IDENTIFICATION
****

PRODUCT CODE: MAINDEC-08-DIVTB-A-D

PRODUCT NAME: VT20 HOST COMPUTER PROGRAM

DATE CREATED: JUN 12, 1974

MAINTAINER: DIAGNOSTIC GROUP

AUTHOR: ED C. BADGER

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1. ABSTRACT
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THIS PROGRAM IS A KL8-JA DATA HANDLING ROUTINE TO BE USED WITH
MD-11-DBVTA (VT20 DIAGNOSTIC TEST), TEST 21. IT RECEIVES OR
ORIGINATES DATA COMING FROM OR GOING TO THE VT20, IT MAY ALSO BE
USED TO "BOOT" PROGRAMS TO THE VT20.
THIS PROGRAM WAS WRITTEN TO ENABLE EXERCISING 6 KL8JA 'S SIMUTANEOUSLY.

2. REQUIREMENTS (EQUIPMENT)
****

A. PDP-8 FAMILY COMPUTER W/ CONSOLE DEVICE AND 8K OR MORE OF CORE
MEMORY

3. LOADING PROCEDURE
****

A. USE STANDARD PROCEDURE FOR LOADING BINARY TAPE.

4. STARTING PROCEDURE
****

A. LOAD AND START AT LOCATION 200.

B. THE PROGRAM WILL ASK YOU FOR THE NUMBER OF RECEIVERS YOU HAVE.
(1) RESPOND WITH A CARRIAGE RETURN IF YOU HAVE ALREADY ANSWERED
THIS QUESTION
(2) RESPOND WITH THE NUMBER OF RECEIVERS (OR LINES) FOLLOWED BY
A CARRIAGE RETURN.

C. IF YOU RESPONDED TO QUESTION ONE WITH A NUMBER, THE PROGRAM
WILL ASK YOU CODES FOR RECEIVER DEVICE CODES FOR EACH RECEIVER
YOU INDICATED. ENTER EACH DEVICE CODE FOLLOWED BY A CARRIAGE
RETURN. THE FIRST RECEIVER WILL BE CALLED "RECEIVER 0".

5. PROGRAM ACTION
****

THE PROGRAM MUST FIRST OVERLAY THE ENTIRE SKIP CHAIN AND RECEIVER
SERVICE ROUTINES TO REFLECT THE DEVICE CODES ENTERED BY OPERATOR.
IT NEXT SETS UP BUFFER POINTERS FOR EACH RECEIVER FOR THE NEXT 4K
OF MEMORY AS WELL AS PUTTING CODE "14" IN EACH LOCATION TO PREVENT
SOFTWARE "RUNAWAY". TRANSMITTER DEVICE CODES ARE SETUP FOR EACH
LINE BASED ON THE RECEIVERS DEVICE CODE. A "^C" IS TYPED ON THE
CONSOLE DEVICE TO INDICATE THIS PROCEDURE IS BEING INITIATED.
WHEN THE INITIAL SET UP IS COMPLETE, A "." (PERIOD) IS TYPED
TO INDICATE THAT THE PROGRAM IS READY TO EXCEPT DATA
TRANSMITTIONS FROM THE VT20(S) OR COMMANDS FROM THE CONSOLE.

6. MONITOR COMMANDS
****

AFTER "." IS PRINTED, THE PROGRAM IS READY TO RECEIVE, BUFFER,
AND RETRANSMIT DATA FROM THE VT20(S). THERE ARE SEVERAL
MONITOR COMMANDS THAT ENABLE YOU TO DEBUG AND CONTROL THE RECIEVER AND
TRANSMITTION LINES. THEY CAN BE USED ALONE OR IN CONJUNCTION WITH EACH

OTHER'.

A. SEND MODE (*S)*

THIS FEATURE ENABLES THE USER TO SEND DATA DIRECTLY FROM
THE HOST COMPUTER'S TTY TO A SPECIFIED 'LINE' TRANSMITTER,
TO USE THE SEND MODE, TYPE "*S LINE NO, & CR",
IF YOU HAVE SET HOLD MODE FOR THE SPECIFIED LINE, DATA FROM
THE HOST'S TTY WILL BE BUFFERED IN THE SPECIFIED LINE'S
BUFFER, TYPING 'ALTMODE', ESCAPE OR "*C" WILL TAKE YOU OUT OF THIS MODE,
NOT THAT SWRØ MUST BE SET TO A 1 ON THE VT2Ø'S COMPUTER, OR A RECEIVER
ERROR WILL BE DISPLAYED.

B. PRINT MODE (*P)*

THIS FEATURE ENABLES YOU TO PRINT THE CONTENTS OF A
LINE'S BUFFER, TO USE THE PRINT MODE, TYPE "*P LINE NO,&CR",

C. HOLD MODE (*H)*

THIS FEATURE ENABLES YOU TO HOLD A 'LINES' BUFFER FROM BEING
SENT BACK TO THE VT2Ø, TO ENTER, TYPE "*H LINE NO, & CR",

D. RELEASE MODE (*R)*

THIS FEATURE IS USED TO RELEASE A LINE THAT WAS HELD, TO
ENTER, TYPE "*R LINE NO, &CR",

E. CLEAR MODE (*C)*

THIS FEATURE IS USED TO CLEAR ALL SOFTWARE FLAGS THAT WERE
SET BY SELECTING ANY OF THE OTHER MODES, AS WELL AS RESET
RESET BUFFER POINTS AND INTERNAL SOFTWARE FLAGS, USE
CAUTION IF USING THIS MODE, STOP VT2Ø TUBES FROM TRANSMITTING
TO HOST FIRST,

F. BOOT MODE (*B)*

THIS FEATURE ALLOWS THE USER TO "BOOT" PROGRAMS FROM
A READER ON THE PDP-8 HOST COMPUTER TO THE VT2Ø,
TO BOOT ABSOLUTE LOADER TO THE VT2Ø'S PDP11, (1) LOAD
THE BOOTSTRAP LOADER INTO THE PDP-11 TO BE BOOTED, (2) IN
ADDRESS *776 (* DETERMINED BY MEMORY SIZE) PUT THE ADDRESS
OF THE FIRST LINE'S RECEIVER CSR, (3) LOAD ADDRESS *744 ON THE
PDP11 AND START, (4) NOW PLACE THE ABSOLUTE LOADER TAPE
(DEC-11-L2PC) IN THE PDP-8'S READER, (5) TYPE "*B" ON THE
PDP-8'S CONSOLE DEVICE, (6) THE PROGRAM WILL ASK YOU FOR THE
DEVICE CODE OF THE READER, RESPOND BY TYPING THE DEVICE CODE
FOLLOWED BY A CARRIAGE RETURN (I.E. DEVICE CODE FOR HSR IS 1),
(7) THE PROGRAM WILL NEXT ASK FOR THE DEVICE CODE OF THE LINE
YOU WISH TO TRANSFERR THE DATA ON, RESPOND BY TYPING THE
DEVICE CODE FOLLOWED BY A CARRAGE RETURN,
AS SOON AS DEVICE CODE IS ENTERED THE TAPE WILL BE READ AND
TRANSMITTED TO THE PDP-11, AFTER THE TAPE IS READ IN, TYPE

ANY KEY ON THE TTY TO RETURN MONITOR IF THE ABSOLUTE LOADER IS
IN THE PDP-11 AND YOU WISH TO LOAD ANOTHER PROGRAM INTO THE
PDP-11, LOAD ADDRSS #750 ON THE PDP-11, PRESS START,
PLACE THE TAPE TO BE READ IN THE PDP-8'S READER
AND FOLLOW STEPS 5 THROUGH 7.

G. RESTART (↑A)*

BY TYPING "↑A" YOU WILL RESTART PROGRAM AT LOCATION 200.

H. COMBINING MODES

WHILE SEND MODE MAY "STAND ALONE", IT MAY BE USED
WITH "HOLD" AND "RELEASE" MODES TO SEND "BURSTS" OF DATA
FROM THE HOST TO THE VT20 UNIT.

* ALL CONTROL CHARACTERS ARE OBTAINED BY
  TYPING THE 'CNTRL AND THE CHARACTER DESIGNATED'
  KEYS SIMULTANEOUSLY.

THESE MODES ARE INTENDED AS A SINGLE LINE DEBUG TOOL,
IF THEY ARE USED WHILE OTHER LINES ARE IN "CONTINUOUS TRANSMIT
MODE" OVERRUN ERRORS MAY OCCUR ON THESE OTHER LINES,
THESE ERRORS SHOULD NOT BE INTERPRETED AS HARDWARE
FAILURES.

7. ERRORS

7.1 RECIEVER ERRORS

ERRORS ARE REPORTED AS A BACKGROUND JOB UNLESS THE STORAGE
BUFFER HAS BEEN EXCEEDED, IF THIS BUFFER HAS BEEN EXCEEDED, THEN
THE PROGRAM WILL TYPE "ERROR BUFFER EXCEEDED-AUTOMATIC RESTART
OF PROGRAM", FOLLOWED BY A LIST OF ERRORS, A MAXIMUM OF 144
CONSECUTIVE ERRORS ARE ALLOWED.

FORMAT

```
RECV    ERROR
0002    5000
```

WHERE "2" UNDER "RECV" INDICATES THAT RECEIVER 2 (LINE 3) HAD AN
ERROR, THE "5000" UNDER "ERROR" IS BROKEN DOWN TO; BIT0=1
INDICATING THERE WAS AN ERROR, BIT2=1 INDICATING A FRAMING ERROR.

DBR ERROR BITS	CONDITION
0=1	HAS ERROR
1=1	PARITY ERROR
2=1	FRAMING ERROR
3=1	OVERRUN ERROR

7.2 INTERRUPT ERRORS

SINCE THE INTERRUPT SKIP CHAIN IS SET UP TO SERVICE
ONLY INTERRUPTS FROM KL8JA'S SPECIFIED BY YOUR ANSWERS TO
QUESTIONS IN THE INITIAL START-UP, AND TTY, IF ANY OTHER
DEVICE ON THE SYSTEM INTERRUPTS, THE PROGRAM COULD "HANG",
TO AVOID "HANGING" THE PROGRAM FROM AN UNEXPECTED INTERRUPT
THE PROGRAM HAS A SENSOR (INTNO) TO DETERMINE IF ANY FLAGS
ARE UP THAT HAVEN'T BEEN SERVICED. IF THERE ARE ANY, THE
PROGRAM WILL SEEK OUT AND CLEAR THESE FLAGS AND REPORT
WHAT FLAGS WERE UP. DURING THIS PERIOD OF SEEK OUT AND CLEAR
IF A NORMAL FLAG HAS COME UP IT WILL ALSO BE CLEARED POSS-
IBLEY CAUSING OTHER ERRORS.
AFTER TYPEOUT OF THE ERRORS, THE PROGRAM WILL
DO AN AUTOMATIC "^C" (SEE SECTION 6.E) AND RETURN TO MONITOR.
YOU SHOULD DETERMINE THE CAUSE OF THE UNEXPECTED INTERRUPT
BEFORE RERUNNING THE PROGRAM.

