOCT=PRINT+1
BINDEC=PRTOCT+1
OCTPR3=BINDEC+1

ISUBROUTINE TO PRINT ASCII MESSAGES.
ISUBROUTINE TO PRINT A 6 DIGIT OCTAL NO
ISUBROUTINE TO CONVERT OCTAL TO BINARY & PRINT IT
ISUBROUTINE TO PRINT A 3 DIGIT OCTAL NO.

66
67
68
69
70
71 001214 177546
72 001216 000100
73 001220 000102

ILINE CLOCK REGISTER AND VECTOR ADDRESSES

KM111 177546
KMVTR: 100
KMOR: 102

74
75
76
77
78
79
80

IDM11 ADDRESS TABLE
ITMIS TABLE IS OVERLAYED WITH DM11 ADDRESSES SPECIFIED BY THE USER
IOM PROGRAM INITIALIZATION.

81 001222 160020
82 001224 160022
83 001226 160024
84 001230 160026
85 001232 160030
86 001234 160032
87 001236 160034
88 001240 160036
89 001242 000540
90 001244 000542
91 001246 000544
92 001250 000546

DMSCR: 160020
DMNRC: 160022
DMLPR: 160024
DMCAR: 160026
DMDCR: 160030
DMBAR: 160032
DMBKR: 160034
DMSSR: 160036
DMRVTR: 540
DMRBR: 542
DMTVTR: 544
DMTBR: 546

ISYSTEM CONTROL REGISTER
INEXT RECEIVED CHARACTER REGISTER
ILINE PARAMETER REGISTER
ICURRENT ADDRESS REGISTER
IBYTE COUNT REGISTER
IBUFFER ACTIVE REGISTER
IBREAK CONTROL REGISTER
ISILO STATUS REGISTER
IRECEIVER VECTOR ADDRESS
IRECEIVER 'BR' LEVEL ADDRESS
ITRANSMITTER VECTOR ADDRESS
ITRANSMITTER 'BR' LEVEL ADDRESS

93
94
95
96
97
98 001252 000000
99 001254 000100
100 001256 000200
101 001260 000300
102 001262 000400
103 001264 000500
104 001266 000600
105 001270 000700
106 001272 001000
107 001274 001100
108 001276 001200

IRECEIVER BAUD SPEED EQUIVALENCE TABLE

RCBAUD: 0
100
200
300
400
500
600
700
1000
1100
1200

IZERO
150
175
1110
1134.5
1150
1200
1300
1600
11200
11800

109 001300 001300
110 001302 001400
111 001304 001500
112
113
114
115
116
117 001306 000000
118 001310 002000
119 001312 004000
120 001314 006000
121 001316 010000
122 001320 012000
123 001322 014000
124 001324 016000
125 001326 020000
126 001330 022000
127 001332 024000
128 001334 026000
129 001336 030000
130 001340 032000
131
132
133
134
135

1300 12400
1400 14800
1500 19600

TRANSMITTER BAUD SPEED EQUIVALENC TABLE

TRBAUD: 0 1ZERO
2000 150
4000 175
6000 1110
10000 1134.5
12000 1150
14000 1200
16000 1300
20000 1600
22000 11200
24000 11800
26000 12400
30000 14200
32000 19.00

REQUEST AND SET UP A DH11 DEVICE ADDRESS TABLE.

136 001342 012777 000340 177630
137 001350 012706 001100
138 001354 005077 177622
139 001360 005037 005546
140 001364 005037 007646
141 001370 004737 010626
142 001374 012737 001412 000004
143 001402 012701 020000
144 001406 005721
145 001410 000776
146 001412 162701 001000
147 001416 010137 014274
148 001422 012737 000006 000004
149 001430 012737 000004 000006
150 001436 012700 014376
151 001442 005020
152 001444 023700 014274
153 001450 001374
154 001452 005737 014270
155 001456 001004
156 001460 005237 014270
157 001464 104000 011031
158 001470 104000 012346
159 001474 004737 004722
160 001500 005737 015044
161 001504 001003
162 001506 012737 160020 015044

START: MOV 0340,OPSH ;SET PROCESSOR PRIORITY '07'
MOV 0STACK,SP ;INITIALIZE STACK POINTER
CLR 0YKB ;CLR KEYBOARD INTERRUPT ENABLE
CLR VERPT ;RESET VERIFY REPEAT REQUEST
CLR PRTEPR ;RESET INHIBIT ERROR PRINTOUT
JSR PC,OVRLAY ;OVERLAY TRAP AREA.
MOV 0CORISZ,004 ;RESET TIMEOUT
MOV 020000,R1 ;TEST CORE SIZE
TST (R1)+
BR .-2
CORISZ: SUB 01000,R1 ;SAVE THIS ADDRESS AS ERROR BUFFER LIMIT
MOV R1,MEMSIZ
MOV 06,004
MOV 04,006 ;RESET '6' TO TRAP
MOV 00SUPPTR,R0 ;SETUP TO CLR BUFFER & STORAGE AREA
CLR (R0)+
CMP MEMSIZ,R0 ;DONE?
BNE .-6 ;NO
TST MONFLG ;HAS THE HEADER BEEN TYPED?
BNE START1 ;YES, SKIP RE-TYPING IT
INC MONFLG ;NO, SET FLAG
PRINT, TITLE ;TEXT 'DH11 DATA HANDLING ROUTINE'
START1: PRINT ,MPIAD ;ASK FOR THE DH11 'SCR' ADDRESS
JSR PC,GETLNI ;GET & DECODE THE LINE ADDRESS
TST DEVAOR ;HAS AN ADDRESS INPUTTED?
BNE START2 ;YES, SET IT UP.
MOV 0160020,DEVAOR ;NO, USE DEFAULT 160020 AS 'SCR' ADDRESS

```
163 001514 013701 015044          START2: MOV      DEVAOR,R1      IGET READY TO ASSEMBLE DM11 ADDRESSES
164 001520 012704 001222          MOV      @DMSCR,R4          ISET UP POINTER TO SAVE ACTIVE DL'S
165 001524 012737 001636 000004    MOV      @START5,004       ISET UP TIME-OUT ADDRESS
166 001532 012737 000340 000006    MOV      @340,006
167 001540 052711 040000          BIS      @40000,(R1)       ITEST IF ADDRESS IS PRESENT BY SETTING
168 001544 000240          NOP                          ITHE INITIALIZE BIT
169 001546 000240          NOP
170 001550 010105          START3: MOV      R1,R5
171 001552 062705 000020          ADD      @20,R5           ISET UP END ADDRESS COMPARE
172 001556 010124          181  MOV      R1,(R4)+      ISAVE ADDRESS IN TABLE
173 001560 062701 000002          ADD      @2,R1           ISET UP NEXT DM ADDRESS
174 001564 020105          CMP      R1,R5           IAT END OF ADDRESSES?
175 001566 001373          BNE      18              JNO
176 001570 012737 001606 000004    MOV      @START4,004       ISET UP TIME-OUT ADDRESS
177 001576 005777 177412          TST      @KW11           IIS LINE CLOCK AVAILABLE?
178 001602 000240          NOP
179 001604 000403          BR       START6
180 001606 104000 013010          START4: PRINT,  MESS14      ITEXT "CLOCK NOT AVAILABLE"
181 001612 000402          BR       START7
182 001614 005237 014272          START6: INC      LINCLK     IYES, SET THE SOFTWARE FLAG
183 001620 012737 000006 000004    START7: MOV      @6,004     INO, RESET TRAP WITH A 'IOT' TRAP
184 001626 012737 000004 000006    MOV      @4,006
185 001634 000403          BR       FINVEC          I NOW SETUP VECTOR ADDRESS
186 001636 104000 012133          START5: PRINT,  MESS1       ITEXT 'THAT DM11 ADDRESS IS NOT PRESENT'.
187 001642 000712          BR       START1          IREQUEST A NEW ADDRESS
188
189
190
191
192
193
194 001644 013700 001222          FINVEC: MOV      @DMSCR,R0   ISET UP 'SCR' ADDRESS POINTER
195 001650 012701 001242          MOV      @DMRVTR,R1        ISET UP RECEIVER VECTOR ADDRESS POINTER
196 001654 005077 177320          CLR      @PSW              ISET PROC. PRIORITY 00
197 001660 052737 000001 015144    BIS      @1,FMAP          ISET MAPPING FLAG
198 001666 012710 001100          MOV      @100,(R0)        ISELECT: MAINTENANCE MODE, REC. INTR. ENABLE
199 001672 052710 000200          BIS      @200,(R0)        ICAUSE RECEIVER INTERRUPT
200 001676 000240          NOP
201 001700 000240          NOP
202 001702 012777 000340 177270    MOV      @340,@PSW
203 001710 005010          CLR      (R0)             ICLEAR 'SCR'
204 001712 005737 015144          TST      FMAP             IDID INTERRUPT OCCUR?
205 001716 001412          BEQ     LDVECT           IYES, NOW LOAD THE VECTOR ADDRESS
206 001720 005037 015144          CLR      FMAP            ICLEAR THE SOFTWARE FLAG
207 001724 104000 012177          PRINT,  MESS2           ITEXT 'NO INTERRUPT RESPONSE FROM DEVICE'
208 001730 010037 015122          MOV      @R0,KSTOR1       IPRINT 'SRC' ADDRESS
209 001734 104001 015122          PROCT,  KSTOR1
210 001740 000137 001470          JMP     START1
211
212
213
214
215
216
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217
218 001744 013701 001242      LOVECT: MOV      DMRVTR,R1      ;SET UP TO LOAD THE SERVICE ADDRESSES
219 001750 012721 006256      MOV      RRCVER,(R1)+        ;LOAD THE RECEIVER SERVICE ADDRESS
220 001754 012721 000340      MOV      0340,(R1)+        ;SET RECEIVER TO BR LEVEL 7
221 001760 012721 007144      MOV      STRNMT,(R1)+       ;LOAD THE TRANSMITTER SERVICE ADDRESS
222 001764 012721 000340      MOV      0340,(R1)+        ;SET TRANSMITTER TO BR LEVEL 7
223
224
225 ;*****
226 ;ENTERED HERE TO REQUEST THE BAUD RATE FOR EACH OF THE 16 DM LINES.
227 ;THIS ROUTINE CHECKS FOR LEGAL BAUD RATES, ASSEMBLES THEM INTO USABLE
228 ;RECEIVER & TRANSMITTER BAUD EQUIVALENCE VALUES AND SAVES THEM IN A TABLE.
229 ;THIS TABLE IS THEN LATTER LOADED INTO THE LINE PARAMETER REGISTER.
230 ;*****
231 001770 012701 014450      GTBAUD: MOV      @LPWORD,R1    ;SET UP LINE PARAMETER TABLE POINT
232 001774 005011              CLR      (R1)                ;CLEAR 1ST WORD IN TABLE
233 001776 005037 015032      CLR      LINNO              ;
234 002002 012702 014512      MOV      @BAUDMS,R2        ;SET UP POINTER TO SAVE 'ASCII' BAUD VALUES
235 002006 104000 012556      PRINT,  MEB12              ;REQUEST THE LINE BAUD RATES
236 002012 104002 015032      181    BINDEC, LINNO        ;PRINT THE LINE NUMBER
237 002016 004737 010334      JBR     PC,DECODE          ;SET & DECODE BAUD VALUE
238 002022 000773              BR      18                  ;RETURN HERE FROM DECODE ON ILLEGAL ENTRY
239 002024 013703 015034      MOV      OFFSET,R3         ;SET UP OFFSET
240 002030 016311 001292      MOV      RCBAUD(R3),(R1)   ;SAVE RECEIVER BAUD RATE
241 002034 056311 001306      BIS     TRBAUD(R3),(R1)   ;SAVE TRANSMITTER BAUD RATE
242 002040 052721 000023      BIS     023,(R1)+        ;SELECT: FULL DUPLEX, ODD PARITY, PAR. ENABLED, 8-BIT
243 002044 012703 016526      MOV      @TTYBUF,R3        ;SET UP TO SAVE 'ASCII' VALUE OF BAUD SETTINGS
244 002050 012322              MOV      (R3)+,(R2)+      ;SAVE FOR PRINTING BAUD RATE IN MONITOR ('M) ROUTINE
245 002052 012322              MOV      (R3)+,(R2)+
246 002054 005237 015032      INC     LINNO              ;UPDATE THE LINE NUMBER
247 002060 022737 000020 015032  CMP     020,LINNO          ;DONE ALL '16' LINES?
248 002066 001351              BNE     18                  ;NO
249
250
251 ;*****
252 ;PROGRAM ENTERED HERE TO INITIALIZE ALL SOFTWARE SWITCHES (BOTH FOR
253 ;USER OPTIONS I.E. 'S', 'P, ETC. AND PROGRAM SWITCHES. THIS IS ENTER-
254 ;ED EITHER FROM THE MONITOR ON PROGRAM LOADS OR BY TYPING A 'E'.
255 ;*****
256
257 002070 012777 000340 177102  SERVICE: MOV      0340,OPSW    ;SET PROC. PRIORITY 07
258 002076 012706 001100      MOV      @STACK,SP        ;RESET STACK POINTER
259 002102 005037 005546      CLR     VERPT              ;CLEAR CONTROL X FLAG
260 002106 005037 005544      CLR     LINSTR            ;RESET CONTROL X LINE STORAGE
261 002112 005037 007646      CLR     PRERR             ;RESET ERROR PRINT FLAG
262 002116 012701 014614      MOV     @HOLDSW,R1        ;SET UP TO CLEAR ALL SOFTWARE SW'S.
263 002122 005021              181    CLR     (R1)+        ;
264 002124 023701 014274      CMP     MEMBIZ,R1         ;DONE?
265 002130 001374              BNE     18                  ;NO
266 002132 012702 014450      MOV     @LPWORD,R2        ;SET UP LINE PARAMETER TABLE POINTER
267 002136 012701 030100      MOV     030100,R1         ;
268 002142 012777 004000 177052  MOV     04000,@DMSCR      ;ISSUE MASTER CLEAR TO INITIALIZE THE 'DM'
269 002150 010177 177046      281    MOV     R1,@DMSCR   ;SELECT: REC, TRANS & NON-EX MEM INTERRUPTS
270 002154 012277 177046      MOV     (R2)+,@DHLPR     ;LOAD THE LINE PARAMETER REG. FROM TABLE

```

271 002160 012777 005542 177042
272 002166 012777 177777 177036
273 002174 005201
274 002176 032701 000020
275 002202 001762
276 002204 005077 177030
277 002210 005737 014272
278 002214 001521
279 002216 012777 000040 177014
280 002224 012777 006250 176764
281 002232 012777 000300 176760
282 002240 052777 000100 176746
283
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295 002246 012700 015704
296 002252 010005
297 002254 052777 000100 176720
298 002262 104000 014262
299 002266 005077 176706
300 002272 012701 014450
301 002276 012702 000001
302 002302 005003
303 002304 022721 000077
304 002310 002043
305 002312 052777 001000 176702
306 002320 056337 014276 015020
307 002326 056337 014276 015022
308 002334 056337 014276 315152
309 002342 050277 176666
310 002346 005037 015006
311 002352 022737 000003 015006
312 002360 001374
313 002362 005737 015022
314 002366 001405
315 002370 112720 000014
316 002374 110310
317 002376 106220
318 002400 000407
319 002402 005737 015020
320 002406 001404
321 002410 112720 000016
322 002414 110310
323 002416 106220
324 002420 042777 001000 176574

MOV OVERDAY,0DMCAR ISET UP CURRENT ADDRESS REGISTER
MOV 0-1,0DMBCR ISET BYTE COUNT REGISTER
INC R1 IUPDATE THE LINE NUMBER
BIT 020,R1 ILOADED ALL '16' LINES?
BEQ 28 INO
CLR 0DMSSR ISET SILO ALARM TO '0' IF NO CLOCK
TST LINCLK IIS A LINE CLOCK AVAILABLE?
BEQ RESTRY INO
MOV 032,,0DMSSR ISET SILO ALARM FOR '32' CHARACTERS
MOV 0CLKSRV,0KHWTR IYES, SERVICE RECEIVER SILO ON INTERRUPT
MOV 0300,0KWBK ISET CLOCK TO BR LEVEL 0
BIS 0100,0KWI1 ISET THE INTERRUPT ENABLE

)EACH ACTIVE TRANSMITTER (DEFINED BY THE USER) IS NOW TESTED TO BE OPERATIONAL.
)THIS IS DONE BY TRANSMITTING A '129' CHARACTER ON EACH ACTIVE TRANSMITTER
)WITH THE MAINTENANCE BIT (9) SET. A CHECK IS THEN MADE THAT THE
)TRANSMITTER INTERRUPTED AND THAT THE RECEIVER INTERRUPTED AND
)RECEIVED THE '129' TEST CHARACTER.
)THE ERROR CODES FOR THIS CHECKING ARE:
)14=NO TRANSMITTER INTERRUPT OCCURRED
)16=NO RECEIVER INTERRUPT OCCURRED

TRNCHK1 MOV 0ERRBUF,R0 ISETUP THE ERROR BUFFER
MOV R0,R5
BIS 0100,0TKS IENABLE KEYBOARD INTERRUPTS
PRINT, DOT ITO INDICATE READY
CLR 0PSW ISET PROC. PRIORITY 00
MOV 0LPWORD,R1 ISET UP POINTER TO CHECK ACTIVE TRANSMITTER
MOV 01,R2
CLR R3
181 CMP 077,(R1)+ IIS THIS LINE ACTIVE?
BGE 38 INO
BIS 01000,0DMBCR ISET THE MAINTENANCE BIT
BIS LINENO(R3),RECVCK ISET THE RECEIVER CHECK SW.
BIS LINENO(R3),ACTIVE IYES, SET LINE ACTIVE BIT
BIS LINENO(R3),TRNSHM
BIS R2,0DMBAR ISTART TRANSMITTER
CLR CLKCTR
311 CMP 03,CLKCTR IWAIT FOR CLOCK INTERRUPT TO GIVE
BNE 0-6 ITRANSMITTER AMPLE TIME
TST ACTIVE I)WAS A TRANSMITTER INTERRUPT SERVICED?
BEQ 28 IYES
MOV 014,(R0)+ INO, POST AS NO TRANSMITTER INTERRUPT
MOV R3,(R0) ISET UP TO SAVE FAILING LINE NUMER
ASRB (R0)+
BR 38
281 TST RECVCK IDID THE RECEIVER INTERRUPT?
BEQ 38 IYES
MOV 016,(R0)+ INO, POST AN RECEIVER ERROR
MOV R3,(R0) ISAVE FAILING LINE NUMBER
ASRB (R0)+
381 BIC 01000,0DMBCR ICLEAR THE MAINTENANCE BIT

325 002426 005037 015022
326 002432 005037 015152
327 002436 005037 015020
328 002442 006302
329 002444 062703 000002
330 002450 022703 000040
331 002454 001313
332 002456 000424

CLR ACTIVE
CLR TRNSM
CLR RECVCK
ASL R2 IUPDATE POINTER
ADD 02,R3 IUPDATE OFFSET
CMP 032.,R3 ITESTED ALL LINES?
BNE 18 INO
BR MONTR IYES, ENTER THE MONITOR

I RESTART ENTRY POINT WHEN 'C' IS TYPED.
I ENTRY HERE ONLY CLEARS USERS SOFTWARE SWITCHES AND RESETS THE ERROR
I BUFFER POINTERS TO INHIBIT PRINTING FOR PREVIOUSLY BUFFERED ERRORS.

