SCHEMATIC DESIGNER

By
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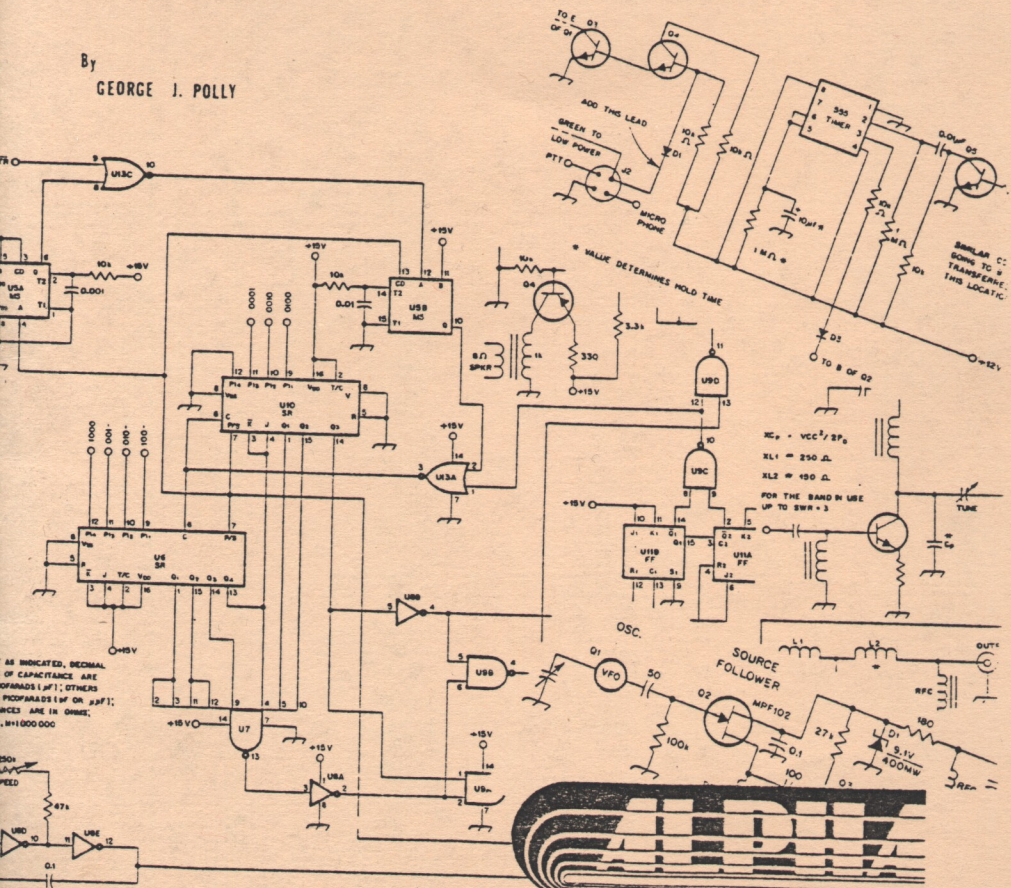
SCHEMATIC DESIGNER

By George Polly
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INTRODUCTION

SCHEMATIC DESIGNER is the paper of the future, for geniuses to design the electronic gadgets of the future. SCHEMATIC DESIGNER features 26 built-in symbols and the possibility of hundreds more, in high resolution graphics. It's as simple as moving a joystick. Leave a trail, place a resistor, make a connection and erase it all with the press of a button.

After you've designed that gadget of the future, save it! You can use SCHEMATIC DESIGNER to save a drawing for later use or print it out on your printer.

Just imagine for a moment, no more sharpening pencils, eraser marks or smears, all gone every last one. SCHEMATIC DESIGNER includes many sample schematics which can be used to build useful electronics projects, such as a working light pen.

REQUIRED ACCESORIES
    48K RAM
    Disk Drive
    Joystick

OPTIONAL ACCESSORIES
    Epson Printer (with Graftrax)
    Gemini Printers
    C. Itoh Printer
    Any Graphic Printer with Graphics 8 screen dump utility

Note:
    This manual and program assume you already know how to make a schematic and you know what each symbol means. If you need to brush up on these things, please refer to your local library for information on this subject.

