```
LINE# LOC   CODE        LINE

00001 0000                      .LIB DISCLAIMER
00002 0000                ;*****************************************
00003 0000                ;*                                       *
00004 0000                ;* KK  K EEEEE RRRR  NN  N  AAA  LL     *
00005 0000                ;* KK KK EE    RR  R NNN N AA  A LL     *
00006 0000                ;* KKK   EE    RR  R NNN N AA  A LL     *
00007 0000                ;* KKK   EEEE  RRRR  NNNNN AAAAA LL     *
00008 0000                ;* KK K  EE    RR  R NN NN AA  A LL     *
00009 0000                ;* KK KK EE    RR  R NN NN AA  A LL     *
00010 0000                ;* KK KK EEEEE RR  R NN NN AA  A LLLLL  *
00011 0000                ;*                                       *
00012 0000                ;*****************************************
00013 0000                ;
00014 0000                ;*****************************************
00015 0000                ;* C64 KERNAL                            *
00016 0000                ;*   MEMORY AND I/O DEPENDENT ROUTINES   *
00017 0000                ;* DRIVING THE HARDWARE OF THE           *
00018 0000                ;* FOLLOWING CBM MODELS:                 *
00019 0000                ;*   COMMODORE 64 (NTSC OR PAL VIDEO)    *
00020 0000                ;* COPYRIGHT (C) 1983 BY                 *
00021 0000                ;* COMMODORE BUSINESS MACHINES (CBM)     *
00022 0000                ;*****************************************


00024 0000                ;****LISTING DATE --1200 05 AUG  1983***


00026 0000                ;*****************************************
00027 0000                ;* THIS SOFTWARE IS FURNISHED FOR USE    *
00028 0000                ;* USE IN THE VIC OR COMMODORE COMPUTER*
00029 0000                ;* SERIES ONLY.                          *
00030 0000                ;*                                       *
00031 0000                ;* COPIES THEREOF MAY NOT BE PROVIDED    *
00032 0000                ;* OR MADE AVAILABLE FOR USE ON ANY      *
00033 0000                ;* OTHER SYSTEM.                         *
00034 0000                ;*                                       *
00035 0000                ;* THE INFORMATION IN THIS DOCUMENT IS   *
00036 0000                ;* SUBJECT TO CHANGE WITHOUT NOTICE.     *
00037 0000                ;*                                       *
00038 0000                ;* NO RESPONSIBILITY IS ASSUMED FOR      *
00039 0000                ;* RELIABILITY OF THIS SOFTWARE. RSR     *
00040 0000                ;*                                       *
00041 0000                ;*****************************************
00042 0000                      .END
00043 0000                      .LIB DECLARE
```

```
LINE# LOC   CODE        LINE

00045  0000                    *=$0000          ;DECLARE 6510 PORTS
00046  0000             D6510  *=*+1            ;6510 DATA DIRECTION REGISTER
00047  0001             R6510  *=*+1            ;6510 DATA REGISTER
00048  0002                    *=$0002          ;MISS 6510 REGS
00049  0002             ;VIRTUAL REGS FOR MACHINE LANGUAGE MONITOR
00050  0002             PCH    *=*+1
00051  0003             PCL    *=*+1
00052  0004             FLGS   *=*+1
00053  0005             ACC    *=*+1
00054  0006             XR     *=*+1
00055  0007             YR     *=*+1
00056  0008             SP     *=*+1
00057  0009             INVH   *=*+1            ;USER MODIFIABLE IRQ
00058  000A             INVL   *=*+1


00060  000B                    * =$90
00061  0090             STATUS *=*+1            ;I/O OPERATION STATUS BYTE
00062  0091             ; CRFAC *=*+2 ;CORRECTION FACTOR (UNUSED)
00063  0091             STKEY  *=*+1            ;STOP KEY FLAG
00064  0092             SVXT   *=*+1            ;TEMPORARY
00065  0093             VERCK  *=*+1            ;LOAD OR VERIFY FLAG
00066  0094             C3PO   *=*+1            ;IEEE BUFFERED CHAR FLAG
00067  0095             BSOUR  *=*+1            ;CHAR BUFFER FOR IEEE
00068  0096             SYNO   *=*+1            ;CASSETTE SYNC #
00069  0097             XSAV   *=*+1            ;TEMP FOR BASIN
00070  0098             LDTND  *=*+1            ;INDEX TO LOGICAL FILE
00071  0099             DFLTN  *=*+1            ;DEFAULT INPUT DEVICE #
00072  009A             DFLTO  *=*+1            ;DEFAULT OUTPUT DEVICE #
00073  009B             PRTY   *=*+1            ;CASSETTE PARITY
00074  009C             DPSW   *=*+1            ;CASSETTE DIPOLE SWITCH
00075  009D             MSGFLG *=*+1            ;OS MESSAGE FLAG
00076  009E             PTR1                    ;CASSETTE ERROR PASS1
00077  009E             T1     *=*+1            ;TEMPORARY 1
00078  009F             TMPC
00079  009F             PTR2                    ;CASSETTE ERROR PASS2
00080  009F             T2     *=*+1            ;TEMPORARY 2
00081  00A0             TIME   *=*+3            ;24 HOUR CLOCK IN 1/60TH SECONDS
00082  00A3             R2D2                    ;SERIAL BUS USAGE
00083  00A3             PCNTR  *=*+1            ;CASSETTE STUFF
00084  00A4             ; PTCH *=*+1  (UNUSED)
00085  00A4             BSOUR1                  ;TEMP USED BY SERIAL ROUTINE
00086  00A4             FIRT   *=*+1
00087  00A5             COUNT                   ;TEMP USED BY SERIAL ROUTINE
00088  00A5             CNTDN  *=*+1            ;CASSETTE SYNC COUNTDOWN
00089  00A6             BUFPT  *=*+1            ;CASSETTE BUFFER POINTER
00090  00A7             INBIT                   ;RS-232 RCVR INPUT BIT STORAGE
00091  00A7             SHCNL  *=*+1            ;CASSETTE SHORT COUNT
00092  00A8             BITCI                   ;RS-232 RCVR BIT COUNT IN
00093  00A8             RER    *=*+1            ;CASSETTE READ ERROR
00094  00A9             RINONE                  ;RS-232 RCVR FLAG FOR START BIT
00095  00A9             REZ    *=*+1            ;CASSETE READING ZEROES
00096  00AA             RIDATA                  ;RS-232 RCVR BYTE BUFFER
00097  00AA             RDFLG  *=*+1            ;CASSETTE READ MODE
```

```
00098  00AB                RIPRTY                  ;RS-232 RCVR PARITY STORAGE
00099  00AB                SHCNH   *=*+1           ;CASSETTE SHORT CNT
00100  00AC                SAL     *=*+1
00101  00AD                SAH     *=*+1
00102  00AE                EAL     *=*+1
00103  00AF                EAH     *=*+1
```

DECLARE.....PAGE 0003

```
LINE# LOC   CODE        LINE

00104  00B0                CMPO    *=*+1
00105  00B1                TEMP    *=*+1
00106  00B2                TAPE1   *=*+2           ;ADDRESS OF TAPE BUFFER #1Y.
00107  00B4                BITTS                   ;RS-232 TRNS BIT COUNT
00108  00B4                SNSW1   *=*+1
00109  00B5                NXTBIT                  ;RS-232 TRNS NEXT BIT TO BE SENT
00110  00B5                DIFF    *=*+1
00111  00B6                RODATA                  ;RS-232 TRNS BYTE BUFFER
00112  00B6                PRP     *=*+1
00113  00B7                FNLEN   *=*+1           ;LENGTH CURRENT FILE N STR
00114  00B8                LA      *=*+1           ;CURRENT FILE LOGICAL ADDR
00115  00B9                SA      *=*+1           ;CURRENT FILE 2ND ADDR
00116  00BA                FA      *=*+1           ;CURRENT FILE PRIMARY ADDR
00117  00BB                FNADR   *=*+2           ;ADDR CURRENT FILE NAME STR
00118  00BD                ROPRTY                  ;RS-232 TRNS PARITY BUFFER
00119  00BD                OCHAR   *=*+1
00120  00BE                FSBLK   *=*+1           ;CASSETTE READ BLOCK COUNT
00121  00BF                MYCH    *=*+1
00122  00C0                CAS1    *=*+1           ;CASSETTE MANUAL/CONTROLLED SWITN
00123  00C1                TMPO
00124  00C1                STAL    *=*+1
00125  00C2                STAH    *=*+1
00126  00C3            MEMUSS                      ;CASSETTE LOAD TEMPS (2 BYTES)
00127  00C3            TMP2    *=*+2
00128  00C5            ;
00129  00C5            ;VARIABLES FOR SCREEN EDITOR
00130  00C5            ;
00131  00C5            LSTX    *=*+1               ;KEY SCAN INDEX
00132  00C6            ; SFST  *=*+1  ;KEYBOARD SHIFT FLAG (UNUSED)
00133  00C6            NDX     *=*+1               ;INDEX TO KEYBOARD Q
00134  00C7            RVS     *=*+1               ;RVS FIELD ON FLAG
00135  00C8            INDX    *=*+1
00136  00C9            LSXP    *=*+1               ;X POS AT START
00137  00CA            LSTP    *=*+1
00138  00CB            SFDX    *=*+1               ;SHIFT MODE ON PRINT
00139  00CC            BLNSW   *=*+1               ;CURSOR BLINK ENAB
00140  00CD            BLNCT   *=*+1               ;COUNT TO TOGGLE CUR
00141  00CE            GDBLN   *=*+1               ;CHAR BEFORE CURSOR
00142  00CF            BLNON   *=*+1               ;ON/OFF BLINK FLAG
00143  00D0            CRSW    *=*+1               ;INPUT VS GET FLAG
00144  00D1            PNT     *=*+2               ;POINTER TO ROW
00145  00D3            ; POINT *=*+1    (UNUSED)
00146  00D3            PNTR    *=*+1               ;POINTER TO COLUMN
00147  00D4            QTSW    *=*+1               ;QUOTE SWITCH
00148  00D5            LNMX    *=*+1               ;40/80 MAX POSITON
00149  00D6            TBLX    *=*+1
00150  00D7            DATA    *=*+1
00151  00D8            INSRT   *=*+1               ;INSERT MODE FLAG
00152  00D9            LDTB1   *=*+26              ;LINE FLAGS+ENDSPACE
```

```
00153  00F3                 USER    *=*+2           ;SCREEN EDITOR COLOR IP
00154  00F5                 KEYTAB  *=*+2           ;KEYSCAN TABLE INDIRECT
00155  00F7                 ;RS-232 Z-PAGE
00156  00F7                 RIBUF   *=*+2           ;RS-232 INPUT BUFFER POINTER
00157  00F9                 ROBUF   *=*+2           ;RS-232 OUTPUT BUFFER POINTER
0015[illegible]  00FB       FREKZP  *=*+4           ;FREE KERNAL ZERO PAGE 9/24/80
0015[illegible]  00FF       BASZPT  *=*+1           ;LOCATION ($00FF) USED BY BASIC



00161  0100                         *=$100
00162  0100                 BAD     *=*+1
```

```
DECLARE.....PAGE 0004

LINE# LOC   CODE        LINE


00163  0101                         *=$200
0016[illegible]  0200       BUF     *=*+89          ;BASIC/MONITOR BUFFER

00166  0259                 ; TABLES FOR OPEN FILES
00167  0259                 ;
00168  0259                 LAT     *=*+10          ;LOGICAL FILE NUMBERS
00169  0263                 FAT     *=*+10          ;PRIMARY DEVICE NUMBERS
00170  026D                 SAT     *=*+10          ;SECONDARY ADDRESSES


00172  0277                 ; SYSTEM STORAGE
00173  0277                 ;
00174  0277                 KEYD    *=*+10          ;IRQ KEYBOARD BUFFER
00175  0281                 MEMSTR  *=*+2           ;START OF MEMORY
00176  0283                 MEMSIZ  *=*+2           ;TOP OF MEMORY
00177  0285                 TIMOUT  *=*+1           ;IEEE TIMEOUT FLAG


00179  0286                 ; SCREEN EDITOR STORAGE
00180  0286                 ;
0018[illegible]  0286       COLOR   *=*+1           ;ACTIV COLOR NYBBLE
00182  0287                 GDCOL   *=*+1           ;ORIGINAL COLOR BEFORE CURSOR
00183  0288                 HIBASE  *=*+1           ;BASE LOCATION OF SCREEN (TOP)
00184  0289                 XMAX    *=*+1
00185  028A                 RPTFLG  *=*+1           ;KEY REPEAT FLAG
00186  028B                 KOUNT   *=*+1
00187  028C                 DELAY   *=*+1
00188  028D                 SHFLAG  *=*+1           ;SHIFT FLAG BYTE
00189  028E                 LSTSHF  *=*+1           ;LAST SHIFT PATTERN
00190  028F                 KEYLOG  *=*+2           ;INDIRECT FOR KEYBOARD TABLE SETUP
00191  0291                 MODE    *=*+1           ;0-PET MODE, 1-CATTACANNA
00192  0292                 AUTODN  *=*+1           ;AUTO SCROLL DOWN FLAG(=0 ON,<>0 OF


00194  0293                 ; RS-232 STORAGE
00195  0293                 ;
00196  0293                 M51CTR  *=*+1           ;6551 CONTROL REGISTER
0019[illegible]  0294       M51CDR  *=*+1           ;6551 COMMAND REGISTER
0019[illegible]  0295       M51AJB  *=*+2           ;NON STANDARD (BITTIME/2-100)
00199  0297                 RSSTAT  *=*+1           ; RS-232 STATUS REGISTER
00200  0298                 BITNUM  *=*+1           ;NUMBER OF BITS TO SEND (FAST RESPO
00201  0299                 BAUDOF  *=*+2           ;BAUD RATE FULL BIT TIME (CREATED B
```

```
0202  029B                ;
0203  029B                ; RECIEVER STORAGE
0204  029B                ;
0205  029B                ; INBIT *=*+1 ;INPUT BIT STORAGE
020   029B                ; BITCI *=*+1 ;BIT COUNT IN
02    029B                ; RINONE *=*+1 ;FLAG FOR START BIT CHECK
020   029B                ; RIDATA *=*+1 ;BYTE IN BUFFER
0209  029B                ; RIPRTY *=*+1 ;BYTE IN PARITY STORAGE
0210  029B               RIDBE  *=*+1            ;INPUT BUFFER INDEX TO END
0211  029C               RIDBS  *=*+1            ;INPUT BUFFER POINTER TO START
0212  029D               ;
0213  029D               ; TRANSMITTER STORAGE
0214  029D               ;
0215  029D               ; BITTS *=*+1 ;# OF BITS TO BE SENT
0216  029D               ; NXTBIT *=*+1 ;NEXT BIT TO BE SENT
0217  029D               ; ROPRTY *=*+1 ;PARITY OF BYTE SENT
0218  029D               ; RODATA *=*+1 ;BYTE BUFFER OUT
0219  029D               RODBS  *=*+1            ;OUTPUT BUFFER INDEX TO START
```

```
ECL  E.....PAGE 0005

LINE# LOC   CODE        LINE

0220  029E               RODBE  *=*+1            ;OUTPUT BUFFER INDEX TO END
0221  029F               ;
0222  029F               IRQTMP *=*+2            ;HOLDS IRQ DURING TAPE OPS
0223  02A1               ;
0224  02A1               ; TEMP SPACE FOR VIC-40 VARIABLES ****
0225  02A1               ;
0226  02A1               ENABL  *=*+1            ;RS-232 ENABLES (REPLACES IER)
0227  02A2               CASTON *=*+1            ;TOD SENSE DURING CASSETTES
0228  02A3               KIKA26 *=*+1            ;TEMP STORAGE FOR CASSETTE READ ROU
0229  02A4               STUPID *=*+1            ;TEMP D1IRQ INDICATOR FOR CASSETTE
0230  02A5               LINTMP *=*+1            ;TEMPORARY FOR LINE INDEX
0231  02A6               PALNTS *=*+1            ;PAL VS NTSC FLAG 0=NTSC 1=PAL


0233  02A7                      *=$0300          ;REM PROGRAM INDIRECTS(10)
0234  0300                      *=$0300+20       ;REM KERNAL/OS INDIRECTS(20)
0235  0314               CINV   *=*+2            ;IRQ RAM VECTOR
0236  0316               CBINV  *=*+2            ;BRK INSTR RAM VECTOR
0237  0318               NMINV  *=*+2            ;NMI RAM VECTOR
0238  031A               IOPEN  *=*+2            ;INDIRECTS FOR CODE
0239  031C               ICLOSE *=*+2            ; CONFORMS TO KERNAL SPEC 8/19/80
0240  031E               ICHKIN *=*+2
0241  0320               ICKOUT *=*+2
0242  0322               ICLRCH *=*+2
0243  0324               IBASIN *=*+2
0244  0326               IBSOUT *=*+2
0245  0328               ISTOP  *=*+2
0246  032A               IGETIN *=*+2
0247  032C               ICLALL *=*+2
0248  032E               USRCMD *=*+2
0249  0330               ILOAD  *=*+2
025   0332               ISAVE  *=*+2            ;SAVESP


0252  0334                      *=$0300+60
```

```
00253  033C                TBUFFR *=*+192          ;CASSETTE DATA BUFFER


00255  03FC                       * =$400
0025?  0400                VICSCN *=*+1024
0025?  0800                RAMLOC


DECLARE.....PAGE 0006

LINE# LOC   CODE         LINE


00260  0800                ; I/O DEVICES
00261  0800                ;
00262  0800                       * =$D000
00263  D000                VICREG =*               ;VIC REGISTERS


00265  D000                       * =$D400
00266  D400                SIDREG =*               ;SID REGISTERS


00268  D400                       * =$D800
00269  D800                VICCOL *=*+1024          ;VIC COLOR NYBBLES


00271  DC00                       * =$DC00          ;DEVICE1 6526 (PAGE1 IRQ)
00272  DC00                COLM                    ;KEYBOARD MATRIX
00273  DC00                D1PRA  *=*+1
00274  DC01                ROWS                    ;KEYBOARD MATRIX
00275  DC01                D1PRB  *=*+1
00276  DC02                D1DDRA *=*+1
00277  DC03                D1DDRB *=*+1
00278  DC04                D1T1L  *=*+1
00279  DC05                D1T1H  *=*+1
00280  DC06                D1T2L  *=*+1
00281  DC07                D1T2H  *=*+1
00282  DC08                D1TOD1 *=*+1
002??  DC09                D1TODS *=*+1
002?   DC0A                D1TODM *=*+1
00285  DC0B                D1TODH *=*+1
00286  DC0C                D1SDR  *=*+1
00287  DC0D                D1ICR  *=*+1
```

```
00288  DC0E                D1CRA   *=*+1
00289  DC0F                D1CRB   *=*+1


00291  DC10                        * =$DD00        ;DEVICE2 6526 (PAGE2 NMI)
00292  DD00                D2PRA   *=*+1
00293  DD01                D2PRB   *=*+1
00294  DD02                D2DDRA  *=*+1
00295  DD03                D2DDRB  *=*+1
00296  DD04                D2T1L   *=*+1
00297  DD05                D2T1H   *=*+1
00298  DD06                D2T2L   *=*+1
00299  DD07                D2T2H   *=*+1
00300  DD08                D2TOD1  *=*+1
00301  DD09                D2TODS  *=*+1
00302  DD0A                D2TODM  *=*+1
00303  DD0B                D2TODH  *=*+1
00304  DD0C                D2SDR   *=*+1
00305  DD0D                D2ICR   *=*+1
00306  DD0E                D2CRA   *=*+1
00307  DD0F                D2CRB   *=*+1


00309  DD10                TIMRB   =$19            ;6526 CRB ENABLE ONE-SHOT TB
```

DECLARE.....PAGE 0007

```
LINE# LOC   CODE        LINE


00311  DD10                ;TAPE BLOCK TYPES
00312  DD10                ;
00313  DD10                EOT     =5              ;END OF TAPE
00314  DD10                BLF     =1              ;BASIC LOAD FILE
00315  DD10                BDF     =2              ;BASIC DATA FILE
00316  DD10                PLF     =3              ;FIXED PROGRAM TYPE
00317  DD10                BDFH    =4              ;BASIC DATA FILE HEADER
00318  DD10                BUFSZ   =192            ;BUFFER SIZE
00319  DD10                ;
00320  DD10                ;SCREEN EDITOR CONSTANTS
00321  DD10                ;
00322  DD10                LLEN    =40             ;SINGLE LINE 40 COLUMNS
00323  DD10                LLEN2   =80             ;DOUBLE LINE = 80 COLUMNS
00324  DD10                NLINES  =25             ;25 ROWS ON SCREEN
00325  DD10                WHITE   =$01            ;WHITE SCREEN COLOR
00326  DD10                BLUE    =$06            ;BLUE CHAR COLOR
00327  DD10                CR      =$D             ;CARRIAGE RETURN
00328  DD10                        .END
00329  DD10                        *=$E500         ;START OF COMMODORE 64 KERNAL
00330  E500                        .LIB EDITOR.1
```

```
LINE# LOC   CODE        LINE

00332  E500             MAXCHR=80
00333  E500             NWRAP=2                 ;MAX NUMBER OF PHYSICAL LINES PER L
00334  E500             ;
00335  E500             ;UNDEFINED FUNCTION ENTRY
00336  E500             ;
00337  E500             ; UNDEFD LDX #0
00338  E500             ; UNDEF2 LDA UNMSG,X
00339  E500             ; JSR PRT
00340  E500             ; INX
00341  E500             ; CPX #UNMSG2-UNMSG
00342  E500             ; BNE UNDEF2
00343  E500             ; SEC
00344  E500             ; RTS
00345  E500             ;
00346  E500             ; UNMSG .BYT $D,'?ADVANCED FUNCTION NOT AVAILABLE',$D
00347  E500             ; UNMSG2
00348  E500             ;
00349  E500             ;RETURN ADDRESS OF 6526
00350  E500             ;
```

```
00351  E500  A2 00     IOBASE LDX #<D1PRA
00352  E502  A0 DC            LDY #>D1PRA
00353  E504  60               RTS
00354  E505            ;
00355  E505            ;RETURN MAX ROWS,COLS OF SCREEN
00356  E505            ;
00357  E505  A2 28     SCRORG LDX #LLEN
00358  E507  A0 19            LDY #NLINES
00359  E509  60               RTS
00360  E50A            ;
00361  E50A            ;READ/PLOT CURSOR POSITION
00362  E50A            ;
00363  E50A  B0 07     PLOT   BCS PLOT10
00364  E50C  86 D6            STX TBLX
00365  E50E  84 D3            STY PNTR
00366  E510  20 6C E5         JSR STUPT
00367  E513  A6 D6     PLOT10 LDX TBLX
00368  E515  A4 D3            LDY PNTR
00369  E517  60               RTS




00372  E518            ;INITIALIZE I/O
00373  E518            ;
00374  E518            CINT
00375  E518            ;
00376  E518            ; ESTABLISH SCREEN MEMORY
00377  E518            ;
00378  E518  20 A0 E5         JSR PANIC       ;SET UP VIC
00379  E51B            ;
00380  E51B  A9 00            LDA #0          ;MAKE SURE WE'RE IN PET MODE
00381  E51D  8D 91 02         STA MODE
00382  E520  85 CF            STA BLNON       ;WE DONT HAVE A GOOD CHAR FROM THE S

00383  E522  A9 48            LDA #<SHFLOG    ;SET SHIFT LOGIC INDIRECTS
00384  E524  8D 8F 02         STA KEYLOG
00385  E527  A9 EB            LDA #>SHFLOG
00386  E529  8D 90 02         STA KEYLOG+1
00387  E52C  A9 0A            LDA #10
00388  E52E  8D 89 02         STA XMAX        ;MAXIMUM TYPE AHEAD BUFFER SIZE
```

SCREEN EDITOR.....PAGE 0009

```
LINE# LOC   CODE        LINE


00389  E531  8D 8C 02         STA DELAY
00390  E534  A9 0E            LDA #14         ;INIT COLOR TO LT BLUE 901227-03****
00391  E536  8D 86 02         STA COLOR
00392  E539  A9 04            LDA #4
00393  E53B  8D 8B 02         STA KOUNT       ;DELAY BETWEEN KEY REPEATS
00394  E53E  A9 0C            LDA #$C
00395  E540  85 CD            STA BLNCT
00396  E542  85 CC            STA BLNSW
00397  E544  AD 88 02  CLSR   LDA HIBASE       ;FILL HI BYTE PTR TABLE
00398  E547  09 80            ORA #$80
00399  E549  A8               TAY
00400  E54A  A9 00            LDA #0
00401  E54C  AA               TAX
```

```
00402  E54D  94 D9        LPS1    STY LDTB1,X
00403  E54F  18                    CLC
00404  E550  69 28                 ADC #LLEN
00405  E552  90 01                 BCC LPS2
00406  E554  C8                    INY              ;CARRY BUMP HI BYTE
00407  E555  E8            LPS2    INX
00408  E556  E0 1A                 CPX #NLINES+1    ;DONE # OF LINES?
00409  E558  D0 F3                 BNE LPS1         ;NO...
00410  E55A  A9 FF                 LDA #$FF         ;TAG END OF LINE TABLE
00411  E55C  95 D9                 STA LDTB1,X
00412  E55E  A2 18                 LDX #NLINES-1    ;CLEAR FROM THE BOTTOM LINE UP
00413  E560  20 FF E9     CLEAR1  JSR CLRLN         ;SEE SCROLL ROUTINES
00414  E563  CA                    DEX
00415  E564  10 FA                 BPL CLEAR1




00417  E566                ;HOME FUNCTION
00418  E566                ;
00419  E566  A0 00         NXTD    LDY #0
00420  E568  84 D3                 STY PNTR         ;LEFT COLUMN
00421  E56A  84 D6                 STY TBLX         ;TOP LINE
00422  E56C                ;
00423  E56C                ;MOVE CURSOR TO TBLX,PNTR
00424  E56C                ;
00425  E56C                STUPT
00426  E56C  A6 D6                 LDX TBLX         ;GET CURENT LINE INDEX
00427  E56E  A5 D3                 LDA PNTR         ;GET CHARACTER POINTER
00428  E570  B4 D9         FNDSTR  LDY LDTB1,X      ;FIND BEGINING OF LINE
00429  E572  30 08                 BMI STOK         ;BRANCH IF START FOUND
00430  E574  18                    CLC
00431  E575  69 28                 ADC #LLEN        ;ADJUST POINTER
00432  E577  85 D3                 STA PNTR
00433  E579  CA                    DEX
00434  E57A  10 F4                 BPL FNDSTR
00435  E57C                ;
00436  E57C  20 F0 E9      STOK    JSR SETPNT       ;SET UP PNT INDIRECT 901227-03*****
00437  E57F                ;
00438  E57F  A9 27                 LDA #LLEN-1
00439  E581  E8                    INX
00440  E582  B4 D9         FNDEND  LDY LDTB1,X
00441  E584  30 06                 BMI STDONE
00442  E586  18                    CLC
00443  E587  69 28                 ADC #LLEN
00444  E589  E8                    INX
00445  E58A  10 F6                 BPL FNDEND




SCREEN EDITOR.....PAGE 0010

LINE# LOC   CODE        LINE


00446  E58C                STDONE
00447  E58C  85 D5                 STA LNMX
00448  E58E  4C 24 EA              JMP SCOLOR       ;MAKE COLOR POINTER FOLLOW 901227-03


00450  E591                ; THIS IS A PATCH FOR INPUT LOGIC 901227-03**********
00451  E591                ;   FIXES INPUT"XXXXXXX-40-XXXXX";A$ PROBLEM
```

```
00452  E591                ;
00453  E591  E4 C9         FINPUT CPX LSXP          ;CHECK IF ON SAME LINE
00454  E593  F0 03                BEQ FINPUX       ;YES...RETURN TO SEND
00455  E595  4C ED E6             JMP FINDST       ;CHECK IF WE WRAPPED DOWN...
00456  E598  60            FINPUX RTS
00457  E599  EA                   NOP              ;KEEP THE SPACE THE SAME...


00459  E59A                ;PANIC NMI ENTRY
00460  E59A                ;
00461  E59A  20 A0 E5      VPAN   JSR PANIC        ;FIX VIC SCREEN
00462  E59D  4C 66 E5             JMP NXTD         ;HOME CURSOR


00464  E5A0  A9 03         PANIC  LDA #3           ;RESET DEFAULT I/O
00465  E5A2  85 9A                STA DFLTO
00466  E5A4  A9 00                LDA #0
00467  E5A6  85 99                STA DFLTN


00469  E5A8                ;INIT VIC
00470  E5A8                ;
00471  E5A8  A2 2F         INITV  LDX #47          ;LOAD ALL VIC REGS ***
00472  E5AA  BD B8 EC      PX4    LDA TVIC-1,X
00473  E5AD  9D FF CF             STA VICREG-1,X
00474  E5B0  CA                   DEX
00475  E5B1  D0 F7                BNE PX4
00476  E5B3  60                   RTS
```

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```
LINE  LOC   CODE         LINE

00478  E5B4                ;
```

```
00479  E5B4                    ;REMOVE CHARACTER FROM QUEUE
00480  E5B4                    ;
00481  E5B4  AC 77 02    LP2   LDY KEYD
00482  E5B7  A2 00             LDX #0
00483  E5B9  BD 78 02    LP1   LDA KEYD+1,X
00484  E5BC  9D 77 02          STA KEYD,X
00485  E5BF  E8                INX
00486  E5C0  E4 C6             CPX NDX
00487  E5C2  D0 F5             BNE LP1
00488  E5C4  C6 C6             DEC NDX
00489  E5C6  98                TYA
00490  E5C7  58                CLI
00491  E5C8  18                CLC                ;GOOD RETURN
00492  E5C9  60                RTS
00493  E5CA                    ;
00494  E5CA  20 16 E7    LOOP4 JSR PRT
00495  E5CD                    LOOP3
00496  E5CD  A5 C6             LDA NDX
00497  E5CF  85 CC             STA BLNSW
00498  E5D1  8D 92 02          STA AUTODN         ;TURN ON AUTO SCROLL DOWN
00499  E5D4  F0 F7             BEQ LOOP3
00500  E5D6  78                SEI
00501  E5D7  A5 CF             LDA BLNON
00502  E5D9  F0 0C             BEQ LP21
00503  E5DB  A5 CE             LDA GDBLN
00504  E5DD  AE 87 02          LDX GDCOL          ;RESTORE ORIGINAL COLOR
00505  E5E0  A0 00             LDY #0
00506  E5E2  84 CF             STY BLNON
00507  E5E4  20 13 EA          JSR DSPP
00508  E5E7  20 B4 E5    LP21  JSR LP2
00509  E5EA  C9 83             CMP #$83           ;RUN KEY?
00510  E5EC  D0 10             BNE LP22
00511  E5EE  A2 09             LDX #9
00512  E5F0  78                SEI
00513  E5F1  86 C6             STX NDX
00514  E5F3  BD E6 EC    LP23  LDA RUNTB-1,X
00515  E5F6  9D 76 02          STA KEYD-1,X
00516  E5F9  CA                DEX
00517  E5FA  D0 F7             BNE LP23
00518  E5FC  F0 CF             BEQ LOOP3
00519  E5FE  C9 0D       LP22  CMP #$D
00520  E600  D0 C8             BNE LOOP4
00521  E602  A4 D5             LDY LNMX
00522  E604  84 D0             STY CRSW
00523  E606  B1 D1       CLP5  LDA (PNT)Y
00524  E608  C9 20             CMP #'
00525  E60A  D0 03             BNE CLP6
00526  E60C  88                DEY
00527  E60D  D0 F7             BNE CLP5
00528  E60F  C8           CLP6  INY
00529  E610  84 C8             STY INDX
00530  E612  A0 00             LDY #0
00531  E614  8C 92 02          STY AUTODN         ;TURN OFF AUTO SCROLL DOWN
00532  E617  84 D3             STY PNTR
00533  E619  84 D4             STY QTSW
00534  E61B  A5 C9             LDA LSXP
00535  E61D  30 1B             BMI LOP5
00536  E61F  A6 D6             LDX TBLX
00537  E621  20 91 E5          JSR FINPUT         ;CHECK FOR SAME LINE AS START  90122
00538  E624  E4 C9             CPX LSXP
```

```
LINE# LOC   CODE        LINE


00540  E626  D0 12              BNE LOP5
00541  E628  A5 CA              LDA LSTP
00541  E62A  85 D3              STA PNTR
00542  E62C  C5 C8              CMP INDX
00543  E62E  90 0A              BCC LOP5
00544  E630  B0 2B              BCS CLP2




00546  E632                    ;INPUT A LINE UNTIL CARRIAGE RETURN
00547  E632                    ;
00548  E632  98          LOOP5  TYA
00549  E633  48                 PHA
00550  E634  8A                 TXA
00551  E635  48                 PHA
00552  E636  A5 D0              LDA CRSW
00553  E638  F0 93              BEQ LOOP3
00554  E63A  A4 D3        LOP5   LDY PNTR
00555  E63C  B1 D1              LDA (PNT)Y
00556  E63E                    NOTONE
00557  E63E  85 D7              STA DATA
00558  E640  29 3F        LOP51  AND #$3F
00559  E642  06 D7              ASL DATA
00560  E644  24 D7              BIT DATA
00561  E646  10 02              BPL LOP54
00562  E648  09 80              ORA #$80
00563  E64A  90 04        LOP54  BCC LOP52
00564  E64C  A6 D4              LDX QTSW
00565  E64E  D0 04              BNE LOP53
00566  E650  70 02        LOP52  BVS LOP53
00567  E652  09 40              ORA #$40
00568  E654  E6 D3        LOP53  INC PNTR
00569  E656  20 84 E6           JSR QTSWC
00570  E659  C4 C8              CPY INDX
00571  E65B  D0 17              BNE CLP1
00572  E65D  A9 00        CLP2   LDA #0
00573  E65F  85 D0              STA CRSW
00574  E661  A9 0D              LDA #$D
00575  E663  A6 99              LDX DFLTN        ;FIX GETS FROM SCREEN
00576  E665  E0 03              CPX #3           ;IS IT THE SCREEN?
00577  E667  F0 06              BEQ CLP2A
00578  E669  A6 9A              LDX DFLTO
00579  E66B  E0 03              CPX #3
00580  E66D  F0 03              BEQ CLP21
00581  E66F  20 16 E7     CLP2A  JSR PRT
00582  E672  A9 0D        CLP21  LDA #$D
00583  E674  85 D7        CLP1   STA DATA
00584  E676  68                 PLA
00585  E677  AA                 TAX
00586  E678  68                 PLA
00587  E679  A8                 TAY
00588  E67A  A5 D7              LDA DATA
00589  E67C  C9 DE              CMP #$DE         ;IS IT <PI> ?
00590  E67E  D0 02              BNE CLP7
00591  E680  A9 FF              LDA #$FF
00592  E682  18           CLP7   CLC
00593  E683  60                 RTS
```

```
LINE# LOC   CODE         LINE

00595  E684  C9 22       QTSWC  CMP ##$22
00596  E686  D0 08              BNE QTSWL
00597  E688  A5 D4              LDA QTSW
00598  E68A  49 01              EOR ##$1
00599  E68C  85 D4              STA QTSW
00600  E68E  A9 22              LDA ##$22
00601  E690  60         QTSWL  RTS




00603  E691  09 40       NXT33  ORA ##$40
00604  E693  A6 C7       NXT3   LDX RVS
00605  E695  F0 02              BEQ NVS
00606  E697  09 80       NC3    ORA ##$80
00607  E699  A6 D8       NVS    LDX INSRT
00608  E69B  F0 02              BEQ NVS1
00609  E69D  C6 D8              DEC INSRT
00610  E69F  AE 86 02    NVS1   LDX COLOR PUT COLOR ON SCREEN
00611  E6A2  20 13 EA           JSR DSPP
00612  E6A5  20 B6 E6           JSR WLOGIC      ;CHECK FOR WRAPAROUND
00613  E6A8  68         LOOP2  PLA
00614  E6A9  A8                TAY
00615  E6AA  A5 D8              LDA INSRT
00616  E6AC  F0 02              BEQ LOP2
00617  E6AE  46 D4              LSR QTSW
00618  E6B0  68         LOP2   PLA
00619  E6B1  AA                TAX
00620  E6B2  68                PLA
00621  E6B3  18                CLC              ;GOOD RETURN
00622  E6B4  58                CLI
00623  E6B5  60                RTS
```

```
LINE# LOC   CODE         LINE

00625  E6B6                WLOGIC
00626  E6B6  20 B3 E8             JSR CHKDWN      ;MAYBE WE SHOULD WE INCREMENT TBLX
00627  E6B9  E6 D3                INC PNTR        ;BUMP CHARCTER POINTER
00628  E6BB  A5 D5                LDA LNMX        ;
00629  E6BD  C5 D3                CMP PNTR        ;IF LNMX IS LESS THAN PNTR
00630  E6BF  B0 3F                BCS WLGRTS      ;BRANCH IF LNMX>=PNTR
00631  E6C1  C9 4F                CMP #MAXCHR-1   ;PAST MAX CHARACTERS
00632  E6C3  F0 32                BEQ WLOG10      ;BRANCH IF SO
00633  E6C5  AD 92 02             LDA AUTODN      ;SHOULD WE AUTO SCROLL DOWN?
00634  E6C8  F0 03                BEQ WLOG20      ;BRANCH IF NOT
00635  E6CA  4C 67 E9             JMP BMT1         ;ELSE DECIDE WHICH WAY TO SCROLL



00637  E6CD                WLOG20
00638  E6CD  A6 D6                LDX TBLX        ;SEE IF WE SHOULD SCROLL DOWN
00639  E6CF  E0 19                CPX #NLINES
00640  E6D1  90 07                BCC WLOG30      ;BRANCH IF NOT
00641  E6D3  20 EA E8             JSR SCROL       ;ELSE DO THE SCROL UP
00642  E6D6  C6 D6                DEC TBLX        ;AND ADJUST CURENT LINE#
00643  E6D8  A6 D6                LDX TBLX
00644  E6DA  16 D9        WLOG30  ASL LDTB1,X      ;WRAP THE LINE
00645  E6DC  56 D9                LSR LDTB1,X
00646  E6DE  E8                   INX             ;INDEX TO NEXT LLINE
00647  E6DF  B5 D9                LDA LDTB1,X     ;GET HIGH ORDER BYTE OF ADDRESS
00648  E6E1  09 80                ORA #$80        ;MAKE IT A NON-CONTINUATION LINE
00649  E6E3  95 D9                STA LDTB1,X     ;AND PUT IT BACK
00650  E6E5  CA                   DEX             ;GET BACK TO CURRENT LINE
00651  E6E6  A5 D5                LDA LNMX        ;CONTINUE THE BYTES TAKEN OUT
00652  E6E8  18                   CLC
00653  E6E9  69 28                ADC #LLEN
00654  E6EB  85 D5                STA LNMX
00655  E6ED                FINDST
00656  E6ED  B5 D9                LDA LDTB1,X     ;IS THIS THE FIRST LINE?
00657  E6EF  30 03                BMI FINX        ;BRANCH IF SO
00658  E6F1  CA                   DEX             ;ELSE BACKUP 1
00659  E6F2  D0 F9                BNE FINDST
00660  E6F4                FINX
00661  E6F4  4C F0 E9             JMP SETPNT      ;MAKE SURE PNT IS RIGHT

00663  E6F7  C6 D6        WLOG10  DEC TBLX
00664  E6F9  20 7C E8             JSR NXLN
00665  E6FC  A9 00                LDA #0
00666  E6FE  85 D3                STA PNTR        ;POINT TO FIRST BYTE
00667  E700  60           WLGRTS  RTS
```

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LINE# LOC   CODE         LINE

00669  E701  A6 D6       BKLN   LDX TBLX
00670  E703  D0 06              BNE BKLN1
00671  E705  86 D3              STX PNTR
00672  E707  68                 PLA
00673  E708  68                 PLA
00674  E709  D0 9D              BNE LOOP2
00675  E70B                    ;
00676  E70B  CA          BKLN1  DEX
00677  E70C  86 D6              STX TBLX
00678  E70E  20 6C E5           JSR STUPT
00679  E711  A4 D5              LDY LNMX
00680  E713  84 D3              STY PNTR
00681  E715  60                 RTS



00683  E716                    ;PRINT ROUTINE
00684  E716                    ;
00685  E716  48          PRT    PHA
00686  E717  85 D7              STA DATA
00687  E719  8A                 TXA
00688  E71A  48                 PHA
00689  E71B  98                 TYA
00690  E71C  48                 PHA
00691  E71D  A9 00              LDA #0
00692  E71F  85 D0              STA CRSW
00693  E721  A4 D3              LDY PNTR
00694  E723  A5 D7              LDA DATA
00695  E725  10 03              BPL *+5
00696  E727  4C D4 E7           JMP NXTX
00697  E72A  C9 0D              CMP #$D
00698  E72C  D0 03              BNE NJT1
00699  E72E  4C 91 E8           JMP NXT1
00700  E731  C9 20       NJT1   CMP #'
00701  E733  90 10              BCC NTCN
00702  E735  C9 60              CMP #$60          ;LOWER CASE?
00703  E737  90 04              BCC NJT8          ;NO...
00704  E739  29 DF              AND #$DF          ;YES...MAKE SCREEN LOWER
00705  E73B  D0 02              BNE NJT9          ;ALWAYS
00706  E73D  29 3F       NJT8   AND #$3F
00707  E73F  20 84 E6    NJT9   JSR QTSWC
```

```
00708  E742  4C 93 E6           JMP NXT3
00709  E745  A6 D8      NTCN    LDX INSRT
00710  E747  F0 03              BEQ CNC3X
00711  E749  4C 97 E6           JMP NC3
00712  E74C  C9 14      CNC3X   CMP #$14
00713  E74E  D0 2E              BNE NTCN1
00714  E750  98                 TYA
00715  E751  D0 06              BNE BAK1UP
00716  E753  20 01 E7           JSR BKLN
00717  E756  4C 73 E7           JMP BK2
00718  E759  20 A1 E8    BAK1UP JSR CHKBAK      ;SHOULD WE DEC TBLX
00719  E75C  88                 DEY
00720  E75D  84 D3              STY PNTR
00721  E75F  20 24 EA    BK1    JSR SCOLOR      ;FIX COLOR PTRS
00722  E762  C8          BK15   INY
00723  E763  B1 D1              LDA (PNT)Y
00724  E765  88                 DEY
00725  E766  91 D1              STA (PNT)Y
```

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```
LINE# LOC   CODE        LINE

00726  E768  C8                 INY
00727  E769  B1 F3              LDA (USER)Y
00728  E76B  88                 DEY
00729  E76C  91 F3              STA (USER)Y
00730  E76E  C8                 INY
00731  E76F  C4 D5              CPY LNMX
00732  E771  D0 EF              BNE BK15
00733  E773  A9 20      BK2     LDA #'
00734  E775  91 D1              STA (PNT)Y
00735  E777  AD 86 02           LDA COLOR
00736  E77A  91 F3              STA (USER)Y
00737  E77C  10 4D              BPL JPL3
00738  E77E  A6 D4      NTCN1   LDX QTSW
00739  E780  F0 03              BEQ NC3W
00740  E782  4C 97 E6    CNC3    JMP NC3
00741  E785  C9 12      NC3W    CMP #$12
00742  E787  D0 02              BNE NC1
00743  E789  85 C7              STA RVS
00744  E78B  C9 13      NC1     CMP #$13
00745  E78D  D0 03              BNE NC2
00746  E78F  20 66 E5           JSR NXTD
00747  E792  C9 1D      NC2     CMP #$1D
00748  E794  D0 17              BNE NCX2
00749  E796  C8                 INY
00750  E797  20 B3 E8           JSR CHKDWN
00751  E79A  84 D3              STY PNTR
00752  E79C  88                 DEY
00753  E79D  C4 D5              CPY LNMX
00754  E79F  90 09              BCC NCZ2
00755  E7A1  C6 D6              DEC TBLX
00756  E7A3  20 7C E8           JSR NXLN
00757  E7A6  A0 00              LDY #0
00758  E7A8  84 D3      JPL4    STY PNTR
00759  E7AA  4C A8 E6    NCZ2    JMP LOOP2
00760  E7AD  C9 11      NCX2    CMP #$11
00761  E7AF  D0 1D              BNE COLR1
00762  E7B1  18                 CLC
```

