

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

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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 SIMULTANEOUSLY.

2: REQUIREMENTS (EQUIPMENT)  
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A. PDP-8 FAMILY COMPUTER w/ CONSOLE DEVICE AND 8K OR MORE OF CORE MEMORY

3: LOADING PROCEDURE  
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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 TRANSMISSIONS 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 RECEIVER AND TRANSMISSION LINES. THEY CAN BE USED ALONE OR IN CONJUNCTION WITH EACH

OTHER:

A. SEND MODE (\*S)\*

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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 SWRM MUST BE SET TO A 1 ON THE VT20'S COMPUTER, OR A RECEIVER ERROR WILL BE DISPLAYED.

B. PRINT MODE (\*P)\*

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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)\*

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THIS FEATURE ENABLES YOU TO HOLD A 'LINE'S' BUFFER FROM BEING SENT BACK TO THE VT20, TO ENTER, TYPE " \*H LINE NO. & CR".

D. RELEASE MODE (\*R)\*

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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 TRANSFER THE DATA ON, RESPOND BY TYPING THE DEVICE CODE FOLLOWED BY A CARRIAGE 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 ADDRESS \*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  
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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.

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\* ALL CONTROL CHARACTERS ARE OBTAINED BY TYPING THE CTRL AND THE CHARACTER DESIGNATED KEYS SIMULTANEOUSLY.

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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  
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7.1 RECIEVER ERRORS  
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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  
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RECV ERROR 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

INTERRUPT ERRORS  
-----

SINCE THE INTERRUPT SKIP CHAIN IS SET UP TO SERVICE ONLY INTERRUPTS FROM KLBJA'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 POSSIBLY CAUSING OTHER ERRORS. THE PROGRAM WILL AFTER TYPEOUT OF THE ERRORS, AND RETURN TO MONITOR. 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  
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/DIVTB
*****
/* PROGRAM DIVTB BY ED BADGER LAST REVISED JUN,12,1974
/* COPYRIGHT 1974 DIGITAL EQUIPMENT CO.,MAYNARD MASS
*****
/

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/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 RETAD, 0 /HARDWARE JMS TO THIS ADDRESS ON INTR;
0001 5402 JMP I ,+I /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 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
0017 0000 AUTO17, 0
0020 0000 WXMIT, 0 /ERROR REPORTER
0021 0001 HXMIT, 1 /ERROR STORER
0022 0001 1 /XMITTER POINTER FOR XMITTER ROUTINE
0023 0001 1 /HOLD SW FOR XMITTER 0
0024 0001 1 /HOLD SW FOR XMITTER 1
0025 0001 1 /HOLD SW FOR XMITTER 2
0026 0001 1 /HOLD SW FOR XMITTER 3
0027 0001 1 /HOLD SW FOR XMITTER 4
0028 0001 1 /HOLD SW FOR XMITTER 5
0030 0000 TXMIT, 1 /TEMP STORAGE FOR XMITTER ROUTINE
0031 0000 TXMIT1, 0 /TEMP STORAGE FOR XMITTER ROUTINE
0032 0530 DXMIT, 530 /DEV CODE FOR XMITTER 0
0033 0530 530 /DEV CODE FOR XMITTER 1
0034 0530 530 /DEV CODE FOR XMITTER 2
0035 0530 530 /DEV CODE FOR XMITTER 3
0036 0530 530 /DEV CODE FOR XMITTER 4
0037 0520 DREC, 520 /DEV CODE FOR RECIEVER 0
0040 0520 520 /DEC CODE FOR RECIEVFR 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 RECIEVFR 4
0044 0520 520 /DEC CODE FOR RECIEVER 5
0045 0000 RUFPO, 0 /BUFFER POINTER FOR REC+XMIT DATA
0046 0000 0 /GET SET UP INITIAL TO VALUE IN
0047 0000 0 /X00-X05 CHANGES WHEN RECEIVING OR XMITTING DATA
0050 0000 0
0051 0000 0
0052 0000 0
0053 0000 X00, 0 /INITIAL BUFFER POINTERS FOR XMITTERS+REC 0-5
0054 1000 X01, 1000 /BUFFER AREA LOCATED IN NEXT 4K AREA
0055 2000 X02, 2000 /DATA FIELDS AREA CHANGE WHEN
0056 3000 X03, 3000 /STORING OR RETRIEVING DATA
0057 4000 X04, 4000
0060 5000 X05, 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 2244 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

