

128K/Color Computer 3/Disk

# Color Schematic Creator

LICENSED TO MICROCOM SOFTWARE

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## Introduction

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Color Schematic Creator is a powerful software package designed for use by the electronics hobbyist interested in making quality printouts of schematic diagrams and designing those schematics in an interactive environment.

Besides the normal features of line drawing, symbol tables, simple text, rotation, and others found in similar programs, the Color Schematic Creator, designed for the 128k Color Computer 3 with floppy drive, gives you a workspace far larger than the screen and three circuit layers in depth, three different text fonts, multiple error removal capability, and the capability to interface to plotters for production quality output.

Unlike most similar programs, which store actual graphics screens of the circuitry in memory, Color Schematic Creator stores shapes in memory. This means that the physical size of the circuit is nearly unlimited - any circuit consisting of up to one-thousand symbols, lines, etc., can be designed.

Color Schematic Creator represents the latest in software with its graphical interface, pull-down menus, dialog boxes, and user-friendliness. We thank you for making it your choice in CAD software.

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## Getting Started

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After turning on your computer system, make a backup of the **Color Schematic Creator** disk onto a blank disk and set aside your original. Use the new disk as your work disk, keeping the original in a safe place.

After you have done this, place your work disk into drive 0 of your computer and type

**RUN "BOOT"**

After you press **ENTER** the program will load and after a few seconds it will begin its startup functions. Once you see the small blinking cursor, the program is ready for use.

## General Use

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The cursor indicates where drawing would currently take place. Press a few arrow keys and note its movement, along with the changing coordinates labelled **X** and **Y** on the menu bar at the top of the screen. More details on cursor movement are given in the **Mode** section of the manual.

Across the top of the screen is the menu bar. Each of the **keywords** across the top two lines denote a **command** or **type** of command. Attached to most of those keywords is another list of commands, called a **menu**. By pressing the first letter of the keyword, you can pull down its menu; hence the menus are called **pull-down menus**. For instance, press **[F]** to pull down the **File** menu. If you do this you will notice the list of commands which are attached to the **File** keyword, **Open**, **Close**, **Save**, **Quit**, **Directory**, et cetera. To access any of these commands, you simply press its first letter. For instance, press **[D]** for **Directory**. The

**General Use (continued)**

File menu will disappear, and a box will appear on the screen. These boxes or **windows** are often called **dialog boxes**, because the computer can ask you questions with them. In the dialog box the computer will list all the **schematic files** in the disk on drive 0. If you do this now you will see a number of test and sample circuits included with the program.

Now press any key to remove the dialog box from the screen. Suppose you want to load a circuit from the disk, perhaps the one called **RECIEVER**. Type the following one letter commands:

File Open

Do **not** press **ENTER**. You will notice a dialog box asking for a **filename**. Type

**RECIEVER**

Notice that because the filename is eight characters long, you do not have to press **ENTER**. If it were shorter, you would have to press **ENTER**.

The circuit will load from disk and momentarily it will be drawn on the screen. Once complete, the cursor will reappear, signifying readiness for another command. Once you have finished, you will want to **Quit**. Press

File Quit Yes

and you will be back at the familiar **BASIC** prompt.

This generally is the way **Color Schematic Creator** works. All the commands and features are given in much greater detail in the

successive pages of the manual. Please read the **entire next section** of the manual before attempting to use the program. Once you are familiar with the general usage of the program you can read the **Advanced Features** section for details on **Color Schematic Creator's** more powerful functions.

### Command Overviews

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The following sections details the various menus and commands of Color Schematic Creator.

#### The File menu

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The File menu contains those commands used to access schematic files, to get a disk directory, to print out diagrams, to erase the current schematic from memory, and to quit.

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**Open:** Loads a schematic file from the disk. Type in the name of the file to load. Note that if the filename is eight characters long (the maximum file size), you do not have to press the ENTER key. If not, simply press ENTER to load it.

**Close:** Saves the schematic file currently in memory to disk and allows you to exit the program. If the file you are working on already has a name, it will be saved with that name. If not, the file will be given the name CURRFIL and will be loaded automatically the next time you use the program.

**Save:** Use this command when you want to rename a file or name a file for the first

## The File Menu (continued)

time. Simply give it any name eight or fewer characters in length, and press **ENTER**. Note that if the name is eight characters long, you need not press **ENTER**. **Save** may also be used to tell the program that you would like it to automatically load the current schematic when run. To do this, name the file **CURRFILE**. Then, the next time you run the program, and every time after until you rename the file, the program will automatically load your schematic.

**Quit:** Use this command when you are finished with your diagram for the time being, you have saved it, and you would like to exit the program.

**Directory:** This command gives you a listing of the schematic files in drive O. Press any key when you have finished looking at the list.