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LOADING SCHEMATIC DESIGNER

TO LOAD:

1. Plug in a joystick into port 1. If you have a printer, turn it on.

2. Turn on your disk drive and monitor.

3. When the busy light goes out , open the disk drive door and insert the SCHEMATIC DESIGNER diskette with the label in the lower righthand corner nearest you. (Use disk drive one if you have multiple drives.)

4. Turn on your computer. SCHEMATIC DESIGNER will load and start automatically.

DRAWING A SCHEMATIC

Before you do any serious drawing with SCHEMATIC DESIGNER, try experimenting with the different options. Spell your name with symbols, draw a meaningless circuit, or modify one of the sample schematics. This gives you the oportunity to get a feel for how the program works, and to learn from your mistakes in a pressure-free situation. It's no big deal if a 'garbage' circuit is messed up, but it can be frustrating if an important project is accidentally ruined!

When SCHEMATIC DESIGNER has loaded, the screen will be dark green with a light green border. At the bottom it will say:

Command Entered:

This is the Draw mode. In the dark green portion of the screen is a purple cross with no center. This is the pointer. It indicates your current position on the screen. You can move the pointer with the joystick.

To move the pointer push your joystick in the direction you wish the pointer to move. Push the fire button once to draw. The pointer turns light blue, and it will leave a trail as it moves around on the screen. Push the fire button again to stop drawing, the pointer will turn purple. Hold the fire button down to draw a dotted line. The pointer will flash while the fire button is held down. Dotted line can be used as shielding.

You may use one of the options or symbols at any time, by pressing the key corresponding to the option or symbol (see next section).

OPTIONS

To use an option while in draw mode, press and hold the 'OPTION' key, then press the key which corresponds to the option you wish to use.

If you use an option, either the screen will disappear or the border of your screen will turn a different color, depending on which option you have chosen. The list of options and colors is

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below.

CROSS COLOR	- No change
DOS	- Screen
ERASE MODE	- Gray
FIND LINE	- No change
HELP SCREEN	- Screen
LOAD SCHEMATIC	- Light orange
PRINT SCHEMATIC	- Light purple
SAVE SCHEMATIC	- Pink
WRITE MODE	- Blue-Gray
ZOOM	- Screen

CROSS COLOR - OPTION and 'C'
This option removes the pointer from screen. Press the OPTION and the 'C' keys, and the pointer will disappear, Press them again and it will reappear.

MINI DOS - OPTION and 'D'
This option allows accesss to some DOS functions without losing the schematic.
The Mini-DOS screen is light green, and the disk directory is displayed. The bottom of the screen has six options for you to choose from. They are as follows:

1 - LOCK FILE	4 - RENAME FILE
2 - UNLOCK FILE	5 - DISK DIRECTORY
3 - DELETE FILE	6 - MAIN DRAWING

To choose a command, press the corresponding number. The first four options will ask for a filename. Enter it using the format given below.

Format : Dn:filename.ext   Example: D1:DESIGN2.SCH

With only one disk drive it is not necessary to enter 'D:'. If you are using a second disk drive you must enter 'D2:' before the filename.

Press the 'RETURN' key. When using the rename option you must enter two filenames, the original filename first, then the new filename. You do not need to type 'Dn:' before the new filename.

After using any command, the updated directory will be displayed.

If you wish to exit a command leaving a disk unchanged, press the 'RETURN' key without entering a filename. If you make a mistake, press the 'BACK SPACE' key to delete the last character typed.

When you are finished making changes insert the SCHEMATIC DESIGNER diskette and press the '6' key. Your schematic will return to the screen.

ERASE MODE - OPTION and 'E'

After entering the Erase Mode the pointer will turn into a gray diamond. Everything inside this diamond will be erased. When you are finished using the Erase Mode, press the 'RETURN' key. The pointer will reappear and you will be back in draw mode.

FIND LINE - OPTION and 'F'

This command is used to locate the pointer directly on the closest line in any direction. In the draw mode it will move the pointer, leave a trail, and stop on the line closest to the pointer's original position. In the non-draw mode it allows you to center the pointer exactly on a currently existing line.