340 002460 012706 001100
341 002464 012701 014616
342 002470 005021
343 002472 022701 015146
344 002476 001374
345 002500 005037 007646
346 002504 012700 015704
347 002510 010005
348 002512 052777 000100 176462
349 002520 104000 014262
350 002524 005077 176450

RESTRY: MOV 0STACK,SP IRESET STACK POINTER
MOV 0SEND0W,R1
481 CLR (R1)+ ICLEAR THE 'C' SOFTWARE SWITCHES.
CMP 0RECSM,R1 IDONE?
BNE 48
CLR PRYERR IPRINT ALL ERRORS
MOV 0ERRBUF,R0 ISETUP ERROR BUFFER
MOV R0,R5
DIS 0100,0TKS IENABLE KEYBOARD INTERRUPTS
PRINT, DOT ITO INDICATE READY
CLR 0PSW ISET PROC. PRIORITY 00

I PROGRAM RUNS IN THE FOLLOWING SUBROUTINE BREAKING OUT TO SERVICE
I DM11, LINE CLOCK, READER AND KEYBOARD INTERRUPTS, IT ALSO RUNS
I A BACKGROUND JOB OF PRINTING ERRORS ENCOUNTERED BY THE PROGRAM.

358 002530 013777 015022 176454
359 002536 022700 016512
360 002542 003003
361 002544 012700 015704
362 002550 010005
363 002552 004737 002634
364 002556 004737 003004
365 002562 004737 002570
366 002566 000760

MONTR1: MOV ACTIVE,0SWR I DISPLAY SYSTEM STATUS
CMP 0ERRBUF+390.,R0 ITEST THAT THE ERROR BUFFER ISN'T EXCEEDED
BGT MONTR1 IBUFFER OK
MOV 0ERRBUF,R0 INO, RE-SET THE BUFFER POINTER
MOV R0,R5
MONTR1: JBR PC,0VERR ICHECK ERROR BUFFER
JBR PC,0YSCK1 ICHECK IF LINES ARE BEING VALIDATED
JBR PC,0TSTBOT ICHECK IF ANY LINES ARE BEING BOOTED
BR MONTR

I ENTERED HERE TO CHECK STATUS OF ANY LINES BEING BOOTED

372 002570 005737 014620
373 002574 001416
374 002576 023737 015036 015130
375 002604 001012
376 002606 005037 015036
377 002612 012737 016570 015052
378 002620 005037 015056

TSTBOT: TBT 0BOOTPG ICURRENTLY BOOTING PROGRAM?
BEQ TSTEXT INO, EXIT
CMP 0REDONE,KSTOR4 IYES, HAVE ALL TRANSMITTERS FINISHED?
BNE TSTEXT INO, EXIT
CLR 0REDONE IYES, CLEAR COUNTER
MOV 0READBP,0BOOTP2 IRESET READER BUFFER POINTER
CLR READCT ICLEAR THE CHARACTER COUNTER

```
379 002624 012777 000101 012322      MOV      #101,PRCSR      ;SET READER GO TO RESTART BOOT
380 002632 000207                      TSTEXT: RTS      PC      ;RETURN
381
382
383
384
385
386
387
388 002634 020005                      SRVERR: CMP      R0,R5      ;ARE THERE ANY ERRORS PENDING?
389 002636 001441                      BEQ      SRVEXT          ;NO, EXIT
390 002640 005737 015132                      TST      RMODE          ;YES, DATA REPORT MODE REQUESTED?
391 002644 001106                      BNE      DATA          ;YES, GO TO DATA REPORT ROUTINE
392 002646 112537 015124                      MOVB    (R5)+,KSTOR2    ;GET THE ERROR CODE
393 002652 112537 015122                      MOVB    (R5)+,KSTOR1    ;GET FAILING UNIT NO.
394 002656 104000 012255                      281     PRINT, MESS      ;TEXT 'LINE'
395 002662 104002 015122                      BINDEC, KSTOR1          ;PRINT FAILING UNIT NO.
396 002666 013704 015124                      MOV     KSTOR2,R4        ;PICK UP OFFSET TO PRINT ERROR TYPE
397 002672 042704 177760                      BIC     #177760,R4
398 002676 006304                      ASL     R4
399 002700 016437 002744 002710                      MOV     ERRTAB(R4),ERRMES*2
400 002706 104000 000000                      ERRMES: PRINT, HALT      ;MODIFIED TO PRINT ERROR MESSAGE
401 002712 022704 000024                      CMP     #24,R4          ;IS THIS A VERIFY DATA ERROR?
402 002716 001403                      BEQ     38              ;YES,
403 002720 022704 000036                      CMP     #36,R4          ;NO, IS THIS A CHECK DATA ERROR
404 002724 001006                      BNE     SRVEXT          ;NO, EXIT
405 002726 112537 015122                      381     MOVB    (R5)+,KSTOR1 ;YES, PICK UP THE BAD DATA
406 002732 104003 015122                      OCTPR3, KSTOR1          ;PRINT IT
407 002736 104000 014262                      PRINT, DOT
408 002742 000207                      SRVEXT: RTS      PC      ;RETURN
409
410 002744 013224                      ERRTAB: CODE00          ;= ILLEGAL RECEIVER INTERRUPT
411 002746 013260                      CODE01          ;= OVERRUN ERROR
412 002750 013301                      CODE02          ;= FRAMING ERROR
413 002752 013322                      CODE03          ;= PARITY ERROR
414 002754 013342                      CODE04          ;= ILLEGAL START CODE RECEIVED
415 002756 013501                      CODE05          ;= ILLEGAL READER INTERRUPT
416 002760 013535                      CODE06          ;= ILLEGAL TRANSMITTER INTERRUPT
417 002762 013571                      CODE07          ;= ATTEMPT TO RECEIVE WHILE IN SEND MODE
418 002764 013642                      CODE10          ;= TRANSMITTER NON-EX MEMORY INTERRUPT
419 002766 013711                      CODE11          ;= VERIFY CHECK OK
420 002770 013730                      CODE12          ;= DATA VERIFY ERROR, SENT=377 RECV'D=XXX
421 002772 013775                      CODE13          ;= NO VERIFY DATA RETURNED
422 002774 014030                      CODE14          ;= NO TRANSMITTER INTERRUPTS OCCURRING
423 002776 014077                      CODE15          ;= IS ACTIVE, CAN'T VERIFY - TYPE 'E'
424 003000 014146                      CODE16          ;= NO RECEIVER INTERRUPTS OCCURRING
425 003002 014212                      CODE17          ;= DATA CHECK ERROR, SENT=377 RECV'D=XXX
426
427
428
429
430
431 003004 005737 015004                      SYSCK1: TST      SYSSH1      ;ARE THERE ANY VALIDATING LINES MUNG?
432 003010 001423                      BEQ     SYSEXT          ;NO, EXIT
```

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433 003012 013701 015004      MOV      SYSSW1,R1      IYES, REPORT THEM
434 003016 012702 000001      MOV      R1,R2        ISET UP AS POLLING BIT
435 003022 005003              CLR      R3           ISET UP AS LINE NO.
436 003024 030201      181     BIT      R2,R1      ILINE HUNG?
437 003026 001404              BEQ      Z0           INO
438 003030 112720 000013      MOVSB   R13,(R0)+     IYES, POST AS NO DATA RETURNED ON VERIFY
439 003034 110310              MOVSB   R3,(R0)       ISET UP LINE NO.
440 003036 106220              ASRB    (R0)+
441 003040 006302      281     ASL      R2
442 003042 062703 000002      ADD     R2,R3
443 003046 022703 000040      CMP     R32.,R3       ITESTED ALL LINES?
444 003052 001364              BNE     Z0
445 003054 005037 015004      CLR     SYSSW1        ICLEAR THE SOFTWARE SWITCH
446 003060 000207      SYSEXT: RTS          PC           IRETURN

```

)*****
)ENTERED HERE WHEN IN DIAGNOSTIC MODE TO TYPE DATA RECEIVED FROM THE VT20
)*****

```

451
452 003062 105777 176120      DATA:  TSTB    07PB
453 003066 100375              BPL     04
454 003070 122715 000377      CMPB   R377,(R5)     ICHAR, = TO START CODE?
455 003074 001010              BNE     PRTAB1       INO, CHECK FOR 'LF' CODE
456 003076 112777 000336 176104      MOVSB  R336,07PB     IYES, CHANGE CODE TO ' '.
457 003104 005037 015134      PRTAB0: CLR    PRTCNT  ICLR PRINT COUNT.
458 003110 104000 014260      PRINT,  CR LF
459 003114 000413              BR     EXIT
460
461 003116 122715 000012      PRTAB1: CMPB   R12,(R5)  ICHAR, = TO 'LF'
462 003122 001770              BEQ    PRTAB0        IYES, PRINT 'CR-LF'
463 003124 111577 176060      MOVSB  (R5),07PB     INO, PRINT CHAR, AS IS.
464 003130 005237 015134              INC    PRTCNT       IINC, PRINT COUNT
465 003134 022737 000100 015134      CMP    R64.,PRTCNT  ILINE FULL?
466 003142 001760              BEQ    PRTAB0        IYES, PRINT CR LF.
467 003144 105725      EXIT:  TSTB   (R5)+   IINC, BUFFER POINTER.
468 003146 000207      RTS     PC           IRETURN

```

)*****
)ENTERED HERE TO SERVICE KEYBOARD INTERRUPTS
)THE CHARACTERS SERVICED BY THE 'KEYSRV' ROUTINE ARE CATEGORIZED INTO
)ONE OF THREE (3) CATEGORIES: (1)CONTROL CHARACTERS, (2)CHARACTERS ENTERED WHILE
)IN THE SEND MODE, (3)LINE NO'S & ADDRESSES. ALL CONTROL CHARACTERS ARE
)TESTED AND VALIDATED BY THE 'KEYSRV' ROUTINE. IF IT ISN'T A CONTROL CHARACTER
)A TEST IS MADE TO SEE IF THE SEND MODE IS ACTIVE (CONSP1=1). THESE
)CHARACTERS ARE HANDLED BY THE 'SENDLN' ROUTINE. IF NEITHER OF THE ABOVE ARE
)TRUE, THE CHARACTER IS HANDLED BY THE 'GETLN2' ROUTINE. THIS ROUTINE
)ASSEMBLES LINE NUMBERS, REGISTER ADDRESSES AND BAUD RATES.
)*****

```

481
482 003150 010146      KEYSRV: MOV     R1,-(SP)  ISAVE WORKING REG.'S
483 003152 010246              MOV     R2,-(SP)
484 003154 010346              MOV     R3,-(SP)
485 003156 010446              MOV     R4,-(SP)
486 003160 117701 176020      MOVSB  0TK0,R1       IGET CHAR.

```

487	003164	042701	177600		RIC	0177600,R1	!STRIP OFF PARITY BIT
488	003170	010137	015030		MOV	R1,8CHAR	!SAVE THE CHAR.
489	003174	022701	000019		CMP	015,R1	!CHAR. = TO 'CR'?
490	003200	001003			BNE	48	!NO
491	003202	004737	006226		JBR	PC,TYPEIT	!YES, ECHO IT
492	003206	000554			BR	EXITKB	!EXIT
493	003210	022701	000012	481	CMP	012,R1	!CHAR. = TO 'LF'?
494	003214	001536			BEO	GETLN	!YES
495	003216	020127	000033		CMP	R1,033	!CHAR. PRINTABLE?
496	003222	002133			BGE	GETLN	!YES
497	003224	012701	000136		MOV	0136,R1	!NO, PRINT AS A CONTROL CHAR.
498	003230	004737	006226		JBR	PC,TYPEIT	
499	003234	013701	015030		MOV	8CHAR,R1	
500	003240	052701	000100		BIS	0100,R1	!MAKE CHAR. PRINTABLE
501	003244	004737	006226		JBR	PC,TYPEIT	
502	003250	122701	000101		CHPB	0101,R1	!CHAR. = TO '^A'?
503	003254	001002			BNE	.+6	!NO
504	003256	000137	001342		JMP	START	!YES, RESTART PROGRAM
505	003262	122701	000103		CHPB	0103,R1	!CHAR. = TO '^C'?
506	003266	001557			BEO	CONC	
507	003270	122701	000105		CHPB	0105,R1	!^E FOR ESCAPE AND RESTART
508	003274	001002			BNE	.+6	
509	003276	000137	002070		JMP	SERVICE	!YES, DO A COMPLETE RESTART
510	003302	005737	015010		TST	SYSSWH	!SYSTEM ACTIVE?
511	003306	001074			BNE	QMARK	!YES, IGNORE REQUEST
512	003310	005237	015010		INC	SYSSWH	!NO, SET REQUEST SW.
513	003314	122701	000102		CHPB	0102,R1	!CHAR. = TO '^B'?
514	003320	001002			BNE	100	!NO
515	003322	000137	005550		JMP	BOOT	!YES, BOOT TAPE TO VT20.
516	003326	122701	000130	1001	CHPB	0130,R1	!CHAR. = '^X'?
517	003332	001003			BNE	118	!NO
518	003334	012737	000001	005546	MOV	01,VERPT	!YES=LOAD VERIFY REPEAT FLAG
519	003342	000137	005310		JMP	VERIFY	!AND GO VERIFY
520	003346	122701	000124	1181	CHPB	0124,R1	!CHAR. = '^Y'?
521	003352	001003			BNE	128	!NO
522	003354	005137	007646		COM	PRYERR	!COMPLEMENT PRINT INHIBIT FLAG
523	003360	000463			BR	PRYDOT	!AND EXIT
524	003362	122701	000104	1281	CHPB	0104,R1	!CHAR. = '^D'?
525	003366	001503			BEO	COND	!YES, DIAGNOSTIC MODE
526	003370	122701	000110		CHPB	0110,R1	!^H (HOLD)?
527	003374	001466			BEO	CONH	
528	003376	122701	000122		CHPB	0122,R1	!^R (RELEASE)?
529	003402	001521			BEO	CONR	
530	003404	122701	000123		CHPB	0123,R1	!^S (SEND)?
531	003410	001002			BNE	.+6	!NO
532	003412	000137	004066		JMP	CONS	
533	003416	122701	000114	181	CHPB	0114,R1	!^L (LIST SYSTEM STATUS)
534	003422	001002			BNE	28	!NO
535	003424	000137	005006		JMP	CONL	!YES
536	003430	122701	000120	281	CHPB	0120,R1	!^P (PRINT)?
537	003434	001571			BEO	CONP	
538	003436	122701	000117		CHPB	0117,R1	!^O (SUPPRESS PRINTING)
539	003442	001007			BNE	38	!NO
540	003444	005237	015026		INC	OSWITCH	!YES, SET THE SOFTWARE FLAG


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541 003450 005337 015010      DEC      SYSSWM
542 003454 112701 000040      MOV      @40,R1      JPRINT SPACE
543 003460 000427              BR        EXITKS      JEXIT
544 003462 122701 000126      381     CMPB      @126,R1  J"V (VERIFY LINE)
545 003466 001002              BNE      58            JNO
546 003470 000137 005310      JMP      VERIFY      JYES, VERIFY LINE(S)
547 003474 005337 015010      581     DEC      SYSSWM  JCLR SYSTEM SWITCH ON ILLEGAL ENTRY
548 003500 112701 000077      QMARK:  MOV      @77,R1  JILLEGAL CHAR.
549 003504 004737 006226      KEY1:   JBR      PC,TYPEIT  JTYPE '9'.
550 003510 000413              BR        EXITKS      JIGNORE IT
551 003512 005737 015040      GETLN:  TST      CON$PL    JARE WE IN SEND MODE?
552 003516 001402              BEQ      .+6          JNO
553 003520 000137 004136      JMP      SENDLN      JYES, GO TO THE SEND ROUTINE
554 003524 000137 004416      JMP      GETLN2     JGO TO LINE NO. INPUT ROUTINE
555
556 003530 005037 015010      PRD$OT: CLR      SYSSWM
557 003534 104000 014262      PRINT, DOT
558 003540 012604      EXITKS: MOV      (SP)+,R4  JRESTORE THE WORKING REG.'S
559 003542 012603      MOV      (SP)+,R3
560 003544 012602      MOV      (SP)+,R2
561 003546 012601      MOV      (SP)+,R1
562 003550 000002      RTI          JEXIT
563
564
565
566
567
568
569
570 003552 004737 004626      CONH:   JBR      PC,FORMIT  JFORM OFFSETS
571 003556 056337 014276 014614      BIS      LINENO(R3),HOLD$W  JSET HOLD $W. FOR THIS LINE.
572 003564 005337 014732      DEC      $C$CTR      JANY MORE LINES TO BE HELD?
573 003570 001403              BEQ      CONH1       JNO
574 003572 004737 004632      JBR      PC,FORMON  JYES, FORM OFFSET FOR LINE
575 003576 000767              BR        CONH+4     JHOLD NEXT LINE
576 003600 000753      CONH1:  BR        PRD$OT    JEXIT
577
578
579
580
581
582 003602 005137 015132      COND:   COM      RMODE  JSET/CLEAR DIAGNOSTIC $W.
583 003606 001403              BEQ      18          JRESET POINTERS IF CLEARED
584 003610 104000 012500      PRINT, MESS          JTEXT 'DIAG. MODE ENABLED'
585 003614 000403              BR        28          JEXIT
586 003616 012700 015704      181     MOV      @ERR$BUF,R0  JRESET $UPPER POINTERS
587 003622 010005              MOV      R0,R5
588 003624 000741      281     BR        PRD$OT    JEXIT
589
590
591
592
593
594 003626 005002      CONC:   CLR      R2

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595 003630 005003
596 003632 012604
597 003634 012603
598 003636 012602
599 003640 012601
600 003642 000137 002460

CLR R3
MOV (SP)+,R4 ;RESTORE THE WORKING REG.'S
MOV (SP)+,R3
MOV (SP)+,R2
MOV (SP)+,R1
JMP RESTRY

601
602 ;*****
603 ;ENTERED HERE ON RECEIPT OF A 'R' TO RELEASE A SPECIFIED TRANSMISSION
604 ;LINE. THIS COMMAND RELEASES HELD LINES IN ONE OF THREE WAYS: (1)LINES THAT
605 ;ARE INDICATED TO BE RELEASED AND WEREN'T BEING HELD ARE IGNORED, (2)LINES THAT
606 ;ARE BEING HELD BUT HAVE NO DATA PENDING, SIMPLY CLEAR THE HOLD SWITCH (HOLD SW), (3)LINES
607 ;THAT ARE BEING HELD AND HAVE DATA PENDING ARE RELEASED AND THE TRANSMITTERS FOR
608 ;THOSE LINES ARE INITIALIZED AND ACTIVATED.
609 ;*****

611 003646 004737 004626
612 003652 004737 003660
613 003656 000724

CONR1: JBR PC,FORMIT ;FORM THE OFFSETS
JBR PC,RELESE ;RELEASE HELD LINES
BR PRYDOT ;EXIT

614
615 003660 036337 014276 014614
616 003666 001445
617 003670 046337 014276 014614
618 003676 046337 014276 014616
619 003704 036337 014276 015150
620 003712 001433
621 003714 056337 014276 015152
622 003722 012777 000340 175250
623 003730 046337 014276 015150
624 003736 056337 014276 015022
625 003744 052702 030500
626 003750 010277 175246
627 003754 016377 015160 175250
628 003762 016377 014336 175240
629 003770 056377 014276 175236
630 003776 005077 175176
631 004002 005337 014732
632 004006 003403
633 004010 004737 004632
634 004014 000721
635 004016 000207

RELESE1: BIT LINENO(R3),HOLD SW ;IS LINE BEING HELD?
BEQ CONR2 ;NO, EXIT
CONR11: BIC LINENO(R3),HOLD SW ;CLR HOLD SW. FOR THIS LINE.
BIC LINENO(R3),SEND SW ;CLEAR THE SEND SW.
BIT LINENO(R3),PENDIN ;IS DATA PENDING ON THIS LINE?
BEQ CONR2 ;NO SIMPLY RELEASE THE LINE
BIS LINENO(R3),TRNSW ;YES, SET TRANSMITTER SW.
MOV 0340,OPSW ;TEMPORARILY INHIBIT ANY INTERRUPTS
BIC LINENO(R3),PENDIN ;CLEAR THE PEND SW.
BIS LINENO(R3),ACTIVE ;SET WHEN TRANSMITTING
MOV 030500,R2
MOV R2,ODHSCR
MOV BYTECT(R3),ODHSCR ;SET UP BYTE COUNT
MOV BUPADR(R3),ODHCAR ;SET UP CURRENT ADDRESS
BIS LINENO(R3),ODHBAR ;START UP TRANSMITTER
CLR OPSW ;RE-ENABLE INTERRUPTS
CONR21: DEC BCDCYR ;ANY MORE LINES TO BE RELEASED?
BLE CONR3 ;NO
JBR PC,FORMON ;YES, FORM OFFSET FOR NEXT LINE
BR RELESE ;RELEASE NEXT LINE
CONR31: RTS PC ;RETURN

636
637 ;*****
638 ;ENTERED HERE ON RECEIPT OF A 'P' TO PRINT THE DATA IN A SPECIFIED
639 ;LINES BUFFER. THIS CAN EITHER BE DATA RECEIVED FROM A SLAVE VT20
640 ;OR DATA ENTERED WHILE IN THE SEND MODE.
641 ;*****

643 004020 005077 175154
644 004024 005037 015132
645 004030 004737 004626
646 004034 010437 004042
647 004040 104000 000000
648 004044 005337 014732

CONP1: CLR OPSW ;ENABLE FURTHER INTERRUPTS
CLR RMODE ;CLR DIAGNOSTIC MODE
JBR PC,FORMIT ;FORM THE OFFSETS
CONP11: MOV R4,CONP2+2 ;SET UP BUFFER TO BE PRINTED
CONP21: PRINT, HALT
DEC BCDCYR ;DONE PRINTING ALL REQUESTS

