

# MEGABIT INTERNAL ROM ADAPTER

BY D. C. NEWBURY



FOR THE COMMODORE C128 AND 128D COMPUTERS



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## INTRODUCTION

The Megabit 128 Internal ROM Adapter is an adapter that will allow the use of high capacity EPROMs such as 27010 (1 Meg.), 27020 (2 Meg.), 27040 (4 Meg.) and 27080 (8 Meg.).

It's very easy to install, the only soldering involved will be to de-solder the shield from the C128 Printed Circuit Board (PCB). Then plug the adapter into the empty Internal ROM socket on the left side of the PCB and install the mini clip. That's it.

There has been an addition to the PC Board. A direction diode and a place on the board to add a 24-26 AWG insulated wire (=> 12"). On the opposite end you can tack solder it to any one of the RESET lines in the computer or if you have a mini-clip in your junk box put it on the end of the wire.

There are a few programs in the ROM that require you to turn the computer off and then back on. With the wire connected to a reset line, you will be able to use the reset button instead of turning the computer off.

The remainder of this manual will cover installation and how to use the software that came with the adapter. If there is an interest by some to make their own adapter and program their own EPROM, then I will supply the schematics, layout and parts list. Also some do's and don'ts and source code (menu and program loaders).

## **INSTALLATION**

### **C128**

1. Remove all cables connected to the C128, especially the power cable. If you have had your C128 apart before, then you can skip steps 2 thru 4.
2. Turn the C128 over, keyboard down and remove six screws (2 at the top, one in the middle and three along the bottom).
3. Turn the C128 over, keyboard up and pop the cover off. Unplug the power LED, the keyboard connector and remove the ground wire. Set the cover/keyboard aside.
4. Remove the screws around the outside edge holding the shield in place and one screw in the upper left side. There may be one or two places where the shield is tack soldered to the ground plane of the PCB. De-solder the shield and remove the shield from the PCB.
5. Notice the empty 28-pin IC socket at the upper left side of the PCB. There may be 2 or 3 disk caps standing up that will be in your way when you install the adapter. Push them over flat against the PC Board. Install the adapter in the socket. Install the mini clip to pin 12 of IC U3. See Figures 1 and 2.
6. If you want to re-install the shield, you will have to enlarge the opening around the Internal ROM socket area.

I have used my C128 for years without a shield and have had no problems with overheating or RFI interference. But that is up to you.

Install the shield; make sure the shield does not touch the adapter PCB. Install the screws and re-solder the shield to the ground plane. If you do not want to install the shield, then screw the PCB to the bottom cover.

7. Re-install the cover/keyboard. Connect the ground wire, the keyboard connector and the power LED. Snap the cover in place and turn the C128 over and install the six screws.
8. Install all of the cables and turn the system on. On the label of the EPROM you will find the name of the function key that has been programmed to activate the Internal ROM Menu, press the key and it will come up on the screen.