After choosing this function, the computer will print 'FIND LINE' at the bottom of the screen. Push the joystick in the direction you wish the pointer to travel (up, down, left, or right). The pointer will   travel in that direction until it reaches a line.

HELP SCREEN - OPTION and 'H'

SCHEMATIC DESIGNER has three help screens. The first is asscesable from the draw mode. To call this Help screen, press the OPTION and 'H' keys. The other two are files that must be loaded using the OPTON 'L' command. You must save your schematic to disk before loading tese screens, or your drawing will be lost.

When you call the Help screen, the chart below will appear.

NAME	V	NAME	V	OPTIONS
* *********	*	* *********	*	*******

A	AND		N	RECEPTOR		E	ERASE
B	BATTERY		O	OR		C	CROSS
C	CAPACITOR	B	P	CRYSTAL	B	D	DOS
D	DIODE	B	Q	TRANSIST.		H	HELP
E	ANTENNA	V	R	RESISTOR	B	L	LOAD
F	FUSE	B	S	SWITCH		P	PRINT
G	GROUND	V	T	TRANSFOR.		S	SAVE
H	INVERTOR		U	OPAMP		W	WRITE
I	I.C.	B	V	VAR.ARROW			
J	SPEAKER		W	DIODE(R)	B		
K	MIC		X	LAMP			
L	LED	B	Y	TREM(NOT)	B		
M	METER		Z	ZENNER	B		

Q TRANSISTOR   T TRANSFORMER

1-PNP	4-FET P	1-TOP	1-CORE	1-TOP
2-NPN	5-UJT	2-MID	2-CORE	2-MID
3-FET N		3-BRK		3-BRK
		4-BOT		4-BOT

The screen is divided into two parts. In the top part, the 1st and 4th columns list the key code for the symbols. Press these keys to draw the symbols. The 2nd and 5th columns contain the symbols name. The 3rd and 6th columns indicate which direction the symbols can be drawn. A 'V' indicates a symbols which can be drawn vertically only. A 'B' indicates a symbol which can be drawn in either direction. If this column is blank, the symbol can be drawn horizontally only.

The last two columns list the options, the key code first, then the corresponding function. To use any of these functions, press the OPTION key, then the key code.

The bottom half of the screen contains the codes for transistors and transformers. Press 'Q' for transistors, or 'T' for transformers, then the number codes for the symbols you need.

The other two Help screens include drawings of the symbols. These screens are called HELP1.SCH and HELP2.SCH. Load them as you would any normal schematic drawing.

To return to the draw mode and your drawing, make sure the SCHEMATIC DESIGNER diskette is inserted in the disk drive, and press RETURN.

LOAD & SAVE SCHEMATICS - OPTION and 'L' or 'S'
     If you have a schematic which is half done, and don't have the time to finish it, save it!
     After pressing the 'S' or 'L' key, the prompt below appears at the bottom of the screen:

Command Entered: File?

     Enter the filename for the schematic in the format below:

Format : Dn:filename.ext   Example: D1:DESIGN2.SCH

     With one disk drive it is not necessary to type 'D:' before the filename. But, to use disk drive #2, you must enter 'D2:' before the filename.
     Refer to your DOS manual for more information on filenames. We also suggest you give all your schematic filenames an extension of 'SCH', to idetify them as schematic drawings.
     After entering the filename, press RETURN. The schematic will be loaded or saved.
     If SCHEMATIC DESIGNER cannot complete the load or save process, the comptuer will buzz and an error message and number will be displayed on the bottom of the screen. Make sure the right disk is in the right drive, and the drive door is closed. If you are saving a file, make sure the disk has no write-protect tab. Try again. If an error still occurs, check your DOS manual for specific information about the error, and how to correct it.
     Press the 'BACK SPACE' key to delete the last character typed. To abort the process, press the RETURN key before entering a filename.
     When the computer has loaded or saved correctly, SCHEMATIC DESIGNER will return to the Draw Mode.

PRINT SCHEMATIC - OPTION and 'P'

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If you have a printer, you can print your schematics on paper. When you select this option, the prompt below will appear on the screen:

Command Entered: Type?