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/WHO DID IT ROUTINE FOR INTERRUPTS
/

```

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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 /"IOTSF" OF SKIP ON FLAG INSTRUCTION OR "STR1"
0076 456 JMS I TRSRV0 /AFTER NUMBER OF RECEIVERS, AND THEIR
0077 6771 SRV1, IOTSF /DEVICE CODES ARE KNOWN
0100 7410 SKP
0101 4567 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
0112 4562 JMS I TRSRV4 /***NOTE***
0113 6771 SRV5, IOTSF /DO NOT MODIFY THIS SKIP CHAIN WITHOUT MODIFYING
0114 7410 SKP /OVERLAY ROUTINES
0115 4563 JMS I TRSRV5
0116 6041 TSP
0117 7410 SRVE, SKP /DID PRINTER INTER?
/NO=SKIP

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```

0120 5564 JMP I TTPP2 /YES=EXIT
0121 6031 XSF /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 /FOR SERVICING INTERRUPTS (EXPECTED)
0132 6002 IOTCF
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, IOP
0201 4466 CRLF
0202 4403 TYPE /TYPE HEADER OF PROGRAM
0203 2474 MHED
    
```

```

0204 4466 START1, CRLF /ASK HOW MANY RECEIVERS
0205 4403 TYPE
0206 2533 MNCL /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 SET0 /IF IT WERE ZERO THEN OPERATOR WAS RESTARTING PROGRAM
0213 5270 JMP IAC
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 RECEIVERS
0220 1062 TAD WREC /DOES NOT EXCEED 6
0221 1375 TAD (=7)
0222 7700 SNA CLA /IF IT DOES REASK QUESTION!
0223 5204 JMP START1 /GET RECEIVER CODE POINTER
0224 1374 TAD (DREC-1)
0225 3010 DCA AUTO10 /STORE
0226 4466 STR1, CRLF /TYPE QUESTION "DEVICE CODE OF RECEIVER "X""
0227 4403 TYPE
0230 2433 WHI /TYPE VALUE OF "X"
0231 1027 TAD
0232 4773 JMS TPP1
0233 1372 TAD (240)
0234 4773 JMS TPP1 /GET ANSWER
0235 4464 INOCT
0236 6002 IOP
0237 4466 CRLF
0240 1071 TAD INTMP1 /GET FIRST REC DEV CODE
0241 7450 SNA /IF ZERO THEN USE DEFUALY 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 ISE TXMIT /DONE ALL RECEIVERS?
0250 2062 ISE WREC
0251 5227 JMP STR1 /NO=REPEAT
    
```

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

```

0252 6007 ST0, 0007 /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
    
```



```

#262 3411 ST2, DCA I AUTO11
#263 7001 IAC
#264 1367 TAD (-BUFFPO
#265 1010 TAD AUTO10
#266 7640 SZA CLA
#267 5260 JMP STI
    
```

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

```

#270 7240 SET0, CLA CMA
#271 1366 TAD (X00 /GET INIAL POINTER VALUE KEEPER
#272 3010 DCA AUTO10 /STORE IN 10
#273 1365 TAD (BUFFPO-1 /GET RUNNING BUFFER POINTER
#274 3011 DCA AUTO11 /STORE IN 11
#275 1410 SET1, TAD I AUTO10 /GET INIT VALUE
#276 3411 DCA I AUTO11 /STORE FOR RUNNING POINTER
#277 1010 TAD AUTO10
#300 7041 CMA IAC
#301 1364 TAD (X05 /ALL DONE?
#302 7640 SZA CLA
#303 5275 JMP SET1 /NO=CONTINUE
#304 1363 TAD (ERPO-1
#305 3016 DCA AUTO16 /YET STORE ERROR POINTER IN
#306 1016 TAD AUTO16 /AUTO REGISTERS 16 & 17
#307 3017 DCA AUTO17
    
```

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

```

#310 4403 OVER1, TYPE /TYPE "*"
#311 2516 MCONC
#312 6002 IOF /SET AC=-1
#313 6007 0007 /CLEAR ALL FLAGS
#314 1374 TAD (DREC-1
#315 3010 DCA AUTO10 /SET LIST POINTER OF DEV CODES IN LOC 10
#316 1362 TAD (SRV0 /GET FIRST LOCATION TO BE OVERLAYED
#317 3000 DCA 0
#320 1410 OVER2, TAD I AUTO10 /GET FIRST DEVICE CODE
#321 1361 TAD (0001 /IOT CODE "KSF"=DEV CODE
#322 3400 DCA I 0 /STORE IOT
#323 1000 TAD 0 /UPDATE OVERLAY POINTER
#324 1360 TAD (3
#325 3000 DCA 0
#326 7001 IAC
#327 1000 TAD 0 /HAVE WE OVERLAYED THE
#330 1357 TAD (-SRVE /LAST LOCATION
#331 7640 SZA CLA
#332 5320 JMP OVER2 /NO=DO NEXT ONE
    
```

```

#333 1371 OVER3, TAD (DXMIT-1 /NOW OVERLAY XMITTER
#334 3010 DCA AUTO10 /CLEAR FLAG AREA
#335 1356 TAD (SRV7-3 /OF SKIP CHAIN
#336 3011 DCA AUTO11
#337 2011 OVER4, ISE AUTO11
#338 2011 ISE AUTO11
#341 1361 TAD (0001
#342 1410 TAD I AUTO10
#343 3411 DCA I AUTO11
#344 1355 TAD (-SRV0
#345 1011 TAD AUTO11
#346 7640 SZA CLA
#347 5337 JMP OVER4
    
```

```

#350 1354 TAD (HXMIT-1 /THIS AREA OVERLAYS
#351 3010 DCA AUTO10 /THE HXMIT AREA TO STOP
#352 5753 JMP OVER5 /THE SOFTWARE FROM STARTING
    
```

```

#353 0400
#354 0020
#355 7635
#356 0121
#357 7661
#360 0003
#361 6001
#362 0074
#363 3777
#364 0060
#365 0044
#366 0053
#367 7733
#370 0010
#371 0030
#372 0240
#373 2273
#374 0036
#375 7771
#376 0260
#377 0007
#400 0400 PAGE
    
```

```

#400 7201 OVER5, CLA IAC /THE XMITTERS AT START OF
#401 3410 DCA I AUTO10 /TEST
#402 1010 TAD AUTO10
#403 1377 TAD (-YXMIT /ALL DONE?
#404 7640 SZA CLA
#405 5200 JMP OVER5 /NO CONTINUE
#406 7040 CMA
    
```

