

This memory map has been created after many hours of research ,investigation and experimentation. It is too bad Radio Shack (RS) does not publish an accurate map like this for our use. I probably have over 650 hrs into this project and I know I am not finished. I plan to offer an update to this document at least yearly. If you are interested in being informed when a new release is available please complete and mail the enclosed postcard. Also, I hope this will become a living growing document that you will also contribute to. I also am aware that there are probably some errors in this map. I hope you will bring them to my attention and also share any other unmapped discoveries you may have made. To encourage you to do so I offer a 40% discount on the next release version you purchase for notification of errors and omissions.

My experience in utilizing Radio Shack information has been often very frustrating. Information in general and especially memory references made by RS's Getting Started With Basic, Going Ahead with Color Basic, and TRS-80 Microcomputer News are frequently incorrect. However RS's Service Manual is much more exact and reliable. (A recommended purchase for the serious Color Computer user). Two other sources of information also have been much more exact and reliable. They are magazines available for your purchase. These magazines are Color Computer News and The Rainbow (also recommended purchases). If you refer to these resources you will most often find much more detailed information (sometimes even a commented listing that can be matched to a disassembled listing to really describe what is going on!!). Throughout the Map I will reference some of these resources. An \*S\* indicates a ROM or RAM based RS routines that you could potentially call from your own assembly language program. \$nnn is a notation for hexadecimal values.

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|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| [1] Getting Started With Color Basic<br>Copyright 1981 Tandy Corporation<br>Fort Worth, Texas 76102, U.S.A.                 | [5] Color Computer News<br>Remarkable Software<br>PO Box 1192<br>Muskegan, Mi. 49443 |
| [2] Going Ahead With Extended Basic<br>Copyright 1981 Tandy Corporation<br>Fort Worth, Texas 76102, U.S.A.                  | [6] The Rainbow - Falsoft, Inc.<br>5803 Timber Ridge Drive<br>Prospect Ky. 40059     |
| [3] Service Manual TRS-80 Color Computer<br>Catalog number 26-3001/3002                                                     | [7] 80 Micro<br>P.O. Box 981<br>Farmingdale, NY. 11737                               |
| [4] TRS-80 Microcomputer News<br>(Information published for TRS-80 users)<br>P.O. Box 2910, Fort Worth, Texas<br>76113-2910 | [8] Hot CoCo<br>P.O. Box 975<br>Farmingdale, NY. 11737                               |

Happy Explorations,

\*\*\*\*\*  
 \* Color Computer Memory Map: \*  
 \* \* \* \* \*  
 \* While reasonable time and effort has \*  
 \* been taken in preparation of this Memory Map to assure its accuracy, R. R. \*  
 \* Enterprises assumes no liability resulting from any errors or omissions in \*  
 \* this manual, or from the use of the information obtained herein. \*  
 \* \* \* \* \*

| Beginning<br>DEC | Ending<br>HEX | Beginning<br>DEC | Ending<br>HEX | Description                                                                                                                                                                                                                                                                                        |
|------------------|---------------|------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ADDR             | ADDR          | ADDR             | ADDR          |                                                                                                                                                                                                                                                                                                    |
| 00000            | 0000          | 32767            | 7FFF          | RAM                                                                                                                                                                                                                                                                                                |
| 00000            | 0000          | 01023            | 03FF          | System Use                                                                                                                                                                                                                                                                                         |
| 00003            | 0003          |                  |               | General Counter                                                                                                                                                                                                                                                                                    |
| 00006            | 0006          |                  |               | String flag indicating variable type.<br>\$00 = number<br>\$FF = string                                                                                                                                                                                                                            |
| 00007            | 0007          |                  |               | Garbage Collection Flag<br>\$00 = not occurred<br>\$FF = occurred                                                                                                                                                                                                                                  |
| 00008            | 0008          |                  |               | Array assignment Flag<br>\$00 = assignment ok<br>\$FF = assignment not allowed<br>Cleared from \$AD43                                                                                                                                                                                              |
| 00011            | 000B          | 00012            | 000C          | Address of next available string descriptor<br>reset at \$AD33                                                                                                                                                                                                                                     |
| 00025            | 0019          | 00026            | 001A          | Address of start of BASIC program set by PCLEAR                                                                                                                                                                                                                                                    |
| 00027            | 001B          | 00028            | 001C          | Address of start of variable storage also<br>address of end of BASIC program + 1. Note,<br>I count the 3 zeros at the end of every program<br>as part of the program. One zero comes from end<br>of the last line in the program and the other 2<br>zeros act as a flag to signify end of program. |
| 00029            | 001D          | 00030            | 001E          | Address of start of arrays (subscripted<br>variable storage) Also address of end of<br>variable storage + 1.                                                                                                                                                                                       |
| 00031            | 001F          | 00032            | 0020          | Address of beginning of free memory used in<br>NEW command. Also address of end of arrays + 1.                                                                                                                                                                                                     |
| 00033            | 0021          | 00034            | 0022          | Address of start of string pool (string stack)                                                                                                                                                                                                                                                     |
| 00035            | 0023          | 00036            | 0024          | Address of Basic limit. Also address of bottom<br>of string stack.                                                                                                                                                                                                                                 |
| 00037            | 0025          | 00038            | 0026          | Address of start of last string in string pool                                                                                                                                                                                                                                                     |
| 00039            | 0027          | 00040            | 0028          | Highest available ram address (end of string<br>pool) set from CLEAR command                                                                                                                                                                                                                       |
| 00041            | 0029          | 00042            | 002A          | Continue line number displayed by execution of<br>"STOP"                                                                                                                                                                                                                                           |
| 00043            | 002B          | 00044            | 002C          | Temporary 2 byte storage area                                                                                                                                                                                                                                                                      |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | DEC<br>ADDR | HEX<br>ADDR | Description                                                                                    |
|--------------------------|-----------------------|-------------|-------------|------------------------------------------------------------------------------------------------|
| 00000                    | 0000                  | 32767       | 7FFF        | RAM                                                                                            |
| 00000                    | 0000                  | 01023       | 03FF        | System Use Cont.                                                                               |
| 00045                    | 002D                  | 00046       | 002E        | Address of position to return to after execution of CONT.                                      |
| 00047                    | 002F                  | 00048       | 0030        | Address of current Basic program line the interpreter is executing.                            |
| 00049                    | 0031                  | 00050       | 0032        | Current Data statement line number (after read)                                                |
| 00051                    | 0033                  | 00052       | 0034        | Pointer to comma after last data value read                                                    |
| 00055                    | 0037                  | 00056       | 0038        | Name of last variable used                                                                     |
| 00065                    | 0041                  | 00072       | 0048        | Scratch area used by Tokenizing routine, garbage collection routine, move memory block routine |
| 00065                    | 0041                  | 00072       | 0048        | Data for Block Move                                                                            |
| 00065                    | 0041                  | 00066       | 0042        | High end destination address                                                                   |
| 00067                    | 0043                  | 00068       | 0044        | High end origin address                                                                        |
| 00069                    | 0045                  | 00070       | 0046        | Low end destination address                                                                    |
| 00071                    | 0047                  | 00072       | 0048        | Low end origin address                                                                         |
| 00079                    | 004F                  | 00084       | 0054        | Floating point accumulator 1 (FPAC1)                                                           |
| 00079                    | 004F                  |             |             | Exponent                                                                                       |
| 00080                    | 0050                  | 00083       | 0053        | Mantissa                                                                                       |
| 00084                    | 0054                  |             |             | Sign                                                                                           |
| 00086                    | 0056                  |             |             | String variable length                                                                         |
| 00092                    | 005C                  | 00097       | 0061        | Floating point accumulator 2 (FPAC2)                                                           |
| 00092                    | 005C                  |             |             | Exponent.                                                                                      |
| 00093                    | 005D                  | 00096       | 0060        | Mantissa                                                                                       |
| 00097                    | 0061                  |             |             | Sign                                                                                           |
| 00098                    | 0062                  |             |             | Sign comparison                                                                                |
| 00099                    | 0063                  |             |             | Extended precision byte                                                                        |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | DEC<br>ADDR | HEX<br>ADDR | Description                                                                                                                                                                                                                                                         |
|--------------------------|-----------------------|-------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00000                    | 0000                  | 32767       | 7FFF        | RAM                                                                                                                                                                                                                                                                 |
| 00000                    | 0000                  | 01023       | 03FF        | System Use Cont.                                                                                                                                                                                                                                                    |
| 00104                    | 0068                  | 00105       | 0069        | Current line number being interpreted. Will contain \$FFFF if illegal line number or if in command mode                                                                                                                                                             |
| 00106                    | 006A                  | 00111       | 006F        | Parameters set by definition of the output device.                                                                                                                                                                                                                  |
| 00106                    | 006A                  |             |             | Comma field width (defaults to 16)                                                                                                                                                                                                                                  |
| 00107                    | 006B                  |             |             | Tab field width (defaults to 16)                                                                                                                                                                                                                                    |
| 00108                    | 006C                  |             |             | Current column position (value of pos)                                                                                                                                                                                                                              |
| 00109                    | 006D                  |             |             | Number of characters in output line (if Device is set to 0 for screen this value is set to 32)                                                                                                                                                                      |
| 00110                    | 006E                  |             |             | Output device number                                                                                                                                                                                                                                                |
| 00111                    | 006F                  |             |             | Device DEVNUM[2]<br>-2=Printer (\$FE)<br>-1=Cassette (\$FF)<br>0=Screen<br>1-15=File for Disk BASIC                                                                                                                                                                 |
| 00112                    | 0070                  |             |             | Input Buffer status flag<br>0=unpurged (something left)<br>FF=purged (empty)                                                                                                                                                                                        |
| 00113                    | 0071                  |             |             | Warm start flag (RSTFLAG[2]) Ref[5]#22 pp 98-103<br>\$12= Do warm start<br>\$0 = Condition before cartridge prog.<br>starts created by BASIC<br><br>\$55= IF RSTVEC[2] points to a NOP \$12 then<br>control is transfered to address RSTVEC<br>else BASIC starts up |
| 00114                    | 0072                  | 00115       | 0073        | Warm start vector address (RSTVEC[2]). At power up this contains \$80C0                                                                                                                                                                                             |
| 00116                    | 0074                  | 00117       | 0075        | Highest physical memory address determined by routine at \$A084                                                                                                                                                                                                     |
| 00120                    | 0078                  |             |             | File mode set by OPEN or CLOSE statements<br>0 = closed<br>1 = open for input<br>2 = open for output                                                                                                                                                                |

| Beginning Ending |      |       |      | Description                                                                                                                            |
|------------------|------|-------|------|----------------------------------------------------------------------------------------------------------------------------------------|
| DEC              | HEX  | DEC   | HEX  |                                                                                                                                        |
| ADDR             | ADDR | ADDR  | ADDR |                                                                                                                                        |
| 00000            | 0000 | 32767 | 7FFF | RAM                                                                                                                                    |
| 00000            | 0000 | 01023 | 03FF | System Use Cont.                                                                                                                       |
| 00121            | 0079 |       |      | Dynamic changing count of characters remaining in the cassette Block as bytes are moved from the block to the Input/Output Buffer.     |
| 00122            | 007A | 00123 | 007B | Address of the Input/Output Buffer.                                                                                                    |
| 00124            | 007C |       |      | Block type BLKTYP[2]<br>0=file header<br>1=data<br>\$FF=end of file                                                                    |
| 00125            | 007D |       |      | Bytes in block 0-255 BLKLEN[2]<br>Z=1,A=CSRERR=0 for no errors<br>Z=0,A=CSRERR=1 for checksum error<br>Z=0,A=CSRERR=2 for memory error |
| 00126            | 007E | 00127 | 007F | Buffer address CBUFAD[2]. Also program end address + 1 after CLOADM.                                                                   |
| 00128            | 0080 |       |      | Checksum                                                                                                                               |
| 00129            | 0081 |       |      | CSRERR[2]<br>1 = Checksum Error (Tape Error)<br>2 = Memory Error (load error)                                                          |
| 00130            | 0082 |       |      | General bit counter. Pulse counter for cassette input.                                                                                 |
| 00131            | 0083 |       |      | Pulse width timing count                                                                                                               |
| 00132            | 0084 |       |      | Rise/fall flag (0=rise)                                                                                                                |
| 00133            | 0085 |       |      | Last sine value output voltage                                                                                                         |
| 00134            | 0086 |       |      | Pixel information stored from RESET routine (\$A8B1)                                                                                   |
| 00135            | 0087 |       |      | Last key pressed (character obtained by INKEY\$)                                                                                       |
| 00136            | 0088 | 00137 | 0089 | Address of current cursor location                                                                                                     |
| 00138            | 008A | 00139 | 008B | 2 bytes always containing zeros                                                                                                        |
| 00140            | 008C |       |      | Pitch of sound (frequency)                                                                                                             |
| 00141            | 008D | 00142 | 008E | Duration of sound                                                                                                                      |
| 00143            | 008F |       |      | Full wave threshold \$12                                                                                                               |

| Beginning<br>DEC | Ending<br>HEX | DEC    | HEX      | Description                                                                                |
|------------------|---------------|--------|----------|--------------------------------------------------------------------------------------------|
| ADDR             | ADDR          | ADDR   | ADDR     |                                                                                            |
| 00000            | 0000          | 32767  | 7FFF     | RAM                                                                                        |
| 00000            | 0000          | 01023  | 03FF     | System Use Cont.                                                                           |
| 00144            | 0090          |        |          | Upper allowable pulse width limit. Default = \$18 for cassette input.                      |
| 00145            | 0091          |        |          | Lower allowable pulse width limit. Default = \$0A for cassette input.                      |
| 00146            | 0092          |        |          | Gap length \$80. Controls length of unmodulated carrier preceding I/O Ref. [6]Vol II No. 2 |
| 00148            | 0094          |        |          | Cursor color flash count down timer (poke 0 to make cursor disappear)                      |
| 00149            | 0095          | 00156  | 009C     | Printer variables                                                                          |
| 00149            | 0095          | 00150  | 0096     | RS-232 baud rate LPTBTD[2]                                                                 |
|                  |               |        |          | HEX MSB, LSB(Decimal) Baud                                                                 |
|                  |               | 149    | 150      |                                                                                            |
|                  |               | \$02EB | 2 ,235   | 75                                                                                         |
|                  |               | \$01CA | 1 ,202   | 120                                                                                        |
|                  |               | \$0173 | 1 ,115   | 150                                                                                        |
|                  |               | \$00BE | 0 ,180   | 300                                                                                        |
|                  |               | \$0057 | 0 , 87   | 600 Default                                                                                |
|                  |               | \$0029 | 0 , 41   | 1200                                                                                       |
|                  |               | \$0012 | 0 , 18   | 2400                                                                                       |
|                  |               | \$0006 | 0 , 6    | 4800                                                                                       |
|                  |               | \$0001 | 0 , 1    | 9600                                                                                       |
| 00151            | 0097          | 00152  | 0098     | RS-232 line return delay LPTLND[2]                                                         |
|                  |               |        |          | HEX MSB, LSB(Decimal) Delay in sec.                                                        |
|                  |               | 151    | 152      |                                                                                            |
|                  |               | \$0001 | 0, 1     | 0 Default                                                                                  |
|                  |               | \$4000 | 64, 0    | .288                                                                                       |
|                  |               | \$8000 | 128, 0   | .576                                                                                       |
|                  |               | \$FFFF | 255, 255 | 1.15                                                                                       |
| 00153            | 0099          |        |          | RS-232 comma field width \$10 OR 16 DEFAULT                                                |
| 00154            | 009A          |        |          | RS-232 last comma field width \$70 OR 112 default                                          |

| Beginning<br>DEC | Ending<br>HEX | DEC   | HEX  |                                                                                                                                                                                                                                                                      | Description |
|------------------|---------------|-------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| ADDR             | ADDR          | ADDR  | ADDR |                                                                                                                                                                                                                                                                      |             |
| <hr/>            |               |       |      |                                                                                                                                                                                                                                                                      |             |
| 00000            | 0000          | 32767 | 7FFF | RAM                                                                                                                                                                                                                                                                  |             |
| 00000            | 0000          | 01023 | 03FF | System Use Cont.                                                                                                                                                                                                                                                     |             |
| 00149            | 0095          | 00156 | 009C | Printer variables Cont.                                                                                                                                                                                                                                              |             |
| 00155            | 009B          |       |      | RS-232 line printer width. It appears that Radioshack has a bug in BASIC 1.1 and extended BASIC 1.0 in that you can not set the line printer width by poking the width into 9B. The routine does delay for a carriage return but does not execute a carriage return. |             |
|                  |               |       |      | HEX (Decimal) char/line                                                                                                                                                                                                                                              |             |
|                  |               |       |      | \$10 16 16                                                                                                                                                                                                                                                           |             |
|                  |               |       |      | \$20 32 32                                                                                                                                                                                                                                                           |             |
|                  |               |       |      | \$40 64 64                                                                                                                                                                                                                                                           |             |
|                  |               |       |      | \$84 132 132 Default                                                                                                                                                                                                                                                 |             |
|                  |               |       |      | \$FF 255 255                                                                                                                                                                                                                                                         |             |
| 00156            | 009C          |       |      | Line printer head position LPTPOS[2]                                                                                                                                                                                                                                 |             |
| 00157            | 009D          | 00158 | 009E | Transfer or execution address after CLOADM. Address jumped to by execution of EXEC command. Ref. [6]Vol. II No 2.                                                                                                                                                    |             |
| 00159            | 009F          | 00168 | 00A8 | *S* Get next character routine. A JSR \$009F will get the next byte. JSR \$00A5 will get the same byte. Ref [5] #12                                                                                                                                                  |             |
| 00166            | 00A6          | 00167 | 00A7 | Next character pointer                                                                                                                                                                                                                                               |             |
| 00168            | 00A8          | 00170 | 00AA | Vector to 43376. Contains \$7EAA1A (jump AAlA) to print "OK"                                                                                                                                                                                                         |             |
| 00171            | 00AB          | 00174 | 00AE | Extended product area 32 bits of a 64                                                                                                                                                                                                                                |             |
| 00175            | 00AF          |       |      | Trace Flag<br>0 = TRON<br>76 = TROFF                                                                                                                                                                                                                                 |             |
| 00176            | 00B0          | 00177 | 00B1 | Address of start of DEFUSR table. \$013E                                                                                                                                                                                                                             |             |
| 00178            | 00B2          | 00179 | 00B3 | Foreground Color                                                                                                                                                                                                                                                     |             |
| 00180            | 00B4          |       |      | Color                                                                                                                                                                                                                                                                |             |
| 00181            | 00B5          | 00219 | 00DB | Graphics data/constants                                                                                                                                                                                                                                              |             |
| 00181            | 00B5          |       |      | Current color; if 4 color mode legal values are \$00,\$55,\$AA,\$FF; if 2 color mode legal values are \$00 or \$FF                                                                                                                                                   |             |