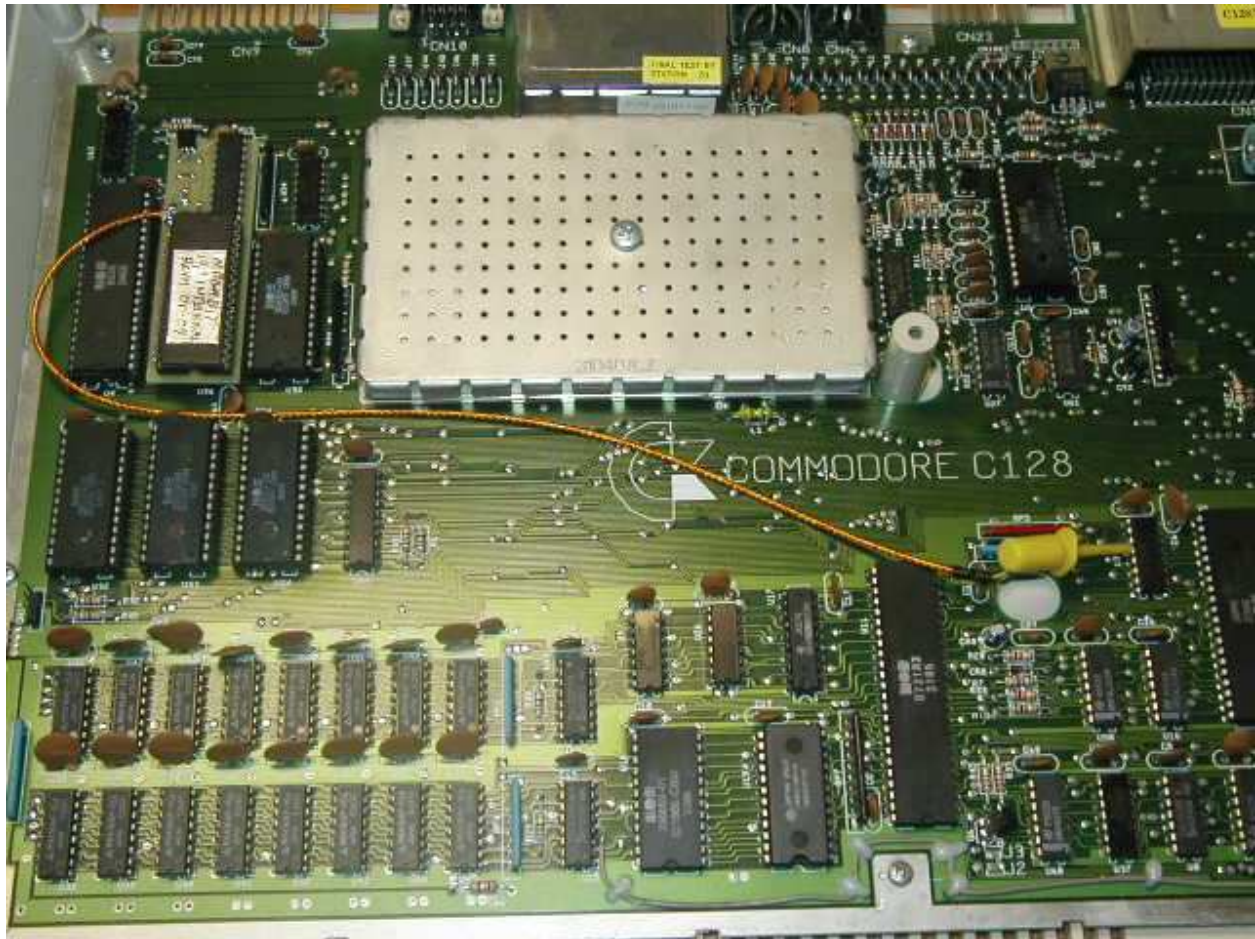
**NOTE:** If you have a JiffyDOS adapter installed, remove it first then install the Internal ROM Adapter. Then re-install your JiffyDOS adapter. If the edge of the JiffyDOS adapter touches the ROM leads of the Internal ROM Adapter, put a small piece of insulating tape between them.

## **128D**

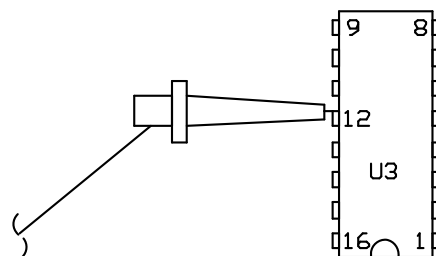
1. Remove all cables connected to the 128D, especially the power cable. If you have had your 128D apart before, then you can skip step 2.
2. To remove the metal cover on the 128D, you will have to remove five screws, three on the back and two by the plastic bezel at the front of the computer. Once the screws have been removed, push the cover toward the rear of the computer. It will slide back about half an inch, then lift the cover straight up and set it aside. Sometimes the cover will stick and not slide easily. Take a flat blade screwdriver and carefully pry it loose at the rear of the computer.
3. Notice the empty 28-pin IC socket at the left side of the PCB, in front of the power supply. There may be 2 or 3 disk caps standing up that will be in your way when you install the adapter. Push them over flat against the PC Board. Place the rear of the adapter under the power supply, line up the pins with the IC socket and push it in place. Now install the mini clip to pin 12 of IC U3. See Figures 2 and 3.
4. Re-install the cover and five screws. Install the cables and turn the system on. On the label of the EPROM you will find the name of the function key that has been programmed to activate the Internal ROM Menu, press the key and it will come up on the screen.

## **NOTE:**

If the Menu does not show up, then turn off the computer, go back to step 1. After you have removed the cover and shield, check the mini clip and make sure it's connected to U3 pin 12. Make sure the adapter is plugged in properly, the pins on the adapter line up with the sockets of the IC socket. Put the computer back together and try again.

