NEWSLETTER '85
Vol. 1 No. 4

Greetings,

First of all, please allow the editor to say that he is sorry for the delay in getting this issue to you. You see, in between our last meeting and Rainbow Fest alot has happened in this household...It's amazing just how a little baby can keep you from your duties. Again, sorry guys!

## LAST MEETING IN REVIEW

There were three product presentations during our last meeting. If you missed them...Too bad, they were great! John Keller reviewed CoCo Paint using the X-Pad. CoCo Paint is yet another graphic software program. Where it is not CoCoMax, it is a close second and at half the price. Ed Hathaway gave a brief showing of a new video digitizer called VIDX by Grafx. Once again a close second to Micro Works DS-69, but at a far less cost. Closing out the meeting, Tony Podraza tryed to show us how to burn a ADOS chip. Due to a bad tape copy of the customized ADOS, the presentation was cut short...Sorry Tony!

## JULY MEETING INFORMATION

For the July meeting, I'm sure there will be a product presentation, but at this mailing, one has not been arranged. We will however, be hearing about a very important protection program for all of your software/hardware. If for nothing else, don't miss this information.

## TIB-BITS

Attached with this newsletter is a complete listing of the CoCo's memory locations. I believe you will find this information handy in allot of ways. It was published in the December '83 issue of MICRO and is reprinted with-out permission, so mom's the word!!!

## OUTSIDE WORLD

Coming soon will be the Commodore 128. Having read a great deal about this new system, this is the low-down. This system will use an upgraded basic called BASIC 7.0 and in 80 columns. It's disk operating system will be CP/M Plus (3.0) with a beige screen (not blue). There will be a throw switch to boot their 64 mode, thus, staying fully compatible with existing software. Commodore claims that this systems separate 64, 128 and CP/M operating modes offer features that would be considered standard on most machines but were lacking on the 64 - including a faster drive (the 1517), 80-column display (on the new 1902 monitor) and memory expansion up to a 512K total. No prices have been set for the 128 of peripherals, yet, according to experts, expect to see it at around $1000 (this price will include all of the above). Commodore feels that using CP/M, it will bring this system into the business world of computers.
Footnote: At the price of this NEW system, check out Tandy's 1000. MS-DOS, disk drive, 128K, etc., etc...with a sale price of $999.95. NOW, how has the edge!!!

## CLOSING NOTES

Remember, July 11th is our next meeting. For the new guys and guests, we meet at the Glenside Public Library on Fullerton Road in Glendale Heights. Our meetings start around 7:30pm and run no latter then 10:00pm. Hope to see you all there in cocoheaven! Oh, the Glenside Color Computer Club is doing a road show at the Glendale Heights Founders Day party. Details at our July meeting.

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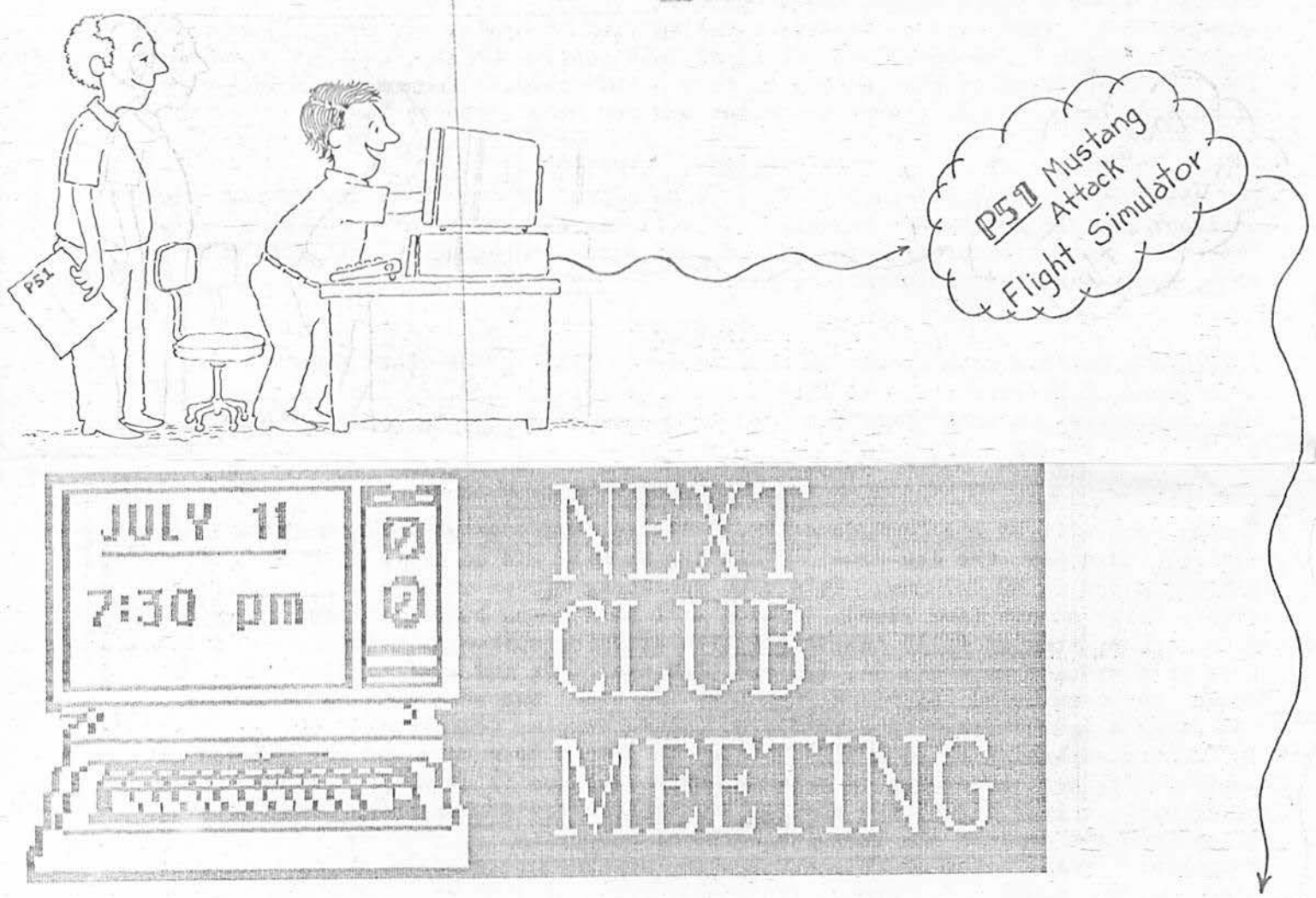
# G.C.C.C.