| Beginning<br>DEC | Ending<br>HEX | DEC   | HEX  | Description                                                                                                                                                                                  |
|------------------|---------------|-------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ADDR             | ADDR          | ADDR  | ADDR |                                                                                                                                                                                              |
| 00000            | 0000          | 32767 | 7FFF | RAM                                                                                                                                                                                          |
| 00000            | 0000          | 01023 | 03FF | System Use Cont.                                                                                                                                                                             |
| 00181            | 00B5          | 00219 | 00DB | Graphics data/constants cont.                                                                                                                                                                |
| 00182            | 00B6          |       |      | Current PMODE                                                                                                                                                                                |
| 00183            | 00B7          | 00184 | 00B8 | Address of end of graphics page                                                                                                                                                              |
| 00185            | 00B9          |       |      | Number of bytes per line                                                                                                                                                                     |
| 00186            | 00BA          |       |      | Address of top of graphics page                                                                                                                                                              |
| 00188            | 00BC          |       |      | Graphics page base address. Contains \$0E if Disk system else \$06. Non disk system can start graphics at \$0600 but a disk system uses page 1 & 2 and thus graphic must start after \$0E00. |
| 00189            | 00BD          | 00202 | 00CA | Line Data                                                                                                                                                                                    |
| 00189            | 00BD          | 00190 | 00BE | X1 line starting X coordinate.                                                                                                                                                               |
| 00191            | 00BF          | 00192 | 00C0 | Y1 line starting Y coordinate.                                                                                                                                                               |
| 00193            | 00C1          |       |      | Current CSS mask for control of PIA register bits at \$FF22. Value is either 0 or 8.                                                                                                         |
| 00194            | 00C2          |       |      | Value is either 1 (indicating PSET or 0 indicating PRESET).                                                                                                                                  |
| 00195            | 00C3          | 00196 | 00C4 | X2 line ending X coordinate.                                                                                                                                                                 |
| 00197            | 00C5          | 00198 | 00C6 | Y2 line ending Y coordinate.                                                                                                                                                                 |
| 00199            | 00C7          | 00200 | 00C8 | Previous line ending X coordinate.                                                                                                                                                           |
| 00201            | 00C9          | 00202 | 00CA | Previous line ending Y coordinate.                                                                                                                                                           |
| 00203            | 00CB          | 00218 | 00DA | Circle data                                                                                                                                                                                  |
| 00203            | 00CB          | 00204 | 00CC | Center X coordinate.                                                                                                                                                                         |
| 00205            | 00CD          | 00206 | 00CE | Center Y coordinate.                                                                                                                                                                         |
| 00207            | 00CF          | 00208 | 00D0 | Radius                                                                                                                                                                                       |
| 00209            | 00D1          | 00210 | 00D2 | H/W ratio                                                                                                                                                                                    |
| 00217            | 00D9          | 00218 | 00DA | End point of a circle section                                                                                                                                                                |
| 00219            | 00DB          |       |      | Pixel Change flag                                                                                                                                                                            |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Description                                                              |
|--------------------------|-----------------------|--------------------------------------------------------------------------|
| 00000                    | 0000 32767 7FFF       | RAM                                                                      |
| 00000                    | 0000 01023 03FF       | System Use Cont.                                                         |
| 00222                    | 00DE 00229 00E5       | PLAY command data/constants                                              |
| 00222                    | 00DE                  | Octave. "O" parameter-1. Default value is 2 or "O3".                     |
| 00223                    | 00DF 00224 00E0       | Volume. "Vn" parameter.                                                  |
| 00223                    | 00DF                  | MSB of "V" ( $126+n*4$ ). Default value is 186 or V15 ( $186=126+15*4$ ) |
| 00224                    | 00E0                  | LSB of "V" ( $126-n*4$ ). Default value is 66 or V15 ( $126-15*4$ ).     |
| 00225                    | 00E1                  | Note length "L". Default value is 4 or L4                                |
| 00226                    | 00E2                  | Tempo "T". Default value is 2 or T2. Must be value 0-255                 |
| 00227                    | 00E3                  | Note Timer                                                               |
| 00229                    | 00E5                  | Number of Dots after note length. Default value is 0.                    |
| 00230                    | 00E6                  | Baud rate constant                                                       |
| 00231                    | 00E7                  | Input timeout constant                                                   |
| 00232                    | 00E8                  | Angle Parameter of DRAW command                                          |
| 00233                    | 00E9                  | Scale parameter of DRAW command                                          |
| 00234                    | 00EA 00239 00EF       | Disk I/O variables [5] #9                                                |
| 00234                    | 00EA                  | Disk operation code (0-3)                                                |
| 00235                    | 00EB                  | Drive number (0-3)                                                       |
| 00236                    | 00EC                  | Track number (0-34)                                                      |
| 00237                    | 00ED                  | Sector number (1-18)                                                     |
| 00238                    | 00EE 00239 00EF       | Buffer address                                                           |
| 00240                    | 00F0                  | Disk status returned. I/O error codes                                    |

| Beginning |       | Ending |       | Description                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------|-------|--------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DEC       | HEX   | DEC    | HEX   |                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| ADDR      | ADDR  | ADDR   | ADDR  |                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| -----     | ----- | -----  | ----- |                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 00000     | 0000  | 32767  | 7FFF  | RAM                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 00000     | 0000  | 01023  | 03FF  | System Use Cont.                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 00256     | 0100  | 00273  | 0111  | Interrupt vectors                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 00256     | 0100  | 00258  | 0102  | SWI3 - Software Interrupt 3 called from SFFF2<br>Execution of a SWI3 instruction (\$113F) will<br>stack registers and jump here.                                                                                                                                                                                                                                                                                                      |
| 00259     | 0103  | 00261  | 0105  | SWI2 - Software Interrupt 2 called from SFFF4<br>Execution of a SWI2 instruction (\$103F) will<br>stack registers and jump here.                                                                                                                                                                                                                                                                                                      |
| 00262     | 0106  | 00264  | 0108  | SWI1 - Software Interrupt 1 called from SFFFA<br>Execution of a SWI1 instruction (\$3F) will<br>stack registers and jump here.                                                                                                                                                                                                                                                                                                        |
| 00265     | 0109  | 00267  | 010B  | NMI - Non-Maskable Interrupt called from<br>\$FFFC Set to \$7ED7AE (JMP \$D7AE) by<br>initialization of Disk Operating System.                                                                                                                                                                                                                                                                                                        |
| 00268     | 010C  | 00270  | 010E  | IRQ - Interrupt Request called from \$FFF8<br>Set to \$7EA9B3 (JMP \$A9B3) by initialization<br>of Basic. Set to \$7E894C (JMP \$894C) by<br>initialization of Extended Basic. Set to<br>\$7ED7BC (JMP \$D7BC) by initialization of the<br>Disk Operating System. This is primarily a<br>timing interrupt and is used by SOUND & TIMER<br>commands and to turn off Disk Motor when disk<br>has not been accessed for several seconds. |
| 00271     | 010F  | 00273  | 0111  | FIRQ - Fast Interrupt Request called from<br>\$FFF6. Set to \$7EA0F6 (JMP \$A0F6) by<br>initialization of Basic. This causes a jump<br>to the cartridge port in the expansion<br>interface.                                                                                                                                                                                                                                           |
| 00274     | 0112  | 00276  | 0114  | *S* Execution of "USR" Basic function (Token<br>\$FF83) USRJMP jump to basic's usr routine[1]<br>also 274-275 high and low order bytes of<br>TIMER value Ref. [6] Vol II No 2                                                                                                                                                                                                                                                         |
| 00278     | 0116  | 00281  | 0119  | Seed for RND function Ref. [6] Vol II No 2                                                                                                                                                                                                                                                                                                                                                                                            |
| 00281     | 0119  | 00282  | 0120  | Address of next file buffer that could be<br>allocated                                                                                                                                                                                                                                                                                                                                                                                |
| 00282     | 011A  |        |       | Keyboard alpha lock (upper or lower case<br>selection) [1]<br>0 = not locked (lower case)<br>255 = locked (upper case)                                                                                                                                                                                                                                                                                                                |

| Beginning Ending |      |       |      | Description                                                                                                                                                                                                                                                                                                   |
|------------------|------|-------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DEC              | HEX  | DEC   | HEX  |                                                                                                                                                                                                                                                                                                               |
| ADDR             | ADDR | ADDR  | ADDR |                                                                                                                                                                                                                                                                                                               |
| 00000            | 0000 | 32767 | 7FFF | RAM                                                                                                                                                                                                                                                                                                           |
| 00000            | 0000 | 01023 | 03FF | System Use Cont.                                                                                                                                                                                                                                                                                              |
| 00283            | 011B | 00284 | 011C | Keyboard delay constant[1]                                                                                                                                                                                                                                                                                    |
| 00285            | 011D | 00287 | 011F | Exponentiation operation Vector to 45509.<br>Contains \$7E8489 (JMP \$8489)                                                                                                                                                                                                                                   |
| 00288            | 0120 | 00316 | 013C | Token Table Directory Ref. [5] No.7 and Ref.<br>[7] December Anniversary Issue                                                                                                                                                                                                                                |
| 00288            | 0120 | 00292 | 0124 | Basic Commands                                                                                                                                                                                                                                                                                                |
| 00288            | 0120 |       |      | Number of BASIC command keywords in token<br>table located at \$AA66-\$AB19 (\$35)                                                                                                                                                                                                                            |
| 00289            | 0121 | 00290 | 0122 | Address of BASIC Command Keyword Table<br>(\$AA66)                                                                                                                                                                                                                                                            |
| 00291            | 0123 | 00292 | 0124 | Address of table of pointers to BASIC<br>Command subroutine entry addresses<br>(\$AB67)                                                                                                                                                                                                                       |
| 00293            | 0125 | 00297 | 0129 | Basic Functions                                                                                                                                                                                                                                                                                               |
| 00293            | 0125 |       |      | Number of BASIC function keywords in token<br>table located at \$AB1A-\$AB66 (\$14)                                                                                                                                                                                                                           |
| 00294            | 0126 | 00295 | 0127 | Address of BASIC function Keyword table<br>(\$AB1A)                                                                                                                                                                                                                                                           |
| 00296            | 0128 | 00297 | 0129 | Address of table of pointers to BASIC<br>Function subroutine entry addresses<br>(\$AA29)                                                                                                                                                                                                                      |
| 00298            | 012A | 00302 | 012E | Extended Basic Commands                                                                                                                                                                                                                                                                                       |
| 00298            | 012A |       |      | Number of Extended BASIC Command keywords<br>in token table located at \$8183-\$81EF (\$19)                                                                                                                                                                                                                   |
| 00299            | 012B | 00300 | 012C | Address of Extended Basic Command keyword<br>table (\$8183)                                                                                                                                                                                                                                                   |
| 00301            | 012D | 00302 | 012E | Address of a subroutine that determines<br>subroutine entry addresses for tokens<br>\$B5 to \$CB and \$FF90 to \$FF9F. Can also be<br>used as hook to add new commands to<br>Extended or Disk Basics. Set to \$813C by<br>initialization of Extended Basic. Set to<br>\$CE2E by initialization of Disk Basic. |

| Beginning Ending |      |       |      | Description                                                                                                                                               |
|------------------|------|-------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| DEC              | HEX  | DEC   | HEX  |                                                                                                                                                           |
| ADDR             | ADDR | ADDR  | ADDR |                                                                                                                                                           |
| <hr/>            |      |       |      |                                                                                                                                                           |
| 00000            | 0000 | 32767 | 7FFF | RAM                                                                                                                                                       |
| 00000            | 0000 | 01023 | 03FF | System Use Cont.                                                                                                                                          |
| 00288            | 0120 | 00316 | 013C | Token Table Directory Ref. [5] No.7 and Ref.<br>[7] December Anniversary Issue Cont.                                                                      |
| 00303            | 012F | 00307 | 0133 | Extended Basic Functions                                                                                                                                  |
| 00303            | 012F |       |      | Number of Extended BASIC Function keywords<br>in token table located at \$821E-\$8272 (\$E)                                                               |
| 00304            | 0130 | 00305 | 0131 | Address of Extended Basic Function keyword<br>table (\$821E)                                                                                              |
| 00306            | 0132 | 00307 | 0133 | Address of a subroutine that determines<br>subroutine entry addresses for tokens<br>\$FF94 to \$FF9F with the exception of \$FF90<br>and \$FF9F. (\$8168) |
| 00308            | 0134 | 00312 | 0138 | Disk Basic Command                                                                                                                                        |
| 00308            | 0134 |       |      | Number of tokens                                                                                                                                          |
| 00309            | 0135 | 00310 | 0136 | Address of Keyword Table                                                                                                                                  |
| 00311            | 0137 | 00312 | 0138 | Address of where to go to execute a token                                                                                                                 |
| 00313            | 0138 | 00317 | 013C | Disk Basic Function                                                                                                                                       |
| 00313            | 0138 |       |      | Number of tokens                                                                                                                                          |
| 00314            | 0139 | 00315 | 013A | Address of Keyword Table                                                                                                                                  |
| 00316            | 013B | 00317 | 013C | Address of where to go to execute a token                                                                                                                 |
| 00318            | 013E | 00337 | 0151 | DEFUSR Table. Definition of entry point for<br>USR functions 0-9                                                                                          |
| 00318            | 013E | 00319 | 013F | Address of DEFUSR 0                                                                                                                                       |
| 00320            | 0140 | 00321 | 0141 | Address of DEFUSR 1                                                                                                                                       |
| 00322            | 0142 | 00323 | 0143 | Address of DEFUSR 2                                                                                                                                       |
| 00324            | 0144 | 00325 | 0145 | Address of DEFUSR 3                                                                                                                                       |
| 00326            | 0146 | 00327 | 0147 | Address of DEFUSR 4                                                                                                                                       |
| 00328            | 0148 | 00329 | 0149 | Address of DEFUSR 5                                                                                                                                       |
| 00330            | 014A | 00331 | 014B | Address of DEFUSR 6                                                                                                                                       |
| 00332            | 014C | 00333 | 014D | Address of DEFUSR 7                                                                                                                                       |
| 00334            | 014E | 00335 | 014F | Address of DEFUSR 8                                                                                                                                       |
| 00336            | 0150 | 00337 | 0151 | Address of DEFUSR 9                                                                                                                                       |

Beginning Ending

DEC HEX DEC HEX

ADDR ADDR ADDR ADDR

Description

00000 0000 32767 7FFF RAM

00000 0000 01023 03FF System Use Cont.

00338 0152 00345 0159 Keyboard rollover table [4] Oct 1981

|            | Bit 7 | 6     | 5 | 4 | 3 | 2 | 1 | 0 |             |
|------------|-------|-------|---|---|---|---|---|---|-------------|
| 00338 0152 |       | ENTER | 8 | 0 | X | P | H | @ |             |
| 00339 0153 |       | CLEAR | 9 | 1 | Y | Q | I | A |             |
| 00340 0154 |       | BREAK | : | 2 | Z | R | J | B |             |
| 00341 0155 |       |       | ; | 3 | ~ | S | K | C | ~= UP ARROW |
| 00342 0156 |       |       | , | 4 | ~ | T | L | D | ~= DN ARROW |
| 00343 0157 |       |       | - | 5 | ~ | U | M | E | ~= LT ARROW |
| 00344 0158 |       |       | . | 6 | ~ | V | N | F | ~= RT ARROW |
| 00345 0159 |       | SHIFT | / | 7 | ~ | W | O | G | ~= BLANK    |

Dec val of contents 191 223 239 247 251 253 254  
 of 338-345 if key in  
 col. is pressed

1 1 1 1 1 1 1 1

Is the binary value or \$FF or 255  
 when no key is pressed

If right joystick fire button is pressed:

1 1 1 1 1 1 1 0

Is the binary value or \$FE or 254 at all  
 locations \$152-\$159 or 338-345

If left joystick fire button is pressed:

1 1 1 1 1 1 0 1

is the binary value or \$FD OR 253 at all  
 locations \$152-\$159 or 338-345

When a key or mutiple keys are  
 simultaneously pressed the 1's toggle to  
 zero bit at col positions corresponding  
 to table above

Example: 'A' key is pressed

1 1 1 1 1 1 1 0

is the binary val or \$FE OR 254 at  
 location \$153 or 339

Example: 'd' and '4' keys are pressed  
 simultaneously

1 1 1 0 1 1 1 0

is the binary val or \$EE OR 238 at  
 location \$156 OR 342

| Beginning Ending |       |       |       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------|-------|-------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DEC              | HEX   | DEC   | HEX   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| ADDR             | ADDR  | ADDR  | ADDR  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| -----            | ----- | ----- | ----- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 00000            | 0000  | 32767 | 7FFF  | RAM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 00000            | 0000  | 01023 | 03FF  | System Use Cont.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 00346            | 015A  | 00349 | 015D  | Joystick pot values[1]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 00346            | 015A  |       |       | Joystick 0 x position left                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 00347            | 015B  |       |       | Joystick 0 y position left                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 00348            | 015C  |       |       | Joystick 1 x position right                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 00349            | 015D  |       |       | Joystick 1 y position right                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 00350            | 015E  | 00423 | 01A8  | Hooks to Ram area from Roms. Unless otherwise defined assume Basic initializes hooks with \$39 (RTS) Ref. [5] #11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 00350            | 015E  |       |       | Hook to allow device numbers 1-16 to be opened to disk files. Called from \$A5F7. Set to \$7EC426 (JMP \$C426) by initialization of Disk Operating System. Comes here before OPEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 00353            | 0161  | 00255 | 0163  | Hook to allow device numbers greater than 0 for disk. Called from \$A5B9. Set to \$7EC838 (JMP \$C838) by initialization of Disk Operating System. Comes here after device number is obtained.                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 00356            | 0164  | 00358 | 0166  | Hook to return device parameters for disk files such as current position in record, tab length, etc. Called from A35F. Set to \$7EC843 (JMP \$C843) by initialization of Disk Operating System. Comes here before output parameters are obtained.                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 00359            | 0167  | 00361 | 0169  | Hook to allow user interface of other types of terminals or printers with different protocols. This location is referenced during each print. Extended Basic changes graphic screen back to text and ignores output to device #3 used in DLOAD. Disk operating system enables output to disk files. Set to \$39 (RTS) by initialization of Basic. Set to \$7E8273 (JMP \$8273) by initialization of Extended Basic. Set to \$7ECB4A (JMP \$7ECB4A) by Disk Operating System. User may poke or load a JMP to user defined modified RS232 driver then exiting driver and executing the proper JMP depending on system being run. Comes here before printing. Ref. [5] #6 & #11 |

| Beginning<br>DEC | Ending<br>HEX | Beginning<br>DEC | Ending<br>HEX | Description                                                                                                                                                                                                              |
|------------------|---------------|------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ADDR             | ADDR          | ADDR             | ADDR          |                                                                                                                                                                                                                          |
| 00000            | 0000          | 32767            | 7FFF          | RAM                                                                                                                                                                                                                      |
| 00000            | 0000          | 01023            | 03FF          | System Use Cont.                                                                                                                                                                                                         |
| 00350            | 015E          | 00423            | 01A8          | Hooks to Ram area from Roms. Unless otherwise defined assume Basic initializes hooks with \$39 (RTS) Ref. [5] #11 Cont.                                                                                                  |
| 00362            | 016A          | 00364            | 016C          | Hook to keyboard input. Set to \$7E8CF1 by initialization of Extended Basic. Comes here before input.                                                                                                                    |
| 00365            | 016D          | 00367            | 016F          | Hook to make sure that a device number is open for input. Called from \$A3ED. Set to \$7EC818 (JMP \$C818 ) by initialization of Disk Operating System.                                                                  |
| 00368            | 0170          | 00370            | 0172          | Hook to Make sure that a device is open for output.                                                                                                                                                                      |
| 00371            | 0173          | 00373            | 0175          | Hook to allow closing of all open files. Called from \$A426. Set to \$7ECA3B (JMP \$CA3B) by initialization of Disk Operating System. Called before CLOSE is performed.                                                  |
| 00374            | 0176          | 00376            | 0178          | Hook to allow closing of the file opened to a specified device number. Called from \$A42D. Set to \$7ECA4B (JMP \$CA4B) by initialization of Disk Operating System. Set to \$7E8286 by initialization of Extended Basic. |
| 00377            | 0179          | 00379            | 017B          | Hook to enable PRINTUSING statement. Called from \$B918. Set to \$7E8E90 (JMP \$8E90) by initialization of Extended Basic. Comes here during print.                                                                      |
| 00380            | 017C          | 00382            | 017E          | Hook to enable INPUT statements from disk. Called from \$B061. Set to \$7ECC5B (JMP \$CC5B) by initialization of Disk Operating System. Comes here after input.                                                          |
| 00383            | 017F          | 00385            | 0181          | Hook to enable/disable BREAK key. BREAK key is disabled during disk output. Called from \$A549. Set to \$7EC859 (JMP \$C859) by initialization of Disk Operating System. Comes here before BREAK.                        |