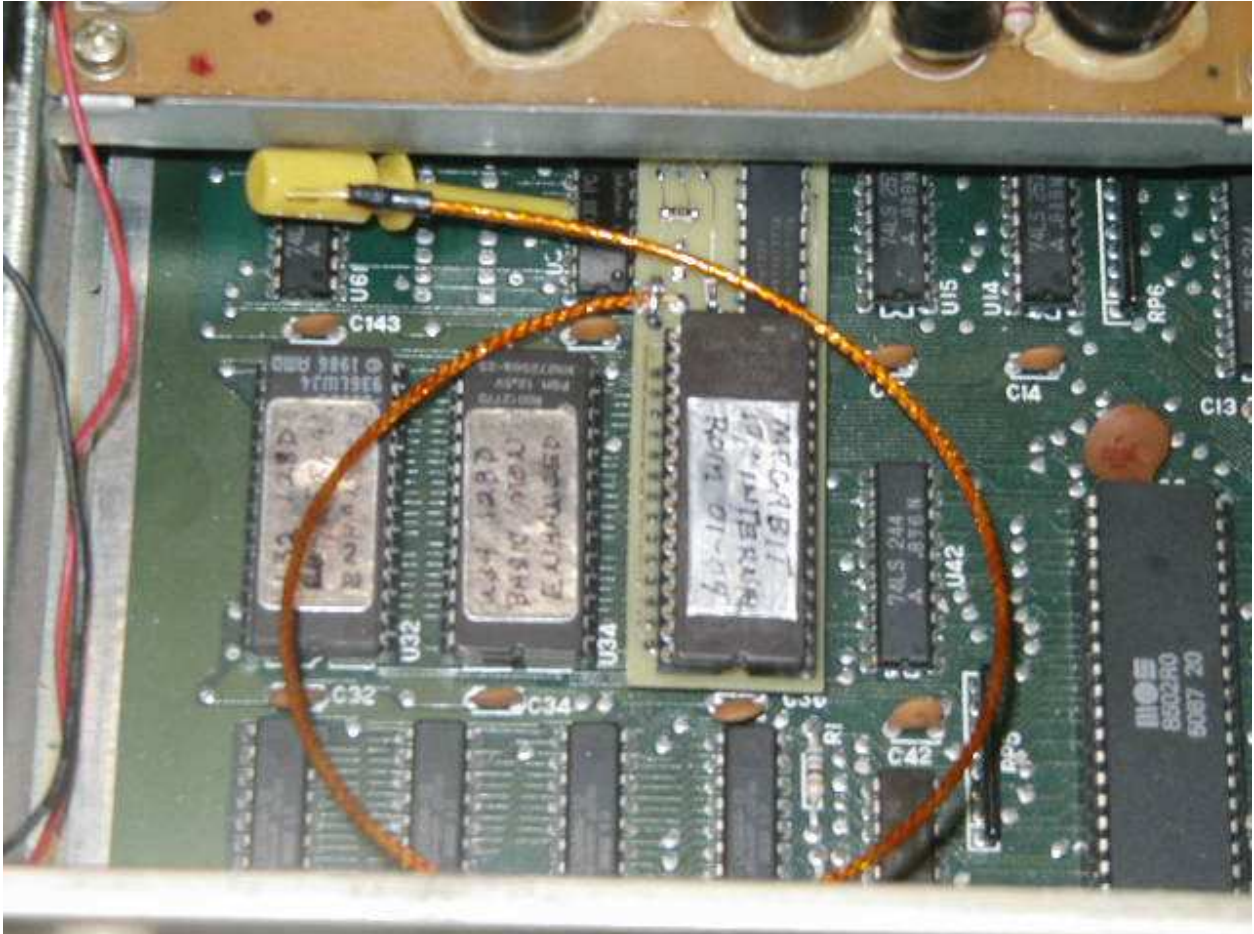


**FIGURE 1: C128 INSTALLATION**



**FIGURE 2: U3 CONNECTION**

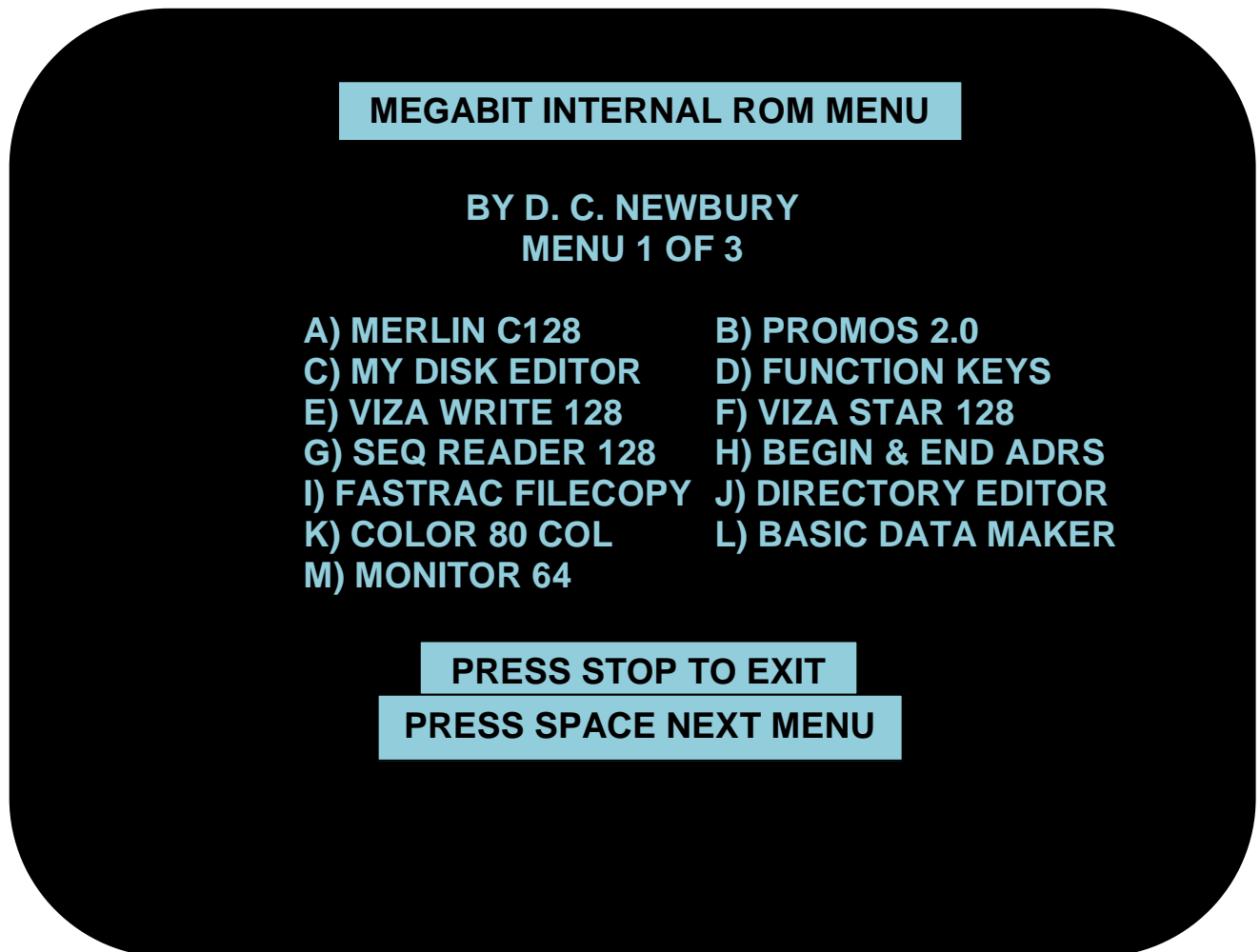




### FIGURE 3: 128D INSTALLATION

## INTERNAL ROM PROGRAMS

Most of the Programs in this ROM are the software/firmware that I use in my C128 and 128D. Below are pictures of the three menus.