Press the number for your printer, according to the chart below. If your printer is not on listed, try either number, or see the advanced user section which follows.

NO. 1   NO. 2

Epson printers with graftrax   C. Itoh printers
Gemini printers

Press the 'RETURN' key to begin printing your schematic. If an error occurs, the computer will buzz and an error message and number will be displayed. Make sure your printer is turned on, and all the cables are securely fastened. Try again. If it still doesn't work properly, refer to your printer manual or your DOS manual for specific information regarding your error. Your printer manual will also supply you with more specific information regarding compatability. To abort the printing process, press the 'ESC' key.

FOR ADVANCED USERS

Because of the staggering number of different kinds of printers available today, and rapid changes in the computer hardware industry, SCHEMATIC DESIGNER's printing ability is limited to only a few of the most common brands (and others that are compatible). However, once the schematic is saved to disk as a data file, it can be retrieved and used with many other programs, incuding standard printer dumps and modem programs.

If you have a modem, you can transfer your schematic drawing to anyone, anywhere you like, with one of the many commercial or public domain telecommunications programs available. Simply choose a program that is compatible with your equipment, and that offers the features you prefer.

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If you own a printer or plotter which SCHEMATIC DESIGNER does not support, you can still print your schematic, but it may take a little more work. If your printer came with a printer dump utility program, use it; otherwise choose a commercial or public domain program. You may need to load your schematic from DOS into the computer's memory, or display it on the screen with a Load and Display utility (such as the one provided below) before the printer program can print the drawing. Some printers do not support high-resolution graphics, and others do not support graphics at all. If your printer lacks high-resolution graphics capabilities (or lacks graphics capabilities completely), you may not be able to print your drawings on it.

If you own the program Graphics Master from DataSoft, you can use it to print your schematics. Save your schematic on a disk, just as you normally would. Load Graphics Master (don't forget to use BASIC), load your drawing, then print it with the START 'P' command. For more information on Graphics Master, refer to your Graphics Master manual. If you wish to purchase Graphics Master, consult your local computer store, or check favorite Atari magazine for mail order sources.

The program listed below will load a schematic from disk and display it on the screen. You may need to use this program in combination with your printer utility to print your schematic.

PROGRAM LISTING

```
10 GRAPHICS 8+16:DIM FN$(20):? CHR$(125);"FILE?";:INPUT FN$:TRAP
100
15 SMEM=PEEK(88)+PEEK(89)*256
20 OPEN #1,4,0,FN$:FOR I=0 TO 8000:GET #1,A:POKE SMEM+I,A:NEXT I
30 IF PEEK(195)=136 THEN 40
35 ? CHR$(253);CHR$(253);"LOADING ERROR"
40 CLOSE #1
50 GOTO 50
```

WRITE MODE - OPTION and 'W'

The write mode is used to write words and label parts on your schematic. All Atari's built in characters (except inverse video letters) will print.

In the write mode, the pointer is an orange box. The letter you type will appear in the box, then the box will move to the right. If you make a mistake, press the 'BACK SPACE' key. You can move this box in any direction using the joystick.

SCHEMATIC DESIGNER also provides two additional special characters. They are the ohms symbol or delta, and the micro symbol. To print them hold down the 'CONTROL' key and press either 'A' for ohms or 'B' for micro.

When you're finished, press the 'RETURN' key. The pointer will return to the first letter, and the program will return to draw mode.

ZOOM - OPTION and 'Z'

This option will enlarge the area around the pointer. Position the pointer in the center of the portion of the screen to be enlarged (be careful not to draw unwanted lines while positioning pointer). Press OPTION and the 'Z' key simultaneously.

The enlarged section will appear on the screen. In this mode, the cursor is a box, located in the upper left hand corner of the screen. It's controlled with the joystick, but draws dots instead of lines. Pressing the trigger places a dot on the screen under the box if that spot is blank. If the cursor is positioned over a dot, pressing the trigger erases the spot.