```

649 004050 003405          BLE  CONP3          IYES
650 004052 004737 004632  JBR  PC,FORMON     INO, FORM NEXT OFFSET
651 004056 104000 014260  PRINT, CRLF
652 004062 000764          BR   CONP1
653 004064 000621  CONP3: BR   PRTOOT          IEXIT
654
655 /*****
656 /SUBROUTINE ENTERED TO SETUP TO SEND DATA FROM KB TO SPECIFIED LINE
657 /CALLING SEQUENCE: "S(LINE NO.),(LINE NO.),...ETC.  IUP TO 16 LINE NO.'S
658 /          DATA          IUP TO 304 CHAR,'S
659 /          'ALT'MODE          ITO TERMINATE SEND MODE
660 /*****
661
662 004066 004737 004626  CONB1  JBR  PC,FORMIT     IFORM THE OFFSETS
663 004072 005237 015040  INC  CONBFL          ISET SOFTWARE SW.
664 004076 010463 014376  CONB1: MOV  R4,BUFPTR(R3)  ISET UP THE BUFFER POINTER
665 004102 012763 000005 015160  MOV  05,BYTECT(R3)  IINITIALIZE THE BYTE COUNTER
666 004110 056337 014276 014616  BIT  LINENO(R3),SENDSW  ISET THE SEND SW.
667 004116 005337 014732  DEC  BCDCTR          IANY MORE LINES TO BE SETUP?
668 004122 003403          BLE  CONB2          INO
669 004124 004737 004632  JBR  PC,FORMON     IYES, SET THEM UP
670 004130 000762          BR   CONB1
671 004132 000137 003540  CONB2: JMP  EXITKS          IEXIT
672
673 /*****
674 /ENTERED HERE FROM THE 'KEYSRV' ROUTINE WHEN THE SEND SWITCH (CONBFL) IS SET
675 /*****
676
677 004136 004737 006226  SENDLN: JBR  PC,TYPEIT     IECMO CHAR.
678 004142 005001          CLR  R1
679 004144 005002          CLR  R2
680 004146 005003          CLR  R3
681 004150 036337 014276 014616  CONB0: BIT  LINENO(R3),SENDSW  ISEND TO THIS LINE?
682 004156 001422          BEQ  TAGC          INO, CHECK NEXT LINE
683 004160 016304 014376  MOV  BUFPTR(R3),R4  ISET UP BUFFER POINTER
684 004164 122737 000033 015030  CMPB 033,SCHAR     I=TO 'ALT' TO TERMINATE SEND MODE?
685 004172 001424          BEQ  TAGA          IYES
686 004174 122737 000175 015030  CMPB 0175,SCHAR     I= ALT ON ABR33
687 004202 001420          BEQ  TAGA          IYES,
688
689 004204 113724 015030  SENDBF: MOVB  SCHAR,(R4)+  ISAVE CHARACTER IN BUFFER
690 004210 112714 000014  MOVB  0EOP,(R4)     ITERIMATE THE BUFFER
691 004214 010463 014376  MOV  R4,BUFPTR(R3)  ISAVE BUFFER POINTER
692 004220 005263 015160  INC  BYTECT(R3)     ICOUNT NO. OF BYTES SAVED
693 004224 005202  TAGC:  INC  R2          IUPDATE THE LINE NO.
694 004226 062703 000002  ADD  02,R3
695 004232 022703 000040  CMP  032.,R3        IDONE ALL LINES?
696 004236 001344          BNE  CONB0          INO
697 004240 000137 003540  JMP  EXITKS          IYES, EXIT
698 004244 005037 015040  TABA:  CLR  CONBFL
699 004250 112714 000014  MOVB  0EOP,(R4)     ITERMINATE BUFFER
700 004254 036337 014276 014616  TAGB:  BIT  LINENO(R3),SENDSW  ISENDING ON THIS LINE?
701 004262 001445          BEQ  TAGC          INO, CHECK NEXT LINE
702 004264 046337 014276 014616  BIC  LINENO(R3),SENDSW  ICLEAR THE SEND SW.

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703 004272 005463 015160      NEG      BYTECT(R3)      ICOMPLIMENT BYTE COUNT
704 004276 036337 014276 014614      BIT      LINENO(R3),HOLDSW  IIS THIS LINE BEING HELD?
705 004304 001404      RED      TAGD          INO
706 004306 056337 014276 015150      BIS      LINENO(R3),PENDIN  IYES, SET THE PENDING SW.
707 004314 000430      RR      TAGD
708 004316 012777 000340 174654  TAGD1  MOV      0340,0PSW  ITEMPORARILY INHIBIT FURTHER INTERRUPTS
709 004324 052702 030100      BIS      030100,R2  ISET UP TO INITIALIZE TRANSMITTER
710 004330 010277 174660      MOV      R2,0DMSCR
711 004334 016377 015160 174670      MOV      BYTECT(R3),0DMBCR
712 004342 016377 014336 174660      MOV      0UPADR(R3),0DMCAR
713 004350 056337 014276 015152      BIS      LINENO(R3),TRNSW  ISET TRANSMITTER SW.
714 004356 056337 014276 015022      BIS      LINENO(R3),ACTIVE
715 004364 056377 014276 174642      BIS      LINENO(R3),0DMBAR ISTART TRANSMITTER
716 004372 005077 174602      CLR      0PSW      IRE-ENABLE INTERRUPTS
717 004376 005202      TAGD1  INC      R2          IUPDATE THE LINE NO.
718 004400 062703 000002      ADD      02,R3
719 004404 022703 000040      CMP      032.,R3
720 004410 001321      BNE      TAGD
721 004412 000137 003530      JMP      PRTOOT      EXIT

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)*****
)SUBROUTINE ENTERED TO FORM ADDRESSES, BAUD RATES OR LINE NUMBER
)*****

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```

727 004416 022701 000177      GETLN21 CMP      0177,R1      ICHAR, = RUBOUT?
728 004422 001446      BEQ      RUBOUT      IYES
729 004424 005737 015024      TST      RUBSWH      IIS RUBOUT SW. SET?
730 004430 001402      BEQ      18          INO
731 004432 104000 014265      PRINT,  SLASH      IYES, PRINT '/'
732 004436 005037 015024      181  CLR      RUBSWH      ICLR SW.
733 004442 004737 006226      JSR      PC,TYPEIT  IECHO CHAR.
734 004446 120127 000054      CMPB    R1,054      ICHAR, = TO ', '?
735 004452 001410      BEQ      38          IYES, SAVE IT
736 004454 120127 000060      CMPB    R1,060      ILEGAL NO.?
737 004460 002403      BLT      28          INO
738 004462 120127 000071      CMPB    R1,071
739 004466 003402      BLE      38          IYES
740 004470 000137 003500      281  JMP      0MARK      INO, TYPE '?'
741 004474 110177 010312      381  MOVB    R1,0TTYPTR  ISAVE CHAR. IN TTY BUFFER
742 004500 005237 015012      INC      TTYPTR      IUPDATE POINTER
743 004504 105077 010302      CLRB    0TTYPTR      ITERMINATE BUFFER WITH NULL
744 004510 042701 177770      BIC      0177770,R1  ISTRIP
745 004514 006337 015044      ASL     DEVAOR      ILEFT JUSTIFY '3' PLACES
746 004520 006337 015044      ASL     DEVAOR
747 004524 006337 015044      ASL     DEVAOR
748 004530 060137 015044      ADD     R1,DEVAOR  ITHEN ADD NEW DIGIT
749 004534 000137 003540      JMP     EXIT8      IEXIT
750
751 004540 005737 015024      RUBOUT1 TST      RUBSWH      IIS THE RUBOUT SW. SET?
752 004544 001002      BNE     18          IYES
753 004546 104000 014265      PRINT,  SLASH
754 004552 005237 015024      181  INC     RUBSWH      ISET SW.
755 004556 005337 015012      DEC     TTYPTR      IBACK UP BUFFER POINTER
756 004562 117701 010224      MOVB    0TTYPTR,R1  IPICK UP PREVIOUS CHAR.

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```

757 004566 105077 010220          CLR      0TTYPTR          ITERMNATE BUFFER
758 004572 004737 006226          JSR      PC,TYPEIT      IECMO CHAR.
759 004576 013701 015044          MOV      DEVADR,R1
760 004602 042701 177770          BIC      0177770,R1
761 004606 006237 015044          ASR      DEVADR
762 004612 006237 015044          ASR      DEVADR
763 004616 006237 015044          ASR      DEVADR
764 004622 000137 003540          JMP      EXITK9          IEXIT
765
766
767
768
769
770 004626 004737 004722          FORMIT: JSR      PC,GETLN1  IFORM LINE NO.
771 004632 005001 005001          FORMON: CLR      R1
772 004634 005002 005002          CLR      R2
773 004636 005003 005003          CLR      R3
774 004640 017700 010070          MOV      0BCOPTR,R4      IPICK UP LINE NUMBER
775 004644 062737 000002 014734          ADD      02,BCOPTR      IUPDATE POINTER FOR NEXT ENTRY
776 004652 005700 005700          TST      R4              IIS THE LINE NO. '0'?
777 004654 001415 001415          BEQ      18              IYES, NO WORK NEEDED
778 004656 022700 000017          CMP      015.,R4        ILEGAL LINE NO?
779 004662 002005 002005          BGE      28              IYES
780 004664 012701 000077          MOV      077,R1
781 004670 004737 006226          JSR      PC,TYPEIT
782 004674 000754 000754          BR       FORMIT
783 004676 005202 005202          28:     INC      R2              IUPDATE LINE NO.
784 004700 062703 000002          ADD      02.,R3         IFORM THE ADDRESS OFFSET
785 004704 005304 005304          DEC      R4              IDONE?
786 004706 001373 001373          BNE      28              INO
787 004710 016304 014336          18:     MOV      0UPADR(R3),R4  ISET UP THE BUFFER ADDRESS POINTER
788 004714 005024 005024          CLR      (R4)+
789 004716 005024 005024          .R      (R4)+
790 004720 000207 000207          T8      PC              IRETURN
791
792
793
794
795 004722 005037 015044          GETLN1: CLR      DEVADR      ISET UP TO GET LINE NUMBER
796 004726 005037 015030          CLR      SCHAR
797 004732 005037 016926          CLR      TTYBUF
798 004736 012737 016926 015012          MOV      0TTYBUF,TTYPTR  ISET UP BUFFER POINTER
799 004744 052777 000100 174230          BIS      0100,0TKS      IENABLE TTY INTERRUPTS
800 004752 005077 174222          CLR      0PSW
801 004756 013777 015022 174226          18:     MOV      ACTIVE,0SHR  IDISPLAY SYSTEM STATUS
802 004764 023727 015030 000015          CMP      SCHAR,015      IEXIT ON CARRIAGE RETURN
803 004772 001371 001371          BNE      18
804 004774 004737 010050          JSR      PC,0COBIN      ICONVERT LINE NO. TO OCTAL
805 005000 104000 014260          PRINT   ,CRLF
806 005004 000207 000207          RTS      PC
807
808
809
810

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I*****
IENTERED HERE ON RECEIPT OF A 'L' TO LIST SYSTEM STATUS. THE 'L'
IOPTION CAN BE USED IN ONE OF TWO WAYS: (1) TYPE 'L (CR)' TO PRINT THE

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011          ;STATUS OF ALL DM11 LINES. (2) TYPE 'L & LINE NO.' TO PRINT THE STATUS
012          ;OF SPECIFIED LINE(S).
013          ;*****
014
015 005006 005077 174166 CONL1 CLR      OPSW      ;ENABLE FURTHER INTERRUPTS
016 005012 004737 004626      JSR      PC,FORMIT ;FORM THE LINE NUMBER
017 005016 012701 000020      MOV      @16.,R1   ;SET UP THE NO. OF DM LINES
018 005022 104000 012415      PRINT,  MESS      ;PRINT HEADER
019 005026 010337 015032      181     MOV      R3,LINNO
020 005032 006237 015032      ASR      LINNO    ;SET UP THE LINE NO.
021 005036 104000 014260      281     PRINT,  CRLF
022 005042 104002 015032      BINDEC,  LINNO    ;PRINT THE LINE NO.
023 005046 016337 015222 015120  MOV      RECNTR(R3),TEMP
024 005054 104002 015120      BINDEC,  TEMP     ;PRINT NO. OF BLOCKS RECEIVED
025 005060 016337 015370 015120  MOV      OR(R3),TEMP
026 005066 104002 015120      BINDEC,  TEMP     ;PRINT NO. OF OVERRUN ERRORS
027 005072 016337 015474 015120  MOV      PAR(R3),TEMP
028 005100 104002 015120      BINDEC,  TEMP     ;PRINT NO. OF PARITY ERRORS
029 005104 016337 015432 015120  MOV      PRM(R3),TEMP
030 005112 104002 015120      BINDEC,  TEMP     ;PRINT NO. OF FRAMING ERRORS
031 005116 016337 015600 015120  MOV      TRN(R3),TEMP
032 005124 104002 015120      BINDEC,  TEMP     ;PRINT NO. OF TRANSMITTER ERRORS
033 005130 016337 015536 015120  MOV      ST(R3),TEMP
034 005136 104002 015120      BINDEC,  TEMP     ;PRINT NO. OF START CODE ERRORS
035 005142 005037 015120      CLR      TEMP
036 005146 036337 014276 014614  BIT      LINENO(R3),HOLDSW  ;IS THIS LINE BEING HELD?
037 005154 001402          BEQ      ,*0        JNO
038 005156 005237 015120      INC      TEMP
039 005162 104002 015120      BINDEC,  TEMP     ;PRINT STATUS IF HELD
040 005166 005037 015120      CLR      TEMP
041 005172 036337 014276 015150  BIT      LINENO(R3),PENDIN  ;IS THIS LINE PENDING?
042 005200 001402          BEQ      ,*0        JNO
043 005202 005237 015120      INC      TEMP
044 005206 104002 015120      BINDEC,  TEMP     ;PRINT STATUS OF PENDING
045 005212 010302          MOV      R3,R2
046 005214 006302          ASL      R2
047 005216 016237 014512 014440  MOV      @AUDMS(R2),MSGBUF
048 005224 062702 000002          ADD      @2,R2
049 005230 016237 014512 014442  MOV      @AUDMS(R2),MSGBUF+2
050 005236 005037 014444          CLR      MSGBUF+4
051 005242 104000 014440          PRINT,  MSGBUF    ;PRINT THE LINE BAUD RATE
052 005246 005237 015032          INC      LINNO    ;UPDATE THE LINE NO.
053 005252 062703 000002          ADD      @2,R3     ;UPDATE THE OFFSET NO.
054 005256 105737 016526          TSTB    TTYBUF
055 005262 001002          BNE     38        ;YES, EXIT
056 005264 005301          DEC     R1        ;NO, DONE ALL LINES?
057 005266 001263          BNE     28        JNO
058 005270 005337 014732      381     DEC     BCDCTR    ;DONE ALL LINES?
059 005274 003403          BLE     48        ;YES, EXIT
060 005276 004737 004632          JSR     PC,FORMON  ;NO SET UP NEXT LINE
061 005302 000651          BR     18
062 005304 000137 005530      481     JMP     PRTOOT
063
064          ;*****
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892 005310 004737 004626
893 005314 013737 014732 005544
894 005322 056337 014276 015004
895 005330 012763 000001 014626
896 005336 004737 005406
897 005342 005337 014732
898 005346 001403
899
900 005350 004737 004632
901 005354 000762
902 005356 005737 005546
903 005362 001407
904 005364 013737 005544 014732
905 005372 012737 014736 014734
906 005400 000763
907 005402 000137 003530
908
909 005406 036337 014276 015146
910 005414 001004
911 005416 036337 014276 015152
912 005424 001413
913 005426 046337 014276 015004
914 005434 005737 005546
915 005440 001004
916 005442 112720 000015
917 005446 110310
918 005450 106220