### MENU 1

## MEGABIT INTERNAL ROM MENU

BY D. C. NEWBURY

MENU 2 OF 3

N) ZED 128	O) BASIC MERGE +
P) MAV FILE COPY	Q) MAV TRACK EDITOR
R) SGL 41 DATA COPY	S) DUL 41 DATA COPY
T) SINGLE NYBBLER	U) DUAL NYBBLER
V) SGL 81 DATA COPY	W) MAV FILE TRACER
X) MAV TRK&SEC EDIT	Y) 64K VDC RAM TEST
Z) REU TEST	

PRESS STOP TO EXIT

PRESS SPACE NEXT MENU

MENU 2

## MEGABIT INTERNAL ROM MENU

BY D. C. NEWBURY

MENU 3 OF 3

£) BASIC 8  
←) KEY DOS

↑) SERVANT

PRESS STOP TO EXIT

PRESS SPACE NEXT MENU

## MENU 3

The menu is simple to use, select the letter in front of the program you want to use. Press the space bar to move from menu to menu. Press the stop key to reset the computer and return to basic. Any letter can be selected while in any of the three menus. Below is a list of software and a brief description.

## **A) MERLIN C128**

Merlin C128 Version 1.0 is a macro assembler system for the Commodore C128/128D. The program runs in 80 column mode only. The manual is included on CD in PDF format.

The program has been modified, when first loaded THE SORCEROR and SORCEROR LABELS are loaded also. To access SORCEROR, **when the program is first started**, press 'B'. It will ask if you want labels Y/N?. Then it will go back to the opening screen. Now follow the instructions in the manual, Page 114, start with step 2 (except loading SORCEROR).

## **B) PROMOS 2.0**

Promos 2.0 is software used to read/program EPROMs on the Promenade C1 EPROM Programmer. The program runs in 40 or 80 column mode. The manual is included on CD. You'll find it attached to the end of the EPROM Programmers Handbook in PDF format.

## **E) VIZA WRITE 128**

Vizawrite 128 is a Word Processor used on the Commodore C128/128D. The program runs in 80 column mode only. The manual is included on CD in PDF format. Copies of the program disks are included on CD in D64 format. To exit the program you will have to turn off the computer.

## **E) VIZA STAR 128**

Vizastar 128 is a Spreadsheet and Database used on the Commodore C128/128D. The program runs in 80 column mode only. The manual is included on CD in PDF format. Copies of the program disks are included on CD in D64 format. To exit the program you will have to turn off the computer.

### **I) FASTRAC FILECOPY**

This File Copier is from Fastrac 128 used on the Commodore C128/128D. The program runs in 40 or 80 column mode. The manual is included on CD in PDF format.

### **J) DIRECTORY EDITOR**

This Directory Editor is from Fastrac 128 used on the Commodore C128/128D. The program runs in 40 or 80 column mode. The manual is included on CD in PDF format.

### **M) MONITOR 64**

Monitor64 is SUPERMON V1.2 by Jim Butterfield that I modified back in the day (1980's). It runs in C64 mode only but allows the use of the C128/128D keypad and cursor keys. It also has a print mode that will send the output to device 4. Documentation for the monitor is on CD, D64 file name is MIRA.D64

### **P) MAV FILE COPY**

This File Copier is from MAVERICK V5.04. It runs in C64 mode only. The manual is included on CD in PDF format.

### **Q) MAV TRACK EDITOR**

This Track Editor is from MAVERICK V5.04. It runs in C64 mode only. The manual is included on CD in PDF format.

### **R) SGL 41 DATA COPY**

This 1541 Data Copier is from MAVERICK V5.04. It runs in C64 mode only. The manual is included on CD in PDF format.

### **S) DUL 41 DATA COPY**

This Dual 1541 Data Copier is from MAVERICK V5.04. It runs in C64 mode only. The manual is included on CD in PDF format.

### **T) SINGLE NYBBLER**

This Single 1541 Nybbler is from MAVERICK V5.04. It runs in C64 mode only. The manual is included on CD in PDF format.

### **U) DUAL NYBBLER**

This Dual 1541 Nybbler is from MAVERICK V5.04. It runs in C64 mode only. The manual is included on CD in PDF format.

### **V) SGL 81 DATA COPY**

This Single 1581 Data Copier is from MAVERICK V5.04. It runs in C64 mode only. The manual is included on CD in PDF format.

### **W) MAV FILE TRACER**

This File Tracer is from MAVERICK V5.04. It runs in C64 mode only. The manual is included on CD in PDF format.

### **X) MAV TRK&SEC EDIT**

This Track & Sector Editor is from MAVERICK V5.04. It runs in C64 mode only. The manual is included on CD in PDF format.

### **Y) 64k VDC TEST**

This 64K VDC Test Routine is from MAVERICK V5.04. It runs in C64 mode only. The manual is included on CD in PDF format.