LISTING
****

```
                    /DIVTB
                    /*****************************************************************
                    /* PROGRAM DIVTB BY ED BADGER LAST REVISED JUN,12,1974
                    /* COPYRIGHT 1974 DIGITAL EQUIPMENT CO,,MAYNARD MASS
                    /*****************************************************************
                    /
                    /

                    /DEFINITIONS
           4464     INOCT=  JMS I   INOCTR
           4403     TYPE=   JMS I   PRINTR
           4466     CRLF=   JMS I   CRLFR
           4404     MODIFY= JMS I   MODY

           6771     IOTSF=6771
           6002     IOTCF=6002
           6006     IOTKRB=6006
           6004     IOTKRS=6004
           6002     IOTKCC=6002

           0000     *0
     0000  0000     RETAD,  0                       /HARDWARE JMS TO THIS ADDRESS ON INTR,
     0001  5402             JMP I   .+1             /GOTO INTR, SERVICE ROUTINE
     0002  0072             INTSRV                  /ADDR OF INTR, SERVICE
     0003  2200     PRINTR, LPRINT                  /ADDR OF PRINT ROUTINE
     0004  2231     MODY,   MOD                     /ADDR OF MODIFY ROUTINE
     0005  0000     CHAR,   0                       /STORAGE OF INPUTTED CHARACTERS
     0006  0000     INTNO,0                         /NUMBER  OF INTERRUPT FLAGS SERVICED

           0010     *10
     0010  0000     AUTO10, 0                       /AUTO INDEX REGISTERS FOR POINTERS
     0011  0000     AUTO11, 0
     0012  0000     AUTO12, 0
     0013  0000     AUTO13, 0
     0014  0000     AUTO14, 0
     0015  0000     AUTO15, 0
     0016  0000     AUTO16, 0                       /ERROR REPORTER
     0017  0000     AUTO17, 0                       /ERROR STORER
     0020  0000     WXMIT,  0                       /XMITTER POINTER FOR XMITTER ROUTINE
     0021  0001     HXMIT,  1                       /HOLD SW FOR XMITTER 0
     0022  0001             1                       /HOLD SW FOR XMITTER 1
     0023  0001             1                       /HOLD SW FOR XMITTER 2
     0024  0001             1                       /HOLD SW FOR XMITTER 3
     0025  0001             1                       /HOLD SW FOR XMITTER 4
     0026  0001             1                       /HOLD SW FOR XMITTER 5
     0027  0001     TXMIT,  1                       /TEMP STORAGE FOR XMITTER ROUTINE
     0030  0000     TXMIT1, 0                       /TEMP STORAGE FOR XMITTER ROUTINE
     0031  0530     DXMIT,  530                     /DEV CODE FOR XMITTER 0
     0032  0530             530                     /DEV CODE FOR XMITTER 1          SKIP CHAIN IS OVER LAYED WITH
     0033  0530             530                     /DEV CODE FOR XMITTER 2          THESE DEVICE CODES, THEREFORE THEY
     0034  0530             530                     /DEV CODE FOR XMITTER 3          CANNOT BE SET AT ZERO, OR AN HIGHR
     0035  0530             530                     /DEV CODE FOR XMITTER 4          (CODE 6001) COULD BE FORMED AND PLACED
     0036  0530             530                     /DEV CODE FOR XMITTER 5          IN SKIP CHAIN,
     0037  0520     DREC,   520                     /DEC CODE FOR RECIEVER 0
     0040  0520             520                     /DEC CODE FOR RECIEVER 1
```



```
     0041  0520             520                     /DEC CODE FOR RECIEVER 2
     0042  0520             520                     /DEC CODE FOR RECIEVER 3
     0043  0520             520                     /DEC CODE FOR RECIEVER 4
     0044  0520             520                     /DEC CODE FOR RECIEVER 5
     0045  0000     BUFPO,  0                       /BUFFER POINTER FOR REC+XMIT DATA
     0046  0000             0                       /GET SET UP INITIAL TO VALUE IN
     0047  0000             0                       /XB0-XB5 CHANGES WHEN RECEIVING OR XMITTING DATA
     0050  0000             0
     0051  0000             0
     0052  0000             0
     0053  0000     XB0,    0                       /INTIAL BUFFER POINTERS FOR XMITTERS+REC 0-5
     0054  1000     XB1,    1000                    /BUFFER AREA LOCATED IN NEXT 4K AREA
     0055  2000     XB2,    2000                    /DATA FIELDS AREA CHANGE WHEN
     0056  3000     XB3,    3000                    /STORING OR RETRIEVING DATA
     0057  4000     XB4,    4000
     0060  5000     XB5,    5000
     0061  1200     KBPO,   KEYSRV                  /POINTER TO KEYBOARD SERVICE ROUTINE (KEYSRV OR OCTR1)

     0062  0000     WREC,   0                       /POINTS TO CURRENT RECEIVER
     0063  0000     RTEMP,  0                       /RECEIVER ROUTINE TEMP, STORAGE
     0064  2000     INOCTR, INOCTS                  /POINTER TO OCTAL INPUT ROUTINE
     0065  0000     STORAC, 0                       /STORAGE OF AC WHEN INTERRUPTED
     0066  2264     CRLFR,  CRLFS                   /POINTER TO CARRIAGE RETURN, LINE FEED ROUTINE
     0067  0000     RERRS,  0                       /ERROR COUNT
     0070  0000     RCHAR,  0
     0071  0000     INTMP1, 0                       /USE BY OCTAL INPUT ROUTINE TO STORE NUMBER INPUTTED

                    /
                    /WHO DID IT ROUTINE FOR INTERRUPTS
                    /
                    /

     0072  3865     INTSRV, DCA     STORAC          /STORE AC
     0073  3006             DCA     INTNO           /CLEAR INTR FLAGS SERV, FLAG
     0074  6771     SRV0,   IOTSF                   /"IOTSF" INSTRUCTIONS REPLACED WITH
     0075  7410             SKP                     /"TSF" OF SKIP ON FLAG INSTRUCTION OR "STR1"
     0076  4536             JMS I   TRSRV0          /AFTER NUMBER OF RECEIVERS, AND THEIR
     0077  6771     SRV1,   IOTSF                   /DEVICE CODES ARE KNOWN
     0100  7410             SKP
     0101  4537             JMS I   TRSRV1          /RSRV "X" ROUTINES SERVICE RECEIVER INTRS,
     0102  6771     SRV2,   IOTSF                   /"SKIP CHAIN" TO RE-INTERABLE TO ALLOW RECEIVERS
     0103  7410             SKP
     0104  4560             JMS I   TRSRV2          /MAXIMUM ACKNOWLEDGEMENT TIME EXCEPT FOR
     0105  6771     SRV3,   IOTSF                   /XMITTER ROUTINE, OR PRINTER ROUTINE WHERE THE PARTICULAR
     0106  7410             SKP                     /INTERRUPT "WAS EXPECTED,"
     0107  4561             JMS I   TRSRV3
     0110  6771     SRV4,   IOTSF
     0111  7410             SKP                     /***NOTE***
     0112  4562             JMS I   TRSRV4          /DO NOT MODIFY THIS SKIP CHAIN WITHOUT MODIFYING
     0113  6771     SRV5,   IOTSF                   /OVERLAY ROUTINES
     0114  7410             SKP
     0115  4563             JMS I   TRSRV5
     0116  6041             TSF                     /DID PRINTER INTER?
     0117  7410     SRVE,   SKP                     /NO-SKIP
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          0120  5564            JMP I   TTPP2            /YES-EXIT
          0121  6031            KSF                      /DID KEY BOARD INTERRUPT?
          0122  7410            SKP                      /NO-EXIT INTERRUPT CHECKED
          0123  5461            JMP I   KBPO             /YES-GO TO KEYBOARD ROUTINE

          0124  6002    SRV7,   IOTCF                    /"IOTCF" INSTRUCTIONS REPLACED BY XMITTER SKIP
          0125  7410            SKP                      /ON FLAG INSTRUCTION BY ROUTINE
          0126  5565            JMP I   TGXRET
          0127  6002            IOTCF                    /"ST1" AFTER DEVICE CODES ARE KNOWN
          0130  7410            SKP                      /"GXRET" IS A COMMON ENTRY POINT
          0131  5565            JMP I   TGXRET
          0132  6002            IOTCF                    /FOR SERVICING INTERRUPTS (EXPECTED)
          0133  7410            SKP
          0134  5565            JMP I   TGXRET           /FROM ANY XMITTER
          0135  6002            IOTCF
          0136  7410            SKP
          0137  5565            JMP I   TGXRET
          0140  6002            IOTCF
          0141  7410            SKP
          0142  5565            JMP I   TGXRET
          0143  6002    SRV8,   IOTCF
          0144  7410            SKP
          0145  5565            JMP I   TGXRET
          0146  7300    SRV6,   CLA CLL                  /MAKE SURE LINK IS CLEARED!
          0147  1006            TAD     INTNO            /DID WE SERVICE ANY DEVICE?
          0150  7650            SNA CLA                  /INTNO <>0 IF SO
          0151  5566            JMP I   TUEXIN           /IF NOT THEN CLEAR FATAL ERROR
          0152  1065    SRVEX,  TAD     STORAC           /RETRIEVE AC
          0153  6244            RMF                      /RESTORE MEMORY FIELD

          0154  6001            ION                      /TURN ON INTERRUPTS AFTER NEXT INSTRUCTION
          0155  5400            JMP I   0                /EXIT-"SKIP CHAIN"

          0156  0601    TRSRV0, RSRV0
          0157  0626    TRSRV1, RSRV1
          0160  0653    TRSRV2, RSRV2
          0161  0700    TRSRV3, RSRV3
          0162  0725    TRSRV4, RSRV4
          0163  1001    TRSRV5, RSRV5
          0164  2275    TTPP2,  TPP2
          0165  1103    TGXRET, GXRET
          0166  2307    TUEXIN, UEXIN


                0200    PAGE

                        /THIS ROUTINE IS INITIAL START-UP
                        /AND ASK QUESTION
                        /

          0200  6002    START,  IOF
          0201  4466            CRLF
          0202  4403            TYPE                     /TYPE HEADER OF PROGRAM
          0203  2474            MHED


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          0204  4466    START1, CRLF
          0205  4403            TYPE                     /ASK HOW MANY RECEIVERS
          0206  2533            MNOL
          0207  4464            INOCT                    /GO TO INPUT OCTAL ROUTINE
          0210  1071            TAD     INTMP1           /GET THE NUMBER
          0211  0377            AND     (7               /MAKE SURE THAT IT DOESN'T EXCEED "7"
          0212  7450            SNA
          0213  5270            JMP     SET0             /IF IT WERE ZERO THEN OPERATOR WAS RESTARTING PROGRAM
          0214  7041            CMA IAC
          0215  3062            DCA     WREC             /STORE COMPLEMENT OF NUMBER OF RECEIVERS SO THAT WE CAN INPUT
          0216  1376            TAD     (260             /DEVICE CODES FOR EACH RECEIVER
          0217  3027            DCA     TXMIT
          0220  1062            TAD     WREC             /MAKE SURE THAT #OF RECIEVERS
          0221  1375            TAD     (-7              /DOES NOT EXCEED 6
          0222  7700            SMA CLA
          0223  5204            JMP     START1           /IF IT DOES REASK QUESTION!
          0224  1374            TAD     (DREC-1          /GET RECEIVER CODE POINTER