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)VERIFY LINE ROUTINE
)ENTERED HERE ON RECEIPT OF A "V". THIS ROUTINE IS USED TO VERIFY THAT A
)SELECTED DH11 LINE OR LINES ARE FUNCTIONING I.E. TRANSMITTING & RECEIVING.
)TO CALL THIS ROUTINE, TYPE: "V LINE NO, LINE NO,..."(CR). THE SELECTED
)LINE(S) WILL THEN HAVE A CODE OF '125' TRANSMITTED OVER THEM (REFER TO NOTE).
)A CHECK IS THEN MADE THAT ALL LINES RESPONDED WITHIN 16 MSEC. WITH THE
)CORRECT DATA. THIS CODE IS TRANSMITTED '5' TIMES PER LINE AND THEN THE
)MESSAGE: "LINE XXX VERIFIED OK" IS TYPED. IF A LINE FAILS TO RESPOND,
)THE MESSAGE: "LINE XXX NO VERIFY DATA RETURNED" IS TYPED. IF A
)LINE RESPONDS BUT THE DATA IS INVALID, THE MESSAGE: "LINE XXX VERIFY DATA
)ERROR, SENT -125 RECV'D-XXX" IS TYPED.
)
)NOTE: IN ODRER FOR THIS TEST TO FUNCTION, EITHER 'TST21' OF THE VT20
)DIAGNOSTIC MUST BE LOADED AND RUNNING WITH 'SW00 & SW01' SET OR THE
)FOLLOWING DL11 ECHO PATCH ROUTINE MUST BE TOGGLED INTO THE VT20
)SYSTEM UNDER TEST.
)
)1000/ 105737 175618          TSTB @DLRCSR      )WAIT FOR DATA
)1004/ 100375                BPL          )
)1006/ 113737 1756Y2 1756N6   MOVB @DLRBUF,@DLXBUF
)1014/ 771                    BR          )-14          )WAIT FOR NEXT CHAR
)
)WHERE: 0 ADDRESS OF SELECTED DL11 RECEIVER CONTROL STATUS REGISTER
)        0 ADDRESS OF SELECTED DL11 RECEIVER DATA BUFFER REGISTER
)        NNNNNN ADDRESS OF SELECTED DL11 TRANSMITTER DATA BUFFER REGISTER
)*****
)FORM THE SELECTED LINE NUMBER
)STORE LINE COUNT IN CASE LOOP SET
)SET THE VERIFY SWITCH
)TRANSMIT THE VERIFY CHARACTER
)DONE ALL LINES?
)YES,CHECK REPEAT FLAG
)NO, FORM THE NEXT LINE NUMBER
)REPEAT?
)NO=EXIT
)RESET LINE COUNTER
)RESET THE LINE POINTER
)AND REPEAT TESTS
)IS LINE CURRENTLY RECEIVING?
)YES, REPORT LINE AS ACTIVE
)IS LINE TRANSMITTING?
)NO, LINE IS IDLE
)CLEAR THE VERIFY REQUEST SW.
)CONTROL XT
)YES-BYPASS ERROR LOGGING
)LINE IS ACTIVE, CAN'T VERIFY
)SET UP LINE NUMBER

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919 005452 000207
920 005454 010302
921 005456 000202
922 005460 052702 030100
923 005464 012777 000348 173506
924 005472 010277 173524
925 005476 012777 177777 173526
926 005504 012777 005542 173516
927 005512 056337 014276 015152
928 005520 056337 014276 015022
929 005526 056377 014276 173500
930 005534 005077 173440
931 005540 000207
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933 005542 052525
934 005544 000000
935 005546 000000
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949 005550 004737 004626
950 005554 013737 014732 015130
951 005562 005037 014624
952 005566 056337 014276 014624
953 005574 005337 014732
954 005600 001403
955 005602 004737 004632
956 005606 000767
957 005610 005237 014620
958 005614 005737 015154
959 005620 001030
960 005622 104000 012525
961 005626 004737 004722
962 005632 013701 015044
963 005636 005701
964 005640 001770
965 005642 010137 015154
966 005646 062701 000002
967 005652 010137 015156
968 005656 104000 012767
969 005662 004737 004722
970 005666 013701 015044
971 005672 012721 005736
972 005676 012711 000200

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1081 RTS PC ;EXIT IF NO OTHER LINES TO BE CHECKED
281 MOV R3,R2
ASR R2 ;SET UP THE LINE NUMBER
BIS #30100,R2
MOV #340,OPSW ;TEMPORARILY INHIBIT INTERRUPTS
MOV R2,ODMSCR
MOV #-1,ODMBCR ;SET UP BYTE COUNT
MOV OVEROAT,ODMCAR ;SET UP THE CURRENT ADDRESS
BIS LINENO(R3),TRNSW ;SET TRANSMITTER SW.
BIS LINENO(R3),ACTIVE
BIS LINENO(R3),ODMCR ;START THE TRANSMITTER
CLR OPSW
VEREYTI RTS PC

VERDATI 52525
LINSTRI 0 ;TEMP STORAGE FOR LINE COUNT
VERPTI 0 ;VERIFY REPEAT FLAG

;*****
;BOOT SUBROUTINE
;THIS SUBROUTINE IS ENTERED ON RECEIPT OF A 'B' FROM THE KEYBOARD.
;ITS PURPOSE IS TO BOOT (TRANSFER) THE VT20 PROGRAM FROM THE READER
;OF THE MOST COMPUTER TO A SELECTED VT20 SYSTEMS. WHEN ENTERED, THE
;THE PROGRAM WILL WAIT FOR THE LINE OR LINES OVER WHICH THE PROGRAM
;IS TO BE TRANSFERED. THE PROGRAM WILL THEN CHECK TO SEE IF A READER
;DEVICE ADDRESS HAS BEEN PREVIOUSLY SETUP. IF IT HASN'T, THE PROGRAM
;WILL REQUEST THE DEVICE & VECTOR ADDRESSES. AFTER COMPLETION OF
;LOADING, THE PROGRAM WILL RETURN TO THE MONITOR.
;*****

BOOTI JSR PC,FORMIT ;WAIT FOR LINE NUMBERS
MOV BCDCTR,KBSTORA ;SAVE NO. OF LINE SET UP
CLR BOOTLN ;SET UP TO SAVE LINES TO BE BOOTED
BOOTI1: BIS LINENO(R3),BOOTLN
DEC BCDCTR ;SET UP ALL LINES?
BEQ BOOT2 ;YES.
JSR PC,FORMON ;NO, FORM OFFSETS FOR NEXT LINE
OR BOOT1
BOOT2: INC BOOTPG ;SET TO INDICATE THAT READER IS ACTIVE
TST RCSR ;HAS READER ADDRESS BEEN SETUP?
BNE BOOT4 ;YES
BOOT3: PRINT, MEB11 ;REQUEST READER DEVICE ADDRESS
JSR PC,GETLN1 ;GET IT
MOV DEVAOR,R1
TST R1 ;HAS ONE ENTERED?
BEQ BOOT3 ;NO, MAKE HIM DO IT
MOV R1,RCSR ;YES, SET IT UP
ADD #2,R1
MOV R1,RDBR
PRINT, MEB13 ;ASK FOR VECTOR ADDRESS
JSR PC,GETLN1 ;GET IT
MOV DEVAOR,R1
MOV #READER,(R1) ;SET UP READER SERVICE ROUTINE
MOV #200,(R1) ;SET BR LEVEL 04

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973 005702 012737 016570 015052 BOOT4: MOV      @READBP,BOOTP2
974 005710 005037 015036          CLR      REDONE          ICLEAR READ TRANSMIT DONE COUNTER
975 005714 005037 015036          CLR      READCT
976 005720 012777 000101 007226      MOV      @101,ORCSR      ISET GO & INTERRUPT ENABLE FOR READER
977 005726 005037 015010          CLR      SYSSW
978 005732 000137 003540          JMP      EXITK          IEXIT
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988 005736 010146          READR1: MOV      R1,-(SP)          ISAVE WORKING REGISTERS
989 005740 010246          MOV      R2,-(SP)
990 005742 010346          MOV      R3,-(SP)
991 005744 017737 007204 015002      MOV      ORCSR,RSTAT      ISAVE READER STATUS
992 005752 017737 007200 015000      MOV      ORDBR,RCHAR      IREAD & SAVE CHAR.
993 005760 013702 015052          MOV      BOOTP2,R2      ISET UP THE READER BUFFER POINTER
994 005764 005737 014620          TST      BOOTPG          IIS READER ACTIVE?
995 005770 001006          BNE      READ1          IYES, LEGAL INTERRUPT
996 005772 112720 000005          MOV#     @5,(R0)         ICODE FOR ILLEGAL READER INTERRUPT
997 005776 105020          CLR#     (R0)         ILINE NO, IS NOT APPLICABLE
998 006000 005077 007150          CLR      ORCSR          IDISABLE FURTHER READER INTERRUPTS
999 006004 000504          BR       READ4          IEXIT
1000 006006 005737 015002      READ1:  TST      RSTAT      IEND OF TAPE FLAG SET?
1001 006012 100416          BMI      READ2          IYES, EXIT
1002 006014 113722 015000          MOV#     RCHAR,(R2)     ISAVE CHAR IN READER BUFFER
1003 006020 010237 015052          MOV      R2,BOOTP2      ISAVE BUFFER POINTER
1004 006024 005237 015056          INC      READCT          IKEEP TRACK OF NO. OF CHAR'S READ.
1005 006030 022737 000100 015056      CMP      @64,READCT     IREAD '64' CHAR'S?
1006 006036 001413          BEQ      READ3          IYES
1007 006040 012777 000101 007106      MOV      @101,ORCSR     ISTART NEXT READ
1008 006046 000463          BR       READ4          IEXIT
1009 006050 005077 007100      READ2:  CLR      ORCSR          IDISABLE READER INTERRUPT
1010 006054 005037 014620          CLR      BOOTPG         ICLEAR THE SOFTWARE SW.
1011 006060 005737 015056          TST      READCT         IANY DATA TO TRANSMIT?
1012 006064 001452          BEQ      READ3          INO, EXIT
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          IAT THIS POINT EITHER THE READER BUFFER IS FULL (64 CHARACTERS) OR THE END OF
          ITAPE POINT HAS BEEN REACHED. THE TRANSMITTERS ARE NOW SET UP TO
          ITRANSMIT THE READER BUFFER.
1018 006066 005003          READ3:  CLR      R3
1019 006070 004637 015056          NEG      READCT
1020 006074 036337 014276 014624 101      BIT      LINENO(R3),BOOTLN IBOOTING THIS LINE?
1021 006102 001433          BEQ      20              INO
1022 006104 010302          MOV      R3,R2
1023 006106 006202          ASR      R2              I'R2' NOW = TO A LINE NO.
1024 006110 052702 030100          BIS      @30100,R2      IASSEMBLE 'SCR' WORD
1025 006114 012777 000340 173056      MOV      @340,OPSW      ITEMPORARILY INHIBIT INTERRUPTS
1026 006122 010277 173074          MOV      R2,ODMSCR

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1027 006126 013777 015096 173076
 1028 006134 012777 016570 173066
 1029 006142 056337 014276 014622
 1030 006150 056337 014276 015022
 1031 006156 056377 014276 173050
 1032 006164 012777 000200 173006
 1033 006172 062703 000002
 1034 006176 022703 000040
 1035 006202 001334
 1036 006204 005737 015002
 1037 006210 100002
 1038 006212 104000 014262
 1039 006216 012603
 1040 006220 012602
 1041 006222 012601
 1042 006224 000002
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 1048 006226 013777 015022 172756
 1049 006234 105777 172746
 1050 006240 100372
 1051 006242 110177 172742
 1052 006246 000207
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 1061 006250 005237 015006
 1062 006254 000400
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MOV READCT,0DHBCR ;SET UP BYTE COUNT
MOV @READBP,0DMCAR ;SET UP CURRENT ADDRESS
BIS LINENO(R3),BOOTSW ;SET THE BOOT SW.
BIS LINENO(R3),ACTIVE ;SET ACTIVE WHEN TRANSMITTING
BIS LINENO(R3),0DHBAR ;START THE TRANSMITTER
MOV @200,0PSW ;RE-SET DR 04
281 ADD @2,R3 ;SET UP TO GET THE NEXT LINE NO.
CMP @32,,R3 ;SERVICED ALL LINES?
BNE 18 ;NO
TST RSTAT ;WAS END OF TAPE REACHED?
BPL READ4 ;NO
READ3A1 PRINT, DOT ;YES,
READ41 MOV (SP)+,R3
MOV (SP)+,R2
MOV (SP)+,R1
RTI ;EXIT

;*****
;SUBROUTINE TO TYPE THE CHARACTER IN 'R1'
;*****

TYPEIT1 MOV ACTIVE,0SHR ;DISPLAY SYSTEM STATUS
TSTB @TPB ;WAIT FOR PRINTER
BPL TYPEIT
MOV R1,@TPB ;OUTPUT CHAR.
RTS PC

;*****
;KX11 LINE CLOCK SERVICE ROUTINE
;ENTERED HERE ON RECEIPT OF CLOCK INTERRUPTS. THIS ROUTINE SIMPLY INCREMENTS
;A CLOCK COUNTER (USED TO CHECK SYSTEM STATUS) AND THEN SERVICES THE RECEIVER
;SILO.
;*****

CLKSRV1 INC CLKCTR ;UPDATE THE COUNTER
DR RECVR ;SERVICE RECEIVER SILO

;*****
;SUBROUTINE ENTERED TO SERVICE ALL DH11 RECEIVER INTERRUPTS.
;R0=ERROR ADDRESS POINTER
;R1=DATA BUFFER ADDRESS OFFSET (BUFFERS ARE 512 BYTES APART)
;R2=DEVICE REGISTER ADDRESS OFFSET
;R3=UNIT ADDRESS OFFSET
;R4=DATA BUFFER ADDRESS POINTER
;RECEIVER ERROR CODES ARE AS FOLLOWS:
;00 = ILLEGAL RECEIVER INTERRUPT
;01 = OVERRUN ERROR
;02 = FRAMING ERROR
;03 = PARITY ERROR
;04 = ILLEGAL START CODE
;07 = ATTEMPT TO RECEIVE DATA WHILE IN SEND MODE
;11 = VERIFIED 'OK'
;12 = VERIFY DATA ERROR
;17 = DATA CHECK ERROR, SENT=000 RECV'D=XXX
    
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1001
1002
1003 006256 010146
1004 006260 010246
1005 006262 010346
1006 006264 010446
1007 006266 017702 172732
1008 006272 010203
1009 006274 000303
1090 006276 042703 177760
1091 006302 006303
1092 006304 005702
1093 006306 100402
1094 006310 000137 007132
1095 006314 036337 014276 014616 181
1096 006322 001412
1097 006324 005263 015642
1098 006330 022763 000005 014670
1099 006336 002753
1100 006340 112720 000007
1101 006344 000137 007116
1102
1103 006350 032702 070000
1104 006354 001444
1105 006356 032702 040000
1106 006362 001412
1107 006364 005263 015370
1108 006370 022763 000005 014670
1109 006376 002733
1110 006400 112720 000001
1111 006404 000137 007116
1112
1113 006410 032702 020000
1114 006414 001412
1115 006416 005263 015432
1116 006422 022763 000005 014670
1117 006430 002716
1118 006432 112720 000002
1119 006436 000137 007116
1120
1121 006442 005263 015474
1122 006446 022763 000005 014670
1123 006454 002704
1124 006456 112720 000003
1125 006462 000137 007116
1126
1127 006466 016304 014376
1128 006472 036337 014276 015146
1129 006500 001116
1130 006502 036337 014276 015020
1131 006510 001414
1132 006512 046337 014276 015020
1133 006520 122702 000125
1134 006524 001660

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RECVR1 MOV R1,=(SP) ISAVE WORKING REGISTERS
MOV R2,=(SP)
MOV R3,=(SP)
MOV R4,=(SP)
RECNXT1 MOV 00HNR, R2 IREAD NEXT WORD FROM THE SILO
MOV R2, R3
SNAB R3 ISET UP TO USE LINE NO. AS OFFSET
BIC 0177760, R3
ABL R3
TST R2 IIS CHARACTER VALID?
BHI 18 IYES
JMP RECNXT INO, SILO IS EMPTY, EXIT
BIT LINENO(R3), SENDSW IIS THIS LINE IN SEND MODE?
BEQ RECVR1 INO
INC SNO(R3) IKEEP TRACK OF NO. OF SEND ERRORS
CMP 05, ERRCTR(R3) IHAS UNIT EXCEEDED ERROR LIMIT?
BLT RECNXT IYES, SERVICE THE NEXT CHAR.
MOVB 007, (R0)+ INO, POST AS SEND ERROR
JMP RECNXT

RECVR11 BIT 070000, R2 IANY RECEIVER ERROR FLAGS SET?
BEQ RECVR2 INO, VALID CHAR.
BIT 040000, R2 IYES, IS IT AN OVERRUN ERROR?
BEQ FRAMER INO
INC OR(R3) IKEEP TRACK OF OVERRUN ERRORS
CMP 05, ERRCTR(R3) IHAS UNIT EXCEEDED ERROR LIMIT?
BLT RECNXT IYES, SERVICE NEXT CHAR.
MOVB 001, (R0)+ IYES, POST AS OVERRUN ERROR
JMP RECNXT

FRAMER1 BIT 020000, R2 IIS IT A FRAMING ERROR?
BEQ PARITY INO
INC FRM(R3) IKEEP TRACK OF FRAMING ERRORS
CMP 05, ERRCTR(R3) IHAS UNIT EXCEEDED ERROR LIMIT?
BLT RECNXT IYES, SERVICE NEXT CHAR.
MOVB 002, (R0)+ IYES, POST AS FRAMING ERROR
JMP RECNXT

PARITY1 INC PAR(R3) IKEEP TRACK OF PARITY ERRORS
CMP 05, ERRCTR(R3) IHAS UNIT EXCEEDED ERROR LIMIT?
BLT RECNXT IYES, SERVICE NEXT CHAR.
MOVB 003, (R0)+ IPOST AS PARITY ERROR
JMP RECNXT

RECVR21 MOV BUFPTR(R3), R4 ISET UP DATA BUFFER POINTER
BIT LINENO(R3), RECSW IIS THIS LINE CURRENTLY RECEIVING?
BNE RECVR0 IYES, SAVE CHAR.
BIT LINENO(R3), RECVCK IMAINT. CHECKING THIS RECEIVER?
BEQ 38 INO
BIC LINENO(R3), RECVCK IYES, CLEAR THE CHECK SW.
CMPB 0125, R2 IIS THE CHECK CHAR. = 125
BEQ RECNXT IYES, IT IS OK