### **Z) REU TEST**

This Ram Expansion Unit Test Routine is from MAVERICK V5.04. It runs in C64 mode only. The manual is included on CD in PDF format.

## N) ZED 128

This program is a text editor program (version 0.77.00) for the Commodore 128. It runs in 80-column mode only. Instructions for the program is on CD in pdf format.

## O) BASIC MERGE +

This program will merge two basic programs, but it will renumber the line numbers and update all the GOTO's and GOSUB's. With this merge routine, you will **NOT** have to make sure the program that you merge has a higher line number. When you select **BASIC MERGE +**, the program will be loaded in memory at \$0C00.

To use the program, select **BASIC MERGE +** from the menu. Then DLOAD your first basic program, then type '**SYS3072:DLOAD"second program**' and press return. Press F7 and both programs will be listed.

One thing about merging programs, **watch your variables**.

The following programs run in ROM (function ROM). Once selected, you cannot use the other programs in the Function ROM.



## INTERNAL ROM FIRMWARE

### **C) MY DISK EDITOR**

This Disk Editor was written in the 1980's when I was learning to program in ML. It will run in 40 or 80 column mode and will read/write 1541 or 1571 disks in drive 8 only. I could not afford a 1581 back then. If you need to read/write a 1581 disk then use the Maverick Track & Sector Editor.

To start the program, put a disk in the drive. The program will not do anything fancy while reading a track/sector, so if there is a bad track or sector 'do not trust the data on the display'.

When the program starts it will initialize the disk, fill the buffer with 0's. The opening display will look like the picture on the next page. Notice the 3 extra lines at the bottom of the screen; I call it the status line area. It shows what each function key is programmed for and displays all of the commands.

**Bugs I never fixed:** Where it says 'DRIVE 1571', I was going to write a routine that would recognize the drive (1541/1571) and display it. Also a routine that would change the drive number (8,9,10,11). It has been over 20 years now, so I will probably never get it done.

## STARTUP DISPLAY

C128 DISK EDITOR

BY D. C. NEWBURY

DRIVE 1571 TRACK \$00 #00 SECTOR \$00 #00

H	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
>00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
>10	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
>20	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
>30	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
>40	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
>50	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
>60	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
>70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
>80	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
>90	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
>A0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
>B0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
>C0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
>D0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
>E0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
>F0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

F1=R12 01< F3=+< F5=-< F7=C< F9=T< R=READS T&S W=WRITES T&S I=READS BAM  
F2=R01 00< F4=J+< F6=J-< F8=T< F10=P< C=HEX/ASCII/SCN P=PRT SCN X=EXIT PGRM  
M=ENTER MON T=TGL CHAR S=NEW SCN +=NEXT SEC -=LAST SEC J+/J- =JMP PGRM+/-

The '<' in the above status line area represents a carriage return. In the actual display on an 80 column monitor, it will be a back arrow.

The TRACK number and SECTOR number is displayed above the buffer area in hex and decimal.

The command line is located below the buffer display on the left side of the screen. The flashing cursor will always return to that location after completing a command.

## List of Commands and Definitions

- R -** Reads the track and sector specified: R12 01 or R#18 #1 will read track 18 (\$12) sector 1 (\$01). The program assumes a hexadecimal number, for a decimal number, you will have to put a sharp sign (#) in front of the number.
- W -** Writes the track and sector specified: W12 01 or W#18 #1 will write track 18 (\$12) sector 1 (\$01). The program assumes a hexadecimal number, for a decimal number, you will have to put a sharp sign (#) in front of the number.
- I -** This command will initialize the disk in drive 8 (read the BAM). Any time you change disks without restarting the program, you should initialize the new disk. If you read a track and sector from one disk and want to write it to another disk, then initialize the other disk before you write to it.
- C -** This command will toggle the characters in the buffer display from hex to ascii to screen code and back to hex. It will not change the data in the buffer.
- P -** This command will send the screen to a Commodore compatible printer setup as device 4.
- X -** This command will exit the program and reset the computer.
- M -** This command will jump to the 128 monitor. It can be used to change data in the buffer, disassemble code in the buffer or transfer data in or out of the buffer area. The buffer area is located at \$0B00 to \$0BFF. By the way, don't change any data at \$0C00 to \$0FFF. The program uses this area to store the tracks and sectors when using the J+ and J- commands. To re-enter the program, press 'X' then the RETURN key.
- T -** This command will toggle the character set from uppercase to lowercase and back again.
- S -** This command will re-fresh the screen. The cursor can be moved around the screen anywhere except the status line area. So if the display gets accidentally messed up, just move the cursor to the command line, press 'S' then the RETURN key.
- + -** This command will single step to the next sector. If you have just read track 12 sector 02, then it will read track 12 sector 03. If you keep going to the last sector, then it will increment to track 13 sector 00.