**Top Layer:** This is a more advanced command. It allows you to take a schematic file from your disk in drive O and load it directly into the Top Layer of your workspace. On the screen it will normally appear all black to differentiate it from other layers. Please refer to the Advanced Features section of the manual for more information on layering. Note that any layer information in the file you are loading will be ignored, and the entire file will be merged with the current top layer.

**Mid Layer:** Similar in operation to the Top Layer command, this command will load a file into the middle layer of the workspace. Middle layer circuitry is colored blue on the screen.

**Low Layer:** Similar to both the Top and Mid Layer commands, Low Layer loads a file into the low, blue-grey layer of the workspace.

The **File** Menu (continued)

**Full Print:** Prints out the entire workspace, including all layers and all screens. Full Print currently works only with EPSON compatible graphics capable printers. It is currently set up for 9600 baud operation. Please see addendum for DMP printers.

**Part Print:** Prints out whatever part of the workspace is currently on the screen. Full Print currently works only with EPSON compatible printers. It is currently set up for 9600 baud operation.

**Erase Mem:** This command will clear the entire workspace and allow you to start a new circuit. **Note:** Erase Mem will **not** ask you for confirmation before erasing memory. Once erased, you **cannot** retrieve your circuit unless you had saved it before issuing the erase command. Be careful with this command.

The **Mode** Menu

The Mode menu allows you to specify what type of monitor you have and whether or not you would like to use a joystick. It also lets you enter exclusive layer modes, special modes where you can only see a given layer of the workspace.

**RGB:** Tells the program you have an RGB monitor. Note that this is the default, or normal type of monitor. RGB will also reset the layer mode to normal. Refer to the Advanced Features section of the manual for more information on layering.

**NSTC:** Tells the program that you have a color TV or a color composite monitor. Refer



**The Mode Menu** (continued)

to the Customization section of the manual to set the program to automatically select this mode when it is run. Note that NSTC, like the RGB command, sets the layer mode to normal.

**B&W:** This command operates just like the RGB and NSTC commands. Use it if you have a monochrome monitor or a black and white television set.

**Joystick:** This command turns on the joystick as a positioning device. The joystick plugged into the right-hand receptacle on your computer will be used. The joystick can be used to move the cursor left, right, up, down, or diagonally. The button on the joystick may be used in the same capacity as the ENTER key on the keyboard. If you have a two-button joystick, the second button is used to set a connection dot wherever the cursor is, indicating that two wires are connected. It has the same function as the [.] key on the keyboard. The joystick may **not** be used to make command selections from the pull-down menus. Note that the keyboard cursor control still functions when the joystick is on.

**Keyboard:** Turns off joystick control. The keyboard has a number of ways to move the cursor. If you press any of the four arrow keys, the cursor will move one step in the direction you choose. If you hold the key down it will repeat, and the cursor will move multiple steps in the chosen direction. If you hold two arrow keys down simultaneously, i.e. the up and right arrows, the cursor will move diagonally in the given direction. SHIFT plus an arrow key causes the cursor to jump to the chosen side in one step. Finally, the CLEAR key causes the cursor to go to center of the screen.

### The Mode Menu (continued)

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**Top Layer:** This advanced feature causes the program to display only the circuitry contained in the top layer of the workspace. The circuitry is displayed in full color rather than only black as it is normally displayed. Any circuitry drawn while in top layer mode is added to the top layer. Use the RGB, NSTC, or B&W commands to return to normal display mode. See the Advanced Features for more information on layering.

**Mid Layer:** Similar in operation to the Top Layer command, Mid Layer allows you to work with just the middle layer.

**Low Layer:** The obvious complement to the two preceding commands, Low Layer allows you to work with the lowest layer of circuitry in the workspace.

### The Zone Menu

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The Zone menu is one of the most important features of this program. Your workspace is far larger than in any comparable color computer program, and is symbolized by the vertical rectangle at the bottom of the zone menu. The smaller rectangle at the top of the large rectangle represents the part of the workspace displayed on the screen. With the commands in the Zone menu you can move the small rectangle (or window) anywhere in the workspace and therefore access far more information than can fit on one screen.

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**Up:** moves the window upwards in the workspace. When it is positioned where you want, use **Redraw** to redraw the entire screen.

### The Zone Menu (continued)

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**Down:** moves the window downwards in the workspace. Use **Redraw** when it is properly positioned to complete the command.

**Jump:** this command allows you to jump directly to a specified vertical coordinate in the workspace. You will note that on the screen there is an area which contains the X and Y coordinate of the cursor in the workspace. The Y coordinate can range from 0 to 255, but only about 40 steps can fit on the screen at once. Refer to the Workspace section for more technical details.