```
00763  E7B2  98                TYA
00764  E7B3  69 28             ADC #LLEN
00765  E7B5  A8                TAY
00766  E7B6  E6 D6             INC TBLX
00767  E7B8  C5 D5             CMP LNMX
00768  E7BA  90 EC             BCC JPL4
00769  E7BC  F0 EA             BEQ JPL4
00770  E7BE  C6 D6             DEC TBLX
00771  E7C0  E9 28     CURS10  SBC #LLEN
00772  E7C2  90 04             BCC GOTDWN
00773  E7C4  85 D3             STA PNTR
00774  E7C6  D0 F8             BNE CURS10
00775  E7C8  20 7C E8  GOTDWN  JSR NXLN
00776  E7CB  4C A8 E6  JPL3    JMP LOOP2
00777  E7CE  20 CB E8  COLR1   JSR CHKCOL      ;CHECK FOR A COLOR
00778  E7D1  4C 44 EC          JMP LOWER      ;WAS JMP LOOP2



00780  E7D4              ;CHECK COLOR
00781  E7D4              ;
```

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```
LINE# LOC   CODE        LINE


00783  E7D4              ;SHIFTED KEYS
00784  E7D4              ;
00785  E7D4              NXTX
00786  E7D4              KEEPIT
00787  E7D4  29 7F             AND #$7F
00788  E7D6  C9 7F             CMP #$7F
00789  E7D8  D0 02             BNE NXTX1
00790  E7DA  A9 5E             LDA #$5E
00791  E7DC              NXTX1
00792  E7DC              NXTXA
00793  E7DC  C9 20             CMP #$20       ;IS IT A FUNCTION KEY
00794  E7DE  90 03             BCC UHUH
00795  E7E0  4C 91 E6          JMP NXT33
00796  E7E3              UHUH
00797  E7E3  C9 0D             CMP #$D
00798  E7E5  D0 03             BNE UP5
00799  E7E7  4C 91 E8          JMP NXT1
00800  E7EA  A6 D4     UP5     LDX  QTSW
00801  E7EC  D0 3F             BNE UP6
00802  E7EE  C9 14             CMP #$14
00803  E7F0  D0 37             BNE UP9
00804  E7F2  A4 D5             LDY LNMX
00805  E7F4  B1 D1             LDA (PNT)Y
00806  E7F6  C9 20             CMP #'
00807  E7F8  D0 04             BNE INS3
00808  E7FA  C4 D3             CPY PNTR
00809  E7FC  D0 07             BNE INS1
00810  E7FE  C0 4F     INS3    CPY #MAXCHR-1
00811  E800  F0 24             BEQ INSEXT     ;EXIT IF LINE TOO LONG
00812  E802  20 65 E9          JSR NEWLIN     ;SCROLL DOWN 1
00813  E805  A4 D5     INS1    LDY LNMX
```

```
00814  E807  20 24 EA           JSR SCOLOR
00815  E80A  88          INS2   DEY
00816  E80B  B1 D1              LDA (PNT)Y
00817  E80D  C8                 INY
00818  E80E  91 D1              STA (PNT)Y
008.   E810  88                 DEY
0082   E811  B1 F3              LDA (USER)Y
00821  E813  C8                 INY
00822  E814  91 F3              STA (USER)Y
00823  E816  88                 DEY
00824  E817  C4 D3              CPY PNTR
00825  E819  D0 EF              BNE INS2
00826  E81B  A9 20              LDA #$20
00827  E81D  91 D1              STA (PNT)Y
00828  E81F  AD 86 02           LDA COLOR
00829  E822  91 F3              STA (USER)Y
00830  E824  E6 D8              INC INSRT
00831  E826  4C A8 E6  INSEXT   JMP LOOP2
00832  E829  A6 D8      UP9     LDX INSRT
00833  E82B  F0 05              BEQ UP2
00834  E82D  09 40      UP6     ORA #$40
00835  E82F  4C 97 E6           JMP NC3
00836  E832  C9 11      UP2     CMP #$11
00837  E834  D0 16              BNE NXT2
008.   E836  A6 D6              LDX TBLX
0083   E838  F0 37              BEQ JPL2
00840  E83A  C6 D6              DEC TBLX
00841  E83C  A5 D3              LDA PNTR
00842  E83E  38                 SEC
00843  E83F  E9 28              SBC #LLEN
```

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```
LINE# LOC   CODE        LINE

00844  E841  90 04              BCC UPALIN
00845  E843  85 D3              STA PNTR
008.   E845  10 2A              BPL JPL2
0084   E847  20 6C E5  UPALIN   JSR STUPT
00848  E84A  D0 25              BNE JPL2
00849  E84C  C9 12      NXT2    CMP #$12
00850  E84E  D0 04              BNE NXT6
00851  E850  A9 00              LDA #0
00852  E852  85 C7              STA RVS
00853  E854  C9 1D      NXT6    CMP #$1D
00854  E856  D0 12              BNE NXT61
00855  E858  98                 TYA
00856  E859  F0 09              BEQ BAKBAK
00857  E85B  20 A1 E8           JSR CHKBAK
00858  E85E  88                 DEY
00859  E85F  84 D3              STY PNTR
00860  E861  4C A8 E6           JMP LOOP2
00861  E864  20 01 E7  BAKBAK   JSR BKLN
00862  E867  4C A8 E6           JMP LOOP2
00863  E86A  C9 13      NXT61   CMP #$13
008F   E86C  D0 06              BNE SCCL
008.   E86E  20 44 E5           JSR CLSR
00866  E871  4C A8 E6  JPL2     JMP LOOP2
00867  E874              SCCL
00868  E874  09 80              ORA #$80          ;MAKE IT UPPER CASE
```

```
00869  E876  20 CB E8           JSR CHKCOL       ;TRY FOR COLOR
00870  E879  4C 4F EC           JMP UPPER       ;WAS JMP LOOP2
00871  E87C                    ;
00872  E87C  46 C9             NXLN   LSR LSXP
00873  E87E  A6 D6                    LDX TBLX
00874  E880  E8                NXLN2  INX
00875  E881  E0 19                    CPX #NLINES      ;OFF BOTTOM?
00876  E883  D0 03                    BNE NXLN1        ;NO...
00877  E885  20 EA E8                 JSR SCROL        ;YES...SCROLL
00878  E888  B5 D9             NXLN1  LDA LDTB1,X      ;DOUBLE LINE?
00879  E88A  10 F4                    BPL NXLN2        ;YES...SCROLL AGAIN
00880  E88C  86 D6                    STX TBLX
00881  E88E  4C 6C E5                 JMP STUPT
00882  E891                    NXT1
00883  E891  A2 00                    LDX #0
00884  E893  86 D8                    STX INSRT
00885  E895  86 C7                    STX RVS
00886  E897  86 D4                    STX QTSW
00887  E899  86 D3                    STX PNTR
00888  E89B  20 7C E8                 JSR NXLN
00889  E89E  4C A8 E6           JPL5   JMP LOOP2
00890  E8A1                    ;
00891  E8A1                    ;
00892  E8A1                    ; CHECK FOR A DECREMENT TBLX
00893  E8A1                    ;
00894  E8A1  A2 02             CHKBAK LDX #NWRAP
00895  E8A3  A9 00                    LDA #0
00896  E8A5  C5 D3             CHKLUP CMP PNTR
00897  E8A7  F0 07                    BEQ BACK
00898  E8A9  18                       CLC
00899  E8AA  69 28                    ADC #LLEN
00900  E8AC  CA                       DEX
00901  E8AD  D0 F6                    BNE CHKLUP
00902  E8AF  60                       RTS
00903  E8B0                    ;
00904  E8B0  C6 D6             BACK   DEC TBLX
```



```
LINE# LOC   CODE        LINE

00905  E8B2  60                 RTS
00906  E8B3                    ;
00907  E8B3                    ; CHECK FOR INCREMENT TBLX
00908  E8B3                    ;
00909  E8B3  A2 02             CHKDWN LDX #NWRAP
00910  E8B5  A9 27                    LDA #LLEN-1
00911  E8B7  C5 D3             DWNCHK CMP PNTR
00912  E8B9  F0 07                    BEQ DNLINE
00913  E8BB  18                       CLC
00914  E8BC  69 28                    ADC #LLEN
00915  E8BE  CA                       DEX
00916  E8BF  D0 F6                    BNE DWNCHK
00917  E8C1  60                       RTS
00918  E8C2                    ;
00919  E8C2  A6 D6             DNLINE LDX TBLX
00920  E8C4  E0 19                    CPX #NLINES
00921  E8C6  F0 02                    BEQ DWNBYE
00922  E8C8  E6 D6                    INC TBLX
00923  E8CA                    ;
```

```
00924  E8CA  60          DWNBYE RTS

00926  E8CB              CHKCOL
00927  E8CB  A2 0F              LDX #15          ;THERE'S 15 COLORS
00928  E8CD  DD DA E8    CHK1A  CMP COLTAB,X
00929  E8D0  F0 04              BEQ CHK1B
00930  E8D2  CA                 DEX
00931  E8D3  10 F8              BPL CHK1A
00932  E8D5  60                 RTS
00933  E8D6              ;
00934  E8D6              CHK1B
00935  E8D6  8E 86 02           STX COLOR        ;CHANGE THE COLOR
00936  E8D9  60                 RTS

00938  E8DA              COLTAB
00939  E8DA              ;BLK,WHT,RED,CYAN,MAGENTA,GRN,BLUE,YELLOW
00940  E8DA  90                 .BYT $90,$05,$1C,$9F,$9C,$1E,$1F,$9E
00940  E8DB  05
00940  E8DC  1C
00940  E8DD  9F
00940  E8DE  9C
00940  E8DF  1E
00940  E8E0  1F
00940  E8E1  9E
00941  E8E2  81                 .BYT $81,$95,$96,$97,$98,$99,$9A,$9B
00941  E8E3  95
00941  E8E4  96
00941  E8E5  97
00941  E8E6  98
00941  E8E7  99
00941  E8E8  9A
00941  E8E9  9B
00942  E8EA                    .END
00943  E8EA              ;.LIB CONKAT (JAPAN CONVERSION TABLES)
00944  E8EA                    .LIB EDITOR.2
```



```
LINE# LOC   CODE        LINE

00946  E8EA              ;SCREEN SCROLL ROUTINE
00947  E8EA              ;
00948  E8EA  A5 AC       SCROL  LDA SAL
00949  E8EC  48                 PHA
00950  E8ED  A5 AD              LDA SAH
00951  E8EF  48                 PHA
00952  E8F0  A5 AE              LDA EAL
00953  E8F2  48                 PHA
00954  E8F3  A5 AF              LDA EAH
00955  E8F5  48                 PHA
00956  E8F6              ;
00957  E8F6              ;   S C R O L L   U P
00958  E8F6              ;
```

```
00959  E8F6  A2 FF       SCR00  LDX #$FF
00960  E8F8  C6 D6              DEC TBLX
00961  E8FA  C6 C9              DEC LSXP
00962  E8FC  CE A5 02           DEC LINTMP
00963  E8FF  E8          SCR10  INX                ;GOTO NEXT LINE
009[illegible]  E900  20 F0 E9           JSR SETPNT       ;POINT TO 'TO' LINE
0096[illegible]  E903  E0 18              CPX #NLINES-1    ;DONE?
00966  E905  B0 0C              BCS SCR41        ;BRANCH IF SO
00967  E907                     ;
00968  E907  BD F1 EC           LDA LDTB2+1,X    ;SETUP FROM PNTR
00969  E90A  85 AC              STA SAL
00970  E90C  B5 DA              LDA LDTB1+1,X
00971  E90E  20 C8 E9           JSR SCRLIN       ;SCROLL THIS LINE UP1
00972  E911  30 EC              BMI SCR10
00973  E913                     ;
00974  E913                     SCR41
00975  E913  20 FF E9           JSR CLRLN
00976  E916                     ;
00977  E916  A2 00              LDX #0            ;SCROLL HI BYTE POINTERS
00978  E918  B5 D9       SCRL5  LDA LDTB1,X
00979  E91A  29 7F              AND #$7F
00980  E91C  B4 DA              LDY LDTB1+1,X
00981  E91E  10 02              BPL SCRL3
00982  E920  09 80              ORA #$80
009[illegible]  E922  95 D9       SCRL3  STA LDTB1,X
0098[illegible]  E924  E8                INX
00985  E925  E0 18              CPX #NLINES-1
00986  E927  D0 EF              BNE SCRL5
00987  E929                     ;
00988  E929  A5 F1              LDA LDTB1+NLINES-1
00989  E92B  09 80              ORA #$80
00990  E92D  85 F1              STA LDTB1+NLINES-1
00991  E92F  A5 D9              LDA LDTB1         ;DOUBLE LINE?
00992  E931  10 C3              BPL SCR00         ;YES...SCROLL AGAIN
00993  E933                     ;
00994  E933  E6 D6              INC TBLX
00995  E935  EE A5 02           INC LINTMP
00996  E938  A9 7F              LDA #$7F          ;CHECK FOR CONTROL KEY
00997  E93A  8D 00 DC           STA COLM          ;DROP LINE 2 ON PORT B
00998  E93D  AD 01 DC           LDA ROWS
00999  E940  C9 FB              CMP #$FB          ;SLOW SCROLL KEY?(CONTROL)
01000  E942  08                 PHP               ;SAVE STATUS. RESTORE PORT B
0100[illegible]  E943  A9 7F              LDA #$7F          ;FOR STOP KEY CHECK
010[illegible]  E945  8D 00 DC           STA COLM
0100[illegible]  E948  28                PLP
01004  E949  D0 0B              BNE MLP42
01005  E94B                     ;
01006  E94B  A0 00              LDY #0
```



```
LINE# LOC   CODE        LINE

01007  E94D  EA          MLP4   NOP               ;DELAY
01008  E94E  CA                 DEX
0100[illegible]  E94F  D0 FC              BNE MLP4
010[illegible]  E951  88                 DEY
0101[illegible]  E952  D0 F9              BNE MLP4
01012  E954  84 C6              STY NDX           ;CLEAR KEY QUEUE BUFFER
01013  E956                     ;
```

```
01014  E956  A6 D6        MLP42  LDX TBLX
01015  E958               ;
01016  E958  68           PULIND PLA              ;RESTORE OLD INDIRECTS
01017  E959  85 AF                 STA EAH
01018  E95B  68                    PLA
010.   E95C  85 AE                 STA EAL
0102   E95E  68                    PLA
01021  E95F  85 AD                 STA SAH
01022  E961  68                    PLA
01023  E962  85 AC                 STA SAL
01024  E964  60                    RTS
```



```
LINE  LOC   CODE        LINE

01026  E965             NEWLIN
```

```
01027  E965  A6 D6          LDX TBLX
01028  E967  E8          BMT1   INX
01029  E968               ; CPX #NLINES ;EXCEDED THE NUMBER OF LINES ???
01030  E968               ; BEQ BMT2 ;VIC-40 CODE
01031  E968  B5 D9          LDA LDTB1,X     ;FIND LAST DISPLAY LINE OF THIS LINE
01032  E96A  10 FB          BPL BMT1        ;TABLE END MARK=>$FF WILL ABORT...AL
01033  E96C  8E A5 02     BMT2   STX LINTMP       ;FOUND IT
01034  E96F               ;GENERATE A NEW LINE
01035  E96F  E0 18          CPX #NLINES-1   ;IS ONE LINE FROM BOTTOM?
01036  E971  F0 0E          BEQ NEWLX       ;YES...JUST CLEAR LAST
01037  E973  90 0C          BCC NEWLX       ;<NLINES...INSERT LINE
01038  E975  20 EA E8       JSR SCROL       ;SCROLL EVERYTHING
01039  E978  AE A5 02       LDX LINTMP
01040  E97B  CA             DEX
01041  E97C  C6 D6          DEC TBLX
01042  E97E  4C DA E6       JMP WLOG30
01043  E981  A5 AC        NEWLX  LDA SAL
01044  E983  48             PHA
01045  E984  A5 AD          LDA SAH
01046  E986  48             PHA
01047  E987  A5 AE          LDA EAL
01048  E989  48             PHA
01049  E98A  A5 AF          LDA EAH
01050  E98C  48             PHA
01051  E98D  A2 19          LDX #NLINES
01052  E98F  CA           SCD10  DEX
01053  E990  20 F0 E9       JSR SETPNT      ;SET UP TO ADDR
01054  E993  EC A5 02       CPX LINTMP
01055  E996  90 0E          BCC SCR40
01056  E998  F0 0C          BEQ SCR40       ;BRANCH IF FINISHED
01057  E99A  BD EF EC       LDA LDTB2-1,X   ;SET FROM ADDR
01058  E99D  85 AC          STA SAL
01059  E99F  B5 D8          LDA LDTB1-1,X
01060  E9A1  20 C8 E9       JSR SCRLIN      ;SCROLL THIS LINE DOWN
01061  E9A4  30 E9          BMI SCD10
01062  E9A6               SCR40
01063  E9A6  20 FF E9       JSR CLRLN
01064  E9A9  A2 17          LDX #NLINES-2
01065  E9AB               SCRD21
01066  E9AB  EC A5 02       CPX LINTMP      ;DONE?
01067  E9AE  90 0F          BCC SCRD22      ;BRANCH IF SO
01068  E9B0  B5 DA          LDA LDTB1+1,X
01069  E9B2  29 7F          AND #$7F
01070  E9B4  B4 D9          LDY LDTB1,X     ;WAS IT CONTINUED
01071  E9B6  10 02          BPL SCRD19      ;BRANCH IF SO
01072  E9B8  09 80          ORA #$80
01073  E9BA  95 DA        SCRD19 STA LDTB1+1,X
01074  E9BC  CA             DEX
01075  E9BD  D0 EC          BNE SCRD21
01076  E9BF               SCRD22
01077  E9BF  AE A5 02       LDX LINTMP
01078  E9C2  20 DA E6       JSR WLOG30
01079  E9C5               ;
01080  E9C5  4C 58 E9       JMP PULIND      ;GO PUL OLD INDIRECTS AND RETURN
01081  E9C8               ;
01082  E9C8               ; SCROLL LINE FROM SAL TO PNT
01083  E9C8               ; AND COLORS FROM EAL TO USER
01084  E9C8               ;
01085  E9C8               SCRLIN
01086  E9C8  29 03          AND #$03        ;CLEAR ANY GARBAGE STUFF
```

```
LINE# LOC   CODE        LINE

01086 E9CA  0D 88 02            ORA HIBASE      ;PUT IN HIORDER BITS
01088 E9CD  85 AD               STA SAL+1
01089 E9CF  20 E0 E9            JSR TOFROM      ;COLOR TO & FROM ADDRS
01090 E9D2  A0 27               LDY #LLEN-1
01091 E9D4                  SCD20
01092 E9D4  B1 AC               LDA (SAL)Y
01093 E9D6  91 D1               STA (PNT)Y
01094 E9D8  B1 AE               LDA (EAL)Y
01095 E9DA  91 F3               STA (USER)Y
01096 E9DC  88                  DEY
01097 E9DD  10 F5               BPL SCD20
01098 E9DF  60                  RTS
01099 E9E0                  ;
01100 E9E0                  ; DO COLOR TO AND FROM ADDRESSES
01101 E9E0                  ; FROM CHARACTER TO AND FROM ADRS
01102 E9E0                  ;
01103 E9E0                  TOFROM
01104 E9E0  20 24 EA            JSR SCOLOR
01105 E9E3  A5 AC               LDA SAL         ;CHARACTER FROM
01106 E9E5  85 AE               STA EAL         ;MAKE COLOR FROM
01107 E9E7  A5 AD               LDA SAL+1
01108 E9E9  29 03               AND #$03
01109 E9EB  09 D8               ORA #>VICCOL
01110 E9ED  85 AF               STA EAL+1
01111 E9EF  60                  RTS
01112 E9F0                  ;
01113 E9F0                  ; SET UP PNT AND Y
01114 E9F0                  ; FROM .X
01115 E9F0                  ;
01116 E9F0  BD F0 EC        SETPNT LDA LDTB2,X
01117 E9F3  85 D1               STA PNT
01118 E9F5  B5 D9               LDA LDTB1,X
01119 E9F7  29 03               AND #$03
01120 E9F9  0D 88 02            ORA HIBASE
01121 E9FC  85 D2               STA PNT+1
01122 E9FE  60                  RTS
01123 E9FF                  ;
01124 E9FF                  ; CLEAR THE LINE POINTED TO BY .X
01125 E9FF                  ;
01126 E9FF  A0 27           CLRLN  LDY #LLEN-1
01127 EA01  20 F0 E9            JSR SETPNT
01128 EA04  20 24 EA            JSR SCOLOR
01129 EA07  20 DA E4        CLR10  JSR CPATCH       ;REVERSED ORDER FROM 901227-02
01130 EA0A  A9 20               LDA #$20        ;STORE A SPACE
01131 EA0C  91 D1               STA (PNT)Y      ;TO DISPLAY
01132 EA0E  88                  DEY
01133 EA0F  10 F6               BPL CLR10
01134 EA11  60                  RTS
01135 EA12  EA                  NOP



01137 EA13                  ;
01138 EA13                  ;PUT A CHAR ON THE SCREEN
01139 EA13                  ;
01140 EA13  A8              DSPP   TAY              ;SAVE CHAR
01141 EA14  A9 02               LDA #2
01142 EA16  85 CD               STA BLNCT       ;BLINK CURSOR
01143 EA18  20 24 EA            JSR SCOLOR      ;SET COLOR PTR
```

```
LINE# LOC   CODE        LINE

01144  EA1B  98              TYA             ;RESTORE COLOR
01145  EA1C  A4 D3     DSPP2  LDY PNTR        ;GET COLUMN
01146  EA1E  91 D1            STA (PNT)Y      ;CHAR TO SCREEN
01147  EA20  8A              TXA
01148  EA21  91 F3            STA (USER)Y     ;COLOR TO SCREEN
01149  EA23  60              RTS




01151  EA24  A5 D1     SCOLOR LDA PNT         ;GENERATE COLOR PTR
01152  EA26  85 F3            STA USER
01153  EA28  A5 D2            LDA PNT+1
01154  EA2A  29 03            AND #$03
01155  EA2C  09 D8            ORA #>VICCOL    ;VIC COLOR RAM
01156  EA2E  85 F4            STA USER+1
01157  EA30  60              RTS
```

```
LINE# LOC   CODE        LINE

01159  EA31  20 EA FF    KEY     JSR $FFEA        ;UPDATE JIFFY CLOCK
01160  EA34  A5 CC               LDA BLNSW       ;BLINKING CRSR ?
01161  EA36  D0 29               BNE KEY4        ;NO
01162  EA38  C6 CD               DEC BLNCT       ;TIME TO BLINK ?
01163  EA3A  D0 25               BNE KEY4        ;NO
01164  EA3C  A9 14               LDA #20         ;RESET BLINK COUNTER
01165  EA3E  85 CD       REPDO   STA BLNCT
01166  EA40  A4 D3               LDY PNTR        ;CURSOR POSITION
01167  EA42  46 CF               LSR BLNON       ;CARRY SET IF ORIGINAL CHAR
01168  EA44  AE 87 02            LDX GDCOL       ;GET CHAR ORIGINAL COLOR
01169  EA47  B1 D1               LDA (PNT)Y      ;GET CHARACTER
01170  EA49  B0 11               BCS KEY5        ;BRANCH IF NOT NEEDED
01171  EA4B                      ;
01172  EA4B  E6 CF               INC BLNON       ;SET TO 1
01173  EA4D  85 CE               STA GDBLN       ;SAVE ORIGINAL CHAR
01174  EA4F  20 24 EA            JSR SCOLOR
01175  EA52  B1 F3               LDA (USER)Y     ;GET ORIGINAL COLOR
01176  EA54  8D 87 02            STA GDCOL       ;SAVE IT
01177  EA57  AE 86 02            LDX COLOR       ;BLINK IN THIS COLOR
01178  EA5A  A5 CE               LDA GDBLN       ;WITH ORIGINAL CHARACTER
01179  EA5C                      ;
01180  EA5C  49 80       KEY5    EOR #$80         ;BLINK IT
01181  EA5E  20 1C EA            JSR DSPP2       ;DISPLAY IT
01182  EA61                      ;
01183  EA61  A5 01       KEY4    LDA R6510        ;GET CASSETTE SWITCHES
01184  EA63  29 10               AND #$10        ;IS SWITCH DOWN ?
01185  EA65  F0 0A               BEQ KEY3        ;BRANCH IF SO
01186  EA67                      ;
01187  EA67  A0 00               LDY #0
01188  EA69  84 C0               STY CAS1        ;CASSETTE OFF SWITCH
01189  EA6B                      ;
01190  EA6B  A5 01               LDA R6510
01191  EA6D  09 20               ORA #$20
01192  EA6F  D0 08               BNE KL24        ;BRANCH IF MOTOR IS OFF
01193  EA71                      ;
01194  EA71  A5 C0       KEY3    LDA CAS1
01195  EA73  D0 06               BNE KL2
01196  EA75                      ;
01197  EA75  A5 01               LDA R6510
01198  EA77  29 1F               AND #%011111    ;TURN MOTOR ON
01199  EA79                      ;
01200  EA79                      KL24
01201  EA79  85 01               STA R6510
01202  EA7B                      ;
01203  EA7B  20 87 EA    KL2     JSR SCNKEY       ;SCAN KEYBOARD
01204  EA7E                      ;
01205  EA7E  AD 0D DC    KPREND  LDA D1ICR        ;CLEAR INTERUPT FLAGS
01206  EA81  68                  PLA             ;RESTORE REGISTERS
01207  EA82  A8                  TAY
```

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01208  EA83  68                PLA
01209  EA84  AA                TAX
01210  EA85  68                PLA
01211  EA86  40                RTI             ;EXIT FROM IRQ ROUTINES


01213  EA87                    ; ****** GENERAL KEYBOARD SCAN ******
01214  EA87                    ;
01215  EA87  A9 00             SCNKEY LDA #$00
01216  EA89  8D 8D 02                STA SHFLAG
01217  EA8C  A0 40                    LDY #64         ;LAST KEY INDEX
```



```
LINE# LOC   CODE        LINE


01219  EA8E  84 CB                    STY SFDX        ;NULL KEY FOUND
01220  EA90  8D 00 DC                 STA COLM        ;RAISE ALL LINES
01221  EA93  AE 01 DC                 LDX ROWS        ;CHECK FOR A KEY DOWN
01222  EA96  E0 FF                    CPX #$FF        ;NO KEYS DOWN?
01223  EA98  F0 61                    BEQ SCNOUT      ;BRANCH IF NONE
01224  EA9A  A8                       TAY             ;.A=0 LDY #0
01225  EA9B  A9 81                    LDA #<MODE1
01226  EA9D  85 F5                    STA KEYTAB
01227  EA9F  A9 EB                    LDA #>MODE1
01228  EAA1  85 F6                    STA KEYTAB+1
01229  EAA3  A9 FE                    LDA #$FE        ;START WITH 1ST COLUMN
01230  EAA5  8D 00 DC                 STA COLM
01231  EAA8  A2 08             SCN20  LDX #8           ;8 ROW KEYBOARD
01232  EAAA  48                       PHA             ;SAVE COLUMN OUTPUT INFO
01233  EAAB  AD 01 DC          SCN22  LDA ROWS
01234  EAAE  CD 01 DC                 CMP ROWS        ;DEBOUNCE KEYBOARD
01235  EAB1  D0 F8                    BNE SCN22
01236  EAB3  4A                SCN30  LSR A           ;LOOK FOR KEY DOWN
01237  EAB4  B0 16                    BCS CKIT        ;NONE
01238  EAB6  48                       PHA
01239  EAB7  B1 F5                    LDA (KEYTAB),Y  ;GET CHAR CODE
01240  EAB9  C9 05                    CMP #$05
01241  EABB  B0 0C                    BCS SPCK2       ;IF NOT SPECIAL KEY GO ON
01242  EABD  C9 03                    CMP #$03        ;COULD IT BE A STOP KEY?
01243  EABF  F0 08                    BEQ SPCK2       ;BRANCH IF SO
01244  EAC1  0D 8D 02                 ORA SHFLAG
01245  EAC4  8D 8D 02                 STA SHFLAG      ;PUT SHIFT BIT IN FLAG BYTE
01246  EAC7  10 02                    BPL CKUT
01247  EAC9                    SPCK2
01248  EAC9  84 CB                    STY SFDX        ;SAVE KEY NUMBER
01249  EACB  68                CKUT   PLA
01250  EACC  C8                CKIT   INY
01251  EACD  C0 41                    CPY #65
01252  EACF  B0 0B                    BCS CKIT1       ;BRANCH IF FINISHED
01253  EAD1  CA                       DEX
01254  EAD2  D0 DF                    BNE SCN30
01255  EAD4  38                       SEC
01256  EAD5  68                       PLA             ;RELOAD COLUMN INFO
01257  EAD6  2A                       ROL A
01258  EAD7  8D 00 DC                 STA COLM        ;NEXT COLUMN ON KEYBOARD
01259  EADA  D0 CC                    BNE SCN20       ;ALWAYS BRANCH
01260  EADC  68                CKIT1  PLA             ;DUMP COLUMN OUTPUT...ALL DONE
01261  EADD  6C 8F 02                 JMP (KEYLOG)    ;EVALUATE SHIFT FUNCTIONS
```

```
01261  EAE0  A4 CB        REKEY  LDY SFDX          ;GET KEY INDEX
01262  EAE2  B1 F5               LDA (KEYTAB)Y     ;GET CHAR CODE
01263  EAE4  AA                  TAX               ;SAVE THE CHAR
01264  EAE5  C4 C5               CPY LSTX          ;SAME AS PREV CHAR INDEX?
01265  EAE7  F0 07               BEQ RPT10         ;YES
012[   EAE9  A0 10               LDY #$10          ;NO - RESET DELAY BEFORE REPEAT
126[   EAEB  8C 8C 02            STY DELAY
01268  EAEE  D0 36               BNE CKIT2         ;ALWAYS
01269  EAF0  29 7F        RPT10  AND #$7F           ;UNSHIFT IT
01270  EAF2  2C 8A 02            BIT RPTFLG        ;CHECK FOR REPEAT DISABLE
01271  EAF5  30 16               BMI RPT20         ;YES
01272  EAF7  70 49               BVS SCNRTS
01273  EAF9  C9 7F               CMP #$7F          ;NO KEYS ?
01274  EAFB  F0 29        SCNOUT BEQ CKIT2         ;YES - GET OUT
01275  EAFD  C9 14               CMP #$14          ;AN INST/DEL KEY ?
01276  EAFF  F0 0C               BEQ RPT20         ;YES - REPEAT IT
01277  EB01  C9 20               CMP #$20          ;A SPACE KEY ?
01278  EB03  F0 08               BEQ RPT20         ;YES
```

EDI[illegible].2.....PAGE 0027

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LINE# LOC   CODE        LINE

01279  EB05  C9 1D               CMP #$1D          ;A CRSR LEFT/RIGHT ?
01280  EB07  F0 04               BEQ RPT20         ;YES
01281  EB09  C9 11               CMP #$11          ;A CRSR UP/DWN ?
01282  EB0B  D0 35               BNE SCNRTS        ;NO - EXIT
01283  EB0D  AC 8C 02     RPT20  LDY DELAY         ;TIME TO REPEAT ?
01284  EB10  F0 05               BEQ RPT40         ;YES
01285  EB12  CE 8C 02            DEC DELAY
01286  EB15  D0 2B               BNE SCNRTS
01287  EB17  CE 8B 02     RPT40  DEC KOUNT         ;TIME FOR NEXT REPEAT ?
01288  EB1A  D0 26               BNE SCNRTS        ;NO
01289  EB1C  A0 04               LDY #4            ;YES - RESET CTR
01290  EB1E  8C 8B 02            STY KOUNT
01291  EB21  A4 C6               LDY NDX           ;NO REPEAT IF QUEUE FULL
012[   EB23  88                  DEY
012[   EB24  10 1C               BPL SCNRTS
012[   EB26                CKIT2
01295  EB26  A4 CB               LDY SFDX          ;GET INDEX OF KEY
01296  EB28  84 C5               STY LSTX          ;SAVE THIS INDEX TO KEY FOUND
01297  EB2A  AC 8D 02            LDY SHFLAG        ;UPDATE SHIFT STATUS
01298  EB2D  8C 8E 02            STY LSTSHF
01299  EB30  E0 FF        CKIT3  CPX #$FF          ;A NULL KEY OR NO KEY ?
01300  EB32  F0 0E               BEQ SCNRTS        ;BRANCH IF SO
01301  EB34  8A                  TXA               ;NEED X AS INDEX SO...
01302  EB35  A6 C6               LDX NDX           ;GET # OF CHARS IN KEY QUEUE
01303  EB37  EC 89 02            CPX XMAX          ;IRQ BUFFER FULL ?
01304  EB3A  B0 06               BCS SCNRTS        ;YES - NO MORE INSERT
01305  EB3C                PUTQUE
01306  EB3C  9D 77 02            STA KEYD,X        ;PUT RAW DATA HERE
01307  EB3F  E8                  INX
01308  EB40  86 C6               STX NDX           ;UPDATE KEY QUEUE COUNT
01309  EB42  A9 7F        SCNRTS LDA #$7F          ;SETUP PB7 FOR STOP KEY SENSE
01310  EB44  8D 00 DC            STA COLM
013[[  EB47  60                  RTS
```

```
LINE# LOC   CODE        LINE


01313  EB48             ;
01314  EB48             ; SHIFT LOGIC
01315  EB48             ;
01316  EB48             SHFLOG
01317  EB48  AD 8D 02          LDA SHFLAG
01318  EB4B  C9 03             CMP #$03        ;COMMODORE SHIFT COMBINATION?
01319  EB4D  D0 15             BNE KEYLG2      ;BRANCH IF NOT
01320  EB4F  CD 8E 02          CMP LSTSHF      ;DID I DO THIS ALREADY
0132.  EB52  F0 EE             BEQ SCNRTS      ;BRANCH IF SO
0132   EB54  AD 91 02          LDA MODE
01323  EB57  30 1D             BMI SHFOUT      ;DONT SHIFT IF ITS MINUS

01325  EB59  AD 18 D0    SWITCH LDA VICREG+24    ;**********************************
01326  EB5C  49 02             EOR #$02        ;TURN ON OTHER CASE
01327  EB5E  8D 18 D0          STA VICREG+24   ;POINT THE VIC THERE
01328  EB61  4C 76 EB          JMP SHFOUT

01330  EB64             ;
01331  EB64             KEYLG2
01332  EB64  0A                ASL A
01333  EB65  C9 08             CMP #$08        ;WAS IT A CONTROL KEY
01334  EB67  90 02             BCC NCTRL       ;BRANCH IF NOT
01335  EB69  A9 06             LDA #6          ;ELSE USE TABLE #4
01336  EB6B             ;
01337  EB6B             NCTRL
01338  EB6B             NOTKAT
013    EB6B  AA                TAX
013    EB6C  BD 79 EB          LDA KEYCOD,X
0134   EB6F  85 F5             STA KEYTAB
01342  EB71  BD 7A EB          LDA KEYCOD+1,X
01343  EB74  85 F6             STA KEYTAB+1
```

```
01344  EB76                 SHFOUT
01345  EB76  4C E0 EA              JMP REKEY
01346  EB79                        .END
01347  EB79                        .LIB EDITOR.3
```

KEYBOARD TABLES.....PAGE 0029

```
LINE# LOC   CODE         LINE


01349  EB79                KEYCOD                    ;KEYBOARD MODE 'DISPATCH'
01350  EB79  81 EB                .WORD MODE1
01351  EB7B  C2 EB                .WORD MODE2
01352  EB7D  03 EC                .WORD MODE3
01353  EB7F  78 EC                .WORD CONTRL    ;CONTROL KEYS
01354  EB81                ;
01355  EB81                ; COTTACONNA MODE
01356  EB81                ;
01357  EB81                ;.WORD MODE1   ;PET MODE1
01358  EB81                ;.WORD MODE2   ;PET MODE2
01359  EB81                ;.WORD CCTTA3 ;DUMMY WORD
01360  EB81                ;.WORD CONTRL
01361  EB81                ;
01362  EB81                ; EXTENDED KATAKANA MODE
01363  EB81                ;
01364  EB81                ;.WORD CCTTA2 ;KATAKANA CHARACTERS
01365  EB81                ;.WORD CCTTA3 ;LIMITED GRAPHICS
01366  EB81                ;.WORD CCTTA3 ;DUMMY
01367  EB81                ;.WORD CONTRL
```

```
LINE  LOC   CODE         LINE


01370  EB81                MODE1
01371  EB81                ;DEL,3,5,7,9,+,YEN SIGN,1
01372  EB81  14                    .BYT $14,$0D,$1D,$88,$85,$86,$87,$11
01372  EB82  0D
01372  EB83  1D
01372  EB84  88
01372  EB85  85
01372  EB86  86
01372  EB87  87
01372  EB88  11
01373  EB89                ;RETURN,W,R,Y,I,P,*,LEFT ARROW
01374  EB89  33                    .BYT $33,$57,$41,$34,$5A,$53,$45,$01
01374  EB8A  57
01374  EB8B  41
01374  EB8C  34
01374  EB8D  5A
01374  EB8E  53
01374  EB8F  45
01374  EB90  01
```