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

```

0407 3010      DCA   AUTO10      /THIS SECTION SETS THE NEXT
0410 1376      TAO   (1000      /4K OF MEMORY TO CODE "14", THE USE IS TO
0411 3000      DCA   0              /ISSUE NULL CHARACTERS AT BEGINING
0412 6211      CDF   10              /OF A TRANSMISSION TO A LINE
0413 1375      OVER6, TAO   (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, TAO   (DREC=1      /GET LIST OF RECEIVER DEVICE CODES
0421 3010      DCA   AUTO10
0422 1373      TAO   (RSRV0      /GET ADDRESS OF FIRST RECEIVERS' SERVICE
0423 3011      DCA   AUTO11      /ROUTINE
0424 1410      OVER8, TAO I  AUTO10      /OVERLAY WITH 6XX2 INSTR
0425 3000      DCA   0
0426 1000      TAO   0
0427 1372      TAO   (6002
0430 3411      DCA I  AUTO11
0431 1000      TAO   0              /OVERLAY NEXT ADDR WITH 6XX4 INSTR,
0432 1371      TAO   (6004
0433 3411      DCA I  AUTO11
0434 1011      TAO   AUTO11
0435 1370      TAO   (23              /***NOTE***
0436 3011      DCA   AUTO11      /IF ANY MODIFICATIONS ARE MADE TO
0437 1011      TAO   AUTO11      /RECEIVER SERVICE ROUTINES, THAN THIS
0440 7041      CMA   IAC              /OVERLAYING AREA MUST BE CHANGED,
0441 1367      TAO   (RBRV4+25
0442 7640      SZA  CLA
0443 5224      JMP   OVER8
0444 1366      TAO   (RSRV5
0445 3011      DCA   AUTO11
0446 1410      TAO I  AUTO10
0447 3000      DCA   0
0450 1000      TAO   0
0451 1372      TAO   (6002
0452 3411      DCA I  AUTO11
0453 1000      TAO   0
0454 1371      TAO   (6004
0455 3411      DCA I  AUTO11
0456 3067      DCA   RERRS
0457 3765      DCA   SNDNG
0460 1364      TAO   (KEYSRV
0461 3061      DCA   KBPO
    
```

/THIS SECTION ENABLES THE CSR OF THE KLBJA TO REPORT  
/ERRORS AS PART OF DATA RECEIVED  
/

```

0462 1374      OVER9, TAO   (DREC=1      /GET POINTER OF RECIEVER DEV CODES
0463 3011      DCA   AUTO11
0464 1411      OVER10, TAO I  AUTO11      /GET DEVICE CODE
0465 1363      TAO   (6005      /FORM 6XX5 CODE FOR ENABLING ERRORS
0466 3270      DCA   +2              /STORE INSTRUCTION
0467 7325      CLLI CLA IAC STL RAL      /AC=3 ENABLE INTR,ERROR REPOTING
0470 0000      0              /6XX5 INST, FORMED ABOVE
0471 7200      CLA
0472 1011      TAO   AUTO11      /DONE ALL RECIEVERS?
0473 7041      CMA IAC
0474 1362      TAO   (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
0503 2515      WDOT
0504 3005      DCA   CHAR
0505 6001      CERORS, ION
0506 1067      TAO   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, IOFF
0515 6007      0007      /CLEAR ALL FLAGS
0516 7201      CLA IAC
0517 3761      DCA   IOFFLG      /DON'T ALLOW INTERRUPTS
0520 4760      JMS   CERROR      /GO DIRECTLY TO ERROR TYPOTUT ROUTINE
0521 4466      CRLF
    
```

```

0522 4403 TYPE /TELL OPERATOR THAT ERROR BUFFER WAS EXCEEDED
0523 2574 MERBX /AND THAT PROGRAM RUN WAS ABORTED WITH
0524 5755 JMB 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 0600