          0225  3010            DCA     AUTO10           /STORE
          0226  4466            CRLF
          0227  4403    STR1,   TYPE                     /TYPE QUESTION "DEVICE CODE OF RECEIVER "X""
          0230  2433            MH1
          0231  1027            TAD     TXMIT            /TYPE VALUE OF "X"
          0232  4773'           JMS     TPP1
          0233  1372            TAD     (240
          0234  4773'           JMS     TPP1
          0235  4464            INOCT                    /GET ANSWER
          0236  6002            IOF
          0237  4466            CRLF
          0240  1071            TAD     INTMP1           /GET FIRST REC DEV CODE
          0241  7450            SNA                      /IF ZERRO THEN USE DEFUALT OR PREIOSLY TYPED D'C,
          0242  5252            JMP     ST0              /DEVICE CODE OF "00" NOT VALID,
          0243  7100            CLL                      /POSITION DEVICE CODE FOR USE IN INSTRUCTION FORMING
          0244  7006            RTL
          0245  7004            RAL
          0246  3410            DCA I   AUTO10           /STORE CODE
          0247  2027            ISZ     TXMIT            /DONE ALL RECEIVERS?
          0250  2062            ISZ     WREC
          0251  5227            JMP     STR1             /NO-REPEAT

                        /
                        /ROUTINE TO FORM XMITTER DEVICE
                        /CODES BASED ON REC, DEV CODE
                        /

          0252  6007    ST0,    6007                     /CLEAR ALL HARDWARE FLAGS
          0253  7200            CLA
          0254  1374            TAD     (DREC-1          /FIX-UP XMITTER DEVICE CODE
          0255  3010            DCA     AUTO10
          0256  1371            TAD     (DXMIT-1
          0257  3011            DCA     AUTO11

          0260  1410    ST1,    TAD I   AUTO10           /XMITTER DEVICE CODE =
          0261  1370            TAD     (10              /REC, DEV', CODE +10
```

```
0262  3411  ST2,    DCA I   AUTO11
0263  7001          IAC
0264  1367          TAD     (-BUFPO
0265  1010          TAD     AUTO10
0266  7640          SZA CLA
0267  5260          JMP     ST1


                    /
                    / ROUTINE TO SET UP BUFFER POINTS IN INT RUN
                    /

0270  7240  SET0,   CLA CMA
0271  1366          TAD     (X80            /GET INITAL POINTER VALUE KEEPER
0272  3010          DCA     AUTO10          /STORE IN 10
0273  1365          TAD     (BUFPO-1        /GET RUNNING BUFFER POINTER
0274  3011          DCA     AUTO11          /STORE IN 11
0275  1410  SET1,   TAD I   AUTO10          /GET INIT VALUE
0276  3411          DCA I   AUTO11          /STORE FOR RUNNING POINTER
0277  1010          TAD     AUTO10
0300  7041          CMA IAC
0301  1364          TAD     (X85            /ALL DONE?
0302  7640          SZA CLA
0303  5275          JMP     SET1            /NO-CONTINUE
0304  1363          TAD     (ERPO-1
0305  3016          DCA     AUTO16          /YET STORE ERROR POINTER IN
0306  1016          TAD     AUTO16          /AUTO REGISTERS 16 & 17
0307  3017          DCA     AUTO17


                    /
                    /THIS LITTLE ROUTINE HANDLES OVERLAYING
                    /OF THE INTERRUPT SKIP CHANGE
                    /

0310  4403  OVER1,  TYPE                    /TYPE   "+"
0311  2516          MCONC
0312  6002          ION                     /SET AC=-1
0313  6007          6007                    /CLEAR ALL FLAGS
0314  1374          TAD     (DREC-1
0315  3010          DCA     AUTO10          /SET LIST POINTER OF DEV CODES IN LOC 10
0316  1362          TAD     (SRV0           /GET FIRST LOCATION TO BE OVERLAYED
0317  3000          DCA     0
0320  1410  OVER2,  TAD I   AUTO10          /GET FIRST DEVICE CODE
0321  1361          TAD     (6001           /IOT CODE "KSF"-DEV CODE
0322  3400          DCA I   0               /STORE IOT
0323  1000          TAD     0               /UPDATE OVERLAY POINTER
0324  1360          TAD     (3
0325  3000          DCA     0
0326  7001          IAC
0327  1000          TAD     0               /HAVE WE OVERLAYED THE
0330  1357          TAD     (-SRVE          /LAST LOCATION
0331  7640          SZA CLA
0332  5320          JMP     OVER2           /NO-DO NEXT ONE
```



```
                                            /NOW OVERLAY XMITTER
0333  1371  OVER3,  TAD     (DXMIT-1        /CLEAR FLAG AREA
0334  3010          DCA     AUTO10          /OF SKIP CHAIN
0335  1356          TAD     (SRV7-3
0336  3011          DCA     AUTO11
0337  2011  OVER4,  ISZ     AUTO11
0340  2011          ISZ     AUTO11
0341  1361          TAD     (6001
0342  1410          TAD I   AUTO10
0343  3411          DCA I   AUTO11
0344  1355          TAD     (-SRV8
0345  1011          TAD     AUTO11
0346  7640          SZA CLA
0347  5337          JMP     OVER4


                                            /THIS AREA OVERLAYS
0350  1354          TAD     (HXMIT-1        /THE HXMIT AREA TO STOP
0351  3010          DCA     AUTO10          /THE SOFTWARE FROM STARTING
0352  5753          JMP     OVER5

0353  0400
0354  0020
0355  7635
0356  0121
0357  7661
0360  0003
0361  6001
0362  0074
0363  3777
0364  0060
0365  0044
0366  0053
0367  7733
0370  0010
0371  0030
0372  0240
0373  2273
0374  0036
0375  7771
0376  0260
0377  0007
      0400  PAGE

0400  7201  OVER5,  CLA     IAC             /THE XMITTERS AT START OF
0401  3410          DCA I   AUTO10          /TEST
0402  1010          TAD     AUTO10
0403  1377          TAD     (-TXMIT         /ALL DONE?
0404  7640          SZA CLA
0405  5200          JMP     OVER5           /NO CONTINUE
0406  7040          CMA

                    /
```

```
                        /ROUTINE TO PRESET DATA FIELD 1 TO ALL CODE 14
                        /

                                                        /THIS SECTION SETS THE NEXT
0407  3010              DCA     AUTO10                /4K OF MEMORY TO CODE "14",  THE USE IS TO
0410  1376              TAD     (1000                 /ISSUE NULL CHARACTERS AT BEGINING
0411  3000              DCA     0                     /OF A TRANSMITION TO A LINE
0412  6211              CDF     10
0413  1375  OVER6,      TAD     (14
0414  3410              DCA I   AUTO10
0415  2000              ISZ     0                     /WHAT WE WILL NOT DO IS WIPE
0416  5213              JMP     OVER6                 /OUT BIN IF IN NEXT 4K,
0417  6201              CDF     00


                        /
                        /THIS ROUTINE OVERLAYS THE RECEIVES'
                        /INTERRUPT SERVICE ROUTINES WITH DEVICE CODES
                        /

0420  1374  OVER7,      TAD     (DREC-1               /GET LIST OF RECEIVER DEVICE CODES
0421  3010              DCA     AUTO10
0422  1373              TAD     (RSRV0                /GET ADDRESS OF FIRST RECEIVERS' SERVICE
0423  3011              DCA     AUTO11                /ROUTINE
0424  1410  OVER8,      TAD I   AUTO10                /OVERLAY WITH 6XX2 INSTR
0425  3000              DCA     0
0426  1000              TAD     0
0427  1372              TAD     (6002
0430  3411              DCA I   AUTO11
0431  1000              TAD     0                     /OVERLAY NEXT ADDR WITH 6XX4 INSTR,
0432  1371              TAD     (6004
0433  3411              DCA I   AUTO11
0434  1011              TAD     AUTO11
0435  1370              TAD     (23                   /***NOTE***
0436  3011              DCA     AUTO11                /IF ANY MODIFICATIONS ARE MODE TO
0437  1011              TAD     AUTO11                /RECEIVER SERVICE ROUTINES, THAN THIS
0440  7041              CMA     IAC                   /OVERLAYING AREA MUST BE CHANGED,
0441  1367              TAD     (RSRV4-25
0442  7640              SZA CLA
0443  5224              JMP     OVER8
0444  1366              TAD     (RSRV5
0445  3011              DCA     AUTO11
0446  1410              TAD I   AUTO10
0447  3000              DCA     0
0450  1000              TAD     0
0451  1372              TAD     (6002
0452  3411              DCA I   AUTO11
0453  1000              TAD     0
0454  1371              TAD     (6004
0455  3411              DCA I   AUTO11
0456  3067              DCA     RERRS
0457  3765'             DCA     SNDNG
0460  1364              TAD     (KEYSRV
0461  3061              DCA     KBP0
```



```
                        /
                        /THIS SECTION ENABLES THE CSR OF THE KL8JA TO REPORT
                        /ERRORS AS PART OF DATA RECIEVED
                        /

0462  1374  OVER9,      TAD     (DREC-1               /GET POINTER OF RECIEVER DEV CODES
0463  3011              DCA     AUTO11
0464  1411  OVER10,     TAD I   AUTO11                /GET DEVICE CODE
0465  1363              TAD     (6005                 /FORM 6XX5 CODE FOR ENABLEING ERRORS
0466  3270              DCA     .+2                   /STORE INSTRUCTION
0467  7325              CLL CLA IAC STL RAL           /AC=3 ENABLE INTR,ERROR REPOTING
0470  0000              0                             /6XX5 INST, FORMED ABOVE
0471  7200              CLA
0472  1011              TAD     AUTO11                /DONE ALL RECIEVERS?
0473  7041              CMA IAC
0474  1362              TAD     (BUFPO-1
0475  7640              SZA CLA
0476  5264              JMP     OVER10


                        /
                        /THIS IS WHERE THE PROGRAM ENTERS EACH TIME
                        /A FUNCTION IS COMPLETED - REGULAR RETURN IS AT
                        /LOCATION MONITR+3
                        /

0477  7200  MONITR,CLA
0500  3761'             DCA     IOFFLG
0501  4466              CRLF
0502  4403              TYPE                          /TYPE A DOT TO INDICATE WERE IN
0503  2515              MDOT                          /MONITOR
0504  3005              DCA     CHAR

0505  6001  CERORS,     ION
0506  1067              TAD     RERRS                 /SEE IF WE HAVE ENCOUNTERED
0507  7640              SZA CLA                       /ANY RECIEVER ERRORS
0510  4760'             JMS     CERROR                /IF SO, TAKE CARE OF THEM
0511  4757'             JMS     KSERV                 /CHECK FOR KEYBOARD INTERRUPTS
0512  4756'             JMS     GXMIT                 /SERVICE XMITTERS
0513  5305              JMP     CERORS
                        /
                        /*THIS ROUTINE ENTERED WHEN ERROR
                        /*BUFFER HAS BEEN EXCEEDED WILL
                        /*TYPE OUT ALL ERRORS AND RESTART PROGRAM
                        /
0514  6002  CSER,       IOF
0515  6007              6007                          /CLEAR ALL FLAGS
0516  7201              CLA IAC
0517  3761'             DCA     IOFFLG                /DON'T ALLOW INTERRUPTS
0520  4760'             JMS     CERROR                /GO DIRECTLY TO ERROR TYPOUT ROUTINE
0521  4466              CRLF
```