```
01375  EB91                 ;RT CRSR,A,D,G,J,L,;,CTRL
01376  EB91  35                    .BYT $35,$52,$44,$36,$43,$46,$54,$58
01376  EB92  52
01376  EB93  44
01376  EB94  36
01376  EB95  43
01376  EB96  46
01376  EB97  54
01376  EB98  58
01377  EB99                 ;F4,4,6,8,0,-,HOME,2
01378  EB99  37                    .BYT $37,$59,$47,$38,$42,$48,$55,$56
01378  EB9A  59
01378  EB9B  47
01378  EB9C  38
01378  EB9D  42
01378  EB9E  48
01378  EB9F  55
01378  EBA0  56
01379  EBA1                 ;F1,Z,C,B,M,.,R.SHIFTT,SPACE
01380  EBA1  39                    .BYT $39,$49,$4A,$30,$4D,$4B,$4F,$4E
01380  EBA2  49
01380  EBA3  4A
01380  EBA4  30
01380  EBA5  4D
01380  EBA6  4B
01380  EBA7  4F
01380  EBA8  4E
01381  EBA9                 ;F2,S,F,H,K,:,=,COM.KEY
01382  EBA9  2B                    .BYT $2B,$50,$4C,$2D,$2E,$3A,$40,$2C
01382  EBAA  50
01382  EBAB  4C
01382  EBAC  2D
01382  EBAD  2E
01382  EBAE  3A
01382  EBAF  40
01382  EBB0  2C
01383  EBB1                 ;F3,E,T,U,O,@,EXP,Q
01384  EBB1  5C                    .BYT $5C,$2A,$3B,$13,$01,$3D,$5E,$2F
01384  EBB2  2A
01384  EBB3  3B
01384  EBB4  13
01384  EBB5  01
```

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```
LINE# LOC   CODE        LINE

01384  EBB6  3D
01384  EBB7  5E
01384  EBB8  2F
01385  EBB9                 ;CRSR DWN,L.SHIFT,X,V,N,,,/,STOP
01386  EBB9  31                    .BYT $31,$5F,$04,$32,$20,$02,$51,$03
01386  EBBA  5F
01386  EBBB  04
01386  EBBC  32
01386  EBBD  20
01386  EBBE  02
01386  EBBF  51
01386  EBC0  03
01387  EBC1  FF                    .BYT $FF          ;END OF TABLE NULL
```

```
01389  EBC2                MODE2                       ;SHIFT
01390  EBC2                ;INS,%,',),+,YEN,!
01391  EBC2  94                    .BYT $94,$8D,$9D,$8C,$89,$8A,$8B,$91
01391  EBC3  8D
01391  EBC4  9D
01391  EBC5  8C
01391  EBC6  89
01391  EBC7  8A
01391  EBC8  8B
01391  EBC9  91
01392  EBCA                ;SRETURN,W,R,Y,I,P,*,SLEFT ARROW
01393  EBCA  23                    .BYT $23,$D7,$C1,$24,$DA,$D3,$C5,$01
01393  EBCB  D7
01393  EBCC  C1
01393  EBCD  24
01393  EBCE  DA
01393  EBCF  D3
01393  EBD0  C5
01393  EBD1  01
01394  EBD2                ;LF.CRSR,A,D,G,J,L,;,CTRL
01395  EBD2  25                    .BYT $25,$D2,$C4,$26,$C3,$C6,$D4,$D8
01395  EBD3  D2
01395  EBD4  C4
01395  EBD5  26
01395  EBD6  C3
01395  EBD7  C6
01395  EBD8  D4
01395  EBD9  D8
01396  EBDA                ;,$,&,(,       ,"
01397  EBDA  27                    .BYT $27,$D9,$C7,$28,$C2,$C8,$D5,$D6
01397  EBDB  D9
01397  EBDC  C7
01397  EBDD  28
01397  EBDE  C2
01397  EBDF  C8
01397  EBE0  D5
01397  EBE1  D6
01398  EBE2                ;F5,Z,C,B,M,.,R.SHIFT,SSPACE
01399  EBE2  29                    .BYT $29,$C9,$CA,$30,$CD,$CB,$CF,$CE
01399  EBE3  C9
01399  EBE4  CA
01399  EBE5  30
01399  EBE6  CD
01399  EBE7  CB
01399  EBE8  CF
01399  EBE9  CE
01400  EBEA                ;F6,S,F,H,K,:,=,SCOM.KEY
```



```
LINE# LOC   CODE        LINE

01401  EBEA  DB                    .BYT $DB,$D0,$CC,$DD,$3E,$5B,$BA,$3C
01401  EBEB  D0
01401  EBEC  CC
01401  EBED  DD
01401  EBEE  3E
01401  EBEF  5B
01401  EBF0  BA
```

```
01401  EBF1  3C
01402  EBF2                ;F7,E,T,U,O,@,PI,G
01403  EBF2  A9                    .BYT $A9,$C0,$5D,$93,$01,$3D,$DE,$3F
01403  EBF3  C0
01403  EBF4  5D
01403  EBF5  93
01403  EBF6  01
01403  EBF7  3D
01403  EBF8  DE
01403  EBF9  3F
01404  EBFA                ;CRSR DWN,L.SHIFT,X,V,N,,,/,RUN
01405  EBFA  21                    .BYT $21,$5F,$04,$22,$A0,$02,$D1,$83
01405  EBFB  5F
01405  EBFC  04
01405  EBFD  22
01405  EBFE  A0
01405  EBFF  02
01405  EC00  D1
01405  EC01  83
01406  EC02  FF                    .BYT $FF          ;END OF TABLE NULL
01407  EC03                ;
01408  EC03                MODE3                     ;LEFT WINDOW GRAHPICS
01409  EC03                ;INS,C10,C12,C14,9,+,POUND SIGN,C8
01410  EC03  94                    .BYT $94,$8D,$9D,$8C,$89,$8A,$8B,$91
01410  EC04  8D
01410  EC05  9D
01410  EC06  8C
01410  EC07  89
01410  EC08  8A
01410  EC09  8B
01410  EC0A  91
01411  EC0B                ;RETURN,W,R,Y,I,P,*,LFT.ARROW
01412  EC0B  96                    .BYT $96,$B3,$B0,$97,$AD,$AE,$B1,$01
01412  EC0C  B3
01412  EC0D  B0
01412  EC0E  97
01412  EC0F  AD
01412  EC10  AE
01412  EC11  B1
01412  EC12  01
01413  EC13                ;LF.CRSR,A,D,G,J,L,;,CTRL
01414  EC13  98                    .BYT $98,$B2,$AC,$99,$BC,$BB,$A3,$BD
01414  EC14  B2
01414  EC15  AC
01414  EC16  99
01414  EC17  BC
01414  EC18  BB
01414  EC19  A3
01414  EC1A  BD
01415  EC1B                ;F8,C11,C13,C15,0,-,HOME,C9
01416  EC1B  9A                    .BYT $9A,$B7,$A5,$9B,$BF,$B4,$B8,$BE
01416  EC1C  B7
01416  EC1D  A5
01416  EC1E  9B
```



```
LINE  LOC   CODE        LINE

01416  EC1F  BF
```

```
01416  EC20  B4
01416  EC21  B8
01416  EC22  BE
01417  EC23                ;F2,Z,C,B,M,.,R.SHIFT,SPACE
01418  EC23  29                    .BYT $29,$A2,$B5,$30,$A7,$A1,$B9,$AA
014.   EC24  A2
0141   EC25  B5
01418  EC26  30
01418  EC27  A7
01418  EC28  A1
01418  EC29  B9
01418  EC2A  AA
01419  EC2B                ;F4,S,F,H,K,:,=,COM.KEY
01420  EC2B  A6                    .BYT $A6,$AF,$B6,$DC,$3E,$5B,$A4,$3C
01420  EC2C  AF
01420  EC2D  B6
01420  EC2E  DC
01420  EC2F  3E
01420  EC30  5B
01420  EC31  A4
01420  EC32  3C
01421  EC33                ;F6,E,T,U,O,@,PI,Q
01422  EC33  A8                    .BYT $A8,$DF,$5D,$93,$01,$3D,$DE,$3F
01422  EC34  DF
014.   EC35  5D
0142   EC36  93
01422  EC37  01
01422  EC38  3D
01422  EC39  DE
01422  EC3A  3F
01423  EC3B                ;CRSR.UP,L.SHIFT,X,V,N,,,/,STOP
01424  EC3B  81                    .BYT $81,$5F,$04,$95,$A0,$02,$AB,$83
01424  EC3C  5F
01424  EC3D  04
01424  EC3E  95
01424  EC3F  A0
01424  EC40  02
01424  EC41  AB
01424  EC42  83
01425  EC43  FF                    .BYT $FF          ;END OF TABLE NULL
01426  EC44                ;CCTTA2 ;WAS CCTTA2 IN JAPANESE VERSION
01427  EC44                LOWER
0142   EC44  C9 0E                 CMP #$0E          ;DOES HE WANT LOWER CASE?
014.   EC46  D0 07                 BNE UPPER         ;BRANCH IF NOT
0143   EC48  AD 18 D0              LDA VICREG+24     ;ELSE SET VIC TO POINT TO LOWER CASE
01431  EC4B  09 02                 ORA #$02
01432  EC4D  D0 09                 BNE ULSET         ;JMP

01434  EC4F                UPPER
01435  EC4F  C9 8E                 CMP #$8E          ;DOES HE WANT UPPER CASE
01436  EC51  D0 0B                 BNE LOCK          ;BRANCH IF NOT
01437  EC53  AD 18 D0              LDA VICREG+24     ;MAKE SURE VIC POINT TO UPPER/PET SE
01438  EC56  29 FD                 AND #$FF-$02
01439  EC58  8D 18 D0     ULSET   STA VICREG+24
01440  EC5B  4C A8 E6     OUTHRE  JMP LOOP2

01442  EC5E                LOCK
01443  EC5E  C9 08                 CMP #8            ;DOES HE WANT TO LOCK IN THIS MODE?
01444  EC60  D0 07                 BNE UNLOCK        ;BRANCH IF NOT
01445  EC62  A9 80                 LDA #$80          ;ELSE SET LOCK SWITCH ON
```

```
LINE# LOC   CODE        LINE

01446  EC64  0D 91 02           ORA MODE        ;DON'T HURT ANYTHING - JUST IN CASE
01447  EC67  30 09              BMI LEXIT

01449  EC69                   UNLOCK
01450  EC69  C9 09              CMP #9          ;DOES HE WANT TO UNLOCK THE KEYBOARD
01451  EC6B  D0 EE              BNE OUTHRE      ;BRANCH IF NOT
01452  EC6D  A9 7F              LDA #$7F        ;CLEAR THE LOCK SWITCH
01453  EC6F  2D 91 02           AND MODE        ;DONT HURT ANYTHING
01454  EC72  8D 91 02    LEXIT  STA MODE
01455  EC75  4C A8 E6           JMP LOOP2       ;GET OUT
01456  EC78                   ;CCTTA3
01457  EC78                   ;.BYT $04,$FF,$FF,$FF,$FF,$FF,$E2,$90
01458  EC78                   ;RUN-K24-K31
01459  EC78                   ;.BYT $83,$01,$FF,$FF,$FF,$FF,$FF,$91
01460  EC78                   ;K32-K39.F5
01461  EC78                   ;.BYT $A0,$FF,$FF,$FF,$FF,$EE,$01,$89
01462  EC78                   ;C0.KEY,K40-K47.F6
01463  EC78                   ;.BYT $02,$FF,$FF,$FF,$FF,$E1,$FD,$8A
01464  EC78                   ;K48-K55
01465  EC78                   ;.BYT $FF,$FF,$FF,$FF,$FF,$B0,$E0,$8B
01466  EC78                   ;K56-K63
01467  EC78                   ;.BYT $F2,$F4,$F6,$FF,$F0,$ED,$93,$8C
01468  EC78                   ;.BYT $FF ;END OF TABLE NULL

01470  EC78                   CONTRL
01471  EC78                   ;NULL,RED,PURPLE,BLUE,RVS ,NULL,NULL,BLACK
01472  EC78  FF                      .BYT $FF,$FF,$FF,$FF,$FF,$FF,$FF,$FF
01472  EC79  FF
01472  EC7A  FF
01472  EC7B  FF
01472  EC7C  FF
01472  EC7D  FF
01472  EC7E  FF
01472  EC7F  FF
01473  EC80                   ;NULL, W  ,REVERSE, Y  , I  , P  ,NULL,MUSIC
01474  EC80  1C                      .BYT $1C,$17,$01,$9F,$1A,$13,$05,$FF
01474  EC81  17
01474  EC82  01
01474  EC83  9F
01474  EC84  1A
01474  EC85  13
01474  EC86  05
01474  EC87  FF
01475  EC88  9C                      .BYT $9C,$12,$04,$1E,$03,$06,$14,$18
01475  EC89  12
01475  EC8A  04
01475  EC8B  1E
01475  EC8C  03
01475  EC8D  06
01475  EC8E  14
01475  EC8F  18
01476  EC90                   ;NULL,CYAN,GREEN,YELLOW,RVS OFF,NULL,NULL,WHITE
01477  EC90  1F                      .BYT $1F,$19,$07,$9E,$02,$08,$15,$16
01477  EC91  19
01477  EC92  07
01477  EC93  9E
01477  EC94  02
01477  EC95  08
01477  EC96  15
01477  EC97  16
01478  EC98  12                      .BYT $12,$09,$0A,$92,$0D,$0B,$0F,$0E
```

```
EDIT .3.....PAGE 0035

LINE# LOC   CODE        LINE

01478  EC99  09
01478  EC9A  0A
01478  EC9B  92
01478  EC9C  0D
01478  EC9D  0B
01478  EC9E  0F
01478  EC9F  0E
01479  ECA0  FF                .BYT $FF,$10,$0C,$FF,$FF,$1B,$00,$FF
01479  ECA1  10
01479  ECA2  0C
01479  ECA3  FF
01479  ECA4  FF
01479  ECA5  1B
01479  ECA6  00
01479  ECA7  FF
01480  ECA8  1C                .BYT $1C,$FF,$1D,$FF,$FF,$1F,$1E,$FF
01480  ECA9  FF
01480  ECAA  1D
01480  ECAB  FF
01480  ECAC  FF
01480  ECAD  1F
01480  ECAE  1E
01480  ECAF  FF
01481  ECB0  90                .BYT $90,$06,$FF,$05,$FF,$FF,$11,$FF
01481  ECB1  06
01481  ECB2  FF
01481  ECB3  05
01481  ECB4  FF
01481  ECB5  FF
01481  ECB6  11
01481  ECB7  FF
01482  ECB8  FF                .BYT $FF          ;END OF TABLE NULL
01483  ECB9              TVIC
01483  ECB9  00                .BYT 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0 ;SPRITES (0-
01484  ECBA  00                                                        (0-16)
01484  ECBB  00
01484  ECBC  00
01484  ECBD  00
01484  ECBE  00
01484  ECBF  00
01484  ECC0  00
01484  ECC1  00
01484  ECC2  00
01484  ECC3  00
01484  ECC4  00
01484  ECC5  00
01484  ECC6  00
01484  ECC7  00
01484  ECC8  00
01484  ECC9  00
01485  ECCA  9B                .BYT $9B,55,0,0,0,$08,0,$14,$0F,0,0,0,0,0,0 ;DATA (
01485  ECCB  37                                                        (17-31)
01485  ECCC  00
01485  ECCD  00
01485  ECCE  00
```

```
01485  ECCF  08
01485  ECD0  00
01485  ECD1  14
01485  ECD2  0F
01485  ECD3  00
014[illegible]  ECD4  00
```



```
LINE# LOC   CODE        LINE

01485  ECD5  00
01485  ECD6  00
01485  ECD7  00
01485  ECD8  00
01486  ECD9  0E                .BYT 14,6,1,2,3,4,0,1,2,3,4,5,6,7 ;32-46
01486  ECDA  06
01486  ECDB  01
014[illegible]  ECDC  02
0148[illegible]  ECDD  03
01486  ECDE  04
01486  ECDF  00
01486  ECE0  01
01486  ECE1  02
01486  ECE2  03
01486  ECE3  04
01486  ECE4  05
01486  ECE5  06
01486  ECE6  07
01487  ECE7                ;
01488  ECE7  4C 4F         RUNTB   .BYT 'LOAD',$D,'RUN',$D
01488  ECEB  0D
01488  ECEC  52 55 4E
01488  ECEF  0D
01489  ECF0                ;
01490  ECF0                LINZ0   = VICSCN
014[illegible]  ECF0                LINZ1   = LINZ0+LLEN
014[illegible]  ECF0                LINZ2   = LINZ1+LLEN
014[illegible]  ECF0                LINZ3   = LINZ2+LLEN
01494  ECF0                LINZ4   = LINZ3+LLEN
01495  ECF0                LINZ5   = LINZ4+LLEN
01496  ECF0                LINZ6   = LINZ5+LLEN
01497  ECF0                LINZ7   = LINZ6+LLEN
01498  ECF0                LINZ8   = LINZ7+LLEN
01499  ECF0                LINZ9   = LINZ8+LLEN
01500  ECF0                LINZ10  = LINZ9+LLEN
01501  ECF0                LINZ11  = LINZ10+LLEN
01502  ECF0                LINZ12  = LINZ11+LLEN
01503  ECF0                LINZ13  = LINZ12+LLEN
01504  ECF0                LINZ14  = LINZ13+LLEN
01505  ECF0                LINZ15  = LINZ14+LLEN
01506  ECF0                LINZ16  = LINZ15+LLEN
01507  ECF0                LINZ17  = LINZ16+LLEN
01508  ECF0                LINZ18  = LINZ17+LLEN
01509  ECF0                LINZ19  = LINZ18+LLEN
015[illegible]  ECF0                LINZ20  = LINZ19+LLEN
015[illegible]  ECF0                LINZ21  = LINZ20+LLEN
015[illegible]  ECF0                LINZ22  = LINZ21+LLEN
01513  ECF0                LINZ23  = LINZ22+LLEN
01514  ECF0                LINZ24  = LINZ23+LLEN
```

```
01516  ECF0                ;****** SCREEN LINES LO BYTE TABLE ******
01517  ECF0                ;
01518  ECF0                LOTB2
01519  ECF0  00                    .BYTE <LINZ0
01520  ECF1  28                    .BYTE <LINZ1
01521  ECF2  50                    .BYTE <LINZ2
01522  ECF3  78                    .BYTE <LINZ3
01523  ECF4  A0                    .BYTE <LINZ4
01524  ECF5  C8                    .BYTE <LINZ5
```



```
LINE# LOC   CODE        LINE

01525  ECF6  F0                    .BYTE <LINZ6
01526  ECF7  18                    .BYTE <LINZ7
01527  ECF8  40                    .BYTE <LINZ8
01528  ECF9  68                    .BYTE <LINZ9
01529  ECFA  90                    .BYTE <LINZ10
01530  ECFB  B8                    .BYTE <LINZ11
01531  ECFC  E0                    .BYTE <LINZ12
01532  ECFD  08                    .BYTE <LINZ13
01533  ECFE  30                    .BYTE <LINZ14
01534  ECFF  58                    .BYTE <LINZ15
01535  ED00  80                    .BYTE <LINZ16
01536  ED01  A8                    .BYTE <LINZ17
01537  ED02  D0                    .BYTE <LINZ18
01538  ED03  F8                    .BYTE <LINZ19
01539  ED04  20                    .BYTE <LINZ20
01540  ED05  48                    .BYTE <LINZ21
01541  ED06  70                    .BYTE <LINZ22
01542  ED07  98                    .BYTE <LINZ23
01543  ED08  C0                    .BYTE <LINZ24
01544  ED09                        .END
01545  ED09                        .LIB SERIAL???
```

```
LINE# LOC   CODE        LINE

01547  ED09             ;COMMAND SERIAL BUS DEVICE TO TALK
01548  ED09             ;
01549  ED09  09 40      TALK   ORA #$40        ;MAKE A TALK ADR
01550  ED0B  2C               .BYT $2C        ;SKIP TWO BYTES


01552  ED0C             ;COMMAND SERIAL BUS DEVICE TO LISTEN
01553  ED0C             ;
01554  ED0C  09 20      LISTN  ORA #$20        ;MAKE A LISTEN ADR
01555  ED0E  20 A4 F0         JSR RSP232      ;PROTECT SELF FROM RS232 NMI'S
01556  ED11  48         LIST1  PHA
01557  ED12             ;
01558  ED12             ;
01559  ED12  24 94            BIT C3PO        ;CHARACTER LEFT IN BUF?
01560  ED14  10 0A            BPL LIST2       ;NO...
01561  ED16             ;
01562  ED16             ;SEND BUFFERED CHARACTER
01563  ED16             ;
01564  ED16  38               SEC             ;SET EOI FLAG
01565  ED17  66 A3            ROR R2D2
01566  ED19             ;
01567  ED19  20 40 ED         JSR ISOUR       ;SEND LAST CHARACTER
01568  ED1C             ;
01569  ED1C  46 94            LSR C3PO        ;BUFFER CLEAR FLAG
01570  ED1E  46 A3            LSR R2D2        ;CLEAR EOI FLAG
01571  ED20             ;
01572  ED20             ;
01573  ED20  68         LIST2  PLA             ;TALK/LISTEN ADDRESS
01574  ED21  85 95            STA BSOUR
01575  ED23  78               SEI
01576  ED24  20 97 EE         JSR DATAHI
01577  ED27  C9 3F            CMP #$3F        ;CLKHI ONLY ON UNLISTEN
01578  ED29  D0 03            BNE LIST5
01579  ED2B  20 85 EE         JSR CLKHI
01580  ED2E             ;
01581  ED2E  AD 00 DD   LIST5  LDA D2PRA       ;ASSERT ATTENTION
```

```
01582  ED31  09 08           ORA #$08
01583  ED33  8D 00 DD        STA D2PRA
01584  ED36                  ;


01585  ED36  78              ISOURA SEI
01587  ED37  20 8E EE         JSR CLKLO        ;SET CLOCK LINE LOW
01588  ED3A  20 97 EE         JSR DATAHI
01589  ED3D  20 B3 EE         JSR W1MS         ;DELAY 1 MS


01591  ED40  78              ISOUR  SEI         ;NO IRQ'S ALLOWED
01592  ED41  20 97 EE         JSR DATAHI      ;MAKE SURE DATA IS RELEASED
01593  ED44  20 A9 EE         JSR DEBPIA      ;DATA SHOULD BE LOW
01594  ED47  B0 64            BCS NODEV
01595  ED49  20 85 EE         JSR CLKHI       ;CLOCK LINE HIGH
01596  ED4C  24 A3            BIT R2D2        ;EOI FLAG TEST
01597  ED4E  10 0A            BPL NOEOI
01598  ED50                  ; DO THE EOI
01599  ED50  20 A9 EE        ISR02  JSR DEBPIA  ;WAIT FOR DATA TO GO HIGH
01600  ED53  90 FB            BCC ISR02
01601  ED55                  ;
```

SERIAL ROUTINES.....PAGE 0039

```
LINE# LOC   CODE         LINE


01602  ED55  20 A9 EE     ISR03  JSR DEBPIA   ;WAIT FOR DATA TO GO LOW
01603  ED58  B0 FB            BCS ISR03
01604  ED5A                  ;
01605  ED5A  20 A9 EE     NOEOI  JSR DEBPIA   ;WAIT FOR DATA HIGH
01606  ED5D  90 FB            BCC NOEOI
01607  ED5F  20 8E EE         JSR CLKLO       ;SET CLOCK LOW
01608  ED62                  ;
01609  ED62                  ; SET TO SEND DATA
01610  ED62                  ;
01611  ED62  A9 08            LDA #$08        ;COUNT 8 BITS
01612  ED64  85 A5            STA COUNT
01613  ED66                  ;
01614  ED66                  ISR01
01615  ED66  AD 00 DD         LDA D2PRA       ;DEBOUNCE THE BUS
01616  ED69  CD 00 DD         CMP D2PRA
01617  ED6C  D0 F8            BNE ISR01
01618  ED6E  0A               ASL A           ;SET THE FLAGS
01619  ED6F  90 3F            BCC FRMERR      ;DATA MUST BE HI
01620  ED71                  ;
01621  ED71  66 95            ROR BSOUR       ;NEXT BIT INTO CARRY
01622  ED73  B0 05            BCS ISRHI
01623  ED75  20 A0 EE         JSR DATALO
01624  ED78  D0 03            BNE ISRCLK
01625  ED7A  20 97 EE     ISRHI  JSR DATAHI
01626  ED7D  20 85 EE     ISRCLK JSR CLKHI    ;CLOCK HI
01627  ED80  EA               NOP
01628  ED81  EA               NOP
01629  ED82  EA               NOP
01630  ED83  EA               NOP
01631  ED84  AD 00 DD         LDA D2PRA
01632  ED87  29 DF            AND #$FF-$20    ;DATA HIGH
```

```
01633  ED89  09 10          ORA #$10        ;CLOCK LOW
01634  ED8B  8D 00 DD       STA D2PRA
01635  ED8E  C6 A5          DEC COUNT
01636  ED90  D0 D4          BNE ISR01
01637  ED92  A9 04          LDA #$04        ;SET TIMER FOR 1MS
01638  ED94  8D 07 DC       STA D1T2H
01639  ED97  A9 19          LDA #TIMRB      ;TRIGGER TIMER
01640  ED99  8D 0F DC       STA D1CRB
01641  ED9C  AD 0D DC       LDA D1ICR       ;CLEAR THE TIMER FLAGS<<<<<<<<<<<<<
01642  ED9F  AD 0D DC  ISR04 LDA D1ICR
01643  EDA2  29 02          AND #$02
01644  EDA4  D0 0A          BNE FRMERR
01645  EDA6  20 A9 EE       JSR DEBPIA
01646  EDA9  B0 F4          BCS ISR04
01647  EDAB  58             CLI             ;LET IRQ'S CONTINUE
01648  EDAC  60             RTS
01649  EDAD                 ;
01650  EDAD                 NODEV           ;DEVICE NOT PRESENT ERROR
01651  EDAD  A9 80          LDA #$80
01652  EDAF  2C             .BYT $2C
01653  EDB0                 FRMERR          ;FRAMING ERROR
01654  EDB0  A9 03          LDA #$03
01655  EDB2  20 1C FE  CSBERR JSR UDST      ;COMMODORE SERIAL BUSS ERROR ENTRY
01656  EDB5  58             CLI             ;IRQ'S WERE OFF...TURN ON
01657  EDB6  18             CLC             ;MAKE SURE NO KERNAL ERROR RETURNED
01658  EDB7  90 4A          BCC DLABYE      ;TURN ATN OFF ,RELEASE ALL LINES
01659  EDB9                 ;
```

SERIAL ROUTINES.....PAGE 0040

```
LINE# LOC   CODE        LINE

01661  EDB9                 ;SEND SECONDARY ADDRESS AFTER LISTEN
01662  EDB9                 ;
01663  EDB9  85 95          SECND   STA BSOUR       ;BUFFER CHARACTER
01664  EDBB  20 36 ED               JSR ISOURA      ;SEND IT


01666  EDBE                 ;RELEASE ATTENTION AFTER LISTEN
01667  EDBE                 ;
01668  EDBE  AD 00 DD       SCATN   LDA D2PRA
01669  EDC1  29 F7                  AND #$FF-$08
01670  EDC3  8D 00 DD               STA D2PRA       ;RELEASE ATTENTION
01671  EDC6  60                     RTS


01673  EDC7                 ;TALK SECOND ADDRESS
01674  EDC7                 ;
01675  EDC7  85 95          TKSA    STA BSOUR       ;BUFFER CHARACTER
01676  EDC9  20 36 ED               JSR ISOURA      ;SEND SECOND ADDR


01678  EDCC                 TKATN                   ;SHIFT OVER TO LISTENER
01679  EDCC  78                     SEI             ;NO IRQ'S HERE
```

```
01680  EDCD  20 A0 EE           JSR DATALO       ;DATA LINE LOW
01681  EDD0  20 BE ED           JSR SCATN
01682  EDD3  20 85 EE           JSR CLKHI        ;CLOCK LINE HIGH JSR/RTS
01683  EDD6  20 A9 EE    TKATN1 JSR DEBPIA       ;WAIT FOR CLOCK TO GO LOW
01684  EDD9  30 FB               BMI TKATN1
0168   EDDB  58                  CLI              ;IRQ'S OKAY NOW
0168   EDDC  60                  RTS



01688  EDDD              ;BUFFERED OUTPUT TO SERIAL BUS
01689  EDDD              ;
01690  EDDD  24 94       CIOUT   BIT C3PO         ;BUFFERED CHAR?
01691  EDDF  30 05               BMI CI2          ;YES...SEND LAST
01692  EDE1              ;
01693  EDE1  38                  SEC              ;NO...
01694  EDE2  66 94               ROR C3PO         ;SET BUFFERED CHAR FLAG
01695  EDE4  D0 05               BNE CI4          ;BRANCH ALWAYS
01696  EDE6              ;
01697  EDE6  48          CI2     PHA              ;SAVE CURRENT CHAR
01698  EDE7  20 40 ED            JSR ISOUR        ;SEND LAST CHAR
01699  EDEA  68                  PLA              ;RESTORE CURRENT CHAR
01700  EDEB  85 95       CI4     STA BSOUR        ;BUFFER CURRENT CHAR
01701  EDED  18                  CLC              ;CARRY-GOOD EXIT
017    EDEE  60                  RTS



01704  EDEF              ;SEND UNTALK COMMAND ON SERIAL BUS
01705  EDEF              ;
01706  EDEF  78          UNTLK   SEI
01707  EDF0  20 8E EE            JSR CLKLO
01708  EDF3  AD 00 DD            LDA D2PRA        ;PULL ATN
01709  EDF6  09 08               ORA #$08
01710  EDF8  8D 00 DD            STA D2PRA
01711  EDFB  A9 5F               LDA #$5F         ;UNTALK COMMAND




SERIAL ROUTINES......PAGE 0041

LINE# LOC   CODE        LINE


01712  EDFD  2C                  .BYT $2C         ;SKIP TWO BYTES



01714  EDFE              ;SEND UNLISTEN COMMAND ON SERIAL BUS
01715  EDFE              ;
01716  EDFE  A9 3F       UNLSN   LDA #$3F         ;UNLISTEN COMMAND
01717  EE00  20 11 ED            JSR LIST1       ;SEND IT
01718  EE03              ;
01719  EE03              ; RELEASE ALL LINES
01720  EE03  20 BE ED    DLABYE JSR SCATN         ;ALWAYS RELEASE ATN
01721  EE06              ; DELAY THEN RELEASE CLOCK AND DATA
01722  EE06              ;
01723  EE06  8A          DLADLH TXA               ;DELAY APPROX 60 US
01724  EE07  A2 0A               LDX #10
017    EE09  CA          DLADO0 DEX
01726  EE0A  D0 FD               BNE DLADO0
01727  EE0C  AA                  TAX
01728  EE0D  20 85 EE            JSR CLKHI
```

```
01729  EE10  4C 97 EE           JMP DATAHI



01731  EE13                    ;INPUT A BYTE FROM SERIAL BUS
01732  EE13                    ;
01733  EE13                    ACPTR
01734  EE13  78                       SEI              ;NO IRQ ALLOWED
01735  EE14  A9 00                    LDA #$00         ;SET EOI/ERROR FLAG
01736  EE16  85 A5                    STA COUNT
01737  EE18  20 85 EE                 JSR CLKHI        ;MAKE SURE CLOCK LINE IS RELEASED
01738  EE1B  20 A9 EE    ACP00A       JSR DEBPIA        ;WAIT FOR CLOCK HIGH
01739  EE1E  10 FB                    BPL ACP00A
01740  EE20                    ;
01741  EE20                    EOIACP
01742  EE20  A9 01                    LDA #$01         ;SET TIMER 2 FOR 256US
01743  EE22  8D 07 DC                 STA D1T2H
01744  EE25  A9 19                    LDA #TIMRB
01745  EE27  8D 0F DC                 STA D1CRB
01746  EE2A  20 97 EE                 JSR DATAHI       ;DATA LINE HIGH (MAKES TIMMING MORE
01747  EE2D  AD 0D DC                 LDA D1ICR        ;CLEAR THE TIMER FLAGS<<<<<<<<<<<<
01748  EE30  AD 0D DC    ACP00        LDA D1ICR
01749  EE33  29 02                    AND #$02         ;CHECK THE TIMER
01750  EE35  D0 07                    BNE ACP00B       ;RAN OUT.....
01751  EE37  20 A9 EE                 JSR DEBPIA       ;CHECK THE CLOCK LINE
01752  EE3A  30 F4                    BMI ACP00        ;NO NOT YET
01753  EE3C  10 18                    BPL ACP01        ;YES.....
01754  EE3E                    ;
01755  EE3E  A5 A5       ACP00B LDA COUNT        ;CHECK FOR ERROR (TWICE THRU TIMEOU
01756  EE40  F0 05                    BEQ ACP00C
01757  EE42  A9 02                    LDA #2
01758  EE44  4C B2 ED                 JMP CSBERR       ; ST = 2 READ TIMEOUT
01759  EE47                    ;
01760  EE47                    ; TIMER RAN OUT DO AN EOI THING
01761  EE47                    ;
01762  EE47  20 A0 EE    ACP00C       JSR DATALO        ;DATA LINE LOW
01763  EE4A  20 85 EE                 JSR CLKHI        ; DELAY AND THEN SET DATAHI (FIX FOR
01764  EE4D  A9 40                    LDA #$40
01765  EE4F  20 1C FE                 JSR UDST         ;OR AN EOI BIT INTO STATUS
01766  EE52  E6 A5                    INC COUNT        ;GO AROUND AGAIN FOR ERROR CHECK ON
01767  EE54  D0 CA                    BNE EOIACP
01768  EE56                    ;
```

SERIAL ROUTINES.....PAGE 0042

```
LINE# LOC   CODE         LINE


01769  EE56                    ; DO THE BYTE TRANSFER
01770  EE56                    ;
01771  EE56  A9 08       ACP01  LDA #08          ;SET UP COUNTER
01772  EE58  85 A5                    STA COUNT
01773  EE5A                    ;
01774  EE5A  AD 00 DD    ACP03  LDA D2PRA        ;WAIT FOR CLOCK HIGH
01775  EE5D  CD 00 DD                 CMP D2PRA        ;DEBOUNCE
01776  EE60  D0 F8                    BNE ACP03
01777  EE62  0A                       ASL A            ;SHIFT DATA INTO CARRY
01778  EE63  10 F5                    BPL ACP03        ;CLOCK STILL LOW(!)
01779  EE65  66 A4                    ROR BSOUR1       ;ROTATE DATA IN
01780  EE67                    ;
01781  EE67  AD 00 DD    ACP03A LDA D2PRA        ;WAIT FOR CLOCK LOW
```

```
01782  EE6A  CD 00 DD          CMP D2PRA        ;DEBOUNCE
01783  EE6D  D0 F8             BNE ACP03A
01784  EE6F  0A                ASL A
01785  EE70  30 F5             BMI ACP03A
01786  EE72  C6 A5             DEC COUNT
01787  EE74  D0 E4             BNE ACP03        ;MORE BITS.....
01788  EE76                 ;...EXIT...
01789  EE76  20 A0 EE          JSR DATALO       ;DATA LOW
01790  EE79  24 90             BIT STATUS       ;CHECK FOR EOI
01791  EE7B  50 03             BVC ACP04        ;NONE...
01792  EE7D                 ;
01793  EE7D  20 06 EE          JSR DLADLH       ;DELAY THEN SET DATA HIGH
01794  EE80                 ;
01795  EE80  A5 A4          ACP04  LDA BSOUR1
01796  EE82  58                CLI              ;IRQ IS OK
01797  EE83  18                CLC              ;GOOD EXIT
01798  EE84  60                RTS
01799  EE85                 ;
01800  EE85                 CLKHI                ;SET CLOCK LINE HIGH (INVERTED)
01801  EE85  AD 00 DD           LDA D2PRA
01802  EE88  29 EF              AND #$FF-$10
01803  EE8A  8D 00 DD           STA D2PRA
01804  EE8D  60                 RTS
01805  EE8E                 ;
01806  EE8E                 CLKLO                ;SET CLOCK LINE LOW  (INVERTED)
01807  EE8E  AD 00 DD           LDA D2PRA
01808  EE91  09 10              ORA #$10
01809  EE93  8D 00 DD           STA D2PRA
01810  EE96  60                 RTS
01811  EE97                 ;
01812  EE97                 ;
01813  EE97                 DATAHI               ;SET DATA LINE HIGH (INVERTED)
01814  EE97  AD 00 DD           LDA D2PRA
01815  EE9A  29 DF              AND #$FF-$20
01816  EE9C  8D 00 DD           STA D2PRA
01817  EE9F  60                 RTS
01818  EEA0                 ;
01819  EEA0                 DATALO               ;SET DATA LINE LOW  (INVERTED)
01820  EEA0  AD 00 DD           LDA D2PRA
01821  EEA3  09 20              ORA #$20
01822  EEA5  8D 00 DD           STA D2PRA
01823  EEA8  60                 RTS
01824  EEA9                                     ;
01825  EEA9  AD 00 DD       DEBPIA LDA D2PRA     ;DEBOUNCE THE PIA
01826  EEAC  CD 00 DD           CMP D2PRA
01827  EEAF  D0 F8              BNE DEBPIA
01828  EEB1  0A                 ASL A            ;SHIFT THE DATA BIT INTO THE CARRY..
01829  EEB2  60                 RTS              ;...AND THE CLOCK INTO NEG FLAG
```



```
LINE# LOC   CODE        LINE


01830  EEB3                 ;
01831  EEB3                 W1MS                 ;DELAY 1MS USING LOOP
01832  EEB3  8A                 TXA              ;SAVE .X
01833  EEB4  A2 B8              LDX #200-16      ;1000US-(1000/500*8=#40US HOLDS)
01834  EEB6  CA             W1MS1  DEX           ;5US LOOP
01835  EEB7  D0 FD              BNE W1MS1
01836  EEB9  AA                 TAX              ;RESTORE .X
```

```
01837  EEBA  60                    RTS
01838  EEBB                        .END
01839  EEBB                        .LIB RS232TRANS
```



```
LINE  LOC   CODE        LINE

01841  EEBB              ; RSTRAB - ENTRY FOR NMI CONTINUE ROUTINE
```

```
01842  EEBB                ; RSTBGN - ENTRY FOR START TRANSMITTER
01843  EEBB                ;
01844  EEBB                ;   RSR - 8/18/80
01845  EEBB                ;
01846  EEBB                ; VARIABLES USED
018·   EEBB                ;   BITTS - # OF BITS TO BE SENT (<>0 NOT DONE)
0184   EEBB                ;   NXTBIT - BYTE CONTAINS NEXT BIT TO BE SENT
01849  EEBB                ;   ROPRTY - BYTE CONTAINS PARITY BIT CALCULATED
01850  EEBB                ;   RODATA - STORES DATA BYTE CURRENTLY BEING TRANSMITTED
01851  EEBB                ;   RODBS - OUTPUT BUFFER INDEX START
01852  EEBB                ;   RODBE - OUTPUT BUFFER INDEX END
01853  EEBB                ;   IF RODBS=RODBE THEN BUFFER EMPTY
01854  EEBB                ;   ROBUF - INDIRECT POINTER TO DATA BUFFER
01855  EEBB                ;   RSSTAT - RS-232 STATUS BYTE
01856  EEBB                ;
01857  EEBB                ;   XXX US - NORMAL BIT PATH
01858  EEBB                ;   XXX US - WORST CASE PARITY BIT PATH
01859  EEBB                ;   XXX US - STOP BIT PATH
01860  EEBB                ;   XXX US - START BIT PATH
01861  EEBB                ;
01862  EEBB  A5 B4         RSTRAB LDA BITTS       ;CHECK FOR PLACE IN BYTE...
01863  EEBD  F0 47                BEQ RSTBGN     ;...DONE, =0 START NEXT
01864  EEBF                ;
01865  EEBF  30 3F                BMI RST050     ;...DOING STOP BITS
018·   EEC1                ;
0186   EEC1  46 B6                LSR RODATA     ;SHIFT DATA INTO CARRY
01868  EEC3  A2 00                LDX #00        ;PREPARE FOR A ZERO
01869  EEC5  90 01                BCC RST005     ;YES...A ZERO
01870  EEC7  CA                   DEX            ;NO...MAKE AN $FF
01871  EEC8  8A            RST005 TXA             ;READY TO SEND
01872  EEC9                ;
01873  EEC9  45 BD                EOR ROPRTY     ;CALC INTO PARITY
01874  EECB  85 BD                STA ROPRTY
01875  EECD                ;
01876  EECD  C6 B4                DEC BITTS      ;BIT COUNT DOWN
01877  EECF  F0 06                BEQ RST010     ;WANT A PARITY INSTEAD
01878  EED1                ;
01879  EED1  8A            RSTEXT TXA             ;CALC BIT WHOLE TO SEND
01880  EED2  29 04                AND #$04       ;GOES OUT D2PA2
01881  EED4  85 B5                STA NXTBIT
01882  EED6  60                   RTS
```

```
LOC    CODE          LINE

EED7                 ; CALCULATE PARITY
EED7                 ;  NXTBIT =0 UPON ENTRY
EED7                 ;
EED7   A9 20         RST010 LDA #$20          ;CHECK 6551 REG BITS
EED9   2C 94 02             BIT M51CDR
EEDC   F0 14                BEQ RSPNO        ;...NO PARITY, SEND A STOP
EEDE   30 1C                BMI RST040       ;...NOT REAL PARITY
EEE0   70 14                BVS RST030       ;...EVEN PARITY
EEE2                 ;
EEE2   A5 BD                LDA ROPRTY       ;CALC ODD PARITY
EEE4   D0 01                BNE RSPEXT       ;CORRECT GUESS
EEE6                 ;
EEE6   CA            RSWEXT DEX               ;WRONG GUESS...ITS A ONE
EEE7                 ;
EEE7   C6 B4         RSPEXT DEC BITTS         ;ONE STOP BIT ALWAYS
EEE9   AD 93 02             LDA M51CTR       ;CHECK # OF STOP BITS
EEEC   10 E3                BPL RSTEXT       ;...ONE
EEEE   C6 B4                DEC BITTS        ;...TWO
EEF0   D0 DF                BNE RSTEXT       ;JUMP
EEF2                 ;
EEF2                 RSPNO                    ;LINE TO SEND CANNOT BE PBO
EEF2   E6 B4                INC BITTS        ;COUNTS AS ONE STOP BIT
EEF4   D0 F0                BNE RSWEXT       ;JUMP TO FLIP TO ONE
EEF6                 ;
EEF6   A5 BD         RST030 LDA ROPRTY        ;EVEN PARITY
EEF8   F0 ED                BEQ RSPEXT       ;CORRECT GUESS...EXIT
EEFA   D0 EA                BNE RSWEXT       ;WRONG...FLIP AND EXIT
EEFC                 ;
EEFC   70 E9         RST040 BVS RSPEXT        ;WANTED SPACE
EEFE   50 E6                BVC RSWEXT       ; WANTED MARK


EF00                 ; STOP BITS
EF00                 ;
EF00   E6 B4         RST050 INC BITTS         ;STOP BIT COUNT TOWARDS ZERO
EF02   A2 FF                LDX #$FF         ;SEND STOP BIT
EF04   D0 CB                BNE RSTEXT       ;JUMP TO EXIT
EF06                 ;
```

```
LINE# LOC   CODE        LINE

01922  EF06             ; RSTBGN - ENTRY TO START BYTE TRANS
01923  EF06             ;
01924  EF06  AD 94 02   RSTBGN LDA M51CDR      ;CHECK FOR 3/X LINE
01925  EF09  4A                LSR A
01926  EF0A  90 07              BCC RST060     ;3 LINE...NO CHECK
01927  EF0C  2C 01 DD           BIT D2PRB      ;CHECK FOR...
01928  EF0F  10 1D              BPL DSRERR     ;...DSR ERROR
01929  EF11  50 1E              BVC CTSERR     ;...CTS ERROR
01930  EF13             ;
01931  EF13             ; SET UP TO SEND NEXT BYTE
01932  EF13             ;
01933  EF13  A9 00      RST060 LDA #0
01934  EF15  85 BD              STA ROPRTY     ;ZERO PARITY
01[illegible]  EF17  85 B5              STA NXTBIT     ;SEND START BIT
01[illegible]  EF19  AE 98 02           LDX BITNUM     ;GET # OF BITS
01937  EF1C  86 B4      RST070 STX BITTS       ;BITTS=#OF BITTS+1
01938  EF1E             ;
01939  EF1E  AC 9D 02   RST080 LDY RODBS       ;CHECK BUFFER POINTERS
01940  EF21  CC 9E 02           CPY RODBE
01941  EF24  F0 13              BEQ RSODNE     ;ALL DONE...
01942  EF26             ;
01943  EF26  B1 F9              LDA (ROBUF)Y   ;GET DATA...
01944  EF28  85 B6              STA RODATA     ;...INTO BYTE BUFFER
01945  EF2A  EE 9D 02           INC RODBS      ;MOVE POINTER TO NEXT
01946  EF2D  60                 RTS



01948  EF2E             ; SET ERRORS
01949  EF2E             ;
01950  EF2E  A9 40      DSRERR LDA #$40        ;DSR GONE ERROR
01951  EF30  2C                .BYT $2C
01[illegible]  EF31  A9 10      CTSERR LDA #$10        ;CTS GONE ERROR
01[illegible]  EF33  0D 97 02           ORA RSSTAT
01954  EF36  8D 97 02           STA RSSTAT
01955  EF39             ;
01956  EF39             ; ERRORS TURN OFF T1
01957  EF39             ;
01958  EF39  A9 01      RSODNE LDA #$01        ;KILL T1 NMI
01959  EF3B             ;ENTRY TO TURN OFF AN ENABLED NMI...
01960  EF3B  8D 0D DD   OENABL STA D2ICR       ;TOSS BAD/OLD NMI
01961  EF3E  4D A1 02           EOR ENABL      ;FLIP ENABLE
01962  EF41  09 80              ORA #$80       ;ENABLE GOOD NMI'S
01963  EF43  8D A1 02           STA ENABL
01964  EF46  8D 0D DD           STA D2ICR
01965  EF49  60                 RTS



01967  EF4A             ; BITCNT - CAL # OF BITS TO BE SENT
01[illegible]  EF4A             ;   RETURNS #OF BITS+1
01[illegible]  EF4A             ;
01[illegible]  EF4A  A2 09      BITCNT LDX #9          ;CALC WORD LENGTH
01971  EF4C  A9 20              LDA #$20
01972  EF4E  2C 93 02           BIT M51CTR
```

```
01973  EF51  F0 01              BEQ BIT010
01974  EF53  CA                 DEX            ;BIT 5 HIGH IS A 7 OR 5
01975  EF54  50 02       BIT010 BVC BIT020
01976  EF56  CA                 DEX            ;BIT 6 HIGH IS A 6 OR 5
01977  EF57  CA                 DEX
019    EF58  60           BIT020 RTS
```

RS-232 TRANSMITT.....PAGE 0047

```
LINE# LOC   CODE        LINE

01979  EF59                     .END
01980  EF59                     .LIB RS232RCVR
```

```
LINE# LOC   CODE        LINE

01982  EF59             ; RSRCVR - NMI ROUTINE TO COLLECT
01983  EF59             ;  DATA INTO BYTES
01984  EF59             ;
01985  EF59             ; RSR 8/18/80
01986  EF59             ;
01987  EF59             ; VARIABLES USED
01988  EF59             ;   INBIT - INPUT BIT VALUE
01989  EF59             ;   BITCI - BIT COUNT IN
01990  EF59             ;   RINONE - FLAG FOR START BIT CHECK <>0 START BIT
01991  EF59             ;   RIDATA - BYTE INPUT BUFFER
01992  EF59             ;   RIPRTY - HOLDS BYTE INPUT PARITY
01993  EF59             ;   RIBUF - INDIRECT POINTER TO DATA BUFFER
01994  EF59             ;   RIDBE - INPUT BUFFER INDEX TO END
01995  EF59             ;   RIDBS - INPUT BUFFER POINTER TO START
01996  EF59             ;   IF RIDBE=RIDBS THEN INPUT BUFFER EMPTY
01997  EF59             ;
01998  EF59  A6 A9      RSRCVR LDX RINONE       ;CHECK FOR START BIT
01999  EF5B  D0 33            BNE RSRTRT       ;WAS START BIT
02000  EF5D             ;
02001  EF5D  C6 A8            DEC BITCI        ;CHECK WHERE WE ARE IN INPUT...
02002  EF5F  F0 36            BEQ RSR030       ;HAVE A FULL BYTE
02003  EF61  30 0D            BMI RSR020       ;GETTING STOP BITS
02004  EF63             ;
02005  EF63             ; CALC PARITY
02006  EF63             ;
02007  EF63  A5 A7            LDA INBIT        ;GET DATA UP
02008  EF65  45 AB            EOR RIPRTY       ;CALC NEW PARITY
02009  EF67  85 AB            STA RIPRTY
02010  EF69             ;
02011  EF69             ; SHIFT DATA BIT IN
02012  EF69             ;
02013  EF69  46 A7            LSR INBIT        ;IN BIT POS 0
02014  EF6B  66 AA            ROR RIDATA       ;C INTO DATA
02015  EF6D             ;
02016  EF6D             ; EXIT
02017  EF6D             ;
02018  EF6D  60         RSREXT RTS
```

```
LINE# LOC   CODE         LINE

02020  EF6E              ; HAVE STOP BIT, SO STORE IN BUFFER
02021  EF6E              ;
02022  EF6E  C6 A8       RSR018 DEC BITCI        ;NO PARITY, DEC SO CHECK WORKS
02023  EF70  A5 A7       RSR020 LDA INBIT        ;GET DATA...
02024  EF72  F0 67              BEQ RSR060       ;...ZERO, AN ERROR?
02025  EF74              ;
02026  EF74  AD 93 02           LDA M51CTR       ;CHECK FOR CORRECT # OF STOP BITS
02027  EF77  0A                 ASL A            ;CARRY TELL HOW MAY STOP BITS
02028  EF78  A9 01              LDA #01
02029  EF7A  65 A8              ADC BITCI
02030  EF7C  D0 EF              BNE RSREXT       ;NO..EXIT
02031  EF7E              ;
02032  EF7E              ; RSRABL - ENABLE TO RECIEVE A BYTE
02033  EF7E              ;
0203[illegible]  EF7E  A9 90       RSRABL LDA #$90         ;ENABLE FLAG FOR NEXT BYTE
0203[illegible]  EF80  8D 0D DD           STA D2ICR        ;TOSS BAD/OLD NMI
02036  EF83  0D A1 02           ORA ENABL        ;MARK IN ENABLE REGISTER**********
02037  EF86  8D A1 02           STA ENABL        ;RE-ENABLED BY JMP OENABL
02038  EF89  85 A9              STA RINONE       ;FLAG FOR START BIT
02039  EF8B              ;
02040  EF8B  A9 02       RSRSXT LDA #$02         ;DISABLE T2
02041  EF8D  4C 3B EF           JMP OENABL       ;FLIP-OFF ENABL***************


02043  EF90              ; RECIEVER START BIT CHECK
02044  EF90              ;
02045  EF90  A5 A7       RSRTRT LDA INBIT        ;CHECK IF SPACE
02046  EF92  D0 EA              BNE RSRABL       ;BAD...TRY AGAIN
02047  EF94  4C D3 E4           JMP PRTYP        ;GO TO PARITY PATCH 901227-03
02048  EF97              ; STA RINONE ;GOOD...DISABLE FLAG
02049  EF97              ; RTS ;AND EXIT



02051  EF97              ;
02052  EF97              ; PUT DATA IN BUFFER (AT PARITY TIME)
```

```
02053  EF97                    ;
02054  EF97  AC 9B 02    RSR030 LDY RIDBE        ;GET END
02055  EF9A  C8                  INY
02056  EF9B  CC 9C 02            CPY RIDBS       ;HAVE WE PASSED START?
02057  EF9E  F0 2A               BEQ RECERR      ;YES...ERROR
020!    EFA0                    ;
0205   EFA0  8C 9B 02            STY RIDBE       ;MOVE RIDBE FOWARD
02060  EFA3  88                  DEY
02061  EFA4                    ;
02062  EFA4  A5 AA               LDA RIDATA      ;GET BYTE BUFFER UP
02063  EFA6  AE 98 02            LDX BITNUM      ;SHIFT UNTILL FULL BYTE
02064  EFA9  E0 09       RSR031  CPX #9           ;ALWAYS 8 BITS
02065  EFAB  F0 04               BEQ RSR032
02066  EFAD  4A                  LSR A           ;FILL WITH ZEROS
02067  EFAE  E8                  INX
02068  EFAF  D0 F8               BNE RSR031
02069  EFB1                    ;
02070  EFB1  91 F7       RSR032  STA (RIBUF)Y     ;DATA TO PAGE BUFFER
02071  EFB3                    ;
02072  EFB3                    ; PARITY CHECKING
02073  EFB3                    ;
02074  EFB3  A9 20               LDA ##$20       ;CHECK 6551 COMMAND REGISTER
02075  EFB5  2C 94 02            BIT M51CDR
02076  EFB8  F0 B4               BEQ RSR018      ;NO PARITY BIT SO STOP BIT
```