Enlarged or 'Zoomed' screens can be saved and loaded from disk, just as normal sized schematics, with the OPTION 'S' and OPTION 'L' key sequences. It's a good idea to use the extension '.ZOM' with these screens, to avoid confusiong them with normal sized schematics. When you have finished modifing the zoomed portion of the screen, make sure the SCHEMATIC DESIGNER disk is in drive #1, and press 'RETURN'. The changes made in the Zoom mode will be incorporated into the drawing, and the modified schematic will reappear.

The zoom mode gives you the ability to create a limitless number of specialty symbols. First, enter the zoom mode and draw your symbol. Next, save it to disk. This Zoom screen can be loaded in any time the symbol is needed. To use a special symbol in a

drawing, enter the Zoom mode and load the zoom screen. I's usually
easiest to place these special symbols on the screen before
drawing the schematic, becuase it can be difficult to match them
up with already drawn lines.

QUADARENT JUMP
    The quaderant jump keys are used to move the pointer to any of
four different locations on the screen. After using the quadarent
jump the program will be in the draw off mode. Do NOT press the
OPTION button when using the Quadrant Jump The chart below
indicates where the cursor will appear when each Quadrant Jump key
is pressed.

-	=
+	*

SYMBOLS

SCHEMATIC DESIGNER features 26 built-in symbols, all are accessible from the draw mode with a single keystroke

To use a symbol, position the pointer where the symbol should be located. Now press the the key which corresponds to the symbol you have chosen. SCHEMATIC DESIGNER will print the symbol horizontally across the screen.

Some of the symbols can be printed vertically, too. The symbols which can be drawn either way have a 'B' next to their name on the Help screen. Some symbols can only be drawn vertically, these symbols have a 'V' after thier name on the Help screen.

The alignment of the symbols which can be used either horizontally or vertically is determmined by the last direction the joystick was pushed. For example, if the joystick was last pushed to the right (or left) the symbol will be drawn horizontally from left to right. If it was last pushed down (or up), the symbol will be drawn vertically from top to bottom. When pressing a symbol key the computer may buzz and say 'DIRECTON!', this means the symbol cannot be drawn in the direction the joystick is being pushed. Redirect the joystick and try again.

HELPFUL HINTS

Positioning a symbol exactly right takes practice. Here are some helpful hints to get you started.

1. Symbols are easiest to draw when moving from left to right or from top to bottom.

2. If you are going to draw a symbol in any other direction, remember that the symbol will always be drawn from left to right. If you are moving from right to left, or from bottom to top, move the joystick past the point where the symbol should be.

3. To draw a transistor, press the 'Q' key, then press '1' through '5' for the type of transistor.

4. Because of the varying sizes of I.C.'s, SCHEMATIC DESIGNER uses a box as an I.C. To draw the box, place the pointer where one corner should be. Press the 'I' key. SCHEMATIC DESIGNER will leave a mark where the corner will be. Now move to the opposite corner and press the 'I' key again, and SCHEMATIC DESIGNER will drawn the box to fit. Note: Any other command may be used between the two corners.

5. The ground and antenna symbols have no exit points because they are used at the end of a line. After using one of these symbols, the program will go to draw off mode, and the pointer will not move.

6. The connection is a special symbol used to show a junction between two wires. Pressing the 'SPACE BAR' will draw a dot but will not move the pointer.

7. The terminal is a special symbol because it is drawn like a connection with no center. It can be used as a 'NOT', for example a NAND or a NOR symbol.

8. The variable arrow is not a symbol by itself. Placing this arrow over another symbol makes the symbol beneath the arrow variable. The pointer will not move after the arrow has been drawn

TRANSFORMERS

There's no such thing as a one size fits all transformer, so SCHEMATIC DESIGNER gives you the ability to create your own custom transformers for your specific needs.