Glenside Color Computer Club



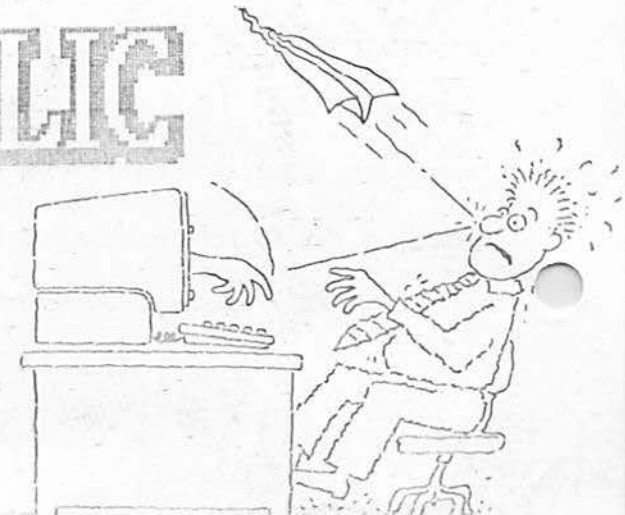

JULY 11
7:30 pm

# NEXT CLUB MEETING

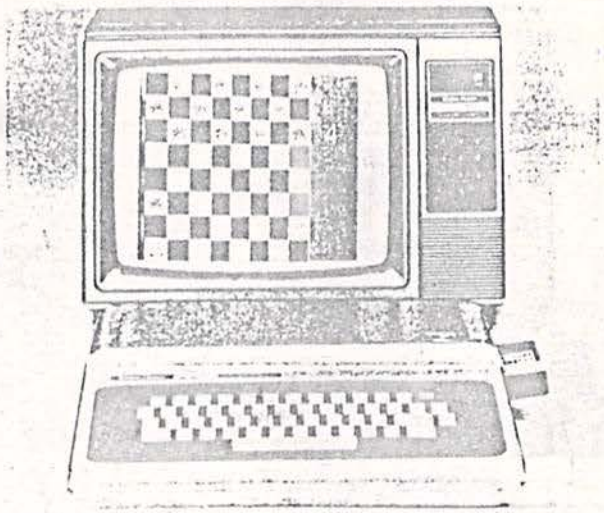
# GLENSIDE PUBLIC LIBRARY

FULLERTON AVE.

GLENDALE HEIGHTS



# Radio Shack Color Computer Memory Map



(All Numbers in Hex)

### Overview

| | |
|---|---|
| 0000-03FF | Ram used by BASIC Interpreter |
| 0400-05FF | Video Display (May be moved) |
| 0600-0FFF | RAM for user program |
| 1000-3FFF | Additional RAM in 16K system |
| 4000-7FFF | Additional RAM in 32K system |
| 8000-9FFF | Extended BASIC ROM |
| A000-BFFF | Basic Interpreter ROM |
| C000-FEFF | Cartridge ROM |
| FF00-FFFF | I/O and Control |

### Extended

| | |
|---|---|
| 0003 | General Counter |
| 0006 | String Flag |
| 0007 | Flag if Garbage Collected |
| 0019 | Start of User RAM |
| 0019-001A | BASIC Program Begin |
| 001B-001C | Pointer to Top of Program/Begin Variables |
| 001D-001E | Pointer to Top of Variables/Start of Arrays |
| 001F-0020 | Pointer to End of Arrays/Start of Available Memory |
| 0021-0022 | Top of Stack/Start of String Pool |
| 0023-0024 | Start of Used Area of String Pool |
| 0025-0026 | Pointer to BASIC Memory Limit |
| 0027-0028 | End of String Pool/Start of User Space |
| 0033-0034 | Pointer to Current Data Read Position |
| 0037-0038 | Current Variable Name |
| 0041 | 4 Bytes Used by Tokenize |
| 0041-0048 | Start and End Address of Block Move |
| 0041 | Highest Address to Move to |
| 0043 | Highest Address to Move |
| 0045 | Lowest Address Moved to |
| 0047 | Lowest Address to Move |
| 0047 | Highest String Found |
| 004B | Address of Descriptor of Highest String Found |
| 004F-0054 | Floating Point Accumulator #1 (6 bytes) |
| 0056 | String Length |
| 005C-0061 | Floating Point Accumulator #2 (6 bytes) |
| 0062 | Sign Comparison |
| 0063 | Extended Precision Byte |
| 0068-0069 | Current Program Line |
| 006C | Current Column Position |
| 006F | Device Number for Output Character (0 = Screen, $FE = Printer, $FF = Tape, 1-16 = Disk BASIC File#) |
| 0070 | EOF on Tape File Flag |
| 0071 | Reset Flag = $55 for Warmstart |
| 0072-0073 | Restart Pointer (contains $80C0-BASIC Warmstart) |
| 0074-0075 | Pointer to End of Memory |
| 0078 | File Mode (0 = None, 1 = Input, 2 = Output) |
| 0079 | Tape Working Buffer Length |
| 007A-007B | Tape Working Buffer Pointer |
| 007C | Tape File Block Type (0 = Header, 1 = Data, $FF = EOF) |
| 007D | Number of Data Bytes in Cassette I/O Block |
| 007E-007F | Program End Address 1 after a CLOADM |
| 0080 | Checksum |
| 0081 | Cassette Error # |
| 0082 | General Counter |
| 0083 | Pulse Width Count |
| 0084 | Rise/Fall Flag |
| 0085 | Last Sine Value |
| 0087 | Last Key Entered |
| 0088-0089 | Pointer to Current Cursor Position |
| 008A-008B | Serial Read # of Tries |
| 008C | Sound Frequency |
| 008D-008E | Duration of Sound |
| 008F | Start of Area Downloaded from ROM |
| 0092 | Controls Length of Unmodulated Carrier Preceeding Casette I/O |
| 0094 | Cursor Color |
| 0095-0096 | High and Low bytes of Baud Rate Code (Normally $0057) |
| 0097-0098 | Carriage Return Delay (Normally $0001) |
| 0099 | Comma Field Width (Normally $10) |
| 009A | Last Comma Field (Normally $70) |
| 009B | Printer Line Width (Normally $84) |
| 009C | Affects positions of Vars. Line-printed in Comma Fields ($00) |