**Redraw:** use this command after Up or Down to actually display that section of the workspace on the screen. Note that if you want to leave the Zone menu without changing the window, i.e., if you want to keep the window in the position it was when you pulled down the Zone menu, you can just press [Q] to exit the Zone menu without redrawing.

### The Text Menu

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Color Schematic Creator has a number of text styles and special electronics-oriented text characters available. Three styles are available, **Normal**, **Bold**, and **Small**. The special characters available include the ohm and kilo-ohm symbols.

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**Normal:** The normal character set is a readable and relatively large typeface. Once a character set is selected, the cursor can be moved with the arrow keys or joystick, and text can be put anywhere on the screen. Special symbols are available by pressing and holding

### The Text Menu (continued)

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the ALT key while typing one or more of the following characters: [O]: Ohm, [K]: KiloOhm, [M]: MegaOhm, [C]: cc (used in IC power supply pins as Vcc), [D]: dd (used as Vdd), and [S]: ss (used as Vss). Note that once you type a character you cannot use the back arrow to erase a mistake. Instead you must leave the Text mode (press ENTER) and use the Undo Last command to remove the entire line of text, and then retype it.

**Bold:** Turns on Text mode and uses a darker bold face style. Features are similar to those described above.

**Small:** Turns on Text mode with a half-height text style. Features are similar to those described above.

### The Line Menu

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One of the most necessary commands, the Line menu lets you draw different types of lines or boxes between two or more points.

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**Normal:** Use this to draw a solid line between any two points on the workspace. After pressing [N], move the cursor to one end of the desired line. Press ENTER or the fire button on your joystick to "anchor" one end of the line to the chosen spot. Now move the cursor to wherever you want the other end of the line to be and press the selector again. You will see a line drawn between the points. If the line is not quite right, you can use the Undo Last command to erase it, and then you may draw a new line. You can draw any number of lines once you enter line mode.

### The Line Menu (continued)

**Dotted:** Working very much like the Normal line mode, Dotted allows you to draw a dotted lines between sets of two points.

**Box:** This line mode draws boxes rather than lines. You simply anchor one corner of the box, move the cursor to where you want the other corner of the box, and press the button again. If you want to draw a dotted box, you must draw four dotted lines instead.

### The Undo Menu

Another very powerful feature, Color Schematic Creator's Undo feature allows you to erase your mistakes. Not only can you erase the last object you created or erase a block of the screen, as in some other similar programs, but also Color Schematic Creator keeps track of every thing you have drawn: you can erase the last five things you drew or even the last ninety-five things.

**Last:** This erases the last thing you did, be it draw a line, draw a symbol, type some text, or any other workspace altering command. Note that once you undo something, you cannot get it back again without drawing it over.

**Many:** allows you to erase a number of prior mistakes. Simply type a number and press **ENTER:** that many of your most recent drawing commands will be removed from the workspace.

**Eraser:** This command is useful if you want to erase some area of the workspace which you drew earlier, where Last would erase you more recent activity. It works just like the **Box**

### The Undo Menu (continued)

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function in the **Line** menu, but instead of drawing a box, erases everything enclosed in its corners. Note that you **can Undo Last** if your erase the wrong area.

### The SetDot Command

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SetDot is not a menu, but rather a command so often used that it needs an entry of its own. At any time except when you are in text mode, you can place a dot marker on the workspace at the current cursor position by pressing [.] or the second button on a two button joystick. This marker is used to indicate that two intersecting wires are electrically connected. The absence of the marker at the intersection of two wires usually means they are not connected electrically.

### The Rotate Command

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Rotate allows you to rotate schematic symbols in ninety degree increments. See the following entry for details on its use.

### The Symbol, Part, and Device Menus

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These menus allow you to access the various schematic symbols supplied with the program. After pulling down one of these menus, press the letter corresponding to the symbol which you need. The symbol will appear on the screen and move with the cursor. You can now move the symbol wherever you want on the screen, pressing **ENTER** wherever you want to place it on the screen. After you have

### The Symbol, Part, and Device Menus (continued)

selected a symbol, you can also **Rotate** it with the **[R]** key in order to fit it properly into the circuit.

### Advanced Features

**Layering** is a powerful function of Color Schematic Creator. With layering you can create three circuits each as big as the workspace, keep them in memory simultaneously, and still work with them individually. In **Normal** layer mode any circuitry which is not specifically drawn in a specific layer is color coded a certain color for its lines, another color for text, and a third for symbols. Those colors also indicate layers, however. Load the RECIEVER schematic into the top layer of memory using the **F**ile **I**op Layer command. You will notice that the entire circuit will be black. Now display just the lower layer of the workspace by typing **M**ode **L**ow Layer. The screen will be blank, indicating that the lower layer is empty. Now draw a few lines and put some text into it. It will be color coded just as if you were in normal mode. Now type **M**ode **I**op Layer. Now again you will see only the RECIEVER, but it will now appear color coded, as if you were in normal mode. Finally, type **M**ode **R**GB (or **N**STC or **B**&W) to return to normal mode. Both the layers will now appear, the top layer black and the lower layer blue-gray. In general this gives you the operation of the layering functions.