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1135	006526	112720	000017		MOVB	017,(R0)+			INO, POST AS A DATA CHECK ERROR
1136	006532	110310			MOVB	R3,(R2)			ISAVE LINE NO.
1137	006534	106220			ASRB	(R0)+			
1138	006536	110220			MOVB	R2,(R2)+			ISAVE RECVD CHAR.
1139	006540	000652			BR	RECNXT			ISERVICE THE NEXT CHAR.
1140									
1141	006542	009763	014626		38:	TST	VRFSWH(R3)		IVERIFYING THIS LINE?
1142	006546	001439			BEG	R4A			INO
1143	006550	046337	014276	015004	BIC	LINENO(R3),SVSSW1			YES, CLEAR SOFTWARE SW.
1144	006556	009737	005546		TST	VERPT			CONTROL X?
1145	006562	001163			BNE	RECEXT			YES BY-PASS ERROR CHECKING
1146	006564	122702	000125		CMPB	0129,R2			YES, IS DATA CORRECT?
1147	006570	001411			BEG	R1A			YES
1148	006572	112720	000012		MOVB	012,(R0)+			INO POST AS VERIFY DATA ERROR
1149	006576	110310			MOVB	R3,(R0)			ISSET UP TO SAVE LINE NO.
1150	006600	106220			ASRB	(R0)+			
1151	006602	110220			MOVB	R2,(R0)+			ISAVE THE BAD DATA
1152	006604	004737	005406		R2A:	JSR	PC,VRFSND		ISEND ANOTHER CHARACTER
1153	006610	000137	006266		JMP	RECNXT			ISERVICE THE NEXT CHARACTER
1154									
1155	006614	009263	014626		R1A:	INC	VRFSWH(R3)		
1156	006620	022763	000006	014626	CMP	06,VRFSWH(R3)			IMAVE WE HAD FIVE (5) GOOD TRANSFERS?
1157	006626	001366			BNE	R2A			INO, START NEXT TRANSFER
1158	006630	112720	000011		MOVB	011,(R0)+			YES, POST AS LINE VERIFIED
1159	006634	005063	014626		CLR	VRFSWH(R3)			ICLEAR THE SW.
1160	006640	000530			BR	RECEXT			EXIT
1161									
1162	006642	109702			R4A:	TSTB	R2		INULL CHAR.?
1163	006644	001610			BEG	RECNXT			YES, IGNORE IT
1164	006646	122702	000377		CMPB	0377,R2			IS TO START CODE CHAR.?
1165	006652	001413			BEG	RECVRS			YES, SET UP TO RECEIVE DATA
1166	006654	009263	015536		INC	ST(R3)			
1167	006660	022763	000005	014670	CMP	05,ERRCTR(R3)			IMAS UNIT EXCEEDED ERROR LIMIT?
1168	006666	003002			BGT	00			
1169	006670	000137	006266		JMP	RECNXT			YES, SERVICE NEXT CHAR.
1170	006674	112720	000004		58:	MOVB	004,(R0)+		INO, POST AS ILLEGAL START CODE
1171	006700	000906			BR	RECEXT			
1172									
1173									ENTERED HERE ON RECEIPT OF A START CODE (377)
1174									
1175	006702	056337	014276	015146	RECVRS:	BIS	LINENO(R3),RECSWH		ISSET RECEIVER SW.
1176	006710	046337	014276	015022	BIC	LINENO(R3),ACTIVE			IKEEP TRACK OF SYSTEM STATUS
1177	006716	016304	014336		MOV	BUPADR(R3),R4			ISSET UP BUFFER ADDRESS POINTER
1178	006722	005024			CLR	(R4)+			
1179	006724	005024			CLR	(R4)+			
1180	006726	012763	000004	015160	MOV	04,BYTECT(R3)			INITIALIZE BYTE COUNT
1181	006734	000403			BR	RECR4A			
1182									
1183									ENTERED HERE TO PROCESS THE CHAR. WHEN THE 'RECSWH' IS SET
1184									
1185									
1186	006736	122702	000377		RECVRS:	CMPB	0377,R2		ICLEAR, IS TO START CODE?
1187	006742	001757			BEG	RECVRS			YES, RE-SET RECEIVER
1188	006744	110224			RECR4A:	MOVB	R2,(R4)+		ISAVE CHARACTER IN BUFFER

1189	006746	005263	015160		INC	BYTECT(R3)	IUPDATE BYTE COUNT	
1190	006752	005737	015132		TST	RMODE	I RUNNING DATA REPORT MODE?	
1191	006756	001401			BEQ	RECVRS	I NO	
1192	006760	110220			MOVB	R2,(R0)+	I YES, SAVE CHAR. IN ERROR BUFFER	
1193	006762	010463	014376	RECVR5:	MOV	R4,BUPPTR(R3)	I SAVE DATA BUFFER POINTER	
1194	006766	122702	000014		CMPO	0EOP,R2	I CHAR. = END OF PARAGRAPH?	
1195	006772	001402			BEQ	,+6		
1196	006774	000137	006266		JMP	RECNTX	I NO, SERVICE THE NEXT CHAR.	
1197	007000	046337	014276	015146	BIC	LINENO(R3),RECSW	I YES, CLEAR THE RECEIVER SW.	
1198	007006	036337	014276	014614	BIT	LINENO(R3),MOLDSW	I IS THIS LINE BEING HELD?	
1199	007014	001405			BEQ	RECVR6	I NO, SET UP TO TRANSMIT	
1200	007016	056337	014276	015190	BIS	LINENO(R3),PENDIN	I YES, SET THE PENDING DATA SW.	
1201	007024	000137	006266		JMP	RECNTX	I SERVICE THE NEXT CHARACTER	
1202	007030	010301		RECVR6:	MOV	R3,R1		
1203	007032	006201			ASR	R1	I = TO CURRENT LINE NUMBER	
1204	007034	052701	030500		BIS	030500,R1	I ASSEMBLE THE 'SCR' WORD	
1205	007040	010177	172156		MOV	R1,0DHSCR		
1206	007044	005463	015160		NEG	BYTECT(R3)	I COMPLIMENT BYTE COUNT	
1207	007050	016377	015160	172154	MOV	BYTECT(R3),0DHSCR	I LOAD THE BYTE COUNT REG.	
1208	007056	016377	014336	172144	MOV	BUPADR(R3),0DHCAR	I LOAD THE CURRENT ADDRESS REGISTER	
1209	007064	056377	014276	172142	BIS	LINENO(R3),0DHBAR	I START THE TRANSMITTER.	
1210	007072	005263	015222		INC	RECNTX(R3)	I COUNT NO. OF BLOCKS RECEIVED	
1211	007076	056337	014276	015152	BIS	LINENO(R3),TRNSW	I SET TRANSMITTER SW.	
1212	007104	056337	014276	015022	BIS	LINENO(R3),ACTIVE	I KEEP TRACK OF SYSTEM STATUS	
1213	007112	000137	006266		JMP	RECNTX	I SERVICE THE NEXT CHAR.	
1214	007116	005263	014670	RECERR:	INC	ERRCTR(R3)	I KEEP TRACK OF NO. OF ERRORS	
1215	007122	110310		RECER1:	MOVB	R3,(R0)	I GET FAILING LINE NO.	
1216	007124	106220			ASRB	(R0)+	I SET IT UP TO BE PRINTED	
1217	007126	000137	006266		JMP	RECNTX	I SERVICE THE NEXT CHAR.	
1218	007132	012604		RECEXT:	MOV	(SP)+,R0	I RESTORE THE WORKING REGISTERS	
1219	007134	012603			MOV	(SP)+,R3		
1220	007136	012602			MOV	(SP)+,R2		
1221	007140	012601			MOV	(SP)+,R1		
1222	007142	000002			RTI			
1223								
1224								
1225								
1226								
1227								
1228								
1229								
1230								
1231	007144	042777	100000	172050	TRNMIT:	BIC	0100000,0DHSCR	I CLEAR THE INTERRUPT REQUEST
1232	007152	010146			MOV	R1,-(SP)	I SAVE THE WORKING REGISTERS	
1233	007154	010246			MOV	R2,-(SP)		
1234	007156	010346			MOV	R3,-(SP)		
1235	007160	013701	015022		MOV	ACTIVE,R1	I SET THE CURRENTLY ACTIVE TRANSMITTERS	
1236	007164	017702	172044		MOV	0DHBAR,R2	I READ THE STATUS OF THE ACTIVE TRANSMITTERS	
1237	007170	040201			BIC	R2,R1	I R1 = TO TERMINATED TRANSMITTERS	
1238	007172	012702	000001		MOV	01,R2	I USE 'R2' AS A POLLING BIT	
1239	007176	005003			CLR	R3	I USE 'R3' AS ADDRESS OFFSET POINTER	
1240	007200	030201		TRAN1:	BIT	R2,R1	I TRANSMITTER DONE?	
1241	007202	001007			BNE	TRAN2	I YES, SERVICE IT	
1242	007204	006302		TRAN1A:	ASL	R2	I NO, POLL NEXT RECEIVER	

1243	007206	062703	000002			ADD	02,R3	IUPDATE POINTER
1244	007212	022703	000000			CMP	040,R3	I CHECKED ALL LINES?
1245	007216	001370				BNE	TRAN1	I NO
1246	007220	000444				BR	TRNEXT	I YES, EXIT
1247	007222	036337	014276	014622	TRAN2:	BIT	LINENO(R3),BOOTSW	I BOOTING THIS LINE?
1248	007230	001411				BEG	TRAN3	I NO
1249	007232	005237	015036			INC	REDOONE	I YES, COUNT NO. OF LINE'S THAT HAVE FINISHED
1250	007236	046337	014276	014622		BIC	LINENO(R3),BOOTSW	I CLEAR THE BOOT SW.
1251	007244	046337	014276	015022		BIC	LINENO(R3),ACTIVE	I CLEAR LINE ACTIVE FLAG
1252	007252	000754				BR	TRAN1A	I SERVICE THE NEXT LINE
1253	007254	036337	014276	015152	TRAN3:	BIT	LINENO(R3),TRNSWH	I IS THIS TRANSMITTER ENABLED?
1254	007262	001012				BNE	TRAN4	I YES
1255	007264	112720	000006			MOVB	006,(R0)+	I NO, SAVE AS ILLEGAL TRANSMITTER INTERRUPT
1256	007270	004737	007276			JBR	PC,TRNERR	I SET UP TO REPORT ERROR
1257	007274	000743				BR	TRAN1A	I SERVICE THE NEXT LINE
1258								
1259	007276	005263	014670			TRNERR:	INC	ERRCTR(R3)
1260	007302	110310				MOVB	R3,(R0)	I KEEP TRACK OF NO. OF ERRORS
1261	007304	106220				ASRB	(R0)+	I SAVE THE FAILING LINE NO.
1262	007306	000207				RTS	PC	I RETURN
1263								
1264	007310	046337	014276	015152	TRAN4:	BIC	LINENO(R3),TRNSWH	I CLEAR THE TRANSMITTER SW.
1265	007316	005263	015264			INC	XPERCT(R3)	I COUNT NO. OF BLOCKS TRANSFERRED
1266	007322	046337	014276	015022		BIC	LINENO(R3),ACTIVE	I CLEAR LINE ACTIVE FLAG
1267	007330	000725				BR	TRAN1A	I SERVICE THE NEXT LINE
1268	007332	032777	002000	171662	TRNEXT:	BIT	02000,0DMSCR	I NON-EX MEMORY INTERRUPT?
1269	007340	001407				BEG	10	I NO
1270	007342	052777	000400	171652		BIS	0400,0DMSCR	I CLR NON-EX MEM. INTERRUPT
1271	007350	112720	000010			MOVB	010,(R0)+	I YES, SET UP ERROR CODE
1272	007354	004737	007276			JBR	PC,TRNERR	I REPORT IT
1273	007360	012603			181	MOV	(SP)+,R3	I RESTORE THE WORKING REGISTERS
1274	007362	012602				MOV	(SP)+,R2	
1275	007364	012601				MOV	(SP)+,R1	
1276	007366	000002				RTI		

 I MESSAGE PRINT ROUTINE, ENTERED VIA EMT DISPATCH HANDLER.
 I ROUTINE PICKS UP CONTENTS OF THE 'PC' AND USES THIS AS
 I THE ADDRESS OF MESSAGE TO BE TYPED.

1284	007370	003077	171600			TYPMES:	CLR	0PSH	
1285	007374	010237	015016				MOV	R2,TYPSV2	I SAVE R2
1286	007400	017602	000000				MOV	0(SP),R2	I SET THE MESSAGE ADDRESS FROM START
1287	007404	062716	000002				ADD	02,(SP)	I SET UP STACK TO EXIT
1288	007410	010146					MOV	R1,-(SP)	I SAVE R1
1289	007412	005037	015134				CLR	PRTCNT	
1290	007416	005737	015026			TYPERR:	TST	OSWITCH	I IS THE 'O' SWITCH SET?
1291	007422	001103					BNE	TYPEXT	I YES, SUPPRESS PRINTING & EXIT
1292	007424	005737	007646				TST	PRTERR	I INHIBIT PRINT SWITCH SET?
1293	007430	001100					BNE	TYPEXT	I YES-EXIT
1294	007432	112201					MOVB	(R2)+,R1	I NO, PICK UP CHAR.
1295	007434	105701					TSTB	R1	I TEST FOR NULL CHARACTER
1296	007436	001475					BEG	TYPEXT	I IF 80, EXIT

1297	007440	122701	000012		CMPB	012,R1		I TEST FOR LINE FEED
1298	007444	001003			BNE	18		I NO
1299	007446	004737	007560		JSR	PC,TYPECL		I YES, TYPE 'CR/LF'
1300	007452	000761			BR	TYPERA		
1301	007454	122701	000377	181	CMPB	0377,R1		I TEST FOR START CODE
1302	007460	001455			BEO	TYPERB		
1303	007462	122701	000014		CMPB	0E0P,R1		I TEST FOR 'END OF PARAGRAPH'
1304	007466	001447			BEO	TYPEOP		I TYPE '(EOP)'
1305	007470	122701	000045		CMPB	045,R1		I TEST FOR '3'
1306	007474	001003			BNE	28		I NO
1307	007476	004737	007560		JSR	PC,TYPECL		I YES, TYPE 'CR/LF'
1308	007502	000745			BR	TYPERA		
1309	007504	122701	000040	281	CMPB	040,R1		I IS THIS CHAR. PRINTABLE?
1310	007510	003410			BLE	38		I YES, PRINT IT
1311	007512	010146			MOV	R1,-(SP)		I NO, SAVE IT
1312	007514	012701	000336		MOV	0336,R1		I PRINT IT AS A CONTROL CHAR.
1313	007520	004737	007540		JSR	PC,OUTPUT		
1314	007524	012601			MOV	(SP)+,R1		I RETRIEVE CHAR.
1315	007526	052701	000100		BIS	0100,R1		I MAKE IT PRINTABLE
1316	007532	004737	007540	381	JSR	PC,OUTPUT		
1317	007536	000727			BR	TYPERA		
1318								
1319	007540	004737	006226		OUTPUT:	JSR	PC,TYPEIT	
1320	007544	005237	015134		INC	PRTCNT		
1321	007550	022737	000100	015134	CMP	060,,PRTCNT		I LINE FULL?
1322	007556	003012			GBT	TYPRT		I NO, CHECK NEXT CHAR.
1323	007560	005037	015134		TYPECL:	CLR	PRTCNT	
1324	007564	012701	000015		MOV	015,R1		
1325	007570	004737	006226		JSR	PC,TYPEIT		I TYPE 'CR'
1326	007574	012701	000012		MOV	012,R1		
1327	007600	004737	006226		JSR	PC,TYPEIT		I TYPE 'LF'
1328	007604	000207			TYPRET:	RTS	PC	I RETURN
1329								
1330	007606	012702	013215		TYPEOP:	MOV	0E0PMS6,R2	
1331	007612	000701			BR	TYPERA		
1332								
1333	007614	012701	000336		TYPERB:	MOV	0336,R1	
1334	007620	004737	006226		JSR	PC,TYPEIT		I PRINT '0'
1335	007624	004737	007560		JSR	PC,TYPECL		I TYPE 'CR/LF'
1336	007630	000672			BR	TYPERA		
1337								
1338	007632	005037	015026		TYPEXT:	CLR	08SWTCH	I CLEAR THE '0' SOFTWARE SWITCH
1339	007636	013702	015016		MOV	TYPSV2,R2		I RESTORE R2
1340	007642	012601			MOV	(SP)+,R1		I RESTORE R1
1341	007644	000002			RTI			I RETURN
1342	007646	000000			PRTERR:	0		I PRINT INHIBIT SWITCH
1343								
1344								
1345								
1346								
1347								
1348								
1349								
1350	007650	005077	171324		OCTPRT:	CLR	0PSW	

 I SUBROUTINE TO TYPEOUT A '3 OR 6' DIGIT OCTAL NO. THE 'PC' CONTAINS
 I THE ADDRESS OF 'NUMBER' TO BE TYPED

```
1351 007654 005737 007646      TST      PRERR      ;INHIBIT ERROR PRINT?
1352 007660 001057      BNE      OCTEXT    ;YES=EXIT
1353 007662 010137 010022      MOV      R1,OCTSV1 ;SAVE R1
1354 007666 010237 010024      MOV      R2,OCTSV2 ;SAVE R2
1355 007672 017601 000000      MOV      0(SP),R1  ;THE ADDRESS OF WORD TO BE TYPED
1356 007676 062716 000002      ADD      #2,(SP)   ;SET UP STACK TO EXIT
1357 007702 005737 010026      TST      OCTSV3    ;PRINT '6' DIGITS?
1358 007706 001402      BEQ      ,+6       ;YES
1359 007710 042711 177400      BIC      0177400,(R1) ;NO, STRIPE TO '3' DIGITS
1360 007714 012737 000006 015126      MOV      #6,KSTOR3
1361 007722 012737 000376 010030      MOV      #376,MASK ;MASK FOR FIRST BIT
1362 007730 000401      BR       ,+4
1363 007732 006111      MOVEIT: ROL      (R1)
1364 007734 006111      ROL      (R1)
1365 007736 006111      ROL      (R1)
1366 007740 005337 010026      DEC      OCTSV3
1367 007744 002013      BGE      MOVEON
1368 007746 111102      MOV      (R1),R2
1369 007750 143702 010030      BIC      MASK,R2
1370 007754 052702 000260      BIS      #260,R2
1371 007760 132777 000200 171220      BIT      #200,OTPB
1372 007766 100374      BPL      ,+6
1373 007770 110277 171214      MOV      R2,OTPB   ;PRINT CHAR.
1374 007774 012737 000370 010030      MOVEON: MOV      #370,MASK ;MASK FOR NEXT '5' DIGITS
1375 010002 005337 015126      DEC      KSTOR3
1376 010006 001351      BNE      MOVEIT
1377 010010 013701 010022      MOV      OCTSV1,R1 ;RESTORE R1
1378 010014 013702 010024      MOV      OCTSV2,R2
1379 010020 000002      OCTEXT: RTI
1380
1381 010022 000000      OCTSV1: 0
1382 010024 000000      OCTSV2: 0
1383 010026 000000      OCTSV3: 0
1384 010030 000376      MASK1: 376
1385 010032 005037 010026      XOCTP6: CLR      OCTSV3
1386 010036 000704      BR       OCTPRT
1387
1388 010040 012737 000003 010026      XOCTP3: MOV      #3,OCTSV3
1389 010046 000700      BR       OCTPRT
1390
1391 ;*****
1392 ;SUBROUTINE TO CONVERT 'N' 'BCD' WORDS SEPERATED VIA COMMA'S TO OCTAL
1393 ;*****
1394
1395 010050 010146      BCDBINI: MOV      R1,=(SP) ;SAVE WORKING REGISTERS
1396 010052 010246      MOV      R2,=(SP)
1397 010054 010346      MOV      R3,=(SP)
1398 010056 010446      MOV      R4,=(SP)
1399 010060 012704 016526      MOV      @TTYBUF,R4 ;PICK UP BUFFER POINTER
1400 010064 012737 014736 014734      MOV      @BCDBUF,BCDPTR ;SET UP BUFFER POINTER
1401 010072 005037 014732      CLR      BCDCTR ;COUNT NO. OF ENTRIES IN BUFFER
1402 010076 005001      BCDBN0: CLR      R1
1403 010100 105714      BCDBN1: TST      (R4) ;END OF DATA?
1404 010102 001431      BEQ      BCDEND   ;YES, EXIT
```


