IDENTIFICATION
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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

1. ABSTRACT
****

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
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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 VT20'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 VT20, 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 VT20 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 VT20,
TO BOOT ABSOLUTE LOADER TO THE VT20'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 VEVISED 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 "IONM
          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
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          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  3065    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  4556            JMS I   TRSRV0          /AFTER NUMBER OF RECEIVERS, AND THEIR
          0077  6771    SRV1,   IOTSF                   /DEVICE CODES ARE KNOWN
          0100  7410            SKP
          0101  4557            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                    /ASK HOW MANY RECEIVERS
0205  4403            TYPE
0206  2533            MNOL                    /GO TO INPUT OCTAL ROUTINE
0207  4464            INOCT                   /GET THE NUMBER
0210  1071            TAD     INTMP1          /MAKE SURE THAT IT DOESN'T EXCEED "7"
0211  0377            AND     (7
0212  7450            SNA                     /IF IT WERE ZERO THEN OPERATOR WAS RESTARTING PROGRAM
0213  5270            JMP     SET0
0214  7041            CMA IAC                 /STORE COMPLEMENT OF NUMBER OF RECEIVERS SO THAT WE CAN INPUT
0215  3062            DCA     WREC            /DEVICE CODES FOR EACH RECEIVER
0216  1376            TAD     (260
0217  3027            DCA     TXMIT           /MAKE SURE THAT #OF RECIEVERS
0220  1062            TAD     WREC            /DOES NOT EXCEED 6
0221  1375            TAD     (-7
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'S,
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
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```
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     (XB0            /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     (XB5            /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           IOF                     /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  7074
0363  3777
0364  0060
0365  0044
0366  0053
0367  7733
0370  7010
0371  0030
0372  0240
0373  2273
0374  0036
0375  7771
0376  7260
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     KBPO
```



```
                    /
                    /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              "DOT                      /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#, #6
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#, #6
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#, #6
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#, #6
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     RENO            /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     BUFPO+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#, 04
0734  6211          CDF     10              /CHANGE DATA FIELDS TO STORE CHAR,
0735  3451          DCA I   BUFPO+4         /STORE IT,
0736  6201          CDF     00              /CHANGE TO CURRENT DATA FIELD
0737  2051          ISZ     BUFPO+4
0740  4776'         JMS     RENO            /SEE IF WE HAVE RECIEVED "EOT"
0741  5347          JMP     RSRV4A          /RETURN HERE IF NOT - NORMAL EXIT
0742  1025          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     BUFPO+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#, 06
1010  6211          CDF     10              /CHANGE DATA FIELDS TO STORE CHAR,
1011  3452          DCA I   BUFPO+5         /STORE IT,
1012  6201          CDF     00              /CHANGE TO CURRENT DATA FIELD
1013  2052          ISZ     BUFPO+5
1014  4244          JMS     RENO            /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     BUFPO+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     RENO            /STORE ADDRESS OF REC, #
1032  1070          TAD     RCHAR           /GET CHARACTERS
1033  0375          AND     (7400
1034  1644          TAD I   RENO            /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  RENO,   0
1045  1372          TAD     (-14            /GET CODE OF EOT
1046  1070          TAD     RCHAR           /GET CHARACTER
1047  7640          SZA CLA
1050  5644          JMP I   RENO            /IF UNEQUAL - NORMAL EXIT TO RECEIVER ROUTINE
1051  2244          ISZ     RENO            /EQUAL - MODIFY RETURN - OR REENTRY POINT
1052  5644          JMP I   RENO            /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     (X80            /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            ISE     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     (BUFPO-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           /NOW SET ANOTHER FLAG TO INDICATE
1333  7001          IAC                     /WE'RE SENDING TO A XMITTER
1334  3336          DCA     SNDNG           /RETURN TO MONITOR
1335  5760'         JMP     MONITR

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  5771'           JMP     GXMIT2

1441  3765'   SEX,    DCA     SNDNG           /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     (XB0
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     SNDNG           /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     SNDNG           /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     IN*MP1
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 "DXMIT"
                    /*
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
```



```
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 "TSF" 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