| | |
|---|---|
| 009D-009E | Transfer Address after CLOADM |
| 009F | Start of get next character subroutine |
| 00A5 | Start of get same character subroutine |
| 00A6 | Next Character Pointer |
| 00A8-00AA | Jump Vector to Print OK |
| 00AB-00AE | Extended Product Area |
| 00AF | Trace Flag |
| 00B5 | Current Color |
| 00B6 | Current PMODE |
| 00B7-00B8 | End of Screen1 |
| 00B9 | Number of Bytes per Line |
| 00BA-00BB | Address of Graphics Page |
| 00BC | $E = Disk system, $6 = No disk |
| 00BD | X1 |
| 00BF | Y1 |
| 00C1 | Color Set 1 = 8 |
| 00C3 | X2 |
| 00C5 | Y2 |
| 00D7 | Temp |
| 00DB | Change Flag |
| 00E6 | DLOAD Baud Rate |
| 00E7 | Input Timeout Constant |
| 00EA | Operation Code |
| 00EB | Drive Number |
| 00EC | Track |
| 00ED | Sector |
| 00EE | Buffer Address |
| 00F0 | Status Returned |
| 0100-0102 | Software Interrupt 3 Called by Vector at $FFF2 |
| 0103-0104 | Software Interrupt 2 Called by Vector at $FFF4 |
| 0105-0108 | Software Interrupt 1 Called by Vector at $FFFA |
| 0109-010B | Non-Maskable Interrupt Called by Vector at $FFFC Set to $D7AE by Disk |
| 010C-010E | Interrupt Request Called by Vector at $FFF8 Set to $A9B3/Set to $894C by Extended/Set to $D7BC by Disk |
| 010F-0111 | Fast Interrupt Vector Called by Vector at $FFF6/Set to $A0F6 |
| 0112-0113 | High and low bytes of TIMER |
| 0116-0117 | Seed for RND Function |
| 011A | Shift Lock Flag |
| 011C | Keyboard Delay Constant |
| 011D-011F | Jump vector to $8489-Print OK |
| 0120-013C | Token Table Directory(Byte 1 = # of Keywords, Byte 2,3 = Address of Table, Byte 4,5 = Address of Subroutines) |
| 0120-0124 | BASIC Commands |
| 0125-0129 | BASIC Functions |
| 012A-012E | Extended BASIC Commands |
| 012F-0133 | Extended BASIC Functions |
| 0134-0138 | Disk BASIC Commands |
| 0139-013C | Disk BASIC Functions |
| 013E-013F | Address for USR0 |
| 0140-0141 | Address for USR1 |
| 0142-0143 | Address for USR2 |
| 0144-0145 | Address for USR3 |
| 0146-0147 | Address for USR4 |
| 0148-0149 | Address for USR5 |
| 014A-014B | Address for USR6 |
| 014C-014D | Address for USR7 |
| 014E-014F | Address for USR8 |
| 0150-0151 | Address for USR9 |
| 0152-0159 | Keyboard Rollover Table |
| 015A-015D | Joystick Readings |
| 015A | Left Joystick Up/Down |
| 015B | Left Joystick Left/Right |
| 015C | Right Joystick Up/Down |
| 015D | Right Joystick Right/Left |
| 015E-0160 | Open Device Hook Called at $A5F6/Set to $C426 by Disk |
| 0161-0163 | Device Number Check Called at $A5B9/Set to $C838 by Disk |
| 0164-0166 | Return Device Parameters Called at $A35F/Set to $C843 by Disk |
| 0167-0169 | Character Output Called at $A282/Set to $8273 by Extended/Set to $CB4A by Disk |
| 016A-016C | Character Input Called at $A176/Set to $BCF1 by Extended/Set to $C58F by Disk |
| 016D-016F | Check File OPEN for Input Called at $A3ED/Set to $C818 by Disk |
| 0173-0175 | Close All Open Files Called at $A426/Set to $CA3B by Disk |
| 0176-0178 | Close One File Called at $A42D/Set to $8286 by Extended/Set to $CA4B by Disk |
| 0179-017B | Print Using Called at $B918/Set to $8E90 by Extended |
| 017C-017E | File Item Scanner Called at $B061/Set to $CC5B by Disk |
| 017F-0181 | Break Key Check Called at $A549/Set to C859 by Disk |
| 0182-0184 | Get Line From Keyboard Called at $A390/Set to JMP RTS by Disk |
| 0185-0187 | Finish Loading ASCII File Called at $A4BF/Set to $CA36 by Disk |
| 0188-018A | Check End Of File Called at $A5CE/Set to $C860 by Disk |
| 018B-018D | Evaluate Operand Called at $B223/Set to $8846 by Extended/Set to $CDF6 by Disk |
| 018E-0190 | User Error Called at $AC46/Set to JMP RTS by Disk |
| 0191-0193 | Error Called at $AC49/Set to $88F0 by Extended/Set to $C24D by Disk |
| 0194-0196 | Run Called at $AE75/Set to $829C by Extended/Set to $C990 by Disk |
| 0197-0199 | Hex & Octal Called at $BD22/Set to $87E5 by Extended |
| 019A-019C | Execute Line Called at $AD9E/Set to $82B9 by Extended |
| 019D-019F | Graphics Address Called at $A8C4 |
| 01A0-01A2 | CLS,GET,PUT etc. Called at $A910,$975C,$8AFA,$8162 Set to $C29A by Disk |
| 01A3-01A5 | Tokenize Called at $B821/Set to $8304 by Extended |
| 8000-9FFF | Extended BASIC ROM |
| 01D1 | Tape File Length |
| 01D2-01D9 | Tape File Name |
| 01DA-02D8 | Cassette Buffer |
| 01DA-01E1 | CLOADM File Name |
| 01EA-01E6 | EXEC Address from Tape |