1405	010104	112403			MOVB	(R4)+,R3	ISAVE IT
1406	010106	022703	000054		CMF	#54,R3	ICHR. * TO *,*?
1407	010112	001003			BNE	BCDBN2	INO
1408	010114	004737	010146		JSR	PC,BCDBN3	IYES, SAVE CURRENT WORD
1409	010120	000766			BR	BCDBNF	ICONVERT NEXT WORD
1410	010122	042703	000360	BCDBN2I	BIC	#360,R3	IATYPE NO. TO BCD
1411	010126	010102			MOV	R1,R2	ISAVE CURRENT TOTAL
1412	010130	006301			ASL	R1	INX2
1413	010132	006301			ASL	R1	INX4
1414	010134	006301			ASL	R1	INX8
1415	010136	060201			ADD	R2,R1	INX9
1416	010140	060201			ADD	R2,R1	INX10
1417	010142	060301			ADD	R3,R1	IN+NEW NO.
1418	010144	000755			BR	BCDBN1	
1419							
1420	010146	010177	004562		BCDBN3I	MOV R1,BCDBPTR	ISAVE WORD
1421	010152	062737	000002	014734	ADD	R2,BCDBPTR	IUPDATE POINTER
1422	010160	005237	014732		INC	BCDBCTR	ICOUNT NO. OF ENTRIES IN BUFFER
1423	010164	000207			RTS	PC	IRETURN
1424							
1425	010166	004737	010146		BCDEN0I	JSR PC,BCDBN3	ISAVE WORD
1426	010172	012737	014736	014734	MOV	#BCDBUF,BCDBPTR	
1427	010200	012604			MOV	(SP)+,R4	IRESTORE THE WORKING REGISTERS
1428	010202	012603			MOV	(SP)+,R3	
1429	010204	012602			MOV	(SP)+,R2	
1430	010206	012601			MOV	(SP)+,R1	
1431	010210	000207			RTS	PC	IEXIT
1432							
1433							
1434							
1435							
1436	010212	005077	170762		XBINDECICLR	#PSW	
1437	010216	010237	010024		MOV	R2,OCTSV2	ISAVE R2
1438	010222	017602	000000		MOV	#(SP),R2	IPICK UP ADDRESS OF VALUE
1439	010226	011202			MOV	(R2),R2	IMOVE VALUE TO R2
1440	010230	042702	160000		BIC	#160000,R2	ICAN ONLY PRINT A '4' DIGIT NO.
1441	010234	062716	000002		ADD	R2,(SP)	ISET UP STACK TO EXIT
1442	010240	010146			MOV	R1,-(SP)	
1443	010242	010446			MOV	R4,-(SP)	
1444	010244	012704	010322		MOV	#DECPTR,R4	
1445	010250	012701	177777		TYPT1I	MOV #1,R1	
1446	010254	005201			TYPT2I	INC R1	
1447	010256	161402			SUB	(R4),R2	
1448	010260	100375			BPL	TYPT2	
1449	010262	062402			ADD	(R4)+,R2	
1450	010264	052701	000260		DEC1I	BIS #260,R1	
1451	010270	004737	006226		JSR	PC,TYPEIT	
1452	010274	005714			TST	(R4)	IDONET
1453	010276	001360			BNE	TYPT1	INO
1454	010300	012701	000240		MOV	#240,R1	IYES, TYPE SPACE
1455	010304	004737	006226		JSR	PC,TYPEIT	
1456	010310	013702	010024		MOV	OCTSV2,R2	IRESTORE R2
1457	010314	012604			MOV	(SP)+,R4	
1458	010316	012601			MOV	(SP)+,R1	

A4

1459 010320 000002
1460
1461 010322 001750
1462 010324 000144
1463 010326 000012
1464 010330 000001
1465 010332 000000
1466
1467
1468
1469
1470
1471
1472
1473
1474
1475 010334 013703 016526
1476 010340 004737 004722
1477 010344 005737 016526
1478 010350 001006
1479 010352 010337 016526
1480 010356 005737 014450
1481 010362 001033
1482 010364 000434
1483
1484 010366 012703 013370
1485 010372 005037 015034
1486 010376 012704 016526
1487 010402 122713 000040
1488 010406 001001
1489 010410 105723
1490 010412 122324
1491 010414 001006
1492 010416 122713 000054
1493 010422 001373
1494 010424 006337 015034
1495 010430 000410
1496 010432 005237 015034
1497 010436 105713
1498 010440 001406
1499 010442 122723 000054
1500 010446 001753
1501 010450 000772
1502 010452 062716 000002
1503 010456 000207
1504
1505
1506
1507
1508 010460 010046
1509 010462 010146
1510 010464 010246
1511 010466 010346
1512 010470 010446

```

RTI
DECPTR: 1000,
        100,
        10,
        1,
        0

;*****
;SUBROUTINE ENTERED TO ACCEPT & DECODE BAUD RATES INPUT BY THE USER.
;DECODE CALLING SEQUENCE:
;       JSR      PC,DECODE           ;CALL DECODE
;       RETURN   CALL+2             ;ILLEGAL ENTRY RETURN
;       RETURN   CALL+4             ;LEGAL ENTRY RETURN
;*****

DECODE: MOV     TTYBUF,R3           ;SAVE CONTENTS OF TTY BUFFER
        JSR     PC,GETLN1          ;PICK UP INPUTTED BAUD RATE
        TST     TTYBUF             ;WAS A BAUD RATE INPUTTED?
        BNE     DECOD1            ;YES, DECODE IT
        MOV     R3,TTYBUF          ;RESTORE CONTENTS OF TTY BUFFER
        TST     LPWORD             ;NO, HAS AN ENTRY BEEN MADE IN THE TABLE?
        BNE     OUT2              ;YES, USE CURRENT BAUD SETTING
        BR      OUT1              ;NO, ILLEGAL ENTRY - RETURN TO CALL+2

DECOD1: MOV     @BAUDTB,R3         ;SET UP MESSAGE MATCH TABLE POINTER
        CLR     OFFSET            ;
RECYCL: MOV     @TTYBUF,R4         ;SET UP TELETYPE BUFFER POINTER
        CMPB   @40,(R3)           ;CHAR = TO SPACE?
        BNE     ,+4               ;NO
        TSTB   (R3)+              ;YES, SKIP IT
MATCH:  CMPB   (R3)+,(R4)+        ;COMPARE BUFFERS
        BNE     FLUSH             ;NOT EQUAL, SET UP NEXT WORD
        CMPB   @54,(R3)           ;CHAR = COMMA?
        BNE     MATCH            ;NO, COMPARE NEXT CHAR.
        ASL    OFFSET            ;YES, SET UP THE OFFSET
        BR      OUT2              ;
FLUSH:  INC     OFFSET            ;INCREMENT THE OFFSET CNTR.
        TSTB   (R3)              ;END OF MESSAGE?
        BEQ    OUT1              ;YES, ILLEGAL ENTRY - RETURN TO CALL+2
        CMPB   @54,(R3)+        ;CHAR = COMMA
        BEQ    RECYCL            ;YES, COMPARE NEXT WORD
        BR      FLUSH+4         ;NO, KEEP GOING
OUT2:   ADD     @2,(SP)           ;SET UP TO RETURN TO CALL +4
OUT1:   RTS      PC              ;RETURN

;*****
;POWER FAIL HANDLER
;*****

PWRFAIL: MOV     R0,=(SP)
        MOV     R1,=(SP)
        MOV     R2,=(SP)
        MOV     R3,=(SP)
        MOV     R4,=(SP)
    
```

```
1513 010472 010546          MOV      R5,=(SP)
1514 010474 013746 000024    MOV      24,=(SP)
1515 010500 010637 015120    MOV      SP,TEMP
1516 010504 012737 010514 000024    MOV      PWRUP,0024
1517 010512 000000          HALT
1518 010514 012777 000340 170456 PWRUP:  MOV      0340,OPSH
1519 010522 005001          CLR      R1                ;POWER UP DELAY
1520 010524 005201          INC      R1
1521 010526 001376          BNE     ,=2
1522 010530 013706 015120    MOV      TEMP,SP
1523 010534 012637 000024    MOV      (SP)+,0024
1524 010540 012605          MOV      (SP)+,R5
1525 010542 012604          MOV      (SP)+,R4
1526 010544 012603          MOV      (SP)+,R3
1527 010546 012602          MOV      (SP)+,R2
1528 010550 012601          MOV      (SP)+,R1
1529 010552 012600          MOV      (SP)+,R0
1530 010554 104000          PRINT
1531 010556 012263          MSG4
1532 010560 000137 002070    JMP      SERVICE
1533
1534          ;*****
1535          ;EMT DISPATCH SERVICE ROUTINE
1536          ;ARGUMENT OF EMT IS EXTRACTED AND USED AS OFFSET TO OBTAIN POINTER
1537          ;TO THE SELECTED SUBROUTINE.
1538          ;*****
1539
1540 010564 011646          EMTSRV: MOV      (SP),=(SP)      ;GET PC FOR TO RETURN
1541 010566 162716 000002    SUB      02,(SP)          ;PC OF EMT
1542 010572 017616 000000    MOV      0(SP),(SP)      ;GET EMT
1543 010576 006316          EMTOK:  ABL      (SP)        ;MULTIPLY EMT ARG BY '2'
1544 010600 042716 177001    BIC      0177001,(SP)    ;CLEAR UNWANTED BITS
1545 010604 062716 010616    ADD      0EMTTAB,(SP)    ;POINTER TO SUBROUTINE ADDRESS
1546 010610 017616 000000    MOV      0(SP),(SP)      ;SUBROUTINE ADDRESS
1547 010614 000136          JMP      0(SP)+         ;GO TO SUBROUTINE
1548
1549          ;EMT DISPATCH TABLE
1550
1551 010616 007370          EMTTAB: TYPHES          ;SUBROUTINE TO PRINT ASCII MESSAGES.
1552 010620 010032          KOCTP6                ;SUBROUTINE TO PRINT A '6' DIGIT OCTAL NO.
1553 010622 010212          XBINDEC               ;SUBROUTINE TO CONVERT OCTAL TO BINARY & PRNT IT
1554 010624 010040          KOCTP3                ;SUBROUTINE TO PRINT A '3' DIGIT OCTAL NO.
1555          ;*****
1556          ;OVERLAY VECTOR AREA WITH ',+2' IN THE VECTOR FOLLOWED W/ IOT TRAP
1557          ;*****
1558
1559 010626 012701 000210    OVRLAY: MOV      0210,X1      ;GET DL11-E VECTOR BASE ADDRESS
1560 010632 012702 000212    MOV      0212,X2
1561 010636 012703 000004    MOV      04,X3
1562 010642 010221          OVRLYAI: MOV      X2,(1)+    ;LOAD VECTOR WITH IOT ERROR TRAP
1563 010644 010321          MOV      X3,(1)+
1564 010646 062702 000004    ADD      04,X2
1565 010652 020127 001000    CMP      X1,01000
1566 010656 001401          BEQ     OVRLYB          ;ALL VECTORS BEEN LOADED
```

1567 010660 000770
1568 010662 000207
1569
1570
1571
1572
1573
1574 010664 011637 015140
1575 010670 022626
1576 010672 011637 015142
1577 010676 005737 015144
1578 010702 001427
1579 010704 162737 000004 015140
1580 010712 013721 015140
1581 010716 062737 000002 015140
1582 010724 013721 015140
1583 010730 062737 000002 015140
1584 010736 013721 015140
1585 010742 062737 000002 015140
1586 010750 013721 015140
1587 010754 005037 015144
1588 010760 000002
1589
1590
1591
1592 010762 052777 004000 170232
1593 010770 104000
1594 010772 012324
1595 010774 162737 000004 015140
1596 011002 104001
1597 011004 015140
1598 011006 104000
1599 011010 012406
1600 011012 162737 000002 015142
1601 011020 104001
1602 011022 015142
1603 011024 000137 001342
1604
1605 011030 000
1606
1607
1608 011031 045 042045 030510
011036 027461 052126 030062
011044 044040 051517 020124
011052 044504 043501 047516
011060 052123 041511 050040
011066 047522 051107 046501
011074 045
1609 011075 115 044501 042116
011102 041505 030455 026461
011110 055104 052126 026507
011116 026501 041120
1610 011122 020040 032040 031497
011130 027460 032467 022456

BR OVRLYA
OVRLYB: RTS 7 JEXIT
J*****
JMAPVEC = MAP VECTOR OR REPORT ERROR DEPENDING ON STATE OF 'PMAP' FLAG
J*****
MAPVEC: MOV (SP),TOPC
POP2SP
MOV (SP),FROMPC
TBT PMAP JMAPPING?
SEQ ERTRAP JNO, REPORT ERROR
SUB 04,TOPC JSETUP TO LOAD RECEIVER VECTOR
MOV TOPC,(R1)+ JSTORE RECEIVER VECTOR
ADD 02,TOPC
MOV TOPC,(R1)+ JSTORE BR ADDRESS
ADD 02,TOPC JSET UP TO LOAD TRANSMITTER VECTOR
MOV TOPC,(R1)+ JSTORE RECEIVER
ADD 02,TOPC
MOV TOPC,(R1)+
CLR PMAP
RTI
JERROR TRAP HANDLER, ENTERED ON ILLEGAL TRAPS
ERTRAP: BIR 04000,0DMSCR JISSUE MASTER CLEAR TO 'DM'
PRINT
MESS JTEXT 'ILLEGAL TRAP TO'
SUB 04,TOPC
PRTOCT
TOPC J TYPE 'PC' TRAPPED TOO
PRINT
MESS JTEXT 'FROM'
SUB 02,FROMPC
PRTOCT
FROMPC JTYPE WHERE IT TRAPPED FROM
JMP START JRE-START TEST
J.BYTE
JMESSAGES
TITLE: J.ASCII JXSDH11/VT20 HOST DIAGNOSTIC PROGRAMS;
J.ASCII JMAINDEC-11-DZVTG-A-PB;
J.ASCII J 4/30/75.3;

1611	011136	054523	052123	046505	.ASCII	!SYSTEM COMMAND LISTX!
	011144	041440	046517	040515		
	011152	042116	046040	051511		
	011160	022524				
1612	011162	040536	020040	041101	.ASCII	!^A ABSOLUTE SYSTEM RESTARTX!
	011170	047523	052514	042524		
	011176	051440	051531	042524		
	011204	020115	042522	052123		
	011212	051101	022524			
1613	011216	041136	020040	047502	.ASCII	!^B BOOT SELECTED LINES!
	011224	052117	051440	046105		
	011232	041505	042524	020104		
	011240	044514	042516	022523		
1614	011246	041536	020040	046103	.ASCII	!^C CLEAR SOFTWARE SWITCHES/EXIT PRESENT MODEX!
	011254	040505	020122	047523		
	011262	052106	040527	042522		
	011270	051440	044527	041524		
	011276	042510	027523	054105		
	011304	052111	050040	042522		
	011312	042523	052116	046440		
	011320	042117	022505			
1615	011324	042136	020040	051120	.ASCII	!^D PRINT RECEIVED DATA/DIAGNOSTIC MODEX!
	011332	047111	020124	042522		
	011340	042503	053111	042105		
	011346	042040	052101	027501		
	011354	044504	043501	047516		
	011362	052123	041511	046440		
	011370	042117	022505			
1616	011374	042536	020040	046505	.ASCII	!^E EMERGENCY RESTART/REINITIALIZE ALL SWITCHES!
	011402	051105	042507	041516		
	011410	020131	042522	052123		
	011416	051101	027524	042522		
	011424	047111	052111	040511		
	011432	044514	042532	040440		
	011440	046114	051440	044527		
	011446	041524	042510	022523		
1617	011454	044136	020040	047510	.ASCII	!^H HOLD SELECTED LINES/INHIBIT TRANSMISSIONX!
	011462	042114	051440	046105		
	011470	041505	040524	020104		
	011476	044514	042516	027523		
	011504	047111	044510	044502		
	011512	020124	051124	047101		
	011520	046523	051511	044523		
	011526	047117	045			
1618	011531	136	020114	046040	.ASCII	!^L LIST SELECTED LINE STATUS!
	011536	051511	020124	042523		
	011544	042514	052103	042105		
	011552	046040	047111	020105		
	011560	052123	052101	051525		
	011566	045				
1619	011567	136	020120	050040	.ASCII	!^P PRINT SELECTED LINE BUFFERS!
	011574	044522	052116	051440		
	011602	046105	041505	042524		
	011610	020104	044514	042516		

	011616	041040	043125	042506			
	011624	022522					
1620	011626	051136	020040	042522	.ASCII	1^R RELEASE SELECTED LINESX)	
	011634	042514	051501	020105			
	011642	042523	042514	052103			
	011650	042105	046040	047111			
	011656	051505	045				
1621	011661	136	020123	051440	.ASCII	1^S SEND FOLLOWING DATA TO SELECTED LINESX)	
	011666	047105	020104	047506			
	011674	046114	053517	047111			
	011702	020107	040504	040524			
	011710	052040	020117	042523			
	011716	042514	052103	042105			
	011724	046040	047111	051505			
	011732	045					
1622	011733	136	020117	044440	.ASCII	1^O INHIBIT/KILL CURRENT PRINTOUTX)	
	011740	044116	041111	052111			
	011746	045457	046111	020114			
	011754	052503	051122	047105			
	011762	020124	051120	047111			
	011770	047524	052125	045			
1623	011775	136	020124	044440	.ASCII	1^T INHIBIT/RESTART ERROR PRINTOUTX)	
	012002	044116	041111	052111			
	012010	051057	051505	040524			
	012016	052122	042440	051122			
	012024	051117	050040	044522			
	012032	052116	052517	051524			
	012040	045					
1624	012041	136	020126	053040	.ASCII	1^V VERIFY SELECTED LINESX)	
	012046	051105	043111	020131			
	012054	042523	042514	052103			
	012062	042105	046040	047111			
	012070	051505	045				
1625	012073	136	020130	052040	.ASCII	1^X TRANSMIT ON SELECTED LINESX)	
	012100	040522	051516	044515			
	012106	020124	047117	051440			
	012114	046105	041505	042524			
	012122	020104	044514	042516			
	012130	022523	000				
1626							
1627	012133	045	044124	052101	MSG11	.ASCII	1^Y THAT DH11 ADDRESS IS NOT PRESENT??)
	012140	042040	030510	020061			
	012146	042101	051104	051505			
	012154	020123	051511	047040			
	012162	052117	050040	042522			
	012170	042523	052116	037477			
	012176	000					
1628							
1629	012177	045	047516	051040	MSG21	.ASCII	1^Z NO RECEIVER INTERRUPT RESPONSE FROM DEVICE)
	012204	041505	044505	042526			
	012212	020122	047111	042524			
	012220	051122	050125	020124			
	012226	042522	050123	047117			
	012234	042523	043040	047522			