| Beginning<br>DEC | Ending<br>HEX | Beginning<br>DEC | Ending<br>HEX | Description                                                                                                                                                                                                                                                       |
|------------------|---------------|------------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ADDR             | ADDR          | ADDR             | ADDR          |                                                                                                                                                                                                                                                                   |
| 000000           | 0000          | 32767            | 7FFF          | RAM                                                                                                                                                                                                                                                               |
| 000000           | 0000          | 01023            | 03FF          | System Use Cont.                                                                                                                                                                                                                                                  |
| 00350            | 015E          | 00423            | 01A8          | Hooks to Ram area from Roms. Unless otherwise defined assume Basic initializes hooks with \$39 (RTS) Ref. [5] #11 Cont.                                                                                                                                           |
| 00386            | 0182          | 00388            | 0184          | Hook to enable line input. Called from \$A390. Set to \$39 (RTS) by initialization of Disk Operating System. Comes here before keyboard input.                                                                                                                    |
| 00389            | 0185          | 00391            | 0187          | Hook to enable cleanup after loading an ASCII file. Called from \$A4BF. Set to \$7ECA36 (JMP \$CA36) by initialization of Disk Operating System.                                                                                                                  |
| 00392            | 0188          | 00394            | 018A          | Hook to enable check before end of disk file. Set to \$393939 by initialization of Extended Basic. Set to \$7EC860 (JMP \$C860) by initialization of Disk Operating System. Called from \$A5CE.                                                                   |
| 00395            | 018B          | 00397            | 018D          | Hook to evaluate Extended Basic Operands and Functions. Called from \$B223. Set to \$7E8846 (JMP \$8846) by initialization of Extended Basic. Set to \$7ECDF6 (JMP \$CDF6) by initialization of Disk Operating System.                                            |
| 00398            | 018E          | 00400            | 0190          | Hook to allow a user program to trap errors. Called from \$AC46. Set to \$39 (RTS) by initialization of Extended Basic. Set to \$7EC70D by initialization Disk Operating System.                                                                                  |
| 00401            | 0191          | 00403            | 0193          | Hook to print Extended and Disk Basic Error messages. Also closes files upon errors. Called from \$AC49. Set to \$7E88F0 (JMP \$88F0) by initialization of Extended Basic. Set to \$7EC24D (JMP \$C24D) by initialization of Disk Operating System.               |
| 00404            | 0194          | 00406            | 0196          | Hook to set up Graphics parameters for Extended Basic. Also enables RUN "filename" for Disk Basic. Called from \$AE75. Set to \$7E829C (JMP \$829C) by initialization of Extended Basic. Set to \$7EC990 (JMP \$C990) by initialization of Disk Operating System. |

| Beginning Ending |      | Description                                                                                                                                                                                                                                                                                                                                                 |
|------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DEC              | HEX  |                                                                                                                                                                                                                                                                                                                                                             |
| ADDR             | ADDR |                                                                                                                                                                                                                                                                                                                                                             |
| 00000            | 0000 | 32767 7FFF RAM                                                                                                                                                                                                                                                                                                                                              |
| 00000            | 0000 | 01023 03FF System Use Cont.                                                                                                                                                                                                                                                                                                                                 |
| 00350            | 015E | 00423 01A8 Hooks to Ram area from Roms. Unless otherwise defined assume Basic initializes hooks with \$39 (RTS) Ref. [5] #11 Cont.                                                                                                                                                                                                                          |
| 00407            | 0197 | 00409 0199 Hook to enable Hex (&H) and Octal (&O) conversions. Called from \$AD9E. Set to \$7E87E5 (JMP \$87E5) by initialization of Extended Basic.                                                                                                                                                                                                        |
| 00410            | 019A | 00412 019C Hook to allow user control of extended Basic interpreter. Called from \$AD9E after interpreting each Basic statement. Set to \$7E82B9 (JMP \$82B9) by initialization of Extended Basic. Purpose of Hook to Extended Basic is to enable TRACE function. It can be used to disable the BREAK key or SHIFT @ key. This speeds up Basic. Ref. [5] #6 |
| 00413            | 019D | 00415 019F Hook for Graphics. Called from \$A8C4.                                                                                                                                                                                                                                                                                                           |
| 00416            | 01A0 | 00418 01A2 Hook to allow Get and Put routines to access disk records. Called from \$8162,\$8AFA,\$975C,\$A910, and \$C29A. Set to \$7EC29A (JMP SC29A).                                                                                                                                                                                                     |
| 00419            | 01A3 | 00421 01A5 Hook for Extended Basic interpreter tokenization Called from \$B821. Set to \$7E8304 (JMP \$8304) by initialization of Extended Basic.                                                                                                                                                                                                           |
| 00422            | 01A6 | 00424 01A8 Hook for Extended Basic interpreter untokenize. Called from \$B7C2.                                                                                                                                                                                                                                                                              |

| Beginning Ending |      |       |      | Description                                                                                                             |
|------------------|------|-------|------|-------------------------------------------------------------------------------------------------------------------------|
| DEC              | HEX  | DEC   | HEX  |                                                                                                                         |
| ADDR             | ADDR | ADDR  | ADDR |                                                                                                                         |
| -----            |      |       |      | -----                                                                                                                   |
| 00000            | 0000 | 32767 | 7FFF | RAM                                                                                                                     |
| 00000            | 0000 | 01023 | 03FF | System Use Cont.                                                                                                        |
| 00465            | 01D1 | 00488 | 01E6 | File I/O data                                                                                                           |
| 00465            | 01D1 |       |      | Length of filename requested.                                                                                           |
| 00466            | 01D2 | 00473 | 01D9 | Cassette filename requested (8 bytes max)                                                                               |
| 00474            | 01DA | 00731 | 02D8 | Cassette buffer 255 bytes.                                                                                              |
| 00474            | 01DA | 00481 | 01E1 | Filename found                                                                                                          |
| 00482            | 01E2 |       |      | File Type<br>0 = Tokenized Basic<br>1 = Data<br>2 = Binary                                                              |
| 00483            | 01E3 | 00484 | 01E4 | File descriptor block                                                                                                   |
| 00483            | 01E3 |       |      | 0 = Data                                                                                                                |
| 00484            | 01E4 |       |      | 0 = Tokenized Basic or assembly language<br><>0 = Ascii                                                                 |
| 00485            | 01E5 | 00486 | 01E6 | Transfer address used in CSAVEM command.<br>Address of where a assembly language<br>program begins execution.           |
| 00487            | 01E7 | 00488 | 01E8 | Start address or load address of an<br>assembly language program                                                        |
| 00733            | 02DD | 00988 | 03DC | Keyboard buffer 255 bytes (input terminated<br>by 0). When data is tokenized it is stored<br>starting at 00732 (\$02DC) |
| 00737            | 02E1 | 00827 | 033B | Screen Buffer (90 bytes)                                                                                                |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Description                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------|-----------------------|--------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00000                    | 0000                  | 32767                    | 7FFF                  | RAM                                                                                                                                                                                                                                                                                                                                                                                        |
| 01024                    | 0400                  | 01535                    | 05FF                  | Text screen memory (normal video display)[1]                                                                                                                                                                                                                                                                                                                                               |
| 01536                    | 0600                  | 13823                    | 35FF                  | GRAPHICS PAGE AREA[2]                                                                                                                                                                                                                                                                                                                                                                      |
| 01536                    | 0600                  | 03071                    | 0BFF                  | Page 1                                                                                                                                                                                                                                                                                                                                                                                     |
| 03072                    | 0C00                  | 04607                    | 11FF                  | Page 2                                                                                                                                                                                                                                                                                                                                                                                     |
| 04608                    | 1200                  | 06143                    | 17FF                  | Page 3                                                                                                                                                                                                                                                                                                                                                                                     |
| 06144                    | 1800                  | 07679                    | 1DFF                  | Page 4                                                                                                                                                                                                                                                                                                                                                                                     |
| 07680                    | 1E00                  | 09215                    | 23FF                  | Page 5                                                                                                                                                                                                                                                                                                                                                                                     |
| 09216                    | 2400                  | 10751                    | 29FF                  | Page 6                                                                                                                                                                                                                                                                                                                                                                                     |
| 10752                    | 2A00                  | 12287                    | 2FFF                  | Page 7                                                                                                                                                                                                                                                                                                                                                                                     |
| 12288                    | 3000                  | 13823                    | 35FF                  | Page 8                                                                                                                                                                                                                                                                                                                                                                                     |
| 01536                    | 0600                  | 06350                    | 18CE                  | Disk buffers, variable storage, and DOS variable storage (NOTE CONFLICT WITH GRAPHICS PAGES 1 - 4)<br>Buffer space normally defaults to 256 bytes at startup but may be changed using the FILES command. File control blocks (FCB's) default to 843 bytes total at startup but can also be reset by the FILES command. Req. FCB bytes = (FILES+1)*281.<br>Ref. [5] #9; [6] July 83 pp71-80 |
| 01536                    | 0600                  | 01791                    | 06FF                  | Disk buffer for Disk I/O - 1 sector long - 256 bytes are reserved at startup but may be changed using FILES command.                                                                                                                                                                                                                                                                       |
| 01792                    | 0700                  | 02047                    | 07FF                  | Disk buffer for Disk I/O - 1 sector long - 256 bytes are reserved at startup but may be changed using FILES command.                                                                                                                                                                                                                                                                       |
| 02048                    | 0800                  | 02343                    | 0927                  | Disk drive table - 74 bytes data per drive                                                                                                                                                                                                                                                                                                                                                 |
| 02048                    | 0800                  | 02121                    | 0849                  | Drive 0 status table                                                                                                                                                                                                                                                                                                                                                                       |
| 02122                    | 084A                  | 02195                    | 0893                  | Drive 1 status table                                                                                                                                                                                                                                                                                                                                                                       |
| 02196                    | 0894                  | 02269                    | 08DD                  | Drive 2 status table                                                                                                                                                                                                                                                                                                                                                                       |
| 02270                    | 08DE                  | 02343                    | 0927                  | Drive 3 status table                                                                                                                                                                                                                                                                                                                                                                       |

| Beginning<br>DEC | Ending<br>HEX | Beginning<br>DEC | Ending<br>HEX | Description                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------|---------------|------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ADDR             | ADDR          | ADDR             | ADDR          |                                                                                                                                                                                                                                                                                                                                                                                                    |
| 00000            | 0000          | 32767            | 7FFF          | RAM                                                                                                                                                                                                                                                                                                                                                                                                |
| 01536            | 0600          | 06350            | 18CE          | Disk buffers, variable storage, and DOS variable storage (NOTE CONFLICT WITH GRAPHICS PAGES 1 - 4)<br>Buffer space normally defaults to 256 bytes at startup but may be changed using the FILES command.<br>File control blocks (FCB's) default to 843 bytes total at startup but can also be reset by the FILES command. Req. FCB bytes = (FILES+1)*281.<br>Ref. [5] #9:[6] July 83 pp71-80 Cont. |
| 02344            | 0928          | 02349            | 029D          | File buffer table                                                                                                                                                                                                                                                                                                                                                                                  |
| 02344            | 0928          | 02345            | 0929          | Address of file buffer #1                                                                                                                                                                                                                                                                                                                                                                          |
| 02346            | 092A          | 02347            | 092B          | Address of file buffer #2                                                                                                                                                                                                                                                                                                                                                                          |
| 02348            | 029C          | 02349            | 029D          | Address of file buffer #3                                                                                                                                                                                                                                                                                                                                                                          |
| 02376            | 0948          | 02378            | 094A          | Random access buffer                                                                                                                                                                                                                                                                                                                                                                               |
| 02380            | 094C          |                  |               | Disk filename storage area                                                                                                                                                                                                                                                                                                                                                                         |
| 02391            | 0957          | 02392            | 0958          | File type<br>\$0000 Basic Program<br>\$00FF Basic Program ASCII format<br>\$0100 Binary Data<br>\$01FF ASCII Data<br>\$0200 Machine language program<br>\$0300 Binary Text<br>\$03FF ASCII Text                                                                                                                                                                                                    |
| 02394            | 095A          |                  |               | Current Default drive number                                                                                                                                                                                                                                                                                                                                                                       |
| 02395            | 095B          |                  |               | Number of user allocated file buffers                                                                                                                                                                                                                                                                                                                                                              |
| 02396            | 095C          |                  |               | Non 0 while doing DISKINI or BACKUP                                                                                                                                                                                                                                                                                                                                                                |
| 02397            | 095D          |                  |               | Non 0 while doing LOAD                                                                                                                                                                                                                                                                                                                                                                             |
| 02399            | 095F          |                  |               | Disk Basic USR function Vectors                                                                                                                                                                                                                                                                                                                                                                    |
| 02426            | 097A          |                  |               | Count of Gran Tabl changes before rewrite                                                                                                                                                                                                                                                                                                                                                          |

| Beginning Ending |      |       |      | Description                                                                                                                                                                                                                                                                                                                                                                               |
|------------------|------|-------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DEC              | HEX  | DEC   | HEX  |                                                                                                                                                                                                                                                                                                                                                                                           |
| ADDR             | ADDR | ADDR  | ADDR |                                                                                                                                                                                                                                                                                                                                                                                           |
| 000000           | 0000 | 32767 | 7FFF | RAM                                                                                                                                                                                                                                                                                                                                                                                       |
| 01536            | 0600 | 06350 | 18CE | Disk buffers, variable storage, and DOS variable storage (NOTE CONFLICT WITH GRAPHICS PAGES 1 - 4) Buffer space normally defaults to 256 bytes at startup but may be changed using the FILES command. File control blocks (FCB's) default to 843 bytes total at startup but can also be reset by the FILES command. Req. FCB bytes = (FILES+1)*281. Ref. [5] #9:[6] July 83 pp71-80 Cont. |
| 02430            | 097E | 02438 | 0986 | Disk variable storage                                                                                                                                                                                                                                                                                                                                                                     |
| 02430            | 097E |       |      | Start of table of current tracks                                                                                                                                                                                                                                                                                                                                                          |
| 02434            | 0982 |       |      | NMI in use flag (non 0 if NMI in use)                                                                                                                                                                                                                                                                                                                                                     |
| 02435            | 0983 |       |      | Address of return after NMI interrupt                                                                                                                                                                                                                                                                                                                                                     |
| 02437            | 0985 |       |      | Motor shutoff counter                                                                                                                                                                                                                                                                                                                                                                     |
| 02438            | 0986 |       |      | Current Latch data - status of 1793 register in RAM                                                                                                                                                                                                                                                                                                                                       |
| 02459            | 0987 |       |      | Verify Status<br>1 for on<br>0 for off                                                                                                                                                                                                                                                                                                                                                    |
| 02460            | 0989 |       |      | Random Access record buffer initially set to 256 bytes.                                                                                                                                                                                                                                                                                                                                   |
| 02978            | 0BA2 | 06350 | 18CE | Disk Buffers. For every file opened Disk BASIC allocates a 281 byte buffer. Last                                                                                                                                                                                                                                                                                                          |
| 02978            | 0BA2 | 03259 | 0CBB | 1 file open.                                                                                                                                                                                                                                                                                                                                                                              |
| 03260            | 0CBC | 03540 | 0DD4 | 2 files open.                                                                                                                                                                                                                                                                                                                                                                             |
| 03541            | 0DD5 | 03821 | 0EED | 3 files open.                                                                                                                                                                                                                                                                                                                                                                             |
| 03822            | 0EEF | 04102 | 1006 | 4 files open.                                                                                                                                                                                                                                                                                                                                                                             |
| 04103            | 1007 | 04383 | 111F | 5 files open.                                                                                                                                                                                                                                                                                                                                                                             |
| 04384            | 1120 | 04664 | 1238 | 6 files open.                                                                                                                                                                                                                                                                                                                                                                             |
| 04665            | 1239 | 04945 | 1351 | 7 files open.                                                                                                                                                                                                                                                                                                                                                                             |
| 04946            | 1352 | 05226 | 146A | 8 files open.                                                                                                                                                                                                                                                                                                                                                                             |
| 05227            | 146B | 05507 | 1583 | 9 files open.                                                                                                                                                                                                                                                                                                                                                                             |
| 05508            | 1584 | 05788 | 169C | 10 files open.                                                                                                                                                                                                                                                                                                                                                                            |
| 05789            | 169D | 06069 | 17B5 | 11 files open.                                                                                                                                                                                                                                                                                                                                                                            |
| 06070            | 17B6 | 06350 | 18CE | 12 files open.                                                                                                                                                                                                                                                                                                                                                                            |

| Beginning Ending |      |       |      | Description                                                                                                                                                                                                                                                                                                                           |
|------------------|------|-------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DEC              | HEX  | DEC   | HEX  |                                                                                                                                                                                                                                                                                                                                       |
| ADDR             | ADDR | ADDR  | ADDR |                                                                                                                                                                                                                                                                                                                                       |
| <hr/>            |      |       |      |                                                                                                                                                                                                                                                                                                                                       |
| 00000            | 0000 | 32767 | 7FFF | RAM                                                                                                                                                                                                                                                                                                                                   |
| 13824            | 1536 | 32767 | 7FFF | Program and variable storage (program and variable storage could actually begin anywhere from 1536 to 13824 depending on number of graphics pages used; and if Disk Rom is in used, more storage is required for disk variables and disk buffers. The more files concurrently opened ,the less room for program and variable storage. |

| Beginning |      | Ending |      | Description                                                                                                        |
|-----------|------|--------|------|--------------------------------------------------------------------------------------------------------------------|
| DEC       | HEX  | DEC    | HEX  |                                                                                                                    |
| ADDR      | ADDR | ADDR   | ADDR |                                                                                                                    |
| <hr/>     |      |        |      | <hr/>                                                                                                              |
| 32768     | 8000 | 40959  | 9FFF | EXTENDED BASIC ROM[1]                                                                                              |
| 32768     | 8000 | 32769  | 8001 | Flag to Identify Extended Basic Rom                                                                                |
| 32770     | 8002 | 32957  | 80BD | Extended BASIC cold start routine                                                                                  |
| 32960     | 80C0 | 32973  | 80CD | Extended BASIC warm start routine                                                                                  |
| 32976     | 80D0 | 32989  | 80DD | Unused routine to try to set up 32k compatibility prior to release of updated BASIC ROM 1.1 Ref. [5] Aug 23, 1983. |
| 32990     | 80DE |        |      | Number of Extended BASIC commands.                                                                                 |
| 32991     | 80DF | 32992  | 80E0 | Address of start of Extended BASIC keyword - token table. (\$8183)                                                 |
| 32993     | 80E1 | 32994  | 80E2 | Address of Extended BASIC command processor.                                                                       |
| 32995     | 80E3 |        |      | Number of Extended BASIC functions.                                                                                |
| 32996     | 80E4 | 32997  | 80E5 | Address of start of Extended BASIC keyword - Function table. (\$821E)                                              |
| 32998     | 80E6 | 32999  | 80E7 | Address of Extended BASIC function processor.                                                                      |
| 33000     | 80E8 | 33083  | 813B | Extended BASIC copyright notice.                                                                                   |

Beginning Ending

DEC HEX DEC HEX

ADDR ADDR ADDR ADDR

Description

33155 8183 33263 81EF Extended BASIC Command keyword - token table -  
ASCII Characters Ref. [7] December 1982 Anniversary  
Issue

|       |      |       |      | CONTAINS | CONVERTED TO TOKEN |     |
|-------|------|-------|------|----------|--------------------|-----|
|       |      |       |      | STRING   | HEX                | DEC |
| 33155 | 8183 | 33157 | 8185 | DEL      | \$B5               | 181 |
| 33158 | 8186 | 33161 | 8189 | EDIT     | \$B6               | 182 |
| 33162 | 818A | 33165 | 818D | TRON     | \$B7               | 183 |
| 33166 | 818E | 33170 | 8192 | TROFF    | \$B8               | 184 |
| 33171 | 8193 | 33173 | 8195 | DEF      | \$B9               | 185 |
| 33174 | 8196 | 33176 | 8198 | LET      | \$BA               | 186 |
| 33177 | 8199 | 33180 | 819C | LINE     | \$BB               | 187 |
| 33181 | 819D | 33184 | 81A0 | PCLS     | \$BC               | 188 |
| 33185 | 81A1 | 33188 | 81A4 | PSET     | \$BD               | 189 |
| 33189 | 81A5 | 33194 | 81AA | PRESET   | \$BE               | 190 |
| 33195 | 81AB | 33200 | 81B0 | SCREEN   | \$BF               | 191 |
| 33201 | 81B1 | 33206 | 81B6 | PCLEAR   | \$C0               | 192 |
| 33207 | 81B7 | 33211 | 81BB | COLOR    | \$C1               | 193 |
| 33212 | 81BC | 33217 | 81C1 | CIRCLE   | \$C2               | 194 |
| 33218 | 81C2 | 33222 | 81C6 | PAINT    | \$C3               | 195 |
| 33223 | 81C7 | 33225 | 81C9 | GET      | \$C4               | 196 |
| 33226 | 81CA | 33228 | 81CC | PUT      | \$C5               | 197 |
| 33229 | 81CD | 33232 | 81D0 | DRAW     | \$C6               | 198 |
| 33233 | 81D1 | 33237 | 81D5 | PCOPY    | \$C7               | 199 |
| 33238 | 81D6 | 33242 | 81D7 | PMODE    | \$C8               | 200 |
| 33243 | 81D8 | 33246 | 81DE | PLAY     | \$C9               | 201 |
| 33247 | 81DF | 33251 | 81E3 | DLOAD    | \$CA               | 202 |
| 33252 | 81E4 | 33256 | 81E8 | RENUM    | \$CB               | 203 |
| 33257 | 81E9 | 33258 | 81EA | FN       | \$CC               | 204 |
| 33259 | 81EB | 55263 | 81EF | USING    | \$CD               | 205 |