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0522  4403            TYPE                    /TELL OPERATOR THAT ERROR BUFFER WAS EXCEEDED
0523  2574            MERBX                   /AND THAT PROGRAM RUN WAS ABORTED WITH
0524  5755'           JMP     SET0            /RESTART A VERY BEGINNING
0555  0270
0556  1053
0557  1211
0560  1600
0561  2355
0562  0044
0563  6005
0564  1200
0565  1336
0566  1001
0567  0752
0570  0023
0571  6004
0572  6002
0573  0601
0574  0036
0575  0014
0576  1000
0577  7751
      0600            PAGE
                      /*
                      /*ROUTINE TO SERVICE LINE 0'S RECIEVER
                      /*
0600  0000  RNUB0,    0                       /RECIEVER NUMBER
0601  0000  RSRV0,    0                       /ENTRY
0602  6002            IOTKCC                  /KCC INSTRUCTION FORMED BY OVERLAY AREA
0603  6004            IOTKRS                  /KRB INSTRUCTION FORMED BY OVERLAY AREA
0604  3070            DCA     RCHAR           /STORE CHAR (TEMP)
0605  1070            TAD     RCHAR           /LOOK AT CHAR FOR ERRORS IT WILL BE
0606  7510            SPA                     /MINUS IF ERROR
0607  4777'           JMS     RERROR          /GOTO ERROR ROUTINE REC#, 06
0610  6211            CDF     10              /CHANGE DATA FIELDS TO STORE CHAR,
0611  3445            DCA I   BUFPO           /STORE IT,
0612  6201            CDF     00              /CHANGE TO CURRENT DATA FIELD
0613  2045            ISZ     BUFPO
0614  4776'           JMS     REND            /SEE IF WE HAVE RECIEVED "EOT"
0615  5223            JMP     RSRV0A          /RETURN HERE IF NOT - NORMAL EXIT
0616  1021            TAD     HXMIT           /RETURN HERE ON "EOT" CLEAR XMITT HOLD SWITCH (SOFT)
0617  0375            AND     (4000           /BUT DON'T CLEAR ANY OPRATOR SWITCH
0620  3021            DCA     HXMIT
0621  1053            TAD     XB0             /RESTORE BUFFER POINTER FOR RETURNING DATA
0622  3045            DCA     BUFPO
0623  2006  RSRV0A,   ISZ     INTNO
0624  5601            JMP I   RSRV0           /EXIT
                      /*
                      /*ROUTINE TO SERVICE LINE 1'S RECIEVER
                      /*
0625  0001  RNUB1,    1                       /RECIEVER NUMBER
0626  0000  RSRV1,    0                       /ENTRY
0627  6032            IOT KCC                 /KCC INSTRUCTION FORMED BY OVERLAY AREA
0630  6034            IOT KRS                 /KRB INSTRUCTION FORMED BY OVERLAY AREA
0631  3070            DCA     RCHAR           /STORE CHAR (TEMP)
```



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0632  1070            TAD     RCHAR           /LOOK AT CHAR FOR ERRORS IT WILL BE
0633  7510            SPA                     /MINUS IF ERROR
0634  4777'           JMS     RERROR          /GOTO ERROR ROUTINE REC#, 06
0635  6211            CDF     10              /CHANGE DATA FIELDS TO STORE CHAR
0636  3446            DCA I   BUFPO+1         /STORE IT,
0637  6201            CDF     00              /CHANGE TO CURRENT DATA FIELD
0640  2046            ISZ     BUFPO+1
0641  4776'           JMS     REND            /SEE IF WE HAVE RECIEVED "EOT"
0642  5250            JMP     RSRV1A          /RETURN HERE IF NOT - NORMAL EXIT
0643  1022            TAD     HXMIT+1         /RETURN HERE ON "EOT" CLEAR XMITT HOLD SWITCH (SOFT)
0644  0375            AND     (4000           /BUT DON'T CLEAR ANY OPERATOR SWITCH
0645  3022            DCA     HXMIT+1
0646  1054            TAD     XB0+1           /RESTORE BUFFER POINTER FOR RETURNING DATA
0647  3046            DCA     BUFPO+1
0650  2006  RSRV1A,   ISZ     INTNO
0651  5626            JMP I   RSRV1           /EXIT
                      /*
                      /*ROUTINE TO SERVICE LINE 2'S RECIEVER
                      /*
0652  0002  RNUB2,    2                       /RECIEVER NUMBER
0653  0000  RSRV2,    0                       /ENTRY
0654  6002            IOTKCC                  /KCC INSTRUCTION FORMED BY OVER LAY AREA
0655  6004            IOTKRS                  /KRB INSTRUCTION FORMED BY OVERLAY AREA
0656  3070            DCA     RCHAR           /STORE CHAR (TEMP)
0657  1070            TAD     RCHAR           /LOOK AT CHAR FOR ERRORS IT WILL BE
0660  7510            SPA                     /MINUS IF ERROR
0661  4777'           JMS     RERROR          /GOTO ERROR ROUTINE REC#, 06
0662  6211            CDF     10              /CHANGE DATA FIELDS TO STORE CHAR,
0663  3447            DCA I   BUFPO+2         /STORE IT,
0664  6201            CDF     00              /CHANGE TO CURRENT DATA FIELD
0665  2047            ISZ     BUFPO+2
0666  4776'           JMS     REND            /SEE IF WE HAVE RECIEVED "EOT"
0667  5275            JMP     RSRV2A          /RETURN HERE IF NOT - NORMAL EXIT
0670  1023            TAD     HXMIT+2         /RETURN HERE ON "EOT" CLEAR XMITT HOLD SWITCH (SOFT)
0671  0375            AND     (4000           /BUT DON'T CLEAR ANY OPERATOR SWITCH
0672  3023            DCA     HXMIT+2
0673  1055            TAD     XB0+2           /RESTORE BUFFER POINTER FOR RETURNING DATES
0674  3047            DCA     BUFPO+2
0675  2006  RSRV2A,   ISZ     INTNO
0676  5653            JMP I   RSRV2           /EXIT
                      /*
                      /*ROUTINE TO SERVICE LINE 3'S RECIEVER
                      /*
0677  0003  RNUB3,    3                       /RECIEVER NUMBER
0700  0000  RSRV3,    0                       /ENTRY
0701  6002            IOTKCC                  /KCC INSTRUCTION FORMED BY OVERLAY AREA
0702  6004            IOTKRS                  /KRB INSTRUCTION FORMED BY OVERLAY AREA
0703  3070            DCA     RCHAR           /STORE CHAR (TEMP)
0704  1070            TAD     RCHAR           /LOOK AT CHAR FOR ERRORS IT WILL BE
0705  7510            SPA                     /MINUS IF ERROR
0706  4777'           JMS     RERROR          /GOTO ERROR ROUTINE REC#, 06
0707  6211            CDF     10              /CHANGE DATA FIELDS TO STORE CHAR,
0710  3450            DCA I   BUFPO+3         /STORE IT,
0711  6201            CDF     00              /CHANGE TO CURRENT DATA FIELD
0712  2050            ISZ     BUFPO+3
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0713  4776'          JMS     REND            /SEE IF WE HAVE RECIEVED "EOT"
0714  5322          JMP     RSRV3A          /RETURN HERE IF NOT - NORMAL EXIT
0715  1024          TAD     HXMIT+3         /RETURN HERE ON "EOT" CLEAR XMITT HOLD SWITCH (SOFT)
0716  0375          AND     (4000           /BUT DON'T CLEAR ANY OPERATOR SWITCH
0717  3024          DCA     HXMIT+3
0720  1056          TAD     XB0+3           /RESTORE BUFFER POINTER FOR RETURNING DATA
0721  3050          DCA     BUFP0+3
0722  2006  RSRV3A, ISZ     INTNO
0723  5700          JMP I   RSRV3           /EXIT
                    /
                    /ROUTINE TO SERVICE LINE 4'S RECIEVER
                    /
0724  0004  RNUB4,  4                       /RECIEVER NUMBER
0725  0000  RSRV4,  0                       /ENTRY
0726  6002          IOTKCC                  /KCC INSTRUCTION FORMED BY VERLAY AREA
0727  6004          IOTKRS                  /KRB INSTRUCTION FORMED BY OVERLAY AREA
0730  3070          DCA     RCHAR           /STORE CHAR (TEMP)
0731  1070          TAD     RCHAR           /LOOK AT CHAR FOR ERRORS IT WILL BE
0732  7510          SPA                     /MINUS IF ERROR
0733  4777'         JMS     RERROR          /GOTO ERROR ROUTINE REC#, +6
0734  6211          CDF     10              /CHANGE DATA FIELDS TO STORE CHAR,
0735  3451          DCA I   BUFP0+4         /STORE IT,
0736  6201          CDF     00              /CHANGE TO CURRENT DATA FIELD
0737  2051          ISZ     BUFP0+4
0740  4776'         JMS     REND            /SEE IF WE HAVE RECIEVED "EOT"
0741  5347          JMP     RSRV4A          /RETURN HERE IF NOT - NORMAL EXIT
0742  1023          TAD     HXMIT+4         /RETURN HERE ON "EOT" CLEAR XMITT HOLD SWITCH (SOFT)
0743  0375          AND     (4000           /BUT DON'T CLEAR ANY OPERATOR SWITCH
0744  3025          DCA     HXMIT+4
0745  1057          TAD     XB0+4           /RESTORE BUFFER POINTER FOR RETURNING DATA
0746  3051          DCA     BUFP0+4
0747  2006  RSRV4A, ISZ     INTNO
0750  5725          JMP I   RSRV4           /EXIT
0775  4000
0776  1044
0777  1025
      1000  PAGE
                    /
                    /ROUTINE TO SERVICE LINE 5'S RECIEVER
                    /
1000  0005  RNUB5,  5                       /RECIEVER NUMBER
1001  0000  RSRV5,  0                       /ENTRY
1002  6002          IOTKCC                  /KCC INSTRUCTION FORMED BY OVERLAY AREA
1003  6004          IOTKRS                  /KRB INSTRUCTION FORMED BY OVERLAY AREA
1004  3070          DCA     RCHAR           /STORE CHAR (TEMP)
1005  1070          TAD     RCHAR           /LOOK AT CHAR FOR ERRORS IT WILL BE
1006  7510          SPA                     /MINUS IF ERROR
1007  4225          JMS     RERROR          /GOTO ERROR ROUTINE REC#, +6
1010  6211          CDF     10              /CHANGE DATA FIELDS TO STORE CHAR,
1011  3452          DCA I   BUFP0+5         /STORE IT,
1012  6201          CDF     00              /CHANGE TO CURRENT DATA FIELD
1013  2052          ISZ     BUFP0+5
1014  4244          JMS     REND            /SEE IF WE HAVE RECIEVED "EOT"
1015  5223          JMP     RSRV5A          /RETURN HERE IF NOT - NORMAL EXIT
1016  1026          TAD     HXMIT+5         /RETURN HERE ON "EOT" CLEAR XMITT HOLD SWITCH (SOFT)
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1017  0377          AND     (4000           /BUT DON'T CLEAR ANY OPERATOR SWITCH
1020  3026          DCA     HXMIT+5
1021  1060          TAD     XB0+5           /RETSTORE BUFFER POINTER FOR RETUNING DATA
1022  3052          DCA     BUFP0+5
1023  2006  RSRV5A, ISZ     INTNO
1024  5601          JMP I   RSRV5           /EXIT


                    /
                    /ROUTINE TO STORE AWAY ERRORS
                    /


1025  0000  RERROR, 0
1026  7200          CLA
1027  1225          TAD     RERROR          /PICK UP ADDRESS OF CALLER
1030  1376          TAD     (-10            /FORM ADDR, THAT CONTAINS RECEIVER #
1031  3244          DCA     REND            /STORE ADDRESS OF REC, #
1032  1070          TAD     RCHAR           /GET CHARACTERS
1033  0375          AND     (7400
1034  1644          TAD I   REND            /STRIP FOR ERROR BITS (0-4)
1035  3417          DCA I   AUTO17          /GET RECEIVER NUMBER
1036  2067          ISZ     RERRS           /STORE REC # AND ERROR
1037  1017          TAD     AUTO17          /SEE IF ERROR BUFFER EXCEEDED,
1040  1374          TAD     (-ERPOE
1041  7650          SNA CLA
1042  5773'         JMP     CSER            /IF IT IS THEN STOP EVERYTHING TO REPORT ALL ERRORS
1043  5625          JMP I   RERROR          /EXIT - NORMAL


                    /
                    /THIS ROUTINE CHECKS FOR CODE "EOT" (14)
                    /FOR ALL RECEIVERS IF CHARACTER IS EOT THAN MORE
                    /WORK MUST BE DONE BY RECEIVER SERVICE ROUTINE
                    /


1044  0000  REND,   0
1045  1372          TAD     (-14            /GET CODE OF EOT
1046  1070          TAD     RCHAR           /GET CHARACTER
1047  7640          SZA CLA
1050  5644          JMP I   REND            /IF UNEQUAL - NORMAL EXIT TO RECEIVER ROUTINE
1051  2244          ISZ     REND            /EQUAL - MODIFY RETURN - OR REENTRY POINT
1052  5644          JMP I   REND            /TO RECEIVER ROUTINE
                    /*
                    /
                    /BACKGROUND JOB TO SERVICE TRANSMITTERS
                    /