| | |
|---|---|
| 01E7-01E8 | Load Address from Tape |
| 02DC | Contains token for first keyword in BASIC Statement |
| 02DD-03DC | Console I/O Buffer |
| 0400-05FF | Lo-res screen |
| 0600-35FF | Posible Graphic Screens |
| 0600 | Bottom of program area/No Disk |
| 0600-06FF | Disk Buffer |
| 0700-07FF | Disk Buffer |
| 0800-0927 | Drive Table |
| 097E | Table of Current Tracks |
| 0982 | NMI in use flag |
| 0983 | NMI JMP |
| 0985 | Motor shutoff counter |
| 0986 | Current latch data |
| 0C00 | Program Start/Disk System |
| 0FFF | Top of memory (4K) |
| 3FFF | Top of memory (16K) |
| 7FFF | Top of memory (32K) |
| 8000-9FFF | Extended BASIC ROM |
| 807F | Cold Start to BASIC without size Search and Workspace init. Resets pointers to Start of BASIC Program |
| 80C0 | Warmstart to BASIC. Does not Reset Pointers to Start of BASIC Prog |
| 8183-81EF | Extended Command Token Table |
| 81F0-821D | Subroutine Entry Addresses |
| 821E-8256 | Extended Function Token Table |
| 8257-8272 | Subroutine Entry Addresses |
| 82B9 | Break or Stop Routine |
| 82BB | Extended interpret loop |
| 8378 | COSine |
| 8381 | TANgent |
| 83B0 | ArcTaNgent |
| 8446 | LOG |
| 8480 | SQuare Root |
| 84F2 | EXPonential |
| 8524 | FIX |
| 8533 | EDIT |
| 86A7 | TRace ON |
| 86A8 | TRace OFF |
| 86AC | POSition |
| 86BE | VARiable PoinTeR |
| 874E | STRING$ |
| 877E | INSTRing |
| 8871 | DEFine |
| 8968 | TIMER |
| 8970 | DELete |
| 8A09 | RENUMber |
| 8BDD | HEX$ |
| 8C18 | DownLOAD |
| 8DBC | Input Serial Character |
| 8E06 | Output Serial Character |
| 928F | Find Byte/Bit Routine |
| 92A6 | Byte/Bit; PMODES 0,2,4 |
| 92C2 | Byte/Bit; PMODES 1,3 |
| 92DD | Bit Tables |
| 9339 | PPOINT |
| 9361 | PSET |
| 9365 | PRESET |
| 93BB | LINE |
| 9444 | Draw Horizontal Line |
| 946C | Draw Vertical Line |
| 94A1 | Draw Line |
| 94E2 | The Draw Line Loop |
| 9506 | Move Up, Down, Left, Right Routines |
| 9532 | PCLS |
| 9546 | COLOR |
| 9621 | PMODE |
| 9670 | SCREEN |
| 968B | PCLEAR |
| 9710 | Compare Two Points |
| 9723 | PCOPY |
| 9755 | GET |
| 9758 | PUT |
| 98EC | PAINT |
| 9A22 | PLAY |
| 9CB6 | DRAW |
| 9E9D | CIRCLE |
| A000-BFFF | BASIC ROM |
| A000-A001 | Address of Check Keyboard |
| A002-A003 | Address of Character Out |
| A004-A005 | Address of Cassette Read On |
| A006-A007 | Address of Block In |
| A008-A009 | Address of Block Out |
| A00A-A00B | Address of Joystick In |
| A00C-A00D | Address of Header Out |
| A00E | Secondary Reset |
| A027 | Primary Reset |
| A06E | Hardstart (After Reset) |
| A0A6 | Check for Disk ROM |
| A0CB | Check for Extended ROM |
| A0D7 | Print Version |
| A0E8 | Softstart (After Reset) |
| A0F6 | FIRQ Entry (ROM Pack Check) |
| A10D | Start of Area Downloaded to RAM at $8F |
| A129 | Start of Area Downloaded to RAM at $10C |
| A171 | Input Character, Bit 7 Clear |
| A176 | Input Character |
| A199 | Blink Cursor Color |
| A1B1 | Wait for Keypress and Read Kybd; Char Returned in A Register |
| A1C1 | Check Keyboard and Get Key if pressed; Z = 1,A = 0 if no key Z = 0,A = key, B and X Preserved |
| A26E | Table of Codes for non-alpha keys |
| A282 | Output Character to Device Specified by $6F, All But CC Preserved |
| A2BF | Output Character in A to Printer (RS232) |
| A30A | Output Character in A to Screen |
| A390 | Input Line from Keyboard into Buffer at $02DD; Return X$02DC; Zero byte at End of Buffer |
| A416 | CLOSE |
| A44C | CSAVE |
| A46C | Perform CSAVEM Function; Requires Start of Memory Block in $19-A0 and in $01E7-8, Transfer Address in $01E5-6, and File Name in $01D2-9. Enter with A = 2 and X = 0. |
| A498 | CLOAD |
| A4FE | CLOADM |
| A53E | EXEC |