A transformer is three columns of symbols. To build a transformer, position the pointer where the top left line is to enter (figure 3). Press the 'T' key to begin drawing the transformer. Enter the number for the symbol that belongs in this position. For example, to use symbol #1, press the '1' key. Next do the symbol directly underneath the previous symbol. To move to the top of the next column press the 'RETURN' key. When the transformer is finished, press the 'RETURN' key and the pointer will move to the end of the transformer. To abort a transformer press the RETURN key at the beginning of the first column.
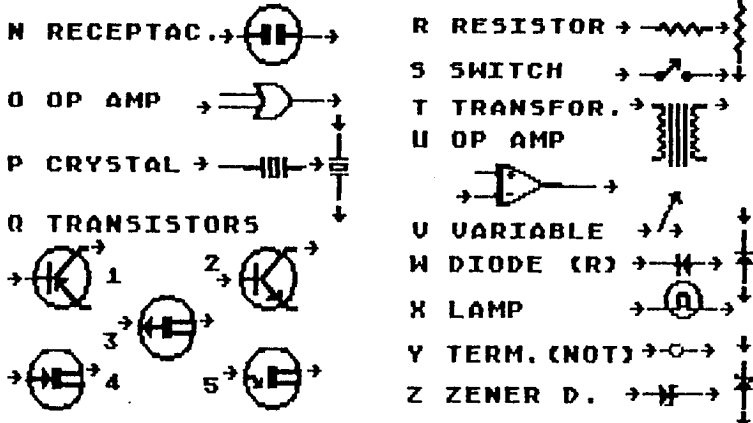
A AND

H INVERTER

B BATTERY

I I.C.

C CAPACITOR

D DIODE

J SPEAKER

E ANTENNA

K MIC.

F FUSE

L L.E.D.

M METER

G GROUND

SCHEMATIC DESIGNER #2
SUPER HELPER

N RECEPTAC.

R RESISTOR

S SWITCH

O OP AMP

T TRANSFOR.

U OP AMP

P CRYSTAL

Q TRANSISTORS

V VARIABLE

1   2

W DIODE (R)

3

X LAMP

4   5

Y TERM. (NOT)

Z ZENER D.
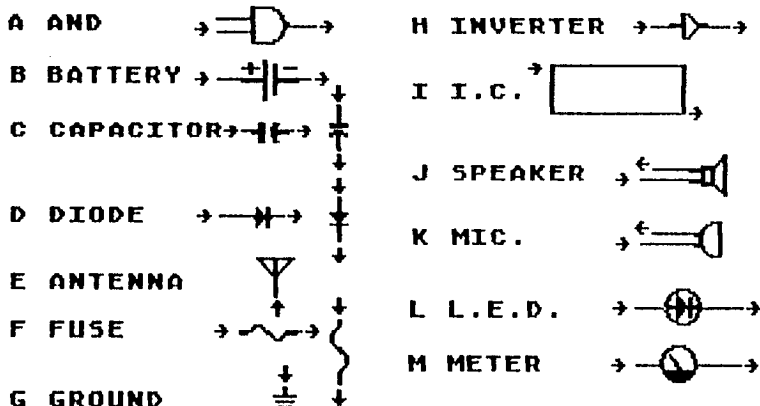
The chart which follows gives the symbols which correspond to the keys.

'T' TRANSFORMER

1 - ?   1 - III   1 - 5

2 - ξ   2 - II   2 - ₹

3 - ≃   3 - ≃

4 - ₅   4 - ₂

RETURN - Next Column

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SAMPLE SCHEMATICS

SCHEMATIC DESIGNER comes with several sample schematics. They demonstrate some of SCHEMATIC DESIGNER's many capabilities.

DRAWINGS

One sample schematic is an Atari compatible light pen. Also included are schematics of an AM wireless microphone, a 60 cycle time base and an amplifier. There's two Super Help screens on the disk, they show the symbol, key code and name. A sample Zoom screen of a triac is included also. The filenames of all the samples are listed below.

The schematic drawings are samples. Some may need a little modification to suit your needs before you build them. Good Luck!

AMMIC.SCH
TIMEBAS.SCH
AMPL.SCH
LIGHTPEN.SCH
HELP1.SCH
HELP2.SCH
PRINTER.SCH
TRAIC.ZOM
HOUSE.ZOM

Tell Us What You Think

We at Alpha Systems are sincerely interested in bringing you the best possible products at the lowest possible prices. Please write us if you experience any difficulties with our products, or have any comments or ideas for improvements. We will do our best to make our products better meet your needs. When you write, please enclose the following: 1) Your name, address, and phone number. 2) Your comments, or a description of your problem. 3) A description of your system. 4) If you are reporting a problem, please also include a description of what you were doing when the problem occurred, any printouts or other output showing the problem if possible, and any suggestions you may have regarding the cause and solution.