                    /*
1053  0000  GXMIT,  0
1054  7200          CLA
1055  1351  GXMIT1, TAD     WXMITT
1056  1371          TAD     (HXMIT          /IS XMITER BEING HELD?
1057  3027          DCA     TXMIT
1060  1427          TAD I   TXMIT
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1061  7640          SZA CLA                 /ANY SOFTWARE HOLD ON THIS XMITER?
1062  5321          JMP     NXMIT
1063  1351          TAD     WXMITT
1064  1370          TAD     (DXMIT          /GET IOT INSTRUCTION POINTER
1065  3027          DCA     TXMIT
1066  1367          TAD     (6006           /FORM IOT INSTRUCTION "TLS"
1067  1427          TAD I   TXMIT           /SERVICE CODE
1070  3300          DCA     GXMIT2
1071  1351          TAD     WXMITT          /GET OFFSET AGAIN
1072  1366          TAD     (BUFPO          /GET BUFFER POINTER
1073  3030          DCA     TXMIT1
1074  1430          TAD I   TXMIT1
1075  3027          DCA     TXMIT           /WE NEED TO GET A CHARACTER
1076  6211          CDF     10
1077  1427          TAD I   TXMIT
1100  0000  GXMIT2, 0                       /"TLS" INSTRUCTION 6XX6
1101  6001          ION
1102  5302          JMP     .               /WAIT HERE FOR INTERPUPT
1103  6244  GXRET,  RMF                     /RESTORE MEMORY FIELD
1104  1427          TAD I   TXMIT           /IS CHARACTER SOFT "EOT"?
1105  6201          CDF     0
1106  1372          TAD     (-14            /CODE "EOT"
1107  7650          SNA CLA
1110  5331          JMP     GXMIT4
1111  1027          TAD     TXMIT           /GET CURRENT ADDR
1112  7001          IAC                     /UPDATE BUFFER POINTER
1113  3430          DCA I   TXMIT1          /STORE IT
1114  1300  GXRET1, TAD     GXMIT2          /FORM CLEAR FLAG
1115  0365          AND     (6772           /INSTRUCTION
1116  3317          DCA     GXMITI
1117  0000  GXMITI, 0                       /CLEAR FLAG INSTRUCTION 6XX2
1120  6001          ION                     /TURN BACK ON INTRS,
1121  1351  NXMIT,  TAD     WXMITT          /INCREMENT XMITER POINTER
1122  7001          IAC
1123  3351          DCA     WXMITT
1124  1351          TAD     WXMITT
1125  1364          TAD     (-7             /HAVE SE SERVICED ALL XMITTERS?
1126  7650          SNA CLA
1127  3351          DCA     WXMITT
1130  5653          JMP I   GXMIT          /YES-EXIT
1131  1351  GXMIT4, TAD     WXMITT          /WE'VE SENT BUFFER BACK NOW ALLS WE GOT
1132  1371          TAD     (HXMIT          /TO DO IS SET SOFT FLAG TO INDICATE WE DON'T
1133  3027          DCA     TXMIT           /SERVICE THIS XMITTER AGAIN!
1134  1427          TAD I   TXMIT
1135  0377          AND     (4000           /IF BEING HELD, KEEP HOLDER
1136  7001          IAC
1137  3427          DCA I   TXMIT
1140  1351          TAD     WXMITT          /NOW, RESTORE BEGINING POINTER
1141  1363          TAD     (XB0            /FOR THIS XMITER SO WE CAN
1142  3027          DCA     TXMIT           /STORE INCOMING DATA AGAIN
1143  1366          TAD     (BUFPO
1144  1351          TAD     WXMITT
1145  3030          DCA     TXMIT1
1146  1427          TAD I   TXMIT
1147  3430          DCA I   TXMIT1
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1150  5314          JMP     GXRET1          /GO BACK FOR MORE XMITTERS
1151  0000  WXMITT, 0

1163  0053
1164  7771
1165  6772
1166  0045
1167  6006
1170  0031
1171  0021
1172  7764
1173  0514
1174  3600
1175  7400
1176  7770
1177  4000
      1200    PAGE

                      /
                      /INTERRUPT SERVICE ROUTINE FOR KEYBOARD-TAKE
                      /NO IMMEDIATE ACTION - ONLY STORE CHARACTER UNLESS
                      /IT WAS A ^C
                      /

1200  6036  KEYSRV, KRS                     /KEYBOARD SERVICE ROUTINE
1201  0377          AND     (177
1202  3005          DCA     CHAR            /GET CHARACTER AND STOR
1203  1376          TAD     (-3             /CODE FOR ^C
1204  1005          TAD     CHAR            /GET CHARACTER
1205  7650          SNA CLA                 /SKP IF NOT ^C
1206  5775'         JMP     ST0             /IT WAS - RESTART
1207  2006          ISZ     INTNO
1210  5146          JMP     SRV6            /NOW EXIT- KSERV WILL HANDLE CHARACTER

                      /
                      /THIS ROUTINE PICKS UP CHARACTER TYPED (EXCEPT FOR OCTAL
                      /NUMBER WHEN IT IS EXPECTED) AND DESIFIERS WHAT IS MENT
                      /BY CHAR, THIS ROUTINE IS IN BACKGROUND MODE
                      /

1211  0000  KSERV,  0                       /ENTERY POINT
1212  1005          TAD     CHAR            /GET CHARACTER TYPED
1213  7450          SNA                     /IF NONE TYPED THEN EXIT!
1214  5611          JMP I   KSERV           /NONE TYPED IF CHAR=0
1215  1374          TAD     (-2             /WAS IT A ^B??
1216  7650          SNA     CLA
1217  5773'         JMP     BOOTVT+1        /YES - GO TO BOOT ROUTINE
1220  7040          CMA
1221  1005          TAD     CHAR
1222  7650          SNA     CLA
1223  5772'         JMP     200
1224  1005          TAD     CHAR            /NO-CONTINUE DESSIFR
1225  1371          TAD     (-10            /WAS IT A ^H?
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1226  7650          SNA CLA
1227  5261          JMP     HOLDLN          /YES GOTO HOLD ROUTINE
1230  1005          TAD     CHAR            /NO=CONTINUE
1231  1370          TAD     (-22            /WAS IT A ^R?
1232  7650          SNA CLA
1233  5276          JMP     RELEAS          /YES GOTO RELEASE ROUTINE
1234  1005          TAD     CHAR            /NO=CONTINUE
1235  1367          TAD     (-23            /WAS  IT A ^S
1236  7650          SNA CLA
1237  5306          JMP     CONS            /YES=GO TO SEND ROUTINE
1240  1005          TAD     CHAR            /NO=CONTINUE
1241  1366          TAD     (-20            /WAS IT A ^P?
1242  7650          SNA CLA
1243  5765'         JMP     CONP            /YES GO TO PRINT ROUTINE
1244  1005          TAD     CHAR            /NO=CONTINUE
1245  4764'         JMS     TPP1            /ECHO CHARACTER
1246  7200          CLA
1247  1336          TAD     SNDNG           /ARE WE IN SEND MODE??
1250  7640          SZA CLA
1251  5763'         JMP     SENDLN          /YES=GO TO SEND ROUTINE
1252  1005          TAD     CHAR
1253  1362          TAD     (-115           /MODIFY COMMAND?
1254  7650          SNA CLA
1255  5761'         JMP     MODER           /YES, GO TO MODIFY ROUTINE
1256  4403          TYPE                    /NO!! ILLEGAL INPUT
1257  2527          MQM                     /TYPE A QUESTION MARK AND
1260  5760'         JMP     MONITR          /RETURN TO MONITOR

                    /
                    /THIS ROUTINE SETS THE HOLD SWITCH OF A LINE IF
                    /"^H" IS TYPED
                    /

1261  4403    HOLDLN, TYPE                    /TYPE   "^H"
1262  2521          MCH
1263  4464          INOCT                   /GET LINE NUMBER OF LINE TO BE HELD
1264  7200          CLA
1265  1071          TAD     IN%MP1          /GET NUMBER
1266  0357          AND     (7              /STRIP NUMBER
1267  1356          TAD     (HXMIT          /GET ADDR OF HOLD FLAGS
1270  3020          DCA     WXMIT           /ADD IT TO LINE NUMBER FOR AN OFFSET
1271  1420          TAD I   WXMIT           /GET PRESENT FLAG
1272  0355          AND     (377            /IF LINE WAS HELD DON'T DESTROY FLAG
1273  1354          TAD     (4000           /BUT SET THIS FLAG
1274  3420          DCA I   WXMIT           /STORE FLAG
1275  5760'         JMP     MONITR          /RETURN TO MONITOR


                    /THIS ROUTINE RELEASES A LINE FROM BEING HELD IF THE
                    /LINE WAS BEING HELD
                    /

1276  4403    RELEAS, TYPE                    /TYPE   "^R"
1277  2523          MCR
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1300  4464          INOCT                   /GET LINE NUMBER
1301  1071          TAD     IN%MP1          /LINE NUMBER
1302  1356          TAD     (HXMIT          /GET ADDR OF HOLD XMITTER FLAGS
1303  3020          DCA     WXMIT           /ADD LINE NUMBER AS OFFSET TO GET TRUE FLAG


1304  3420          DCA I   WXMIT           /CLEAR HOLD SWITCH OF XMITTER
1305  5760'         JMP     MONITR          /RETURN TO MONITOR


                    /
                    /THIS ROUTINE SETS UP SEND ROUTINE
                    /BY SETTING SEND FLAG AND GETTING LINE NUMBER
                    /

1306  4403    CONS,   TYPE                    /TYPE   "^S"
1307  2525          MCONS
1310  4464          INOCT                   /GET LINE NUMBER
1311  1071          TAD     IN%MP1          /LINE NUMBER
1312  0357          AND     (7              /STRIP FOR INSURANCE
1313  3337          DCA     CONSL           /STORE LINE NUMBER FOR USE IN NEXT
1314  1337          TAD     CONSL           /RETRIEVE NUMBER

1315  1353          TAD     (XB0-1          /NOW RESET BUFFER POINTER FOR THIS
1316  3010          DCA     AUTO10          /LINE TO BEGINING OF BUFFER
1317  1337          TAD     CONSL           /IF HOLD SWITCH IS SET ON THIS LINE
1320  1352          TAD     (BUFFO-1        /THEN DATA TYPED WILL BE BUFFERED
1321  3011          DCA     AUTO11
1322  1410          TAD I   AUTO10
1323  3411          DCA I   AUTO11
1324  1337          TAD     CONSL           /NOW WE MUST SET A TEMPORY HOLD SWITCH
1325  1351          TAD     (HXMIT-1        /ON THIS LINE SO THAT WE DON'T XMIT
1326  3020          DCA     WXMIT           /TO LINE IN REGULAR XMIT ROUTINE
1327  1420          TAD I   WXMIT           /GET CURRENT FLAG
1330  0354          AND     (4000           /IF OPERATOR HAS A SWITCH SET KEEP IT
1331  7001          IAC                     /SET OUR OWN SWITCH
1332  3420          DCA I   WXMIT
1333  7001          IAC                     /NOW SET ANOTHER FLAG TO INDICATE
1334  3336          DCA     SNDNG           /WE'RE SENDING TO A XMITTER
1335  5760'         JMP     MONITR          /RETURN TO MONITOR

1336  0000    SNDNG,  0                       /FLAG TO INDICATE WE'RE XMITTING TO A XMITTER
1337  0000    CONSL,  0                       /NUMBER OF XMITTER WE'RE SENDING TO
1351  0020
1352  0044
1353  0052
1354  4000
1355  0377
1356  0021
1357  0007
1360  0477
1361  1552
1362  7663
1363  1400
1364  2273
```

```
1365  1511
1366  7760
1367  7755
1370  7756
1371  7770
1372  0200
1373  1641
1374  7776
1375  0252
1376  7775
1377  0177
      1400    PAGE

                        /
                        /THIS ROUTINE DOES THE ACTUAL SENDING OF DATA FROM
                        /THE TTY TO THE XMITTER WILL NOT BE ENTERED UNTIL
                        /"^S" IS TYPED FOLLOWED BY DATA
                        / NOTE!! IF SWITCH REGISTER BIT 0 IS NOT SET = TO 1
                        /       THEN A RECIEVER ERROR WILL BE INDICATED
                        /       ON THE TUBE CORRESPONDING TO THE LINE YOU'RE
                        /       SENDING TO.
                        /

1400  7200    SENDLN, CLA
1401  1777'           TAD     CONSL           /GET LINE NUMBER
1402  1376            TAD     (HXMIT          /GET ADDR OF HOLD FLAGS
1403  3020            DCA     WXMIT
1404  1420            TAD I   WXMIT           /IS LINE BEING HELD BY OPERATOR??
1405  7710            SPA CLA
1406  5256            JMP     SENDBF          /IF YES THEN GO BUFFER CHARACTER
1407  1005            TAD     CHAR
1410  1375            TAD     (-33
1411  7650            SNA CLA
1412  5241            JMP     SEX

1413  1005            TAD     CHAR            /IF NOT THEN SEND IT
1414  1374            TAD     (-175           /IS CHARACTER AN ALTMODE INDICATING