- - This command will single step back one sector. If you have just read track 12 sector 02, then it will read track 12 sector 01. If you keep going to sector 00, then it will increment to track 11 sector 14.
- J+ -** This command will jump to the next track/sector of a file that is stored on the disk. The first 2 bytes in each sector points to the next track and sector (254 bytes) of the file you are jumping through. When you reach the end of the file, the second byte in the sector will tell the drive how many bytes in this sector belongs to the file (00-FF).
- J- -** This command will jump backwards from the track and sector that you J+. When you J+, the track and sector is stored in a separate buffer (\$0C00 to \$0FFF). J- will take you back to where you came from.

## FUNCTION KEY DEFINITIONS

- F1 =** R12 01 ←, reads track 18 sector 1 which is the first sector of the directory. Press F7 and the display will change to ascii.
- F2 =** R01 00 ←, reads track 1 sector 0 which is where the autoboot routine is stored.
- F3 =** + ←, will jump forward one sector.
- F4 =** J+ ←, will jump to the track and sector specified by the first two bytes in the buffer.
- F5 =** - ←, will jump backward one sector.
- F6 =** J- ←, will jump backward to last J+ track and sector.
- F7 =** C ←, will change the display characters from hex to ascii to screen code and back again.
- F8 =** I ←, will initialize the disk in the drive.
- F9 =** T ←, will toggle the character set from uppercase to lowercase and back again. F9 is actually the shift/runstop keys.
- F10 =** P ←, will send the screen to a printer, device 4. F10 is actually the help key.

In the status display, the back arrow represents a carriage return (CR).

To edit data in the buffer area (hex only), move the cursor to the byte or bytes you want to change. Make sure you maintain the same format, byte-space-byte, etc. Change one line at a time. Enter your change and hit the carriage return and the change will be entered in the buffer at \$0B00 - \$0BFF. After you have made your changes, write the sector back to the disk.

## **D) FUNCTION KEYS**

The function key program will write two extra lines on the monitor display and scan the function key area at \$1000 in RAM. It will then display in the status line area how you have your function keys programmed, including the shift/run keys and the help key.

A carriage return will display as a back arrow, the escape key will display as an up arrow and the tab key will display as a blank space.

**FUNCTION KEYS** will not work in 40 column mode. To clear the function key display, push the reset button.

## **G) SEQ READER 128**

This program is a sequential text file reader. It will run fine as long as there is not a lot of fancy formatting in the file. It's easy and quick to use and will run in 40 or 80 column mode.

When the program is started, you'll see the familiar status line area that tells you what function key to use. Put a disk in drive 8, press F3 and the directory will be displayed on the screen. To load a file, move the cursor up the left side of the directory listing. Align the cursor with the file you want to look at, press F1 and the file will fill the screen. If the file is longer than 21 lines, then it will pause and give you an option to continue by pressing the space bar, print the screen by pressing 'P' or quit by pressing 'Q'. When you have reached the end of the file, it will pause again, let you know that you have reach the end and allow you to print the screen or quit.

If you want to print a complete file, then press F5 to activate print mode. Press F3, list the directory, line up the cursor and press F1. The file will go to the printer and echo to the screen.

Press F7 to toggle the character set, uppercase, lowercase.

Press 'X' to exit the program and reset the computer.

## H) BEGIN & END ADRS

This program will give you the beginning address (loading address), the ending address and the total number of bytes of a selected **PRG** file.

The display has the familiar status line area with the function key definitions. F1 will check a file, F3 will read the directory, F5 will send the data on the screen to a printer (device 4) and F7 will exit the program and reset the computer.

To check a file on disk, first list the directory (F3), then move the cursor up the left side of the listing and align the cursor with the file you want to check. Press F1 and the program will take the information from the serial bus until the end of the file is reached. The file is not loaded into memory; the only memory used is to store the loading address, total number of bytes and the end address of the file

The display will list the beginning address, the ending address, the number of bytes in hexadecimal and decimal.