| | |
|---|---|
| A564 | INKEY$ |
| A59A | Transfer Block |
| A5CE | EOF |
| A5EC | SKIPF |
| A5F6 | OPEN |
| A629 | Open Tape File |
| A681 | Find Filename |
| A6FE | Blink Screen Corner |
| A701 | READ Block from Tape |
| A70B | Read a Block from Cassette; Must be On and In Bit Sync. $7C Contains File Block Type:0 = File Header, 1 = data, $FF = EOF. $7D Contains Number of Data Bytes in File (0-$FF). Z = 1, A = 0 if no Errors, Z = 0, A = 1 if Checksum Error, Z = 0, A = 2 if Memory Error. X = Buffer Start Block Length if no Error, X Points to Beyond Bad Address if Error. U and Y Preserved |
| A77C | Start Cassette and Get Into Bit Sync for Reading. U and Y Preserved, FIRQ and IRQ Masked. |
| A7BD | MOTOR |
| A7D8 | Turn Cassette On and Write Leader |
| A7E5 | Write Tape File |
| A7E9 | Turn Off Motor |
| A7F4 | Write Block to Cassette; Tape to Speed and Leader Written, $7E = Buffer Address, $7C = Block Type, $7D = Number of Data Bytes, X = Buffer Address Data Bytes, All Registers Modified |
| A85C | Sine Table for Cassette Out |
| A880 | SET |
| A8B1 | RESET |
| A8F5 | POINT |
| A910 | CLS |
| A928 | Clear Screen and Home Cursor |
| A937 | Print Copyright (CLS 9) |
| A94B | SOUND |
| A956 | Generate Sound |
| A992 | AUDIO |
| A9B3 | Interrupt Processor (60 Hz Counter) |
| A9C6 | JOYSTICK |
| A9DE | Read and Store Joystick Values; Left:Up/Down is $15A,Rt/Lft is $15B; Right:Up/Down is $15C,Rt/Lft is $15D. Y is Preserved |
| AA29 | Function Address Table |
| AA51 | Operation Table for +, −, *, /, , AND,OR (3 bytes each-Addresses and Precedence Values) |
| AA66 | Command Name Table |
| AB1A | Function Name Table |
| AB67 | Command Address Table |
| ABAF | Error Code Table |
| ABE1 | Text Strings |
| ABF9 | Search Stack for GOSUB or FOR |
| AC1E | Open up space in memory |
| AC20 | Move Block of Memory Starting at Top; $41-2 is Destination Top Address, $43-4 is Source Top Address, $45-6 is Destination Bottom Address after Move, $47-8 is Source Bottom Address |
| AC46 | Error Handler |
| AC73 | Idle Loop |
| AD17 | NEW (Clear Memory) |
| AD19 | Execute NEW |
| AD47 | FOR |
| AD9E | Interpret Loop |
| ADC6 | Execute line |
| ADE4 | RESTORE |
| ADEB | Check for Break or Pause |
| AE02 | END |
| AE09 | STOP |
| AE30 | CONTinue |
| AE41 | CLEAR |
| AE75 | RUN |
| AE86 | GO |
| AE92 | GOSUB |
| AEA4 | GOTO |
| AEC0 | RETURN |
| AEE0 | DATA |
| AEE3 | REM or ' |
| AEE8 | ELSE |
| AF14 | IF |
| AF42 | ON |
| AF67 | Get Unsigned Integer |
| AF89 | LET |
| AFF5 | INPUT |
| B046 | READ |
| B0F8 | NEXT |
| B156 | Get Expression |
| B1CB | Another Entry in Operation Table |
| B223 | Get Operand |
| B290 | Execute Functions |
| B2D4 | AND/OR Operations |
| B2F4 | Relational Operations |
| B34E | DIMension |
| B38F | Variable Creation |
| B3E4 | Evaluate Integer Expression |
| B3ED | Convert Number in FPAC into 16-bit Two's Complement Integer Left in D Register; Overflow, return to BASIC if >+32767 or <-32768 |
| B4EE | MEM |
| B4FD | STR$ |
| B518 | Get String |
| B56D | Allocate string routine |
| B591 | Garbage Collect |
| B5D8 | Process one descriptor |
| B5EF | Compact one string |
| B6F1 | LEN |
| B68C | CHR$ |
| B6A0 | ASC |
| B6AB | LEFT$ |
| B6C8 | RIGHT$ |
| B6CF | MID$ |
| B716 | VAL |
| B750 | PEEK |
| B757 | POKE |
| B75E | LLIST Command |
| B764 | LIST Command |
| B7C2 | Untokenize |