1415  7650            SNA CLA                 /THAT OPERATOR IS THROUGH SENDING TO LINE
1416  5241            JMP     SEX             /IF SO THEN EXIT
1417  1777'           TAD     CONSL           /GET LINE NUMBER TO BE ADDED TO
1420  1373            TAD     (DXMIT          /ADDR OF DEVICE CODES TO GET
1421  3020            DCA     WXMIT           /DEV COD OF XMITER TO BE SNET TO
1422  1372            TAD     (6006           /GET TLS CODE
1423  1420            TAD I   WXMIT           /ADD DEVICE CODE
1424  3771'           DCA     GXMIT2          /STORE INSTRUCTION TO BE USED LATTER
1425  1370            TAD     (DUMB           /WE NOW WILL TRANSFERR PROGRAM CONTROL
1426  3027            DCA     TXMIT           /TO REGULAR XMITT ROUTINE FOR SENDING
1427  1367            TAD     (DUMB2
1430  3030            DCA     TXMIT1
1431  1366            TAD     (6
1432  3020            DCA     WXMIT
1433  1005            TAD     CHAR            /CHAR, TO XMITTER
1434  3000            DCA     0
1435  3005            DCA     CHAR
```



```
1436  1000            TAD     0
1437  6001            ION
1440  3771'           JMP     GXMIT2

1441  3765'   SEX,    DCA     SNONG           /OPERATER DONE SENDING CLEAR FLAG
1442  3005            DCA     CHAR
1443  1777'           TAD     CONSL           /RESET POINTERS TO BEGINING OF BUFFER
1444  1364            TAD     (BUFPO
1445  3020            DCA     WXMIT
1446  1777'           TAD     CONSL
1447  1363            TAD     (X80
1450  3071            DCA     INTMP1
1451  1471            TAD I   INTMP1
1452  3420            DCA I   WXMIT
1453  5762'           JMP     MONITR          /RETURN TO MONITER

1454  0000    DUMB,   0
1455  0000    DUMB2,  0

1456  1005    SENDBF, TAD     CHAR            /DID HE TYPE "ALTMODE"?
1457  1374            TAD     (-175
1460  7640            SZA CLA                 /IF HE DID THEN HE WANTS TO GET
1461  5265            JMP     SENDB1          /OUT OF THIS ROUTINE
1462  3765'           DCA     SNONG           /CLEAR SENDING FLAG-WE'RE THOUGH
1463  1361            TAD     (14             /REPLACE ALT WITH "EOT"
1464  3005            DCA     CHAR
1465  1005    SENDB1, TAD     CHAR
1466  1375            TAD     (-33
1467  7650            SNA CLA
1470  5262            JMP     .-6
1471  1777'           TAD     CONSL           /LINE NUMBER TO BE ADDED TO
1472  1364            TAD     (BUFPO          /ADDR OF BUFFER
1473  3020            DCA     WXMIT           /TO GET REAL BUFFER ADDR,
1474  1420            TAD I   WXMIT
1475  3027            DCA     TXMIT           /ADDR TO STORE THIS DATA
1476  6211            CDF     10              /CHANGE DATA FIELDS TO PUT DATA IN
1477  1005            TAD     CHAR            /NEXT 4K
1500  3427            DCA I   TXMIT
1501  6201            CDF     00              /RESTORE DATA   FIELD
1502  1420            TAD I   WXMIT           /GET ADDR WE USED
1503  7001            IAC
1504  3420            DCA I   WXMIT           /INCREMENT IT FOR NEXT TIME
1505  1765'           TAD     SNONG           /WE DONE SENDING?
1506  7650            SNA CLA
1507  5241            JMP     SEX             /IF YES THEN GO TO MONITOR
1510  5760'           JMP     MONITR+3        /IF NOT GO AHEAD OF MONITOR


                        /
                        /THIS ROUTINE PRINTS THE CONTENTS OF A LINES BUFFER
                        /

1511  4403    CONP,   TYPE                    /TYPE "P"
```

```
1512  2531            *CONP
1513  4464            INOCT                   /GET THE LINE NUMBER
1514  4466            CRLF
1515  6001            ION
1516  7240            CLA CMA
1517  1071            TAD     INTMP1
1520  1363            TAD     (XB0            /GET ADDR OF START OF BUFFER
1521  3010            DCA     AUTO10
1522  7040            CMA
1523  1410            TAD I   AUTO10
1524  3010            DCA     AUTO10
1525  6211    CONP1,  CDF     10              /CHANGE DATA FIELDS TO GET DATA
1526  1410            TAD I   AUTO10
1527  3011            DCA     AUTO11
1530  1011            TAD     AUTO11          /GET CHAR, AND PRINT IT
1531  1357            TAD     (-377           /BUT IF START CODE REPLACE IT
1532  7650            SNA CLA                 /WITH "*"
1533  4346            JMS     CONP2           /REPLACER ROUTINE
1534  6201            CDF     00
1535  1011            TAD     AUTO11          /GET CHAR AGAIN
1536  4756'           JMS     TPP1
1537  6001            ION
1540  1011            TAD     AUTO11          /WAS CHAR, A "EOT"?
1541  1355            TAD     (-14
1542  7640            SZA CLA
1543  5325            JMP     CONP1
1544  6201            CDF     00
1545  5762'           JMP     MONITR

1546  0000    CONP2,  0                       /ENTERY POINT
1547  1354            TAD     (336            /ASCII FOR "*"
1550  3011            DCA     AUTO11          /REPLACE #377
1551  5746            JMP I   CONP2           /RETURN


                      /
                      /THIS ROUTINE IS A COMPLIMENT TO "MOD" TO CALL
                      /MOD AND TO RETURN TO MONITER AFTER
                      /

1552  4404    MODER,  MODIFY                  /BREAKPOINT CALL TO MODIFY ROUTINE
1553  5762'           JMP     MONITR          /RETURN TO MONITER









1554  0336
1555  7764
1556  2273
1557  7401
1560  0502
```



```
1561  0014
1562  0477
1563  0053
1564  0045
1565  1336
1566  0006
1567  1455
1570  1454
1571  1100
1572  6006
1573  0031
1574  7603
1575  7745
1576  0021
1577  1337
        1600    PAGE
                      /
                      /*ERROR CHECKER AND
                      /*ERROR PRINTOUT ROUTINES
                      /*ENTERED FROM MONITER TO SEE
                      /*PRINT OUT ERRORS (INTERRUPTS
                      /*ON) IF ENTERED FROM "CSER"
                      /*THEN INTERRUPTS WILL BE OFF,
                      /
1600  0000    CERROR, 0
1601  7200            CLA
1602  1067            TAD     RERRS           /ANY ERRORS PENDING?
1603  7450            SNA
1604  5600            JMP I   CERROR          /IF NOT EXIT,
1605  1377            TAD     (-1             /DECREMENT ERROR COUNT,
1606  3067            DCA     RERRS
1607  1416            TAD I   AUTO16          /GET ERROR
1610  3237            DCA     ROR1            /STORE
1611  4466            CRLF
                                              /GET FIRST MESSAGE "LINE  ERROR"
1612  4403            TYPE                    /PRINT
1613  2425            EM1
1614  4466            CRLF
1615  7200            CLA
1616  1237            TAD     ROR1            /GET LINE NO
1617  0376            AND     (7
1620  4775'           JMS     OCTOUT
1621  1237            TAD     ROR1            /GET THE ERROR
1622  0374            AND     (7400           /
1623  4775'           JMS     OCTOUT          /PRINT IT OUT
1624  4466            CRLF                    /PRINT CARRIAGE RETURN-LINE FEED,
```

```
1625  1067            TAD     RERRS           /TAKEN CARE OF ALL ERRORS
1626  7440            SZA
1627  5201            JMP     CERROR+1        /NO-DO NEXT ONE
1630  6002            IOF                     /TURN INTERRUPTS OFF SO THAT WHEN
1631  1373            TAD     (ERPO-1         /WE RESTORE POINTER WE AREN'T INTR,
1632  3017            DCA     AUTO17          /DURING PROCESSES
1633  1373            TAD     (ERPO-1         /RESTORE BACKGROUND ERROR POINTER
1634  3016            DCA     AUTO16
1635  6001            ION
1636  5600            JMP I   CERROR
1637  0000    ROR1,   0
                      /*
                      /*ROUTINE TO BOOT PROGRAMS FROM VT20 HOST
                      /*TO VT20-ENTER WITH JSR INSTR WITH
                      /*DEVICE CODE OF LINE TO BE XMITED ON IN LOC "DOXMIT"
                      /*
1640  0000    BOOTVT, 0
1641  4466            CRLF
1642  4403            TYPE                    /ASK FOR DEVICE CODE OF (JMS I)
1643  2400            MDEV                    /PAPER TAPE READER
1644  4464            INOCT                   /(JMS I)TO INPUT OCTAL ROUTINE
1645  1071            TAD     INTMP1          /GET NUMBER
1646  7100            CLL
1647  7006            RTL
1650  7004            RAL
1651  3342            DCA     BOTCDI          /STORE DEVICE CODE
1652  4403            TYPE
1653  2413            MDEV2
1654  4464            INOCT
1655  7300            CLA CLL
1656  1071            TAD     INTMP1
1657  7006            RTL
1660  7004            RAL
1661  3071            DCA     INTMP1
1662  1372            TAD     (6001           /MAKE KSF
1663  1342            TAD     BOTCDI          /INSTRUCTION FOR SKIP FLAG
1664  3320            DCA     BKSF
1665  1371            TAD     (6006           /MAKE KRB INSTRUCTION
1666  1342            TAD     BOTCDI          /FOR READ DATA
1667  3324            DCA     BKRB
1670  1372            TAD     (6001           /MAKE KSF INSTRUCTIONS
1671  1071            TAD     INTMP1          /FOR XMITTING SKIP FLAG
1672  3326            DCA     BTSF
1673  1371            TAD     (6006           /MAKE KRB INSTRUCTION
1674  1071            TAD     INTMP1          /FOR XMITTING DATA
1675  3325            DCA     BTLS
1676  1324            TAD     BKRB
1677  0370            AND     (7776
1700  3311            DCA     INTBOT
1701  1326            TAD     BTSF
1702  7001            IAC
1703  3330            DCA     BTCF
1704  1320            TAD     BKSF
1705  3312            DCA     INIT1
1706  1324            TAD     BKRB
```



```
1707  3316            DCA     INIT2
1710  6002            IOF                     /TURN INTERRUPTS OFF
1711  0000    INTBOT, 0                       /KCC INSTRUCTION TO BE FORMED BY PREVIOUS CODE
1712  0000    INIT1,  0
1713  4333            JMS     CHECK           /TTY REQUEST PENDING?
1714  7410            SKP
1715  5312            JMP     INIT1           /RECHECK READER FOR DONE
1716  0000    INIT2,  0                       /READ FIRST DATA
1717  7300            CLA CLL                 /AND THROW IT AWAY
1720  0000    BKSF,   0                       /KSF INSTRUCTION TO BE FORMED BY PREVIOUS CODE
1721  4333            JMS     CHECK
1722  7410            SKP
1723  5320            JMP     BKSF

1724  0000    BKRB,   0                       /KRB INSTRUCTION TO BE FORMED BY PREVIOUS CODE
1725  0000    BTLS,   0
1726  0000    BTSF,   0                       /TSF INSTRUCTION FORMED BY PREVIOUS CODE
1727  5326            JMP     .-1
1730  0000    BTCF,   0
1731  7200            CLA
1732  5320            JMP     BKSF

1733  0000    CHECK,  0
1734  2333            ISZ     CHECK           /FIX RETURN ADDR,
1735  6031            KSF                     /DID KEYBOARD HAVE REQUEST UP?
1736  5733            JMP I   CHECK           /NO-RETURN
1737  6032            KCC                     /YES-CLEAR FLAG
1740  6007            6007                    /MAKE SURE ALL FLAGS ARE CLEAR!
1741  5767'           JMP     MONITR          /AND RETURN TO MONITER
1742  0040    BOTCDI, 40
1767  0477
1770  7776
1771  6006
1772  6001
1773  3777
1774  7400
1775  2070
1776  0007
1777  7777
      2000    PAGE

                      /
                      /INPUT OCTAL ROUTINE
                      /

2000  0000    INOCTS, 0
2001  6032            KCC
2002  7000            NOP
2003  7200            CLA                     /SAVE PERSENT INTR POINTER
2004  1061            TAD     KBPO
2005  3266            DCA     INTMP
2006  1377            TAD     (OCTR1
2007  3061            DCA     KBPO
2010  3071            DCA     INTMP1
2011  3265            DCA     OCTF
```