```

```

PAGE
/*
/*ROUTINE TO SERVICE LINE 0'S RECIEVER
/*
0600 0000 RNUB0, 0 /RECIEVER NUMBER
0601 0000 RSRV0, 0 /ENTRY
0602 6002 10TKCC /KCC INSTRUCTION FORMED BY OVERLAY AREA
0603 6004 10TKRS /KRB INSTRUCTION FORMED BY OVERLAY AREA
0604 3070 DCA RCHAR /STORE CHAR (TEMP)
0605 1070 TAO 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 BUFP0 /STORE IT,
0612 6201 CDF 00 /CHANGE TO CURRENT DATA FIELD
0613 2045 ISZ BUFP0
0614 4776 JMS REND /SEE IF WE HAVE RECIEVED "EOT"
0615 5223 JMP RSRV0A /RETURN HERE IF NOT = NORMAL EXIT
0616 1021 TAO 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 TAO XB0 /RESTORE BUFFER POINTER FOR RETURNING DATA
0622 3045 DCA BUFP0
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 10T KCC /KCC INSTRUCTION FORMED BY OVERLAY AREA
0630 6034 10T KRS /KRB INSTRUCTION FORMED BY OVERLAY AREA
0631 3070 DCA RCHAR /STORE CHAR (TEMP)

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0632 1070 TAO 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 BUFP0+1 /STORE IT,
0637 6201 CDF 00 /CHANGE TO CURRENT DATA FIELD
0640 2046 ISZ BUFP0+1
0641 4776 JMS REND /SEE IF WE HAVE RECIEVED "EOT"
0642 5223 JMP RSRV1A /RETURN HERE IF NOT = NORMAL EXIT
0643 1022 TAO 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 TAO XB0+1 /RESTORE BUFFER POINTER FOR RETURNING DATA
0647 3046 DCA BUFP0+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 10TKCC /KCC INSTRUCTION FORMED BY OVER LAY AREA
0655 6004 10TKRS /KRB INSTRUCTION FORMED BY OVERLAY AREA
0656 3070 DCA RCHAR /STORE CHAR (TEMP)
0657 1070 TAO 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 BUFP0+2 /STORE IT,
0664 6201 CDF 00 /CHANGE TO CURRENT DATA FIELD
0665 2047 ISZ BUFP0+2
0666 4776 JMS REND /SEE IF WE HAVE RECIEVED "EOT"
0667 5223 JMP RSRV2A /RETURN HERE IF NOT = NORMAL EXIT
0670 1023 TAO 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 TAO XB0+2 /RESTORE BUFFER POINTER FOR RETURNING DATES
0674 3047 DCA BUFP0+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
0680 0000 RSRV3, 0 /ENTRY
0681 6002 10TKCC /KCC INSTRUCTION FORMED BY OVERLAY AREA
0682 6004 10TKRS /KRB INSTRUCTION FORMED BY OVERLAY AREA
0683 3070 DCA RCHAR /STORE CHAR (TEMP)
0684 1070 TAO RCHAR /LOOK AT CHAR FOR ERRORS IT WILL BE
0685 7510 SPA /MINUS IF ERROR
0686 4777 JMS RERROR /GOTO ERROR ROUTINE REC#, 06
0687 6211 CDF 10 /CHANGE DATA FIELDS TO STORE CHAR,
0690 3450 DCA I BUFP0+3 /STORE IT,
0691 6201 CDF 00 /CHANGE TO CURRENT DATA FIELD
0692 2050 ISZ BUFP0+3