Note that FN and USING  
have tokens but are not in  
the table of pointers  
\$81F0-821D

| Beginning<br>DEC | Ending<br>HEX | Beginning<br>DEC | Ending<br>HEX | Description                                                                                                                                                                          |
|------------------|---------------|------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ADDR             | ADDR          | ADDR             | ADDR          |                                                                                                                                                                                      |
| 32768            | 8000          | 40959            | 9FFF          | EXTENDED BASIC ROM Cont. [1]                                                                                                                                                         |
| 33088            | 81F0          | 33309            | 821D          | Table of Pointers to subroutine entry addresses<br>associated with Extended BASIC Command Keyword<br>Table defined at \$8183 to \$81EF. Ref. [7] December<br>1982 Anniversary Issue. |
|                  |               |                  |               | Contents For Command                                                                                                                                                                 |
| 33088            | 81F0          |                  |               | \$8970 DEL                                                                                                                                                                           |
| 33090            | 81F2          |                  |               | \$8533 EDIT                                                                                                                                                                          |
| 33092            | 81F4          |                  |               | \$86A7 TRON                                                                                                                                                                          |
| 33094            | 81F6          |                  |               | \$86A8 TROFF                                                                                                                                                                         |
| 33096            | 81F8          |                  |               | \$8871 DEF                                                                                                                                                                           |
| 33098            | 81FA          |                  |               | \$AF89 LET                                                                                                                                                                           |
| 33100            | 81FC          |                  |               | \$93BB LINE                                                                                                                                                                          |
| 33102            | 81FE          |                  |               | \$9532 PCLS                                                                                                                                                                          |
| 33104            | 8200          |                  |               | \$9361 PSET                                                                                                                                                                          |
| 33106            | 8202          |                  |               | \$9365 PRESET                                                                                                                                                                        |
| 33108            | 8204          |                  |               | \$9670 SCREEN                                                                                                                                                                        |
| 33110            | 8206          |                  |               | \$968B PCLEAR                                                                                                                                                                        |
| 33112            | 8208          |                  |               | \$9546 COLOR                                                                                                                                                                         |
| 33114            | 820A          |                  |               | \$9E9D CIRCLE                                                                                                                                                                        |
| 33116            | 820C          |                  |               | \$98EC PAINT                                                                                                                                                                         |
| 33118            | 820E          |                  |               | \$9755 GET                                                                                                                                                                           |
| 33120            | 8210          |                  |               | \$9758 PUT                                                                                                                                                                           |
| 33122            | 8212          |                  |               | \$9CB6 DRAW                                                                                                                                                                          |
| 33124            | 8214          |                  |               | \$9723 PCOPY                                                                                                                                                                         |
| 33126            | 8216          |                  |               | \$9621 PMODE                                                                                                                                                                         |
| 33128            | 8218          |                  |               | \$9A22 PLAY                                                                                                                                                                          |
| 33130            | 821A          |                  |               | \$8C18 DLOAD                                                                                                                                                                         |
| 33132            | 821C          |                  |               | \$8A09 RENUM                                                                                                                                                                         |
| 33310            | 821E          | 33366            | 8256          | Extended BASIC Function keyword - token table -<br>ASCII characters. Ref. [7] December 1982<br>Anniversary Issue.                                                                    |
|                  |               |                  |               | CONTAINS CONVERTED TO TOKEN                                                                                                                                                          |
|                  |               |                  |               | STRING HEX DEC(MSB) DEC(LSB)                                                                                                                                                         |
| 33310            | 821E          | 33312            | 8221          | ATN \$FF94 255 148                                                                                                                                                                   |
| 33313            | 8222          | 33315            | 8223          | COS \$FF95 255 149                                                                                                                                                                   |
| 33316            | 8224          | 33318            | 8226          | TAN \$FF96 255 150                                                                                                                                                                   |
| 33319            | 8227          | 33321            | 8229          | EXP \$FF97 255 151                                                                                                                                                                   |
| 33322            | 822A          | 33324            | 822C          | FIX \$FF98 255 152                                                                                                                                                                   |
| 33325            | 822D          | 33327            | 822F          | LOG \$FF99 255 153                                                                                                                                                                   |
| 33328            | 8230          | 33330            | 8232          | POS \$FF9A 255 154                                                                                                                                                                   |
| 33331            | 8233          | 33333            | 8235          | SQR \$FF9B 255 155                                                                                                                                                                   |
| 33334            | 8236          | 33337            | 8239          | HEXS \$FF9C 255 156                                                                                                                                                                  |
| 33338            | 823A          | 33343            | 823F          | VARPTR \$FF9D 255 157                                                                                                                                                                |
| 33344            | 8240          | 33348            | 8244          | INSTR \$FF9E 255 158                                                                                                                                                                 |
| 33349            | 8245          | 33353            | 8249          | TIMER \$FF9F 255 159                                                                                                                                                                 |
| 33354            | 824A          | 33359            | 824F          | PPOINT \$FFA0 255 160                                                                                                                                                                |
| 33360            | 8250          | 33366            | 8256          | STRINGS \$FFA1 255 161                                                                                                                                                               |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | DEC<br>ADDR | HEX<br>ADDR | Description                                                                                                                                                             |
|--------------------------|-----------------------|-------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 32768                    | 8000                  | 40959       | 9FFF        | EXTENDED BASIC ROM Cont. [1]                                                                                                                                            |
| 33367                    | 8257                  | 33394       | 8272        | Table of Pointers to subroutine entry addresses associated with Extended BASIC Function Keyword Table defined at \$821E to \$8256. Ref. [7] Dec 1982 Anniversary Issue. |
|                          |                       |             |             | Contents For Function                                                                                                                                                   |
| 33367                    | 8257                  |             |             | \$83B0 ATN                                                                                                                                                              |
| 33369                    | 8259                  |             |             | \$8378 COS                                                                                                                                                              |
| 33371                    | 825B                  |             |             | \$8381 TAN                                                                                                                                                              |
| 33373                    | 825D                  |             |             | \$84F2 EXP                                                                                                                                                              |
| 33375                    | 825F                  |             |             | \$8524 FIX                                                                                                                                                              |
| 33377                    | 8261                  |             |             | \$8446 LOG                                                                                                                                                              |
| 33379                    | 8263                  |             |             | \$86AC POS                                                                                                                                                              |
| 33381                    | 8265                  |             |             | \$8480 SQR                                                                                                                                                              |
| 33383                    | 8267                  |             |             | \$8BDD HEX\$                                                                                                                                                            |
| 33385                    | 8269                  |             |             | \$86BE VARPTR                                                                                                                                                           |
| 33387                    | 826B                  |             |             | \$877E INSTR                                                                                                                                                            |
| 33389                    | 826D                  |             |             | \$8968 TIMER                                                                                                                                                            |
| 33391                    | 826F                  |             |             | \$9339 PPOINT                                                                                                                                                           |
| 33393                    | 8271                  |             |             | \$874E STRING\$                                                                                                                                                         |
| 33395                    | 8273                  |             |             | *S* Reset of video display registers to stay in text mode and check for DLOAD                                                                                           |
| 33436                    | 829C                  | 33464       | 82B8        | *S* Execution of Extended BASIC RUN setup. Set default play and draw values in RAM                                                                                      |
| 33436                    | 829C                  |             |             | Set up maximum volume for play command                                                                                                                                  |
| 33439                    | 829F                  |             |             | Set value to mid volume                                                                                                                                                 |
| 33441                    | 82A1                  |             |             | Set Tempo to 2                                                                                                                                                          |
| 33445                    | 82A5                  |             |             | Set Octive to 2                                                                                                                                                         |
| 33447                    | 82A7                  |             |             | Set note length to 4                                                                                                                                                    |
| 33450                    | 82AA                  |             |             | Set dotted length to 0                                                                                                                                                  |
| 33452                    | 82AC                  |             |             | Set Angle and scale for draw to 0                                                                                                                                       |
| 33456                    | 82B0                  |             |             | Set starting X,Y coordinates for DRAW, LINE,CIRCLE,etc to center screen (128,96)                                                                                        |
| 33465                    | 82B9                  | 33566       | 831E        | *S* Routine to look for BREAK or shift @ and do some byte fetching after interpreter is done with a BASIC statement Ref. [5] #6                                         |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | DEC<br>ADDR | HEX<br>ADDR | Description                                                           |
|--------------------------|-----------------------|-------------|-------------|-----------------------------------------------------------------------|
| 32768                    | 8000                  | 40959       | 9FFF        | EXTENDED BASIC ROM Cont. [1]                                          |
| 33467                    | 82BB                  | 33538       | 8302        | *S* Interpret loop to enable trace function                           |
| 33502                    | 82DE                  | 33521       | 82F1        | *S* Trace Routine Ref. [8] Vol 1 No. 1 pp 63-64                       |
| 33656                    | 8378                  |             |             | *S* Execution of "COS" Extended BASIC function<br>(Token \$FF95)      |
| 33665                    | 8381                  |             |             | *S* Execution of "TAN" Extended BASIC function<br>(Token \$FF96)      |
| 33712                    | 83B0                  |             |             | *S* Execution of "ATN" Extended Basic function<br>(Token \$FF94)      |
| 33862                    | 8446                  |             |             | *S* Execution of "LOG" Extended BASIC function<br>(Token \$FF99)      |
| 33920                    | 8480                  |             |             | *S* Execution of "SQR" Extended BASIC function<br>(Token \$FF9B)      |
| 34034                    | 84F2                  |             |             | *S* Execution of "EXP" Extended BASIC function<br>(Token \$FF97)      |
| 34084                    | 8524                  |             |             | *S* Execution of "FIX" Extended BASIC function<br>(Token \$FF98)      |
| 34099                    | 8533                  |             |             | *S* Execution of "EDIT" Extended BASIC command<br>(Token \$B6)        |
| 34115                    | 8543                  |             |             | *S* Edit Routine                                                      |
| 34471                    | 86A7                  |             |             | *S* Execution of "TRON" Extended BASIC command<br>(Token \$B7)        |
| 34472                    | 86A8                  |             |             | *S* Execution of "TROFF" Extended BASIC command<br>(Token \$B8)       |
| 34476                    | 86AC                  |             |             | *S* Execution of "POS" Extended BASIC function<br>(Token \$FF9A)      |
| 34494                    | 86BE                  |             |             | *S* Execution of "VARPTR" Extended BASIC function<br>(Token \$FF9D)   |
| 34638                    | 874E                  |             |             | *S* Execution of "STRING\$" Extended BASIC function<br>(Token \$FFA1) |
| 34686                    | 877E                  |             |             | *S* Execution of "INSTR" Extended BASIC function<br>(Token \$FF9E)    |
| 34929                    | 8871                  |             |             | *S* Execution of "DEF" Extended BASIC command<br>(Token \$B9)         |

| Beginning<br>DEC | Ending<br>HEX | DEC   | HEX  | Description                                                                                                                                                                                   |
|------------------|---------------|-------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ADDR             | ADDR          | ADDR  | ADDR |                                                                                                                                                                                               |
| 32768            | 8000          | 40959 | 9FFF | EXTENDED BASIC ROM Cont. [1]                                                                                                                                                                  |
| 35056            | 88F0          | 35080 | 8908 | *S* Extended BASIC's error processing routines<br>Ref. [5] #21 p126-127                                                                                                                       |
| 35083            | 890B          |       |      | Extended BASIC's error code table.                                                                                                                                                            |
| 35176            | 8968          |       |      | *S* Execution of "TIMER" Extended BASIC function<br>(Token \$FF9F)                                                                                                                            |
| 35184            | 8970          |       |      | *S* Execution of "DEL" Extended BASIC command<br>(Token \$B5)                                                                                                                                 |
| 35337            | 8A09          |       |      | *S* Execution of "RENUM" Extended BASIC command<br>(Token \$CB)                                                                                                                               |
| 35386            | 8A3A          |       |      | *S* Entry to RENUM when all parameters are set                                                                                                                                                |
| 35805            | 8BDD          |       |      | *S* Execution of "HEX\$" Extended BASIC function<br>(Token \$FF9C)                                                                                                                            |
| 35864            | 8C18          | 36282 | 8DBA | *S* Execution of "DLOAD" Extended BASIC command<br>(Token \$CA). DLOADM Ref [5] #13. Note<br>experience has indicated DLOADM does not work,<br>DLOAD does, will try to determine error later. |
| 36284            | 8DBC          |       |      | *S* Input RS232 character Ref. [5] Vol 1 #4                                                                                                                                                   |
| 36326            | 8DE6          |       |      | *S* Get bit or timeout                                                                                                                                                                        |
| 36343            | 8DF7          |       |      | *S* Delay one bit time                                                                                                                                                                        |
| 36358            | 8E06          |       |      | *S* Send RS232 character                                                                                                                                                                      |
| 37519            | 928F          | 37772 | 938C | *S* Get line data and setup Graphics.<br>Ref. [5] #8                                                                                                                                          |
| 37519            | 928F          |       |      | Find byte/bit routine                                                                                                                                                                         |
| 37542            | 92A6          |       |      | Set up for Pmodes 0,2,or 4                                                                                                                                                                    |
| 37570            | 92C2          |       |      | Setup for Pmodes 1,or 3                                                                                                                                                                       |
| 37597            | 92DD          |       |      | Table for 1 bit/point                                                                                                                                                                         |
| 37605            | 92E5          |       |      | Table for 2 bit/point                                                                                                                                                                         |
| 37689            | 9339          |       |      | *S* Execution of "PPOINT" Extended BASIC function<br>(Token \$FFA0)                                                                                                                           |
| 37729            | 9361          |       |      | *S* Execution of "PSET" Extended BASIC command<br>(Token \$BD)                                                                                                                                |

| Beginning<br>DEC | Ending<br>HEX | DEC   | HEX  | Description                                                      |
|------------------|---------------|-------|------|------------------------------------------------------------------|
| ADDR             | ADDR          | ADDR  | ADDR |                                                                  |
| 32768            | 8000          | 40959 | 9FFF | EXTENDED BASIC ROM Cont. [1]                                     |
| 37733            | 9365          |       |      | *S* Execution of "PRESET" Extended BASIC command<br>(Token \$BE) |
| 37819            | 93BB          |       |      | *S* Execution of "LINE" Extended BASIC command<br>(Token \$BB)   |
| 37956            | 9444          |       |      | *S* Draw Horizontal line. Ref. [5] #8                            |
| 37996            | 946C          |       |      | *S* Draw Vertical line. Ref. [5] #8                              |
| 38049            | 94A1          | 38177 | 9521 | *S* Draw sloped line routine. Ref. [5] #8                        |
| 38114            | 94E2          |       |      | Draw line loop                                                   |
| 38150            | 9506          |       |      | Move right                                                       |
| 38157            | 950D          |       |      | Move up                                                          |
| 38164            | 9514          |       |      | Move left                                                        |
| 38171            | 951B          |       |      | Move down                                                        |
| 38194            | 9532          |       |      | *S* Execution of "PCLS" Extended BASIC command<br>(Token \$BC)   |
| 38214            | 9546          |       |      | *S* Execution of "COLOR" Extended BASIC command<br>(Token \$C1)  |
| 38316            | 95AC          |       |      | *S* Returns normal text screen from graphics                     |
| 38433            | 9621          |       |      | *S* Execution of "PMODE" Extended BASIC command<br>(Token \$C8)  |
| 38512            | 9670          |       |      | *S* Execution of "SCREEN" Extended BASIC command<br>(Token \$BF) |
| 38539            | 968B          |       |      | *S* Execution of "PCLEAR" Extended BASIC command<br>(Token \$C0) |

| Beginning |       | Ending |       | Description                                                   |
|-----------|-------|--------|-------|---------------------------------------------------------------|
| DEC       | HEX   | DEC    | HEX   |                                                               |
| ADDR      | ADDR  | ADDR   | ADDR  |                                                               |
| -----     | ----- | -----  | ----- |                                                               |
| 32768     | 80C0  | 40959  | 9FFF  | EXTENDED BASIC ROM Cont. [1]                                  |
| 38630     | 96E6  | 38661  | 9705  | Initialize default RAM system values                          |
| 38630     | 96E6  |        |       | Set program start pointer. PCLEAR 4                           |
| 38634     | 96EA  |        |       | Start graphics page 1 at \$0600                               |
| 38638     | 96EE  |        |       | Set PMODE 0,1. (Start graphics on Page 1 and set PMODE = 0.   |
| 38643     | 96F3  |        |       | Set screen width to 16 bytes.                                 |
| 38647     | 96F7  |        |       | Set Foreground color to 3.                                    |
| 38651     | 96FB  |        |       | Set end of graphics page 1 at \$BFF                           |
| 38655     | 96FF  |        |       | Set up user program space                                     |
| 38657     | 9701  |        |       | Set up \$0 for initial end of line                            |
| 38672     | 9710  |        |       | *S* Compare 2 point. Ref. [5] #8                              |
| 38691     | 9723  |        |       | *S* Execution of "PCOPY" Extended BASIC command (Token \$C7)  |
| 38741     | 9755  |        |       | *S* Execution of "GET" Extended BASIC command (Token \$C4)    |
| 38744     | 9758  |        |       | *S* Execution of "PUT" Extended BASIC command (Token \$C5)    |
| 39148     | 98EC  |        |       | *S* Execution of "PAINT" Extended BASIC command (Token \$C3)  |
| 39458     | 9A22  |        |       | *S* Execution of "PLAY" Extended BASIC command (Token \$C9)   |
| 40118     | 9CB6  |        |       | *S* Execution of "DRAW" Extended BASIC command (Token \$C6)   |
| 40605     | 9E9D  |        |       | *S* Execution of "CIRCLE" Extended BASIC command (Token \$C2) |