RS-232 RECEIVER.....PAGE 0050

```
LINE# LOC   CODE        LINE

02077  EFBA  30 B1               BMI RSREXT      ;NO PARITY CHECK
02078  EFBC                    ;
02079  EFBC                    ; CHECK CALC PARITY
02080  EFBC                    ;
02081  EFBC  A5 A7               LDA INBIT
02082  EFBE  45 AB               EOR RIPRTY      ;PUT IN WITH PARITY
02083  EFC0  F0 03               BEQ RSR050      ;EVEN PARITY
02084  EFC2  70 A9               BVS RSREXT      ;ODD...OKAY SO EXIT
020L    EFC4  2C                  .BYT $2C        ;SKIP TWO
0208   EFC5  50 A6       RSR050  BVC RSREXT       ;EVEN...OKAY SO EXIT
02087  EFC7                    ;
02088  EFC7                    ; ERRORS REPORTED
02089  EFC7  A9 01               LDA #1          ;PARITY ERROR
02090  EFC9  2C                  .BYT $2C
02091  EFCA  A9 04       RECERR  LDA ##$4          ;RECIEVER OVERRUN
02092  EFCC  2C                  .BYT $2C
02093  EFCD  A9 80       BREAKE  LDA ##$80         ;BREAK DETECTED
02094  EFCF  2C                  .BYT $2C
02095  EFD0  A9 02       FRAMEE  LDA ##$02         ;FRAME ERROR
02096  EFD2  0D 97 02    ERR232  ORA RSSTAT
02097  EFD5  8D 97 02            STA RSSTAT
02098  EFD8  4C 7E EF            JMP RSRABL      ;BAD EXIT SO HANG ##????????##
02099  EFDB                    ;
02100  EFDB                    ; CHECK FOR ERRORS
02101  EFDB                    ;
02102  EFDB  A5 AA       RSR060  LDA RIDATA       ;EXPECTING STOP...
021C?  EFDD  D0 F1               BNE FRAMEE      ;FRAME ERROR
021L    EFDF  F0 EC               BEQ BREAKE      ;COULD BE A BREAK
0210?  EFE1                      .END
02106  EFE1                      .LIB RS232INOUT
```

```
LINE# LOC   CODE         LINE

02108  EFE1               ; OUTPUT A FILE OVER USR PORT
02109  EFE1               ;  USING RS232
021.   EFE1               ;
0211   EFE1  85 9A        CKO232 STA DFLTO        ;SET DEFAULT OUT
02112  EFE3  AD 94 02             LDA M51COR     ;CHECK FOR 3/X LINE
02113  EFE6  4A                   LSR A
02114  EFE7  90 29                BCC CKO100     ;3LINE...NO TURN AROUND
02115  EFE9               ;
02116  EFE9               ;*TURN AROUND LOGIC
02117  EFE9               ;
02118  EFE9               ; CHECK FOR DSR AND RTS
02119  EFE9               ;
02120  EFE9  A9 02                LDA #$02       ;BIT RTS IS ON
02121  EFEB  2C 01 DD             BIT D2PRB
02122  EFEE  10 1D                BPL CKDSRX     ;NO DSR...ERROR
02123  EFF0  D0 20                BNE CKO100     ;RTS...OUTPUTING OR FULL DUPLEX
02124  EFF2               ;
02125  EFF2               ; CHECK FOR ACTIVE INPUT
02126  EFF2               ;  RTS WILL BE LOW IF CURRENTLY INPUTING
02127  EFF2               ;
0212   EFF2  AD A1 02     CKO020 LDA ENABL
021    EFF5  29 02                AND #$02       ;LOOK AT IER FOR T2
0213   EFF7  D0 F9                BNE CKO020     ;HANG UNTILL INPUT DONE
02131  EFF9               ;
02132  EFF9               ; WAIT FOR CTS TO BE OFF AS SPEC REQS
```

```
2133  EFF9                    ;
2134  EFF9  2C 01 DD    CKO030 BIT D2PRB
2135  EFFC  70 FB             BVS CKO030
2136  EFFE                    ;
2137  EFFE                    ; TURN ON RTS
21:   EFFE                    ;
213   EFFE  AD 01 DD          LDA D2PRB
2140  F001  09 02             ORA #$02
2141  F003  8D 01 DD          STA D2PRB
2142  F006                    ;
2143  F006                    ; WAIT FOR CTS TO GO ON
2144  F006                    ;
2145  F006  2C 01 DD    CKO040 BIT D2PRB
2146  F009  70 07             BVS CKO100      ;DONE...
2147  F00B  30 F9             BMI CKO040      ;WE STILL HAVE DSR
2148  F00D                    ;
2149  F00D  A9 40       CKDSRX LDA #$40         ;A DATA SET READY ERROR
2150  F00F  8D 97 02          STA RSSTAT      ;MAJOR ERROR....WILL REQUIRE REOPEN
2151  F012                    ;
2152  F012  18          CKO100 CLC              ;NO ERROR
2153  F013  60                RTS
2154  F014                    ;
```



```
LINE  LOC   CODE        LINE

02156  F014                    ; BSO232 - OUTPUT A CHAR RS232
02157  F014                    ;   DATA PASSED IN T1 FROM BSOUT
02158  F014                    ;
02159  F014                    ; HANG LOOP FOR BUFFER FULL
02160  F014                    ;
02161  F014  20 28 F0    BSOBAD JSR BSO100       ;KEEP TRYING TO START SYSTEM...
02162  F017                    ;
02163  F017                    ; BUFFER HANDLER
02164  F017                    ;
02165  F017  AC 9E 02    BSO232 LDY RODBE
02166  F01A  C8                  INY
02167  F01B  CC 9D 02            CPY RODBS       ;CHECK FOR BUFFER FULL
02168  F01E  F0 F4               BEQ BSOBAD      ;HANG IF SO...TRYING TO RESTART
02169  F020  8C 9E 02            STY RODBE       ;INDICATE NEW START
0217?  F023  88                   DEY
021.   F024  A5 9E               LDA T1          ;GET DATA...
02172  F026  91 F9               STA (ROBUF)Y    ;STORE DATA
02173  F028                    ;
02174  F028                    ; SET UP IF NECESSARY TO OUTPUT
```

```
2175  F028                  ;
2176  F028  AD A1 02     BS0100 LDA ENABL        ;CHECK FOR A T1 NMI ENABLE
2177  F02B  4A                   LSR A          ;BIT 0
2178  F02C  B0 1E                BCS BS0120     ;RUNNING....SO EXIT
2179  F02E                  ;
21    F02E                  ; SET UP T1 NMI'S
218   F02E                  ;
2182  F02E  A9 10         BS0110 LDA #$10        ;TURN OFF TIMER TO PREVENT FALSE ST
2183  F030  8D 0E DD             STA D2CRA
2184  F033  AD 99 02             LDA BAUDOF     ;SET UP TIMER1
2185  F036  8D 04 DD             STA D2T1L
2186  F039  AD 9A 02             LDA BAUDOF+1
2187  F03C  8D 05 DD             STA D2T1H
2188  F03F  A9 81                LDA #$81
2189  F041  20 3B EF             JSR OENABL
2190  F044  20 06 EF             JSR RSTBGN     ;SET UP TO SEND (WILL STOP ON CTS OR
2191  F047  A9 11                LDA #$11       ;TURN ON TIMER
2192  F049  8D 0E DD             STA D2CRA
2193  F04C  60           BS0120 RTS
```

RS232 INOUT.....PAGE 0053

```
LINE# LOC   CODE        LINE

02195  F04D                  ; INPUT A FILE OVER USER PORT
02196  F04D                  ;  USING RS232
02197  F04D                  ;
02198  F04D  85 99        CKI232 STA DFLTN       ;SET DEFAULT INPUT
02199  F04F                  ;
02200  F04F  AD 94 02             LDA M51CDR     ;CHECK FOR 3/X LINE
02201  F052  4A                   LSR A
02202  F053  90 28                BCC CKI100     ;3 LINE...NO HANDSHAKE
0220?  F055                  ;
022    F055  29 08                 AND #$08      ;FULL/HALF CHECK (BYTE SHIFTED ABOVE
0220   F057  F0 24                 BEQ CKI100    ;FULL...NO HANDSHAKE
02206  F059                  ;
02207  F059                  ;*TURN AROUND LOGIC
```

```
02208  F059                    ;
02209  F059                    ; CHECK IF DSR AND NOT RTS
02210  F059                    ;
02211  F059  A9 02                    LDA #$02        ;BIT RTS IS ON
02212  F05B  2C 01 DD                 BIT D2PRB
022[illegible]  F05E  10 AD                    BPL CKDSRX      ;NO DSR...ERROR
0221[illegible]  F060  F0 22                    BEQ CKI110      ;RTS LOW...IN CORRECT MODE
02215  F062                    ;
02216  F062                    ; WAIT FOR ACTIVE OUTPUT TO BE DONE
02217  F062                    ;
02218  F062  AD A1 02     CKIO10 LDA ENABL
02219  F065  4A                      LSR A           ;CHECK T1 (BIT 0)
02220  F066  B0 FA                    BCS CKIO10
02221  F068                    ;
02222  F068                    ; TURN OFF RTS
02223  F068                    ;
02224  F068  AD 01 DD                 LDA D2PRB
02225  F06B  29 FD                    AND #$FF-02
02226  F06D  8D 01 DD                 STA D2PRB
02227  F070                    ;
02228  F070                    ; WAIT FOR DCD TO GO HIGH (IN SPEC)
02229  F070                    ;
02230  F070  AD 01 DD     CKIO20 LDA D2PRB
02231  F073  29 04                    AND #$04
022[illegible]  F075  F0 F9                    BEQ CKIO20
0223[illegible]  F077                    ;
02234  F077                    ; ENABLE FLAG FOR RS232 INPUT
02235  F077                    ;
02236  F077  A9 90        CKIO80 LDA #$90
02237  F079  18                      CLC             ;NO ERROR
02238  F07A  4C 3B EF                 JMP OENABL      ;FLAG IN ENABL**********
02239  F07D                    ;
02240  F07D                    ; IF NOT 3 LINE HALF THEN...
02241  F07D                    ;  SEE IF WE NEED TO TURN ON FLAG
02242  F07D                    ;
02243  F07D  AD A1 02     CKI100 LDA ENABL        ;CHECK FOR FLAG OR T2 ACTIVE
02244  F080  29 12                    AND #$12
02245  F082  F0 F3                    BEQ CKIO80      ;NO NEED TO TURN ON
02246  F084  18           CKI110 CLC              ;NO ERROR
02247  F085  60                      RTS
```

RS232 INOUT.....PAGE 0054

```
LINE# LOC   CODE        LINE

02249  F086                    ; BSI232 - INPUT A CHAR RS232
02250  F086                    ;
02251  F086                    ; BUFFER HANDLER
022[illegible]  F086                    ;
02255  F086  AD 97 02     BSI232 LDA RSSTAT       ;GET STATUS UP TO CHANGE...
02254  F089  AC 9C 02            LDY RIDBS       ;GET LAST BYTE ADDRESS
02255  F08C  CC 9B 02            CPY RIDBE       ;SEE IF BUFFER EMPTY
```

```
2256  F08F  F0 0B           BEQ BSI010      ;RETURN A NULL IF NO CHAR
2257  F091                 ;
2258  F091  29 F7           AND #$FF-$08    ;CLEAR BUFFER EMPTY STATUS
2259  F093  8D 97 02        STA RSSTAT
2260  F096  B1 F7           LDA (RIBUF)Y    ;GET LAST CHAR
22(   F098  EE 9C 02        INC RIDBS       ;INC TO NEXT POS
226   F09B                 ;
2263  F09B                 ; RECEIVER ALWAYS RUNS
2264  F09B                 ;
2265  F09B  60             RTS
2266  F09C                 ;
2267  F09C  09 08          BSI010 ORA #$08          ;SET BUFFER EMPTY STATUS
2268  F09E  8D 97 02        STA RSSTAT
2269  F0A1  A9 00           LDA #$0         ;RETURN A NULL
2270  F0A3  60              RTS



2272  F0A4                 ; RSP232 - PROTECT SERIAL/CASS FROM RS232 NMI'S
2273  F0A4                 ;
2274  F0A4  48             RSP232 PHA               ;SAVE .A
2275  F0A5  AD A1 02        LDA ENABL       ;DOES RS232 HAVE ANY ENABLES?
2276  F0A8  F0 11           BEQ RSPOK       ;NO...
22:   F0AA  AD A1 02        RSPOFF LDA ENABL         ;WAIT UNTILL DONE
227   F0AD  29 03           AND #%00000011 ; WITH T1 & T2
2279  F0AF  D0 F9           BNE RSPOFF
2280  F0B1  A9 10           LDA #%00010000 ; DISABLE FLAG (NEED TO RENABLE IN L
2281  F0B3  8D 0D DD        STA D2ICR       ;TURN OF ENABL**********
2282  F0B6  A9 00           LDA #0
2283  F0B8  8D A1 02        STA ENABL       ;CLEAR ALL ENABLS
2284  F0BB  68             RSPOK  PLA               ;ALL DONE
2285  F0BC  60              RTS
2286  F0BD                 .END
2287  F0BD                 .LIB MESSAGES
```



```
LIN   LOC   CODE         LINE

2289  F0BD  0D           MS1     .BYT $D,'I/O ERROR ',$A3
```

```
02289  F0BE  49 2F
02289  F0C8  A3
02290  F0C9  0D          MS5     .BYT $D,'SEARCHING',$A0
02290  F0CA  53 45
02290  F0D3  A0
022.   F0D4  46 4F 52    MS6     .BYT 'FOR',$A0
022.   F0D7  A0
02292  F0D8  0D          MS7     .BYT $D,'PRESS PLAY ON TAP',$C5
02292  F0D9  50 52
02292  F0EA  C5
02293  F0EB  50 52       MS8     .BYT 'PRESS RECORD & PLAY ON TAP',$C5
02293  F105  C5
02294  F106  0D          MS10    .BYT $D,'LOADIN',$C7
02294  F107  4C 4F
02294  F10D  C7
02295  F10E  0D          MS11    .BYT $D,'SAVING',$A0
02295  F10F  53 41
02295  F115  A0
02296  F116  0D          MS21    .BYT $D,'VERIFYIN',$C7
02296  F117  56 45
02296  F11F  C7
02297  F120  0D          MS17    .BYT $D,'FOUND',$A0
02297  F121  46 4F
02297  F126  A0
022.   F127  0D          MS18    .BYT $D,'OK',$8D
022.   F128  4F 4B
02298  F12A  8D
02299  F12B              ; MS34 .BYT $D,'MONITOR',$8D
02300  F12B              ; MS36 .BYT $D,'BREA',$CB



02302  F12B              ;PRINT MESSAGE TO SCREEN ONLY IF
02303  F12B              ;OUTPUT ENABLED
02304  F12B              ;
02305  F12B  24 9D       SPMSG   BIT MSGFLG      ;PRINTING MESSAGES?
02306  F12D  10 0D               BPL MSG10       ;NO...
02307  F12F  B9 BD F0    MSG     LDA MS1,Y
02308  F132  08                  PHP
02309  F133  29 7F               AND #$7F
02310  F135  20 D2 FF            JSR BSOUT
023.   F138  C8                  INY
023.   F139  28                  PLP
02313  F13A  10 F3               BPL MSG
02314  F13C  18          MSG10   CLC
02315  F13D  60                  RTS
02316  F13E                      .END
02317  F13E                      .LIB CHANNELIO
```

```
LINE# LOC   CODE        LINE

02320 F13E              ;*****************************************
02321 F13E              ;* GETIN -- GET CHARACTER FROM CHANNEL *
02322 F13E              ;*      CHANNEL IS DETERMINED BY DFLTN.*
02323 F13E              ;* IF DEVICE IS 0, KEYBOARD QUEUE IS   *
02324 F13E              ;* EXAMINED AND A CHARACTER REMOVED IF *
02325 F13E              ;* AVAILABLE.  IF QUEUE IS EMPTY, Z    *
02326 F13E              ;* FLAG IS RETURNED SET.  DEVICES 1-31 *
02327 F13E              ;* ADVANCE TO BASIN.                   *
02328 F13E              ;*****************************************
02329 F13E  A5 99       NGETIN LDA DFLTN        ;CHECK DEVICE
02330 F140  D0 08              BNE GN10         ;NOT KEYBOARD
02331 F142              ;
02332 F142  A5 C6              LDA NDX          ;QUEUE INDEX
02333 F144  F0 0F              BEQ GN20         ;NOBODY THERE...EXIT
02334 F146              ;
02335 F146  78                 SEI
02336 F147  4C B4 E5           JMP LP2          ;GO REMOVE A CHARACTER
02337 F14A              ;
02338 F14A  C9 02       GN10   CMP #2           ;IS IT RS-232
02339 F14C  D0 18              BNE BN10         ;NO...USE BASIN
02340 F14E              ;
02341 F14E  84 97       GN232  STY XSAV         ;SAVE .Y, USED IN RS232
02342 F150  20 86 F0           JSR BSI232
02343 F153  A4 97              LDY XSAV        ;RESTORE .Y
02344 F155  18          GN20   CLC              ;GOOD RETURN
02345 F156  60                 RTS



02347 F157              ;*****************************************
02348 F157              ;* BASIN-- INPUT CHARACTER FROM CHANNEL*
02349 F157              ;*     INPUT DIFFERS FROM GET ON DEVICE*
02350 F157              ;* #0 FUNCTION WHICH IS KEYBOARD. THE  *
02351 F157              ;* SCREEN EDITOR MAKES READY AN ENTIRE *
02352 F157              ;* LINE WHICH IS PASSED CHAR BY CHAR   *
02353 F157              ;* UP TO THE CARRIAGE RETURN.  OTHER   *
02354 F157              ;* DEVICES ARE:                        *
02355 F157              ;*       0 -- KEYBOARD                 *
02356 F157              ;*       1 -- CASSETTE #1              *
02357 F157              ;*       2 -- RS232                    *
02358 F157              ;*       3 -- SCREEN                   *
02359 F157              ;*    4-31 -- SERIAL BUS               *
02360 F157              ;*****************************************
02361 F157              ;
02362 F157  A5 99       NBASIN LDA DFLTN        ;CHECK DEVICE
02363 F159  D0 0B              BNE BN10         ;IS NOT KEYBOARD...
02364 F15B              ;
02365 F15B              ;INPUT FROM KEYBOARD
02366 F15B              ;
02367 F15B  A5 D3              LDA PNTR         ;SAVE CURRENT...
02368 F15D  85 CA              STA LSTP         ;... CURSOR COLUMN
02369 F15F  A5 D6              LDA TBLX         ;SAVE CURRENT...
02370 F161  85 C9              STA LSXP         ;... LINE NUMBER
02371 F163  4C 32 E6           JMP LOOP5        ;BLINK CURSOR UNTIL RETURN
02372 F166              ;
02373 F166  C9 03       BN10   CMP #3           ;IS INPUT FROM SCREEN?
02374 F168  D0 09              BNE BN20         ;NO...
02375 F16A              ;
02376 F16A  85 D0              STA CRSW         ;FAKE A CARRIAGE RETURN
02377 F16C  A5 D5              LDA LNMX         ;SAY WE ENDED...
```

```
LINE# LOC   CODE        LINE

02378  F16E  85 C8              STA INDX        ;...UP ON THIS LINE
02379  F170  4C 32 E6           JMP LOOP5       ;PICK UP CHARACTERS
02380  F173                ;
02381  F173  B0 38        BN20  BCS BN30        ;DEVICES >3
02382  F175  C9 02              CMP #2          ;RS232?
02383  F177  F0 3F              BEQ BN50
02384  F179                ;
02385  F179                ;INPUT FROM CASSETTE BUFFERS
02386  F179                ;
02387  F179  86 97              STX XSAV
02388  F17B  20 99 F1           JSR JTGET
02389  F17E  B0 16              BCS JTG37       ;STOP KEY/ERROR
02390  F180  48                 PHA
023?   F181  20 99 F1           JSR JTGET
023?   F184  B0 0D              BCS JTG36       ;STOP KEY/ERROR
02393  F186  D0 05              BNE JTG35       ;NOT AN END OF FILE
02394  F188  A9 40              LDA #64         ;TELL USER EOF
02395  F18A  20 1C FE           JSR UDST        ;IN STATUS
02396  F18D  C6 A6        JTG35 DEC BUFPT
02397  F18F  A6 97              LDX XSAV        ;.X PRESERVED
02398  F191  68                 PLA             ;CHARACTER RETURNED
02399  F192                ;C-CLEAR FROM JTGET
02400  F192  60                 RTS             ;ALL DONE
02401  F193                ;
02402  F193  AA            JTG36 TAX             ;SAVE ERROR INFO
02403  F194  68                 PLA             ;TOSS DATA
02404  F195  8A                 TXA             ;RESTORE ERROR
02405  F196  A6 97        JTG37 LDX XSAV        ;RETURN
02406  F198  60                 RTS             ;ERROR RETURN C-SET FROM JTGET



024?   F199                ;GET A CHARACTER FROM APPROPRIATE
024?   F199                ;CASSETTE BUFFER
02410  F199                ;
02411  F199  20 0D F8     JTGET JSR JTP20        ;BUFFER POINTER WRAP?
02412  F19C  D0 0B              BNE JTG10       ;NO...
02413  F19E  20 41 F8           JSR RBLK        ;YES...READ NEXT BLOCK
02414  F1A1  B0 11              BCS BN33        ;STOP KEY PRESSED
02415  F1A3  A9 00              LDA #0
02416  F1A5  85 A6              STA BUFPT       ;POINT TO BEGIN.
02417  F1A7  F0 F0              BEQ JTGET       ;BRANCH ALWAYS
02418  F1A9                ;
02419  F1A9  B1 B2        JTG10 LDA (TAPE1),Y   ;GET CHAR FROM BUF
02420  F1AB  18                 CLC             ;GOOD RETURN
02421  F1AC  60                 RTS



02423  F1AD                ;INPUT FROM SERIAL BUS
02424  F1AD                ;
024?   F1AD  A5 90        BN30  LDA STATUS      ;STATUS FROM LAST
02426  F1AF  F0 04              BEQ BN35        ;WAS GOOD
02427  F1B1  A9 0D        BN31  LDA #$D         ;BAD...ALL DONE
02428  F1B3  18           BN32  CLC             ;VALID DATA
```

```
02429  F1B4  60           BN33   RTS
02430  F1B5               ;
02431  F1B5  4C 13 EE     BN35   JMP ACPTR          ;GOOD...HANDSHAKE
02432  F1B8               ;
02433  F1B8               ;INPUT FROM RS232
024:   F1B8               ;
```



```
LINE# LOC   CODE         LINE

02435  F1B8  20 4E F1     BN50   JSR GN232          ;GET INFO
02436  F1BB  B0 F7               BCS BN33           ;ERROR RETURN
02437  F1BD  C9 00               CMP #00
02438  F1BF  D0 F2               BNE BN32           ;GOOD DATA...EXIT
02439  F1C1  AD 97 02            LDA RSSTAT         ;CHECK FOR DSR OR DCD ERROR
02440  F1C4  29 60               AND #$60
02441  F1C6  D0 E9               BNE BN31           ;AN ERROR...EXIT WITH C/R
024:   F1C8  F0 EE               BEQ BN50           ;NO ERROR...STAY IN LOOP
```

```
LINE# LOC   CODE        LINE

02444  F1CA             ;*****************************************
02445  F1CA             ;* BSOUT -- OUT CHARACTER TO CHANNEL    *
02446  F1CA             ;*      DETERMINED BY VARIABLE DFLTO:   *
02447  F1CA             ;*      0 -- INVALID                    *
02448  F1CA             ;*      1 -- CASSETTE #1                *
02449  F1CA             ;*      2 -- RS232                      *
02450  F1CA             ;*      3 -- SCREEN                     *
02451  F1CA             ;*  4-31 -- SERIAL BUS                  *
02452  F1CA             ;*****************************************
02453  F1CA             ;
02454  F1CA  48         NBSOUT PHA              ;PRESERVE .A
02455  F1CB  A5 9A             LDA DFLTO       ;CHECK DEVICE
02456  F1CD  C9 03             CMP #3          ;IS IT THE SCREEN?
02457  F1CF  D0 04             BNE B010        ;NO...
02458  F1D1             ;
02459  F1D1             ;PRINT TO CRT
02460  F1D1             ;
02461  F1D1  68                PLA             ;RESTORE DATA
02462  F1D2  4C 16 E7          JMP PRT         ;PRINT ON CRT
02463  F1D5             ;
02464  F1D5             B010
02465  F1D5  90 04             BCC B020        ;DEVICE 1 OR 2
02466  F1D7             ;
02467  F1D7             ;PRINT TO SERIAL BUS
02468  F1D7             ;
02469  F1D7  68                PLA
02470  F1D8  4C DD ED          JMP CIOUT
02471  F1DB             ;
02472  F1DB             ;PRINT TO CASSETTE DEVICES
02473  F1DB             ;
02474  F1DB  4A         B020   LSR A           ;RS232?
02475  F1DC  68                PLA             ;GET DATA OFF STACK...
02476  F1DD             ;
02477  F1DD  85 9E      CASOUT STA T1          ;PASS DATA IN T1
02478  F1DF             ; CASOUT MUST BE ENTERED WITH CARRY SET!!!
02479  F1DF             ;PRESERVE REGISTERS
02480  F1DF             ;
02481  F1DF  8A                TXA
02482  F1E0  48                PHA
02483  F1E1  98                TYA
02484  F1E2  48                PHA
02485  F1E3  90 23             BCC B050        ;C-CLR MEANS DFLTO=2 (RS232)
02486  F1E5             ;
```

```
02487  F1E5  20 0D F8          JSR JTP20        ;CHECK BUFFER POINTER
02488  F1E8  D0 0E             BNE JTP10        ;HAS NOT REACHED END
02489  F1EA  20 64 F8          JSR WBLK         ;WRITE FULL BUFFER
02490  F1ED  B0 0E             BCS RSTOR        ;ABORT ON STOP KEY
02491  F1EF                    ;
024    F1EF                    ;PUT BUFFER TYPE BYTE
024    F1EF                    ;
02494  F1EF  A9 02             LDA #BOF
02495  F1F1  A0 00             LDY #0
02496  F1F3  91 B2             STA (TAPE1)Y
02497  F1F5                    ;
02498  F1F5                    ;RESET BUFFER POINTER
02499  F1F5                    ;
02500  F1F5  C8                INY              ;MAKE .Y=1
02501  F1F6  84 A6             STY BUFPT        ;BUFPT=1
02502  F1F8                    ;
02503  F1F8  A5 9E             JTP10  LDA T1
02504  F1FA  91 B2             STA (TAPE1)Y     ;DATA TO BUFFER
```

CHAI EL OUTPUT.....PAGE 0060

```
LINE# LOC   CODE        LINE

02505  F1FC                    ;
02506  F1FC                    ;RESTORE .X AND .Y
02507  F1FC                    ;
02508  F1FC  18                RSTOA  CLC              ;GOOD RETURN
02509  F1FD  68                RSTOR  PLA
02510  F1FE  A8                       TAY
02511  F1FF  68                       PLA
02512  F200  AA                       TAX
02513  F201  A5 9E                    LDA T1           ;GET .A FOR RETURN
02514  F203  90 02                    BCC RSTOR1       ;NO ERROR
02515  F205  A9 00                    LDA #00          ;STOP ERROR IF C-SET
02516  F207  60                RSTOR1 RTS
02517  F208                    ;
02518  F208                    ;OUTPUT TO RS232
025    F208                    ;
0252   F208  20 17 F0          B050   JSR BSO232       ;PASS DATA THROUGH VARIABLE T1
02521  F20B  4C FC F1                 JMP RSTOA        ;GO RESTORE ALL..ALWAYS GOOD
02522  F20E                           .END
02523  F20E                           .LIB OPENCHANNEL
```

```
LINE# LOC   CODE        LINE

02525  F20E             ;*****************************************
02526  F20E             ;* CHKIN -- OPEN CHANNEL FOR INPUT      *
02527  F20E             ;*                                      *
02528  F20E             ;* THE NUMBER OF THE LOGICAL FILE TO BE*
02529  F20E             ;* OPENED FOR INPUT IS PASSED IN .X.    *
02530  F20E             ;* CHKIN SEARCHES THE LOGICAL FILE      *
02531  F20E             ;* TO LOOK UP DEVICE AND COMMAND INFO.  *
02532  F20E             ;* ERRORS ARE REPORTED IF THE DEVICE    *
02533  F20E             ;* WAS NOT OPENED FOR INPUT ,(E.G.      *
02534  F20E             ;* CASSETTE WRITE FILE), OR THE LOGICAL*
02535  F20E             ;* FILE HAS NO REFERENCE IN THE TABLES.*
02536  F20E             ;* DEVICE 0, (KEYBOARD), AND DEVICE 3  *
02537  F20E             ;* (SCREEN), REQUIRE NO TABLE ENTRIES  *
02538  F20E             ;* AND ARE HANDLED SEPARATE.            *
02539  F20E             ;*****************************************
02540  F20E             ;
02541  F20E  20 0F F3   NCHKIN JSR LOOKUP       ;SEE IF FILE KNOWN
02542  F211  F0 03             BEQ JX310        ;YUP...
02543  F213             ;
02544  F213  4C 01 F7          JMP ERROR3       ;NO...FILE NOT OPEN
02545  F216             ;
02546  F216  20 1F F3   JX310  JSR JZ100        ;EXTRACT FILE INFO
02547  F219             ;
02548  F219  A5 BA             LDA FA
02549  F21B  F0 16             BEQ JX320        ;IS KEYBOARD...DONE.
02550  F21D             ;
02551  F21D             ;COULD BE SCREEN, KEYBOARD, OR SERIAL
02552  F21D             ;
02553  F21D  C9 03             CMP #3
02554  F21F  F0 12             BEQ JX320        ;IS SCREEN...DONE.
02555  F221  B0 14             BCS JX330        ;IS SERIAL...ADDRESS IT
```

```
02556  F223  C9 02           CMP #2          ;RS232?
02557  F225  D0 03           BNE JX315       ;NO...
02558  F227                 ;
02559  F227  4C 4D F0        JMP CKI232
02560  F22A                 ;
02561  F22A                 ;SOME EXTRA CHECKS FOR TAPE
02562  F22A                 ;
02563  F22A  A6 B9        JX315  LDX SA
02564  F22C  E0 60           CPX #$60        ;IS COMMAND A READ?
02565  F22E  F0 03           BEQ JX320       ;YES...O.K....DONE
02566  F230                 ;
02567  F230  4C 0A F7        JMP ERROR6      ;NOT INPUT FILE
02568  F233                 ;
02569  F233  85 99        JX320  STA DFLTN    ;ALL INPUT COME FROM HERE
02570  F235                 ;
02571  F235  18              CLC             ;GOOD EXIT
02572  F236  60              RTS
02573  F237                 ;
02574  F237                 ;AN SERIAL DEVICE HAS TO BE A TALKER
02575  F237                 ;
02576  F237  AA           JX330  TAX          ;DEVICE # FOR DFLTO
02577  F238  20 09 ED        JSR TALK        ;TELL HIM TO TALK
02578  F23B                 ;
02579  F23B  A5 B9           LDA SA          ;A SECOND?
02580  F23D  10 06           BPL JX340       ;YES...SEND IT
02581  F23F  20 CC ED        JSR TKATN       ;NO...LET GO
02582  F242  4C 48 F2        JMP JX350
02583  F245                 ;
02584  F245  20 C7 ED     JX340  JSR TKSA     ;SEND SECOND
02585  F248                 ;
```



```
LINE# LOC   CODE        LINE

02586  F248  8A          JX350  TXA
02587  F249  24 90           BIT STATUS      ;DID HE LISTEN?
02588  F24B  10 E6           BPL JX320       ;YES
02589  F24D                 ;
02590  F24D  4C 07 F7        JMP ERROR5      ;DEVICE NOT PRESENT
```

```
LINE  LOC   CODE        LINE

02592  F250             ;****************************************
02593  F250             ;* CHKOUT -- OPEN CHANNEL FOR OUTPUT     *
02594  F250             ;*                                       *
02595  F250             ;* THE NUMBER OF THE LOGICAL FILE TO BE*
02596  F250             ;* OPENED FOR OUTPUT IS PASSED IN .X.   *
02597  F250             ;* CHKOUT SEARCHES THE LOGICAL FILE     *
02598  F250             ;* TO LOOK UP DEVICE AND COMMAND INFO. *
02599  F250             ;* ERRORS ARE REPORTED IF THE DEVICE    *
02600  F250             ;* WAS NOT OPENED FOR INPUT ,(E.G.      *
02601  F250             ;* KEYBOARD), OR THE LOGICAL FILE HAS   *
02602  F250             ;* REFERENCE IN THE TABLES.             *
02603  F250             ;* DEVICE 0, (KEYBOARD), AND DEVICE 3  *
02604  F250             ;* (SCREEN), REQUIRE NO TABLE ENTRIES   *
02605  F250             ;* AND ARE HANDLED SEPARATE.            *
026[illegible]  F250             ;****************************************
026[illegible]  F250             ;
026[illegible]  F250  20 0F F3   NCKOUT JSR LOOKUP      ;IS FILE IN TABLE?
02609  F253  F0 03              BEQ CK5          ;YES...
02610  F255             ;
```

```
02611  F255  4C 01 F7          JMP ERROR3        ;NO...FILE NOT OPEN
02612  F258                    ;
02613  F258  20 1F F3    CK5   JSR JZ100         ;EXTRACT TABLE INFO
02614  F25B                    ;
02615  F25B  A5 BA             LDA FA            ;IS IT KEYBOARD?
026    F25D  D0 03             BNE CK10          ;NO...SOMETHING ELSE.
026    F25F                    ;
02618  F25F  4C 0D F7    CK20  JMP ERROR7        ;YES...NOT OUTPUT FILE
02619  F262                    ;
02620  F262                    ;COULD BE SCREEN,SERIAL,OR TAPES
02621  F262                    ;
02622  F262  C9 03        CK10  CMP #3
02623  F264  F0 0F             BEQ CK30          ;IS SCREEN...DONE
02624  F266  B0 11             BCS CK40          ;IS SERIAL...ADDRESS IT
02625  F268  C9 02             CMP #2            ;RS232?
02626  F26A  D0 03             BNE CK15
02627  F26C                    ;
02628  F26C  4C E1 EF          JMP CK0232
02629  F26F                    ;
02630  F26F                    ;
02631  F26F                    ;SPECIAL TAPE CHANNEL HANDLING
02632  F26F                    ;
02633  F26F  A6 B9        CK15  LDX SA
02634  F271  E0 60             CPX #$60          ;IS COMMAND READ?
026    F273  F0 EA             BEQ CK20          ;YES...ERROR
026    F275                    ;
02637  F275  85 9A        CK30  STA DFLTO        ;ALL OUTPUT GOES HERE
02638  F277                    ;
02639  F277  18                CLC               ;GOOD EXIT
02640  F278  60                RTS
02641  F279                    ;
02642  F279  AA          CK40  TAX               ;SAVE DEVICE FOR DFLTO
02643  F27A  20 0C ED          JSR LISTN         ;TELL HIM TO LISTEN
02644  F27D                    ;
02645  F27D  A5 B9             LDA SA            ;IS THERE A SECOND?
02646  F27F  10 05             BPL CK50          ;YES...
02647  F281                    ;
02648  F281  20 BE ED          JSR SCATN         ;NO...RELEASE LINES
02649  F284  D0 03             BNE CK60          ;BRANCH ALWAYS
02650  F286                    ;
02651  F286  20 B9 ED    CK50  JSR SECND         ;SEND SECOND...
02652  F289                    ;
```

OPEN CHANNEL OUT.....PAGE 0064

LINE# LOC CODE LINE

```
02653  F289  8A          CK60  TXA
02654  F28A  24 90             BIT STATUS        ;DID HE LISTEN?
02655  F28C  10 E7             BPL CK30          ;YES...FINISH UP
02656  F28E                    ;
02657  F28E  4C 07 F7          JMP ERROR5        ;NO...DEVICE NOT PRESENT
02658  F291                    .END
02659  F291                    .LIB CLOSE
```

```
LINE# LOC   CODE        LINE

02661  F291             ;****************************************
02662  F291             ;* CLOSE -- CLOSE LOGICAL FILE          *
02663  F291             ;*                                      *
02664  F291             ;*     THE LOGICAL FILE NUMBER OF THE*
02665  F291             ;* FILE TO BE CLOSED IS PASSED IN .A.*
02666  F291             ;* KEYBOARD, SCREEN, AND FILES NOT      *
02667  F291             ;* OPEN PASS STRAIGHT THROUGH. TAPE     *
```

```
02668  F291                ;* FILES OPEN FOR WRITE ARE CLOSED BY*
02669  F291                ;* DUMPING THE LAST BUFFER AND       *
02670  F291                ;* CONDITIONALLY WRITING AN END OF   *
02671  F291                ;* TAPE BLOCK.SERIAL FILES ARE CLOSED*
02672  F291                ;* BY SENDING A CLOSE FILE COMMAND IF*
026[illegible] F291        ;* A SECONDARY ADDRESS WAS SPECIFIED *
0267[illegible] F291       ;* IN ITS OPEN COMMAND.              *
02675  F291                ;************************************
02676  F291                ;
02677  F291  20 14 F3     NCLOSE JSR JLTLK        ;LOOK FILE UP
02678  F294  F0 02               BEQ JX050        ;OPEN...
02679  F296  18                  CLC              ;ELSE RETURN
02680  F297  60                  RTS
02681  F298                ;
02682  F298  20 1F F3     JX050  JSR JZ100        ;EXTRACT TABLE DATA
02683  F29B  8A                   TXA              ;SAVE TABLE INDEX
02684  F29C  48                   PHA
02685  F29D                ;
02686  F29D  A5 BA                LDA FA           ;CHECK DEVICE NUMBER
02687  F29F  F0 50                BEQ JX150        ;IS KEYBOARD...DONE
02688  F2A1  C9 03                CMP #3
02689  F2A3  F0 4C                BEQ JX150        ;IS SCREEN...DONE
02690  F2A5  B0 47                BCS JX120        ;IS SERIAL...PROCESS
02691  F2A7  C9 02                CMP #2           ;RS232?
026[illegible] F2A9  D0 1D        BNE JX115        ;NO...
026[illegible] F2AB                ;
02694  F2AB                ; RS-232 CLOSE
02695  F2AB                ;
02696  F2AB                ; REMOVE FILE FROM TABLES
02697  F2AB  68                   PLA
02698  F2AC  20 F2 F2             JSR JXRMV
02699  F2AF                ;
02700  F2AF  20 83 F4             JSR CLN232      ;CLEAN UP RS232 FOR CLOSE
02701  F2B2                ;
02702  F2B2                ; DEALLOCATE BUFFERS
02703  F2B2                ;
02704  F2B2  20 27 FE             JSR GETTOP      ;GET MEMSIZ
02705  F2B5  A5 F8                LDA RIBUF+1     ;CHECK INPUT ALLOCATION
02706  F2B7  F0 01                BEQ CLS010      ;NOT...ALLOCATED
02707  F2B9  C8                   INY
02708  F2BA  A5 FA        CLS010  LDA ROBUF+1      ;CHECK OUTPUT ALLOCATION
02709  F2BC  F0 01                BEQ CLS020
02710  F2BE  C8                   INY
027[illegible] F2BF  A9 00        CLS020  LDA #00          ;DEALLOCATE
027[illegible] F2C1  85 F8                STA RIBUF+1
02713  F2C3  85 FA                STA ROBUF+1
02714  F2C5                ; FLAG TOP OF MEMORY CHANGE
02715  F2C5  4C 7D F4             JMP MEMTCF      ;GO SET NEW TOP
02716  F2C8                ;
02717  F2C8                ;CLOSE CASSETTE FILE
02718  F2C8                ;
02719  F2C8  A5 B9        JX115   LDA SA           ;WAS IT A TAPE READ?
02720  F2CA  29 0F                AND #$F
02721  F2CC  F0 23                BEQ JX150        ;YES
```

