GRAPHICOM

CHESHIRE CAT COMPUTER CREATIONS

(Ver 1.3 Dec 83)

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BOOT
PICTURES
GC>BIN
BIN>GC
SUXPIX
PIXCMP
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INTRODUCTION

GRAPHICOM allows you to create, edit and transmit pictures and text using a uniquely powerful set of graphics tools. GRAPHICOM was created, over a three year period, to provide a person who has little experience with computers an easy way to use the power and flexibility of a computer. GRAPHICOM'S functions and power can be compared to dedicated graphics systems with hardware and software costing hundreds of times more than a GRAPHICOM system.

Most of GRAPHICOM was written in the high-level language, FORTH. A great deal of time was spent desighning the way the program would appear to and interact with the user. Version 1.1 of GRAPHICOM was presented at the COLOR EXPO in Pasadena, CA. in November 1983. Now you are using version 1.2 of GRAPHICOM, our second release.

Cheshire Cat Computer Creations wants to bring to the public software that will transform the computer from an esoteric magic box to an easily understandable tool for drawing and communications. You are welcome to use the concepts of GRAPHICOM in designing your own software. The source code for GRAPHICOM is available. However, while we welcome your study and use of GRAPHICOM, we cannot answer questions about it. We just don't have the time.

Read this manual with your Color Computer running GRAPHICOM; skip over paragraphs you don't understand immediately - let the pleasure of seeing graphics unfold be your guide. You'll notice the relatively small set of graphics commands. As you learn them, you'll find how incredibly powerful they are when combined to perform complex functions. At the end of this manual is a section with more technical information about interfacing hardware to GRAPHICOM, (cassette modem), and information about unique ways GRAPHICOM uses disks.

GRAPHICOM is an evolving tool that we hope will icrease understanding between people through the medium of graphics. People all over the country are using it and you'll find free programs and pictures on the Color SIG on Compuserve (COPCS-126, enter the XA2 Databases and look around).

We invite your written responses to GRAPHICOM and your participation in its future. Write CHESHIRE CAT COMPUTER CREATIONS, P.O. BOX 115, Lafayette, Ca. 94549.

REQUIRED HARDWARE

Minimum hardware requirements to run GRAPHICOM.

(1) A 64K, Extende Basic, TRS-80 Color Cumputer.

This can be any 64K CoCo, from a modified 64K D board to the CoCo 2, (provided the CoCo 2 is upgraded to 64K extended Basic). Because GRAPHICOM uses only a few documented cells in the Basic ROM, and does all disk I/O through its own machine language routines, it will work with all existing versions of CoCo ROMs, and will probably be compatible with future CoCo's.

(2) One Disk Drive System.

GRAPHICOM was designed to use one disk drive. It will run with Tandy's 1.0 or 1.1 Disk Extended Basic. GRAPHICOM will also run on systems using the J & M Systems Disk Controller with the special version of Disk Extended Basic that J & M Systems supplies, provided you have version 1.6 or later.

(3) A Pair of Joysticks.

All drawing and program control is done with the joysticks. The right joystick and the left and right fire buttons are used. The stock Radio Shake joysticks will work. Some folks have made a single joystick housing with two fire buttons (or one button and one switch), while others have substituted a foot switch for the left joystick, (menu), fire button and a standard joystick with its fire button on the right. We've tried the Radio Shack computer Mouse (-it works, but we don't recommend it), and even interfaced some more nonstandard stuff (like a Koala Pad), to the joystick port. All of the power of GRAPHICOM can be obtained with the standard Radio Shack joysticks.

(4) A TV set on which to view the CoCo's screen.

GRAPHICOM will work well on an ordinary color TV set. It will work far better when used with a monochrome monitor. All of the program development of GRAPHICOM and most of the pictures drawn with it, to date, (including the color pictures), were done using a green or amber screen monochrome monitor. Such monitors cost from $70 to $200, depending on brand, color, size and where you buy it. In order to use such a monitor, you'll have to purchase an adapter that allows the CoCo to produce a signal that can drive a monitor.

Cheshire Cat makes and sells the best video driver on the market. It costs $35 and can be installed without soldering. It simultaneously provides a clean monochrome video signal and a line level audio output. We have sold hundreds of these devices. The best monitor setup for GRAPHICOM is one monochrome and one color monitor running simultaneously. Only Cheshire Cat's video driver for the CoCo will provide such a setup. Video drivers are available CHESHIRE CAT COMPUTER CREATIONS, P.O. Box 115, Lafayette, Ca. 94549.