| Beginning<br>DEC | Ending<br>HEX | DEC   | HEX  | Description                                                                                                                                                                                                                                                                               |
|------------------|---------------|-------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ADDR             | ADDR          | ADDR  | ADDR |                                                                                                                                                                                                                                                                                           |
| 40960            | A000          | 49151 | BFFF | BASIC ROM[1]                                                                                                                                                                                                                                                                              |
| 40961            | A000          |       |      | Address of routine to poll keyboard for a character<br>POLCAT[2] (\$A1C1)<br>Z=1,A=0 NO KEY<br>Z=0,A=KEY FOR KEY                                                                                                                                                                          |
| 40962            | A002          |       |      | Address of routine to Output char in REG A to<br>current ouput device (all registers but CC are<br>preserved) CHROUT[1] (\$A2A7)                                                                                                                                                          |
| 40964            | A004          |       |      | Address of routine to start cassette--turns on<br>motor and read header/gaps (gets into bit sync)<br>CSRDON[2] (\$A77C)                                                                                                                                                                   |
| 40966            | A006          |       |      | Address of routine to read a block from cassette<br>into tape buffer BLKIN[2], cassette must be on and<br>in bit sync X=CBUFAD[2]+BLKLEN[2] interrupts are<br>masked U and Y are preserved all others modified<br>(\$A70B)                                                                |
| 40968            | A008          |       |      | Address of routine to write a block to cassette<br>from tape buffer BLKOUT[2] X=CBUFAD[2]+BLKLEN[2]<br>all registers modified (\$A7F4)                                                                                                                                                    |
| 40970            | A00A          |       |      | Address of routine to sample joystick pots and<br>store their values in \$15A (346) to \$15D (349).<br>Y is preserved all others modified JOYIN[1] (\$A9DE)                                                                                                                               |
| 40972            | A00C          |       |      | Address of routine to turn cassette on and write<br>leader/gap/ \$55'S WRTLDR[2] (\$A7D8)                                                                                                                                                                                                 |
| 40974            | A00E          | 41328 | A170 | Re-start routines. Ref.[5]#22pp98-102                                                                                                                                                                                                                                                     |
| 40974            | A00E          | 40998 | A026 | *S* Secondary restart routine enables the<br>cartridge interrupt then determines whether cold<br>or warm start is specified. A warm start is<br>performed if the restart flag at \$71 contains<br>\$55 and if the value of the byte pointed to<br>by the address at \$72-73 is \$12(NOP). |
| 40999            | A027          | 41069 | A06D | *S* Primary restart routine. Performs reset when<br>reset button is pressed. PIA and SAM are<br>reinitialized and then a jump to the secondary<br>reset routine \$A00E is executed.<br>Function of reset button can be emulated in<br>software by POKE 113,0:EXEC 40999                   |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Description                                                                                                                                                                                                                                                                                         |
|--------------------------|-----------------------|--------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 40960                    | A000                  | 49151                    | BFFF                  | BASIC ROM Cont. [1]                                                                                                                                                                                                                                                                                 |
| 41076                    | A074                  | 41191                    | A0E7                  | *S*Cold start routine                                                                                                                                                                                                                                                                               |
| 41076                    | A074                  | 41125                    | A0A5                  | Initializes low Ram Scratch pad memory \$0000-\$3FFF, determines upper limit of RAM and stores this limit at \$74-\$75, does equivalent of CLEAR 200, and sets up BASIC's next line pointer.                                                                                                        |
| 41126                    | A0A6                  |                          |                       | Check for extended Disk ROM and branch; Basic ends up here after Extended Basic initializes and reconfigures the system to include Extended Basic functions. Then a check is made to see if Disk Basic ROM is present; if \$C000 contains \$44 and \$C001 contains \$4B then jump is made to \$C002 |
| 41163                    | A0CB                  |                          |                       | Check for extended Basic ROM and branch; a check is made to see if Extended Basic ROM is present; if \$8000 contains \$45 and \$8001 contains \$58 then jump is made to \$8002.                                                                                                                     |
| 41175                    | A0D7                  |                          |                       | *S* Displays version of BASIC ROM \$A000-\$BFFF.                                                                                                                                                                                                                                                    |
| 41181                    | A0DD                  | 41191                    | A0E7                  | *S* set restart vector and flag for warm restart go to main command mode idle loop                                                                                                                                                                                                                  |
| 41192                    | A0E8                  |                          |                       | *S* Warm restart (pointers not reinitialized)                                                                                                                                                                                                                                                       |
| 41203                    | A0F3                  |                          |                       | *S* Return to BASIC                                                                                                                                                                                                                                                                                 |
| 41206                    | A0F6                  |                          |                       | *S* Default FIRQ handler                                                                                                                                                                                                                                                                            |
| 41224                    | A108                  |                          |                       | *S* Cartridge secondary restart routine                                                                                                                                                                                                                                                             |
| 41229                    | A10D                  | 41256                    | A128                  | BASIC Initialization data down loaded to Ram addresses \$008F-\$00AA.                                                                                                                                                                                                                               |
| 41257                    | A129                  | 41286                    | A145                  | BASIC Initialization data down loaded to RAM addresses \$010C-\$0129                                                                                                                                                                                                                                |
| 41286                    | A146                  | 41328                    | A170                  | Copyright notice Logo text                                                                                                                                                                                                                                                                          |
| 41329                    | A171                  |                          |                       | *S* Get character from keyboard or cassette and put into REG. A. Set bit 8=0 and parity off                                                                                                                                                                                                         |
| 41334                    | A176                  |                          |                       | *S* Get character from device specified by \$6F and put that character into REG. A. no modification                                                                                                                                                                                                 |
| 41350                    | A186                  |                          |                       | *S* Get character from cassette and put into REG. A                                                                                                                                                                                                                                                 |

| Beginning<br>DEC | Ending<br>HEX | Beginning<br>DEC | Ending<br>HEX | Description                                                                                                                                 |
|------------------|---------------|------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| ADDR             | ADDR          | ADDR             | ADDR          |                                                                                                                                             |
| 40960            | A000          | 49151            | BFFF          | BASIC ROM Cont. [1]                                                                                                                         |
| 41369            | A199          |                  |               | *S* Display cursor                                                                                                                          |
| 41393            | A1B1          | 41410            | A1C0          | *S* Display cursor and wait for input character from keyboard and put character into REG. A.                                                |
| 41409            | A1C1          | 41414            | A1C6          | *S* Check for character at keyboard and flag status (8 bit =0 if character is not there; 8 bit =1 if character is there). Ref. [5] Vol 1 #3 |
| 41416            | A1C8          | 41452            | A1EC          | *S* Check for character at keyboard and decode character. (called from \$A1C3)                                                              |
| 41453            | A1ED          | 41516            | A22C          | *S* Decode character input from keyboard. (called from \$A1E1)                                                                              |
| 41517            | A22D          | 41527            | A237          | *S* check for shift key depressed. (Called from \$A203)                                                                                     |
| 41528            | A238          | 41581            | A26D          | Check keyboard (called from \$A21B)                                                                                                         |
| 41582            | A26E          | 41601            | A281          | Keyboard Special character table                                                                                                            |
| 41582            | A26E          |                  |               | \$5E (Up Arrow)                                                                                                                             |
| 41583            | A26F          |                  |               | \$5F (Shift Up Arrow)                                                                                                                       |
| 41584            | A270          |                  |               | \$0A (Down Arrow)                                                                                                                           |
| 41585            | A271          |                  |               | \$5B (Shift Down Arrow)                                                                                                                     |
| 41586            | A272          |                  |               | \$08 (Left Arrow)                                                                                                                           |
| 41587            | A273          |                  |               | \$15 (Shift Left Arrow)                                                                                                                     |
| 41588            | A274          |                  |               | \$09 (Right Arrow)                                                                                                                          |
| 41589            | A275          |                  |               | \$5D (Shift Right Arrow)                                                                                                                    |
| 41590            | A276          |                  |               | \$20 (Space)                                                                                                                                |
| 41591            | A277          |                  |               | \$20 (Space)                                                                                                                                |
| 41592            | A278          |                  |               | \$30 (Zero)                                                                                                                                 |
| 41593            | A279          |                  |               | \$12 (Shift Zero)                                                                                                                           |
| 41594            | A27A          |                  |               | \$0D (Enter)                                                                                                                                |
| 41595            | A27B          |                  |               | \$0D (Shift Enter)                                                                                                                          |
| 41596            | A27C          |                  |               | \$0C (Clear)                                                                                                                                |
| 41597            | A27D          |                  |               | \$5C (Shift Clear)                                                                                                                          |
| 41598            | A27E          |                  |               | \$03 (Break)                                                                                                                                |
| 41499            | A27F          |                  |               | \$03 (Shift Break)                                                                                                                          |
| 41500            | A280          |                  |               | \$40 (@)                                                                                                                                    |
| 41501            | A281          |                  |               | \$13 (Shift @)                                                                                                                              |
| 41602            | A282          | 41639            | A2A7          | *S* Character output routine determines current output device specified by \$6F, then outputs the character in reg A to that device.        |
| 41640            | A2A8          | 41662            | A2BE          | Set parameters \$79-\$7E and perform cassette output                                                                                        |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | HEX<br>ADDR | Description                                                                                                                                        |
|--------------------------|-----------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| 40960                    | A000                  | 49151 BFFF  | BASIC ROM Cont. [1]                                                                                                                                |
| 41606                    | A2BF                  | 41722 A2FA  | *S* Send character in REG. A. to current output device. Called as subroutine from \$A282.<br>Ref. [5] Vol 1 #4 and [6] Vol 2 #8 p122-123           |
| 41723                    | A2FB                  | 41737 A309  | *S* Send bit (called from \$A2DD)                                                                                                                  |
| 41730                    | A302                  |             | *S* Delay half bit time                                                                                                                            |
| 41738                    | A30A                  | 41822 A35E  | *S* Screen Display routine. Ref.[6] April 83 p50                                                                                                   |
| 41823                    | A35F                  | 41859 A383  | *S* Routine to set output parameters for selected device in RAM memory \$6A to \$6F                                                                |
| 41860                    | A384                  | 41868 A38C  | *S* Routine to set up parameters for cassette output                                                                                               |
| 41869                    | A38D                  | 41964 A3EC  | *S* Subroutine clears screen then does line input to buffer.                                                                                       |
| 41872                    | A390                  |             | *S* Line input entry point (no clear screen)                                                                                                       |
| 41965                    | A3ED                  | 41989 A405  | *S* Routine to assure proper file mode is set and file has properly been opened                                                                    |
| 41990                    | A406                  | 42005 A415  | *S* Routine to assure when device is set for cassette output that a file is open for output and the mode is correct                                |
| 42006                    | A416                  | 42044 A43C  | *S* Execution of "CLOSE" BASIC command (Token \$9A)                                                                                                |
| 42045                    | A43D                  | 42059 A44B  | *S* Assure any remaining characters in the output buffer are purged from the buffer and written to the output device (called by Close from \$A43B) |
| 42060                    | A44C                  | 42135 A497  | *S* Execution of "CSAVE" BASIC command (Token \$98)                                                                                                |
| 42136                    | A498                  | 42237 A4FD  | *S* Execution of "CLOAD" BASIC command (Token \$97)                                                                                                |
| 42232                    | A4F8                  |             | *S* Display of "I/O Error"                                                                                                                         |
| 42238                    | A4FE                  | 42301 A53D  | *S* Execution of "CLOADM" Called by CLOAD Command from \$A49C                                                                                      |
| 42302                    | A53E                  | 42323 A553  | *S* Execution of "EXEC" BASIC command (Token \$A2)                                                                                                 |
| 42324                    | A554                  | 42339 A563  | Position cursor for PRINT@                                                                                                                         |
| 42340                    | A564                  | 42359 A577  | *S* Execution of "INKEY\$" BASIC function (Token \$FF92)                                                                                           |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | DEC<br>ADDR | HEX<br>ADDR | Description                                                                                                                                                                                                                                                                                                    |
|--------------------------|-----------------------|-------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 40960                    | A000                  | 49151       | BFFF        | BASIC ROM Cont. [1]                                                                                                                                                                                                                                                                                            |
| 42360                    | A578                  | 42401       | A5A1        | *S* Parse out filename from current position in input buffer. Used in conjunction with search for filename routine at \$A648                                                                                                                                                                                   |
| 42394                    | A59A                  | 42401       | A5A1        | *S* Transfer block X register holds starting address, B register holds number of bytes to move, U holds destination address.                                                                                                                                                                                   |
| 42402                    | A5A2                  | 42436       | A5C4        | *S* Parse out device number                                                                                                                                                                                                                                                                                    |
| 42437                    | A5C5                  | 42445       | A5CD        | *S* Parse out filename called by CLOAD from \$A4A0 and by SKIPF from \$A5EC                                                                                                                                                                                                                                    |
| 42446                    | A5CE                  | 42475       | A5EB        | *S* Execution of "EOF" Basic function (Token \$FF8C)                                                                                                                                                                                                                                                           |
| 42476                    | A5EC                  | 42485       | A5F5        | *S* Execution of "SKIPF" command (Token SA3)                                                                                                                                                                                                                                                                   |
| 42486                    | A5F6                  | 42531       | A623        | *S* Execution of "OPEN" command (Token \$99)                                                                                                                                                                                                                                                                   |
| 42532                    | A624                  | 42567       | A647        | *S* Open a tape file for input                                                                                                                                                                                                                                                                                 |
| 42549                    | A635                  |             |             | *S* Read an ASCII file from tape                                                                                                                                                                                                                                                                               |
| 42568                    | A648                  | 42583       | A657        | *S* Search tape for a filename                                                                                                                                                                                                                                                                                 |
| 42584                    | A658                  | 42624       | A680        | *S* Open a tape file for output                                                                                                                                                                                                                                                                                |
| 42625                    | A681                  | 42762       | A70A        | *S* Find a file specified by filename \$1D2 - \$1D9                                                                                                                                                                                                                                                            |
| 42750                    | A6FE                  | 42762       | A70A        | *S* Blink Corner of the screen                                                                                                                                                                                                                                                                                 |
| 42753                    | A701                  |             |             | *S* Read one record from tape with motor control (sync, read gap, read block)                                                                                                                                                                                                                                  |
| 42763                    | A70B                  | 42824       | A748        | *S* Plain read block from cassette only; motor must be on and in bit sync; \$7C holds block type, \$7D holds blocksize; U and Y are preserved; if no errors Z is 1, A is 0, X = buffer start + block length; if checksum error Z is 0, A is 1, X points beyond bad address; if memory error Z is 0 and A is 2. |
| 42825                    | A749                  | 42836       | A754        | *S* Read one byte                                                                                                                                                                                                                                                                                              |
| 42837                    | A755                  | 42844       | A75C        | *S* Read one bit                                                                                                                                                                                                                                                                                               |
| 42845                    | A75D                  | 42859       | A76B        | Determine wavelength of cassette input                                                                                                                                                                                                                                                                         |
| 42860                    | A76C                  | 42875       | A77B        | Time cassette input by watching for 0 crossover                                                                                                                                                                                                                                                                |

| Beginning<br>DEC | Ending<br>HEX | Beginning<br>DEC | Ending<br>HEX | Description                                                                                                                                                                                                                                                                  |
|------------------|---------------|------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ADDR             | ADDR          | ADDR             | ADDR          |                                                                                                                                                                                                                                                                              |
| 40960            | A000          | 49151            | BFFF          | BASIC ROM Cont. [1]                                                                                                                                                                                                                                                          |
| 42876            | A77C          | 42902            | A796          | *S* Turn on tape motor synchronize data (read gap/\$55's); U and Y are preserved; FIRQ and IRQ are masked                                                                                                                                                                    |
| 42903            | A797          | 42924            | A7AC          | Calculate Time Till next falling edge. Called from \$A786                                                                                                                                                                                                                    |
| 42925            | A7AD          | 42937            | A7B9          | Check that pulse width is between allowable limits. Called from \$A784                                                                                                                                                                                                       |
| 42938            | A7BA          | 42940            | A7BC          | Clear pulse counter. Called from \$A7B5.                                                                                                                                                                                                                                     |
| 42941            | A7BD          | 42967            | A7D7          | *S* Execution of "MOTOR" command (Token \$9F)                                                                                                                                                                                                                                |
| 42954            | A7CA          |                  |               | *S* Turn on tape motor                                                                                                                                                                                                                                                       |
| 42961            | A7D1          | 42967            | A7D7          | *S* 500 millisecond delay                                                                                                                                                                                                                                                    |
| 42963            | A7D3          | 42967            | A7D7          | *S* Entry point to the delay routine where you<br>can set the delay by the magnitude of a value you pass in the X register. An RTS will be processed when countdown to 0 is reached.                                                                                         |
| 42968            | A7D8          | 42980            | A7E4          | *S* Turn on tape motor and write leader/gap/\$55's                                                                                                                                                                                                                           |
| 42981            | A7E5          | 42995            | A7F3          | *S* Write one record to tape with motor control                                                                                                                                                                                                                              |
| 42985            | A7E9          | 42995            | A7F3          | *S* Turn off tape motor                                                                                                                                                                                                                                                      |
| 42996            | A7F4          | 43046            | A826          | *S* Write Block; tape should be up to speed and leader of \$55's already written in 1st block; \$7E contains the buffer address; \$7C contains the block type; \$7D contains number of data bytes in block; X= buffer address + number of data bytes; all registers modified |
| 43050            | A82A          |                  |               | *S* Write one byte. Called by Write Block Routine from \$A80F,\$A813,\$A817,\$A81E                                                                                                                                                                                           |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | DEC<br>ADDR | HEX<br>ADDR | Description                                                        |
|--------------------------|-----------------------|-------------|-------------|--------------------------------------------------------------------|
| 40960                    | A000                  | 49151       | BFFF        | BASIC ROM Cont. [1]                                                |
| 43100                    | A85C                  |             |             | Sine table for CSAVE.                                              |
|                          |                       | Hex         | Decimal     |                                                                    |
| 43100                    | A85C                  | \$82        | 130         |                                                                    |
| 43101                    | A85D                  | \$92        | 146         |                                                                    |
| 43102                    | A85E                  | \$AA        | 170         |                                                                    |
| 43103                    | A85F                  | \$BA        | 186         |                                                                    |
| 43104                    | A860                  | \$CA        | 202         |                                                                    |
| 43105                    | A861                  | \$DA        | 218         |                                                                    |
| 43106                    | A862                  | \$EA        | 234         |                                                                    |
| 43107                    | A863                  | \$F2        | 242         |                                                                    |
| 43108                    | A864                  | \$FA        | 250         |                                                                    |
| 43109                    | A865                  | \$FA        | 250         |                                                                    |
| 43110                    | A866                  | \$FA        | 250         |                                                                    |
| 43111                    | A867                  | \$F2        | 242         |                                                                    |
| 43112                    | A868                  | \$EA        | 234         |                                                                    |
| 43113                    | A869                  | \$DA        | 218         |                                                                    |
| 43114                    | A86A                  | \$CA        | 202         |                                                                    |
| 43115                    | A86B                  | \$BA        | 186         |                                                                    |
| 43116                    | A86C                  | \$AA        | 170         |                                                                    |
| 43117                    | A86D                  | \$92        | 146         |                                                                    |
| 43118                    | A86E                  | \$7A        | 122         |                                                                    |
| 43119                    | A86F                  | \$6A        | 106         |                                                                    |
| 43120                    | A870                  | \$52        | 82          |                                                                    |
| 43121                    | A871                  | \$42        | 66          |                                                                    |
| 43122                    | A872                  | \$32        | 50          |                                                                    |
| 43123                    | A873                  | \$22        | 34          |                                                                    |
| 43124                    | A874                  | \$12        | 18          |                                                                    |
| 43125                    | A875                  | \$0A        | 10          |                                                                    |
| 43126                    | A876                  | \$02        | 2           |                                                                    |
| 43127                    | A877                  | \$02        | 2           |                                                                    |
| 43128                    | A878                  | \$02        | 2           |                                                                    |
| 43129                    | A879                  | \$0A        | 10          |                                                                    |
| 43130                    | A87A                  | \$12        | 18          |                                                                    |
| 43131                    | A87B                  | \$22        | 34          |                                                                    |
| 43132                    | A87C                  | \$32        | 50          |                                                                    |
| 43133                    | A87D                  | \$42        | 66          |                                                                    |
| 43134                    | A87E                  | \$52        | 82          |                                                                    |
| 43135                    | A87F                  | 43184       | A8B0        | *S* Execution of "SET" command (Token \$9C)                        |
| 43185                    | A8B1                  | 43252       | A8F4        | *S* Execution of "RESET" command (Token \$9D)                      |
| 43253                    | A8F5                  | 43279       | A90F        | *S* Execution of "POINT" Basic function (Token \$FF91)             |
| 43280                    | A910                  | 43318       | A936        | *S* Execution of "CLS n " command (Token \$9E)                     |
| 43304                    | A928                  | 43318       | A936        | *S* Clear screen to blanks and home cursor<br>Ref [6] April 83 p50 |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Description                                                                                                                                                  |
|--------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 40960 A000               | 49151 BFFF            | BASIC ROM Cont. [1]                                                                                                                                          |
| 43339 A94B               | 43318 A973            | *S* Execution of "SOUND" command (Token \$A0)                                                                                                                |
| 43350 A956               | 43318 A973            | *S* Generate a sound determined by pitch at \$8C and duration at \$8D                                                                                        |
| 43380 A974               | 43396 A984            | *S* Execution of "AUDIO OFF" called from \$A996                                                                                                              |
| 43397 A985               | 43407 A98F            | Timed Output through D/A and level setting routines called by SOUND command \$A94B                                                                           |
| 43408 A990               | 43425 A9A1            | *S* Execution of "AUDIO" command (Token \$A1)                                                                                                                |
| 43426 A9A2               | 43442 A9B2            | *S* Select joystick routine. Sets or resets SEL1 and SEL2 on port A of PIA U8                                                                                |
| 43443 A9B3               | 43461 A9C5            | IRQ                                                                                                                                                          |
| 43462 A9C6               | 43545 AA19            | *S* Execution of "JOYSTK" Basic function (Token \$FF8D)                                                                                                      |
| 43486 A9DE               |                       | *S* Read positions of joysticks                                                                                                                              |
| 43546 AA1A               | 43560 AA28            | *S* ROM part of get next character routine called from \$00A8. Clears carry flag if ':' Sets carry flag if ASCII 0-9. Skips blanks. Ref. [5] #12.            |
| 43561 AA29               | 43600 AA50            | Table of Pointers to subroutine entry addresses associated with Basic Function Keyword Table defined at \$AB1A to AB66. Ref. [7] Dec 1982 Anniversary Issue. |
| Contents For Function    |                       |                                                                                                                                                              |
| 43561 AA29               | \$BC7A                | SGN                                                                                                                                                          |
| 43563 AA2B               | \$BCEE                | INT                                                                                                                                                          |
| 43565 AA2D               | \$BC93                | ABS                                                                                                                                                          |
| 43567 AA2F               | \$0112                | USR                                                                                                                                                          |
| 43569 AA31               | \$BF1F                | RND                                                                                                                                                          |
| 43571 AA33               | \$BF78                | SIN                                                                                                                                                          |
| 43573 AA35               | \$B750                | PEEK                                                                                                                                                         |
| 43575 AA37               | \$B681                | LEN                                                                                                                                                          |
| 43577 AA39               | \$B4FD                | STR\$                                                                                                                                                        |
| 43579 AA3B               | \$B716                | VAL                                                                                                                                                          |
| 43581 AA3D               | \$B6A0                | ASC                                                                                                                                                          |
| 43583 AA3F               | \$B68C                | CHR\$                                                                                                                                                        |
| 43585 AA41               | \$A5CE                | EOF                                                                                                                                                          |
| 43587 AA43               | \$A9C6                | JOYSTK                                                                                                                                                       |
| 43589 AA45               | \$B6AB                | LEFT\$                                                                                                                                                       |
| 43591 AA47               | \$B6C8                | RIGHT\$                                                                                                                                                      |
| 43593 AA49               | \$B6CF                | MID\$                                                                                                                                                        |
| 43595 AA4B               | \$A8F5                | POINT                                                                                                                                                        |
| 43597 AA4D               | \$A564                | INKEY\$                                                                                                                                                      |
| 43599 AA4F               | \$B4EE                | MEM                                                                                                                                                          |