CLOSE.....PAGE 0066

```
LINE  LOC   CODE        LINE

02722  F2CE                ;
```

```
                                    :Z          ;NO. . .IT IS WRITE
02724                               )           ;END OF FILE CHARACTER
02725  F2D3  38                                  ;NEED TO SET CARRY FOR CASOUT (ELSE
02726  F2D4  20 D0 F1              JSR CASOUT     ;PUT IN END OF FILE
02727  F2D7  20 64 F8              JSR WBLK
02[ ]  F2DA  90 04                 BCC JX117      ;NO ERRORS...
02[ ]  F2DC  68                    PLA            ;CLEAN STACK FOR ERROR
02730  F2DD  A9 00                 LDA #0         ;BREAK KEY ERROR
02731  F2DF  60                    RTS
02732  F2E0                 ;
02733  F2E0  A5 B9          JX117  LDA SA
02734  F2E2  C9 62                 CMP #$62       ;WRITE END OF TAPE BLOCK?
02735  F2E4  D0 0B                 BNE JX150      ;NO...
02736  F2E6                 ;
02737  F2E6  A9 05                 LDA #EOT
02738  F2E8  20 6A F7              JSR TAPEH      ;WRITE END OF TAPE BLOCK
02739  F2EB  4C F1 F2              JMP JX150
02740  F2EE                 ;
02741  F2EE                 ;CLOSE AN SERIAL FILE
02742  F2EE                 ;
02743  F2EE  20 42 F6       JX120  JSR CLSEI
02744  F2F1                 ;
02745  F2F1                 ;ENTRY TO REMOVE A GIVE LOGICAL FILE
02746  F2F1                 ;FROM TABLE OF LOGICAL, PRIMARY,
02[ ]  F2F1                 ;AND SECONDARY ADDRESSES
02[ ]  F2F1                 ;
02749  F2F1  68             JX150  PLA            ;GET TABLE INDEX OFF STACK
02750  F2F2                 ;
02751  F2F2                 ; JXRMV - ENTRY TO USE AS AN RS-232 SUBROUTINE
02752  F2F2                 ;
02753  F2F2  AA             JXRMV  TAX
02754  F2F3  C6 98                 DEC LDTND
02755  F2F5  E4 98                 CPX LDTND      ;IS DELETED FILE AT END?
02756  F2F7  F0 14                 BEQ JX170      ;YES...DONE
02757  F2F9                 ;
02758  F2F9                 ;DELETE ENTRY IN MIDDLE BY MOVING
02759  F2F9                 ;LAST ENTRY TO THAT POSITION.
02760  F2F9                 ;
02761  F2F9  A4 98                 LDY LDTND
02762  F2FB  B9 59 02              LDA LAT,Y
02763  F2FE  9D 59 02              STA LAT,X
02764  F301  B9 63 02              LDA FAT,Y
02765  F304  9D 63 02              STA FAT,X
02[ ]  F307  B9 6D 02              LDA SAT,Y
02[ ]  F30A  9D 6D 02              STA SAT,X
02768  F30D                 ;
02769  F30D  18             JX170  CLC            ;CLOSE EXIT
02770  F30E  60             JX175  RTS




02772  F30F                 ;LOOKUP TABLIZED LOGICAL FILE DATA
02773  F30F                 ;
02774  F30F  A9 00          LOOKUP LDA #0
02775  F311  85 90                 STA STATUS
02776  F313  8A                   TXA
02777  F314  A6 98          JLTLK  LDX LDTND
02778  F316  CA             JX600  DEX
```

```
LINE# LOC   CODE        LINE

02780 F317  30 15           BMI JZ101
02780 F319  DD 59 02        CMP LAT,X
02781 F31C  D0 F8           BNE JX600
02782 F31E  60              RTS



02784 F31F                  ;ROUTINE TO FETCH TABLE ENTRIES
02785 F31F                  ;
02786 F31F  BD 59 02    JZ100 LDA LAT,X
02787 F322  85 B8           STA LA
02788 F324  BD 63 02        LDA FAT,X
02789 F327  85 BA           STA FA
02790 F329  BD 6D 02        LDA SAT,X
02791 F32C  85 B9           STA SA
02792 F32E  60          JZ101 RTS
02793 F32F                  .END
02780 F32F                  .LIB CLALL
```

```
LINE# LOC   CODE        LINE

02796  F32F             ;*****************************************
02797  F32F             ;* CLALL -- CLOSE ALL LOGICAL FILES  *
02798  F32F             ;*      DELETES ALL TABLE ENTRIES AND*
02799  F32F             ;* RESTORES DEFAULT I/O CHANNELS     *
02800  F32F             ;* AND CLEARS IEEE PORT DEVICES      *
02801  F32F             ;*****************************************
02802  F32F             ;
02803  F32F  A9 00      NCLALL LDA #0
02804  F331  85 98             STA LDTND       ;FORGET ALL FILES



02806  F333             ;*************************************************
02808  F333             ;* CLRCH -- CLEAR CHANNELS                       *
02809  F333             ;*   UNLISTEN OR UNTALK IEEE DEVICES, BUT        *
02809  F333             ;* LEAVE OTHERS ALONE.  DEFAULT CHANNELS         *
02810  F333             ;* ARE RESTORED.                                 *
02811  F333             ;*************************************************
02812  F333             ;
02813  F333  A2 03      NCLRCH LDX #3
02814  F335  E4 9A             CPX DFLTO       ;IS OUTPUT CHANNEL IEEE?
02815  F337  B0 03             BCS JX750       ;NO...
02816  F339             ;
02817  F339  20 FE ED          JSR UNLSN       ;YES...UNLISTEN IT
02818  F33C             ;
02819  F33C  E4 99      JX750  CPX DFLTN       ;IS INPUT CHANNEL IEEE?
02820  F33E  B0 03             BCS CLALL2      ;NO...
02821  F340             ;
02822  F340  20 EF ED          JSR UNTLK       ;YES...UNTALK IT
02823  F343             ;
02824  F343             ;RESTORE DEFAULT VALUES
02825  F343             ;
02826  F343             ;
02827  F343  86 9A      CLALL2 STX DFLTO       ;OUTPUT CHAN=3=SCREEN
02828  F345  A9 00             LDA #0
02829  F347  85 99             STA DFLTN       ;INPUT CHAN=0=KEYBOARD
02830  F349  60                RTS
02831  F34A                    .END
02832  F34A                    .LIB OPEN
```

```
LINE# LOC   CODE        LINE

02834  F34A             ;*************************************
02835  F34A             ;*                                   *
02836  F34A             ;* OPEN FUNCTION                     *
02837  F34A             ;*                                   *
02838  F34A             ;* CREATES AN ENTRY IN THE LOGICAL   *
02839  F34A             ;* FILES TABLES CONSISTING OF        *
02840  F34A             ;* LOGICAL FILE NUMBER--LA, DEVICE   *
028    F34A             ;* NUMBER--FA, AND SECONDARY CMD--   *
028    F34A             ;* SA.                               *
02843  F34A             ;*                                   *
02844  F34A             ;* A FILE NAME DESCRIPTOR, FNADR &   *
02845  F34A             ;* FNLEN ARE PASSED TO THIS ROUTINE  *
02846  F34A             ;*                                   *
02847  F34A             ;*************************************
02848  F34A             ;
02849  F34A  A6 B8      NOPEN  LDX LA          ;CHECK FILE #
02850  F34C  D0 03             BNE OP98        ;IS NOT THE KEYBOARD
02851  F34E             ;
02852  F34E  4C 0A F7          JMP ERROR6      ;NOT INPUT FILE...
02853  F351             ;
02854  F351  20 0F F3  OP98   JSR LOOKUP       ;SEE IF IN TABLE
02855  F354  D0 03             BNE OP100       ;NOT FOUND...O.K.
02856  F356             ;
02857  F356  4C FE F6          JMP ERROR2      ;FILE OPEN
02858  F359             ;
02859  F359  A6 98      OP100  LDX LDTND       ;LOGICAL DEVICE TABLE END
028    F35B  E0 0A             CPX #10         ;MAXIMUM # OF OPEN FILES
028    F35D  90 03             BCC OP110       ;LESS THAN 10...O.K.
02862  F35F             ;
02863  F35F  4C FB F6          JMP ERROR1      ;TOO MANY FILES
02864  F362             ;
02865  F362  E6 98      OP110  INC LDTND       ;NEW FILE
02866  F364  A5 B8             LDA LA
02867  F366  9D 59 02          STA LAT,X       ;STORE LOGICAL FILE #
02868  F369  A5 B9             LDA SA
02869  F36B  09 60             ORA #$60        ;MAKE SA AN SERIAL COMMAND
02870  F36D  85 B9             STA SA
02871  F36F  9D 6D 02          STA SAT,X       ;STORE COMMAND #
02872  F372  A5 BA             LDA FA
02873  F374  9D 63 02          STA FAT,X       ;STORE DEVICE #
02874  F377             ;
02875  F377             ;PERFORM DEVICE SPECIFIC OPEN TASKS
02876  F377             ;
02877  F377  F0 5A             BEQ OP175       ;IS KEYBOARD...DONE.
0287   F379  C9 03             CMP #3
028    F37B  F0 56             BEQ OP175       ;IS SCREEN...DONE.
028    F37D  90 05             BCC OP150       ;ARE CASSETTES 1 & 2
02881  F37F             ;
02882  F37F  20 D5 F3          JSR OPENI       ;IS ON SERIAL...OPEN IT
```

```
02883  F382  90 4F           BCC OP175       ;BRANCH ALWAYS...DONE
02884  F384                  ;
02885  F384                  ;PERFORM TAPE OPEN STUFF
02886  F384                  ;
02887  F384  C9 02     OP150 CMP #2
028.   F386  D0 03           BNE OP152
028.   F388                  ;
02890  F388  4C 09 F4        JMP OPN232
02891  F38B                  ;
02892  F38B  20 D0 F7  OP152 JSR ZZZ         ;SEE IF TAPE BUFFER
02893  F38E  B0 03           BCS OP155       ;YES
02894  F390                  ;
```

OPEN FILE.....PAGE 0070

```
LINE# LOC   CODE        LINE

02895  F390  4C 13 F7        JMP ERROR9      ;NO...DEALLOCATED
028.   F393                  ;
028.   F393  A5 B9     OP155 LDA SA
02898  F395  29 0F           AND #$F         ;MASK OFF COMMAND
02899  F397  D0 1F           BNE OP200       ;NON ZERO IS TAPE WRITE
02900  F399                  ;
02901  F399                  ;OPEN CASSETE TAPE FILE TO READ
02902  F399                  ;
02903  F399  20 17 F8        JSR CSTE1       ;TELL "PRESS PLAY"
02904  F39C  B0 36           BCS OP180       ;STOP KEY PRESSED
02905  F39E                  ;
02906  F39E  20 AF F5        JSR LUKING      ;TELL USER "SEARCHING"
02907  F3A1                  ;
02908  F3A1  A5 B7           LDA FNLEN
02909  F3A3  F0 0A           BEQ OP170       ;LOOKING FOR ANY FILE
02910  F3A5                  ;
02911  F3A5  20 EA F7        JSR FAF         ;LOOKING FOR NAMED FILE
02912  F3A8  90 18           BCC OP171       ;FOUND IT!!!
02913  F3AA  F0 28           BEQ OP180       ;STOP KEY PRESSED
02914  F3AC                  ;
029.   F3AC  4C 04 F7  OP160 JMP ERROR4      ;FILE NOT FOUND
029.   F3AF                  ;
02917  F3AF  20 2C F7  OP170 JSR FAH         ;GET ANY OLD HEADER
02918  F3B2  F0 20           BEQ OP180       ;STOP KEY PRESSED
02919  F3B4  90 0C           BCC OP171       ;ALL O.K.
02920  F3B6  B0 F4           BCS OP160       ;FILE NOT FOUND...
02921  F3B8                  ;
02922  F3B8                  ;OPEN CASSETTE TAPE FOR WRITE
02923  F3B8                  ;
02924  F3B8  20 38 F8  OP200 JSR CSTE2       ;TELL "PRESS PLAY AND RECORD"
02925  F3BB  B0 17           BCS OP180       ;STOP KEY PRESSED
02926  F3BD  A9 04           LDA #$04        ;DATA FILE HEADER TYPE
02927  F3BF  20 6A F7        JSR TAPEH       ;WRITE IT
02928  F3C2                  ;
02929  F3C2                  ;FINISH OPEN FOR TAPE READ/WRITE
02930  F3C2                  ;
02931  F3C2  A9 BF     OP171 LDA #BUFSZ-1    ;ASSUME FORCE READ
02932  F3C4                  ;
02933  F3C4  A4 B9           LDY SA
029.   F3C6  C0 60           CPY #$60        ;OPEN FOR READ?
02935  F3C8  F0 07           BEQ OP172
02936  F3CA                  ;
02937  F3CA                  ;SET POINTERS FOR BUFFERING DATA
```

```
02938  F3CA                ;
02939  F3CA  A0 00         OP160  LDY #0
02940  F3CC  A9 02                LDA #BDF          ;TYPE FLAG FOR BLOCK
02941  F3CE  91 B2                STA (TAPE1),Y     ;TO BEGIN OF BUFFER
02942  F3D0  98                   TYA
02943  F3D1                ;
02944  F3D1  85 A6         OP172  STA BUFPT         ;POINT TO DATA
02945  F3D3  18            OP175  CLC               ;FLAG GOOD OPEN
02946  F3D4  60            OP180  RTS               ;EXIT IN PEACE




02948  F3D5  A5 B9         OPENI  LDA SA
02949  F3D7  30 FA                BMI OP175         ;NO SA...DONE
02950  F3D9                ;
02951  F3D9  A4 B7                LDY FNLEN




OPEN FILE......PAGE 0071

LINE# LOC   CODE        LINE


02952  F3DB  F0 F6                BEQ OP175         ;NO FILE NAME...DONE
02953  F3DD                ;
02954  F3DD  A9 00                LDA #0            ;CLEAR THE SERIAL STATUS
02955  F3DF  85 90                STA STATUS
02956  F3E1                ;
02957  F3E1  A5 BA                LDA FA
02958  F3E3  20 0C ED             JSR LISTN         ;DEVICE LA TO LISTEN
02959  F3E6                ;
02960  F3E6  A5 B9                LDA SA
02961  F3E8  09 F0                ORA #$F0
02962  F3EA  20 B9 ED             JSR SECND
02963  F3ED                ;
02964  F3ED  A5 90                LDA STATUS        ;ANYBODY HOME?
02965  F3EF  10 05                BPL OP35          ;YES...CONTINUE
02966  F3F1                ;
02967  F3F1                ;THIS ROUTINE IS CALLED BY OTHER
02968  F3F1                ;KERNAL ROUTINES WHICH ARE CALLED
02969  F3F1                ;DIRECTLY BY OS.  KILL RETURN
02970  F3F1                ;ADDRESS TO RETURN TO OS.
02971  F3F1                ;
02972  F3F1  68                   PLA
02973  F3F2  68                   PLA
02974  F3F3  4C 07 F7             JMP ERROR5        ;DEVICE NOT PRESENT
02975  F3F6                ;
02976  F3F6  A5 B7         OP35   LDA FNLEN
02977  F3F8  F0 0C                BEQ OP45          ;NO NAME...DONE SEQUENCE
02978  F3FA                ;
02979  F3FA                ;SEND FILE NAME OVER SERIAL
02980  F3FA                ;
02981  F3FA  A0 00                LDY #0
02982  F3FC  B1 BB         OP40   LDA (FNADR),Y
02983  F3FE  20 DD ED             JSR CIOUT
02984  F401  C8                  INY
02985  F402  C4 B7                CPY FNLEN
02986  F404  D0 F6                BNE OP40
02987  F406                ;
02988  F406  4C 54 F6     OP45   JMP CUNLSN        ;JSR UNLSN: CLC: RTS
```

```
OPEN RS232 FILE......PAGE 0072

LINE# LOC   CODE        LINE

02990  F409             ; OPN232 - OPEN AN RS-232 OR PARALLEL PORT FILE
02991  F409             ;
02992  F409             ; VARIABLES INITILIZED
02993  F409             ;   BITNUM - # OF BITS TO BE SENT CALC FROM M51CTR
02994  F409             ;   BAUDOF - BAUD RATE FULL
02995  F409             ;   RSSTAT - RS-232 STATUS REG
02996  F409             ;   M51CTR - 6551 CONTROL REG
02997  F409             ;   M51CDR - 6551 COMMAND REG
029.   F409             ;   M51AJB - USER BAUD RATE (CLOCK/BAUD/2-100)
029.   F409             ;   ENABL  - 6526 NMI ENABLES (1-NMI BIT ON)
03000  F409             ;
03001  F409  20 83 F4   OPN232 JSR CLN232      ;SET UP RS232, .Y=0 ON RETURN
03002  F40C             ;
03003  F40C             ; PASS PRAMS TO M51REGS
03004  F40C             ;
03005  F40C  8C 97 02          STY RSSTAT      ;CLEAR STATUS
03006  F40F             ;
03007  F40F  C4 B7       OPN020 CPY FNLEN       ;CHECK IF AT END OF FILENAME
03008  F411  F0 0A             BEQ OPN025      ;YES...
03009  F413             ;
03010  F413  B1 BB             LDA (FNADR)Y    ;MOVE DATA
03011  F415  99 93 02          STA M51CTR,Y    ;TO M51REGS
03012  F418  C8                INY
03013  F419  C0 04             CPY #4          ;ONLY 4 POSSIBLE PRAMS
03014  F41B  D0 F2             BNE OPN020
03015  F41D             ;
03016  F41D             ; CALC # OF BITS
030.   F41D             ;
0301.  F41D  20 4A EF   OPN025 JSR BITCNT
03019  F420  8E 98 02          STX BITNUM
03020  F423             ;
```

```
03021  F423                 ; CALC BAUD RATE
03022  F423                 ;
03023  F423  AD 93 02              LDA M51CTR
03024  F426  29 0F                 AND #$0F
03025  F428  F0 1C                 BEQ OPN028
030    F42A                 ;
030    F42A                 ; CALCULATE START-TEST RATE...
03028  F42A                 ;  DIFFERENT THAN ORIGINAL RELEASE 901227-01
03029  F42A                 ;
03030  F42A  0A                    ASL A            ;GET OFFSET INTO TABLES
03031  F42B  AA                    TAX
03032  F42C  AD A6 02              LDA PALNTS       ;GET TV STANDARD
03033  F42F  D0 09                 BNE OPN026
03034  F431  BC C1 FE              LDY BAUD0-1,X    ;NTSC STANDARD
03035  F434  BD C0 FE              LDA BAUD0-2,X
03036  F437  4C 40 F4              JMP OPN027
03037  F43A                 ;
03038  F43A  BC EB E4       OPN026 LDY BAUD0P-1,X   ;PAL STANDARD
03039  F43D  BD EA E4              LDA BAUD0P-2,X
03040  F440  8C 96 02       OPN027 STY M51AJB+1     ;HOLD START RATE IN M51AJB
03041  F443  8D 95 02              STA M51AJB
03042  F446  AD 95 02       OPN028 LDA M51AJB       ;CALCULATE BAUD RATE
03043  F449  0A                    ASL A
03044  F44A  20 2E FF              JSR POPEN        ;GOTO PATCH AREA
030    F44D                 ;
030    F44D                 ; CHECK FOR 3/X LINE RESPONSE
03047  F44D                 ;
03048  F44D  AD 94 02       OPN030 LDA M51CDR       ;BIT 0 OF M51CDR
03049  F450  4A                    LSR A
03050  F451  90 09                 BCC OPN050       ;...3 LINE
```

OPEN RS232 FILE.....PAGE 0073

```
LINE# LOC   CODE        LINE

03051  F453                 ;
03052  F453                 ; CHECK FOR X LINE PROPER STATES
030    F453                 ;
030    F453  AD 01 DD              LDA D2PRB
03055  F456  0A                    ASL A
03056  F457  B0 03                 BCS OPN050
03057  F459  20 0D F0              JSR CKDSRX       ;CHANGE FROM JMP TO PREVENT SYSTEM D
03058  F45C                 ;
03059  F45C                 ; SET UP BUFFER POINTERS (DBE=DBS)
03060  F45C                 ;
03061  F45C  AD 9B 02       OPN050 LDA RIDBE
03062  F45F  8D 9C 02              STA RIDBS
03063  F462  AD 9E 02              LDA RODBE
03064  F465  8D 9D 02              STA RODBS
03065  F468                 ;
03066  F468                 ; ALLOCATE BUFFERS
03067  F468                 ;
03068  F468  20 27 FE       OPN055 JSR GETTOP       ;GET MEMSIZ
03069  F46B  A5 F8                 LDA RIBUF+1      ;IN ALLOCATION...
03070  F46D  D0 05                 BNE OPN060       ;ALREADY
03071  F46F  88                    DEY              ;THERE GOES 256 BYTES
030    F470  84 F8                 STY RIBUF+1
03073  F472  86 F7                 STX RIBUF
03074  F474  A5 FA         OPN060 LDA ROBUF+1      ;OUT ALLOCATION...
03075  F476  D0 05                 BNE MEMTCF       ;ALREAY
```

```
03076  F478  88                DEY             ;THERE GOES 256 BYTES
03077  F479  84 FA             STY ROBUF+1
03078  F47B  86 F9             STX ROBUF
03079  F47D  38          MEMTCF SEC              ;SIGNAL TOP OF MEMORY CHANGE
03080  F47E  A9 F0             LDA #$F0
030    F480  4C 2D FE           JMP SETTOP      ;TOP CHANGED
030    F483                ;
03083  F483                ; CLN232 - CLEAN UP 232 SYSTEM FOR OPEN/CLOSE
03084  F483                ;  SET UP DDRB AND CB2 FOR RS-232
03085  F483                ;
03086  F483  A9 7F        CLN232 LDA #$7F         ;CLEAR NMI'S
03087  F485  8D 0D DD           STA D2ICR
03088  F488  A9 06             LDA #%00000110 ;DDRB
03089  F48A  8D 03 DD           STA D2DDRB
03090  F48D  8D 01 DD           STA D2PRB       ;DTR,RTS HIGH
03091  F490  A9 04             LDA #$04        ;OUTPUT HIGH PA2
03092  F492  0D 00 DD           ORA D2PRA
03093  F495  8D 00 DD           STA D2PRA
03094  F498  A0 00              LDY #00
03095  F49A  8C A1 02           STY ENABL       ;CLEAR ENABLS
03096  F49D  60                 RTS
03097  F49E                     .END
03098  F49E                     .LIB LOAD
```

LOAD FUNCTION.....PAGE 0074

```
LINE  LOC   CODE        LINE

03100  F49E                ;*************************************
03101  F49E                ;* LOAD RAM FUNCTION                 *
03102  F49E                ;*                                   *
03103  F49E                ;* LOADS FROM CASSETTE 1 OR 2, OR    *
03104  F49E                ;* SERIAL BUS DEVICES >=4 TO 31      *
03105  F49E                ;* AS DETERMINED BY CONTENTS OF      *
03106  F49E                ;* VARIABLE FA. VERIFY FLAG IN .A    *
03107  F49E                ;*                                   *
03108  F49E                ;* ALT LOAD IF SA=0, NORMAL SA=1     *
03109  F49E                ;* .X , .Y LOAD ADDRESS IF SA=0      *
03110  F49E                ;* .A=0 PERFORMS LOAD,<> IS VERIFY   *
03111  F49E                ;*                                   *
03112  F49E                ;* HIGH LOAD RETURN IN X,Y.          *
03113  F49E                ;*                                   *
03114  F49E                ;*************************************


03116  F49E  86 C3        LOADSP STX MEMUSS       ;.X HAS LOW ALT START
```

```
03117  F4A0  84 C4              STY MEMUSS+1
03118  F4A2  6C 30 03    LOAD   JMP (ILOAD)      ;MONITOR LOAD ENTRY
03119  F4A5                     ;
03120  F4A5  85 93       NLOAD  STA VERCK        ;STORE VERIFY FLAG
03121  F4A7  A9 00              LDA #0
031    F4A9  85 90              STA STATUS
0312   F4AB                     ;
03124  F4AB  A5 BA              LDA FA           ;CHECK DEVICE NUMBER
03125  F4AD  D0 03              BNE LD20
03126  F4AF                     ;
03127  F4AF  4C 13 F7    LD10   JMP ERROR9       ;BAD DEVICE #-KEYBOARD
03128  F4B2                     ;
03129  F4B2  C9 03       LD20   CMP #3
03130  F4B4  F0 F9              BEQ LD10         ;DISALLOW SCREEN LOAD
03131  F4B6  90 7B              BCC LD100        ;HANDLE TAPES DIFFERENT
03132  F4B8                     ;
03133  F4B8                     ;LOAD FROM CBM IEEE DEVICE
03134  F4B8                     ;
03135  F4B8  A4 B7              LDY FNLEN        ;MUST HAVE FILE NAME
03136  F4BA  D0 03              BNE LD25         ;YES...OK
03137  F4BC                     ;
03138  F4BC  4C 10 F7           JMP ERROR8       ;MISSING FILE NAME
03139  F4BF                     ;
03140  F4BF  A6 B9       LD25   LDX SA           ;SAVE SA IN .X
031    F4C1  20 AF F5           JSR LUKING       ;TELL USER LOOKING
0314   F4C4  A9 60              LDA #$60         ;SPECIAL LOAD COMMAND
03143  F4C6  85 B9              STA SA
03144  F4C8  20 D5 F3           JSR OPENI        ;OPEN THE FILE
03145  F4CB                     ;
03146  F4CB  A5 BA              LDA FA
03147  F4CD  20 09 ED           JSR TALK         ;ESTABLISH THE CHANNEL
03148  F4D0  A5 B9              LDA SA
03149  F4D2  20 C7 ED           JSR TKSA         ;TELL IT TO LOAD
03150  F4D5                     ;
03151  F4D5  20 13 EE           JSR ACPTR        ;GET FIRST BYTE
03152  F4D8  85 AE              STA EAL
03153  F4DA                     ;
03154  F4DA  A5 90              LDA STATUS       ;TEST STATUS FOR ERROR
03155  F4DC  4A                 LSR A
03156  F4DD  4A                 LSR A
03157  F4DE  B0 50              BCS LD90         ;FILE NOT FOUND...
03158  F4E0  20 13 EE           JSR ACPTR
```