ALPHA SCHEMATIC DESIGNER #1
SUPER HELPER

A AND

B BATTERY

C CAPACITOR

D DIODE

E ANTENNA

F FUSE

G GROUND

H INVERTER

I I.C.

J SPEAKER

K MIC.

L L.E.D.

M METER

N RECEPTAC.

O OP AMP

P CRYSTAL

Q TRANSISTORS

1 2 3 4 5

R RESISTOR

S SWITCH

T TRANSFOR.

U OP AMP

V VARIABLE

W DIODE (R)

X LAMP

Y TERM. (NOT)

Z ZENER D.
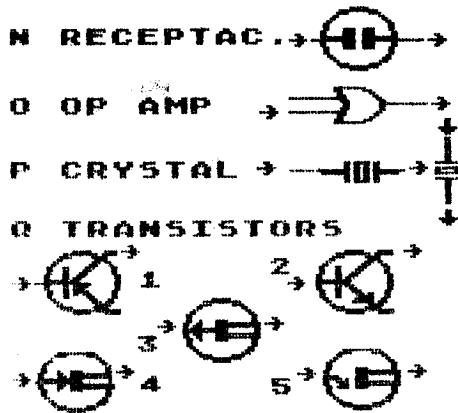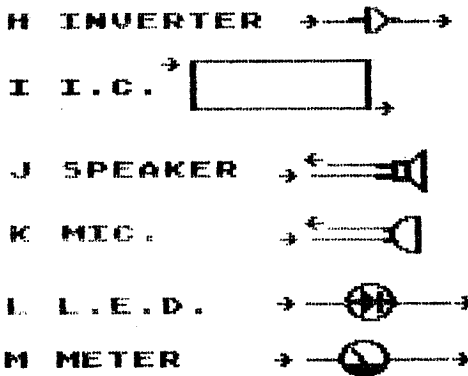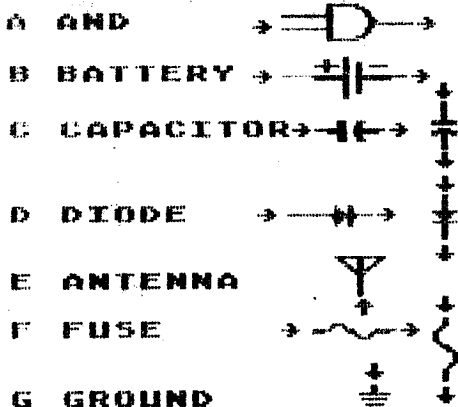
K	NAME	D	K	NAME	D	K	OPTIONS
A	AND	H	N	RECEPTOR	H	Z	ZOOM
B	BATTERY	H	O	OR	H	E	ERASE
C	CAPITOR	B	P	CRYSTAL	B	D	DOS
D	DIODE	B	*Q	TRANSIST.	H	H	HELP
E	ANTENNA	V	R	RESISTOR	B	L	LOAD
F	FUSE	B	S	SWITCH	H	P	PRINT
G	GROUND	V	*T	TRANSFOR.	H	S	SAVE
H	INVERTOR	H	U	OPAMP	H	W	WRITE
I	IC (CHIP)	B	V	VAR.ARROW	H	C	CROSS
J	SPEAKER	H	W	DIODE(R)	H		
K	MIC	H	X	LAMP	H		Print Type.
L	LED	B	Y	TREM(NOT)	B		Press: [1]
M	METER	B	Z	ZENNER	B		For:XMM801

*Q TRANSISTOR		*T TRANSFORMER			Press
1-PNP 4-FET	P	1-TOP 1-CORE	1-TOP		Q/T +
2-NPN 5-UJT		2-MID 2-CORE	2-MID		#(s)
3-FET N		3-BRK	3-BRK		
		4-BOT	4-BOT		

Draw: Press[key] | OPT.(W) Draws:[A]-ohms
Options: Press [OPTION]+[key]   [B]-micro