Hardware items that will greatly enhance and expand the capabilities of GRAPHICOM:

(1) Printer.

GRAPHICOM version 1.2 supports dumping the graphics screen to the following Radio Shack printers: LP VII, LP VIII, DMP 200 and the Color Graphics printer, CGP 115. It can easily be configured to output to an Epson MX 80, Gemini 10, C Itoh 8510 series printer and the Okidata Microline 82. Future versions of GRAPHICOM may include support for other printers. This will depend on popular response to the program; when someone wants to lend us the printer in question to study for a week; and more than anything else on the whims of the authors.

(2) Modem.

A crucial part of the GRAPHICOM is its COMmunications features. GRAPHICOM is designed to allow people to share graphic information. It will support transmission of its screens using a standard telephone modem at 300, 600 or 1200 baud. Such transmission includes error checking, handshaking and data compression. A "dumb" modem with an "answer-off-originate switch" like the Radio Shack Modem I is required. "Smart", automated modems that do not give the user the option to operate them in this simple mode will not work with GRAPHICOM. The Hayes Smartmodem will not work with GRAPHICOM.

(3) Cassette Recorder and/or "Cassette Modem".

Another option provided is to dump the screens to cassette tape or send a CoCo cassette tape type of signal over some kind of transmission line. A schematic diagram for an experimental "cassette modem" is included in the Technical Notes section. Hobbyists have found such 1500 baud modems to be effective. Because the cassette modem is experimental, we at Cheshire will not provide support for it. We have heard of several "cassette modem nests" across the country. In cassette modem mode there is no error checking or handshaking.

(4) Amateur Radio Station.

GRAPHICOM allows the user to transmit its pictures in one of three selectable Slow Scan TV formats. The signal is output from the audio output of the video monitor driver. The radio amateur may then modulate equipment with it and/or feed such signals back into the CoCo through the cassette port. Because the cassette motor relay is actuated only in send mode, a radio amateur can use that line to key a system between receive and transmit. Due to limitations in the harsware of the CoCo, we do not support different grey levels. Because of the analog nature of SSTV transmission, received pictures will not be exactly pixel for pixel identical to the transmitted one. However, a fairly good image can be obtained.

GETTING STARTED

BACK UP YOUR DISKS

The first thing to do with your GRAPHICOM disks is to BACK THEM UP. Although one of the disks you have purchased is in the normal Radio Shack format, (the pictures disk is in GRAPHICOM format), both can be backed up using Basic's "BACKUP" command. Get two blank disks right now! Format each blank disk in the usual way using Radio Shacks "DSKINI" command. Now use Radio Shack's "BACKUP" command to make copies of both GRAPHICOM disks. Bring out your backups only to recreate a crashed disk. Never use them to run the program. This sort of procedure should be used with any program you care about. It is one of the fundamental rules of good data handling.

Later on you'll learn to use the Copy/Format function built into GRAPHICOM to more conveniently create blank picture disks. Also, disks created with GRAPHICOM'S built in Copy/Format function will be read from or written to about four times faster than those formatted using Basic's "DSKINI" command.

PREPARE YOUR JOYSTICKS

All of GRAPHICOM'S many and powerful functions are under the control of one joystick and the two fire buttons. The keyboard is used only for the creation of text on a picture screen. We found that use of GRAPHICOM is greatly aided if you set up your joysticks in a convenient fashion. We suggest that you obtain some double sided stickey tape, which is available at most hardware stores, and at Radio Shack. Also get a small wooden board, about 1/4 to 1 inch thick and roughly 3 x 6 inches on its surface. Using the double sided tape, mount both joysticks side by side on the surface of the board. This form of mounting will greatly enhance your ability to use GRAPHICOM. It doesn't harm the joysticks and they can be easily removed. As mentioned in the section on hardware, there are many other better, more elaborate options, but this simple technique will get you started and it does work rather well.

BOOTING GRAPHICOM

After you have prepared the joysticks, you are ready to get the GRAPHICOM program running on your computer. We refer to this process as "booting" GRAPHICOM.

Booting GRAPHICOM has two stages. First, insert the GRAPHICOM disk in drive 0; type <RUN"BOOT"> <ENTER>. The drive will turn on, the screen will clear and the message "BOOTING GRAPHICOM" will appear on the screen. Then the TITLE PAGE will appear on either a blue or red background... if the background is red, hit 'reset' until you see a blue background.