HER

LOAD FUNCTION.....PAGE 0075

```
LINE# LOC   CODE        LINE

03159  F4E3  85 AF              STA EAH
03160  F4E5                     ;
03161  F4E5  8A                 TXA              ;FIND OUT OLD SA
03162  F4E6  D0 08              BNE LD30         ;SA<>0 USE DISK ADDRESS
03163  F4E8  A5 C3              LDA MEMUSS       ;ELSE LOAD WHERE USER WANTS
03164  F4EA  85 AE              STA EAL
03165  F4EC  A5 C4              LDA MEMUSS+1
03166  F4EE  85 AF              STA EAH
03167  F4F0  20 D2 F5    LD30   JSR LODING       ;TELL USER LOADING
031    F4F3                     ;
0316   F4F3  A9 FD       LD40   LDA #$FD         ;MASK OFF TIMEOUT
03170  F4F5  25 90              AND STATUS
03171  F4F7  85 90              STA STATUS
```

```
03172  F4F9                    ;
03173  F4F9  20 E1 FF          JSR STOP        ;STOP KEY?
03174  F4FC  D0 03             BNE LD45        ;NO...
03175  F4FE                    ;
03176  F4FE  4C 33 F6          JMP BREAK       ;STOP KEY PRESSED
031    F501                    ;
0317   F501  20 13 EE    LD45  JSR ACPTR       ;GET BYTE OFF IEEE
03179  F504  AA                TAX
03180  F505  A5 90             LDA STATUS      ;WAS THERE A TIMEOUT?
03181  F507  4A                LSR A
03182  F508  4A                LSR A
03183  F509  B0 E8             BCS LD40        ;YES...TRY AGAIN
03184  F50B  8A                TXA
03185  F50C  A4 93             LDY VERCK       ;PERFORMING VERIFY?
03186  F50E  F0 0C             BEQ LD50        ;NO...LOAD
03187  F510  A0 00             LDY #0
03188  F512  D1 AE             CMP (EAL)Y      ;VERIFY IT
03189  F514  F0 08             BEQ LD60        ;O.K....
03190  F516  A9 10             LDA #SPERR      ;NO GOOD...VERIFY ERROR
03191  F518  20 1C FE          JSR UDST        ;UPDATE STATUS
03192  F51B  2C                .BYT $2C        ;SKIP NEXT STORE
03193  F51C                    ;
03194  F51C  91 AE       LD50  STA (EAL)Y
03195  F51E  E6 AE       LD60  INC EAL         ;INCREMENT STORE ADDR
031.   F520  D0 02             BNE LD64
0319   F522  E6 AF             INC EAH
03198  F524  24 90       LD64  BIT STATUS      ;EOI?
03199  F526  50 CB             BVC LD40        ;NO...CONTINUE LOAD
03200  F528                    ;
03201  F528  20 EF ED          JSR UNTLK       ;CLOSE CHANNEL
03202  F52B  20 42 F6          JSR CLSEI       ;CLOSE THE FILE
03203  F52E  90 79             BCC LD180       ;BRANCH ALWAYS
03204  F530                    ;
03205  F530  4C 04 F7    LD90  JMP ERROR4      ;FILE NOT FOUND
03206  F533                    ;
03207  F533                    ;LOAD FROM TAPE
03208  F533                    ;
03209  F533  4A          LD100 LSR A
03210  F534  B0 03             BCS LD102       ;IF C-SET THEN IT'S CASSETTE
03211  F536                    ;
03212  F536  4C 13 F7          JMP ERROR9      ;BAD DEVICE #
03213  F539                    ;
03214  F539  20 D0 F7    LD102 JSR ZZZ         ;SET POINTERS AT TAPE
032.   F53C  B0 03             BCS LD104
0321   F53E  4C 13 F7          JMP ERROR9      ;DEALLOCATED...
03217  F541  20 17 F8    LD104 JSR CSTE1       ;TELL USER ABOUT BUTTONS
03218  F544  B0 68             BCS LD190       ;STOP KEY PRESSED?
03219  F546  20 AF F5          JSR LUKING      ;TELL USER SEARCHING
```



```
LINE# LOC   CODE        LINE

03220  F549                    ;
03221  F549  A5 B7       LD112 LDA FNLEN       ;IS THERE A NAME?
0322?  F54B  F0 09             BEQ LD150       ;NONE...LOAD ANYTHING
032.   F54D  20 EA F7          JSR FAF         ;FIND A FILE ON TAPE
0322   F550  90 0B             BCC LD170       ;GOT IT!
03225  F552  F0 5A             BEQ LD190       ;STOP KEY PRESSED
03226  F554  B0 DA             BCS LD90        ;NOPE...END OF TAPE
```

```
03227  F556                    ;
03228  F556  20 2C F7  LD150   JSR FAH          ;FIND ANY HEADER
03229  F559  F0 53             BEQ LD190       ;STOP KEY PRESSED
03230  F55B  B0 D3             BCS LD90        ;NO HEADER
03231  F55D                    ;
032    F55D  A5 90      LD170  LDA STATUS
032    F55F  29 10             AND #SPERR      ;MUST GOT HEADER RIGHT
03234  F561  38                SEC
03235  F562  D0 4A             BNE LD190       ;IS BAD
03236  F564                    ;
03237  F564  E0 01             CPX #BLF        ;IS IT A MOVABLE PROGRAM...
03238  F566  F0 11             BEQ LD178       ;YES
03239  F568                    ;
03240  F568  E0 03             CPX #PLF        ;IS IT A PROGRAM
03241  F56A  D0 DD             BNE LD112       ;NO...ITS SOMETHING ELSE
03242  F56C                    ;
03243  F56C  A0 01      LD177  LDY #1          ;FIXED LOAD...
03244  F56E  B1 B2             LDA (TAPE1)Y    ;...THE ADDRESS IN THE...
03245  F570  85 C3             STA MEMUSS      ;...BUFFER IS THE START ADDRESS
03246  F572  C8                INY
03247  F573  B1 B2             LDA (TAPE1)Y
03248  F575  85 C4             STA MEMUSS+1
03249  F577  B0 04             BCS LD179       ;JMP ..CARRY SET BY CPX'S
03250  F579                    ;
032    F579  A5 B9      LD178  LDA SA          ;CHECK FOR MONITOR LOAD...
032    F57B  D0 EF             BNE LD177       ;...YES WE WANT FIXED TYPE
03253  F57D                    ;
03254  F57D  A0 03      LD179  LDY #3          ;TAPEA - TAPESTA
03255  F57F                    ;CARRY SET BY CPX'S
03256  F57F  B1 B2             LDA (TAPE1)Y
03257  F581  A0 01             LDY #1
03258  F583  F1 B2             SBC (TAPE1)Y
03259  F585  AA                TAX             ;LOW TO .X
03260  F586  A0 04             LDY #4
03261  F588  B1 B2             LDA (TAPE1)Y
03262  F58A  A0 02             LDY #2
03263  F58C  F1 B2             SBC (TAPE1)Y
03264  F58E  A8                TAY             ;HIGH TO .Y
03265  F58F                    ;
03266  F58F  18                CLC             ;EA = STA+(TAPEA-TAPESTA)
03267  F590  8A                TXA
03268  F591  65 C3             ADC MEMUSS      ;
03269  F593  85 AE             STA EAL
032    F595  98                TYA
032    F596  65 C4             ADC MEMUSS+1
03272  F598  85 AF             STA EAH
03273  F59A  A5 C3             LDA MEMUSS      ;SET UP STARTING ADDRESS
03274  F59C  85 C1             STA STAL
03275  F59E  A5 C4             LDA MEMUSS+1
03276  F5A0  85 C2             STA STAH
03277  F5A2  20 D2 F5          JSR LODING      ;TELL USER LOADING
03278  F5A5  20 4A F8          JSR TRD         ;DO TAPE BLOCK LOAD
03279  F5A8  24                .BYT $24        ;CARRY FROM TRD
03280  F5A9                    ;
```



```
LINE  LOC   CODE        LINE

03281  F5A9  18          LD180  CLC             ;GOOD EXIT
```

```
03282  F5AA                   ;
03283  F5AA                   ; SET UP END LOAD ADDRESS
03284  F5AA                   ;
03285  F5AA  A6 AE                   LDX EAL
03286  F5AC  A4 AF                   LDY EAH
032    F5AE                   ;
0328   F5AE  60             LD190  RTS



03290  F5AF                   ;SUBROUTINE TO PRINT TO CONSOLE:
03291  F5AF                   ;
03292  F5AF                   ;SEARCHING #FOR NAMEA
03293  F5AF                   ;
03294  F5AF  A5 9D            LUKING LDA MSGFLG       ;SUPPOSED TO PRINT?
03295  F5B1  10 1E                   BPL LD115        ;...NO
03296  F5B3  A0 0C                   LDY #MS5-MS1     ;"SEARCHING"
03297  F5B5  20 2F F1                JSR MSG
03298  F5B8  A5 B7                   LDA FNLEN
03299  F5BA  F0 15                   BEQ LD115
03300  F5BC  A0 17                   LDY #MS6-MS1     ;"FOR"
03301  F5BE  20 2F F1                JSR MSG



03303  F5C1                   ;SUBROUTINE TO OUTPUT FILE NAME
03304  F5C1                   ;
03305  F5C1  A4 B7            OUTFN  LDY FNLEN        ;IS THERE A NAME?
03306  F5C3  F0 0C                   BEQ LD115        ;NO...DONE
03307  F5C5  A0 00                   LDY #0
03308  F5C7  B1 BB            LD110  LDA (FNADR)Y
03309  F5C9  20 D2 FF                JSR BSOUT
03310  F5CC  C8                      INY
03311  F5CD  C4 B7                   CPY FNLEN
03312  F5CF  D0 F6                   BNE LD110
03313  F5D1                   ;
03314  F5D1  60               LD115  RTS



033    F5D2                   ;SUBROUTINE TO PRINT:
033    F5D2                   ;
033    F5D2                   ;LOADING/VERIFING
03319  F5D2                   ;
03320  F5D2  A0 49            LODING LDY #MS10-MS1    ;ASSUME 'LOADING'
03321  F5D4  A5 93                   LDA VERCK        ;CHECK FLAG
03322  F5D6  F0 02                   BEQ LD410        ;ARE DOING LOAD
03323  F5D8  A0 59                   LDY #MS21-MS1    ;ARE 'VERIFYING'
03324  F5DA  4C 2B F1         LD410  JMP SPMSG
03325  F5DD                          .END
03326  F5DD                          .LIB SAVE
```

```
LINE# LOC   CODE        LINE

      F5DD              ;**********************************
      F5DD              ;* SAVE                           *
      F5DD              ;*                                *
      F5DD              ;* SAVES TO CASSETTE 1 OR 2, OR   *
      F5DD              ;* IEEE DEVICES 4>=N>=31 AS SELECT-*
      F5DD              ;* ED BY VARIABLE FA.             *
      F5DD              ;*                                *
      F5DD              ;*START OF SAVE IS INDIRECT AT .A *
      F5DD              ;*END OF SAVE IS .X,.Y            *
      F5DD              ;**********************************


      F5DD  86 AE       SAVESP STX EAL
      F5DF  84 AF              STY EAH
      F5E1  AA                 TAX              ;SET UP START
      F5E2  B5 00              LDA $00,X
      F5E4  85 C1              STA STAL
      F5E6  B5 01              LDA $01,X
      F5E8  85 C2              STA STAH
      F5EA              ;
      F5EA  6C 32 03    SAVE   JMP (ISAVE)
      F5ED  A5 BA       NSAVE  LDA FA   ***MONITOR ENTRY
      F5EF  D0 03              BNE SV20
      F5F1              ;
      F5F1  4C 13 F7    SV10   JMP ERROR9       ;BAD DEVICE #
      F5F4              ;
      F5F4  C9 03       SV20   CMP #3
      F5F6  F0 F9              BEQ SV10
      F5F8  90 5F              BCC SV100        HER
      F5FA  A9 61              LDA #$61
      F5FC  85 B9              STA SA
      F5FE  A4 B7              LDY FNLEN
      F600  D0 03              BNE SV25
      F602              ;
      F602  4C 10 F7           JMP ERROR8       ;MISSING FILE NAME
      F605              ;
      F605  20 D5 F3    SV25   JSR OPENI
      F608  20 8F F6           JSR SAVING
      F60B  A5 BA              LDA FA
      F60D  20 0C ED           JSR LISTN
      F610  A5 B9              LDA SA
      F612  20 B9 ED           JSR SECND
      F615  A0 00              LDY #0
      F617  20 8E FB           JSR RD300
      F61A  A5 AC              LDA SAL
      F61C  20 DD ED           JSR CIOUT
      F61F  A5 AD              LDA SAH
      F621  20 DD ED           JSR CIOUT
      F624  20 D1 FC    SV30   JSR CMPSTE       ;COMPARE START TO END
      F627  B0 16              BCS SV50         ;HAVE REACHED END
      F629  B1 AC              LDA (SAL)Y
      F62B  20 DD ED           JSR CIOUT
      F62E  20 E1 FF           JSR STOP
      F631  D0 07              BNE SV40
      F633              ;
      F633  20 42 F6    BREAK  JSR CLSEI
      F636  A9 00              LDA #0
      F638  38                 SEC
      F639  60                 RTS
      F63A              ;
```

```
SAVE FUNCTION.....PAGE 0079

LINE# LOC   CODE        LINE

03387  F63A  20 DB FC    SV40   JSR INCSAL       ;INCREMENT CURRENT ADDR.
03388  F63D  D0 E5              BNE SV30
03389  F63F  20 FE ED    SV50   JSR UNLSN




03391  F642  24 B9        CLSEI  BIT SA
03392  F644  30 11              BMI CLSEI2
03393  F646  A5 BA              LDA FA
03394  F648  20 0C ED           JSR LISTN
03395  F64B  A5 B9              LDA SA
033:   F64D  29 EF              AND #$EF
033    F64F  09 E0              ORA #$E0
03398  F651  20 B9 ED           JSR SECND
03399  F654                ;
03400  F654  20 FE ED    CUNLSN JSR UNLSN       ;ENTRY FOR OPENI
03401  F657                ;
03402  F657  18           CLSEI2 CLC
03403  F658  60                 RTS




03405  F659  4A            SV100  LSR A
03406  F65A  B0 03              BCS SV102        ;IF C-SET THEN IT'S CASSETTE
03407  F65C                ;
03408  F65C  4C 13 F7           JMP ERROR9       ;BAD DEVICE #
03409  F65F                ;
03410  F65F  20 D0 F7    SV102  JSR ZZZ          ;GET ADDR OF TAPE
034.   F662  90 8D              BCC SV10         ;BUFFER IS DEALLOCATED
0341   F664  20 38 F8           JSR CSTE2
03413  F667  B0 25              BCS SV115        ;STOP KEY PRESSED
03414  F669  20 8F F6           JSR SAVING       ;TELL USER 'SAVING'
03415  F66C  A2 03       SV105  LDX #PLF         ;DECIDE TYPE TO SAVE
03416  F66E  A5 B9              LDA SA           ;1-PLF 0-BLF
03417  F670  29 01              AND #01
03418  F672  D0 02              BNE SV106
03419  F674  A2 01              LDX #BLF
03420  F676  8A          SV106  TXA
03421  F677  20 6A F7           JSR TAPEH
03422  F67A  B0 12              BCS SV115        ;STOP KEY PRESSED
03423  F67C  20 67 F8           JSR TWRT
03424  F67F  B0 0D              BCS SV115        ;STOP KEY PRESSED
03425  F681  A5 B9              LDA SA
03426  F683  29 02              AND #2           ;WRITE END OF TAPE?
03427  F685  F0 06              BEQ SV110        ;NO...
03428  F687                ;
0342?  F687  A9 05              LDA #EOT
034    F689  20 6A F7           JSR TAPEH
0343   F68C  24                 .BYT $24         ;SKIP 1 BYTE
03432  F68D                ;
03433  F68D  18           SV110  CLC
```

```
03434  F68E  60          SV115  RTS


03436  F68F              ;SUBROUTINE TO OUTPUT:
034    F68F              ;'SAVING <FILE NAME>'
```



```
LINE# LOC   CODE        LINE


03438  F68F              ;
03439  F68F  A5 9D       SAVING LDA MSGFLG
03440  F691  10 FB              BPL SV115        ;NO PRINT
03441  F693              ;
03442  F693  A0 51              LDY #MS11-MS1    ;'SAVING'
03443  F695  20 2F F1           JSR MSG
03444  F698  4C C1 F5           JMP OUTFN        ;<FILE NAME>
034    F69B                     .END
0344   F69B                     .LIB TIME
```

```
LINE# LOC   CODE        LINE

03448  F69B             ;*************************************
034.   F69B             ;*                                   *
0345.  F69B             ;* TIME                              *
03451  F69B             ;*                                   *
03452  F69B             ;*CONSISTS OF THREE FUNCTIONS:       *
03453  F69B             ;* (1) UDTIM-- UPDATE TIME. USUALLY*
03454  F69B             ;*     CALLED EVERY 60TH SECOND.     *
03455  F69B             ;* (2) SETTIM-- SET TIME. .Y=MSD,    *
03456  F69B             ;*     .X=NEXT SIGNIFICANT,.A=LSD    *
03457  F69B             ;* (3) RDTIM-- READ TIME. .Y=MSD,    *
03458  F69B             ;*     .X=NEXT SIGNIFICANT,.A=LSD    *
03459  F69B             ;*                                   *
03460  F69B             ;*************************************

03462  F69B             ;INTERRUPTS ARE COMING FROM THE 6526 TIMERS
03463  F69B             ;
03464  F69B  A2 00      UDTIM  LDX #0           ;PRE-LOAD FOR LATER
03465  F69D             ;
03466  F69D             ;HERE WE PROCEED WITH AN INCREMENT
03467  F69D             ;OF THE TIME REGISTER.
034.   F69D             ;
0346.  F69D  E6 A2       UD20   INC TIME+2
03470  F69F  D0 06             BNE UD30
03471  F6A1  E6 A1             INC TIME+1
03472  F6A3  D0 02             BNE UD30
03473  F6A5  E6 A0             INC TIME
03474  F6A7             ;
03475  F6A7             ;HERE WE CHECK FOR ROLL-OVER 23:59:59
03476  F6A7             ;AND RESET THE CLOCK TO ZERO IF TRUE
03477  F6A7             ;
03478  F6A7  38         UD30   SEC
03479  F6A8  A5 A2             LDA TIME+2
03480  F6AA  E9 01             SBC #$01
03481  F6AC  A5 A1             LDA TIME+1
03482  F6AE  E9 1A             SBC #$1A
03483  F6B0  A5 A0             LDA TIME
03484  F6B2  E9 4F             SBC #$4F
03485  F6B4  90 06             BCC UD60
0348.  F6B6             ;
034.   F6B6             ;TIME HAS ROLLED--ZERO REGISTER
0348.  F6B6             ;
03489  F6B6  86 A0             STX TIME
03490  F6B8  86 A1             STX TIME+1
```

```
03491  F6BA  86 A2              STX TIME+2
03492  F6BC                     ;
03493  F6BC                     ;SET STOP KEY FLAG HERE
03494  F6BC                     ;
03495  F6BC  AD 01 DC     UD60  LDA ROWS          ;WAIT FOR IT TO SETTLE
034:   F6BF  CD 01 DC           CMP ROWS
0349   F6C2  D0 F8              BNE UD60          ;STILL BOUNCING
03498  F6C4  AA                 TAX               ;SET FLAGS...
03499  F6C5  30 13              BMI UD80          ;NO STOP KEY...EXIT  STOP KEY=$7F
03500  F6C7  A2 BD              LDX #$FF-$42      ;CHECK FOR A SHIFT KEY (C64 KEYBOAR
03501  F6C9  8E 00 DC           STX COLM
03502  F6CC  AE 01 DC     UD70  LDX ROWS          ;WAIT TO SETTLE...
03503  F6CF  EC 01 DC           CPX ROWS
03504  F6D2  D0 F8              BNE UD70
03505  F6D4  8D 00 DC           STA COLM          ;!!!!!WATCH OUT...STOP KEY .A=$7F..
03506  F6D7  E8                 INX               ;ANY KEY DOWN ABORTS
03507  F6D8  D0 02              BNE UD90          ;LEAVE SAME AS BEFORE...
03508  F6DA  85 91        UD80  STA STKEY         ;SAVE FOR OTHER ROUTINES
```



```
LINE# LOC   CODE        LINE

03509  F6DC  60          UD90  RTS


03511  F6DD  78          RDTIM SEI               ;KEEP TIME FROM ROLLING
03512  F6DE  A5 A2             LDA TIME+2        ;GET LSD
03513  F6E0  A6 A1             LDX TIME+1        ;GET NEXT MOST SIG.
03514  F6E2  A4 A0             LDY TIME          ;GET MSD


0351   F6E4  78          SETTIM SEI              ;KEEP TIME FROM CHANGING
03517  F6E5  85 A2             STA TIME+2        ;STORE LSD
03518  F6E7  86 A1             STX TIME+1        ;NEXT MOST SIGNIFICANT
03519  F6E9  84 A0             STY TIME          ;STORE MSD
03520  F6EB  58                 CLI
03521  F6EC  60                 RTS
03522  F6ED                     .END
03523  F6ED                     .LIB ERRORHANDLER
```

```
LINE# LOC   CODE        LINE

03525  F6ED             ;*****************************************
03526  F6ED             ;* STOP -- CHECK STOP KEY FLAG AND       *
03527  F6ED             ;* RETURN Z FLAG SET IF FLAG TRUE.       *
03528  F6ED             ;* ALSO CLOSES ACTIVE CHANNELS AND       *
03529  F6ED             ;* FLUSHES KEYBOARD QUEUE.               *
03530  F6ED             ;* ALSO RETURNS KEY DOWNS FROM LAST      *
03531  F6ED             ;* KEYBOARD ROW IN .A.                   *
03532  F6ED             ;*****************************************
035.   F6ED  A5 91       NSTOP  LDA STKEY        ;VALUE OF LAST ROW
0353   F6EF  C9 7F              CMP #$7F        ;CHECK STOP KEY POSITION
03535  F6F1  D0 07              BNE STOP2       ;NOT DOWN
03536  F6F3  08                 PHP
03537  F6F4  20 CC FF           JSR CLRCH       ;CLEAR CHANNELS
03538  F6F7  85 C6              STA NDX         ;FLUSH QUEUE
03539  F6F9  28                 PLP
03540  F6FA  60           STOP2  RTS



03542  F6FB             ;*****************************************
03543  F6FB             ;*                                       *
03544  F6FB             ;* ERROR HANDLER                         *
03545  F6FB             ;*                                       *
03546  F6FB             ;* PRINTS KERNAL ERROR MESSAGE IF        *
0354?  F6FB             ;* BIT 6 OF MSGFLG SET.  RETURNS         *
035.   F6FB             ;* WITH ERROR # IN .A AND CARRY.         *
0354   F6FB             ;*                                       *
03550  F6FB             ;*****************************************
03551  F6FB             ;
```

```
03552  F6FB  A9 01     ERROR1 LDA #1          ;TOO MANY FILES
03553  F6FD  2C               .BYT $2C
03554  F6FE  A9 02     ERROR2 LDA #2          ;FILE OPEN
03555  F700  2C               .BYT $2C
03556  F701  A9 03     ERROR3 LDA #3          ;FILE NOT OPEN
035    F703  2C               .BYT $2C
0355   F704  A9 04     ERROR4 LDA #4          ;FILE NOT FOUND
03559  F706  2C               .BYT $2C
03560  F707  A9 05     ERROR5 LDA #5          ;DEVICE NOT PRESENT
03561  F709  2C               .BYT $2C
03562  F70A  A9 06     ERROR6 LDA #6          ;NOT INPUT FILE
03563  F70C  2C               .BYT $2C
03564  F70D  A9 07     ERROR7 LDA #7          ;NOT OUTPUT FILE
03565  F70F  2C               .BYT $2C
03566  F710  A9 08     ERROR8 LDA #8          ;MISSING FILE NAME
03567  F712  2C               .BYT $2C
03568  F713  A9 09     ERROR9 LDA #9          ;BAD DEVICE #
03569  F715           ;
03570  F715  48               PHA            ;ERROR NUMBER ON STACK
03571  F716  20 CC FF         JSR CLRCH      ;RESTORE I/O CHANNELS
03572  F719           ;
03573  F719  A0 00             LDY #MS1-MS1
03574  F71B  24 9D             BIT MSGFLG     ;ARE WE PRINTING ERROR?
03575  F71D  50 0A             BVC EREXIT     ;NO...
035    F71F           ;
0357   F71F  20 2F F1         JSR MSG        ;PRINT "CBM I/O ERROR #"
03578  F722  68               PLA
03579  F723  48               PHA
03580  F724  09 30             ORA ##30       ;MAKE ERROR # ASCII
03581  F726  20 D2 FF         JSR BSOUT      ;PRINT IT
```



```
LINE# LOC   CODE        LINE

03582  F729           ;
03583  F729  68       EREXIT PLA
035    F72A  38               SEC
0358   F72B  60               RTS
03586  F72C                   .END
03587  F72C                   .LIB TAPEFILE
```

```
LINE  LOC   CODE        LINE

03589  F72C              ;FAH -- FIND ANY HEADER
03590  F72C              ;
03591  F72C              ;READS TAPE DEVICE UNTIL ONE OF FOLLOWING
03592  F72C              ;BLOCK TYPES FOUND: BDFH--BASIC DATA
03593  F72C              ;FILE HEADER, BLF--BASIC LOAD FILE
03594  F72C              ;FOR SUCCESS CARRY IS CLEAR ON RETURN.
03595  F72C              ;FOR FAILURE CARRY IS SET ON RETURN.
03596  F72C              ;IN ADDITION ACCUMULATOR IS 0 IF STOP
03597  F72C              ;KEY WAS PRESSED.
03598  F72C              ;
03599  F72C  A5 93       FAH     LDA VERCK       ;SAVE OLD VERIFY
03600  F72E  48                  PHA
03601  F72F  20 41 F8            JSR RBLK        ;READ TAPE BLOCK
03602  F732  68                  PLA
03603  F733  85 93               STA VERCK       ;RESTORE VERIFY FLAG
0360[  F735  B0 32               BCS FAH40       ;READ TERMINATED
0360[  F737              ;
03606  F737  A0 00               LDY #0
03607  F739  B1 B2               LDA (TAPE1)Y    ;GET HEADER TYPE
```

```
03608  F73B                ;
03609  F73B  C9 05         FAH30   CMP #EOT        ;CHECK END OF TAPE?
03610  F73D  F0 2A                 BEQ FAH40       ;YES...FAILURE
03611  F73F                ;
03612  F73F  C9 01                 CMP #BLF        ;BASIC LOAD FILE?
036    F741  F0 08                 BEQ FAH50       ;YES...SUCCESS
0361   F743                ;
03615  F743  C9 03                 CMP #PLF        ;FIXED LOAD FILE?
03616  F745  F0 04                 BEQ FAH50       ;YES...SUCCESS
03617  F747                ;
03618  F747  C9 04                 CMP #BDFH       ;BASIC DATA FILE?
03619  F749  D0 E1                 BNE FAH         ;NO...KEEP TRYING
03620  F74B                ;
03621  F74B  AA            FAH50   TAX             ;RETURN FILE TYPE IN .X
03622  F74C  24 9D                 BIT MSGFLG      ;PRINTING MESSAGES?
03623  F74E  10 17                 BPL FAH45       ;NO...
03624  F750                ;
03625  F750  A0 63                 LDY #MS17-MS1   ;PRINT "FOUND"
03626  F752  20 2F F1              JSR MSG
03627  F755                ;
03628  F755                ;OUTPUT COMPLETE FILE NAME
03629  F755                ;
03630  F755  A0 05                 LDY #5
03631  F757  B1 B2         FAH55   LDA (TAPE1),Y
036    F759  20 D2 FF              JSR BSOUT
0363   F75C  C8                    INY
03634  F75D  C0 15                 CPY #21
03635  F75F  D0 F6                 BNE FAH55
03636  F761                ;
03637  F761  A5 A1         FAH56   LDA TIME+1      ;SET UP FOR TIME OUT...
03638  F763  20 E0 E4              JSR FPATCH      ;GOTO PATCH...
03639  F766  EA                    NOP
03640  F767                ;
03641  F767  18            FAH45   CLC             ;SUCCESS FLAG
03642  F768  88                    DEY             ;MAKE NONZERO FOR OKAY RETURN
03643  F769                ;
03644  F769  60            FAH40   RTS
```



```
LINE# LOC   CODE        LINE


03646  F76A                ;TAPEH--WRITE TAPE HEADER
03647  F76A                ;ERROR IF TAPE BUFFER DE-ALLOCATED
03648  F76A                ;CARRY CLEAR IF O.K.
03649  F76A                ;
03650  F76A  85 9E         TAPEH   STA T1
03651  F76C                ;
03652  F76C                ;DETERMINE ADDRESS OF BUFFER
03653  F76C                ;
03654  F76C  20 D0 F7              JSR ZZZ
036    F76F  90 5E                  BCC TH40        ;BUFFER WAS DE-ALLOCATED
0365   F771                ;
03657  F771                ;PRESERVE START AND END ADDRESSES
03658  F771                ;FOR CASE OF HEADER FOR LOAD FILE
```

```
03659  F771                ;
03660  F771  A5 C2                 LDA STAH
03661  F773  48                   PHA
03662  F774  A5 C1                 LDA STAL
03663  F776  48                   PHA
0366   F777  A5 AF                 LDA EAH
0366   F779  48                   PHA
03666  F77A  A5 AE                 LDA EAL
03667  F77C  48                   PHA
03668  F77D                ;
03669  F77D                ;PUT BLANKS IN TAPE BUFFER
03670  F77D                ;
03671  F77D  A0 BF                 LDY #BUFSZ-1
03672  F77F  A9 20                 LDA #'
03673  F781  91 B2          BLNK2  STA (TAPE1)Y
03674  F783  88                    DEY
03675  F784  D0 FB                 BNE BLNK2
03676  F786                ;
03677  F786                ;PUT BLOCK TYPE IN HEADER
03678  F786                ;
03679  F786  A5 9E                 LDA T1
03680  F788  91 B2                 STA (TAPE1)Y
03681  F78A                ;
03682  F78A                ;PUT START LOAD ADDRESS IN HEADER
0368   F78A                ;
0368   F78A  C8                    INY
03685  F78B  A5 C1                 LDA STAL
03686  F78D  91 B2                 STA (TAPE1)Y
03687  F78F  C8                    INY
03688  F790  A5 C2                 LDA STAH
03689  F792  91 B2                 STA (TAPE1)Y
03690  F794                ;
03691  F794                ;PUT END LOAD ADDRESS IN HEADER
03692  F794                ;
03693  F794  C8                    INY
03694  F795  A5 AE                 LDA EAL
03695  F797  91 B2                 STA (TAPE1)Y
03696  F799  C8                    INY
03697  F79A  A5 AF                 LDA EAH
03698  F79C  91 B2                 STA (TAPE1)Y
03699  F79E                ;
03700  F79E                ;PUT FILE NAME IN HEADER
03701  F79E                ;
037    F79E  C8                    INY
037    F79F  84 9F                 STY T2
03704  F7A1  A0 00                 LDY #0
03705  F7A3  84 9E                 STY T1
03706  F7A5  A4 9E          TH20   LDY T1
```



```
LINE# LOC   CODE        LINE

03707  F7A7  C4 B7                 CPY FNLEN
03708  F7A9  F0 0C                 BEQ TH30
03709  F7AB  B1 BB                 LDA (FNADR)Y
037    F7AD  A4 9F                 LDY T2
0371   F7AF  91 B2                 STA (TAPE1)Y
03712  F7B1  E6 9E                 INC T1
03713  F7B3  E6 9F                 INC T2
```

```
03714  F7B5  D0 EE              BNE TH20
03715  F7B7                    ;
03716  F7B7                    ;SET UP START AND END ADDRESS OF HEADER
03717  F7B7                    ;
03718  F7B7  20 D7 F7          TH30   JSR LOAD1
037    F7BA                    ;
0372   F7BA                    ;SET UP TIME FOR LEADER
03721  F7BA                    ;
03722  F7BA  A9 69              LDA #$69
03723  F7BC  85 AB              STA SHCNH
03724  F7BE                    ;
03725  F7BE  20 6B F8           JSR TWRT2        ;WRITE HEADER ON TAPE
03726  F7C1                    ;
03727  F7C1                    ;RESTORE START AND END ADDRESS OF
03728  F7C1                    ;LOAD FILE.
03729  F7C1                    ;
03730  F7C1  A8                 TAY              ;SAVE ERROR CODE IN .Y
03731  F7C2  68                 PLA
03732  F7C3  85 AE              STA EAL
03733  F7C5  68                 PLA
03734  F7C6  85 AF              STA EAH
03735  F7C8  68                 PLA
03736  F7C9  85 C1              STA STAL
03737  F7CB  68                 PLA
037:   F7CC  85 C2              STA STAH
0373   F7CE  98                 TYA              ;RESTORE ERROR CODE FOR RETURN
03740  F7CF                    ;
03741  F7CF  60                TH40   RTS




03743  F7D0                    ;FUNCTION TO RETURN TAPE BUFFER
03744  F7D0                    ;ADDRESS IN TAPE1
03745  F7D0                    ;
03746  F7D0  A6 B2              ZZZ    LDX TAPE1        ;ASSUME TAPE1
03747  F7D2  A4 B3              LDY TAPE1+1
03748  F7D4  C0 02              CPY #>BUF        ;CHECK FOR ALLOCATION...
03749  F7D6                    ;...@TAPE1+1A=0 OR 1 MEANS DEALLOCATED
03750  F7D6                    ;...C CLR => DEALLOCATED
03751  F7D6  60                 RTS


03753  F7D7  20 D0 F7          LOAD1  JSR ZZZ          ;GET PTR TO CASSETTE
03754  F7DA  8A                 TXA
03755  F7DB  85 C1              STA STAL         ;SAVE START LOW
03756  F7DD  18                 CLC
03757  F7DE  69 C0              ADC #BUFSZ       ;COMPUTE POINTER TO END
03758  F7E0  85 AE              STA EAL          ;SAVE END LOW
03759  F7E2  98                 TYA


TAPE FILES......PAGE 0088

LINE  LOC   CODE         LINE

03760  F7E3  85 C2              STA STAH         ;SAVE START HIGH
```

```
03761  F7E5  69 00              ADC #0          ;COMPUTE POINTER TO END
03762  F7E7  85 AF              STA EAH         ;SAVE END HIGH
03763  F7E9  60                 RTS


03765  F7EA  20 2C F7    FAF    JSR FAH         ;FIND ANY HEADER
03766  F7ED  B0 1D              BCS FAF40       ;FAILED
03767  F7EF               ;
03768  F7EF               ;SUCCESS...SEE IF RIGHT NAME
03769  F7EF               ;
03770  F7EF  A0 05              LDY #5          ;OFFSET INTO TAPE HEADER
03771  F7F1  84 9F              STY T2
03772  F7F3  A0 00              LDY #0          ;OFFSET INTO FILE NAME
03773  F7F5  84 9E              STY T1
03774  F7F7  C4 B7       FAF20  CPY FNLEN       ;COMPARE THIS MANY
03775  F7F9  F0 10              BEQ FAF30       ;DONE
03776  F7FB               ;
03777  F7FB  B1 BB              LDA (FNADR)Y
03778  F7FD  A4 9F              LDY T2
03779  F7FF  D1 B2              CMP (TAPE1)Y
03780  F801  D0 E7              BNE FAF         ;MISMATCH--TRY NEXT HEADER
037(   F803  E6 9E              INC T1
037    F805  E6 9F              INC T2
03783  F807  A4 9E              LDY T1
03784  F809  D0 EC              BNE FAF20       ;BRANCH ALWAYS
03785  F80B               ;
03786  F80B  18          FAF30  CLC             ;SUCCESS FLAG
03787  F80C  60           FAF40  RTS
03788  F80D                      .END
03789  F80D                      .LIB TAPECONTROL
```

```
LINE# LOC   CODE        LINE

03787  F80D  20 D0 F7    JTP20  JSR ZZZ
03789  F810  E6 A6              INC BUFPT
03793  F812  A4 A6              LDY BUFPT
03794  F814  C0 C0              CPY #BUFSZ
03795  F816  60                 RTS



03797  F817               ;STAYS IN ROUTINE D2T1LL PLAY SWITCH
03798  F817               ;
03799  F817  20 2E F8     CSTE1  JSR CS10
03800  F81A  F0 1A              BEQ CS25
03801  F81C  A0 1B              LDY #MS7-MS1     ;"PRESS PLAY..."
03802  F81E  20 2F F1     CS30   JSR MSG
03803  F821  20 D0 F8     CS40   JSR TSTOP        ;WATCH FOR STOP KEY
03804  F824  20 2E F8             JSR CS10        ;WATCH CASSETTE SWITCHES
03805  F827  D0 F8              BNE CS40
03807  F829  A0 6A              LDY #MS18-MS1    ;"OK"
03809  F82B  4C 2F F1           JMP MSG



03809  F82E               ;SUBR RETURNS <> FOR CASSETTE SWITCH
03810  F82E               ;
03811  F82E  A9 10       CS10   LDA #$10         ;CHECK PORT
03812  F830  24 01              BIT R6510        ;CLOSED?...
03813  F832  D0 02              BNE CS25         ;NO. . .
03814  F834  24 01              BIT R6510        ;CHECK AGAIN TO DEBOUNCE
03815  F836  18           CS25   CLC              ;GOOD RETURN
03816  F837  60                 RTS



03818  F838               ;CHECKS FOR PLAY & RECORD
03819  F838               ;
03820  F838  20 2E F8     CSTE2  JSR CS10
03821  F83B  F0 F9              BEQ CS25
03822  F83D  A0 2E              LDY #MS8-MS1     ;"RECORD"
03823  F83F  D0 DD              BNE CS30



03825  F841               ;READ HEADER BLOCK ENTRY
03826  F841               ;
03827  F841  A9 00        RBLK   LDA #0
03828  F843  85 90              STA STATUS
03829  F845  85 93              STA VERCK
03830  F847  20 D7 F7           JSR LOAD1



03832  F84A               ;READ LOAD BLOCK ENTRY
03833  F84A               ;
```

```
LINE# LOC   CODE        LINE

03834  F84A  20 17 F8    TRD     JSR CSTE1         ;SAY 'PRESS PLAY'
03835  F84D  B0 1F               BCS TWRT3         ;STOP KEY PRESSED
03836  F84F  78                  SEI
03837  F850  A9 00               LDA #0            ;CLEAR FLAGS...
03838  F852  85 AA               STA RDFLG
03839  F854  85 B4               STA SNSW1
03840  F856  85 B0               STA CMP0
03841  F858  85 9E               STA PTR1
03842  F85A  85 9F               STA PTR2
03843  F85C  85 9C               STA DPSW
03844  F85E  A9 90               LDA #$90          ;ENABLE FOR CA1 IRQ...READ LINE
03845  F860  A2 0E               LDX #14           ;POINT IRQ VECTOR TO READ
03846  F862  D0 11               BNE TAPE          ;JMP

03848  F864                     ;WRITE HEADER BLOCK ENTRY
03849  F864                     ;
03850  F864  20 D7 F7    WBLK    JSR LDAD1
03851  F867                     ;
03852  F867                     ;WRITE LOAD BLOCK ENTRY
03853  F867                     ;
03854  F867  A9 14        TWRT    LDA #20           ;BETWEEN BLOCK SHORTS
03855  F869  85 AB               STA SHCNH
03856  F86B  20 38 F8     TWRT2   JSR CSTE2         ;SAY 'PRESS PLAY & RECORD'
03857  F86E  B0 6C        TWRT3   BCS STOP3         ;STOP KEY PRESSED
03858  F870  78                  SEI
03859  F871  A9 82               LDA #$82          ;ENABLE T2 IRQS...WRITE TIME
03860  F873  A2 08               LDX #8            ;VECTOR IRQ TO WRTZ

03862  F875                     ;START TAPE OPERATION ENTRY POINT
03863  F875                     ;
03864  F875  A0 7F        TAPE    LDY #$7F          ;KILL UNWANTED IRQ'S
03865  F877  8C 0D DC             STY D1ICR
03866  F87A  8D 0D DC             STA D1ICR        ;TURN ON WANTED
03867  F87D  AD 0E DC             LDA D1CRA        ;CALC TIMER ENABLES
03868  F880  09 19                ORA #$19
03869  F882  8D 0F DC             STA D1CRB        ;TURN ON T2 IRQ'S FOR CASS WRITE(ONE
03870  F885  29 91                AND #$91         ;SAVE TOD 50/60 INDICATION
03871  F887  8D A2 02             STA CASTON       ;PLACE IN AUTO MODE FOR T1
03872  F88A                     ; WAIT FOR RS-232 TO FINISH
03873  F88A  20 A4 F0             JSR RSP232
03874  F88D                     ; DISABLE SCREEN DISPLAY
03875  F88D  AD 11 D0             LDA VICREG+17
03876  F890  29 EF                AND #$FF-$10     ;DISABLE SCREEN
03877  F892  8D 11 D0             STA VICREG+17
03878  F895                     ; MOVE IRQ TO IRQTEMP FOR CASS OPS
03879  F895  AD 14 03             LDA CINV
03880  F898  8D 9F 02             STA IRQTMP
```

```
03881  F89B  AD 15 03           LDA CINV+1
03882  F89E  8D A0 02           STA IRQTMP+1
03883  F8A1  20 BD FC           JSR BSIV          ;GO CHANGE IRQ VECTOR
03884  F8A4  A9 02              LDA #2            ;FSBLK STARTS AT 2
03885  F8A6  85 BE              STA FSBLK
03886  F8A8  20 97 FB           JSR NEWCH         ;PREP LOCAL COUNTERS AND FLAGS
```

TAPE CONTROL.....PAGE 0091

```
LINE# LOC   CODE        LINE

03887  F8AB  A5 01              LDA R6510         ;TURN MOTOR ON
03888  F8AD  29 1F              AND #%011111      ;LOW TURNS ON
03889  F8AF  85 01              STA R6510
03890  F8B1  85 C0              STA CAS1          ;FLAG INTERNAL CONTROL OF CASS MOTO
03891  F8B3  A2 FF              LDX #$FF          ;DELAY BETWEEN BLOCKS
03892  F8B5  A0 FF        TP32  LDY #$FF
03893  F8B7  88          TP35  DEY
03894  F8B8  D0 FD              BNE TP35
03895  F8BA  CA                 DEX
03896  F8BB  D0 F8              BNE TP32
03897  F8BD  58                 CLI
03898  F8BE  AD A0 02     TP40  LDA IRQTMP+1      ;CHECK FOR INTERRUPT VECTOR...
03899  F8C1  CD 15 03           CMP CINV+1        ;...POINTING AT KEY ROUTINE
03900  F8C4  18                 CLC
03901  F8C5  F0 15              BEQ STOP3         ;...YES RETURN
03902  F8C7  20 D0 F8           JSR TSTOP         ;...NO CHECK FOR STOP KEY
03903  F8CA              ;
03904  F8CA              ; 60 HZ KEYSCAN IGNORED
03905  F8CA              ;
03906  F8CA  20 BC F6           JSR UD60          ; STOP KEY CHECK
03907  F8CD  4C BE F8           JMP TP40          ;STAY IN LOOP UNTILL TAPES ARE DONE



03908  F8D0  20 E1 FF     TSTOP JSR STOP          ;STOP KEY DOWN?
03909  F8D3  18                 CLC               ;ASSUME NO STOP
03911  F8D4  D0 0B              BNE STOP4         ;WE WERE RIGHT
03912  F8D6              ;
03913  F8D6              ;STOP KEY DOWN...
03914  F8D6              ;
03915  F8D6  20 93 FC           JSR TNIF          ;TURN OFF CASSETTES
03916  F8D9  38                 SEC               ;FAILURE FLAG
03917  F8DA  68                 PLA               ;BACK ONE SQUARE...
03918  F8DB  68                 PLA
03919  F8DC              ;
03920  F8DC              ; LDA #0 ;STOP KEY FLAG
03921  F8DC              ;
03922  F8DC  A9 00        STOP3 LDA #0            ;DEALLOCATE IRQTMP
03923  F8DE  8D A0 02           STA IRQTMP+1      ;IF C-SET THEN STOP KEY
03924  F8E1  60           STOP4 RTS



03926  F8E2              ;
03927  F8E2              ; STT1 - SET UP TIMEOUT WATCH FOR NEXT DIPOLE
```

```
03928  F8E2                    ;
03929  F8E2  86 B1      STT1   STX TEMP        ;.X HAS CONSTANT FOR TIMEOUT
03930  F8E4  A5 B0             LDA CMPO        ;CMPO*5
03931  F8E6  0A                ASL A
03932  F8E7  0A                ASL A
03933  F8E8  18                CLC
03934  F8E9  65 B0             ADC CMPO
03935  F8EB  18                CLC
03936  F8EC  65 B1             ADC TEMP        ;ADJUST LONG BYTE COUNT
03937  F8EE  85 B1             STA TEMP
03938  F8F0  A9 00             LDA #0
03939  F8F2  24 B0             BIT CMPO        ;CHECK CMPO ...
```



```
LINE# LOC   CODE        LINE

03940  F8F4  30 01             BMI STT2        ;...MINUS, NO ADJUST
03941  F8F6  2A                ROL A           ;...PLUS SO ADJUST POS
03942  F8F7  06 B1      STT2   ASL TEMP        ;MULTIPLY CORRECTED VALUE BY 4
03943  F8F9  2A                ROL A
03944  F8FA  06 B1             ASL TEMP
03945  F8FC  2A                ROL A
03946  F8FD  AA                TAX
03947  F8FE  AD 06 DC   STT3   LDA D1T2L       ;WATCH OUT FOR D1T2H ROLLOVER...
03948  F901  C9 16             CMP #22         ;...TIME FOR ROUTINE...!!!...
03949  F903  90 F9             BCC STT3        ;...TOO CLOSE SO WAIT UNTILL PAST
03950  F905  65 B1             ADC TEMP        ;CALCULATE AND...
03951  F907  8D 04 DC          STA D1T1L       ;...STORE ADUSTED TIME COUNT
03952  F90A  8A                TXA
03953  F90B  6D 07 DC          ADC D1T2H       ;ADJUST FOR HIGH TIME COUNT
03954  F90E  8D 05 DC          STA D1T1H
03955  F911  AD A2 02          LDA CASTON      ;ENABLE TIMERS
03956  F914  8D 0E DC          STA D1CRA
03957  F917  8D A4 02          STA STUPID      ;NON-ZERO MEANS AN T1 IRQ HAS NOT C
03958  F91A  AD 0D DC          LDA D1ICR       ;CLEAR OLD T1 INTERRUPT
03959  F91D  29 10             AND #$10        ;CHECK FOR OLD-FLAG IRQ
03960  F91F  F0 09             BEQ STT4        ;NO...NORMAL EXIT
03961  F921  A9 F9             LDA #>STT4      ;PUSH SIMULATED RETURN ADDRESS ON S
03962  F923  48                PHA
03963  F924  A9 2A             LDA #<STT4
03964  F926  48                PHA
03965  F927  4C 43 FF          JMP SIMIRQ
03966  F92A  58          STT4   CLI             ;ALLOW FOR RE-ENTRY CODE
03967  F92B  60                RTS
03968  F92C                    .END
03969  F92C                    .LIB READ
```

```
LINE# LOC   CODE        LINE

03971  F92C             ; VARIABLES USED IN CASSETTE READ ROUTINES
03972  F92C             ;
03973  F92C             ;  REZ - COUNTS ZEROS (IF Z THEN CORRECT # OF DIPOLES)
03974  F92C             ;  RER - FLAGS ERRORS (IF Z THEN NO ERROR)
03975  F92C             ;  DIFF - USED TO PRESERVE SYNO (OUTSIDE OF BIT ROUTINES)
03976  F92C             ;  SYNO - FLAGS IF WE HAVE BLOCK SYNC (16 ZERO DIPOLES)
03977  F92C             ;  SNSW1 - FLAGS IF WE HAVE BYTE SYNC (A LONGLONG)
03978  F92C             ;  DATA - HOLDS MOST RECENT DIPOLE BIT VALUE
03979  F92C             ;  MYCH - HOLDS INPUT BYTE BEING BUILT
03980  F92C             ;  FIRT - USED TO INDICATE WHICH HALF OF DIPOLE WE'RE IN
03981  F92C             ;  SVXT - TEMP USED TO ADJUST SOFTWARE SERVO
03982  F92C             ;  TEMP - USED TO HOLD DIPOLE TIME DURING TYPE CALCULATION
03983  F92C             ;  PRTY - HOLDS CURRENT CALCULATED PARITY BIT
03984  F92C             ;  PRP - HAS COMBINED ERROR VALUES FROM BIT ROUTINES
039(   F92C             ;  FSBLK - INDICATE WHICH BLOCK WE'RE LOOKING AT (0 TO EXI
0398   F92C             ;  SHCNL - HOLDS FSBLK, USED TO DIRECT ROUTINES, BECAUSE C
03987  F92C             ;  RDFLG - HOLDS FUNCTION MODE
03988  F92C             ;     MI - WAITING FOR BLOCK SYNC
03989  F92C             ;     VS - IN DATA BLOCK READING DATA
03990  F92C             ;     NE - WAITING FOR BYTE SYNC
03991  F92C             ;  SAL - INDIRECT TO DATA STORAGE AREA
03992  F92C             ;  SHCNH - LEFT OVER FROM DEBUGGING
03993  F92C             ;  BAD - STORAGE SPACE FOR BAD READ LOCATIONS (BOTTOM OF S
03994  F92C             ;  PTR1 - COUNT OF READ LOCATIONS IN ERROR (POINTER INTO E
03995  F92C             ;  PTR2 - COUNT OF RE-READ LOCATIONS (POINTER INTO BAD, DL
03996  F92C             ;  VERCHK - VERIFY OR LOAD FLAG (Z - LOADING)
03997  F92C             ;  CMPO - SOFTWARE SERVO (+/- ADJUST TO TIME CALCS)
03998  F92C             ;  DPSW - IF NZ THEN EXPECTING LL/L COMBINATION THAT ENDS
03999  F92C             ;  PCNTR - COUNTS DOWN FROM 8-0 FOR DATA THEN TO FF FOR PF
04000  F92C             ;  STUPID - HOLD INDICATOR (NZ - NO T1IRQ YET) FOR T1IRQ
04001  F92C             ;  KIKA26 - HOLDS OLD D1ICR AFTER CLEAR ON READ
04002  F92C             ;
```

CASSETTE READ.....PAGE 0094

```
LINE# LOC   CODE         LINE

04004  F92C  AE 07 DC    READ   LDX D1T2H        ;GET TIME SINCE LAST INTERRUPT
04005  F92F  A0 FF              LDY ##$FF        ;COMPUTE COUNTER DIFFERENCE
04006  F931  98                 TYA
04007  F932  ED 06 DC           SBC D1T2L
04008  F935  EC 07 DC           CPX D1T2H        ;CHECK FOR TIMER HIGH ROLLOVER...
04009  F938  D0 F2              BNE READ         ;...YES THEN RECOMPUTE
04010  F93A  86 B1              STX TEMP
04011  F93C  AA                 TAX
040    F93D  8C 06 DC           STY D1T2L        ;RELOAD TIMER2 (COUNT DOWN FROM $FF
040    F940  8C 07 DC           STY D1T2H
04014  F943  A9 19              LDA ##$19        ;ENABLE TIMER
04015  F945  8D 0F DC           STA D1CRB
04016  F948  AD 0D DC           LDA D1ICR        ;CLEAR READ INTERRUPT
04017  F94B  8D A3 02           STA KIKA26       ;SAVE FOR LATTER
04018  F94E  98                 TYA
04019  F94F  E5 B1              SBC TEMP         ;CALCULATE HIGH
04020  F951  86 B1              STX TEMP
04021  F953  4A                 LSR A            ;MOVE TWO BITS FROM HIGH TO TEMP
04022  F954  66 B1              ROR TEMP
04023  F956  4A                 LSR A
04024  F957  66 B1              ROR TEMP
04025  F959  A5 B0              LDA CMP0         ;CALC MIN PULSE VALUE
04026  F95B  18                 CLC
04027  F95C  69 3C              ADC #60
04028  F95E  C5 B1              CMP TEMP         ;IF PULSE LESS THAN MIN...
04029  F960  B0 4A              BCS RDBK         ;...THEN IGNORE AS NOISE
04030  F962  A6 9C              LDX DPSW         ;CHECK IF LAST BIT...
040    F964  F0 03              BEQ RJDJ         ;...NO THEN CONTINUE
040    F966  4C 60 FA           JMP RADJ         ;...YES THEN GO FINISH BYTE
```

```
04034  F969  A6 A3        RJDJ   LDX PCNTR        ;IF 9 BITS READ...
04035  F96B  30 1B               BMI JRAD2        ;... THEN GOTO ENDING
04036  F96D  A2 00               LDX #0           ;SET BIT VALUE TO ZERO
04037  F96F  69 30               ADC #48          ;ADD UP TO HALF WAY BETWEEN...
04038  F971  65 B0               ADC CMPO         ;...SHORT PULSE AND SYNC PULSE
040    F973  C5 B1               CMP TEMP         ;CHECK FOR SHORT...
0404   F975  B0 1C               BCS RADX2        ;...YES IT'S A SHORT
04041  F977  E8                 INX              ;SET BIT VALUE TO ONE
04042  F978  69 26               ADC #38          ;MOVE TO MIDDLE OF HIGH
04043  F97A  65 B0               ADC CMPO
04044  F97C  C5 B1               CMP TEMP         ;CHECK FOR ONE...
04045  F97E  B0 17               BCS RADL         ;...YES IT'S A ONE
04046  F980  69 2C               ADC #44          ;MOVE TO LONGLONG
04047  F982  65 B0               ADC CMPO
04048  F984  C5 B1               CMP TEMP         ;CHECK FOR LONGLONG...
04049  F986  90 03               BCC SRER         ;...GREATER THAN IS ERROR
04050  F988  4C 10 FA    JRAD2  JMP RAD2         ;...IT'S A LONGLONG


04052  F98B  A5 B4        SRER   LDA SNSW1        ;IF NOT SYNCRONIZED...
04053  F98D  F0 1D               BEQ RDBK         ;...THEN NO ERROR
04054  F98F  85 A8               STA RER          ;...ELSE FLAG RER
04055  F991  D0 19               BNE RDBK         ;JMP


0405   F993  E6 A9        RADX2  INC REZ          ;COUNT REZ UP ON ZEROS
04058  F995  B0 02               BCS RAD5         ;JMP
04059  F997  C6 A9        RADL   DEC REZ          ;COUNT REZ DOWN ON ONES
04060  F999  38           RAD5   SEC              ;CALC ACTUAL VALUE FOR COMPARE STOR
04061  F99A  E9 13               SBC #19
```

CASSETTE READ.....PAGE 0095

```
LINE# LOC   CODE        LINE


04062  F99C  E5 B1               SBC TEMP         ;SUBTRACT INPUT VALUE FROM CONSTANT
04063  F99E  65 92               ADC SVXT         ;...ADD DIFFERENCE TO TEMP STORAGE.
040    F9A0  85 92               STA SVXT         ;...USED LATER TO ADJUST SOFT SERVO
0406   F9A2  A5 A4               LDA FIRT         ;FLIP DIPOLE FLAG
04066  F9A4  49 01               EOR #1
04067  F9A6  85 A4               STA FIRT
04068  F9A8  F0 2B               BEQ RAD3         ;SECOND HALF OF DIPOLE
04069  F9AA  86 D7               STX DATA         ;FIRST HALF SO STORE ITS VALUE


04071  F9AC  A5 B4        RDBK   LDA SNSW1        ;IF NO BYTE START...
04072  F9AE  F0 22               BEQ RADBK        ;...THEN RETURN
04073  F9B0  AD A3 02            LDA KIKA26       ;CHECK TO SEE IF TIMER1 IRQD US...
04074  F9B3  29 01               AND #$01
04075  F9B5  D0 05               BNE RADKX        ;...YES
04076  F9B7  AD A4 02            LDA STUPID       ;CHECK FOR OLD T1IRQ
04077  F9BA  D0 16               BNE RADBK        ;NO...SO EXIT
04078  F9BC                ;
04079  F9BC  A9 00        RADKX  LDA #0           ;...YES, SET DIPOLE FLAG FOR FIRST
0408    F9BE  85 A4               STA FIRT
040    F9C0  8D A4 02            STA STUPID       ;SET T1IRQ FLAG
0408   F9C3  A5 A3               LDA PCNTR        ;CHECK WHERE WE ARE IN BYTE...
04083  F9C5  10 30               BPL RAD4         ;...DOING DATA
04084  F9C7  30 BF               BMI JRAD2        ;...PROCESS PARITY
```

```
04086  F9C9  A2 A6        RADP   LDX #166         ;SET UP FOR LONGLONG TIMEOUT
04087  F9CB  20 E2 F8             JSR STT1
04088  F9CE  A5 9B               LDA PRTY         ;IF PARITY NOT EVEN...
0408   F9D0  D0 B9               BNE SRER         ;...THEN GO SET ERROR
0409   F9D2  4C BC FE    RADBK   JMP PREND        ;GO RESTORE REGS AND RTI



04092  F9D5  A5 92        RAD3   LDA SVXT         ;ADJUST THE SOFTWARE SERVO (CMPO)
04093  F9D7  F0 07               BEQ ROUT1        ;NO ADJUST
04094  F9D9  30 03               BMI ROUT2        ;ADJUST FOR MORE BASE TIME
04095  F9DB  C6 B0               DEC CMPO         ;ADJUST FOR LESS BASE TIME
04096  F9DD  2C                  .BYT $2C         ;SKIP TWO BYTES
04097  F9DE  E6 B0        ROUT2  INC CMPO
04098  F9E0  A9 00        ROUT1  LDA #0           ;CLEAR DIFFERENCE VALUE
04099  F9E2  85 92               STA SVXT
04100  F9E4               ;CHECK FOR CONSECUTIVE LIKE VALUES IN DIPOLE...
04101  F9E4  E4 D7               CPX DATA
04102  F9E6  D0 0F               BNE RAD4         ;...NO, GO PROCESS INFO
04103  F9E8  8A                  TXA              ;...YES SO CHECK THE VALUES...
04104  F9E9  D0 A0               BNE SRER         ;IF THEY WERE ONES THEN  ERROR
04105  F9EB               ; CONSECUTIVE ZEROS
041(   F9EB  A5 A9               LDA REZ          ;...CHECK HOW MANY ZEROS HAVE HAPPE
041(   F9ED  30 BD               BMI RDBK         ;...IF MANY DON'T CHECK
04108  F9EF  C9 10               CMP #16          ;... DO WE HAVE 16 YET?...
04109  F9F1  90 B9               BCC RDBK         ;....NO SO CONTINUE
04110  F9F3  85 96               STA SYNO         ;....YES SO FLAG SYNO (BETWEEN BLOC
04111  F9F5  B0 B5               BCS RDBK         ;JMP



04113  F9F7  8A            RAD4   TXA              ;MOVE READ DATA TO .A
04114  F9F8  45 9B               EOR PRTY         ;CALCULATE PARITY
04115  F9FA  85 9B               STA PRTY



CASSETTE READ......PAGE 0096

LINE  LOC   CODE         LINE

04116  F9FC  A5 B4               LDA SNSW1        ;REAL DATA?...
04117  F9FE  F0 D2               BEQ RADBK        ;...NO SO FORGET BY EXITING
04118  FA00  C6 A3               DEC PCNTR        ;DEC BIT COUNT
04119  FA02  30 C5               BMI RADP         ;IF MINUS THEN  TIME FOR PARITY
04120  FA04  46 D7               LSR DATA         ;SHIFT BIT FROM DATA...
04121  FA06  66 BF               ROR MYCH         ;...INTO BYTE STORAGE (MYCH) BUFFER
04122  FA08  A2 DA               LDX #218         ;SET UP FOR NEXT DIPOLE
04123  FA0A  20 E2 F8             JSR STT1
04124  FA0D  4C BC FE             JMP PREND        ;RESTORE REGS AND RTI



04126  FA10               ; RAD2 - LONGLONG HANDLER (COULD BE A LONG ONE)
04127  FA10  A5 96        RAD2   LDA SYNO         ;HAVE WE GOTTEN BLOCK SYNC...
04128  FA12  F0 04               BEQ RAD2Y        ;...NO
041(   FA14  A5 B4               LDA SNSW1        ;CHECK IF WE'VE HAD A REAL BYTE STR
0413   FA16  F0 07               BEQ RAD2X        ;...NO
04131  FA18  A5 A3        RAD2Y  LDA PCNTR        ;ARE WE AT END OF BYTE...
04132  FA1A  30 03               BMI RAD2X        ;YES...GO ADJUST FOR LONGLONG
```

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04133  FA1C  4C 97 F9          JMP RADL        ;...NO SO TREAT IT AS A LONG ONE RE


04135  FA1F  46 B1      RAD2X  LSR TEMP        ;ADJUST TIMEOUT FOR...
04136  FA21  A9 93             LDA #147        ;...LONGLONG PULSE VALUE
041    FA23  38                 SEC
0413   FA24  E5 B1              SBC TEMP
04139  FA26  65 B0              ADC CMP0
04140  FA28  0A                 ASL A
04141  FA29  AA                 TAX             ;AND SET TIMEOUT FOR LAST BIT
04142  FA2A  20 E2 F8           JSR STT1
04143  FA2D  E6 9C              INC DPSW        ;SET BIT THROW AWAY FLAG
04144  FA2F  A5 B4              LDA SNSW1       ;IF BYTE SYNCRONIZED....
04145  FA31  D0 11              BNE RADQ2       ;...THEN SKIP TO PASS CHAR
04146  FA33  A5 96              LDA SYNO        ;THROWS OUT DATA UNTILL BLOCK SYNC.
04147  FA35  F0 26              BEQ RDBK2       ;...NO BLOCK SYNC
04148  FA37  85 A8              STA RER         ;FLAG DATA AS ERROR
04149  FA39  A9 00              LDA #0          ;KILL 16 SYNC FLAG
04150  FA3B  85 96              STA SYNO
04151  FA3D  A9 81              LDA #$81        ;SET UP FOR TIMER1 INTERRUPTS
04152  FA3F  8D 0D DC           STA D1ICR
04153  FA42  85 B4              STA SNSW1       ;FLAG THAT WE HAVE BYTE SYNCRONIZED
04154  FA44             ;
04155  FA44  A5 96      RADQ2  LDA SYNO        ;SAVE SYNO STATUS
041    FA46  85 B5              STA DIFF
0415   FA48  F0 09              BEQ RADK        ;NO BLOCK SYNC, NO BYTE LOOKING
04158  FA4A  A9 00              LDA #0          ;TURN OFF BYTE SYNC SWITCH
04159  FA4C  85 B4              STA SNSW1
04160  FA4E  A9 01              LDA #$01        ;DISABLE TIMER1 INTERRUPTS
04161  FA50  8D 0D DC           STA D1ICR
04162  FA53  A5 BF      RADK   LDA MYCH        ;PASS CHARACTER TO BYTE ROUTINE
04163  FA55  85 BD              STA OCHAR
04164  FA57  A5 A8              LDA RER         ;COMBINE ERROR VALUES WITH ZERO COL
04165  FA59  05 A9              ORA REZ
04166  FA5B  85 B6              STA PRP         ;...AND SAVE IN PRP
04167  FA5D  4C BC FE   RDBK2  JMP PREND       ;GO BACK AND GET LAST BYTE