| Beginning | Ending |       |      | Description                                                                                        |
|-----------|--------|-------|------|----------------------------------------------------------------------------------------------------|
| DEC       | HEX    | DEC   | HEX  |                                                                                                    |
| ADDR      | ADDR   | ADDR  | ADDR |                                                                                                    |
| 40960     | A000   | 49151 | BFFF | BASIC ROM Cont. [1]                                                                                |
| 43622     | AA66   | 43801 | AB19 | BASIC Command keyword - token table - ASCII<br>Characters Ref. [7] December 1982 Anniversary Issue |
|           |        |       |      | CONTAINS CONVERTED TO TOKEN                                                                        |
|           |        |       |      | STRING HEX DECIMAL                                                                                 |
| 43622     | AA66   | 43624 | AA68 | FOR \$80 128                                                                                       |
| 43625     | AA69   | 43626 | AA6A | GO \$81 129                                                                                        |
| 43627     | AA6B   | 43629 | AA6D | REM \$82 130                                                                                       |
| 43630     | AA6E   |       |      | ' \$83 131                                                                                         |
| 43631     | AA6F   | 43634 | AA72 | ELSE \$84 132                                                                                      |
| 43635     | AA73   | 43636 | AA74 | IF \$85 133                                                                                        |
| 43637     | AA75   | 43640 | AA78 | DATA \$86 134                                                                                      |
| 43641     | AA79   | 43645 | AA7D | PRINT \$87 135                                                                                     |
| 43646     | AA7E   | 43647 | AA7F | ON \$88 136                                                                                        |
| 43648     | AA80   | 43652 | AA84 | INPUT \$89 137                                                                                     |
| 43653     | AA85   | 43655 | AA87 | END \$8A 138                                                                                       |
| 43656     | AA88   | 43659 | AA8B | NEXT \$8B 139                                                                                      |
| 43660     | AA8C   | 43662 | AA8E | DIM \$8C 140                                                                                       |
| 43663     | AA8F   | 43666 | AA92 | READ \$8D 141                                                                                      |
| 43667     | AA93   | 43669 | AA95 | RUN \$8E 142                                                                                       |
| 43670     | AA96   | 43676 | AA9C | RESTORE \$8F 143                                                                                   |
| 43677     | AA9D   | 43682 | AAA2 | RETURN \$90 144                                                                                    |
| 43683     | AAA3   | 43686 | AAA6 | STOP \$91 145                                                                                      |
| 43687     | AAA7   | 43690 | AAAA | POKE \$92 146                                                                                      |
| 43691     | AAAB   | 43694 | AAAE | CONT \$93 147                                                                                      |
| 43695     | AAAF   | 43698 | AAB2 | LIST \$94 148                                                                                      |
| 43699     | AAB3   | 43703 | AAB7 | CLEAR \$95 149                                                                                     |
| 43704     | AAB8   | 43706 | AABA | NEW \$96 150                                                                                       |
| 43707     | AABB   | 43711 | AABF | CLOAD \$97 151                                                                                     |
| 43712     | AAC0   | 43716 | AAC4 | CSAVE \$98 152                                                                                     |
| 43717     | AAC5   | 43720 | AAC8 | OPEN \$99 153                                                                                      |
| 43721     | AAC9   | 43725 | AACD | CLOSE \$9A 154                                                                                     |
| 43726     | AACE   | 43730 | AAD2 | LLIST \$9B 155                                                                                     |
| 43731     | AAD3   | 43733 | AAD5 | SET \$9C 156                                                                                       |
| 43734     | AAD6   | 43738 | AADA | RESET \$9D 157                                                                                     |
| 43739     | AADB   | 43741 | AADD | CLS \$9E 158                                                                                       |
| 43742     | AADE   | 43746 | AAE2 | MOTOR \$9F 159                                                                                     |
| 43747     | AAE3   | 43751 | AAE7 | SOUND \$A0 160                                                                                     |
| 43752     | AAE8   | 43756 | AAEC | AUDIO \$A1 161                                                                                     |
| 43757     | AAED   | 43760 | AAF0 | EXEC \$A2 162                                                                                      |
| 43761     | AAF1   | 43765 | AAF5 | SKIPF \$A3 163                                                                                     |
| 43766     | AAF6   | 43769 | AAF9 | TAB( \$A4 164                                                                                      |
| 43770     | AAFA   | 43771 | AAFB | TO \$A5 165                                                                                        |
| 43772     | AAFC   | 43774 | AAFE | SUB \$A6 166                                                                                       |
| 43775     | AAFF   | 43778 | AB02 | THEN \$A7 167                                                                                      |
| 43779     | AB03   | 43781 | AB05 | NOT \$A8 168                                                                                       |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | DEC<br>ADDR | HEX<br>ADDR | Description                                                                                         |
|--------------------------|-----------------------|-------------|-------------|-----------------------------------------------------------------------------------------------------|
| 40960                    | A000                  | 49151       | BFFF        | BASIC ROM Cont. [1]                                                                                 |
| 43622                    | AA60                  | 43801       | AB19        | BASIC Command keyword - token table - ASCII<br>Characters Ref. [7] December 1982 Anniversary Issue  |
|                          |                       |             |             | CONTAINS CONVERTED TO TOKEN                                                                         |
|                          |                       |             |             | STRING HEX DECIMAL                                                                                  |
| 43782                    | AB06                  | 43785       | AB09        | STEP \$A9 169                                                                                       |
| 43786                    | AB0A                  | 43788       | AB0C        | OFF \$AA 170                                                                                        |
| 43789                    | AB0D                  |             |             | + \$AB 171                                                                                          |
| 43790                    | AB0E                  |             |             | - \$AC 172                                                                                          |
| 43791                    | AB0F                  |             |             | * \$AD 173                                                                                          |
| 43792                    | AB10                  |             |             | / \$AE 174                                                                                          |
| 43793                    | AB11                  |             |             | ^ \$AF 175                                                                                          |
| 43794                    | AB12                  | 43896       | AB14        | AND \$B0 176                                                                                        |
| 43797                    | AB15                  | 43898       | AB16        | OR \$B1 177                                                                                         |
| 43799                    | AB17                  |             |             | > \$B2 178                                                                                          |
| 43800                    | AB18                  |             |             | = \$B3 179                                                                                          |
| 43801                    | AB19                  |             |             | < \$B4 180                                                                                          |
| 43802                    | AB1A                  | 43878       | AB66        | BASIC Function keyword - token table - ASCII<br>Characters Ref. [7] December 1982 Anniversary Issue |
|                          |                       |             |             | CONTAINS CONVERTED TO TOKEN                                                                         |
|                          |                       |             |             | STRING HEX DEC(MSB) DEC(LSB)                                                                        |
| 43802                    | AB1A                  | 43804       | AB1C        | SGN \$FF80 255 128                                                                                  |
| 43805                    | AB1D                  | 43807       | AB1F        | INT \$FF81 255 129                                                                                  |
| 43808                    | AB20                  | 43810       | AB22        | ABS \$FF82 255 130                                                                                  |
| 43811                    | AB23                  | 43813       | AB25        | USR \$FF83 255 131                                                                                  |
| 43814                    | AB26                  | 43816       | AB28        | RND \$FF84 255 132                                                                                  |
| 43817                    | AB29                  | 43819       | AB2B        | SIN \$FF85 255 133                                                                                  |
| 43820                    | AB2C                  | 43823       | AB2F        | PEEK \$FF86 255 134                                                                                 |
| 43824                    | AB30                  | 43826       | AB32        | LEN \$FF87 255 135                                                                                  |
| 43827                    | AB33                  | 43830       | AB36        | STR\$ \$FF88 255 136                                                                                |
| 43831                    | AB37                  | 43833       | AB39        | VAL \$FF89 255 137                                                                                  |
| 43834                    | AB3A                  | 43836       | AB3C        | ASC \$FF8A 255 138                                                                                  |
| 43837                    | AB3D                  | 43840       | AB40        | CHR\$ \$FF8B 255 139                                                                                |
| 43841                    | AB41                  | 43843       | AB43        | EOF \$FF8C 255 140                                                                                  |
| 43844                    | AB44                  | 43849       | AB49        | JOYSTK \$FF8D 255 141                                                                               |
| 43850                    | AB4A                  | 43854       | AB4E        | LEFT\$ \$FF8E 255 142                                                                               |
| 43855                    | AB4F                  | 43860       | AB54        | RIGHT\$ \$FF8F 255 143                                                                              |
| 43861                    | AB55                  | 43864       | AB58        | MID\$ \$FF90 255 144                                                                                |
| 43865                    | AB59                  | 43869       | AB5D        | POINT \$FF91 255 145                                                                                |
| 43870                    | AB5E                  | 43875       | AB63        | INKEY\$ \$FF92 255 146                                                                              |
| 43876                    | AB64                  | 43878       | AB66        | MEM \$FF93 255 147                                                                                  |

Beginning Ending

DEC HEX DEC HEX

ADDR ADDR ADDR ADDR

Description

40960 A000 49151 BFFF BASIC ROM[1] Cont.

43879 AB67 43950 ABAE Table of Pointers to subroutine entry addresses  
 associated with BASIC Command Keyword Table defined  
 at \$AA66 to \$AB19 Ref. [7] December 1982  
 Anniversary Issue.

|            | Contents | For Command |
|------------|----------|-------------|
| 43879 AB67 | \$AD47   | FOR         |
| 43881 AB69 | \$AE86   | GO          |
| 43883 AB6B | \$AEE3   | REM         |
| 43885 AB6D | \$AEE3   | '           |
| 43887 AB6F | \$AEE3   | ELSE        |
| 43889 AB71 | \$AF14   | IF          |
| 43891 AB73 | \$AEE0   | DATA        |
| 43893 AB75 | \$B8F7   | PRINT       |
| 43895 AB77 | \$AF42   | ON          |
| 43897 AB79 | \$AFF5   | INPUT       |
| 43899 AB7B | \$AE02   | END         |
| 43901 AB7D | \$B0F8   | NEXT        |
| 43903 AB7F | \$B34E   | DIM         |
| 43905 AB81 | \$B046   | READ        |
| 43907 AB83 | \$AE75   | RUN         |
| 43909 AB85 | \$ADE4   | RESTORE     |
| 43911 AB87 | \$AEC0   | RETURN      |
| 43913 AB89 | \$AE09   | STOP        |
| 43915 AB8B | \$B757   | POKE        |
| 43917 AB8D | \$AE30   | CONT        |
| 43919 AB8F | \$B764   | LIST        |
| 43921 AB91 | \$AE41   | CLEAR       |
| 43923 AB93 | \$AD17   | NEW         |
| 43925 AB95 | \$A498   | CLOAD       |
| 43927 AB97 | \$A44C   | CSAVE       |
| 43929 AB99 | \$A5F6   | OPEN        |
| 43931 AB9B | \$A416   | CLOSE       |
| 43933 AB9D | \$B75E   | LLIST       |
| 43935 AB9F | \$A880   | SET         |
| 43937 ABA1 | \$A8B1   | RESET       |
| 43939 ABA3 | \$A910   | CLS         |
| 43941 ABA5 | \$A7BD   | MOTOR       |
| 43943 ABA7 | \$A94B   | SOUND       |
| 43945 ABA9 | \$A990   | AUDIO       |
| 43947 ABAB | \$A53E   | EXEC        |
| 43949 ABAD | \$A5EC   | SKIPF       |

| Beginning<br>DEC | Ending<br>HEX | DEC   | HEX  | Description                                                                                                                                                                                                        |
|------------------|---------------|-------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ADDR             | ADDR          | ADDR  | ADDR |                                                                                                                                                                                                                    |
| 40960            | AC00          | 49151 | BFFF | BASIC ROM Cont. [1]                                                                                                                                                                                                |
| 43951            | ABAF          | 44000 | ABE0 | BASIC Error Code Table                                                                                                                                                                                             |
|                  |               |       |      | ASCII text                                                                                                                                                                                                         |
| 43951            | ABAF          | 43952 | ABE0 | NF                                                                                                                                                                                                                 |
| 43953            | ABF1          | 43954 | ABB2 | SN                                                                                                                                                                                                                 |
| 43955            | ABF3          | 43956 | ABB4 | RG                                                                                                                                                                                                                 |
| 43957            | ABF5          | 43958 | ABB6 | OD                                                                                                                                                                                                                 |
| 43959            | ABF7          | 43960 | ABB8 | FC                                                                                                                                                                                                                 |
| 43961            | ABF9          | 43962 | ABBA | OV                                                                                                                                                                                                                 |
| 43963            | ABFB          | 43964 | ABBC | OM                                                                                                                                                                                                                 |
| 43965            | ABFD          | 43966 | ABBE | UL                                                                                                                                                                                                                 |
| 43967            | ABFF          | 43968 | ABC0 | RS                                                                                                                                                                                                                 |
| 43969            | ABC1          | 43970 | ABC2 | DD                                                                                                                                                                                                                 |
| 43971            | ABC3          | 43972 | ABC4 | /0                                                                                                                                                                                                                 |
| 43973            | ABC5          | 43974 | ABC6 | ID                                                                                                                                                                                                                 |
| 43975            | ABC7          | 43976 | ABC8 | TM                                                                                                                                                                                                                 |
| 43977            | ABC9          | 43978 | ABCA | OS                                                                                                                                                                                                                 |
| 43979            | ABCB          | 43980 | ABCC | LS                                                                                                                                                                                                                 |
| 43981            | ABCD          | 43982 | ABCE | ST                                                                                                                                                                                                                 |
| 43983            | ABCF          | 43984 | ABD0 | CN                                                                                                                                                                                                                 |
| 43985            | ABD1          | 43986 | ABD2 | FD                                                                                                                                                                                                                 |
| 43987            | ABD3          | 43988 | ABD4 | AO                                                                                                                                                                                                                 |
| 43989            | ABD5          | 43990 | ABD6 | DN                                                                                                                                                                                                                 |
| 43991            | ABD7          | 43992 | ABD8 | IO                                                                                                                                                                                                                 |
| 43993            | ABD9          | 43994 | ABDA | FM                                                                                                                                                                                                                 |
| 43995            | ABDB          | 43996 | ABDC | NO                                                                                                                                                                                                                 |
| 43997            | ABDD          | 43998 | ABDE | IE                                                                                                                                                                                                                 |
| 43999            | ABDF          | 44000 | ABE0 | DS                                                                                                                                                                                                                 |
| 44001            | ABE1          | 44006 | ABE6 | ASCII text 'ERROR'                                                                                                                                                                                                 |
| 44007            | ABE7          | 44008 | ABE8 | \$0 THEN ASCII Space                                                                                                                                                                                               |
| 44009            | ABE9          | 44010 | ABEA | ASCII text 'IN'                                                                                                                                                                                                    |
| 44011            | ABEB          | 44012 | ABEC | ASCII Space then \$0                                                                                                                                                                                               |
| 44013            | ABED          | 44017 | ABF1 | CR ASCII text 'OK' CR THEN \$0                                                                                                                                                                                     |
| 44018            | ABF2          | 44024 | ABF8 | CR ASCII TEXT 'BREAK' THEN \$0                                                                                                                                                                                     |
| 44038            | AC37          |       |      | *S* Check if room under stack                                                                                                                                                                                      |
| 44064            | AC20          |       |      | *S* Routine to move a block of memory; \$41-\$42<br>holds destination top address; \$43-\$44 holds<br>source top address; \$45-\$46 holds destination<br>bottom address; \$47-\$48 holds source bottom<br>address. |
| 44102            | AC46          | 44146 | AC72 | *S* Error Processing routine. Ref. [5] #21 pl26-127                                                                                                                                                                |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | DEC<br>ADDR | HEX<br>ADDR | Description                                                                                                                                  |
|--------------------------|-----------------------|-------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| 40960                    | A000                  | 49151       | BFFF        | BASIC ROM Cont. [1]                                                                                                                          |
| 44147                    | AC73                  | 44189       | AC9D        | *S* Entry to command level of BASIC. This is the idle loop. Print "OK", close files, tokenize line, then JMP \$ADCO. Ref. [5] #12            |
| 44156                    | AC7C                  |             |             | *S* Tokenize ASCII inputs                                                                                                                    |
| 44271                    | ACEF                  |             |             | *S* Execution of a routine that relinks line link pointers (The first 2 bytes in a line point to the address of the start of the next line.) |
| 44313                    | AD17                  | 44357       | AD45        | *S* Execution of "NEW" BASIC command (Token \$96) Ref [5] #21 p126-127                                                                       |
| 44321                    | AD21                  |             |             | *S* Execution from this point clears all variables and moves the stack                                                                       |
| 44326                    | AD26                  |             |             | *S* Execution from this point clears variables only                                                                                          |
| 44359                    | AD47                  |             |             | *S* Execution of "FOR" BASIC command (Token \$80)                                                                                            |
| 44446                    | AD9E                  | 44484       | ADC4        | *S* Interpret loop Ref. [5] #12                                                                                                              |
| 44486                    | ADC6                  | 44542       | ADFE        | *S* Execute line Ref. [5] #12                                                                                                                |
| 44516                    | ADE4                  | 44522       | ADEA        | *S* Execution of "RESTORE" BASIC command (Token \$8F) Ref. [5] #21 p 126-127                                                                 |
| 44539                    | ADFB                  |             |             | *S* Exec 44539 has performs equivalent of :<br>1 A\$=INKEY\$:IFA\$=""THEN1                                                                   |
| 44546                    | AE02                  |             |             | *S* Execution of "END" BASIC command (Token \$8A)                                                                                            |
| 44553                    | AE09                  |             |             | *S* Execution of "STOP" BASIC command (Token \$91)                                                                                           |
| 44592                    | AE30                  |             |             | *S* Execution of "CONT" BASIC command (Token \$93)                                                                                           |
| 44609                    | AE41                  |             |             | *S* Execution of "CLEAR" BASIC command (Token \$95)                                                                                          |
| 44661                    | AE75                  |             |             | *S* Execution of "RUN" BASIC command (Token \$8E)                                                                                            |
| 44678                    | AE86                  |             |             | *S* Execution of "GO" BASIC command (Token \$81)                                                                                             |
| 44736                    | AEC0                  |             |             | *S* Execution of "RETURN" BASIC command (Token \$90)                                                                                         |
| 44768                    | AEE0                  |             |             | *S* Execution of "DATA" BASIC command (Token \$86)                                                                                           |
| 44771                    | AEE3                  |             |             | *S* Execution of "REM or '" BASIC command (Token \$83)                                                                                       |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | DEC<br>ADDR | HEX<br>ADDR | Description                                                                                                                                                                 |
|--------------------------|-----------------------|-------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 40960                    | A000                  | 49151       | BFFF        | BASIC ROM Cont. [1]                                                                                                                                                         |
|                          |                       |             |             | *S* Execution of "ELSE" BASIC command (Token \$84)                                                                                                                          |
| 44820                    | AF14                  |             |             | *S* Execution of "IF" BASIC command (Token \$85)                                                                                                                            |
| 44866                    | AF42                  |             |             | *S* Execution of "ON" BASIC command (Token \$88)                                                                                                                            |
| 44903                    | AF67                  |             |             | *S* Get next line number and place it in temporary<br>scratch area \$2B-2C                                                                                                  |
| 44937                    | AF89                  |             |             | *S* Execution of "LET" Extended BASIC command<br>(Token \$BA)                                                                                                               |
| 45045                    | AFF5                  |             |             | *S* Execution of "INPUT" BASIC command (Token \$89)                                                                                                                         |
| 45126                    | B046                  |             |             | *S* Execution of "READ" BASIC command (Token \$8D)                                                                                                                          |
| 45304                    | B0F8                  |             |             | *S* Execution of "NEXT" BASIC command (Token \$8B)                                                                                                                          |
| 45677                    | B26D                  |             |             | Check for "," syntax                                                                                                                                                        |
| 45679                    | B26F                  |             |             | Check for "A" syntax                                                                                                                                                        |
| 45607                    | B277                  |             |             | *S* Get operand                                                                                                                                                             |
| 45902                    | B34E                  |             |             | *S* Execution of "DIM" BASIC command (Token \$8C)                                                                                                                           |
| 46052                    | B3E4                  |             |             | Put cursor position in D register (called by<br>PRINT@ routine from \$B3E4)                                                                                                 |
| 46061                    | B3ED                  |             |             | *S* INTCNV[2] convert floating point number to a 16<br>bit 2's compliment integer; if number exceeds<br>+ or - 32768 an overflow error will occur and a<br>return to Basic. |
| 46154                    | B44A                  |             |             | *S* Display of "FC ERROR" message.                                                                                                                                          |
| 46324                    | B4F4                  |             |             | *S* Returns an integer to BASIC from D loaded with<br>2's compliment                                                                                                        |
| 46333                    | B4FD                  |             |             | *S* Execution of "STR\$" BASIC function (Token<br>\$FF88)                                                                                                                   |