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2012  6001    OCTRI,  ION

2013  1265            TAD     OCTF
2014  7650            SNA CLA                 /FLAG = -1 IF DONE
2015  5212            JMP     .-3             /IF NOT DONE STAY IN THIS LOOP
2016  1266    OCTRO,  TAD     INTMP           /RESTORE ORIGINAL INTR POINTER
2017  3061            DCA     KBPO
2020  6001            ION
2021  5600            JMP I   INOCTS          /EXIT THIS ROUTINE

2022  6036    OCTR1,  KRB                     /READ THE TTY INPUT
2023  3267            DCA     INTMP2          /STORE CHARACTER
2024  1776'           TAD     IOFFLG
2025  7650            SNA CLA
2026  6001            ION
2027  1267            TAD     INTMP2          /DID OPERATOR HIT A CARRAGE RETURRN
2030  0375            AND     (177            /STRIP PARRITY
2031  1374            TAD     (-15            /CODE FOR CR
2032  7640            SZA CLA
2033  5242            JMP     OCTR2           /IF NOT CR THEN CONTINUE
2034  4466            CRLF
2035  7100            CLL
2036  6002    OCTRF,  IOF
2037  7040            CMA                     /AC TO = -1
2040  3265            DCA     OCTF            /SET FLAG, WE'RE DONE
2041  5212            JMP     OCTRI           /EXIT

2042  1267    OCTR2,  TAD     INTMP2
2043  0375            AND     (177
2044  1373            TAD     (-12
2045  7640            SZA CLA
2046  5251            JMP     OCTR3
2047  7120            STL
2050  5236            JMP     OCTRF

2051  7300    OCTR3,  CLA CLL
2052  1071            TAD     INTMP1          /GET PRESENT NUMBER
2053  7006            RTL
2054  7004            RAL                     /POSITION IT
2055  3071            DCA     INTMP1
2056  1267            TAD     INTMP2          /GET NEW DIGIT
2057  0372            AND     (7              /STRIP IT
2060  1071            TAD     INTMP1          /AND ADD IT
2061  3071            DCA     INTMP1          /TO OLD NUMBER
2062  1267            TAD     INTMP2
2063  4771'           JMS     TPP1
2064  5152            JMP     SRVEX           /NOW EXIT

2065  0000    OCTF,   0                       /FLAGS DONE INPUTING NUMBER
2066  0000    INTMP,  0                       /LOCATION TO STORE INTERRUPT POINTER
2067  0000    INTMP2, 0                       /LOCATION TO STORE DIGIT INPUTED
                /OCTAL TYPOUT ROUTINE-ENTER WITH NUMBER IN AC
2070  0000    OCTOUT, 0
2071  3273            DCA     OCT1            /STORE NUMBER
2072  7410            SKP


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2073  0000    OCT1,   0
2074  1273            TAD     OCT1            /GET LEFT MOST DIGIT
2075  7012            RTR                     /FIX IT FOR PRINTING
2076  7012            RTR
2077  7012            RTR
2100  7012            RTR
2101  7010            RAR
2102  0372            AND     (7              /STRIP IT
2103  1370            TAD     (260
2104  4771'           JMS     TPP1            /PRINT IT
2105  1273            TAD     OCT1            /GET NUMBER AGAIN
2106  7012            RTR                     /FIX IT FOR NEXT DIGIT
2107  7012            RTR
2110  7012            RTR
2111  0372            AND     (7              /STRIP IT
2112  1370            TAD     (260
2113  4771'           JMS     TPP1            /PRINT IT
2114  1273            TAD     OCT1            /GET NUMBER AGAIN
2115  7012            RTR                     /FIX IT FOR PRINTING NEXT DIGIT
2116  7010            RAR
2117  0372            AND     (7              /STRIP IT
2120  1370            TAD     (260
2121  4771'           JMS     TPP1            /PRINT IT
2122  1273            TAD     OCT1            /NOW GET LAST DIGIT
2123  0372            AND     (7              /STRIP
2124  1370            TAD     (260
2125  4771'           JMS     TPP1            /PRINT IT
2126  1367            TAD     (240
2127  4771'           JMS     TPP1
2130  1367            TAD     (240
2131  4771'           JMS     TPP1
2132  5670            JMP I   OCTOUT          /EXIT
2167  0240
2170  0260
2171  2273
2172  0007
2173  7766
2174  7763
2175  0177
2176  2355
2177  2022
      2200      PAGE
                /
                /MESSAGE PRINTING SUBROUTINE--CALL WITH ADDR OF MESSAGE IN AC
                /RETURN WITH THE AC CLEAR
                /IF CALLED WITH THE AC IS CLEAR THE ADDRESS OF THE MESSAGE IS TAKEN FROM THE WORD
                /AT THE ADDRESS+1 OF THE CALL TO THIS SUBROUTINE, AND THE RETURN ADDRESS
                /IS THE ADDRESS+2 OF THE CALLING JMS
  2200  0000  LPRINT, 0000
  2201  7440          SZA                     /IS THE ADDRESS OF THE MESSAGE IN THE AC?
  2202  5205          JMP     .+3             /YES, DONT BOTHER GETTING IT FROM THE WORD FOLLOWING THE JMS
  2203  1600          TAD I   LPRINT          /NO, BOTHER PLEASE
  2204  2200          ISZ     LPRINT          /AND INC THE RETURN ADDRESS
  2205  3306          DCA     TEMP            /STORE THE ADDRESS OF THE MESSAGE
  2206  1706  MES2,   TAD I   TEMP            /GRAB 2 CHARS, PACKED INTO 1 WORD
```

```
2207  7012          RTR
2210  7012          RTR
2211  7012          RTR
2212  4217          JMS     TYPO            /PRINT CHAR IN BITS 0-5
2213  1706          TAD I   TEMP
2214  4217          JMS     TYPO            /PRINT CHAR IN BITS 6-11
2215  2306          ISZ     TEMP            /NEXT WORD PLEASE
2216  5206          JMP     MES2
2217  0000  TYPO,    0000
2220  0377          AND     (0077           /CLEAROUT BITS BELONGING TO THE OTHER CHAR,
2221  7450          SNA                     /IS IT A NULL CHARACTER?
2222  5600          JMP I   LPRINT          /YES! RETURN
2223  1376          TAD     (-40            /NO, CONVERT IT TO 8 BIT
2224  7510          SPA
2225  1375          TAD     (100
2226  1374          TAD     (240
2227  4273          JMS     TPP1            /NOW PRINT IT
2230  5617          JMP I   TYPO
                    /ROUTINE TO MODIFY OR EXAMINE LOCATIONS

2231  0000  MOD,     0
2232  4464          INOCT
2233  7430          SZL
2234  5261          JMP     MOD2
2235  1071          TAD     INTMP1          /GET ADDRESS
2236  7450          SNA
2237  5631          JMP I   MOD             /IF ZERO=EXIT
2240  3027          DCA     TXMIT
2241  4466  MOD1,    CRLF
2242  1027          TAD     TXMIT
2243  4773'         JMS     OCTOUT
2244  4403          TYPE                    /TYPE "/"
2245  2514          MSLAS
2246  1427          TAD I   TXMIT           /GET DATA
2247  4773'         JMS     OCTOUT          /TYPE IT
2250  4403          TYPE                    /TYPE "/"
2251  2514          MSLAS
2252  4464          INOCT                   /GET NEW DATA
2253  1071          TAD     INTMP1
2254  7440          SZA                     /IF ZERO=NO CHANGE WANTED
2255  3427          DCA I   TXMIT           /OTHERWISE=STORE NEW DATA
2256  7430          SZL
2257  5261          JMP     MOD2
2260  5231          JMP     MOD             /REPEAT UNTIL ADDR=0