## K) COLOR 80 COL

This program was written to allow you to make your own color adjustments to your monitor. To make the adjustments, you need a pattern that will stay still while making adjustments.

There are three different patterns to this program, one pattern with Black dots and a white background, one pattern with red, green and blue Color bands and one pattern with one line each of the sixteen colors repeated to fill the whole screen. From each screen, press the **space bar** to return to the menu.

Let's talk in detail about each pattern, starting with "**A**" black dots. This pattern is used to make color convergence adjustments on your monitor screen. If your monitor is adjusted properly you should see all black dots and a white background. If the white background is not white, then try adjusting the color, tint and contrast controls. The black dots are a little harder to explain. If you look closely at the edges of the dots, you may see color spilling over the edge. This can happen anywhere on the screen, but mostly you'll see it happening at the edges of the screen. If your convergence is not adjusted properly then you'll see color at all of the black dots.

With all black dots displayed, shift the screen left or right to center the black dot display, by pressing '**L**' for left '**R**' for right.

Before we go any further with this, I want to caution you about making convergence adjustments. If you feel your monitor needs adjusting, and you have never done this before, take your monitor to a service facility or a friend that you have confidence in. The reason is because the back cover will have to be removed, exposing yourself to very hazardous voltages. Also the adjustments are numerous and it takes some experience to make the necessary adjustments.

If you make the adjustments yourself, don't get discouraged, it's not easy and it's very time consuming, especially without instructions. Don't expect to get it 100% perfect. 90% to 95% is more likely. You'll have to compromise a little, but compromise at the edges of the screen not the middle. Good luck!

The next screen "**B**" red green blue, is used to make vertical height and vertical linearity adjustments. There should be three color bands on the screen and each color band should be the same width. If not then your vert. Linearity needs to be adjusted. On some monitors the adjustments can be made from the outside of the cabinet or with a screwdriver through an access hole in the cabinet and are usually marked. Others, the cover will have to be removed to get access to the controls. In either case, once you're ready to make the adjustments, select the proper screen by pressing "B".

First, adjust the vert. Height control until the raster begins to pull away from the bottom or the top of the screen, usually by turning the control in the counter-clockwise direction. Then turn the control in the opposite direction until the raster just fills the screen. Measure the width of the color bands, if they're equal then you don't have to make any more adjustments. If not, then adjust the Vert. Linearity control to get them as close as possible. The raster may pull away again at the top or bottom of the screen, but in any case, adjust the vert. height control again just as you did before. You may have to make both adjustments several times to get it right. When you have it adjusted properly the color bands will be the same width and the raster will just fill the screen.

The third screen, "**C**" all colors, is used for making adjustments of the brightness, contrast, color and tint controls. No explanation here is necessary. Everyone will have their own preference.

## L) BASIC DATA MAKER

This program will make a data listing of any ML program on disk or from memory in any bank (0-15). When **BASIC DATA MAKER** is started you will see the familiar status line area that defines the function keys.

- F1 -** is used to select a file from a disk in drive 8.
- F3 -** will list the directory of the disk in drive 8. With the directory listed on screen, move the cursor up the left side of the screen and line it up with the program you want to convert. Press F1, the program will be loaded, converted and the program will exit and go to basic. Press F7 and your data listing will list on the screen. You can 'DSAVE' the data listing at this point to merge with another basic program.
- F5 -** will make a data listing from anywhere in RAM 0/1. When you press F5, 'R,' will show up on the screen. You have to enter a beginning address, ending address and bank number, **in hex only**.  
The proper syntax is: **R,0C00,0D24,0** or **R,0C00,0D24,1**. The first example will make a data listing from \$0C00 to \$0D24 from RAM 0, the second example will come from RAM 1.
- F7 -** will exit the program and reset the computer.

## £) BASIC 8

This program is an extension to the basic 7 that comes with the C128/128D. Documentation is on the CD in pdf format, also a BASIC 8 disk in D64 format. To exit the program, you will have to power down.

↑ ) **SERVANT v4.84**

This program has utilities for the C128. Documentation is on the CD in pdf format. To exit the program, you will have to power down.

← ) **KeyDOS**

This program has utilities for the C128. Documentation is on the CD in pdf format, also a KeyDOS utility disk in D64 format. To exit the program, you will have to power down.