| Beginning<br>DEC | Ending<br>HEX | DEC   | HEX  | Description                                                                                                |
|------------------|---------------|-------|------|------------------------------------------------------------------------------------------------------------|
| ADDR             | ADDR          | ADDR  | ADDR |                                                                                                            |
| 40960            | A000          | 49151 | BFFF | BASIC ROM Cont. [1]                                                                                        |
| 46445            | B56D          | 46605 | B60C | Garbage collection routines Ref. [5] #10                                                                   |
| 46445            | B56D          |       |      | Allocate String in string buffer                                                                           |
| 46481            | B591          |       |      | Garbage Collection                                                                                         |
| 46552            | B5D8          |       |      | Process a descriptor                                                                                       |
| 46575            | B5EF          |       |      | Compact a string                                                                                           |
| 46721            | B681          |       |      | *S* Execution of "LEN" BASIC function (Token \$FF87)                                                       |
| 46732            | B68C          |       |      | *S* Execution of "CHR\$" BASIC function (Token \$FF8B)                                                     |
| 46763            | B6AB          |       |      | *S* Execution of "LEFT\$" BASIC function (Token \$FF8E)                                                    |
| 46764            | B6AC          |       |      | *S* Execution of "ASC" BASIC function (Token \$FF8A)                                                       |
| 46792            | B6C8          |       |      | *S* Execution of "RIGHT\$" BASIC function (Token \$FF8F)                                                   |
| 46799            | B6CF          |       |      | *S* Execution of "MID\$" BASIC function (Token \$FF90)                                                     |
| 46859            | B70B          |       |      | *S* Execution of routine to evaluate argument of PCLEAR command. Argument should be present in B register. |
| 46870            | B716          |       |      | *S* Execution of "VAL" BASIC function (Token \$FF89)                                                       |
| 46904            | B738          |       |      | *S* Parse for ',' then return integer <256                                                                 |
| 46909            | B73D          |       |      | Determine offset load value for CLOADM command                                                             |
| 46928            | B750          |       |      | *S* Execution of "PEEK" BASIC function (Token \$FF86)                                                      |
| 46935            | B757          |       |      | *S* Execution of "POKE" BASIC command (Token \$92)                                                         |
| 46942            | B75E          |       |      | *S* Execution of "LLIST" BASIC command (Token \$9B)                                                        |
| 46948            | B764          |       |      | *S* Execution of "LIST" BASIC command (Token \$94)                                                         |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Description                                          |
|--------------------------|-----------------------|--------------------------|-----------------------|------------------------------------------------------|
| 40960                    | A000                  | 49151                    | BFFF                  | BASIC ROM Cont. [1]                                  |
| 47042                    | B7C2                  | 47349                    | B8F5                  | Tokenize & Untokenize Routines Ref. [5] #7           |
| 47042                    | B7C2                  | 47136                    | B820                  | *S* Untokenize Routine                               |
| 47042                    | B7C2                  |                          |                       | RAM Hook from untokenize routine                     |
| 47078                    | B7E6                  |                          |                       | Untokenize one token                                 |
| 47137                    | B821                  | 47349                    | B8F5                  | *S* Tokenize Routine                                 |
| 47137                    | B821                  |                          |                       | RAM Hook from tokenize routine                       |
| 47250                    | B892                  |                          |                       | Tokenize one word                                    |
| 47351                    | B8F7                  |                          |                       | *S* Execution of "PRINT" BASIC command (Token \$87)  |
| 47532                    | B9AC                  |                          |                       | *S* Print a space                                    |
| 47545                    | B9B9                  |                          |                       | *S* Floating point subtract $FPAC1=[X]-FPAC1$        |
| 47554                    | B9C2                  |                          |                       | *S* Floating point add $FPAC1=[X]+FPAC1$             |
| 47818                    | BACA                  |                          |                       | *S* Floating point multiply $FPAC1=[X]*FPAC1$        |
| 48015                    | BB8F                  |                          |                       | *S* Floating point divide $FPAC1=[X]/FPAC1$          |
| 48250                    | BC7A                  |                          |                       | *S* Execution of "SGN" Basic function (Token \$FF80) |
| 48275                    | BC93                  |                          |                       | *S* Execution of "ABS" Basic function (Token \$FF82) |
| 48366                    | BCEE                  |                          |                       | *S* Execution of "INT" Basic function (Token \$FF81) |
| 48588                    | BDCC                  |                          |                       | *S* Display decimal value in D                       |
| 48927                    | BF1F                  |                          |                       | *S* Execution of "RND" Basic function (Token \$FF84) |
| 49016                    | BF78                  |                          |                       | *S* Execution of "SIN" Basic function (Token \$FF85) |
| 49138                    | BFF2                  | 49151                    | BFFF                  | Interrupt and reset vectors                          |
| 49138                    | BFF2                  | 49139                    | BFF3                  | SWI3 Vector                                          |
| 49140                    | BFF4                  | 49141                    | BFF5                  | SWI2 Vector                                          |
| 49142                    | BFF6                  | 49143                    | BFF7                  | FIRQ Vector                                          |
| 49144                    | BFF8                  | 49145                    | BFF9                  | IRQ Vector                                           |
| 49146                    | BFFA                  | 49147                    | BFFB                  | SWI1 Vector                                          |
| 49148                    | BFFC                  | 49149                    | BFFD                  | NMI Vector                                           |
| 49150                    | BFFE                  | 49151                    | BFFF                  | RESET Vector                                         |

| Beginning<br>DEC | Ending<br>HEX | DEC   | HEX  | Description                                                                                          |
|------------------|---------------|-------|------|------------------------------------------------------------------------------------------------------|
| ADDR             | ADDR          | ADDR  | ADDR |                                                                                                      |
| 49152            | C000          | 65279 | FEEF | Cartridge ROM[1]/ Disk Operating System (DOS ends at \$D800)                                         |
| 49152            | C000          | 49153 | C001 | Flag to identify Disk ROM is present. ASCII 'DK'                                                     |
| 49156            | C004          |       |      | Address of DSKCON (\$D66C)                                                                           |
| 49158            | C006          |       |      | Address of DSKCON parameters                                                                         |
| 49160            | C008          |       |      | Cold start Disk Basic. (Actually starts at C002 and continues here)                                  |
| 49364            | C0D4          | 49370 | C0DA | Warm start Disk Basic                                                                                |
| 49373            | C0DD          | 49397 | C0F5 | Reset Disk Drive routine                                                                             |
| 49446            | C126          | 49534 | C17E | Disk Basic Copyright notice                                                                          |
| 49535            | C17F          | 49630 | C1DA | Disk BASIC Command keyword - token table - ASCII Characters Ref. [7] December 1982 Anniversary Issue |

|                       | CONTAINS<br>STRING | CONVERTED TO TOKEN<br>HEX DECIMAL |
|-----------------------|--------------------|-----------------------------------|
| 49535 C17F 49537 C181 | DIR                | \$CE 206                          |
| 49538 C182 49542 C186 | DRIVE              | \$CF 207                          |
| 49543 C187 49547 C18B | FIELD              | \$D0 208                          |
| 49548 C18C 49552 C190 | FILES              | \$D1 209                          |
| 49553 C191 49556 C194 | KILL               | \$D2 210                          |
| 49557 C195 49560 C198 | LOAD               | \$D3 211                          |
| 49561 C199 49564 C19C | LSET               | \$D4 212                          |
| 49565 C19D 49569 C1A1 | MERGE              | \$D5 213                          |
| 49570 C1A2 49575 C1A7 | RENAME             | \$D6 214                          |
| 49576 C1A8 49579 C1AB | RSET               | \$D7 215                          |
| 49580 C1AC 49583 C1AF | SAVE               | \$D8 216                          |
| 49584 C1B0 49588 C1B4 | WRITE              | \$D9 217                          |
| 49589 C1B5 49594 C1BA | VERIFY             | \$DA 218                          |
| 49595 C1BB 49600 C1C0 | UNLOAD             | \$DB 219                          |
| 49601 C1C1 49606 C1C6 | DSKINI             | \$DC 220                          |
| 49607 C1C7 49612 C1CC | BACKUP             | \$DD 221                          |
| 49613 C1CD 49616 C1D0 | COPY               | \$DE 222                          |
| 49617 C1D1 49621 C1D5 | DSKI\$             | \$DF 223                          |
| 49622 C1D6 49626 C1DA | DSKO\$             | \$E0 224                          |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | Description                                                        |
|--------------------------|-----------------------|--------------------------------------------------------------------|
| 49152 C000               | 65279 FEEF            | Cartridge ROM[1]/ Disk Operating System (DOS ends at \$D800) Cont. |

49627 C1DB 49665 C200 Table of Pointers to subroutine entry addresses associated with Disk BASIC Command Keyword Table defined at \$C17F to \$C200 Ref. [7] December 1982 Anniversary Issue.

|            | Contents | For Command |
|------------|----------|-------------|
| 49627 C1DB | \$CBCF   | DIR         |
| 49629 C1DF | \$CDE9   | DRIVE       |
| 49631 C1E1 | \$CFEC   | FIELD       |
| 49633 C1E3 | \$D080   | FILES       |
| 49635 C1E5 | \$C6C2   | KILL        |
| 49637 C1E7 | \$C99A   | LOAD        |
| 49639 C1E9 | \$D026   | LSET        |
| 49641 C1EB | \$C98B   | MERGE       |
| 49643 C1ED | \$CF3F   | RENAME      |
| 49645 C1EF | \$D025   | RSET        |
| 49647 C1F1 | \$C932   | SAVE        |
| 49649 C1F3 | \$CF8A   | WRITE       |
| 49651 C1F5 | \$D65B   | VERIFY      |
| 49653 C1F7 | \$D146   | UNLOAD      |
| 49655 C1F9 | \$D4AB   | DSKINI      |
| 49657 C1FB | \$D175   | BACKUP      |
| 49659 C1FD | \$D2CC   | COPY        |
| 49661 C1FF | \$D3FF   | DSKIS       |
| 49663 C200 | \$D474   | DSKOS       |

49665 C201 49683 C213 Disk BASIC Function keyword - token table - ASCII Characters

|                       | CONTAINS | CONVERTED TO TOKEN |          |          |
|-----------------------|----------|--------------------|----------|----------|
|                       | STRING   | HEX                | DEC(MSB) | DEC(LSB) |
| 49665 C201 49667 C203 | CVN      | \$FFA2             | 255      | 162      |
| 49668 C204 49671 C207 | FREE     | \$FFA3             | 255      | 163      |
| 49672 C208 49674 C20A | LOC      | \$FFA4             | 255      | 164      |
| 49675 C20B 49677 C20D | LOF      | \$FFA5             | 255      | 165      |
| 49678 C20E 49681 C211 | MKN\$    | \$FFA6             | 255      | 166      |
| 49682 C212 49683 C213 | AS       | \$FFA7             | 255      | 167      |

(Note that AS is tokenized but is not in the table of pointers \$C214-C21D.

49684 C214 49693 C21D Table of Pointers to subroutine entry addresses associated with Disk BASIC Function Keyword Table defined at \$C201 to \$C213

|            | Contents | For Function |
|------------|----------|--------------|
| 49684 C214 | \$CD1A   | CVN          |
| 49686 C216 | \$CDC0   | FREE         |
| 49688 C218 | \$CD36   | LOC          |
| 49690 C21A | \$CD5B   | LOF          |
| 49692 C21C | \$CD28   | MKN\$        |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | DEC<br>ADDR | HEX<br>ADDR | Description                                                                                                                                                                                                                                                                                               |
|--------------------------|-----------------------|-------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 49152                    | C000                  | 65279       | FEEF        | Cartridge ROM[1]/ Disk Operating System (DOS ends at \$D800) Cont.                                                                                                                                                                                                                                        |
| 49741                    | C24D                  | 49783       | C277        | *S* Disk BASIC's error processing routine. Ref. [5]<br>#21 p127-128                                                                                                                                                                                                                                       |
| 49784                    | C278                  |             |             | Disk BASIC's error code table.                                                                                                                                                                                                                                                                            |
| 50280                    | C468                  |             |             | *S* OPEN file subroutine. Before calling this routine the filename should be processed by the routine at \$C8A4, the A reg should contain the file mode (\$49=ASCII "I" for input or \$4F=ASCII "O" for output), the B reg should contain the device number. Also \$957-958 should contain the file type. |
| 50882                    | C6C2                  |             |             | *S* Execution of "KILL" Disk BASIC command<br>(Token \$D2)                                                                                                                                                                                                                                                |
| 50885                    | C6C5                  |             |             | *S* Entry point for KILL when you have set the filename you want to kill by executing the routine at C84A.                                                                                                                                                                                                |
| 51364                    | C8A4                  |             |             | *S* Subroutine to process a filename. Prior to calling this routine \$EB should be set with the default drive number, and \$957 should contain the filename.                                                                                                                                              |
| 51506                    | C932                  |             |             | *S* Execution of "SAVE" Disk BASIC command<br>(Token \$D8)                                                                                                                                                                                                                                                |
| 51595                    | C98B                  |             |             | *S* Execution of "MERGE" Disk BASIC command<br>(Token \$D5)                                                                                                                                                                                                                                               |
| 51610                    | C99A                  |             |             | *S* Execution of "LOAD" Disk BASIC command<br>(Token \$D3)                                                                                                                                                                                                                                                |
| 51771                    | CA3B                  |             |             | *S* performs close of a disk file                                                                                                                                                                                                                                                                         |
| 51795                    | CA53                  |             |             | *S* entry point for close when Device # at \$6F is set.                                                                                                                                                                                                                                                   |
| 52175                    | CBCF                  |             |             | *S* Execution of "DIR" Disk BASIC command<br>(Token \$CE)                                                                                                                                                                                                                                                 |
| 52506                    | CD1A                  |             |             | *S* Execution of "CVN" Disk BASIC function<br>(Token \$FFA2)                                                                                                                                                                                                                                              |
| 52520                    | CD28                  |             |             | *S* Execution of "MKN\$" Disk BASIC function<br>(Token \$FFA6)                                                                                                                                                                                                                                            |
| 52534                    | CD36                  |             |             | *S* Execution of "LOC" Disk BASIC function<br>(Token \$FFA4)                                                                                                                                                                                                                                              |

| Beginning<br>DEC | Ending<br>HEX | DEC   | HEX  | Description                                                                                         |
|------------------|---------------|-------|------|-----------------------------------------------------------------------------------------------------|
| ADDR             | ADDR          | ADDR  | ADDR |                                                                                                     |
| 49152            | C000          | 65279 | FEEF | Cartridge ROM[1]/ Disk Operating System (DOS ends at \$D800) Cont.                                  |
| 52571            | CD5B          |       |      | *S* Execution of "LOF" Disk BASIC function<br>(Token \$FFA5)                                        |
| 52672            | CDC0          |       |      | *S* Execution of "FREE" Disk BASIC function<br>(Token \$FFA3)                                       |
| 52713            | CDE9          |       |      | *S* Execution of "DRIVE" Disk BASIC command<br>(Token \$CF)                                         |
| 52876            | CE8C          |       |      | *S* Execution of "SAVEM" Disk BASIC command<br>(tokenized to \$D84D Note \$4D is the letter<br>"M") |
| 52965            | CEE5          |       |      | *S* Execution of "LOADM" Disk BASIC command<br>(tokenized to \$D34D Note \$4D is the letter<br>"M") |
| 53055            | CF3F          |       |      | *S* Execution of "RENAME" Disk BASIC command<br>(Token \$D6)                                        |
| 53130            | CF8A          |       |      | *S* Execution of "WRITE" Disk BASIC command<br>(Token \$D9)                                         |
| 53216            | CFE0          |       |      | *S* Execution of "FIELD" Disk BASIC command<br>(Token \$D0)                                         |
| 53285            | D025          |       |      | *S* Execution of "RSET" Disk BASIC command<br>(Token \$D7)                                          |
| 53286            | D026          |       |      | *S* Execution of "LSET" Disk BASIC command<br>(Token \$D4)                                          |
| 53376            | D080          |       |      | *S* Execution of "FILES" Disk BASIC command<br>(Token \$D1)                                         |
| 53574            | D146          |       |      | *S* Execution of "UNLOAD" Disk BASIC command<br>(Token \$DB)                                        |
| 53621            | D175          |       |      | *S* Execution of "BACKUP" Disk BASIC command<br>(Token \$DD)                                        |
| 53733            | D1E5          | 53774 | D20E | *S* Cleanup after BACKUP, DSKINI, or LOAD command<br>Ref. [5] #21 p126-127                          |
| 53964            | D2CC          |       |      | *S* Execution of "COPY" Disk BASIC command<br>(Token \$DE)                                          |
| 54271            | D3FF          |       |      | *S* Execution of "DSKIS" Disk BASIC command<br>(Token \$DF)                                         |