```

```

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 XBB+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 0002 IOTKCC /KCC INSTRUCTION FORMED BY VERLAY AREA
0727 0004 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#, #0
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 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 XBB+4 /RESTORE BUFFER POINTER FOR RETURNING DATA
0746 3051 DCA BUFP0+4
0747 2006 RSRV4A, ISZ INTNO
0750 5725 JMP I RSRV4 /EXIT
/*
/* ROUTINE TO SERVICE LINE 5'S RECIEVER
/*
1000 0005 RNUB5, 5 /RECIEVER NUMBER
1001 0000 RSRV5, 0 /ENTRY
1002 0002 IOTKCC /KCC INSTRUCTION FORMED BY OVERLAY AREA
1003 0004 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#, #0
1008 6211 CDF 10 /CHANGE DATA FIELDS TO STORE CHAR,
1010 6211 DCA I BUFP0+5 /STORE IT,
1011 3452 CDF 00 /CHANGE TO CURRENT DATA FIELD
1012 6201 ISZ BUFP0+5
1013 2052 JMS REND /SEE IF WE HAVE RECIEVED "EOT"
1014 4244 JMP RSRV5A /RETURN HERE IF NOT = NORMAL EXIT
1015 5223 TAD HXMIT+5 /RETURN HERE ON "EOT" CLEAR XMITT HOLD SWITCH (SOFT)
1016 1026 TAD HXMIT+5

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1017 0377 AND (4000 /BUT DON'T CLEAR ANY OPERATOR SWITCH
1020 3026 DCA HXMIT+5
1021 1060 TAD XBB+5 /RESTORE BUFFER POINTER FOR RETURNING 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 /PICK UP ADDRESS OF CALLER
1027 1225 TAD RERROR /FORM ADDR, THAT CONTAINS RECEIVER #
1030 1376 TAD (=10 /STORE ADDRESS OF REC, #
1031 3244 DCA REND /GET CHARACTERS
1032 1070 TAD RCHAR
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 RRRS /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 HXMIT
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          NXMITE
1063 1351          TAD          WXMITE
1064 1370          TAD          (DXMITE          /GET IOT INSTRUCTION POINTER
1065 3027          DCA          TXMITE
1066 1367          TAD          (6006          /FORM IOT INSTRUCTION "TLS"
1067 1427          TAD I          TXMITE          /SERVICE CODE
1070 3300          DCA          GXMITE2
1071 1351          TAD          WXMITE          /GET OFFSET AGAIN
1072 1366          TAD          (BUPPO          /GET BUFFER POINTER
1073 3030          DCA          TXMITE1
1074 1430          TAD I          TXMITE1
1075 3027          DCA          TXMITE          /WE NEED TO GET A CHARACTER
1076 6211          CDF          10
1077 1427          TAD I          TXMITE
1100 0000          GXMITE2, 0          /"TSL" INSTRUCTION 6XX6
1101 6001          ION
1102 5302          JMP          /WAIT HERE FOR INTERRUPT
1103 6244          GXRET, RMF          /RESTORE MEMORY FIELD
1104 1427          TAD I          TXMITE          /IS CHARACTER SOFT "EOT"?
1105 6201          CDF          0
1106 1372          TAD          (-14          /CODE "EOT"
1107 7650          SNA CLA
1110 5331          JMP          GXMITE4
1111 1027          TAD          TXMITE          /GET CURRENT ADDR
1112 7001          IAC          /UPDATE BUFFER POINTER
1113 3430          DCA I          TXMITE1          /STORE IT
1114 1300          GXRET1, TAD          GXMITE2          /FORM CLEAR FLAG
1115 0365          AND          (6772          /INSTRUCTION
1116 3317          DCA          GXMITE1
1117 0000          GXMITE1, 0          /CLEAR FLAG INSTRUCTION 6XX2
1120 6001          ION          /TURN BACK ON INTR
1121 1351          NXMIT, TAD          WXMITE          /INCREMENT XMITER POINTER
1122 7001          IAC
1123 3351          DCA          WXMITE
1124 1351          TAD          WXMITE
1125 1364          TAD          (=7          /HAVE SE SERVICED ALL XMITTERS?
1126 7650          SNA CLA
1127 3351          DCA          WXMITE
1130 5693          JMP I          GXMITE          /YES=EXIT
1131 1351          GXMITE4, TAD          WXMITE          /WE'VE SENT BUFFER BACK NOW ALLS WE GOT
1132 1371          TAD          (WXMITE          /TO DO IS SET SOFT FLAG TO INDICATE WE DON'T
1133 3027          DCA          TXMITE          /SERVICE THIS XMITTER AGAIN!
1134 1427          TAD I          TXMITE
1135 0377          AND          (4000          /IF BEING HELD, KEEP HOLDER
1136 7001          IAC
1137 3427          DCA I          TXMITE
1140 1351          TAD          WXMITE          /NOW, RESTORE BEGINING POINTER
1141 1363          TAD          (XB0          /FOR THIS XMITER SO WE CAN
1142 3027          DCA          TXMITE          /STORE INCOMING DATA AGAIN
1143 1366          TAD          (BUPPO
1144 1351          TAD          WXMITE
1145 3030          DCA          TXMITE1
1146 1427          TAD I          TXMITE
1147 3430          DCA I          TXMITE1

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1150 5314          JMP          GXRET1          /GO BACK FOR MORE XMITTERS
1151 0000          WXMITE, 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 DESIGNIFERS 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          /HAS IT A *B??
1216 7650          SNA          CLA
1217 5773          JMP          BOOTVT*1          /YES = GO TO BOOT ROUTINE
1220 7040          CHA
1221 1005          TAD          CHAR
1222 7650          SNA          CLA
1223 5772          JMP          200          /NO=CONTINUE DESSIFR
1224 1005          TAD          CHAR          /HAS IT A *M?
1225 1371          TAD          (-10

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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 /HAS 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 /HAS 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 /HAS 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 YPP1 /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 0397 AND (=7 /STRIP NUMBER
1267 1356 TAD (HXMIT /GET ADDR OF HOLD FLAGS
1268 3020 DCA WXMIT /ADD IT TO LINE NUMBER FOR AN OFFSET
1271 1420 TAD I WXMIT /GET PRESENT FLAG
1272 0395 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