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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
AUTO11  0011
AUTO12  0012
AUTO13  0013
AUTO14  0014
AUTO15  0015
AUTO16  0016
AUTO17  0017
BKRB    1724
BKSF    1720
BOOTVP  1640
BOTCD1  1742
BTCF    1730
BTLS    1725
BTSF    1726
BUFPO   0045
CERORS  0505
CERROR  1600
CHAR    0005
CHECK   1733
CONP    1511
CONP1   1525
CONP2   1546
CONS    1306
CONSL   1337
CRLF    4466
CRLFR   0066
CRLFS   2264
CSER    0514
DREC    0037
DUMB    1454
DUMB2   1455
DXMIT   0031
EM1     2425
ERPO    4000
ERPOE   4200
GXMIT   1053
GXMIT1  1055
GXMIT2  1100
GXMIT4  1131
GXMIT1  1117
GXRET   1103
GXRET1  1114
HOLDLN  1261
HXMIT   0021
INIT1   1712
INIT2   1716
INOCT   4464
INOCTR  0064
INOCTS  2000
INTBOT  1711
INTMP   2066
INTMP1  0071
INTMP2  2067
INTNO   0006
INTSRV  0072
IOFFLG  2355
IOTCF   6002
IOTKCC  6002
IOTKRB  6006
IOTKRS  6004
IOTSF   6771
KBPO    0061
KEYSRV  1200
KSERV   1211
LPRINT  2200
MCH     2521
MCONC   2516
MCONP   2531
MCONS   2525
MCR     2523
MDEV    2400
MDEV2   2413
MDOT    2515
MERBX   2574
MES2    2206
MH1     2433
MHED    2474
MLVBH   2546
MNOL    2533
MOD     2231
MOD1    2241
MOD2    2261
MODER   1552
MODIFY  4404
MODY    0004
MONITR  0477
MQM     2527
MSLAS   2514
MUVEX   2450
NXMIT   1121
OCT1    2073
OCTF    2065
OCTOUT  2070
OCTR1   2022
OCTR2   2042
OCTR3   2051
OCTRF   2036
OCTRI   2012
OCTRO   2016
OVER1   0310
OVER10  0464
OVER2   0320
OVER3   0333
OVER4   0337
OVER5   0400
OVER6   0413
OVER7   0420
OVER8   0424
OVER9   0462
PRINTR  0003
RCHAR   0070
RELEAS  1276
REND    1044
RERROR  1025
RERRS   0067
RETAD   0000
RNUB0   0600
RNUB1   0625
RNUB2   0652
RNUB3   0677
RNUB4   0724
RNUB5   1000
ROR1    1637
RSRV0   0601
RSRV0A  0623
RSRV1   0626
RSRV1A  0650
RSRV2   0653
RSRV2A  0675
RSRV3   0700
RSRV3A  0722
RSRV4   0725
RSRV4A  0747
RSRV5   1001
RSRV5A  1023
RTEMP   0063
SENDB1  1465
SENDBF  1456
SENDLN  1400
SET0    0270
SET1    0275
SEX     1441
SNDNG   1336
SRV0    0074
SRV1    0077
SRV2    0102
SRV3    0105
SRV4    0110
SRV5    0113
SRV6    0146
SRV7    0124
SRV8    0143
SRVE    0117
SRVEX   0152
ST0     0252
ST1     0260
ST2     0262
START   0200
START1  0204
STORAC  0065
STR1    0227
TEMP    2306
TGXRET  0165
TPP1    2273
TPP2    2275
TRSRV0  0156
TRSRV1  0157
TRSRV2  0160
TRSRV3  0161
TRSRV4  0162
TRSRV5  0163
TTPP2   0164
TUEXIN  0166
TXMIT   0027
TXMIT1  0030
TYPE    4403
TYPO    2217
U2      2354
UEXIN   2307
UEXIN1  2317
WREC    0062
WXMIT   0020
WXMIT1  1151
XB0     0053
XB1     0054
XB2     0055
XB3     0056
XB4     0057
XB5     0060
```



```
ERRORS DETECTED: 0

LINKS GENERATED: 63

RUN-TIME: 8 SECONDS

3K CORE USED
```