This procedure allows to select which set of ARTIFACT colors you will use. The CoCo graphics hardware allows one of two color sets in the highest-resolution modes. The particular color set is determined randomly when GRPHICOM is booted. Pressing RESET will give one out of two chances of selecting the blue color background. We have arbitrarily chosen BLUE as a standard for GRAPHICOM, and RED may be used. If you are using a MONOCHROME monitor then these instructions do not apply.

SECOND, insert the PICTURE DISK in drive zero, (use the backup copy), and put your GRAPHICOM disk away. Tap the RIGHT joystick fire button, (pen button). The drive will turn on. The MAIN MENUE and the CONFIGURE page will flash on the screen. Then the screen will clear except for a small black square called the TEXT CURSOR, four "L" brackets forming a rectangle and a "crosshair" in the rectangle, indicating the current location of the "PEN".

YOU HAVE NOW SUCCESSFULLY BOOTED GRAPHICOM

From this point on, if you hit the reset on the back of the computer, you will return to BASIC, (cold start). If you get an error message in the course of trying to boot GRAPHICOM, try removing all disks from all drives and turning the computer first OFF, then ON. Now again try to BOOT GRAPHICOM. Another alternative is to enter, (from Basic), <POKE 113,0> <ENTER> and hit the RESET button. This is called 'cold starting the machine'.

THE STRUCTURE of GRAPHICOM

If you are approaching GRAPHICOM for the first time, it is very important that you read this, for it will provide a general idea of how the program operates. Following this section will be more specific information on how to use all of the individual parts of GRAPHICOM. Please remember that this manual provides only the fundamental instructions. GRAPHICOM is so very powerful that advanced users will combine its features in ways we have not anticipated. We have already seen this happen with early test release copies of GRAPHICOM.

PEN, MENU BUTTONS and the JOYSTICK

All program control is accomplished by the two fire buttons and the right joystick. Specificaly, the left fire button is the GRAPHICOM MENU button and the right fire button is the GRAPHICOM PEN button. The right joystick is the GRAPHICOM joystick for CURSOR and STAMP control and MENU selection. The left joystick is not used.

     MENU   : left fire button
     PEN   : right fire button
     JOYSTICK: right joystick
     (left joystick is not used)

Test this out for a moment: Hold down only the MENU button. -the screen will switch to GRAPHICON'S MAIN MENU. Release the MENU button and the MENU screen disappears and the clear "workspace" reappears. This is the SIMPLE DRAW mode.

Virtually all complex programs have modes of operation. GRAPHICOM is no exception. If ever you get confused about what mode the GRAPHICOM program is in, release both buttons. This will always cause the program to return to the SIMPLE DRAW mode, with a picture display, accompanied by the text cursor, the four "L" brackets and the PEN cursor.

WHEN BOTH BUTTONS ARE RELEASED, GRAPHICOM RETURNS TO THE SIMPLE DRAW MODE.

THE FINE CONTROL AREA

In the sections that follow you will see how drawing extraordinarily powerful editing is carried out using the GRAPHICOM joystick. In the SIMPLE DRAW mode, (to be described in detail in the next section), the joystick moves the DRAWING cursor, (the small blinking crosshairs), anywhere on the 256 x 192 pixel CoCo high-resolution screen. There is a bit of a trick here. The joysticks of the CoCo are capable of resolving only a 64 x 64 pixel area, yet GRAPHICOM provides fine cursor control over the entire screen. Understanding how GRAPHICOM does this will aid you in using it to draw and will help explain some things you will soon discover that might otherwise be seen as inexplicable quirks.

GRAPHICOM creates a fine control area that is 56 x 56 pixels in size. This area is outlined by the four "L" brackets that appear on the screen when it is in the SIMPLE DRAW mode. Moving the joystick when the cursor is within this area will result in direct movement of the drawing cursor. If you move the joystick so that the cursor moves up against the edge of the fine control area, two things start to happen: The entire fine control area starts to move in the direction of the cursor, and the speaker emits a clicking noise. (This warns you that you are moving the fine control area). Typically, you will move the fine control area to a position where you want it, then precisely position the cursor within the fine control area.

THE KEYBOARD

The sole function of the keyboard is to place text on the screen when you are in the SIMPLE DRAW mode. The keyboard has no control over the GRAPHICOM program whatsoever. The keyboard cursor is a blinking rectangular block. It can be positioned using the "arrow" keys and the "enter" key.

The character set that is produced by the keyboard is entirely under the control of the user. Later in this manual (in the Configure Screen section), we will show you how to draw your own character sets with any character size up to 8 x 12 pixels. On the picture disk we provide several different varieties of character sets ("fonts"), you can try. Note that you can completely redefine the characters produced by the keyboard. Set up a Dvorak keyboard, or create a Hebrew typewriter or a Cyrillic one. Keep several different type fonts for use with different languages, or mathematical/scientific notation or whatever.