```

```

1300 4464 INOCT /GET LINE NUMBER
1301 1071 TAD IN?MP1 /LINE NUMBER
1302 1396 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
1308 4464 INOCT /GET LINE NUMBER
1311 1071 TAD IN?MP1 /LINE NUMBER
1312 0397 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 1392 TAD (=BUFF0-1 /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 0394 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 1592
1362 7663
1363 1400
1364 2273

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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  
/ "MS" IS TYPED FOLLOWED BY DATA  
/ NOTE!! IF SWITCH REGISTER BIT 0 IS NOT SET = TO 1  
/ THEN A RECEIVER ERROR WILL BE INDICATED  
/ ON THE TUBE CORRESPONDING TO THE LINE YOU'RE  
/ SENDING TO.  
/

1400 7200 SENDLN, CLA /GET LINE NUMBER  
1401 1777, TAD (-175) /GET ADDR OF HOLD FLAGS  
1402 1376 TAD (HXMIT  
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 CONSLS /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 SNEY 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 XMIT 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  
1437 6001  
1440 5771'  
  
1441 3765'  
1442 3005  
1443 1777'  
1444 1364  
1445 3020  
1446 1777'  
1447 1363  
1450 3071  
1451 1471  
1452 3420  
1453 5762'  
  
1454 0000  
1455 0000

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 /RESET POINTERS TO BFGINING OF BUFFER  
1443 1777' TAD CONSLS  
1444 1364 TAD (BUFF0  
1445 3020 DCA WXMIT  
1446 1777' TAD CONSLS  
1447 1363 TAD (X80  
1450 3071 DCA INTMP1  
1451 1471 TAD I INTMP1  
1452 3420 DCA I WXMIT  
1453 5762' JMP MONITR /RETURN TO MONITOR  
  
1454 0000 DUMB, 0  
1455 0000 DUMB2, 0

1456 1005 SENDBF, TAD CHAR /DID HE TYPE "ALTMODE"?  
1457 1374 TAD (-175  
1460 7640 SEA 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 "ENT"  
1464 3005 DCA CHAR  
1465 1005 SENDB1, TAD CHAR  
1466 1375 TAD (-33  
1467 7650 SNA CLA  
1470 5262 JMP =0  
1471 1777' TAD CONSLS /LINE NUMBER TO BE ADDED TO  
1472 1364 TAD (BUFF0 /ADDR I OF BUFFER  
1473 3020 DCA WXMIT /TO GET REAL BUFFER ADDR,  
1474 1420 TAD I WXMIT /ADDR TO STORE THIS DATA  
1475 3027 DCA TXMIT /CHANGE DATA FIELDS TO PUT DATA IN  
1476 6211 CDF 10 /NEXT 4K  
1477 1005 TAD CHAR  
1500 3427 DCA I TXMIT /RESTORE DATA FIELD  
1501 6201 CDF 00 /GET ADDR WE USED  
1502 1420 TAD I WXMIT  
1503 7001 IAC /INCREMENT IT FOR NEXT TIME  
1504 3420 DCA I WXMIT /WE DONE SENDING?  
1505 1765' TAD SNDNG  
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 MCONP
1513 4464 INOCT /GET THE LINE NUMBER
1514 4466 CRLF
1515 6001 ION
1516 7240 CLA CMA
1517 1071 TAO INMP1
1520 1363 TAO (X00 /GET ADDR OF START OF BUFFER
1521 3010 DCA AUTO10
1522 7040 CMA
1523 1410 TAO I AU010
1524 3010 DCA AUTO10
1525 6211 CONP1, GDF 10 /CHANGE DATA FIELDS TO GET DATA
1526 1410 TAO I AU010
1527 3011 DCA AUTO11
1530 1011 TAO 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 GDF 00
1535 1011 TAO AU011 /GET CHAR AGAIN
1536 4756' JMS TPP1
1537 6001 ION
1540 1011 TAO AU011 /HAS CHAR, A "EOT"?
1541 1395 TAD (=14
1542 7640 SZA CLA
1543 5325 JMP CONP1
1544 6201 GDF 00
1545 5762' JMP MONITR

1546 0000 CONP2, 0 /ENTRY 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 "MODM" 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 1495
1570 1454
1571 1100
1572 0006
1573 0031
1574 7603
1575 7745
1576 0021
1577 1337
1600 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 TAO 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 TAO I AUTO16 /GET ERROR
1610 3237 DCA ROR1 /STORE
1611 4466 CRLF /GET FIRST MESSAGE "LINE ERROR"
1612 4403 TYPE /PRINT
1613 2425 EML
1614 4466 CRLF
1615 7200 CLA
1616 1237 TAO ROR1 /GET LINE NO
1617 0376 ANJ (7
1620 4775' JMS OCTOUT
1621 1237 TAO ROR1 /GET THE ERROR
1622 0374 AND (7400 /
1623 4775' JMS OCTOUT /PRINT IT OUT
1624 4466 CRLF /PRINT CARRIAGE RETURN=LINE FEED,

```



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/DIVTB PAL10 V142 8-JUL-74 14120 PAGE 2
1625 1067 TAD RERRS /TAKEN CARE OF ALL ERRORS
1626 7440 SZA
1627 5201 JMP CERROR+1 /NO-DO NEXT ONE
1630 0002 IOF /TURN INTERRUPTS OFF SO THAT WHEN
1631 1373 TAJ (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 0001 IOF
1636 0000 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 (JMS1)
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 (0001 /MAKE KSF
1663 1342 TAD BOTCDI /INSTRUCTION FOR SKIP FLAG
1664 3320 DCA BKSF
1665 1371 TAD (0006 /MAKE KRB INSTRUCTION
1666 1342 TAD BOTCDI /FOR READ DATA
1667 3324 DCA BKRB
1670 1372 TAD (0001 /MAKE KSF INSTRUCTIONS
1671 1071 TAD INTMP1 /FOR XMITTING SKIP FLAG
1672 3326 DCA BTSF
1673 1371 TAD (0006 /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

```

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/DIVTB PAL10 V142 8-JUL-74 14120 PAGE 2-1
1707 3316 DCA INIT2
1710 0002 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 ISE CHECK /FIX RETURN ADDR,
1735 0031 KSF /DID KEYBOARD HAVE REQUEST UP?
1736 5733 JMP I CHECK /NO-RETURN
1737 0032 KCC /YES-CLEAR FLAG
1740 0007 0007 /MAKE SURE ALL FLAGS ARE CLEAR
1741 5767' JMP MONITR /AND RETURN TO MONITR
1742 0040 BOTCDI, 40
1767 0477
1770 7776
1771 0006
1772 0001
1773 3777
1774 7400
1775 2070
1776 0007
1777 7777
PAGE
/
/INPUT OCTAL ROUTINE
/
2000 0000 INOCTS, 0
2001 0032 KCC
2002 7000 NOP
2003 7200 CLA /SAVE PERCENT 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 OCTR1, ION
2013 1269 TAD OCTF
2014 7650 SNA CLA
2015 5212 JMP ,=3 /FLAG = -1 IF DONE
2016 1266 OCTR0, TAD INTMP /IF NOT DONE STAY IN THIS LOOP
2017 3061 DCA KBPO /RESTORE ORIGINAL INTR POINTER
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 RETURN
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 CR,F
2035 7100 CLL
2036 6002 OCTRF, IOF
2037 7040 CMA
2040 3265 DCA OCTF /AC TO = -1
2041 5212 JMP OCTR1 /SET FLAG, WE'RE DONE
/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 DLL
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 TYPDUT ROUTINE=ENTER WITH NUMBER IN AC
2070 0000 OCTYOUT, 0
2071 3273 DCA OCT1 /STORE NUMBER
2072 7410 SKP