	012242	020115	042504	044526			
	012250	042503	020040	000			
1630							
1631	012255	114	047111	020105	ME831	.ASCIZ	ILINE I
	012262	000					
1632	012263	045	051045	041505	ME841	.ASCIZ	IXRECOVERED FROM POWER FAILURE.XI
	012270	053117	051105	042105			
	012276	043040	047522	020115			
	012304	047520	042527	020122			
	012312	040506	046111	051125			
	012320	027105	000045				
1633							
1634	012324	044445	046114	043505	ME851	.ASCIZ	IXILLEGAL TRAP TO I
	012332	046101	052040	040522			
	012340	020120	047524	000040			
1635							
1636							
1637	012346	042445	052116	051105	MPIAD1	.ASCIZ	IXENTER THE DH11 'SCR' ADDRESS? I
	012354	052040	042510	042040			
	012362	030510	020061	051447			
	012370	051103	020047	042101			
	012376	051104	051505	037523			
	012404	000040					
1638							
1639	012406	043040	047522	020115	ME861	.ASCIZ	I FROM I
	012414	000					
1640							
1641							
1642	012415	045	046514	042016	ME881	.ASCIZ	IXLINE IN OR. PAR. FRAM TRAN ST. HELD PEND BAUDI
	012422	044440	020116	020040			
	012430	051117	020056	050040			
	012436	051101	020056	051106			
	012444	046501	052040	040522			
	012452	020116	052123	020056			
	012460	044040	046105	020104			
	012466	042520	042116	041040			
	012474	052501	000104				
1643							
1644							
1645	012500	042040	040511	027107	ME891	.ASCIZ	I DIAG. MODE ENABLED.I
	012506	046440	042117	020105			
	012514	047105	041101	042514			
	012522	027104	000				
1646	012525	045	042522	042101	ME8111	.ASCIZ	IXREADER DEVICE ADDRESS? I
	012532	051105	042040	053105			
	012540	041511	020105	042101			
	012546	051104	051505	037523			
	012554	000040					
1647	012556	047105	042524	020122	ME8121	.ASCII	IXENTER BAUD RATE OF EACH LINE. CONSECUTIVE LINE BAUD RATES MAY BEI
	012564	040502	042125	051040			
	012572	052101	020105	043117			
	012600	042440	041501	020110			
	012606	044514	042516	020056			
	012614	047503	051516	041505			

	012022	052125	053111	020105	
	012030	044514	042516	041040	
	012036	052501	020104	040522	
	012044	042524	020123	040515	
	012052	020131	042502		
1648	012056	047105	042524	020122	.ASCII JENTER BY TYPING 'CR',(NOTE: ENTER UNUSED LINES AS '0' BAUD.)XXI
	012064	054502	052040	050131	
	012072	047111	020107	041447	
	012700	023522	024054	047516	
	012706	042524	020072	047105	
	012714	042524	020122	047125	
	012722	051525	042105	046040	
	012730	047111	051505	040440	
	012736	020123	030047	020047	
	012744	040502	042125	024456	
	012752	022445			
1649	012754	044514	042516	041040	.ASCIZ /LINE BAUDX/
	012762	052501	022504	000	
1650	012767	126	041505	047524	HEB13/ .ASCIZ /VECTOR ADDRESS? /
	012774	020122	042101	051104	
	013002	051505	037523	000040	
1651	013010	047045	020117	046123	HEB14/ .ASCII /ENO SLAVE SYNC RETURNED ADDRESSING THE KW11 LINE CLOCK
	013016	053101	020105	054523	
	013024	041516	051040	052105	
	013032	051125	042516	020104	
	013040	042101	051104	051505	
	013046	044523	043516	052040	
	013054	042510	045440	030527	
	013062	020061	044514	042516	
	013070	041440	047514	045503	
1652	013076	052045	044510	020123	.ASCII /THIS PROGRAM WILL RUN WITHOUT IT BUT ALL/
	013104	051120	043517	040522	
	013112	020115	044527	046114	
	013120	051040	047125	053440	
	013126	052111	047510	052125	
	013134	044440	020124	052502	
	013142	020124	046101	114	
1653	013147	045	054523	052123	.ASCIZ /SYSTEM ERRORS 'MAY NOT' BE REPORTED./
	013154	046505	042440	051122	
	013162	051117	020123	046447	
	013170	054501	047040	052117	
	013176	020047	042502	051040	
	013204	050105	051117	042524	
	013212	027104	000		
1654	013215	040	042450	050117	EOPH80/ .ASCIZ / (EOP);
	013222	000051			
1655	013224	044440	046114	043505	CODE00/ .ASCIZ / ILLEGAL RECVR. INTERRUPTS./
	013232	046101	051040	041505	
	013240	051126	020056	047111	
	013246	042524	051122	050125	
	013254	022524	000056		
1656					
1657	013260	047440	042526	051122	CODE01/ .ASCIZ / OVERRUN ERRORS./
	013266	047125	042440	051122	

1658	013274	051117	027045	000	
1659	013301	040	051106	046501	CODE021 .ASCIZ ; FRAMING ERRORX.;
	013306	047111	020107	051105	
	013314	047522	022522	000056	
1660					
1661	013322	050040	051101	052111	CODE031 .ASCIZ ; PARITY ERRORX.;
	013330	020131	051105	047522	
	013336	022522	000056		
1662					
1663	013342	044440	046114	043505	CODE041 .ASCIZ ; ILLEGAL START CODEX.;
	013350	046101	051440	040524	
	013356	052122	041440	042117	
	013364	022505	000056		
1664					
1665	013370	026060	032440	026060	BAUDT01 .ASCIZ 10, 50, 75, 110, 134.5, 150, 200, ;
	013376	033440	026065	030440	
	013400	030061	020054	031461	
	013412	027064	026065	030440	
	013420	030065	020054	030062	
	013426	026060	040		
1666	013431	063	030060	020054	.ASCIZ 1300, 600, 1200, 1800, 2400, 4800, 9600,;
	013436	030066	026060	030440	
	013444	030062	026060	030440	
	013452	030070	026060	031040	
	013460	030064	026060	032040	
	013466	030070	026060	034440	
	013474	030066	026060	000	
1667					
1668	013501	040	046111	042514	CODE051 .ASCIZ ; ILLEGAL READER INTERRUPTX.;
	013506	040507	020114	042522	
	013514	042101	051105	044440	
	013522	052116	051105	052522	
	013530	052120	027045	000	
1669					
1670	013535	040	046111	042514	CODE061 .ASCIZ ; ILLEGAL TRANS. INTERRUPTX.;
	013542	040507	020114	051124	
	013550	047101	027123	044440	
	013556	052116	051105	052522	
	013564	052120	027045	000	
1671					
1672	013571	040	052101	042524	CODE071 .ASCIZ ; ATTEMPT TO RECEIVE WHILE IN SEND MODEX.;
	013576	050115	020124	047524	
	013604	051040	041505	044905	
	013612	042526	053440	044510	
	013620	042514	044440	020116	
	013626	042523	042116	046440	
	013634	042117	022505	000056	
1673					
1674	013642	052040	040522	051516	CODE101 .ASCIZ ; TRANSMITTER NON-EX MEMORY INTERRUPTX.;
	013650	044515	052124	051105	
	013656	047040	047117	042455	
	013664	020130	042515	047515	
	013672	054522	044440	052116	

	013700	051105	052522	052120	
	013706	027045	000		
1675					
1676	013711	040	042526	044522	CODE111 .ASCIZ ; VERIFIES OKX.)
	013716	044506	051505	047440	
	013724	022513	000056		
1677					
1678	013730	042040	052101	020101	CODE121 .ASCIZ ; DATA VERIFY ERROR, SENT=377 RECV'D=)
	013736	042526	044522	054506	
	013744	042440	051122	051117	
	013752	020054	042523	052116	
	013760	031455	033467	051040	
	013766	041505	023526	026504	
	013774	000			
1679					
1680	013775	040	047516	053040	CODE131 .ASCIZ ; NO VERIFY DATA RETURNED.)
	014002	051105	043111	020131	
	014010	040504	040524	051040	
	014016	052105	051125	042516	
	014024	022504	000056		
1681					
1682	014030	047040	020117	051124	CODE141 .ASCIZ ; NO TRANSMITTER INTERRUPTS OCCURRINGX.)
	014036	047101	046523	052111	
	014044	042524	020122	047111	
	014052	042524	051122	050125	
	014060	051524	047440	041503	
	014066	051125	044922	043516	
	014074	027045	000		
1683					
1684	014077	040	051511	040440	CODE151 .ASCIZ ; IS ACTIVE, CAN'T VERIFY - TYPE 'E'X.)
	014104	052103	053111	026105	
	014112	041440	047101	052047	
	014120	053040	051105	043111	
	014126	020131	020055	054524	
	014134	042520	023440	042536	
	014142	022447	000056		
1685					
1686	014146	047040	020117	042522	CODE161 .ASCIZ ; NO RECEIVER INTERRUPTS OCCURRINGX.)
	014154	042503	053111	051105	
	014162	044440	052116	051105	
	014170	052522	052120	020123	
	014176	041517	052503	051122	
	014204	047111	022507	000056	
1687					
1688	014212	042040	052101	020101	CODE171 .ASCIZ ; DATA CHECK ERROR, SENT=377 RECV'D=)
	014220	044103	041505	020113	
	014226	051105	047522	026122	
	014234	051440	047105	026524	
	014242	033463	020067	042522	
	014250	053103	042047	000055	
1689					
1690	014256	000040			SPACE: .ASCIZ ; ;
1691	014260	000045			CRLF: .ASCIZ ; ;
1692	014262	027045	000		DOT: .ASCIZ ; ;

```

1693 014265 134 P00
1694 014270
1695
1696
1697 014270 000000
1698 014272 000000
1699 014274 000000
1700 014276 000001
1701 014300 000002
1702 014302 000004
1703 014304 000010
1704 014306 000020
1705 014310 000040
1706 014312 000100
1707 014314 000200
1708 014316 000400
1709 014320 001000
1710 014322 002000
1711 014324 004000
1712 014326 010000
1713 014330 020000
1714 014332 040000
1715 014334 100000
1716
1717
1718
1719
1720 014336 016672
1721 014340 017656
1722 014342 020642
1723 014344 021626
1724 014346 022612
1725 014350 023576
1726 014352 024562
1727 014354 025546
1728 014356 026532
1729 014360 027516
1730 014362 030502
1731 014364 031466
1732 014366 032452
1733 014370 033436
1734 014372 034422
1735 014374 035406
1736
1737 014376 000000
1738 014440
1739
1740
1741 014440 000000
1742 014450
1743 014450 000000
1744 014512
1745 014512 000000
1746 014614
    
```

```

SLASHI .ASCIZ 111
.EVEN
    
```

```

MONFLG: 0
LINCLK: 0
MEMSIZ: 0
LINEND: 1
        2
        4
        10
        20
        40
        100
        200
        400
        1000
        2000
        4000
        10000
        20000
        40000
        100000
    
```

ADDRESSES AND CONSTANTS

```

BUFADR: BUFFER
        BUFFER+500.
        BUFFER+1000.
        BUFFER+1500.
        BUFFER+2000.
        BUFFER+2500.
        BUFFER+3000.
        BUFFER+3500.
        BUFFER+4000.
        BUFFER+4500.
        BUFFER+5000.
        BUFFER+5500.
        BUFFER+6000.
        BUFFER+6500.
        BUFFER+7000.
        BUFFER+7500.
    
```

```

BUFPTR: 0
        .B.+40
    
```

```

MSGBUF: 0
        .B.+6
LPHWRD: 0
        .B.+40
BAUDMS: 0
        .B.+100
    
```

THIS BUFFER AREA CONTAINS A POINTER
ADDRESS WHICH POINTS TO THE NEXT
RECEIVER CHARACTER STORAGE BYTE

LINE PARAMETER WORD BUFFER

MESSAGE BUFFER FOR THE BAUD RATES

1747	014614	000000	HOLD SWI 0	!HOLD SW., SET = HOLDING A LINE
1748	014616	000000	SEND SWI 0	!SEND SW., SET = LINE IN SEND MODE
1749	014620	000000	BOOT FGI 0	!SET TO INDICATE READER IS ACTIVE
1750	014622	000000	BOOT SWI 0	!BOOT SW., SET = BOOTING
1751	014624	000000	BOOT LNI 0	!CONTAINS THE BOOT ADDR, LINE NO.
1752	014626	000000	VRF SWI 0	
1753		014670		
1754	014670	000000	ERRCTRI 0	
1755		014732		
1756	014732	000000	BCDCTRI 0	
1757	014734	000000	BCDPTRI 0	
1758	014736	000000	BCDBUPI 0	
1759		015000		
1760	015000	000000	RCHARI 0	
1761	015002	000000	RSTATI 0	
1762	015004	000000	SYSSW1I 0	
1763	015006	000000	CLKCTRI 0	
1764	015010	000000	SYSSWMI 0	
1765	015012	000000	TTYPTRI 0	
1766	015014	000000	CNTRI 0	
1767	015016	000000	TYPBV2I 0	
1768	015020	000000	RECVCKI 0	
1769	015022	000000	ACTIVEI 0	
1770	015024	000000	RUBSWMI 0	
1771	015026	000000	OSWITCI 0	
1772	015030	000000	SCHARI 0	
1773	015032	000000	LINNOI 0	
1774	015034	000000	OFFSETI 0	
1775	015036	000000	REDONEI 0	
1776	015040	000000	CONSPLI 0	
1777	015042	000000	SAVCHRI 0	
1778	015044	000000	DEVADRI 0	
1779	015046	000000	PRYPLBI 0	
1780	015050	000000	BOOTP1I 0	
1781	015052	000000	BOOTP2I 0	
1782	015054	000000	BOOTADI 0	
1783	015056	000000	READCTI 0	!CONTAINS NO. OF CHAR'S READ FROM READER
1784		015120		
1785	015120	000000	TEMPI 0	!TEMPORARY STORAGE
1786	015122	000000	KSTOR1I 0	!PERMANENT STORAGE
1787	015124	000000	KSTOR2I 0	!PERMANENT STORAGE
1788	015126	000000	KSTOR3I 0	
1789	015130	000000	KSTOR4I 0	
1790	015132	000000	RMODEI 0	
1791	015134	000000	PRTCNTI 0	
1792	015136	000000	PRTSWMI 0	!SOFTWARE SW.
1793	015140	000000	TOPCI 0	
1794	015142	000000	FROMPCI 0	
1795	015144	000000	FMAPI 0	!SOFTWARE SW., SET IF MAPPING
1796	015146	000000	RECSWMI 0	!RECEIVER SOFTWARE SW, SET=RECEIVING
1797	015150	000000	PENDINGI 0	!SET WHEN A HELD LINE IS READY TO BE TRANS.
1798	015152	000000	TRNSWMI 0	!TRANSMITTER SOFTWARE SW, SET=TRANSMITTING
1799			!READER DEVICE ADDRESSES	
1800				

1001 015154 000000
1002 015156 000000
1003 015160 000000
1004 015222 015222
1005 015222 000000
1006 015264 015264
1007 015264 000000
1008 015326 015326
1009 015326 000000
1010 015370 015370
1011 015370 000000
1012 015432 015432
1013 015432 000000
1014 015474 015474
1015 015474 000000
1016 015536 015536
1017 015536 000000
1018 015600 015600
1019 015600 000000
1020 015642 015642
1021 015642 000000
1022 015704 015704
1023 015704 000000
1024 016526 016526
1025 016526 000000
1026 016570 016570
1027 016570 000000
1028 016672 016672
1029 016672 000000
1030 000001

RCSRI 0
RDBRI 0
BYTECTI 0
RECNTRI 0
XFERCTI 0
RECI 0
ORI 0
FRMI 0
PARI 0
STI 0
TRNI 0
SNDI 0
ERRBUFI 0
TTYBUFI 0
READDFI 0
BUFFERI 0
END

IBUFFER AREA TO SAVE N OF RECEIVED BYTES
IALLOCATE 'I' LOCATION FOR EACH UNIT,

IERROR BUFFER STORAGE AREA.

IHEADER DATA BUFFER

IDATA BUFFER STORAGE AREA.

DW11/VT28 HOST DIAGNOSTIC PROGRAM
DZVTGA.SRC CROSS REFERENCE TABLE

ACTIVE	015022	307*	313	325*	358	624*	714*	801	928*	1P30*	1040	1176*	1212*	1235
BAUDM3	014512	1251*	1266*	1769*										
BAUD78	013378	234	847	849	17450									
BCDBIN	010050	1404	16650											
BCDBN0	010076	804	13950											
BCDBN1	010100	1402*	1409											
BCDBN2	010122	1403*	1410											
BCDBN3	010146	1407	14100											
BCDRN3	010146	1408	14200	1425										
BCDBUF	014736	985	1400	1426	17500									
BCDCTR	014732	572*	631*	648*	667*	858*	893	897*	924*	950	953*	1401*	1422*	17560
BCDEND	010166	1404	14250											
BCDPTR	014734	774	775*	905*	1400*	1420*	1421*	1426*	1757*					
BINDEC*	104002	640	65	236	395	822	824	826	828	830	832	834	839	844
BOOT	005550	915	9490											
BOOTAD	015054	17820												
BOOTPG	014620	372	957*	994	1010*	17490								
BOOTLN	014624	951*	952*	1020	17510									
BOOTP1	015050	17800												
BOOTP2	015052	377*	973*	993	1003*	17010								
BOOTSX	014622	1029*	1247	1250*	17500									
BOOT1	005566	952*	956											
BOOT2	005610	954	957*											
BOOT3	005622	960*	964											
BOOT4	005702	959	973*											
BUFADR	014336	620	712	787	1177	1208	1720*							
BUFFER	016672	1720	1721	1722	1723	1724	1725	1726	1727	1728	1729	1730	1731	1732
		1733	1734	1735	18290									
BUFPTR	014376	150	664*	683	691*	1127	1193*	1737*						
BYTECT	015160	627	665*	692*	703*	711	1180*	1189*	1206*	1207	18930			
CLKCTR	015006	310*	311	1261*	17630									
CLKSRV	006250	280	10610											
CNTR	015014	17660												
CODE00	013224	410	16550											
CODE01	013260	411	16570											
CODE02	013301	412	16590											
CODE03	013322	413	16610											
CODE04	013342	414	16630											
CODE05	013501	415	16680											
CODE06	013535	416	16700											
CODE07	013571	417	16720											
CODE10	013642	418	16740											
CODE11	013711	419	16760											
CODE12	013730	420	16780											
CODE13	013775	421	16800											
CODE14	014030	422	16820											
CODE15	014077	423	16840											
CODE16	014146	424	16860											
CODE17	014212	425	16880											
CONC	003626	506	5940											
COND	003602	525	5820											
CONM	003552	527	5700	575										
CONM1	003600	573	5760											
CONL	005006	535	8150											