| | |
|---|---|
| B7E6 | Untokenize one token |
| B821 | Tokenize |
| B892 | Tokenize one word |
| B8F7 | PRINT |
| B97E | TAB |
| B99C | Print Text String |
| B9AC | Print a Space |
| B9B4 | Start of Floating Point Routines-Rounding |
| B9B9 | Subtract from FPAC1 |
| B9C2 | Add to FPAC1 |
| BA79 | Two's Complement FPAC1 |
| BAC5 | Constant 1.0 |
| BACA | Multiply |
| BB2F | Move [X] to FPAC2 |
| BB7D | Constant 10.0 |
| BB91 | Divide |
| BC4A | Move FPAC2 to FPAC1 |
| BC5F | Move FPAC1 to FPAC2 |
| BC6D | Test FPAC1 for Zero and Sign |
| BC7A | SiGN |
| BC93 | ABSolute value |
| BCEE | INTeger |
| BD12 | Convert String to Floating Point |
| BDB6 | Constants 99999999.9, 999999999, 1E09 |
| BDCC | Display the Decimal Value in D Register |
| BDD9 | Convert FPAC1 to ASCII |
| BEC0 | Constant 0.5 |
| BEC5 | Series of 4 Byte Constants |
| BF1F | RaNDom |
| BF78 | SINe |
| BFBD | Constants 2 pi, 0.25 |
| BFC8 | Series of 5 Byte Constants |
| BFF2 | Interrupt and Reset Vectors |
| BBF2-BBF3 | SWI3 |
| BBF4-BBF5 | SWI2 |
| BBF6-BBF7 | FIRQ |
| BBF8-BBF9 | IRQ |
| BBFA-BBFB | SWI1 |
| BBFC-BBFD | NMI |
| BBFE-BBFF | RESET |
| C000-D7FF | Disk BASIC ROM |
| C004 | Address of DSKCON |
| C0D4 | Warm Start to Disk BASIC |
| C17F-C1DA | Disk Command Token Table |
| C1DB-C200 | Disk Subroutine Addresses |
| C6C2 | KILL |
| C932 | SAVE |
| C98B | MERGE |
| C99A | LOAD |
| CBCF | DIRectory |
| CD1A | CVN |
| CD28 | MKN$ |
| CD36 | LOC |
| CD5B | LOF |
| CDC0 | FREE |
| CDE9 | DRIVE |
| CF3F | RENAME |
| CF8A | WRITE |
| CFE0 | FIELD |
| D025 | RSET |
| D026 | LSET |
| D080 | FILES |
| D146 | UNLOAD |
| D175 | BACKUP |
| D2CC | COPY |
| D3FF | DSKI$ |
| D474 | DSKO$ |
| D4AB | DSKINI |
| D65B | VERIFY |
| D66C | DSKCON |
| D6C5 | Restore |
| D6DE | Get Status |
| D6FD | Delay 78 msec |
| D705 | Read/Write sector |
| D7A2 | Command Address Table |
| D7AA | Bit Table for Drives |
| D7AE | NMI Handler |
| D7BC | IRQ Handler |
| FF00-FFFF | I/O and Control |
| FF00-FF03 | PIA U8 |

FF00 Bit 0-Keyboard Row 1 and Right joystick switch
Bit 1-Keyboard Row 2 and Left joystick switch
Bit 2-Keyboard Row 3
Bit 3-keyboard Row 4
Bit 4-Keyboard Row 5
Bit 5-Keyboard Row 6
Bit 6-Keyboard Row 7
Bit 7-Joystick comparison input

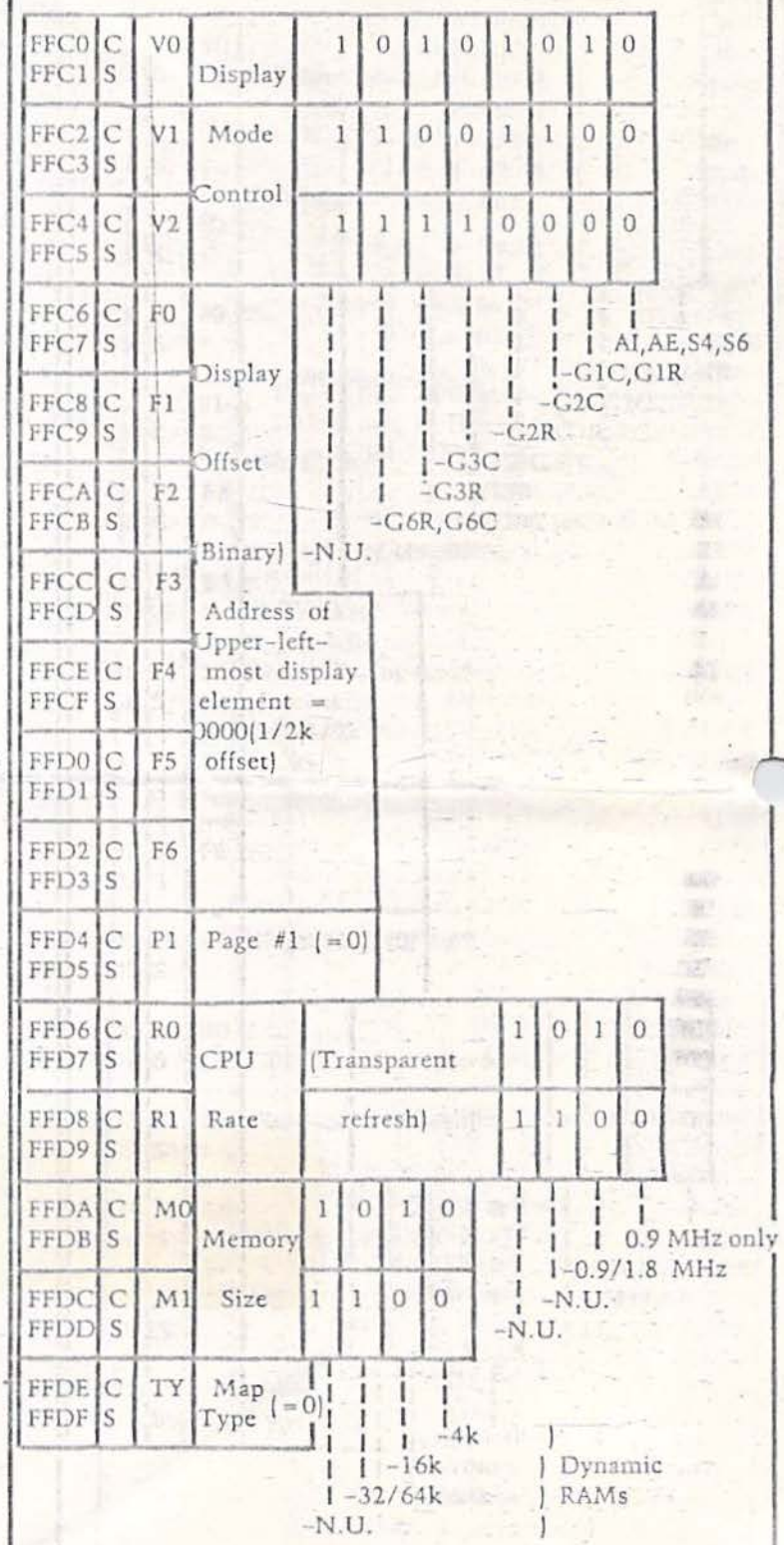
FF01 Bit 0-Control of the Horizontal sync clock(63.5 microsec)
Bit 1-;interrupt input
;
Bit 2-Normally 1 — 0 = Changes FF00 to data direction register
Bit 3-SEL 1: — LSB of the two analog MUX select lines
Bit 4-1 Always
Bit 5-1 Always
Bit 6-Not used
Bit 7-Horizontal sync interrupt flag