```

```

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 7012 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 /PRINT IT
2113 4771' JMS TPP1 /GET NUMBER AGAIN
2114 1273 TAD OCT1 /FIX IT FOR PRINTING NEXT DIGIT
2115 7012 RTR
2116 7012 RAR
2117 0372 AND (7 /STRIP IT
2120 1370 TAD (260 /PRINT IT
2121 4771' JMS TPP1 /PRINT IT
2122 1273 TAD OCT1 /NOW GET LAST DIGIT
2123 0372 AND (7 /STRIP
2124 1370 TAD (260 /PRINT IT
2125 4771' JMS TPP1
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
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

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2207 7012 RTR
2210 7012 RTR
2211 7012 RTR
2212 4217 JMS TYPO /PRINT CHAR IN BITS 0-5
2213 1706 TAD I TEMP /PRINT CHAR IN BITS 6-11
2214 4217 JMS TYPO /NEXT WORD PLEASE
2215 2306 ISE TEMP
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 INDOCT
2233 7430 SEL
2234 5261 JMP MOD2
2235 1071 TAD INTP1 /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 INDOCT /GET NEW DATA
2253 1071 TAD INTP1
2254 7440 SZA /IF ZERO-NO CHANGE WANTED
2255 3427 DCA I TXMIT /OTHERWISE STORE NEW DATA
2256 7430 SEL
2257 5261 JMP MOD2
2260 5231 JMP MOD /REPEAT UNTIL ADDR=0

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

2264 0000 /CARRIAGE RETURN & LINE FEED SUBROUTINE
2265 7200 CRLFS, 0000
2266 1372 CLA
2267 4273 TAD (215
2270 1371 JMS TPP1 /PRINT THE CR
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 TLF /PRINT CHARACTER
2275 6041 TPP2, TLF /PRINTER DONE?
2276 5275 JMP , -1 /NO-RETURN
2277 6042 TCF /CLEAR PRINTER FLAG
/TURN INTERRUPTION

2300 7200 CLA
2301 2006 ISE INTNO
2302 1395 TAD IOFFLG
2303 7650 SNA CLA
2304 6001 IOV
2305 5673 JMP I TPP1
2306 0000 TEMP, 0
/
/UNEXPLAINED INTERRUPT 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 3395 DCA IOFFLG
2311 4466 CRLF
2312 4403 TYPE /TYPE HEADER
2313 2450 MUXEX
2314 4466 CRLF
2315 7200 CLA
2316 3394 DCA U2
2317 4403 UEXIN1, TYPE
2320 2514 MSLAS
2321 7200 CLA
2322 1394 TAD U2 /GET A DEVICE CODE
2323 1370 TAD (10 /ADD 1 TO IT
2324 3394 DCA U2
2325 1394 TAD U2
2326 0367 AND (200
2327 7440 SZA
2330 5321 JMP UEXIN1+2
2331 1394 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

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/DIVTB PAL10 V142 8-JUL-74 14128 PAGE 2-6  
 2344 3345 DCA .+1  
 2345 0000 0 /CLEAR FLAGS INSTR  
 2346 7300 CLA CLL /DID SKP THEN FLG WAS SET REPORT IT  
 2347 1354 IAD U2 /REMEMBER REGULAR INTR COULD HAVE COME UP  
 2350 7012 RTR /IN THIS TIME REPOIT IT ALSO  
 2351 7010 RAR  
 2352 4773 JMS OCTOUT  
 2353 5317 JMP UEXIN1  
 2354 0000 U2, 0  
 2355 0000 IOFFLG,0

2364 0001  
 2365 0252  
 2366 0770  
 2367 0200  
 2370 0010  
 2371 0212  
 2372 0215  
 2373 2070  
 2374 0240  
 2375 0100  
 2376 7740  
 2377 0077  
 2400 2400

PAGE /ASCII MESSAGE SECTION

2400 0405 MDEV, TEXT IDEV CODE OF READER? I  
 2401 2640  
 2402 0317  
 2403 0405  
 2404 4017  
 2405 0640  
 2406 2205  
 2407 0104  
 2410 0522  
 2411 7740  
 2412 0000  
 2413 0405 MDEV2, TEXT IDEV CODE OF LINE? I  
 2414 2640  
 2415 0317  
 2416 0405  
 2417 4017  
 2420 0640  
 2421 1411  
 2422 1605  
 2423 7740  
 2424 0000  
 2425 2205 EM1, TEXT IRECV ERRORI  
 2426 0326  
 2427 4005  
 2430 2222  
 2431 1722  
 2432 0000  
 2433 7704 MH1, TEXT I?DEV CODE OF RECEIVER #I  
 2434 0526

/DIVTB PAL10 V142 8-JUL-74 14128 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 MUNIX, TEXT I?UNEXPLAINED INTERRUPT FROM DEVICE(S)!!  
 2451 1605  
 2452 0020  