04169  FA60  20 97 FB   RADJ   JSR NEWCH       ;FINISH BYTE, CLR FLAGS
04170  FA63  85 9C              STA DPSW        ;CLEAR BIT THROW AWAY FLAG
04171  FA65  A2 DA              LDX #218        ;INITILIZE FOR NEXT DIPOLE
04172  FA67  20 E2 F8           JSR STT1
```



```
LINE# LOC   CODE        LINE

04173  FA6A  A5 BE              LDA FSBLK       ;CHECK FOR LAST VALUE
04174  FA6C  F0 02              BEQ RD15
04175  FA6E  85 A7              STA SHCNL
```

```
LINE# LOC   CODE        LINE

04177  FA70             ;*****************************************************
04178  FA70             ;* BYTE HANDLER OF CASSETTE READ                     *
04179  FA70             ;*                                                   *
041.   FA70             ;* THIS PORTION OF IN LINE CODE IS PASSED THE        *
04181  FA70             ;* BYTE ASSEMBLED FROM READING TAPE IN OCHAR.        *
04182  FA70             ;* RER IS SET IF THE BYTE READ IS IN ERROR.          *
04183  FA70             ;* REZ IS SET IF THE INTERRUPT PROGRAM IS READING*
```

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04184  FA70                ;* ZEROS.  RDFLG TELLS US WHAT WE ARE DOING.     *
04185  FA70                ;* BIT 7 SAYS TO IGNORE BYTES UNTIL REZ IS SET   *
04186  FA70                ;* BIT 6 SAYS TO LOAD THE BYTE. OTHERWISE RDFLG  *
04187  FA70                ;* IS A COUNTDOWN AFTER SYNC.  IF VERCK IS SET   *
04188  FA70                ;* WE DO A COMPARE INSTEAD OF A STORE AND SET    *
041    FA70                ;* STATUS.  FSBLK COUNTS THE TWO BLOCKS. PTR1 IS *
0419   FA70                ;* INDEX TO ERROR TABLE FOR PASS1.  PTR2 IS INDEX*
04191  FA70                ;* TO CORRECTION TABLE FOR PASS2.                *
04192  FA70                ;***********************************************
04193  FA70                ;
04194  FA70                SPERR=16
04195  FA70                CKERR=32
04196  FA70                SBERR=4
04197  FA70                LBERR=8
04198  FA70                ;
04199  FA70  A9 0F         RD15   LDA #$F
04200  FA72                ;
04201  FA72  24 AA                BIT RDFLG        ;TEST FUNCTION MODE
04202  FA74  10 17                BPL RD20         ;NOT WAITING FOR ZEROS
04203  FA76                ;
04204  FA76  A5 B5                LDA DIFF         ;ZEROS YET?
04205  FA78  D0 0C                BNE RD12         ;YES...WAIT FOR SYNC
04206  FA7A  A6 BE                LDX FSBLK        ;IS PASS OVER?
04207  FA7C  CA                   DEX              ;...IF FSBLK ZERO THEN NO ERROR (FI
042    FA7D  D0 0B                BNE RD10         ;NO...
042    FA7F                ;
04210  FA7F  A9 08                LDA #LBERR
04211  FA81  20 1C FE             JSR UDST         ;YES...LONG BLOCK ERROR
04212  FA84  D0 04                BNE RD10         ;BRANCH ALWAYS
04213  FA86                ;
04214  FA86  A9 00         RD12   LDA #0
04215  FA88  85 AA                STA RDFLG        ;NEW MODE IS WAIT FOR SYNC
04216  FA8A  4C BC FE      RD10   JMP PREND        ;EXIT...DONE
04217  FA8D                ;
04218  FA8D  70 31         RD20   BVS RD60         ;WE ARE LOADING
04219  FA8F  D0 18                BNE RD200        ;WE ARE SYNCING
04220  FA91                ;
04221  FA91  A5 B5                LDA DIFF         ;DO WE HAVE BLOCK SYNC...
04222  FA93  D0 F5                BNE RD10         ;...YES, EXIT
04223  FA95  A5 B6                LDA PRP          ;IF FIRST BYTE HAS ERROR...
04224  FA97  D0 F1                BNE RD10         ;...THEN SKIP (EXIT)
04225  FA99  A5 A7                LDA SHCNL        ;MOVE FSBLK TO CARRY...
04226  FA9B  4A                   LSR A
042    FA9C  A5 BD                LDA OCHAR        ; SHOULD BE A HEADER COUNT CHAR
042    FA9E  30 03                BMI RD22         ;IF NEG THEN FIRSTBLOCK DATA
04229  FAA0  90 18                BCC RD40         ;...EXPECTING FIRSTBLOCK DATA...YES
04230  FAA2  18                   CLC
04231  FAA3  B0 15         RD22   BCS RD40         ;EXPECTING SECOND BLOCK?...YES
04232  FAA5  29 0F                AND #$F          ;MASK OFF HIGH STORE HEADER COUNT..
04233  FAA7  85 AA                STA RDFLG        ;...IN MODE FLAG (HAVE CORRECT BLOC
04234  FAA9  C6 AA         RD200  DEC RDFLG        ;WAIT UNTILL WE GET REAL DATA...
04235  FAAB  D0 DD                BNE RD10         ;...9876543210 REAL
04236  FAAD  A9 40                LDA #$40         ;NEXT UP IS REAL DATA...
04237  FAAF  85 AA                STA RDFLG        ;...SET DATA MODE
```



```
LINE  LOC   CODE          LINE

04238  FAB1  20 8E FB             JSR RD300        ;GO SETUP ADDRESS POINTERS
```

```
04239  FAB4  A9 00           LDA #0          ;DEBUG CODE##########################
04240  FAB6  85 AB           STA SHCNH
04241  FAB8  F0 D0           BEQ RD10        ;JMP TO CONTINUE


042.   FABA  A9 80     RD40  LDA #$80        ;WE WANT TO...
0424.  FABC  85 AA           STA RDFLG       ;IGNORE BYTES MODE
04245  FABE  D0 CA           BNE RD10        ;JMP


04247  FAC0  A5 B5     RD60  LDA DIFF        ;CHECK FOR END OF BLOCK...
04248  FAC2  F0 0A           BEQ RD70        ;...OKAY
04249  FAC4                 ;
04250  FAC4  A9 04           LDA #SBERR      ;SHORT BLOCK ERROR
04251  FAC6  20 1C FE        JSR UDST
04252  FAC9  A9 00           LDA #0          ;FORCE RDFLG FOR AN END
04253  FACB  4C 4A FB        JMP RD161


04255  FACE  20 D1 FC  RD70  JSR CMPSTE      ;CHECK FOR END OF STORAGE AREA
04256  FAD1  90 03           BCC *+5         ;NOT DONE YET
04257  FAD3  4C 48 FB        JMP RD160
04258  FAD6  A6 A7           LDX SHCNL       ;CHECK WHICH PASS...
04259  FAD8  CA              DEX
042.   FAD9  F0 2D           BEQ RD58        ;...SECOND PASS
0426.  FADB  A5 93           LDA VERCK       ;CHECK IF LOAD OR VERIFY...
04262  FADD  F0 0C           BEQ RD80        ;...LOADING
04263  FADF  A0 00           LDY #0          ;...JUST VERIFYING
04264  FAE1  A5 BD           LDA OCHAR
04265  FAE3  D1 AC           CMP (SAL)Y      ;COMPARE WITH DATA IN PET
04266  FAE5  F0 04           BEQ RD80        ;...GOOD SO CONTINUE
04267  FAE7  A9 01           LDA #1          ;...BAD SO FLAG...
04268  FAE9  85 B6           STA PRP         ;...AS AN ERROR

04270  FAEB                 ; STORE BAD LOCATIONS FOR SECOND PASS RE-TRY
04271  FAEB  A5 B6     RD80  LDA PRP         ;CHK FOR ERRORS...
04272  FAED  F0 4B           BEQ RD59        ;...NO ERRORS
04273  FAEF  A2 3D           LDX #61         ;MAX ALLOWED IS 30
04274  FAF1  E4 9E           CPX PTR1        ;ARE WE AT MAX?...
04275  FAF3  90 3E           BCC RD55        ;...YES, FLAG AS SECOND PASS ERROR
04276  FAF5  A6 9E           LDX PTR1        ;GET INDEX INTO BAD...
04277  FAF7  A5 AD           LDA SAH         ;...AND STORE THE BAD LOCATION
04278  FAF9  9D 01 01        STA BAD+1,X     ;...IN BAD TABLE
042.   FAFC  A5 AC           LDA SAL
0428.  FAFE  9D 00 01        STA BAD,X
04281  FB01  E8              INX             ;ADVANCE POINTER TO NEXT
04282  FB02  E8              INX
04283  FB03  86 9E           STX PTR1
04284  FB05  4C 3A FB        JMP RD59        ;GO STORE CHARACTER


04286  FB08                 ; CHECK BAD TABLE FOR RE-TRY (SECOND PASS)
04287  FB08  A6 9F     RD58  LDX PTR2        ;HAVE WE DONE ALL IN THE TABLE?...
04288  FB0A  E4 9E           CPX PTR1
04289  FB0C  F0 35           BEQ RD90        ;...YES
04290  FB0E  A5 AC           LDA SAL         ;SEE IF THIS IS NEXT IN THE TABLE..
04291  FB10  DD 00 01        CMP BAD,X
04292  FB13  D0 2E           BNE RD90        ;...NO
04293  FB15  A5 AD           LDA SAH
04294  FB17  DD 01 01        CMP BAD+1,X
```

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BYTE HANDLER.....PAGE 0100

LINE# LOC   CODE        LINE


04297  FB1A  D0 27           BNE RD90        ;...NO
04298  FB1C  E6 9F           INC PTR2        ;WE FOUND NEXT ONE, SO ADVANCE POIN
04299  FB1E  E6 9F           INC PTR2
04300  FB20  A5 93           LDA VERCK       ;DOING A LOAD OR VERIFY?...
04301  FB22  F0 0B           BEQ RD52        ;...LOADING
04302  FB24  A5 BD           LDA OCHAR       ;...VERIFYING, SO CHECK
04303  FB26  A0 00           LDY #0
04304  FB28  D1 AC           CMP (SAL)Y
04305  FB2A  F0 17           BEQ RD90        ;...OKAY
04306  FB2C  C8              INY             ;MAKE .Y= 1
04307  FB2D  84 B6           STY PRP         ;FLAG IT AS AN ERROR


04309  FB2F  A5 B6     RD52  LDA PRP         ;A SECOND PASS ERROR?...
04310  FB31  F0 07           BEQ RD59        ;...NO
04311  FB33                  ;SECOND PASS ERR
04312  FB33  A9 10     RD55  LDA #SPERR
04313  FB35  20 1C FE       JSR UDST
04314  FB38  D0 09           BNE RD90        ;JMP


04316  FB3A  A5 93     RD59  LDA VERCK       ;LOAD OR VERIFY?...
04317  FB3C  D0 05           BNE RD90        ;...VERIFY, DON'T STORE
04318  FB3E  A8              TAY             ;MAKE Y ZERO
04319  FB3F  A5 BD           LDA OCHAR
04320  FB41  91 AC           STA (SAL)Y      ;STORE CHARACTER
04321  FB43  20 DB FC  RD90  JSR INCSAL      ;INCREMENT ADDR.
04322  FB46  D0 43           BNE RD180       ;BRANCH ALWAYS



04324  FB48  A9 80     RD160 LDA #$80        ;SET MODE SKIP NEXT DATA
04325  FB4A  85 AA     RD161 STA RDFLG
04326  FB4C                  ;
04327  FB4C                  ; MODIFY FOR C64 6526'S
04328  FB4C                  ;
04329  FB4C  78              SEI             ;PROTECT CLEARING OF T1 INFORMATION
04330  FB4D  A2 01           LDX #$01
04331  FB4F  8E 0D DC       STX D1ICR       ;CLEAR T1 ENABLE...
04332  FB52  AE 0D DC       LDX D1ICR       ;CLEAR THE INTERRUPT
04333  FB55  A6 BE           LDX FSBLK       ;DEC FSBLK FOR NEXT PASS...
04334  FB57  CA              DEX
04335  FB58  30 02           BMI RD167       ;WE ARE DONE...FSBLK=0
04336  FB5A  86 BE           STX FSBLK       ;...ELSE FSBLK=NEXT
04337  FB5C  C6 A7     RD167 DEC SHCNL       ;DEC PASS CALC...
04338  FB5E  F0 08           BEQ RD175       ;...ALL DONE
04339  FB60  A5 9E           LDA PTR1        ;CHECK FOR FIRST PASS ERRORS...
04340  FB62  D0 27           BNE RD180       ;...YES SO CONTINUE
04341  FB64  85 BE           STA FSBLK       ;CLEAR FSBLK IF NO ERRORS...
04342  FB66  F0 23           BEQ RD180       ;JMP TO EXIT


04344  FB68  20 93 FC  RD175 JSR TNIF        ;READ IT ALL...EXIT
04345  FB6B  20 8E FB       JSR RD300       ;RESTORE SAL & SAH
04346  FB6E  A0 00           LDY #0          ;SET SHCNH TO ZERO...
04347  FB70  84 AB           STY SHCNH       ;...USED TO CALC PARITY BYTE
04348  FB72                  ;
04349  FB72                  ;COMPUTE PARITY OVER LOAD
04350  FB72                  ;
04351  FB72  B1 AC     VPRTY LDA (SAL)Y      ;CALC BLOCK BCC
04352  FB74  45 AB           EOR SHCNH
```

```
BYTE HANDLER......PAGE 0101

LINE# LOC   CODE        LINE

04351  FB76  85 AB              STA SHCNH
04352  FB78  20 DB FC           JSR INCSAL      ;INCREMENT ADDRESS
04353  FB7B  20 D1 FC           JSR CMPSTE      ;TEST AGAINST END
04354  FB7E  90 F2              BCC VPRTY       ;NOT DONE YET...
04355  FB80  A5 AB              LDA SHCNH       ;CHECK FOR BCC CHAR MATCH...
04356  FB82  45 BD              EOR OCHAR
04357  FB84  F0 05              BEQ RD180       ;...YES, EXIT
04358  FB86                ;CHKSUM ERROR
04359  FB86  A9 20              LDA #CKERR
04360  FB88  20 1C FE           JSR UDST
04361  FB8B  4C BC FE    RD180  JMP PREND



04363  FB8E  A5 C2        RD300  LDA STAH        ; RESTORE STARTING ADDRESS...
04364  FB90  85 AD              STA SAH         ;...POINTERS (SAH & SAL)
04365  FB92  A5 C1              LDA STAL
04366  FB94  85 AC              STA SAL
04367  FB96  60                 RTS



04369  FB97  A9 08        NEWCH  LDA #8          ;SET UP FOR 8 BITS+PARITY
04370  FB99  85 A3              STA PCNTR
04371  FB9B  A9 00              LDA #0          ;INITILIZE...
04372  FB9D  85 A4              STA FIRT        ;..DIPOLE COUNTER
04373  FB9F  85 A8              STA RER         ;..ERROR FLAG
04374  FBA1  85 9B              STA PRTY        ;..PARITY BIT
04375  FBA3  85 A9              STA REZ         ;..ZERO COUNT
04376  FBA5  60                 RTS             ;.A=0 ON RETURN
043.   FBA6                     .END
0437   FBA6                     .LIB WRITE
```

```
LINE# LOC   CODE        LINE

04380  FBA6             ; CASSETTE INFO - FSBLK IS BLOCK COUNTER FOR RECORD
04381  FBA6             ;       FSBLK = 2 -FIRST HEADER
04382  FBA6             ;             = 1 -FIRST DATA
04383  FBA6             ;             = 0 -SECOND DATA
04384  FBA6             ;
04385  FBA6             ; WRITE - TOGGLE WRITE BIT ACCORDING TO LSB IN OCHAR
04386  FBA6             ;
04387  FBA6  A5 BD      WRITE  LDA OCHAR        ;SHIFT BIT TO WRITE INTO CARRY
04388  FBA8  4A                LSR A
04389  FBA9  A9 60              LDA #96         ;...C CLR WRITE SHORT
04390  FBAB  90 02              BCC WRT1
04391  FBAD  A9 B0      WRTW   LDA #176        ;...C SET WRITE LONG
04392  FBAF  A2 00      WRT1   LDX #0          ;SET AND STORE TIME
04393  FBB1  8D 06 DC   WRTX   STA D1T2L
04394  FBB4  8E 07 DC          STX D1T2H
04395  FBB7  AD 0D DC          LDA D1ICR       ;CLEAR IRQ
04396  FBBA  A9 19              LDA #$19        ;ENABLE TIMER (ONE-SHOT)
04397  FBBC  8D 0F DC          STA D1CRB
04398  FBBF  A5 01              LDA R6510       ;TOGGLE WRITE BIT
04399  FBC1  49 08              EOR #$08
04400  FBC3  85 01              STA R6510
04401  FBC5  29 08              AND #$08        ;LEAVE ONLY WRITE BIT
04402  FBC7  60                 RTS
04403  FBC8             ;
04404  FBC8  38         WRTL3  SEC              ;FLAG PRP FOR END OF BLOCK
04405  FBC9  66 B6              ROR PRP
04406  FBCB  30 3C              BMI WRT3        ; JMP
04407  FBCD             ;
04408  FBCD             ; WRTN - CALLED AT THE END OF EACH BYTE
04409  FBCD             ;   TO WRITE A LONG RER    REZ
04410  FBCD             ;                HHHHHHHLLLLLLHHHLLL...
04411  FBCD             ;
04412  FBCD  A5 A8      WRTN   LDA RER          ;CHECK FOR ONE LONG
04413  FBCF  D0 12              BNE WRTN1
04414  FBD1  A9 10              LDA #16         ;WRITE A LONG BIT
04415  FBD3  A2 01              LDX #1
04416  FBD5  20 B1 FB          JSR WRTX
04417  FBD8  D0 2F              BNE WRT3
04418  FBDA  E6 A8              INC RER
04419  FBDC  A5 B6              LDA PRP         ;IF END OF BLOCK(BIT SET BY WRTL3).
04420  FBDE  10 29              BPL WRT3        ;...NO END CONTINUE
04421  FBE0  4C 57 FC          JMP WRNC        ;...END ...FINISH OFF
04422  FBE3             ;
04423  FBE3  A5 A9      WRTN1  LDA REZ          ;CHECK FOR A ONE BIT
04424  FBE5  D0 09              BNE WRTN2
04425  FBE7  20 AD FB          JSR WRTW
04426  FBEA  D0 10              BNE WRT3
04427  FBEC  E6 A9              INC REZ
04428  FBEE  D0 19              BNE WRT3
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04429  FBF0                    ;
04430  FBF0  20 A6 FB    WRTN2  JSR WRITE
04431  FBF3  D0 14              BNE WRT3          ;ON BIT LOW EXIT
04432  FBF5  A5 A4              LDA FIRT          ;CHECK FOR FIRST OF DIPOLE
04433  FBF7  49 01              EOR #1
044    FBF9  85 A4              STA FIRT
043    FBFB  F0 0F              BEQ WRT2          ;DIPOLE DONE
04436  FBFD  A5 BD              LDA OCHAR         ;FLIPS BIT FOR COMPLEMENTARY RIGHT
04437  FBFF  49 01              EOR #1
04438  FC01  85 BD              STA OCHAR
04439  FC03  29 01              AND #1            ;TOGGLE PARITY
04440  FC05  45 9B              EOR PRTY
```

TAPE WRITE.....PAGE 0103

```
LINE# LOC   CODE        LINE

04441  FC07  85 9B              STA PRTY
044    FC09  4C BC FE    WRT3   JMP PREND         ;RESTORE REGS AND RTI EXIT
044    FC0C                    ;
04444  FC0C  46 BD        WRT2   LSR OCHAR         ;MOVE TO NEXT BIT
04445  FC0E  C6 A3              DEC PCNTR         ;DEC COUNTER FOR # OF BITS
04446  FC10  A5 A3              LDA PCNTR         ;CHECK FOR 8 BITS SENT...
04447  FC12  F0 3A              BEQ WRT4          ;...IF YES MOVE IN PARITY
04448  FC14  10 F3              BPL WRT3          ;...ELSE SEND REST
04449  FC16                    ;
04450  FC16  20 97 FB    WRTS   JSR NEWCH         ;CLEAN UP COUNTERS
04451  FC19  58                 CLI               ;ALLOW FOR INTERRUPTS TO NEST
04452  FC1A  A5 A5              LDA CNTDN         ;ARE WE WRITING HEADER COUNTERS?...
04453  FC1C  F0 12              BEQ WRT6          ;...NO
04454  FC1E                    ; WRITE HEADER COUNTERS (9876543210 TO HELP WITH READ)
04455  FC1E  A2 00              LDX #0            ;CLEAR BCC
04456  FC20  86 D7              STX DATA
04457  FC22  C6 A5       WRTS1  DEC CNTDN
04458  FC24  A6 BE              LDX FSBLK         ;CHECK FOR FIRST BLOCK HEADER
04459  FC26  E0 02              CPX #2
04460  FC28  D0 02              BNE WRT61         ;...NO
044    FC2A  09 80              ORA #$80          ;...YES MARK FIRST BLOCK HEADER
044    FC2C  85 BD       WRT61  STA OCHAR         ;WRITE CHARACTERS IN HEADER
04463  FC2E  D0 D9              BNE WRT3
04464  FC30                    ;
04465  FC30  20 D1 FC    WRT6   JSR CMPSTE        ;COMPARE START:END
04466  FC33  90 0A              BCC WRT7          ;NOT DONE
04467  FC35  D0 91              BNE WRTL3         ;GO MARK END
04468  FC37  E6 AD              INC SAH
04469  FC39  A5 D7              LDA DATA          ;WRITE OUT BCC
04470  FC3B  85 BD              STA OCHAR
04471  FC3D  B0 CA              BCS WRT3          ;JMP
04472  FC3F                    ;
04473  FC3F  A0 00       WRT7   LDY #0            ;GET NEXT CHARACTER
04474  FC41  B1 AC              LDA (SAL)Y
04475  FC43  85 BD              STA OCHAR         ;STORE IN OUTPUT CHARACTER
04476  FC45  45 D7              EOR DATA          ;UPDATE BCC
04477  FC47  85 D7              STA DATA
04478  FC49  20 DB FC           JSR INCSAL        ;INCREMENT FETCH ADDRESS
04479  FC4C  D0 BB              BNE WRT3          ;BRANCH ALWAYS
044    FC4E                    ;
0448   FC4E  A5 9B       WRT4   LDA PRTY          ;MOVE PARITY INTO OCHAR...
04482  FC50  49 01              EOR #1
04483  FC52  85 BD              STA OCHAR         ;...TO BE WRITTEN AS NEXT BIT
```

```
04484  FC54  4C BC FE     WRTBK   JMP PREND        ;RESTORE REGS AND RTI EXIT
04485  FC57                ;
04486  FC57  C6 BE        WRNC    DEC FSBLK        ;CHECK FOR END
04487  FC59  D0 03                 BNE WREND        ;...BLOCK ONLY
04488  FC5B  20 CA FC              JSR TNOF         ;...WRITE, SO TURN OFF MOTOR
044    FC5E  A9 50        WREND   LDA #80          ;PUT 80 CASSETTE SYNCS AT END
0449   FC60  85 A7                 STA SHCNL
04491  FC62  A2 08                 LDX #8
04492  FC64  78                   SEI
04493  FC65  20 BD FC              JSR BSIV         ;SET VECTOR TO WRITE ZEROS
04494  FC68  D0 EA                 BNE WRTBK        ;JMP
04495  FC6A                ;
04496  FC6A  A9 78        WRTZ    LDA #120         ;WRITE LEADING ZEROS FOR SYNC
04497  FC6C  20 AF FB              JSR WRT1
04498  FC6F  D0 E3                 BNE WRTBK
04499  FC71  C6 A7                 DEC SHCNL        ;CHECK IF DONE WITH LOW SYNC...
04500  FC73  D0 DF                 BNE WRTBK        ;...NO
04501  FC75  20 97 FB              JSR NEWCH        ;...YES CLEAR UP COUNTERS
```

TAPE WRITE.....PAGE 0104

```
LINE# LOC   CODE        LINE

04502  FC78  C6 AB                 DEC SHCNH        ;CHECK IF DONE WITH SYNC...
04503  FC7A  10 D8                 BPL WRTBK        ;...NO
04504  FC7C  A2 0A                 LDX #10          ;...YES SO SET VECTOR FOR DATA
04505  FC7E  20 BD FC              JSR BSIV
04506  FC81  58                    CLI
04507  FC82  E6 AB                 INC SHCNH        ;ZERO SHCNH
04508  FC84  A5 BE                 LDA FSBLK        ;IF DONE THEN...
04509  FC86  F0 30                 BEQ STKY         ;...GOTO SYSTEM RESTORE
04510  FC88  20 8E FB              JSR RD300
04511  FC8B  A2 09                 LDX #9           ;SET UP FOR HEADER COUNT
04512  FC8D  86 A5                 STX CNTDN
04513  FC8F  86 B6                 STX PRP          ;CLEAR ENDOF BLOCK FLAG
04514  FC91  D0 83                 BNE WRTS         ;JMP
04515  FC93                ;
045.   FC93  08            TNIF    PHP              ;CLEAN UP INTERRUPTS AND RESTORE PI
0451   FC94  78                    SEI
04518  FC95  AD 11 D0              LDA VICREG+17    ;UNLOCK VIC
04519  FC98  09 10                 ORA #$10         ;ENABLE DISPLAY
04520  FC9A  8D 11 D0              STA VICREG+17
04521  FC9D  20 CA FC              JSR TNOF         ;TURN OFF MOTOR
04522  FCA0  A9 7F                 LDA #$7F         ;CLEAR INTERRUPTS
04523  FCA2  8D 0D DC              STA D1ICR
04524  FCA5  20 DD FD              JSR IOKEYS       ;RESTORE KEYBOARD IRQ FROM TIMMER1
04525  FCA8  AD A0 02              LDA IRQTMP+1     ;RESTORE KEYBOARD INTERRUPT VECTOR
04526  FCAB  F0 09                 BEQ TNIQ         ;NO IRQ (IRQ VECTOR CANNOT BE Z-PAG
04527  FCAD  8D 15 03              STA CINV+1
04528  FCB0  AD 9F 02              LDA IRQTMP
04529  FCB3  8D 14 03              STA CINV
04530  FCB6  28            TNIQ    PLP
04531  FCB7  60                    RTS
04532  FCB8                ;
04533  FCB8  20 93 FC      STKY    JSR TNIF         ;GO RESTORE SYSTEM INTERRUPTS
04534  FCBB  F0 97                 BEQ WRTBK        ;CAME FOR CASSETTE IRQ SO RTI
045.   FCBD                ;
0453   FCBD                ; BSIV - SUBROUTINE TO CHANGE IRQ VECTORS
04537  FCBD                ;  ENTRYS - .X = 8 WRITE ZEROS TO TAPE
04538  FCBD                ;            .X = 10 WRITE DATA TO TAPE
```

```
04539  FCBD                ;            .X = 12 RESTORE TO KEYSCAN
04540  FCBD                ;            .X = 14 READ DATA FROM TAPE
04541  FCBD                ;
04542  FCBD  BD 93 FD      BSIV   LDA BSIT-8,X     ;MOVE IRQ VECTORS, TABLE TO INDIREC
04543  FCC0  8D 14 03             STA CINV
04545  FCC3  BD 94 FD             LDA BSIT+1-8,X
04546  FCC6  8D 15 03             STA CINV+1
04546  FCC9  60                   RTS
04547  FCCA                ;
04548  FCCA  A5 01         TNOF   LDA R6510        ;TURN OFF CASSETTE MOTOR
04549  FCCC  09 20                ORA #$20         ;
04550  FCCE  85 01                STA R6510
04551  FCD0  60                   RTS



04553  FCD1                ;COMPARE START AND END LOAD/SAVE
04554  FCD1                ;ADDRESSES.  SUBROUTINE CALLED BY
04555  FCD1                ;TAPE READ, SAVE, TAPE WRITE
04556  FCD1                ;
04557  FCD1  38            CMPSTE SEC
04558  FCD2  A5 AC                LDA SAL
04559  FCD4  E5 AE                SBC EAL
04560  FCD6  A5 AD                LDA SAH
```

TAPE WRITE.....PAGE 0105

```
LINE# LOC   CODE        LINE

04561  FCD8  E5 AF                SBC EAH
04562  FCDA  60                   RTS



04564  FCDB                ;INCREMENT ADDRESS POINTER SAL
04565  FCDB                ;
04566  FCDB  E6 AC         INCSAL INC SAL
04568  FCDD  D0 02                BNE INCR
04569  FCDF  E6 AD                INC SAH
04569  FCE1  60            INCR   RTS
04570  FCE2                       .END
04571  FCE2                       .LIB INIT
```

```
INITIALIZATION......PAGE 0106

LINE# LOC   CODE         LINE


04573  FCE2                ; START - SYSTEM RESET
04574  FCE2                ; WILL GOTO ROM AT $8000...
045    FCE2                ; IF LOCS $8004-$8008
0457   FCE2                ; = 'CBM80'
04577  FCE2                ;    ↑↑↑  > THESE HAVE MSB SET
04578  FCE2                ; KERNAL EXPECTS...
04579  FCE2                ; $8000- .WORD INITILIZE (HARD START)
04580  FCE2                ; $8002- .WORD PANIC (WARM START)
04581  FCE2                ; ... ELSE BASIC SYSTEM USED
04582  FCE2                ; ******************TESTING ONLY****************
04583  FCE2                ; USE AUTO DISK/CASSETTE LOAD WHEN DEVELOPED...
04584  FCE2                ;
04585  FCE2  A2 FF         START  LDX #$FF
04586  FCE4  78                   SEI
04587  FCE5  9A                   TXS
04588  FCE6  D8                   CLD
04589  FCE7  20 02 FD             JSR AOINT       ;TEST FOR $A0 ROM IN
04590  FCEA  D0 03                BNE START1
04591  FCEC  6C 00 80             JMP ($8000)     ; GO INIT AS $A000 ROM WANTS
04592  FCEF  8E 16 D0     START1  STX VICREG+22    ;SET UP REFRESH (.X=<5)
0459   FCF2  20 A3 FD             JSR IOINIT      ;GO INITILIZE I/O DEVICES
045    FCF5  20 50 FD             JSR RAMTAS      ;GO RAM TEST AND SET
0459   FCF8  20 15 FD             JSR RESTOR      ;GO SET UP OS VECTORS
04596  FCFB                ;
04597  FCFB  20 5B FF             JSR PCINT       ;GO INITILIZE SCREEN NEWXXX
```

```
04598  FCFE  58                 CLI             ;INTERRUPTS OKAY NOW
04599  FCFF  6C 00 A0           JMP ($A000)     ;GO TO BASIC SYSTEM



04600  FD02                    ; AOINT - TEST FOR AN $8000 ROM
04602  FD02                    ;  RETURNS Z - $8000 IN
04603  FD02                    ;
04604  FD02  A2 05             AOINT  LDX #TBLAOE-TBLAOR ;CHECK FOR $8000
04605  FD04  BD 0F FD          AOIN1  LDA TBLAOR-1,X
04606  FD07  DD 03 80                 CMP $8004-1,X
04607  FD0A  D0 03                    BNE AOIN2
04608  FD0C  CA                       DEX
04609  FD0D  D0 F5                    BNE AOIN1
04610  FD0F  60                AOIN2  RTS
04611  FD10                    ;
04612  FD10  C3                TBLAOR .BYT $C3,$C2,$CD,'80' ;..CBM80..
04612  FD11  C2
04612  FD12  CD
04612  FD13  38 30
04613  FD15                    TBLAOE



04615  FD15                    ; RESTOR - SET KERNAL INDIRECTS AND VECTORS (SYSTEM)
04616  FD15                    ;
04617  FD15  A2 30             RESTOR LDX #<VECTSS
04618  FD17  A0 FD                    LDY #>VECTSS
04619  FD19  18                       CLC
04620  FD1A                    ;
04621  FD1A                    ; VECTOR - SET KERNAL INDIRECT AND VECTORS (USER)
04622  FD1A                    ;
04623  FD1A  86 C3             VECTOR STX TMP2
04624  FD1C  84 C4                    STY TMP2+1



INITIALIZATION......PAGE 0107

LINE  LOC   CODE         LINE


04625  FD1E  A0 1F                    LDY #VECTSE-VECTSS-1
04626  FD20  B9 14 03          MOVOS1 LDA CINV,Y       ;GET FROM STORAGE
04627  FD23  B0 02                    BCS MOVOS2      ;C...WANT STORAGE TO USER
04628  FD25  B1 C3                    LDA (TMP2)Y     ;...WANT USER TO STORAGE
04629  FD27  91 C3             MOVOS2 STA (TMP2)Y      ;PUT IN USER
04630  FD29  99 14 03                 STA CINV,Y      ;PUT IN STORAGE
04631  FD2C  88                       DEY
04632  FD2D  10 F1                    BPL MOVOS1
04633  FD2F  60                       RTS
04634  FD30                    ;
04635  FD30  31 EA             VECTSS .WOR KEY,TIMB,NNMI
04635  FD32  66 FE
04635  FD34  47 FE
04636  FD36  4A F3                    .WOR NOPEN,NCLOSE,NCHKIN
04636  FD38  91 F2
04636  FD3A  0E F2
04636  FD3C  50 F2                    .WOR NCKOUT,NCLRCH,NBASIN
04637  FD3E  33 F3
04637  FD40  57 F1
```

```
04638  FD42  CA F1              .WOR NBSOUT,NSTOP,NGETIN
04638  FD44  ED F6
04638  FD46  3E F1
04639  FD48  2F F3              .WOR NCLALL,TIMB ;GOTO BREAK ON A USRCMD JMP
04639  FD4A  66 FE
046    FD4C  A5 F4              .WOR NLOAD,NSAVE
0464   FD4E  ED F5
04641  FD50              VECTSE
```

INITILIZE CODE.....PAGE 0108

```
LINE# LOC   CODE         LINE


04643  FD50               ; RAMTAS - MEMORY SIZE CHECK AND SET
04644  FD50               ;
04645  FD50  A9 00        RAMTAS LDA #0           ;ZERO LOW MEMORY
04646  FD52  A8                  TAY             ;START AT 0002
04647  FD53  99 02 00     RAMTZ0 STA $0002,Y      ;ZERO PAGE
04648  FD56  99 00 02             STA $0200,Y     ;USER BUFFERS AND VARS
04649  FD59  99 00 03             STA $0300,Y     ;SYSTEM SPACE AND USER SPACE
04650  FD5C  C8                   INY
0465   FD5D  D0 F4                BNE RAMTZ0
046    FD5F               ;
0465   FD5F               ;ALLOCATE TAPE BUFFERS
04654  FD5F               ;
04655  FD5F  A2 3C                LDX #<TBUFFR
```

```
04656  FD61  A0 03              LDY #>TBUFFR
04657  FD63  86 B2              STX TAPE1
04658  FD65  84 B3              STY TAPE1+1
04659  FD67                    ;
04660  FD67                    ; SET TOP OF MEMORY
046    FD67                    ;
0466   FD67                    RAMTBT
04663  FD67  A8                 TAY                ;MOVE $00 TO .Y
04664  FD68  A9 03              LDA #3             ;SET HIGH INITAL INDEX
04665  FD6A  85 C2              STA TMPO+1
04666  FD6C                    ;
04667  FD6C  E6 C2             RAMTZ1 INC TMPO+1    ;MOVE INDEX THRU MEMORY
04668  FD6E  B1 C1             RAMTZ2 LDA (TMPO)Y   ;GET PRESENT DATA
04669  FD70  AA                 TAX                ;SAVE IN .X
04670  FD71  A9 55              LDA #$55           ;DO A $55,$AA TEST
04671  FD73  91 C1              STA (TMPO)Y
04672  FD75  D1 C1              CMP (TMPO)Y
04673  FD77  D0 0F              BNE SIZE
04674  FD79  2A                 ROL A
04675  FD7A  91 C1              STA (TMPO)Y
04676  FD7C  D1 C1              CMP (TMPO)Y
04677  FD7E  D0 08              BNE SIZE
04678  FD80  8A                 TXA                ;RESTORE OLD DATA
04679  FD81  91 C1              STA (TMPO)Y
046    FD83  C8                 INY
0468   FD84  D0 E8              BNE RAMTZ2
04682  FD86  F0 E4              BEQ RAMTZ1
04683  FD88                    ;
04684  FD88  98                SIZE   TYA           ;SET TOP OF MEMORY
04685  FD89  AA                 TAX
04686  FD8A  A4 C2              LDY TMPO+1
04687  FD8C  18                 CLC
04688  FD8D  20 2D FE           JSR SETTOP
04689  FD90  A9 08              LDA #$08           ;SET BOTTOM OF MEMORY
04690  FD92  8D 82 02           STA MEMSTR+1       ;ALWAYS AT $0800
04691  FD95  A9 04              LDA #$04           ;SCREEN ALWAYS AT $400
04692  FD97  8D 88 02           STA HIBASE         ;SET BASE OF SCREEN
04693  FD9A  60                 RTS



04695  FD9B  6A FC             BSIT   .WOR WRTZ,WRTN,KEY,READ ;TABLE OF INDIRECTS FOR CAS
04695  FD9D  CD FB
046.   FD9F  31 EA
0469   FDA1  2C F9
```

INITILIZE CODE.....PAGE 0109

```
LINE# LOC   CODE        LINE


04697  FDA3                    ; IOINIT - INITILIZE IO DEVICES
04698  FDA3                    ;
04699  FDA3  A9 7F             IOINIT LDA #$7F       ;KILL INTERRUPTS
047    FDA5  8D 0D DC           STA D1ICR
0470   FDA8  8D 0D DD           STA D2ICR
04702  FDAB  8D 00 DC           STA D1PRA          ;TURN ON STOP KEY
04703  FDAE  A9 08              LDA #%00001000     ;SHUT OFF TIMERS
```

```
04704  FDB0  8D 0E DC          STA D1CRA
04705  FDB3  8D 0E DD          STA D2CRA
04706  FDB6  8D 0F DC          STA D1CRB
04707  FDB9  8D 0F DD          STA D2CRB
04708  FDBC                ; CONFIGURE PORTS
047    FDBC  A2 00              LDX #$00        ;SET UP KEYBOARD INPUTS
0471   FDBE  8E 03 DC          STX D1DDRB      ;KEYBOARD INPUTS
04711  FDC1  8E 03 DD          STX D2DDRB      ;USER PORT (NO RS-232)
04712  FDC4  8E 18 D4          STX SIDREG+24   ;TURN OFF SID
04713  FDC7  CA                DEX
04714  FDC8  8E 02 DC          STX D1DDRA      ;KEYBOARD OUTPUTS
04715  FDCB  A9 07              LDA #%00000111  ;SET SERIAL/VA14/15 (CLKHI)
04716  FDCD  8D 00 DD          STA D2PRA
04717  FDD0  A9 3F              LDA #%00111111 ;SET SERIAL IN/OUT, VA14/15OUT
04718  FDD2  8D 02 DD          STA D2DDRA
04719  FDD5                                    ;
04720  FDD5                                    ; SET UP THE 6510 LINES
04721  FDD5                                    ;
04722  FDD5  A9 E7              LDA #%11100111 ;MOTOR ON, HIRAM LOWRAM CHAREN HIGH
04723  FDD7  85 01              STA R6510
04724  FDD9  A9 2F              LDA #%00101111 ;MTR OUT,SW IN,WR OUT,CONTROL OUT
04725  FDDB  85 00              STA D6510
04726  FDDD                ;
04727  FDDD                ;JSR CLKHI ;CLKHI TO RELEASE SERIAL DEVICES  ↑
047    FDDD                ;
0473   FDDD  AD A6 02      IOKEYS LDA PALNTS       ;PAL OR NTSC
04730  FDE0  F0 0A              BEQ IO010       ;NTSC
04731  FDE2  A9 25              LDA #<SIXTYP
04732  FDE4  8D 04 DC          STA D1T1L
04733  FDE7  A9 40              LDA #>SIXTYP
04734  FDE9  4C F3 FD           JMP IO020
04735  FDEC  A9 95         IO010  LDA #<SIXTY      ;KEYBOARD SCAN IRQ'S
04736  FDEE  8D 04 DC          STA D1T1L
04737  FDF1  A9 42              LDA #>SIXTY
04738  FDF3  8D 05 DC      IO020  STA D1T1H
04739  FDF6  4C 6E FF           JMP PIOKEY      ;PATCH IOKEYS
04740  FDF9                ; LDA #$81 ;ENABLE T1 IRQ'S
04741  FDF9                ; STA D1ICR
04742  FDF9                ; LDA D1CRA
04743  FDF9                ; AND #$80 ;SAVE ONLY TOD BIT
04744  FDF9                ; ORA #%00010001 ;ENABLE TIMER1
04745  FDF9                ; STA D1CRA
04746  FDF9                ; JMP CLKLO ;RELEASE THE CLOCK LINE
047    FDF9                ;
0474   FDF9                ; SIXTY HERTZ VALUES
04749  FDF9                ;
04750  FDF9                SIXTY  = 17045          ;NTSC
04751  FDF9                SIXTYP = 16421          ;PAL
```

```
INIT - SYS SUBS......PAGE 0110

LINE  LOC   CODE        LINE

04753  FDF9  85 B7        SETNAM STA FNLEN
```

```
04754  FDFB  86 BB           STX FNADR
04755  FDFD  84 BC           STY FNADR+1
04756  FDFF  60              RTS


04758  FE00  85 B8     SETLFS STA LA
04759  FE02  86 BA            STX FA
04760  FE04  84 B9            STY SA
04761  FE06  60               RTS


04763  FE07  A5 BA     READSS LDA FA           ;SEE WHICH DEVICES' TO READ
04764  FE09  C9 02            CMP #2          ;IS IT RS-232?
04765  FE0B  D0 0D            BNE READST      ;NO...READ SERIAL/CASS
04766  FE0D  AD 97 02         LDA RSSTAT      ;YES...GET RS-232 UP
04767  FE10  48               PHA
04768  FE11  A9 00            LDA #00         ;CLEAR RS232 STATUS WHEN READ
04769  FE13  8D 97 02         STA RSSTAT
047    FE16  68               PLA
047    FE17  60               RTS
04772  FE18  85 90     SETMSG STA MSGFLG
04773  FE1A  A5 90     READST LDA STATUS
04774  FE1C  05 90     UDST   ORA STATUS
04775  FE1E  85 90            STA STATUS
04776  FE20  60               RTS


04778  FE21  8D 85 02  SETTMO STA TIMOUT
04779  FE24  60               RTS


047    FE25  90 06     MEMTOP BCC SETTOP
047    FE27           ;
04783  FE27           ;CARRY SET--READ TOP OF MEMORY
04784  FE27           ;
04785  FE27  AE 83 02  GETTOP LDX MEMSIZ
04786  FE2A  AC 84 02         LDY MEMSIZ+1
04787  FE2D           ;
04788  FE2D           ;CARRY CLEAR--SET TOP OF MEMORY
04789  FE2D           ;
04790  FE2D  8E 83 02  SETTOP STX MEMSIZ
04791  FE30  8C 84 02         STY MEMSIZ+1
04792  FE33  60               RTS
```