FF02 Bit 0-Keyboard Column 1
Bit 1-Keyboard Column 2
Bit 2-Keyboard Column 3
Bit 3-Keyboard Column 4
Bit 4-Keyboard Column 5
Bit 5-Keyboard Column 6
Bit 6-Keyboard Column 7
Bit 7-Keyboard Column 8

FF03 Bit 0-Control of the field ;sync clock 16.667 MS
Bit 1-;interrupt input
;
Bit 2-Normally 1 — 0 = changes FF02 to data direction register
Bit 3-SEL 2 — MSB of the two analog MUX select lines
Bit 4-1 Always
Bit 5-1 Always
Bit 6-Not used
Bit 7-Feld sync interrupt flag

FF20-FF23 PIA U4

FF20 Bit 0-Cassette data input
Bit 1-RS-232 data output
Bit 2-6 bit D/A LSB
Bit 3-6 bit D/A
Bit 4-6 bit D/A
Bit 5-6 bit D/A
Bit 6-6 bit D/A
Bit 7-6 bit D/A MSB
FF21 Bit 0-Control of the CD;
;RS-232 status input
Bit 1-;
;
Bit 2-Normally 1
Bit 3-Cassette motor control 0 = Off 1 = On
Bit 4-1 Always
Bit 5-1 Always
Bit 6-Not used
Bit 7-CD interrupt flag
FF22 Bit 0-RS-232 Data input
Bit 1-Single bit sound output
Bit 2-RAM size input
Bit 3-VDG Control output
Bit 4-VDG Control output
Bit 5-VDG Control output
Bit 6-VDG Control output
Bit 7-VDG Control putput
FF23 Bit 0-;Control of the
;Cartridge interrupt
Bit 1-;input
;
Bit 2-Normally 1 — 0 changes FF22 to data direction register
Bit 3-Six bit sound enable
Bit 4-Always 1
Bit 5-Always 1
Bit 6-Not used
Bit 7-Cartridge interrupt flag
FF40 Output latch
Bit 0-Drive Select 0
Bit 1-Drive Select 1
Bit 2-Drive Select 2
Bit 3-Motor On
Bit 4-Precomp
Bit 5-Double Density
Bit 6-Drive Select 3
Bit 7-Halt Enable
FF48 Disk Status
FF49 Disk Track Number
FF4A Disk Sector Number
FF4B Disk Data




FFE0-FFF1 Not used
FFF2-FFF3 SWI3 Vector
FFF4-FFF5 SWI2 Vector
FFF6-FFF6 FIRQ Vector
FFF8-FFF8 IRQ Vector
FFFA-FFFB SWI1 Vector
FFFC-FFFD NMI Vector
FFFE-FFFF Reset Vector