2261  2027  MOD2,   ISZ     TXMIT
2262  7000          NOP
2263  5241          JMP     MOD1

                    /CARRIAGE RETURN & LINE FEED SUBROUTINE
2264  0000  CRLFS,   0000
2265  7200          CLA
2266  1372          TAD     (215
2267  4273          JMS     TPP1            /PRINT THE CR
2270  1371          TAD     (212
```



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2271  4273          JMS     TPP1            /PRINT THE LF
2272  5664          JMP I   CRLFS           /RETURN

                    /
                    /ROUTINE TO PRINT A SINGLE CHARACTER
                    /

2273  0000  TPP1,    0
2274  6046          TLS                     /PRINT CHARACTER
2275  6041  TPP2,    TSF                     /PRINTER DONE?
2276  5275          JMP     .-1             /NO=RETURN
2277  6042          TCF                     /CLEAR PRINTER FLAG
                                            /TURN INTERRUPTION
2300  7200          CLA
2301  2006          ISZ     INTNO
2302  1355          TAD     IOFFLG
2303  7650          SNA CLA
2304  6001          ION
2305  5673          JMP I   TPP1
2306  0000  TEMP,    0
                    /
                    /UNEXPLAINED INTERUPT REPORTING SECTION
                    /SECTION FINDS ALL INTR FLAGS,REPORTS THEM,CLEARS THEM
                    /AND THEN TRYS TO MAKE NORMAL REENTRY TO PROGRAM RUN,
                    /

2307  7201  UEXIN,   CLA IAC          /DON'T ALLOW INTRS, ON
2310  3355          DCA     IOFFLG
2311  4466          CRLF
2312  4403          TYPE            /TYPE HEADER
2313  2450          MUNEX
2314  4466          CRLF
2315  7200          CLA
2316  3354          DCA     U2
2317  4403  UEXIN1, TYPE
2320  2514          MSLAS
2321  7200          CLA
2322  1354          TAD     U2      /GET A DEVICE CODE
2323  1370          TAD     (10     /ADD 1 TO IT
2324  3354          DCA     U2
2325  1354          TAD     U2
2326  0367          AND     (200
2327  7440          SZA
2330  5321          JMP     UEXIN1+2
2331  1354          TAD     U2
2332  0366          AND     (770
2333  7450          SNA
2334  5765'         JMP     ST0
2335  1364          TAD     (6001   /ADD FOR "TSFN TYPE INSTR CODE
2336  3337          DCA     .+1
2337  0000          0               /IF SKPS THEN FLG SET
2340  5321          JMP     UEXIN1+2
2341  7300          CLA CLL
2342  1337          TAD     .-3
2343  7001          IAC
```

```
2344  3345            DCA     .+1
2345  0000            0               /CLEAR FLAGS INSTR
2346  7300            CLA     CLL     /DIO SKP THEN FLG WAS SET REPORT IT
2347  1354            TAD     U2      /REMEMBER REGULAR INTR COULD HAVE COME UP
2350  7012            RTR             /IN THIS TIME REPOT IT ALSO
2351  7010            RAR
2352  4773'           JMS     OCTOUT
2353  5317            JMP     UEXIN1
2354  0000    U2,     0
2355  0000    IOFFLG,0

2364  6001
2365  0252
2366  0770
2367  0200
2370  0010
2371  0212
2372  0215
2373  2070
2374  0240
2375  0100
2376  7740
2377  0077
      2400    PAGE
                    /ASCII MESSAGE SECTION

2400  0405    MDEV,   TEXT    !DEV CODE OF READER? !
2401  2640
2402  0317
2403  0405
2404  4017
2405  0640
2406  2205
2407  0104
2410  0522
2411  7740
2412  0000
2413  0405    MDEV2,  TEXT    !DEV CODE OF LINE? !
2414  2640
2415  0317
2416  0405
2417  4017
2420  0640
2421  1411
2422  1605
2423  7740
2424  0000
2425  2205    EM1,    TEXT    !RECV ERROR!
2426  0326
2427  4005
2430  2222
2431  1722
2432  0000
2433  7704    MM1,    TEXT    !?DEV CODE OF  RECEIVER #!
2434  0526


/DIVTB  PAL10  V142  8-JUL-74  14:28  PAGE 2-7

2435  4003
2436  1704
2437  0540
2440  1706
2441  4040
2442  2205
2443  0305
2444  1126
2445  0522
2446  4043
2447  0000
2450  7725    MUNEX,  TEXT    !?UNEXPLAINED INTERRUPT FROM DEVICE(S)!!
2451  1605
2452  3020
2453  1401
2454  1116
2455  0504
2456  4011
2457  1624
2460  0522
2461  2225
2462  2024
2463  4006
2464  2217
2465  1540
2466  0405
2467  2611
2470  0305
2471  5023
2472  5172
2473  0000
2474  1504    MHED,   TEXT    !M8-08-DIVTB-A VT20 HOST PROGRAM!
2475  5560
2476  7055
2477  0411
2500  2624
2501  0255
2502  0140
2503  2624
2504  6260
2505  4010
2506  1723
2507  2440
2510  2022
2511  1707
2512  2201
2513  1500
2514  5700    MSLAS,  TEXT    !/!
2515  5600    MDOT,   TEXT    !.!
2516  4036    MCONC,  TEXT    ! ^C  !
2517  0340
2520  4000
2521  3610    MCH,    TEXT    !^H!
2522  0000
2523  3622    MCR,    TEXT    !^R!
```

```
2524  0000
2525  3623  MCONS,  TEXT  !*S!
2526  0000
2527  7740  MQM,    TEXT  !?  !
2530  4000
2531  3620  MCONP,  TEXT  !*P!
2532  0000
2533  1625  MNOL,   TEXT  !NUMBER OF REC!EVERS?!
2534  1502
2535  0522
2536  4017
2537  0640
2540  2205
2541  0311
2542  0526
2543  0522
2544  2377
2545  0000
2546  4024  MLNBH,  TEXT  ! THE LINE !SN'T BE!NG HELD=COMMAND !GNORED!
2547  1005
2550  4014
2551  1116
2552  0540
2553  1123
2554  1647
2555  2440
2556  0205
2557  1116
2560  0740
2561  1005
2562  1404
2563  5503
2564  1715
2565  1501
2566  1604
2567  4011
2570  0716
2571  1722
2572  0504
2573  0000
2574  4005  MERBX,  TEXT  ! ERROR BUFFER EXCEED, AUTOMATIC RESTART OF PROGRAM!
2575  2222
2576  1722
2577  4002
2600  2506
2601  0605
2602  2240
2603  0530
2604  0305
2605  0504
2606  5440
2607  0125
2610  2417
2611  1501
2612  2411
```



```
2613  0340
2614  2205
2615  2324
2616  0122
2617  2440
2620  1706
2621  4020
2622  2217
2623  0722
2624  0115
2625  0000

                    /
                    /ERROR BUFFER
                    /
      4000  *4000
4000  0000  ERPO,   0
      4200  *4200
4200  0000  ERPOE,  0

                    $
```

```
0000  11111110  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0100  11111111  11111111  11111111  11111111  11111111  11111111  11111110  00000000

0200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

0400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0500  11111111  11111111  11111000  00000000  00000000  00000111  11111111  11111111

0600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0700  11111111  11111111  11111111  11111111  11111111  10000000  00000000  00000111

1000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1100  11111111  11111111  11111111  11111111  11111111  11000000  00011111  11111111

1200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1300  11111111  11111111  11111111  11111111  00000000  01111111  11111111  11111111

1400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

1600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1700  11111111  11111111  11111111  11111111  11100000  00000000  00000001  11111111

2000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2100  11111111  11111111  11111111  11100000  00000000  00000000  00000001  11111111

2200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2300  11111111  11111111  11111111  11111111  11111111  11111100  00001111  11111111

2400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2600  11111111  11111111  11111100  00000000  00000000  00000000  00000000  00000000
2700  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000

3000
3100

3200
3300

3400
3500

3600
3700
```



```
4000  10000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000
4100  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000

4200  10000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000
4300  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000

4400
4500

4600
4700

5000
5100

5200
5300

5400
5500

5600
5700

6000
6100

6200
6300

6400
6500

6600
6700

7000
7100

7200
7300

7400
7500

7600
7700
```

```
AUTO10  0010        INTMP1  0071        OVER4   0337        ST1     0260
AUTO11  0011        INTMP2  2067        OVER5   0400        ST2     0262
AUTO12  0012        INTNO   0006        OVER6   0413        START   0200
AUTO13  0013        INTSRV  0072        OVER7   0420        START1  0204
AUTO14  0014        IOFFLG  2355        OVER8   0424        STORAC  0065
AUTO15  0015        IOTCF   6002        OVER9   0462        STR1    0227
AUTO16  0016        IOTKCC  6002        PRINTR  0003        TEMP    2306
AUTO17  0017        IOTKRB  6006        RCHAR   0070        TGXRET  0165
BKRB    1724        IOTKRS  6004        RELEAS  1276        TPP1    2273
BKSF    1720        IOTSF   6771        REND    1044        TPP2    2275
BOOTVF  1640        KBPO    0061        RERROR  1025        TRSRV0  0156
BOTCDI  1742        KEYSRV  1200        RERRS   0067        TRSRV1  0157
BTCF    1730        KSERV   1211        RETAD   0000        TRSRV2  0160
BTLS    1725        LPRINT  2200        RNUB0   0600        TRSRV3  0161
BTSF    1726        MCH     2521        RNUB1   0625        TRSRV4  0162
BUFPO   0045        MCONC   2516        RNUB2   0652        TRSRV5  0163
CERORS  0505        MCONP   2531        RNUB3   0677        TTPP2   0164
CERROR  1000        MCONS   2525        RNUB4   0724        TUEXIN  0166
CHAR    0005        MCR     2523        RNUB5   1000        TXMIT   0027
CHECK   1733        MDEV    2400        ROR1    1637        TXMIT1  0030
CONP    1511        MDEV2   2413        RSRV0   0601        TYPE    4403
CONP1   1525        MDOT    2515        RSRV0A  0623        TYPO    2217
CONP2   1546        MERBK   2574        RSRV1   0626        U2      2354
CONS    1306        MES2    2206        RSRV1A  0650        UEXIN   2307
CONSL   1337        MH1     2433        RSRV2   0653        UEXIN1  2317
CRLF    4466        MHED    2474        RSRV2A  0675        WREC    0062
CRLFR   0066        MLNBH   2546        RSRV3   0700        WXMIT   0020
CRLFS   2264        MNOL    2533        RSRV3A  0722        WXMIT1  1151
CSER    0514        MOD     2231        RSRV4   0725        XB0     0053
DREC    0037        MOD1    2241        RSRV4A  0747        XB1     0054
DUMB    1454        MOD2    2261        RSRV5   1001        XB2     0055
DUMB2   1455        MODER   1552        RSRV5A  1023        XB3     0056
DXMIT   0031        MODIFY  4404        RTEMP   0063        XB4     0057
EM1     2425        MODY    0004        SENDB1  1465        XB5     0060
ERPO    4000        MONITR  0477        SENDBF  1456
ERPOE   4200        MQM     2527        SENDLN  1400
GXMIT   1053        MSLAS   2514        SET0    0270
GXMIT1  1055        MUNEX   2490        SET1    0275
GXMIT2  1100        NXMIT   1121        SEX     1441
GXMIT4  1131        OCT1    2073        SNDNG   1336
GXMIT1  1117        OCTF    2065        SRV0    0074
GXRET   1103        OCTOUT  2070        SRV1    0077
GXRET1  1114        OCTR1   2022        SRV2    0102
HOLDLN  1261        OCTR2   2042        SRV3    0105
WXMIT   0021        OCTR3   2051        SRV4    0110
INIT1   1712        OCTRF   2036        SRV5    0113
INIT2   1716        OCTRI   2012        SRV6    0146
INOCT   4464        OCTRO   2016        SRV7    0124
INOCTR  0064        OVER1   0310        SRV8    0143
INOCTS  2000        OVER10  0464        SRVE    0117
INTBOT  1711        OVER2   0320        SRVEX   0152
INTMP   2066        OVER3   0333        ST0     0252
```



```
ERRORS DETECTED: 0

LINKS GENERATED: 63

RUN-TIME: 8 SECONDS

3K CORE USED
```