**Automatic File Loading:** Often when you are working on a project you will not want to have to keep remembering the filename and typing it every time you want to load it and save it. For this purpose there is an auto

load feature. Basically, when run the program checks the disk in drive 0 for a file named CURRFILE. If the file exists, it is automatically loaded into the workspace. To try out this feature do the following: Erase memory ( File Erase Mem ) and draw a simple circuit. Now use File Close to save it and quit. Notice that because you never named the file, it is given the name CURRFILE. Once the BASIC prompt appears, run the program again. This time it should automatically load your test file. Once you have finished a project and you do not want it to autoload, simply File Save it with a name other than CURRFILE to disable autoload.

#### Workspace Details

The workspace is 640 by 1000 pixels in size. Because of screen limitations, only about a seventh of that is displayed. The workspace is organized in 4X4 pixel blocks, of which there are about 160 by 250. One block is the smallest step the cursor can move.

The workspace is also three layers deep, giving a total resolution of 640X1000X3 or approximately 1,920,000 pixels. In memory the circuitry is stored as a series of shapes and coordinates in three dimensions, X, Y, and layer. There is a maximum available space of about 1000 shapes. On the menu bar there is a FREE entry which indicates how many more shapes can be added.

The workspace is stored to disk in two highly compressed files, one with a .SCE extension and one with a .SCT extension. The SCE file contains all the shapes, while the SCT file contains all the text in the circuit. A very large circuit, which would take up to 20 granules of disk space with another design program, can fit in two or three granules.



### In The Future

Color Schematic Creator is designed to be easily enhanced in the future. The program can easily be made to use higher resolution or more colors in its graphics, features such as zoom and increased workspace size, more layers, support for more printers, including laser printers, and publication quality output from plotters are all possible.

## Addendum

### Setting Printer Types

Version 1.1 of Color Schematic Creator supports EPSON Compatible printers and TANDY DMP Series printers. Instructions on printer selection follow.

Color Schematic Creator comes set up to print on an EPSON compatible printer. If you own a TANDY Dot Matrix printer which is not EPSON compatible, you must load the appropriate drivers for your printer.

In order to do this, run a program on your Color Schematic Creator disk called TANDY.BAS. Simply type :

```
RUN "TANDY"
```

and press ENTER. (Note: If the program gives you an ?AE ERROR IN 20 this means that you have already set up Color Schematic Creator for TANDY printers.) At this point the program will ask you if you want NARROW or NORMAL printing. Simply press ENTER to select NORMAL, or type NARROW and press ENTER if you would prefer it. Your disk is now set up for TANDY DMP Series printers.

If your TANDY Printer has an EPSON or IBM Compatible mode, you may want to leave the program set up for EPSON printers. If you do set up the TANDY printer drivers but decide at a later date that you would prefer EPSON style printouts, you may reload the EPSON drivers by typing :

```
RUN "EPSON"
```

and pressing ENTER. Note that because of the higher resolution of EPSON compatible printers,

## Setting Printer Types (continued)

this type of printout is preferred over TANDY mode. The addition of both narrow and normal print modes for TANDY printers is designed to take the printers' limitations into account by giving the user more control over the printer. If you own a TANDY printer, you may want to try printouts in both modes in order to decide which you prefer.

**IMPORTANT:** In order to switch between NARROW and NORMAL modes, use the following steps :

1. Run the program "EPSON.BAS" on your program disk. This removes the former TANDY mode.
2. Run the program "TANDY.BAS" on your program disk, and select either NARROW or NORMAL, whichever you desire.

You cannot simply run "TANDY.BAS" without first running "EPSON.BAS"

## BAUD RATES

Some printers, especially Tandy Printers, run at baud rates less than 9600. The Color Schematic Designer is setup for 9600 baud rate. If your printer runs at a baud rate other than 9600, follow this procedure.

- 1) Determine the Baud Rate of your printer
- 2) Determine the Baud Rate Value from the table:

Baud Rate	Baud Rate Value
600	88
1200	41
2400	18
4800	8

- 3) Insert Color Schematic Designer in drive and LOAD "BOOT"
  - 4) Type 90 DATA yy  
(where yy is the Baud Rate Value)
- For Example for a 1200 baud printer, Line 90 will read:

90 DATA 41

- 5) Type: SAVE "BOOT"

Note: The Serial-to-Parallel Interface from Microcom Software will allow you to run your printer at high speed (9600 baud). This interface costs \$47.95 (\$44.95 + \$3.00 S&H). If interested call Toll Free 1-800-654-5244.