| Beginning Ending |      |       |      | Description                                                        |
|------------------|------|-------|------|--------------------------------------------------------------------|
| DEC              | HEX  | DEC   | HEX  |                                                                    |
| ADDR             | ADDR | ADDR  | ADDR |                                                                    |
| 49152            | C000 | 65279 | FEEF | Cartridge ROM[1]/ Disk Operating System (DOS ends at \$D800) Cont. |
| 54388            | D474 |       |      | *S* Execution of "DSKOS" Disk BASIC command (Token \$E0)           |
| 54443            | D4AB |       |      | *S* Execution of "DSKINI" Disk BASIC command (Token \$DC)          |
| 54875            | D65B |       |      | *S* Execution of "VERIFY" Disk BASIC command (Token \$DA)          |
| 54892            | D66C | 55258 | D7DA | DSKCON Read or write a 256 byte sector. Ref [5] #9                 |
| 54981            | D6C5 | 55005 | D6DD | Restore                                                            |
| 55006            | D6DE | 55036 | D6FC | Get Status                                                         |
| 55037            | D6FD | 55044 | D704 | Delay 78 mSEC                                                      |
| 55045            | D705 | 55201 | D7A1 | Read/write a sector                                                |
| 55202            | D7A2 | 55209 | D7A9 | Command address table                                              |
| 55202            | D7A2 | 55203 | D7A3 | Address of restore                                                 |
| 55204            | D7A4 | 55205 | D7A5 | Address of NOP (RTS)                                               |
| 55205            | D7A6 | 55207 | D7A7 | Address of Read sector                                             |
| 55208            | D7A8 | 55290 | D7A9 | Address of Write sector                                            |
| 55210            | D7AA | 55213 | D7AD | Bit table for drives                                               |
| 55214            | D7AE | 55227 | D7BB | NMI Handler                                                        |
| 55228            | D7BC | 55258 | D7DA | IRQ Handler                                                        |

| Beginning<br>DEC<br>ADDR | Ending<br>HEX<br>ADDR | DEC<br>ADDR | HEX<br>ADDR | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------|-----------------------|-------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 65280                    | FF00                  | 65535       | FFFF        | INPUT/OUTPUT AREA[3]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 65280                    | FF00                  | 65283       | FF03        | PIA U8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 65280                    | FF00                  |             |             | BIT 0 = Keyboard row 1 and right joystick switch<br>BIT 1 = Keyboard row 2 and left joystick switch<br>BIT 2 = Keyboard row 3<br>BIT 3 = Keyboard row 4<br>BIT 4 = Keyboard row 5<br>BIT 5 = Keyboard row 6<br>BIT 6 = Keyboard row 7<br>BIT 7 = Joystick comparison input<br><br>Decimal value is 255 or 127 if no fire buttons<br>are pressed.<br><br>Decimal value is 126 or 254 if right joystick<br>fire button is pressed.<br><br>Decimal value is 125 or 253 if left joystick<br>fire button is pressed. |
| 65281                    | FF01                  |             |             | BIT 0 Control of horizontal<br>0 = IRQ to cpu enabled<br>1 = IRQ to cpu disabled<br>BIT 1 Sync clock (63.5 usec)<br>0 = Flag set on falling edge of hs<br>1 = Flag set on rising edge of hs<br>BIT 2 Normally 1 data I/O register is addressed<br>0 = Changes FF00 to the data dir register<br>BIT 3 SEL 1: lsb of the two analog mux lines<br>BIT 4 1 Always<br>BIT 5 1 always<br>BIT 6 Not used<br>BIT 7 Horizontal sync interrupt flag                                                                       |
| 65282                    | FF02                  |             |             | BIT 0 = keyboard column 1<br>BIT 1 = keyboard column 2<br>BIT 2 = keyboard column 3<br>BIT 3 = keyboard column 4<br>BIT 4 = keyboard column 5<br>BIT 5 = keyboard column 6<br>BIT 6 = keyboard column 7<br>BIT 7 = keyboard column 8                                                                                                                                                                                                                                                                            |

| Beginning<br>DEC | Ending<br>HEX | Beginning<br>DEC | Ending<br>HEX | Description                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------|---------------|------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ADDR             | ADDR          | ADDR             | ADDR          |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 65280            | FF00          | 65535            | FFFF          | INPUT/OUTPUT AREA[3] Cont.                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 65280            | FF00          | 65283            | FF03          | PIA U8 Cont.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 65283            | FF03          |                  |               | BIT 0 = Control of Sync Clock<br>0 = IRQ To CPU disabled<br>1 = IRQ To CPU enabled<br>BIT 1 = 16.667 MS Interrupt input<br>0 = Sets Flag on falling edge FS<br>1 = Sets Flag on rising edge FS<br>BIT 2 = Normally 1 Data I/O Register is<br>addressed<br>0 = Changes F002 to Data Direction Register<br>BIT 3 = SEL2: (MSB of the two analog Mux lines)<br>BIT 4 = 1 Always<br>BIT 5 = 1 Always<br>BIT 6 = Not used<br>BIT 7 = Field Sync Interrupt Flag |
| 65312            | FF20          | 65315            | FF23          | PIA U4[3]                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 65312            | FF20          |                  |               | BIT 0 = Cassette data input<br>BIT 1 = RS232 data output<br>BIT 2-7 = 6 BIT D/A (.25-4.75 volts out)                                                                                                                                                                                                                                                                                                                                                      |
| 65313            | FF21          |                  |               | BIT 0 = control of CD<br>0 = FIRQ to CPU disabled<br>1 = FIRQ to CPU enabled<br>BIT 1 = RS232 Status input<br>0 = Set Flag on falling edge CD<br>1 = Set Flag on rising edge CD<br>BIT 2 = Normally 1 Data I/O Register is<br>addressed<br>0 = Changes FF20 to Data Direction Register<br>BIT 3 = Cassette motor control<br>0 = Off<br>1 = On<br>BIT 4 = 1 Always<br>BIT 5 = 1 Always<br>BIT 6 = Not used<br>BIT 7 = CD Interrupt Flag                    |
| 65314            | FF22          |                  |               | BIT 0 = RS-232 Data input<br>BIT 1 = Single Bit sound output<br>BIT 2 = Ram size input<br>0 = 4K<br>1 = 16K<br>BIT 3 = VDG Control output CSS Color Set Control<br>BIT 4 = VDG Control output GM0 & NOT(INT)/EXT<br>BIT 5 = VDG Control output GM1<br>BIT 6 = VDG Control output GM2<br>BIT 7 = VDG Control output NOT(A)/G                                                                                                                               |

| Beginning<br>DEC | Ending<br>HEX | Beginning<br>DEC | Ending<br>HEX | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------|---------------|------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ADDR             | ADDR          | ADDR             | ADDR          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 65280            | FF00          | 65535            | FFFF          | INPUT/OUTPUT AREA[3] Cont.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 65312            | FF20          | 65315            | FF23          | PIA U4[3] Cont.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 65315            | FF23          |                  |               | Poke 54 to disable auto execute from cartridge<br>Poke 55 to enable auto execute from cartridge<br>BIT 0 = Control of the cartridge<br>0 = FIRQ to CPU disabled<br>1 = FIRQ to CPU enabled<br>BIT 1 = Interrupt input<br>0 = Sets Flag on falling edge of cart<br>1 = Sets Flag on rising edge of cart<br>BIT 2 = Normally 1<br>0 = Changes F22 to the Data Direction Reg.<br>BIT 3 = Six Bit sound enable<br>BIT 4 = 1 Allways<br>BIT 5 = 1 Allways<br>BIT 6 = Not used<br>BIT 7 = Cartridge interrupt flag |
| 65344            | FF40          |                  |               | Disk Output latch (8 bit output port)<br>Ref. [5] #9<br>BIT 0 = Drive select 0<br>BIT 1 = Drive select 1<br>BIT 2 = Drive select 2<br>BIT 3 = Motor on<br>BIT 4 = Precomp<br>BIT 5 = Double density<br>BIT 6 = Drive select 3<br>BIT 7 = Halt enable                                                                                                                                                                                                                                                         |
| 65352            | FF48          | 65355            | FF4B          | Disk Control Registers for 1793 Disk controller chip<br>Ref. [5] #9                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 65352            | FF48          |                  |               | Disk status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 65353            | FF49          |                  |               | Disk track number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 65354            | FF4A          |                  |               | Disk sector number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 65355            | FF4B          |                  |               | Disk data                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

| Beginning<br>DEC | Ending<br>HEX | Beginning<br>DEC | Ending<br>HEX | Description                                                                                                                                                                                         |
|------------------|---------------|------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ADDR             | ADDR          | ADDR             | ADDR          |                                                                                                                                                                                                     |
| 65280            | FF00          | 65535            | FFFF          | INPUT/OUTPUT AREA[3] Cont.                                                                                                                                                                          |
| 65376            | FF60          | 65378            | FF62          | Control registers for special I/O (used for Radio Shack Digitizer 26-1195)                                                                                                                          |
| 65376            | FF60          |                  |               | X coordinate 0-255                                                                                                                                                                                  |
| 65377            | FF61          |                  |               | Y coordinate 0-191                                                                                                                                                                                  |
| 65378            | FF62          |                  |               | Pen Status                                                                                                                                                                                          |
|                  |               |                  |               | Bit 0 = Pen down                                                                                                                                                                                    |
|                  |               |                  |               | Bit 1 = Proximity (pen is within writing range of digitizer)                                                                                                                                        |
|                  |               |                  |               | Bit 2 = X margin                                                                                                                                                                                    |
|                  |               |                  |               | Bit 3 = Y margin                                                                                                                                                                                    |
| 65472            | FFC0          | 65503            | FFDF          | VDG Control Registers for 6883 SAM Address Multiplexer                                                                                                                                              |
| 65472            | FFC0          | 65477            | FFC5          | VDG Mode Register contains 3 pairs of addresses (V0-V2). Poking any value to even addresses Set bit OFF (0) in VDG circuitry. Poking value to odd addresses set bit ON (1) in 6847 VDG circuitry[3] |
| 65472            | FFC0          | 65473            | FFC1          | Control of bit 0 (V0)                                                                                                                                                                               |
| 65474            | FFC2          | 65475            | FFC3          | Control of bit 1 (V1)                                                                                                                                                                               |
| 65476            | FFC4          | 65477            | FFC5          | Control of bit 2 (V2)                                                                                                                                                                               |
|                  |               |                  |               | V0 V1 V2                                                                                                                                                                                            |
|                  |               |                  |               | 1 1 1 DMA                                                                                                                                                                                           |
|                  |               |                  |               | 1 0 1 G6R Graphics 6R (PMODE 4)                                                                                                                                                                     |
|                  |               |                  |               | G6C Graphics 6C (PMODE 3)                                                                                                                                                                           |
|                  |               |                  |               | 1 1 0 G3R Graphics 3R (PMODE 2)                                                                                                                                                                     |
|                  |               |                  |               | 1 0 0 G3C Graphics 3C (PMODE 1)                                                                                                                                                                     |
|                  |               |                  |               | 0 1 1 G2R Graphics 2R (PMODE 0)                                                                                                                                                                     |
|                  |               |                  |               | 0 0 1 G2C Graphics 2C                                                                                                                                                                               |
|                  |               |                  |               | 0 1 0 G1C Graphics 1C                                                                                                                                                                               |
|                  |               |                  |               | 0 0 0 AL Alphanumeric Internal                                                                                                                                                                      |
|                  |               |                  |               | AE Alphanumeric External                                                                                                                                                                            |
|                  |               |                  |               | S4 Semigraphic 4 (Characters generated by SET instruction)                                                                                                                                          |
|                  |               |                  |               | S6 Semigraphic 6                                                                                                                                                                                    |

| Beginning<br>DEC | Ending<br>HEX | DEC   | HEX  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------|---------------|-------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ADDR             | ADDR          | ADDR  | ADDR |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 65280            | FF00          | 65535 | FFFF | INPUT/OUTPUT AREA[3]                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 65472            | FFC0          | 65503 | FFDF | VDG Control Registers for 6883 SAM Address Multiplexer Cont.                                                                                                                                                                                                                                                                                                                                                                                                           |
| 65478            | FFC6          | 65491 | FFD3 | Page Select Register contains 7 pairs of addresses. (F0-F6) Controls display starting address (binary). Address of upper left most display element = $0000 + 1/2 * \text{OFFSET}$ . Poking any Value to even addresses sets bit OFF (0) in Page Select Circuitry. Poking any value to ODD addresses sets bit ON (1) in Page Select Circuitry. Also, Basepage is set by converting binary value of F (BITS F0-F6) to decimal and multiplying this decimal number by 512 |
| 65478            | FFC6          | 65479 | FFC7 | Control of bit 0 F0                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 65480            | FFC8          | 65481 | FFC9 | Control of bit 1 F1                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 65482            | FFCA          | 65483 | FFCB | Control of bit 2 F2                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 65484            | FFCC          | 65485 | FFCD | Control of bit 3 F3                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 65486            | FFCE          | 65487 | FFCF | Control of bit 4 F4                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 65488            | FFD0          | 65489 | FFD1 | Control of bit 5 F5                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 65490            | FFD2          | 65491 | FFD3 | Control of bit 6 F6                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 65492            | FFD4          | 65493 | FFD5 | Page #1 P1 control of bit 7<br>F7<br>0 Normal<br>1                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 65494            | FFD6          | 65497 | FFD9 | Clock speed (R0-R1). Poking any value to even addresses sets bit OFF (0). Poking any value to odd addresses sets bit ON (1)                                                                                                                                                                                                                                                                                                                                            |
| 65494            | FFD6          | 65495 | FFD7 | Control of bit R0                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 65496            | FFD8          | 65497 | FFD9 | Control of bit R1<br>R0 R1<br>1 1<br>0 1 1.8 All memory fast mode (RAM & ROM fast). Note getting all memory fast works as expected -<br>1 0 0.9/1.8 MHZ split memory (essentially ROM fast & RAM slow.<br>0 0 0.9 MHZ ONLY (all memory slow mode default)                                                                                                                                                                                                              |

| Beginning Ending |                 | Description                                                                                                                    |
|------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------|
| DEC              | HEX DEC HEX     |                                                                                                                                |
| ADDR             | ADDR ADDR ADDR  |                                                                                                                                |
| 65280            | FF00 65535 FFFF | INPUT/OUTPUT AREA[3] Cont.                                                                                                     |
| 65472            | FFC0 65503 FFDF | VDG Control Registers for 6883 SAM Address Multiplexer Cont.                                                                   |
| 65498            | FFDA 65501 FFDD | Memory size (M0-M1) Poking any value to even addresses sets bit OFF (0). Poking any value to odd addresses sets bit ON (1)     |
| 65498            | FFDA 65499 FFDB | Control of bit M0                                                                                                              |
| 65500            | FFDC 65501 FFDD | Control of bit M1                                                                                                              |
|                  |                 | M0 M1                                                                                                                          |
|                  |                 | 1 1 64K static memory configuration                                                                                            |
|                  |                 | 0 1 64K dynamic memory configuration                                                                                           |
|                  |                 | 1 0 16K dynamic memory configuration                                                                                           |
|                  |                 | 0 0 4K dynamic memory configuration                                                                                            |
| 65502            | FFDE 65503 FFDF | Register (TY) Map type. Poking any value to even addresses sets bit OFF (0). Poking any value to odd addresses sets bit ON (1) |
|                  |                 | TY                                                                                                                             |
|                  |                 | 0 Normal (ROM selected)                                                                                                        |
|                  |                 | 1 ROM deselected                                                                                                               |
| 65522            | FFF2 65523 FFF3 | SWI3 Vector mapped to 49138 BFF2 - 49139 BFF3                                                                                  |
| 65524            | FFF4 65525 FFF5 | SWI2 Vector mapped to 49140 BFF4 - 49141 BFF5                                                                                  |
| 65526            | FFF6 65527 FFF7 | FIRQ Vector mapped to 49142 BFF6 - 49143 BFF7                                                                                  |
| 65528            | FFF8 65529 FFF9 | IRQ Vector mapped to 49144 BFF8 - 49145 BFF9                                                                                   |
| 65530            | FFFA 65531 FFFB | SWI1 Vector mapped to 49146 BFFA - 49147 BFFB                                                                                  |
| 65532            | FFFC 65533 FFDD | NMI Vector mapped to 49148 BFFC - 49149 BFFD                                                                                   |
| 65534            | FFFE 65535 FFFF | RESET Vector mapped to 49150 BFFE - 49151 BFFF                                                                                 |

| Beginning |       | Ending |       | Description                                                                                                                                                                                                                           |
|-----------|-------|--------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DEC       | HEX   | DEC    | HEX   |                                                                                                                                                                                                                                       |
| ADDR      | ADDR  | ADDR   | ADDR  |                                                                                                                                                                                                                                       |
| -----     | ----- | -----  | ----- |                                                                                                                                                                                                                                       |
|           |       |        |       | Map of areas that have changed between Basic 1.0 and 1.1                                                                                                                                                                              |
| 40988     | A01C  |        |       | Address offset changed                                                                                                                                                                                                                |
| 40996     | A024  |        |       | Address offset changed                                                                                                                                                                                                                |
| 40999     | A027  | 41154  | A0C2  | Revised reset routine 1.0 ROM checked bit 2 of PIA to determine memory size (4/16k); 1.1 ROM checks bit 2 of PIA and also starts at \$600 and looks for ROM if no ROM is present 1.1 basic allows you to access 40K of Contiguous RAM |
| 41217     | A101  | 41220  | A104  | Register change                                                                                                                                                                                                                       |
| 41301     | A155  |        |       | Logo change                                                                                                                                                                                                                           |
| 41409     | A1C1  | 41581  | A26D  | Revised keyboard routine to fix old bug where joystick fire buttons used to be input to the keyboard input routine                                                                                                                    |
| 41669     | A2C5  | 41722  | A2FA  | Fix to printer driver for 8 bit ascii versus 7 bit                                                                                                                                                                                    |
| 42047     | A43F  | 42048  | A440  | Fix to close file to output partially filled buffer without junk                                                                                                                                                                      |
| 42730     | A6EA  | 42731  | A6EB  | FIX to OPEN                                                                                                                                                                                                                           |

| Beginning |      | Ending |      | Description                                                       |
|-----------|------|--------|------|-------------------------------------------------------------------|
| DEC       | HEX  | DEC    | HEX  |                                                                   |
| ADDR      | ADDR | ADDR   | ADDR |                                                                   |
|           |      |        |      | -----                                                             |
|           |      |        |      | Map of areas that have changed between Basic 1.2 and 1.1          |
| 40961     | A001 |        |      | New start address for keyboard poll routine - POLCAT              |
| 41236     | A114 |        |      | Change to Basic initialization value of default Baud rate.        |
| 41301     | A155 |        |      | Change to copyright notice to replace 0 in 1.0 by 1 to obtain 1.1 |
| 41310     | A15E |        |      | Change to year of copyright notice from 0 in 1980 to 3 in 1983.   |
| 41398     | A1B6 |        |      | New address for keyboard strobe routine.                          |
| 41409     | A1C1 | 41490  | A212 | Changes to POLCAT                                                 |
| 41494     | A216 |        |      | "                                                                 |
| 41501     | A21D |        |      | "                                                                 |
| 41505     | A221 |        |      | "                                                                 |
| 41517     | A22D |        |      | "                                                                 |
| 41524     | A234 | 41581  | A26D | "                                                                 |
| 41667     | A2C3 | 41722  | A2FA | Changes to RS-232 Output Byte routine.                            |
| 42346     | A56A |        |      | Change to INKEY\$ routine.                                        |
| 44541     | ADFD |        |      | "                                                                 |
| 45631     | B23F |        |      | ?                                                                 |
| 45966     | B38E |        |      | ?                                                                 |
| 46061     | B3ED | 46118  | B426 | Changes to INTCNV routine                                         |
| 47574     | B9D6 |        |      | Mod to floating point add.                                        |

| Beginning |      | Ending |      | Description                                                                                 |
|-----------|------|--------|------|---------------------------------------------------------------------------------------------|
| DEC       | HEX  | DEC    | HEX  |                                                                                             |
| ADDR      | ADDR | ADDR   | ADDR |                                                                                             |
|           |      |        |      | Map of areas that have changed between Extended Basic 1.1 and 1.0                           |
| 32976     | 80D0 | 32989  | 80DD |                                                                                             |
| 33023     | 80FF |        |      |                                                                                             |
| 33042     | 8112 |        |      |                                                                                             |
| 34555     | 86FB |        |      |                                                                                             |
| 35867     | 8C1B | 35874  | 8C22 | Apparent fix to DLOAD command                                                               |
| 35921     | 8C51 |        |      | "                                                                                           |
| 37241     | 9179 |        |      |                                                                                             |
| 37245     | 917D |        |      |                                                                                             |
| 38444     | 962C | 38445  | 962D | Fix to PMODE command.                                                                       |
| 38563     | 96A3 | 38579  | 96B3 | Fixes to PCLEAR command to eliminate ?SN error when executing PCLEAR in start of a program. |
| \$        |      |        |      |                                                                                             |