Tokens for CoCo, Dragon 32 and MC – 10

| HEX | DEC | COCO | DBL | DRAG | DBL | MC – 10 |
|---|---|---|---|---|---|---|
| 80 | 128 | FOR | SGN | FOR | SGN | FOR |
| 81 | 129 | GO | INT | GO | INT | GOTO |
| 82 | 130 | REM | ABS | REM | ABS | GOSUB |
| 83 | 131 | ' | USR | ' | POS | REM |
| 84 | 132 | ELSE | RND | ELSE | RND | IF |
| 85 | 133 | IF | SIN | IF | SQR | DATA |
| 86 | 134 | DATA | PEEK | DATA | LOG | PRINT |
| 87 | 135 | PRINT | LEN | PRINT | EXP | ON |
| 88 | 136 | ON | STR$ | ON | SIN | INPUT |
| 89 | 137 | INPUT | VAL | INPUT | COS | END |
| 8A | 138 | END | ASC | END | TAN | NEXT |
| 8B | 139 | NEXT | CHR$ | NEXT | ATN | DIM |
| 8C | 140 | DIM | EOF | DIM | PEEK | READ |
| 8D | 141 | READ | JOYSTK | READ | LEN | LET |
| 8E | 142 | RUN | LEFT$ | LET | STR$ | RUN |
| 8F | 143 | RESTORE | RIGHT$ | RUN | VAL | RESTORE |
| 90 | 144 | RETURN | MID$ | RESTORE | ASC | RETURN |
| 91 | 145 | STOP | POINT | RETURN | CHR$ | STOP |
| 92 | 146 | POKE | INKEY$ | STOP | EOF | POKE |
| 93 | 147 | CONT | MEM | POKE | JOYSTK | CONT |
| 94 | 148 | LIST | ATN | CONT | FIX | LIST |
| 95 | 149 | CLEAR | COS | LIST | HEX | CLEAR |
| 96 | 150 | NEW | TAN | CLEAR | LEFT$ | NEW |
| 97 | 151 | CLOAD | EXP | NEW | RIGHT$ | CLOAD |
| 98 | 152 | CSAVE | FIX | DEF | MID$ | CSAVE |
| 99 | 153 | OPEN | LOG | CLOAD | POINT | LLIST |
| 9A | 154 | CLOSE | POS | CSAVE | INKEY$ | LPRINT |
| 9B | 155 | LLIST | SQR | OPEN | MEM | SET |
| 9C | 156 | SET | HEX$ | CLOSE | VARPTR | RESET |
| 9D | 157 | RESET | VARPTR | LLIST | INSTR | CLS |
| 9E | 158 | CLS | INSTR | SET | TIMER | SOUND |
| 9F | 159 | MOTOR | TIMER | RESET | PPOINT | EXEC |
| A0 | 160 | SOUND | PPOINT | CLS | STRING$ | SKIPF |
| A1 | 161 | AUDIO | STRING$ | MOTOR | USR | TAB( |
| A2 | 162 | EXEC | CVN | SOUND | | TO |
| A3 | 163 | SKIPF | FREE | AUDIO | | THEN |
| A4 | 164 | TAB( | LOC | EXEC | | NOT |
| A5 | 165 | TO | LOF | SKIPF | | STEP |
| A6 | 166 | SUB | MKN$ | DEL | | OFF |
| A7 | 167 | THEN | AS | EDIT | | + |
| A8 | 168 | NOT | | TRON | | – |
| A9 | 169 | STEP | | TROFF | | * |
| AA | 170 | OFF | | LINE | | / |
| AB | 171 | + | | PCLS | | ∧ |
| AC | 172 | – | | PSET | | AND |
| AD | 173 | * | | PRESET | | OR |
| AE | 174 | / | | SCREEN | | > |
| AF | 175 | ∧ | | PCLEAR | | = |
| B0 | 176 | AND | | COLOR | | < |
| B1 | 177 | OR | | CIRCLE | | SGN |
| B2 | 178 | > | | PAINT | | INT |
| B3 | 179 | = | | GET | | ABS |
| B4 | 180 | < | | PUT | | USR |
| B5 | 181 | DEL | | DRAW | | RND |
| B6 | 182 | EDIT | | PCOPY | | SQR |
| B7 | 183 | TRON | | PMODE | | LOG |
| B8 | 184 | TROFF | | PLAY | | EXP |
| B9 | 185 | DEF | | DLOAD | | SIN |
| BA | 186 | LET | | RENUM | | COS |

*(Continued on next page)*

| | | |
|---|---|---|
| BB | 187 | LINE |
| BC | 188 | PCLS |
| BD | 189 | PSET |
| BE | 190 | PRESET |
| BF | 191 | SCREEN |
| C0 | 192 | PCLEAR |
| C1 | 193 | COLOR |
| C2 | 194 | CIRCLE |
| C3 | 195 | PAINT |
| C4 | 196 | GET |
| C5 | 197 | PUT |
| C6 | 198 | DRAW |
| C7 | 199 | PCOPY |
| C8 | 200 | PMODE |
| C9 | 201 | PLAY |
| CA | 202 | DLOAD |
| CB | 203 | RENUM |
| CC | 204 | FN |
| CD | 205 | USING |
| CE | 206 | DIR |
| CF | 207 | DRIVE |
| D0 | 208 | FIELD |
| D1 | 209 | FILES |
| D2 | 210 | KILL |
| D3 | 211 | LOAD |
| D4 | 212 | LSET |
| D5 | 213 | MERGE |
| D6 | 214 | RENAME |
| D7 | 215 | RSET |
| D8 | 216 | SAVE |
| D9 | 217 | WRITE |
| DA | 218 | VERIFY |
| DB | 219 | UNLOAD |
| DC | 220 | DSKINI |
| DD | 221 | BACKUP |
| DE | 222 | COPY |
| DF | 223 | DSKI$ |
| E0 | 224 | DSKO$ |

| | |
|---|---|
| TAB( | TAN |
| TO | PEEK |
| SUB | LEN |
| FN | STR$ |
| THEN | VAL |
| NOT | ASC |
| STEP | CHR$ |
| OFF | LEFT$ |
| + | RIGHT$ |
| − | MID$ |
| * | POINT |
| / | VARPTR |
| ∧ | INKEY$ |
| AND | MEM |
| OR | |
| > | |
| = | |
| < | |
| USING | |

Information was gleaned from the following sources in addition to personal observation:

*Color Computer News*
*The Rainbow*
*80 Micro*
*John Beckett*
*John Steiner*
*Ralph Tenny*

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