 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 IHD-08-DIVTB-A VT20 HOST PROGRAMI  
 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 I/I  
 2515 5600 MDDT, TEXT I/I  
 2516 4036 MCONC, TEXT I \*C I  
 2517 0340  
 2520 4000  
 2521 3610 MCH, TEXT I\*HI  
 2522 0000  
 2523 3622 MCR, TEXT I\*RI

2524	0000		
2525	3623	MCONS, TEXT	I+S:
2526	0000		
2527	7740	MQM, TEXT	I? I
2530	4000		
2531	3620	MCONP, TEXT	I+P:
2532	0000		
2533	1625	MNOL, TEXT	NUMBER OF RECEIVERS?
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 ISN'T BEING HELD=COMMAND IGNORED
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	WERBX, 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	11111111	11111111
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	11111111	11111111	11111111	11111111	11111111	11111111
0600	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
0700	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
1000	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
1100	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
1200	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
1300	11111111	11111111	11111111	11111111	11111111	11111111	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	11111111	11111111	11111111	11111111
2000	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
2100	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
2200	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
2300	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
2400	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
2500	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
2600	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
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	INTHP2	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	PRINTH	0003	TEMP	2306
AUTO17	0017	IOTKRB	6006	RCHAR	0070	TGXRET	0165
BKRB	1724	IOTKRS	6004	RELEASE	1276	TPP1	2273
BKSF	1720	IOTSF	6771	REND	1044	TPP2	2275
BOOTV1	1640	KBPO	0061	RERROR	1025	TRSRV0	0156
BOGDI	1742	KEYSRV	1200	RERRS	0067	TRSRV1	0157
BTCF	1730	KSERV	1211	RETAD	0000	TRSRV2	0160
BTLF	1725	LPRINT	2200	RNUB0	0600	TRSRV3	0161
BTSF	1726	MCH	2521	RNUB1	0625	TRSRV4	0162
BUFFO	0045	MCONC	2516	RNUB2	0692	TRSRV5	0163
CERORS	0505	MCONP	2531	RNUB3	0677	TTPP2	0164
CERROR	0500	MCONS	2525	RNUB4	0724	TUEXIN	0166
CHAR	0005	MCR	2523	RNUB5	1000	TXMIT	0027
CHECK	1733	MDEV	2400	ROR1	1637	TXMIT1	0030
COMP	1511	MDEV2	2443	RSRV0	0601	TYPE	4403
CONP1	1525	MOOT	2515	RSRV0A	0623	TYPO	2217
CONP2	1546	HERBK	2574	RSRV1	0626	U2	2354
CONS	1306	MS2	2206	RSRV1A	0650	UEXIN	2307
CONSL	1337	MH1	2433	RSRV2	0653	UEXIN1	2317
CRLF	4466	MHED	2474	RSRV2A	0675	WREC	0062
CRLFR	0066	MLNB4	2546	RSRV3	0700	WXMIT	0020
CRLFS	2264	MNOL	2533	RSRV3A	0722	WXMIT1	1151
CSEF	0514	MOO	2231	RSRV4	0725	XB0	0053
DEC	0037	MOO1	2241	RSRV4A	0747	XB1	0054
DUMB	1454	MOO2	2241	RSRV5	1001	XB2	0055
DUMB2	1455	MODER	1592	RSRV5A	1023	XB3	0056
DXMIT	0031	MODIFY	4404	RTEMP	0063	XB4	0057
EM	2425	MOY	0004	SENDB1	1465	XB5	0060
ERPO	4000	MONTR	0477	SENDBF	1456		
ERPOE	4200	MQ4	2527	SENDLN	1400		
GXMIT	1053	MSLAS	2514	SET0	0270		
GXMIT1	1055	MUNEX	2450	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		
GXPRT1	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		
INDCT	4464	OCTRO	2016	SRV7	0124		
INDCTR	0064	OVER1	0310	SRV8	0143		
INDCTS	2000	OVER10	0444	SRVE	0117		
INTBOT	1711	OVER2	0320	SRVEX	0152		
INTHP	2066	OVER3	0333	ST0	0252		

ERRORS DETECTED: 0  
 LINKS GENERATED: 63  
 RUN-TIME: 8 SECONDS  
 3K CORE USED