```
LINE# LOC   CODE        LINE


04795  FE34             ;MANAGE BOTTOM OF MEMORY
04795  FE34             ;
04796  FE34  90 06      MEMBOT BCC SETBOT
04797  FE36             ;
04798  FE36             ;CARRY SET--READ BOTTOM OF MEMORY
04799  FE36             ;
04800  FE36  AE 81 02          LDX MEMSTR
04801  FE39  AC 82 02          LDY MEMSTR+1
04802  FE3C             ;
04803  FE3C             ;CARRY CLEAR--SET BOTTOM OF MEMORY
04804  FE3C             ;
04805  FE3C  8E 81 02   SETBOT STX MEMSTR
04806  FE3F  8C 82 02          STY MEMSTR+1
04807  FE42  60                RTS
04808  FE43                    .END
04809  FE43                    .LIB RS232NMI
```

```
NMI HANDLER.....PAGE 0112

LINE# LOC   CODE        LINE

04811  FE43  78           NMI     SEI              ;NO IRQ'S ALLOWED...
04812  FE44  6C 18 03              JMP (NMINV)     ;...COULD MESS UP CASSETTES
04813  FE47  48           NNMI    PHA
04814  FE48  8A                    TXA
04815  FE49  48                    PHA
04816  FE4A  98                    TYA
04817  FE4B  48                    PHA
04818  FE4C  A9 7F        NNMI10  LDA #$7F         ;DISABLE ALL NMI'S
04819  FE4E  8D 0D DD               STA D2ICR
04820  FE51  AC 0D DD               LDY D2ICR       ;CHECK IF REAL NMI...
04821  FE54  30 1C                 BMI NNMI20      ;NO...RS232/OTHER
04822  FE56                 ;
04823  FE56  20 02 FD      NNMI18  JSR AOINT        ;CHECK IF $A0 IN...NO .Y
048    FE59  D0 03                  BNE NNMI19      ;...NO
0483   FE5B  6C 02 80               JMP ($8002)     ;...YES
04826  FE5E                 ;
04827  FE5E                 ; CHECK FOR STOP KEY DOWN
04828  FE5E                 ;
04829  FE5E                 NNMI19
04830  FE5E  20 BC F6               JSR UD60        ;NO .Y
04831  FE61  20 E1 FF               JSR STOP        ;NO .Y
04832  FE64  D0 0C                  BNE NNMI20      ;NO STOP KEY...TEST FOR RS232
04833  FE66                 ;
04834  FE66                 ; TIMB - WHERE SYSTEM GOES ON A BRK INSTRUCTION
04835  FE66                 ;
04836  FE66  20 15 FD      TIMB    JSR RESTOR       ;RESTORE SYSTEM INDIRECTS
04837  FE69  20 A3 FD               JSR IOINIT      ;RESTORE I/O FOR BASIC
04838  FE6C  20 18 E5               JSR CINT        ;RESTORE SCREEN FOR BASIC
04839  FE6F  6C 02 A0               JMP ($A002)     ;...NO, SO BASIC WARM START


04841  FE72                 ; DISABLE NMI'S UNTILL READY
048    FE72                 ;  SAVE ON STACK
0484   FE72                 ;
04844  FE72  98           NNMI20  TYA              ;.Y SAVED THROUGH RESTORE
04845  FE73  20 A1 02              AND ENABL       ;SHOW ONLY ENABLES
04846  FE76  AA                    TAX             ;SAVE IN .X FOR LATTER
04847  FE77                 ;
04848  FE77                 ; T1 NMI CHECK - TRANSMITT A BIT
04849  FE77                 ;
04850  FE77  29 01                 AND #$01        ;CHECK FOR T1
04851  FE79  F0 28                  BEQ NNMI30      ;NO...
04852  FE7B                 ;
04853  FE7B  AD 00 DD               LDA D2PRA
04854  FE7E  29 FB                  AND #$FF-$04    ;FIX FOR CURRENT I/O
04855  FE80  05 B5                  ORA NXTBIT      ;LOAD DATA AND...
04856  FE82  8D 00 DD               STA D2PRA       ;...SEND IT
04857  FE85                 ;
04858  FE85  AD A1 02               LDA ENABL       ;RESTORE NMI'S
04859  FE88  8D 0D DD               STA D2ICR       ;READY FOR NEXT...
04860  FE8B                 ;
048    FE8B                 ; BECAUSE OF 6526 ICR STRUCTURE...
0486   FE8B                 ;  HANDLE ANOTHER NMI AS A SUBROUTINE
04863  FE8B                 ;
04864  FE8B  8A                    TXA             ;TEST FOR ANOTHER NMI
```

```
04865  FE8C  29 12              AND #$12        ;TEST FOR T2 OR FLAG
04866  FE8E  F0 0D              BEQ NNMI25
04867  FE90  29 02              AND #$02        ;CHECK FOR T2
04868  FE92  F0 06              BEQ NNMI22      ;MUST BE A FLAG
04869  FE94                   ;
048    FE94  20 D6 FE           JSR T2NMI       ;HANDLE A NORMAL BIT IN...
```



```
LINE# LOC   CODE         LINE

04871  FE97  4C 9D FE           JMP NNMI25      ;...THEN CONTINUE OUTPUT
04872  FE9A                   ;
04873  FE9A  20 07 FF    NNMI22 JSR FLNMI        ;HANDLE A START BIT...
04874  FE9D                   ;
04875  FE9D  20 BB EE    NNMI25 JSR RSTRAB       ;GO CALC INFO (CODE COULD BE IN LIN
04876  FEA0  4C B6 FE           JMP NMIRTI
04877  FEA3                   ;

04879  FEA3                   ; T2 NMI CHECK - RECIEVE A BIT
04880  FEA3                   ;
04881  FEA3  8A          NNMI30 TXA
04882  FEA4  29 02              AND #$02        ;MASK TO T2
04883  FEA6  F0 06              BEQ NNMI40      ;NO...
04884  FEA8                   ;
04885  FEA8  20 D6 FE           JSR T2NMI       ;HANDLE INTERRUPT
04886  FEAB  4C B6 FE           JMP NMIRTI

04888  FEAE                   ; FLAG NMI HANDLER - RECIEVE A START BIT
04889  FEAE                   ;
04890  FEAE  8A          NNMI40 TXA              ;CHECK FOR EDGE
04891  FEAF  29 10              AND #$10        ;ON FLAG...
04892  FEB1  F0 03              BEQ NMIRTI      ;NO...
04893  FEB3                   ;
04894  FEB3  20 07 FF           JSR FLNMI       ;START BIT ROUTINE

04896  FEB6  AD A1 02    NMIRTI LDA ENABL       ;RESTORE NMI'S
04897  FEB9  8D 0D DD           STA D2ICR
04898  FEBC  68          PREND  PLA              ;BECAUSE OF MISSING SCREEN EDITOR
04899  FEBD  A8                 TAY
04900  FEBE  68                 PLA
04901  FEBF  AA                 TAX
04902  FEC0  68                 PLA
04903  FEC1  40                 RTI



04905  FEC2                   ; BAUDO TABLE CONTAINS VALUES
04906  FEC2                   ;  FOR 14.31818E6/14/BAUD RATE/2 (NTSC)
04907  FEC2                   ;
04908  FEC2  C1 27       BAUDO  .WOR 10277-CBIT ; 50 BAUD
04909  FEC4  3E 1A              .WOR 6818-CBIT ;   75   BAUD
049    FEC6  C5 11              .WOR 4649-CBIT ;  110   BAUD
0491   FEC8  74 0E              .WOR 3800-CBIT ;  134.6 BAUD
04912  FECA  ED 0C              .WOR 3409-CBIT ;  150   BAUD
04913  FECC  45 06              .WOR 1705-CBIT ;  300   BAUD
```

```
04914  FECE  F0 02              .WOR 852-CBIT   ;  600   BAUD
04915  FED0  46 01              .WOR 426-CBIT   ; 1200   BAUD
04916  FED2  B8 00              .WOR 284-CBIT   ; 1800   BAUD
04917  FED4  71 00              .WOR 213-CBIT   ; 2400   BAUD
04918  FED6                   ;
04    FED6                   ; CBIT - AN ADJUSTMENT TO MAKE NEXT T2 HIT NEAR CENTER
0492  FED6                   ;   OF THE NEXT BIT.
04921  FED6                   ;   APROX THE TIME TO SERVICE A CB1 NMI
04922  FED6                  CBIT   =100              ;CYCLES
```

NMI - SUBROUTINES.....PAGE 0114

```
LINE# LOC   CODE         LINE

04924  FED6                   ; T2NMI - SUBROUTINE TO HANDLE AN RS232
049    FED6                   ;  BIT INPUT.
0492   FED6                   ;
04927  FED6  AD 01 DD     T2NMI  LDA D2PRB        ;GET DATA IN
04928  FED9  29 01              AND #01          ;MASK OFF...
04929  FEDB  85 A7              STA INBIT        ;...SAVE FOR LATTER
04930  FEDD                   ;
04931  FEDD                   ; UPDATE T2 FOR MID BIT CHECK
04932  FEDD                   ;   (WORST CASE <213 CYCLES TO HERE)
04933  FEDD                   ;   (CALC 125 CYCLES+43-66 DEAD)
04934  FEDD                   ;
04935  FEDD  AD 06 DD              LDA D2T2L        ;CALC NEW TIME & CLR NMI
04936  FEE0  E9 1C                 SBC #22+6
04937  FEE2  6D 99 02              ADC BAUDOF
04938  FEE5  8D 06 DD              STA D2T2L
04939  FEE8  AD 07 DD              LDA D2T2H
04940  FEEB  6D 9A 02              ADC BAUDOF+1
04941  FEEE  8D 07 DD              STA D2T2H
04942  FEF1                   ;
04943  FEF1  A9 11                 LDA #$11         ;ENABLE TIMER
049    FEF3  8D 0F DD              STA D2CRB
0494   FEF6                   ;
04946  FEF6  AD A1 02              LDA ENABL        ;RESTORE NMI'S EARLY...
04947  FEF9  8D 0D DD              STA D2ICR
04948  FEFC                   ;
04949  FEFC  A9 FF                 LDA #$FF         ;ENABLE COUNT FROM $FFFF
04950  FEFE  8D 06 DD              STA D2T2L
04951  FF01  8D 07 DD              STA D2T2H
04952  FF04                   ;
04953  FF04  4C 59 EF              JMP RSRCVR       ;GO SHIFT IN...


04955  FF07                   ; FLNMI - SUBROUTINE TO HANDLE THE
04956  FF07                   ;  START BIT TIMING..
04957  FF07                   ;
04958  FF07                   ; CHECK FOR NOISE ?
04959  FF07                   ;
04960  FF07                  FLNMI
049    FF07                   ;
0496   FF07                   ; GET HALF BIT RATE VALUE
04963  FF07                   ;
04964  FF07  AD 95 02              LDA M51AJB
```

```
04965  FF0A  8D 06 DD          STA D2T2L
04966  FF0D  AD 96 02          LDA M51AJB+1
04967  FF10  8D 07 DD          STA D2T2H
04968  FF13                ;
04969  FF13  A9 11             LDA #$11        ;ENABLE TIMER
04970  FF15  8D 0F DD          STA D2CRB
04971  FF18                ;
04972  FF18  A9 12             LDA #$12        ;DISABLE FLAG, ENABLE T2
04973  FF1A  4D A1 02          EOR ENABL
04974  FF1D  8D A1 02          STA ENABL
04975  FF20                ;ORA #$82
04976  FF20                ;STA D2ICR
04977  FF20                ;
04978  FF20  A9 FF             LDA #$FF        ;PRESET FOR COUNT DOWN
04979  FF22  8D 06 DD          STA D2T2L
04980  FF25  8D 07 DD          STA D2T2H
04981  FF28                ;
04982  FF28  AE 98 02          LDX BITNUM      ;GET #OF BITS IN
```

NMI SUBROUTINES.....PAGE 0115

```
LINE# LOC   CODE        LINE

04983  FF2B  86 A8             STX BITCI       ;PUT IN RCVRCNT
04984  FF2D  60                RTS
04985  FF2E                ;
04986  FF2E                ; POPEN - PATCHES OPEN RS232 FOR UNIVERSAL KERNAL
04987  FF2E                ;
04988  FF2E  AA            POPEN  TAX              ;WE'RE CALCULATING BAUD RATE
04989  FF2F  AD 96 02          LDA M51AJB+1    ; M51AJB=FREQ/BAUD/2-100
04990  FF32  2A                ROL A
04991  FF33  A8                TAY
04992  FF34  8A                TXA
04993  FF35  69 C8             ADC #CBIT+CBIT
04994  FF37  8D 99 02          STA BAUDOF
04995  FF3A  98                TYA
04996  FF3B  69 00             ADC #0
04997  FF3D  8D 9A 02          STA BAUDOF+1
04998  FF40  60                RTS
04999  FF41  EA                NOP
05000  FF42  EA                NOP
05001  FF43                    .END
05002  FF43                    .LIB IR0FILE
```

```
IRQFILE - DISPATCHER......PAGE 0116

LINE# LOC   CODE        LINE

05004  FF43             ; SIMIRQ - SIMULATE AN IRQ (FOR CASSETTE READ)
05005  FF43             ;  ENTER BY A JSR SIMIRQ
05006  FF43             ;
05007  FF43  08         SIMIRQ PHP
05008  FF44  68                PLA             ;FIX THE BREAK FLAG
05009  FF45  29 EF              AND #$EF
05010  FF47  48                 PHA
05011  FF48             ; PULS - CHECKS FOR REAL IRQ'S OR BREAKS
050    FF48             ;
0501   FF48  48         PULS    PHA
05014  FF49  8A                 TXA
05015  FF4A  48                 PHA
05016  FF4B  98                 TYA
05017  FF4C  48                 PHA
05018  FF4D  BA                 TSX
05019  FF4E  BD 04 01           LDA $104,X      ;GET OLD P STATUS
05020  FF51  29 10              AND #$10        ;BREAK FLAG?
05021  FF53  F0 03              BEQ PULS1       ;...NO
05022  FF55  6C 16 03           JMP (CBINV)     ;...YES...BREAK INSTR
05023  FF58  6C 14 03    PULS1  JMP (CINV)       ;...IRQ
```

```
LINE# LOC   CODE         LINE

05025  FF5B               ; PCINT - ADD UNIVERSAL TO CINIT
05026  FF5B               ;
05027  FF5B  20 18 E5     PCINT  JSR CINT
05028  FF5E  AD 12 D0     P0010  LDA VICREG+18   ;CHECK RASTER COMPARE FOR ZERO
05029  FF61  D0 FB               BNE P0010      ;IF IT'S ZERO THEN CHECK VALUE...
05030  FF63  AD 19 D0            LDA VICREG+25  ;GET RASTER IRQ VALUE
05031  FF66  29 01               AND #$01
05032  FF68  8D A6 02            STA PALNTS     ;PLACE IN PAL/NTSC INDICATOR
05033  FF6B  4C DD FD            JMP IOKEYS
05034  FF6E               ;
05035  FF6E               ; PIOKEY - ADD UNIVERSAL TO IOKEYS
05036  FF6E               ;
05037  FF6E  A9 81        PIOKEY LDA #$81         ;ENABLE T1 IRQ'S
05038  FF70  8D 0D DC            STA D1ICR
05039  FF73  AD 0E DC            LDA D1CRA
05040  FF76  29 80               AND #$80        ;SAVE ONLY TOD BIT
05041  FF78  09 11               ORA #%00010001  ;ENABLE TIMER1
05042  FF7A  8D 0E DC            STA D1CRA
05043  FF7D  4C 85 EE            JMP CLKHI       ;RELEASE THE CLOCK LINE***901227-03*
05044  FF80                      *=$E500-20
05045  E4EC               ;
05046  E4EC               ; BAUDOP - BAUD RATE TABLE FOR PAL
05047  E4EC               ;   .985248E6/BAUD-RATE/2-100
05048  E4EC               ;
05049  E4EC  19 26        BAUDOP .WOR 9853-CBIT  ;50 BAUD
```

```
05050  E4EE  44 19              .WOR 6568-CBIT   ;75 BAUD
05051  E4F0  1A 11              .WOR 4478-CBIT   ;110 BAUD
05052  E4F2  E8 00              .WOR 3660-CBIT   ;134.6 BAUD
05053  E4F4  70 0C              .WOR 3284-CBIT   ;150 BAUD
05054  E4F6  06 06              .WOR 1642-CBIT   ;300 BAUD
05055  E4F8  01 02              .WOR 821-CBIT    ;600 BAUD
05056  E4FA  37 01              .WOR 411-CBIT    ;1200 BAUD
05057  E4FC  AE 00              .WOR 274-CBIT    ;1800 BAUD
05058  E4FE  69 00              .WOR 205-CBIT    ;2400 BAUD
```

IRQFILE - PATCHES.....PAGE 0118

```
LINE  LOC   CODE        LINE

05060  E500                     *=$E500-32       ;(20-12)
05061  E4E0               ; FPATCH - TAPE FILENAME TIMEOUT
05062  E4E0               ;
05063  E4E0  69 02        FPATCH ADC #2           ;TIME IS (8 TO 13 SEC OF DISPLAY)
05064  E4E2  A4 91        FPAT00 LDY STKEY        ;CHECK FOR KEY DOWN ON LAST ROW...
05065  E4E4  C8                  INY
05066  E4E5  D0 04               BNE FPAT01      ;KEY...EXIT LOOP
05067  E4E7  C5 A1               CMP TIME+1      ;WATCH TIMER
05068  E4E9  D0 F7               BNE FPAT00
05069  E4EB  60           FPAT01 RTS


05071  E4EC                     *=$E500-38       ;(32-6)
05072  E4DA               ; CPATCH - FIX TO CLEAR LINE...MODIFIED 901227-03
05073  E4DA               ;  PREVENTS WHITE CHARACTER FLASH...
05074  E4DA               ;
05075  E4DA               CPATCH                  ;ALWAYS CLEAR TO CURRENT FOREGND CO
05076  E4DA  AD 86 02             LDA COLOR
05077  E4DD  91 F3               STA (USER)Y
```

```
05078  E4DF  60                  RTS


05080  E4E0                     *=$E500-45      ;(38-7)
05081  E4D3                  ; PRTYP - RS232 PARITY PATCH...ADDED 901227-03
05(  )  E4D3                  ;
0508   E4D3  85 A9            PRTYP  STA RINONE       ;GOOD RECEIVER START...DISABLE FLAG
05084  E4D5  A9 01                   LDA #1          ;SET PARITY TO 1 ALWAYS
05085  E4D7  85 AB                   STA RIPRTY
05086  E4D9  60                      RTS
05087  E4DA                          .END
05088  E4DA                          .LIB VECTORS
```

JUMP TABLE/VECTORS.....PAGE 0119

```
LINE# LOC   CODE        LINE


05090  E4DA                     *=$FF80
05091  FF80  00                 .BYT 0          ;RELEASE NUMBER OF C64 KERNAL
05092  FF81  4C 5B FF           JMP PCINT
05093  FF84  4C A3 FD           JMP IOINIT
05094  FF87  4C 50 FD           JMP RAMTAS
05095  FF8A                     *=$FF8A         ;NEW VECTORS FOR BASIC
05096  FF8A  4C 15 FD           JMP RESTOR      ;RESTORE VECTORS TO INITIAL SYSTEM
05097  FF8D  4C 1A FD           JMP VECTOR      ;CHANGE VECTORS FOR USER
05098  FF90                     * =$FF90
050    FF90  4C 18 FE           JMP SETMSG      ;CONTROL O.S. MESSAGES
0510   FF93  4C B9 ED           JMP SECND       ;SEND SA AFTER LISTEN
05101  FF96  4C C7 ED           JMP TKSA        ;SEND SA AFTER TALK
05102  FF99  4C 25 FE           JMP MEMTOP      ;SET/READ TOP OF MEMORY
```

```
05103  FF9C  4C 34 FE            JMP MEMBOT       ;SET/READ BOTTOM OF MEMORY
05104  FF9F  4C 87 EA            JMP SCNKEY       ;SCAN KEYBOARD
05105  FFA2  4C 21 FE            JMP SETTMO       ;SET TIMEOUT IN IEEE
05106  FFA5  4C 13 EE            JMP ACPTR        ;HANDSHAKE IEEE BYTE IN
05107  FFA8  4C DD ED            JMP CIOUT        ;HANDSHAKE IEEE BYTE OUT
05108  FFAB  4C EF ED            JMP UNTLK        ;SEND UNTALK OUT IEEE
05109  FFAE  4C FE ED            JMP UNLSN        ;SEND UNLISTEN OUT IEEE
0510A  FFB1  4C 0C ED            JMP LISTN        ;SEND LISTEN OUT IEEE
0510B  FFB4  4C 09 ED            JMP TALK         ;SEND TALK OUT IEEE
0510C  FFB7  4C 07 FE            JMP READSS       ;RETURN I/O STATUS BYTE
0510D  FFBA  4C 00 FE            JMP SETLFS       ;SET LA, FA, SA
0510E  FFBD  4C F9 FD            JMP SETNAM       ;SET LENGTH AND FN ADR
0510F  FFC0  6C 1A 03     OPEN   JMP (IOPEN)     ;OPEN LOGICAL FILE
05110  FFC3  6C 1C 03     CLOSE  JMP (ICLOSE)    ;CLOSE LOGICAL FILE
05111  FFC6  6C 1E 03     CHKIN  JMP (ICHKIN)    ;OPEN CHANNEL IN
05112  FFC9  6C 20 03     CKOUT  JMP (ICKOUT)    ;OPEN CHANNEL OUT
05113  FFCC  6C 22 03     CLRCH  JMP (ICLRCH)    ;CLOSE I/O CHANNEL
05114  FFCF  6C 24 03     BASIN  JMP (IBASIN)    ;INPUT FROM CHANNEL
05115  FFD2  6C 26 03     BSOUT  JMP (IBSOUT)    ;OUTPUT TO CHANNEL
05116  FFD5  4C 9E F4            JMP LOADSP       ;LOAD FROM FILE
05117  FFD8  4C DD F5            JMP SAVESP       ;SAVE TO FILE
05118  FFDB  4C E4 F6            JMP SETTIM       ;SET INTERNAL CLOCK
05119  FFDE  4C DD F6            JMP RDTIM        ;READ INTERNAL CLOCK
0511A  FFE1  6C 28 03     STOP   JMP (ISTOP)     ;SCAN STOP KEY
0511B  FFE4  6C 2A 03     GETIN  JMP (IGETIN)    ;GET CHAR FROM Q
0511C  FFE7  6C 2C 03     CLALL  JMP (ICLALL)    ;CLOSE ALL FILES
0511D  FFEA  4C 9B F6            JMP UDTIM        ;INCREMENT CLOCK
0511E  FFED  4C 05 E5     JSCROG JMP SCRORG      ;SCREEN ORG
0511F  FFF0  4C 0A E5     JPLOT  JMP PLOT        ;READ/SET X,Y COORD
05120  FFF3  4C 00 E5     JIOBAS JMP IOBASE      ;RETURN I/O BASE
```

JUMP TABLE/VECTORS.....PAGE 0120

```
LINE# LOC   CODE        LINE

05122  FFF6                       *=$FFFA
05123  FFFA  43 FE                .WOR NMI         ;PROGRAM DEFINEABLE
05124  FFFC  E2 FC                .WOR START       ;INITIALIZATION CODE
05125  FFFE  48 FF                .WOR PULS        ;INTERRUPT HANDLER
05126  0000                       .END
05127  0000                       .END
```

ERRORS = 00000

SYMBOL TABLE

SYMBOL VALUE

AOIN1	FD04	AOIN2	FD0F	AOINT	FD02	ACC	0005
ACP00	EE30	ACP00A	EE1B	ACP00B	EE3E	ACP00C	EE47
ACP01	EE56	ACP03	EE5A	ACP03A	EE67	ACP04	EE80
ACPTR	EE13	AUTODN	0292	BACK	E8B0	BAD	0100
BAK1UP	E759	BAKBAK	E864	BASIN	FFCF	BASZPT	00FF
BAUD0	FEC2	BAUD0F	0299	BAUD0P	E4EC	BDF	0002
BDFH	0004	BIT010	EF54	BIT020	EF58	BITCI	00A8
BITCNT	EF4A	BITNUM	0298	BITTS	00B4	BK1	E75F
BK15	E762	BK2	E773	BKLN	E701	BKLN1	E70B
BLF	0001	BLNCT	00CD	BLNK2	F781	BLNON	00CF
BLNSW	00CC	BLUE	0006	BMT1	E967	BMT2	E96C
BN10	F166	BN20	F173	BN30	F1AD	BN31	F1B1
BN32	F1B3	BN33	F1B4	BN35	F1B5	BN50	F1B8
B010	F1D5	B020	F1DB	B050	F208	BREAK	F633
BREAKE	EFC0	BSI010	F09C	BSI232	F086	BSIT	FD9B
BSIV	FCB0	BSO100	F028	BSO110	F02E	BSO120	F04C
BSO232	F017	BSOBAD	F014	BSOUR	0095	BSOUR1	00A4
BS T	FFD2	BUF	0200	BUFPT	00A6	BUFSZ	00C0
C3P	0094	CAS1	00C0	CASOUT	F1DD	CASTON	02A2
CBINV	0316	CBIT	0064	CHK1A	E8CD	CHK1B	E8D6
CHKBAK	E8A1	CHKCOL	E8CB	CHKDWN	E8B3	CHKIN	FFC6
CHKLUP	E8A5	CI2	EDE6	CI4	EDEB	CINT	E518
CINV	0314	CIOUT	EDDD	CK10	F262	CK15	F26F
CK20	F25F	CK30	F275	CK40	F279	CK5	F258
CK50	F286	CK60	F289	CKDSRX	F00D	CKERR	0020
CKI010	F062	CKI020	F070	CKI080	F077	CKI100	F07D
CKI110	F084	CKI232	F04D	CKIT	EACC	CKIT1	EADC
CKIT2	EB26	CKIT3	EB30	CKO020	EFF2	CKO030	EFF9
CKO040	F006	CKO100	F012	CKO232	EFE1	CKOUT	FFC9
CKUT	EACB	CLALL	FFE7	CLALL2	F343	CLEAR1	E560
CLKHI	EE85	CLKLO	EE8E	CLN232	F483	CLOSE	FFC3
CLP1	E674	CLP2	E650	CLP21	E672	CLP2A	E66F
CLP5	E606	CLP6	E60F	CLP7	E682	CLR10	EA07
CLRCH	FFCC	CLRLN	E9FF	CLS010	F2BA	CLS020	F2BF
CLSEI	F642	CLSEI2	F657	CLSR	E544	CMP0	00B0
CMPSTE	FCD1	CNC3	E782	CNC3X	E74C	CNTDN	00A5
CO	DC00	COLOR	0286	COLR1	E7CE	COLTAB	E8DA
COM L	EC78	COUNT	00A5	CPATCH	E4DA	CR	000D
CRSW	00D0	CS10	F82E	CS25	F836	CS30	F81E
CS40	F821	CSBERR	EDB2	CSTE1	F817	CSTE2	F838
CTSERR	EF31	CUNLSN	F654	CURS10	E7C0	D1CRA	DC0E
D1CRB	DC0F	D1DDRA	DC02	D1DDRB	DC03	D1ICR	DC0D
D1PRA	DC00	D1PRB	DC01	D1SDR	DC0C	D1T1H	DC05
D1T1L	DC04	D1T2H	DC07	D1T2L	DC06	D1TOD1	DC08
D1TODH	DC0B	D1TODM	DC0A	D1TODS	DC09	D2CRA	DD0E
D2CRB	DD0F	D2DDRA	DD02	D2DDRB	DD03	D2ICR	DD0D

SYMBOL TABLE

SYMBOL VALUE

D2PRA	DD00	D2PRB	DD01	D2SDR	DD0C	D2T1H	DD05
D2T1L	DD04	D2T2H	DD07	D2T2L	DD06	D2TOD1	DD08

D2TODH	DD0B	D2TODM	DD0A	D2TODS	DD09	D6510	0000
DATA	0007	DATAHI	EE97	DATALO	EEA0	DEBPIA	EEA9
DELAY	028C	DFLTN	0099	DFLTO	009A	DIFF	00B5
DLABYE	EE03	DLAD00	EE09	DLADLH	EE06	DNLINE	E8C2
DPSW	009C	DSPP	EA13	DSPP2	EA1C	DSRERR	EF2E
DW[illegible]VE	E8CA	DWNCHK	E8B7	EAH	00AF	EAL	00AE
ENA[illegible]	02A1	EOIACP	EE20	EOT	0005	EREXIT	F729
ERR232	EFD2	ERROR1	F6FB	ERROR2	F6FE	ERROR3	F701
ERROR4	F704	ERROR5	F707	ERROR6	F70A	ERROR7	F70D
ERROR8	F710	ERROR9	F713	FA	00BA	FAF	F7EA
FAF20	F7F7	FAF30	F80B	FAF40	F80C	FAH	F72C
FAH40	F769	FAH45	F767	FAH50	F74B	FAH55	F757
FAH56	F761	FAT	0263	FINDST	E6ED	FINPUT	E591
FINPUX	E598	FINX	E6F4	FIRT	00A4	FLGS	0004
FLNMI	FF07	FNADR	00BB	FNDEND	E582	FNDSTR	E570
FNLEN	00B7	FPAT00	E4E2	FPAT01	E4EB	FPATCH	E4E0
FRAMEE	EFD0	FREKZP	00FB	FRMERR	ED80	FSBLK	00BE
GDBLN	00CE	GDCOL	0287	GETIN	FFE4	GETTOP	FE27
GN10	F14A	GN20	F155	GN232	F14E	GOTDWN	E7C8
HIBASE	0288	IBASIN	0324	IBSOUT	0326	ICHKIN	031E
ICKOUT	0320	ICLALL	032C	ICLOSE	031C	ICLRCH	0322
IGETIN	032A	ILOAD	0330	INBIT	00A7	INCR	FCE1
INCSAL	FCDB	INDX	00C8	INITV	E5A8	INS1	E805
INS2	E80A	INS3	E7FE	INSEXT	E826	INSRT	00D8
IN[illegible]	0009	INVL	000A	IO010	FDEC	IO020	FDF3
IOB[illegible]E	E500	IOINIT	FDA3	IOKEYS	FDDD	IOPEN	031A
IRQTMP	029F	ISAVE	0332	ISOUR	ED40	ISOURA	ED36
ISR01	ED66	ISR02	ED50	ISR03	ED55	ISR04	ED9F
ISRCLK	ED7D	ISRHI	ED7A	ISTOP	0328	JIOBAS	FFF3
JLTLK	F314	JPL2	E871	JPL3	E7CB	JPL4	E7A8
JPL5	E89E	JPLOT	FFF0	JRAD2	F988	JSCROG	FFED
JTG10	F1A9	JTG35	F180	JTG36	F193	JTG37	F196
JTGET	F199	JTP10	F1F8	JTP20	F80D	JX050	F298
JX115	F2C8	JX117	F2E0	JX120	F2EE	JX150	F2F1
JX170	F300	JX175	F30E	JX310	F216	JX315	F22A
JX320	F233	JX330	F237	JX340	F245	JX350	F248
JX600	F316	JX750	F33C	JXRMV	F2F2	JZ100	F31F
JZ101	F32E	KEEPIT	E7D4	KEY	EA31	KEY3	EA71
KEY4	EA61	KEY5	EA5C	KEYCOD	EB79	KEYD	0277
KEYLG2	EB64	KEYLOG	028F	KEYTAB	00F5	KIKA26	02A3
KL2	EA7B	KL24	EA79	KOUNT	028B	KPREND	EA7E
LA	00B8	LAT	0259	LBERR	0008	LD10	F4AF
LD100	F533	LD102	F539	LD104	F541	LD110	F5C7
LD[illegible]8	F549	LD115	F5D1	LD150	F556	LD170	F55D
LD1[illegible]	F56C	LD178	F579	LD179	F57D	LD180	F5A9
LD190	F5AE	LD20	F4B2	LD25	F4BF	LD30	F4F0
LD40	F4F3	LD410	F5DA	LD45	F501	LD50	F51C
LD60	F51E	LD64	F524	LD90	F530	LDAD1	F7D7
LDTB1	00D9	LDTB2	ECF0	LDTND	0098	LEXIT	EC72
LINTMP	02A5	LINZ0	0400	LINZ1	0428	LINZ10	0590
LINZ11	05B8	LINZ12	05E0	LINZ13	0608	LINZ14	0630
LINZ15	0658	LINZ16	0680	LINZ17	06A8	LINZ18	06D0
LINZ19	06F8	LINZ2	0450	LINZ20	0720	LINZ21	0748
LINZ22	0770	LINZ23	0798	LINZ24	07C0	LINZ3	0478
LINZ4	04A0	LINZ5	04C8	LINZ6	04F0	LINZ7	0518
LINZ8	0540	LINZ9	0568	LIST1	ED11	LIST2	ED20
LIST5	ED2E	LISTN	ED0C	LLEN	0028	LLEN2	0050
LNMX	0005	LOAD	F4A2	LOADSP	F49E	LOCK	EC5E
LODING	F5D2	LOOKUP	F30F	LOOP2	E6A8	LOOP3	E5CD

SYMBOL TABLE

SYMBOL VALUE

LOOP4	E5CA	LOOP5	E632	LOP2	E6B0	LOP5	E63A
LC 1	E640	LOP52	E650	LOP53	E654	LOP54	E64A
LOW	EC44	LP1	E5B9	LP2	E5B4	LP21	E5E7
LP22	E5FE	LP23	E5F3	LPS1	E540	LPS2	E555
LSTP	00CA	LSTSHF	028E	LSTX	00C5	LSXP	00C9
LUKING	F5AF	M51AJB	0295	M51CDR	0294	M51CTR	0293
MAXCHR	0050	MEMBOT	FE34	MEMSIZ	0283	MEMSTR	0281
MEMTCF	F47D	MEMTOP	FE25	MEMUSS	00C3	MLP4	E94D
MLP42	E956	MODE	0291	MODE1	EB81	MODE2	EBC2
MODE3	EC03	MOVOS1	FD20	MOVOS2	FD27	MS1	F0BD
MS10	F106	MS11	F10E	MS17	F120	MS18	F127
MS21	F116	MS5	F0C9	MS6	F0D4	MS7	F0D8
MS8	F0EB	MSG	F12F	MSG10	F13C	MSGFLG	009D
MYCH	00BF	NBASIN	F157	NBSOUT	F1CA	NC1	E78B
NC2	E792	NC3	E697	NC3W	E785	NCHKIN	F20E
NCKOUT	F250	NCLALL	F32F	NCLOSE	F291	NCLRCH	F333
NCTRL	EB6B	NCX2	E7AD	NCZ2	E7AA	NDX	00C6
NEWCH	FB97	NEWLIN	E965	NEWLX	E981	NGETIN	F13E
NJT1	E731	NJT8	E73D	NJT9	E73F	NLINES	0019
NLOAD	F4A5	NMI	FE43	NMINV	0318	NMIRTI	FEB6
NN	FE47	NNMI10	FE4C	NNMI18	FE56	NNMI19	FE5E
NNM 0	FE72	NNMI22	FE9A	NNMI25	FE9D	NNMI30	FEA3
NNMI40	FEAE	NODEV	EDAD	NOEOI	ED5A	NOPEN	F34A
NOTKAT	EB6B	NOTONE	E63E	NSAVE	F5ED	NSTOP	F6ED
NTCN	E745	NTCN1	E77E	NVS	E699	NVS1	E69F
NWRAP	0002	NXLN	E87C	NXLN1	E888	NXLN2	E880
NXT1	E891	NXT2	E84C	NXT3	E693	NXT33	E691
NXT6	E854	NXT61	E86A	NXTBIT	00B5	NXTD	E566
NXTX	E7D4	NXTX1	E7DC	NXTXA	E7DC	OCHAR	00BD
OENABL	EF3B	OP100	F359	OP110	F362	OP150	F384
OP152	F38B	OP155	F393	OP160	F3AC	OP170	F3AF
OP171	F3C2	OP172	F3D1	OP175	F3D3	OP180	F3D4
OP200	F3B8	OP35	F3F6	OP40	F3FC	OP45	F406
OP98	F351	OPEN	FFC0	OPENI	F305	OPN020	F40F
OPN025	F41D	OPN026	F43A	OPN027	F440	OPN028	F446
OPN030	F44D	OPN050	F45C	OPN055	F468	OPN060	F474
OPN232	F409	OUTFN	F5C1	OUTHRE	EC5B	P0010	FF5E
PALNTS	02A6	PANIC	E5A0	PCH	0002	PCINT	FF5B
PCL	0003	PCNTR	00A3	PIOKEY	FF6E	PLF	0003
PL	E50A	PLOT10	E513	PNT	0001	PNTR	00D3
POP	FF2E	PREND	FEBC	PRP	00B6	PRT	E716
PRTY	009B	PRTYP	E4D3	PTR1	009E	PTR2	009F
PULIND	E958	PULS	FF48	PULS1	FF58	PUTQUE	EB3C
PX4	E5AA	QTSW	00D4	QTSWC	E684	QTSWL	E690
R2D2	00A3	R6510	0001	RAD2	FA10	RAD2X	FA1F
RAD2Y	FA18	RAD3	F9D5	RAD4	F9F7	RAD5	F999
RADBK	F9D2	RADJ	FA60	RADK	FA53	RADKX	F9BC
RADL	F997	RADP	F9C9	RADQ2	FA44	RADX2	F993
RAMLOC	0800	RAMTAS	FD50	RAMTBT	FD67	RAMTZ0	FD53
RAMTZ1	FD6C	RAMTZ2	FD6E	RBLK	F841	RD10	FA8A
RD12	FA86	RD15	FA70	RD160	FB48	RD161	FB4A
RD167	FB5C	RD175	FB68	RD180	FB8B	RD20	FA8D
RD200	FAA9	RD22	FAA3	RD300	FB8E	RD40	FABA
RD52	FB2F	RD55	FB33	RD58	FB08	RD59	FB3A
RD60	FAC0	RD70	FACE	RD80	FAEB	RD90	FB43
RDBK	F9AC	RDBK2	FA5D	RDFLG	00AA	RDTIM	F6DD
READ	F92C	READSS	FE07	READST	FE1A	RECERR	EFCA
REKEY	EAE0	REPDO	EA3E	RER	00A8	RESTOR	FD15
RE	00A9	RIBUF	00F7	RIDATA	00AA	RIDBE	029B
RID	029C	RINONE	00A9	RIPRTY	00AB	RJDJ	F969
ROBUF	00F9	RODATA	00B6	RODBE	029E	RODBS	029D

SYMBOL TABLE

SYMBOL VALUE

ROPRTY	00BD	ROUT1	F9E0	ROUT2	F9DE	ROWS	DC01
RPT10	EAF0	RPT20	E80D	RPT40	EB17	RPTFLG	028A
RSODNE	EF39	RSP232	F0A4	RSPEXT	EEE7	RSPNO	EEF2
RSPOFF	F0AA	RSPOK	F0BB	RSR018	EF6E	RSR020	EF70
RSR030	EF97	RSR031	EFA9	RSR032	EFB1	RSR050	EFC5
RSR060	EFDB	RSRABL	EF7E	RSRCVR	EF59	RSREXT	EF6D
RSRSXT	EF8B	RSRTRT	EF90	RSSTAT	0297	RST005	EEC8
RST010	EED7	RST030	EEF6	RST040	EEFC	RST050	EF00
RST060	EF13	RST070	EF1C	RST080	EF1E	RSTBGN	EF06
RSTEXT	EED1	RSTOA	F1FC	RSTOR	F1FD	RSTOR1	F207
RSTRAB	EEBB	RSWEXT	EEE6	RUNTB	ECE7	RVS	00C7
SA	00B9	SAH	00AD	SAL	00AC	SAT	026D
SAVE	F5EA	SAVESP	F5DD	SAVING	F68F	SBERR	0004
SCATN	EDBE	SCCL	E874	SCD10	E98F	SCD20	E9D4
SC[illegible]0	EAA8	SCN22	EAAB	SCN30	EAB3	SCNKEY	EA87
SCN[illegible]T	EAFB	SCNRTS	EB42	SCOLOR	EA24	SCR10	E8FF
SCR40	E9A6	SCR41	E913	SCRD19	E9BA	SCRD21	E9AB
SCRD22	E9BF	SCRL3	E922	SCRL5	E918	SCRLIN	E9C8
SCROO	E8F6	SCROL	E8EA	SCRORG	E505	SECND	EDB9
SETBOT	FE3C	SETLFS	FE00	SETMSG	FE18	SETNAM	FDF9
SETPNT	E9F0	SETTIM	F6E4	SETTMO	FE21	SETTOP	FE2D
SFDX	00CB	SHCNH	00AB	SHCNL	00A7	SHFLAG	028D
SHFLOG	EB48	SHFOUT	EB76	SIDREG	D400	SIMIRQ	FF43
SIXTY	4295	SIXTYP	4025	SIZE	FD88	SNSW1	00B4
SP	0008	SPCK2	EAC9	SPERR	0010	SPMSG	F12B
SRER	F98B	STAH	00C2	STAL	00C1	START	FCE2
START1	FCEF	STATUS	0090	STDONE	E58C	STKEY	0091
STKY	FCB8	STOK	E57C	STOP	FFE1	STOP2	F6FA
STOP3	F8DC	STOP4	F8E1	STT1	F8E2	STT2	F8F7
STT3	F8FE	STT4	F92A	STUPID	02A4	STUPT	E56C
SV10	F5F1	SV100	F659	SV102	F65F	SV105	F66C
SV106	F676	SV110	F68D	SV115	F68E	SV20	F5F4
SV25	F605	SV30	F624	SV40	F63A	SV50	F63F
SV[illegible]	0092	SWITCH	EB59	SYNO	0096	T1	009E
T2[illegible]	009F	T2NMI	FED6	TALK	ED09	TAPE	F875
TAPE1	00B2	TAPEH	F76A	TBLADE	FD15	TBLADR	FD10
TBLX	00D6	TBUFFR	033C	TEMP	00B1	TH20	F7A5
TH30	F7B7	TH40	F7CF	TIMB	FE66	TIME	00A0
TIMOUT	0285	TIMRB	0019	TKATN	EDCC	TKATN1	EDD6
TKSA	EDC7	TMPO	00C1	TMP2	00C3	TMPC	009F
TNIF	FC93	TNIQ	FCB6	TNOF	FCCA	TOFROM	E9E0
TP32	F8B5	TP35	F8B7	TP40	F8BE	TRD	F84A
TSTOP	F8D0	TVIC	ECB9	TWRT	F867	TWRT2	F86B
TWRT3	F86E	UD20	F69D	UD30	F6A7	UD60	F6BC
UD70	F6CC	UD80	F6DA	UD90	F6DC	UDST	FE1C
UDTIM	F69B	UHUH	E7E3	ULSET	EC58	UNLOCK	EC69
UNLSN	EDFE	UNTLK	EDEF	UP2	E832	UP5	E7EA
UP6	E82D	UP9	E829	UPALIN	E847	UPPER	EC4F
USER	00F3	USRCMD	032E	VECTOR	FD1A	VECTSE	FD50
VECTSS	FD30	VERCK	0093	VICCOL	D800	VICREG	D000
VICSCN	0400	VPAN	E59A	VPRTY	FB72	W1MS	EEB3
W1MS1	EEB6	WBLK	F864	WHITE	0001	WLGRTS	E700
WL[illegible]0	E6F7	WLOG20	E6CD	WLOG30	E6DA	WLOGIC	E6B6
WRE[illegible]	FC5E	WRITE	FBA6	WRNC	FC57	WRT1	FBAF
WRT2	FC0C	WRT3	FC09	WRT4	FC4E	WRT6	FC30
WRT61	FC2C	WRT7	FC3F	WRTBK	FC54	WRTL3	FBC8

WRTN	FBCD	WRTN1	FBE3	WRTN2	FBF0	WRTS	FC16
WRTS1	FC22	WRTW	FBAD	WRTX	FBB1	WRTZ	FC6A
XMAX	0289	XR	0006	XSAV	0097	YR	0007
ZZZ	F700						

END OF ASSEMBLY