DM11/VT20 HOST DIAGNOSTIC PROGRAM
DZVTGA.SRC CROSS REFERENCE TABLE

CONP	004020	537	6430											
CONP1	004034	640	652											
CONP2	004040	640	6470											
CONP3	004064	649	6530											
CONR	003046	529	6110											
CONR1	003070	6170												
CONR2	004002	616	620	6310										
CONR3	004016	632	6350											
CONS	004066	532	6620											
CONSFL	015040	551	6630	690	17760									
CONSO	004150	6810	696											
CONS1	004076	6600	670											
CONSR	004132	660	6710											
CORBIT	001412	142	1460											
CRLF	014260	458	651	805	821	16910								
DATA	003062	391	4520											
DECODE	010334	237	14750											
DECOD1	010366	1470	14800											
DECPTR	010322	1444	14610											
DEC1	010264	14580												
DEVADR	015044	160	1620	163	7450	7460	7470	7480	759	7610	7620	7630	7950	962
		970	17780											
DHBR	001234	860	3090	6200	7150	9200	10310	12090	1236					
DHBCR	001232	850	2720	6270	7110	9250	10270	12070						
DHBR	001236	870												
DHCR	001230	840	2710	6280	7120	9260	10280	12080						
DHLPR	001226	830	2700											
DHNRC	001224	820	1007											
DHRBR	001244	900												
DHRVTR	001242	890	195	210										
DHSCR	001222	810	164	194	2600	2690	3050	3240	6260	7100	9240	10260	12950	12310
		1260	12700	15920										
DHSSR	001240	800	2760	2790										
DHTBR	001250	920												
DHTVTR	001246	910												
DOT	014262	290	349	407	557	1030	16920							
EMTOK	010576	15430												
EMTSRV	010564	43	15400											
EMTYAB	010616	1545	15510											
EOP	000014	200	690	699	1194	1303								
EOPMSG	013215	1330	16540											
ERRBUF	015704	295	346	359	361	586	10230							
ERRCTR	014670	1090	1100	1116	1122	1167	12140	12590	17540					
ERRMES	002706	3990	4000											
ERRYBL	002744	399	4100											
ERTRAP	010762	1570	15920											
EXIT	003144	459	4670											
EXITKS	003540	492	543	550	5500	671	697	749	764	978				
FINVEC	001644	185	1940											
FLUSH	010432	1491	14960	1501										
FMAP	015144	1970	204	2060	1577	15070	17950							
FORMIT	004626	570	611	645	662	7700	782	816	892	949				
FORMON	004632	574	633	650	669	7710	860	900	955					
FRMER	006410	1106	11130											

B5

CROSS REFERENCE TABLE

OCTSV2	010024	1354	1370	13820	1437	1456								
OCTSV3	010026	1357	1366	13830	1385	1388								
OFFSET	015034	239	1405	1494	1496	1774								
OR	015370	825	1107	18110										
OSWTC	015026	540	1290	1330	17710									
OUTPUT	007540	1313	1316	13190										
OUT1	010456	1402	1498	15030										
OUT2	010452	1401	1495	15020										
OVRLAY	010626	141	15590											
OVRLYA	010642	15620	1567											
OVRLYB	010662	1566	15680											
PAR	015474	827	1121	18150										
PARITY	006442	1114	11210											
PC	0000007	190	141	159	237	363	364	365	380	400	446	460	491	498
		501	549	570	574	611	612	633	635	645	650	662	669	677
		733	750	770	781	790	804	806	816	860	892	896	900	919
		931	949	955	961	969	1092	1152	1250	1262	1272	1299	1307	1313
		1316	1319	1325	1327	1328	1334	1335	1400	1423	1425	1431	1451	1455
		1476	1503											
PENDIN	015150	619	623	786	841	1280	17970							
POP1SP	005726	230												
POP2SP	022626	240	1575											
PRINT	0104000	620	63	157	158	180	186	207	235	298	349	394	400	407
		458	557	584	647	651	731	753	805	818	821	851	960	968
		1030	1530	1593	1598									
PRTAS0	003104	4570	462	466										
PRTAS1	003116	455	4610											
PRTCNT	015134	857	464	465	1289	1320	1321	1323	17910					
PRTDOT	003530	523	5560	576	588	613	653	721	862	987				
PRTERR	007646	140	261	365	522	1292	13420	1351						
PRTFLG	015046	17790												
PRTOCT	104001	630	64	209	1596	1601								
PRTSHH	015136	17920												
PSW	001200	530	136	196	202	257	299	350	622	630	643	700	716	800
		819	923	930	1025	1032	1204	1350	1436	1518				
PUSH20	024646	250												
PWRFAL	010460	41	15000											
PWRUP	010514	1516	15100											
QMARK	003500	511	5400	740										
RCBAUD	001292	980	240											
RCHAR	015000	992	1002	17600										
RCSR	015154	379	950	965	976	991	998	1007	1009	10010				
RDBR	015156	967	992	10020										
READBF	016570	377	973	1020	10270									
READCT	015056	378	975	1004	1005	1011	1019	1027	17030					
READER	005736	971	9800											
READ1	006006	995	10000											
READ2	006050	1001	10090											
READ3	006066	1006	10100											
READ3A	006212	1012	10300											
READ4	006216	999	1000	1037	10390									
REC	015326	10090												
RECERR	007116	1101	1111	1119	1125	1171	12140							
RECER1	007122	1160	12150											

RECEXT	007132	1094	1145	12100										
RECNR	015222	823	1210	10050										
RECNYT	006266	10070	1099	1109	1117	1123	1134	1139	1153	1163	1169	1196	1201	1213
		1217												
RECR4A	006744	1101	11000											
RECSWH	015146	343	909	1120	1175	1197	17960							
RECVCK	015020	306	319	327	1130	1132	17600							
RECVR	006256	219	1062	10030										
RECVR1	006350	1096	11030											
RECVR2	006466	1104	11270											
RECVR3	006702	1165	11750	1107										
RECVR4	006736	1129	11060											
RECVR5	006762	1191	11930											
RECVR6	007030	1199	12020											
RECYCL	010376	14060	1500											
REDONE	015036	374	376	974	1240	17750								
RELESE	003660	612	6150	634										
RESTRY	002460	278	3400	600										
RMODE	015132	390	902	664	1190	17900								
RSTAT	015002	991	1000	1036	17610									
RUBOUT	004540	720	7510											
RUBSWH	015024	729	732	751	754	17700								
R0	X000000	120	150	151	152	194	190	199	203	200	295	296	315	316
		317	321	322	323	346	347	359	361	362	300	430	439	440
		506	507	916	917	918	996	997	1100	1110	1110	1124	1135	1136
		1137	1138	1140	1149	1150	1151	1150	1170	1192	1215	1216	1255	1260
		1261	1271	1500	1529									
R1	X000001	130	143	144	146	147	163	167	170	172	173	174	195	210
		219	220	221	222	231	232	240	241	242	262	263	264	267
		269	273	274	300	303	341	342	343	433	436	482	486	487
		488	489	493	495	497	499	500	502	505	507	513	516	520
		524	526	528	530	533	536	538	542	544	548	561	599	670
		727	734	736	738	741	744	748	756	759	760	771	780	817
		856	962	963	965	966	967	970	971	972	980	1041	1051	1083
		1202	1203	1204	1205	1221	1232	1235	1237	1240	1275	1280	1294	1295
		1297	1301	1303	1305	1309	1311	1312	1314	1315	1324	1326	1333	1340
		1353	1355	1359	1363	1364	1365	1368	1377	1395	1402	1411	1412	1413
		1414	1415	1416	1417	1420	1430	1442	1445	1446	1450	1454	1450	1509
		1519	1520	1520	1500	1502	1504	1506						
R1A	006614	1147	11550											
R2	X000002	140	234	244	245	266	278	301	309	320	434	436	441	483
		560	594	598	625	626	679	693	709	710	717	772	783	845
		846	847	848	849	920	921	922	924	989	993	1002	1003	1022
		1023	1024	1026	1040	1084	1087	1088	1092	1103	1105	1113	1133	1138
		1146	1151	1162	1164	1186	1188	1192	1194	1220	1233	1236	1237	1238
		1240	1242	1274	1285	1286	1294	1330	1339	1354	1360	1369	1370	1373
		1378	1396	1411	1415	1416	1429	1437	1438	1439	1440	1447	1449	1456
		1510	1527											
R2A	006604	11520	1157											
R3	X000003	150	239	240	241	243	244	245	302	306	307	308	316	322
		329	330	435	439	442	443	484	559	571	595	597	615	617
		618	619	621	623	624	627	628	629	664	665	666	680	681
		683	691	692	694	695	700	702	703	704	706	711	712	713
		714	715	718	719	773	784	787	819	823	825	827	829	831

		833	836	841	845	853	894	895	929	911	913	917	928	927
		928	929	952	998	1018	1020	1022	1029	1030	1031	1033	1034	1039
		1085	1088	1089	1090	1091	1095	1097	1098	1107	1108	1119	1116	1121
		1122	1127	1128	1130	1132	1136	1141	1143	1149	1155	1156	1159	1166
		1167	1175	1176	1177	1180	1189	1193	1197	1198	1200	1202	1206	1207
		1208	1209	1210	1211	1212	1214	1215	1219	1234	1239	1243	1244	1247
		1250	1251	1253	1259	1268	1264	1265	1266	1273	1397	1405	1406	1410
		1417	1428	1475	1479	1484	1487	1489	1490	1492	1497	1499	1511	1526
R4	=X000004	160	164	172	396	397	398	399	401	403	405	558	596	646
		660	683	689	690	691	699	774	776	778	785	787	788	789
		1086	1127	1177	1178	1179	1188	1193	1218	1398	1399	1403	1405	1427
		1443	1444	1447	1449	1452	1457	1486	1498	1512	1525			
R4A	006642	1142	11620											
R5	=X000005	170	178	171	174	296	347	362	388	392	393	405	454	461
		463	467	587	1513	1524								
SAVCHR	015042	17770												
SCHAR	015030	488	499	684	686	689	796	802	1772					
SENDOP	004204	6890												
SENDLN	004136	553	6770											
SEND8W	014616	341	618	666	681	700	782	1095	1748					
SERVICE	002070	2570	509	1532										
SLASH	014265	731	753	16930										
SND	015642	1097	10210											
SP	=X000006	180	137	258	340	482	483	484	485	558	559	560	561	596
		597	598	599	988	989	990	1039	1040	1041	1083	1084	1085	1086
		1210	1219	1220	1221	1232	1233	1234	1273	1274	1275	1286	1287	1288
		1311	1314	1340	1355	1356	1395	1396	1397	1398	1427	1428	1429	1430
		1438	1441	1442	1443	1457	1458	1502	1508	1509	1510	1511	1512	1513
		1514	1515	1522	1523	1524	1525	1526	1527	1528	1529	1540	1541	1542
		1543	1544	1545	1546	1547	1574	1576						
SPACE	014256	16900												
SRVERR	002634	363	388											
SRVEXT	002742	389	404	4080										
ST	015536	833	1166	18170										
STACK	001100	270	137	250	340									
START	001342	49	1360	504	1683									
START1	001470	155	1580	187	210									
START2	001514	161	1630											
START3	001550	1700												
START4	001606	176	1880											
START5	001636	165	1860											
START6	001614	179	1820											
START7	001620	181	1830											
SWR	001212	580	358	801	1848									
SY8CK1	003004	364	4310											
SY8EXT	003060	432	4460											
SY88WH	015010	510	512	541	547	556	977	17640						
SY88W1	015004	431	433	445	896	913	1143	17620						
YAGA	004244	685	687	6988										
YAGB	004254	7000	720											
YAGC	004224	682	6930											
YAGD	004316	705	7080											
YAGE	004376	701	707	7170										
TEMP	015120	823	824	825	826	827	828	829	830	831	832	833	834	835

ADD	171	173	329	442	694	718	748	775	784	848	853	966	1033	1243	1207
	1356	1415	1416	1417	1421	1441	1449	1502	1545	1564	1581	1583	1585		
ASL	328	398	441	745	746	747	846	1091	1242	1412	1413	1414	1494	1543	
ASR	761	762	763	828	921	1023	1203								
ASRB	317	323	440	918	1137	1150	1216	1261							
BEG	205	275	278	314	320	373	389	402	432	437	462	466	494	506	525
	527	529	537	552	573	583	616	620	682	685	687	721	725	728	730
	735	777	837	842	898	903	912	954	964	1006	1012	1021	1096	1104	1106
	1114	1131	1134	1142	1147	1163	1165	1187	1191	1195	1199	1248	1269	1296	1302
	1304	1358	1404	1498	1500	1566	1578								
BGE	324	496	779	1367											
BGT	360	1168	1322												
BIC	324	397	887	617	618	623	782	744	760	913	1090	1132	1143	1176	1197
	1231	1237	1250	1251	1264	1266	1359	1410	1440	1544					
BICB	1369														
BIS	167	197	199	241	242	282	297	305	306	307	308	309	348	500	571
	621	624	625	629	666	786	789	713	714	715	799	894	922	927	928
	929	952	1024	1029	1030	1031	1175	1200	1204	1209	1211	1212	1270	1315	1370
	1450	1592													
BIT	274	436	615	619	681	788	784	836	841	989	911	1028	1095	1183	1185
	1113	1128	1138	1198	1248	1247	1253	1268							
BITB	1371														
BLE	632	649	668	739	859	1318									
BLT	737	1099	1109	1117	1123										
BMI	1021	1093													
BNE	153	155	161	175	248	265	312	331	344	375	391	484	444	455	498
	503	588	511	514	517	521	531	534	539	545	696	728	752	786	803
	855	857	910	915	959	995	1035	1129	1145	1157	1241	1245	1254	1291	1293
	1298	1386	1352	1376	1407	1453	1478	1481	1488	1491	1493	1521			
BPL	453	1037	1050	1372	1488										
BR	145	179	181	185	187	238	318	332	366	459	492	523	543	558	575
	576	585	588	613	634	652	653	670	707	782	861	981	986	956	999
	1088	1062	1139	1160	1171	1181	1246	1252	1257	1267	1308	1308	1317	1331	1336
	1362	1386	1389	1409	1418	1482	1495	1501	1567						
CLR	138	139	148	151	196	203	286	232	233	259	268	261	263	276	299
	302	318	325	326	327	342	345	350	376	378	435	445	457	556	594
	595	638	643	644	678	679	688	698	716	732	771	772	773	788	789
	795	796	797	808	815	835	848	858	938	951	974	975	977	998	1009
	1018	1018	1159	1178	1179	1239	1284	1289	1323	1338	1358	1385	1481	1482	1436
	1485	1519	1587												
CLRB	743	757	997												
CMP	152	174	247	264	383	311	338	343	359	374	388	401	403	443	465
	489	493	495	695	719	727	778	882	1085	1034	1098	1108	1116	1122	1156
	1167	1244	1321	1486	1565										
CMPB	454	461	582	585	587	513	516	528	524	526	528	538	533	536	538
	544	684	686	734	736	738	1133	1146	1164	1186	1194	1297	1381	1383	1385
	1389	1487	1498	1492	1499										
COM	522	582													
DEC	541	547	572	631	648	667	755	785	856	858	897	953	1366	1375	
EMT	62														
HALT	488	647	1517												
INC	156	182	246	273	464	512	548	663	692	693	717	742	754	783	838
	843	852	957	1084	1061	1097	1107	1115	1121	1155	1166	1189	1218	1214	1249
	1259	1265	1328	1422	1446	1496	1528								

HS

JMP	49	210	504	509	515	519	532	535	546	553	554	600	671	697	721
	740	749	764	862	907	970	1094	1101	1111	1119	1125	1153	1169	1196	1201
	1213	1217	1532	1547	1603										
JSR	141	159	237	363	344	365	491	498	501	549	570	574	611	612	633
	645	650	662	669	677	733	758	770	781	804	816	860	892	896	900
	949	955	961	969	1152	1256	1272	1299	1327	1313	1316	1319	1325	1327	1334
	1335	1400	1425	1451	1455	1476									
MOV	136	137	142	143	147	148	149	150	162	163	164	165	166	170	172
	176	183	184	194	195	198	202	200	218	219	220	221	222	231	234
	239	240	243	244	245	257	258	262	266	267	268	269	270	271	272
	279	280	281	295	296	300	301	340	341	346	347	358	361	362	377
	379	396	399	433	434	482	483	484	485	488	497	499	510	550	559
	560	561	586	587	596	597	598	599	622	626	627	628	646	664	665
	683	691	700	710	711	712	759	774	780	787	798	801	817	819	823
	825	827	829	831	833	845	847	849	893	895	904	905	920	923	924
	925	926	950	962	965	967	970	971	972	973	976	988	989	990	991
	992	993	1003	1007	1022	1025	1026	1027	1028	1032	1039	1040	1041	1048	1003
	1084	1085	1086	1087	1088	1127	1177	1180	1193	1202	1205	1207	1208	1210	1219
	1220	1221	1232	1233	1234	1235	1236	1238	1273	1274	1275	1285	1286	1288	1311
	1312	1314	1324	1326	1330	1333	1339	1340	1353	1354	1355	1360	1361	1374	1377
	1378	1388	1395	1396	1397	1398	1399	1400	1411	1420	1426	1427	1428	1429	1430
	1437	1438	1439	1442	1443	1444	1445	1454	1456	1457	1458	1475	1479	1484	1486
	1508	1509	1510	1511	1512	1513	1514	1515	1516	1518	1522	1523	1524	1525	1526
	1527	1528	1529	1540	1542	1546	1559	1560	1561	1562	1563	1574	1576	1580	1582
	1584	1586													
MOVB	315	316	321	322	392	393	405	430	439	456	463	486	542	548	609
	690	699	741	756	916	917	996	1002	1051	1100	1110	1118	1124	1135	1136
	1138	1140	1149	1151	1158	1170	1180	1192	1215	1255	1260	1271	1294	1360	1373
	1405														
NEG	723	1019	1206												
NOP	168	169	178	200	201										
ROL	1363	1364	1365												
RTI	562	1042	1222	1276	1341	1379	1459	1580							
RTS	380	400	446	460	635	790	806	919	931	1052	1262	1320	1423	1431	1503
	1560														
SUB	146	1447	1541	1579	1595	1600									
SWAB	1009														
TST	144	154	160	177	204	277	313	319	372	390	431	510	551	729	751
	776	902	914	950	963	994	1000	1011	1036	1092	1141	1144	1190	1290	1292
	1351	1357	1452	1477	1480	1577									
TSTB	452	467	854	1049	1162	1295	1403	1489	1497						
.ABS	2														
.ASCII	1600	1609	1610	1611	1612	1613	1614	1615	1616	1617	1618	1619	1620	1621	1622
	1623	1624	1647	1648	1651	1652	1665								
.ABCIZ	1625	1627	1629	1631	1632	1634	1637	1639	1642	1645	1646	1649	1650	1653	1654
	1655	1657	1659	1661	1663	1666	1668	1670	1672	1674	1676	1678	1680	1682	1684
	1686	1688	1690	1691	1692	1693									
.BYTE	1685														
.ENABL	3														
.END	1030														
.EVEN	1694														
.REPT	33														
.TITLE	1														

ERRORS DETECTED: 0

*DZVTGA,DZVTGA/CRF_DZVTGA.SRC
RUN-TIME: 7 15 3 SECONDS
CORE USED: 9K