SIMPLE DRAWIN using the MAIN MENU

Immediately after booting GRAPHICOM, you will be facing a blank screen with the keyboard and graphics cursors and the fine control area brackets blinking on the screen. You are now ready to explore the SIMPLE DRAW MODE by drawing straight lines.

SIMPLE DRAWING

GRAPHICOM uses a rubber band line drawing technique. Hold down the PEN (right), button and start to move the joystick. You will see on the screen a line that acts like a rubber band with one end tacked down where the graphics cursor was when you pushed the PEN button. The other end moves freely wherever the joystick takes it. Now release the PEN button. The line that existed at the time that you released the button has now been printed on the screen. To draw seperate dots, just tap the button without moving the joystick. Experiment now by drawing a number of different lines. Now try drawing a square. Note how you can draw a line, let go of the PEN button to print it, then push the PEN button down again and move the joystick at a right angle to get a second line that starts just where the other ended.

THE MAIN MENU

To use GRAPHICOM you must enter the MAIN MENU. Do this by holding down the MENU (left), button. The screen will fill with GRAPHICOMS 16 selections. Items are selected from the MAIN MENU by "tapping" the PEN button while holding down the MENU button. Let's start with a simple example: Suppose you wish to erase a particular line or dot...or suppose you want to draw a white line on a black background, -this is accomplished by using the "Color" function of the MAIN MENU.
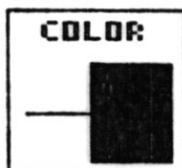
Line drawing (with flip-color).
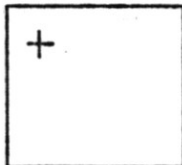
Use joystick to move graphics cursor. When its where you want it, press and hold the PEN button. This tacks down one end of a rubber band line.
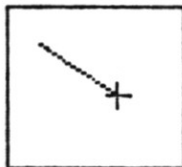
The line will now stretch to follow the joystick. Releasing the PEN button will leave the line as is. Tapping the button creates single pixel dots.

COLOR: Line color can be flipped by selecting COLOR in the MENU and tapping the PEN button.

MAKE STAMP

STAMP SET

MIRROR STAMP

ROTATE STAMP

OPAQUE

MASK (OR)

CLEAR (AND)

REVERSE (XOR)

COLOR

SCREEN MODE

SELECT/ ANIMATE

COPY/ FORMAT

1 2 3 4

DISK PAGES

PRINT

SEND

RECEIVE

MENU

FLIPPING the DRAWING COLOR (erasing a line or dot)

While holding the MENU button down, move the joystick so that the COLOR function is enclosed in the moving selector box. This is in the first column, third row of the MENU. Now tap the PEN button. The appearance of the COLOR box will alter. The word "COLOR" will occur as a negative of what it was before ("reverse video"). The picture in the box shows a line drawn on a half black and half white field. The color of this line will be the 'drawing' color. Tapping the button a second time will restore the drawing color to its original state. In other words, tapping the PEN button will "toggle" the drawing color.

Now that you have reversed the color of the 'pen', return to the SIMPLE DRAW mode by releasing both buttons. Position the drawing cursor over the end of one of the lines you drew before you changed the PEN color. Hold the PEN button down and move the joystick to follow the line you drew before. Notice how the old line disappears as you move the current "rubber band" line over the old line.

NOTE: When you reverse the PEN color you also reverse the color of the characters generated by the keyboard.

Try typing some letters on the picture screen. When the color is set to "white", characters typed on the screen are white with a black background. ONLY the color of the "rubber band" line and the text are affected by the COLOR function on the MAIN MENU. It will not affect the STAMP functions.

COLOR | This function on the MENU flips the line and text color. To activate it, select this box on the Menu and tap the PEN button.

COLOR | Text and lines will be white if the background is black. Otherwise, they're invisible.

COLOR | Text and lines will be black if the background is white. Otherwise, they're invisible.

DISK PAGES

WARNING: This section deals with how to alter your picture disk. Be sure you have made a backup copy of your picture disk before you experiment. Please read the entire section before trying to do what is suggested in the next few paragraphs.

Both the "workspaces" you save and the menus that GRAPHICOM displays (as well as the TYPE FONT for GRAPHICOM and other information as well), all are on the pictures disk. This disk is accessed via the DISK PAGES function on the MAIN MENU. The DISK PAGES function also gives you an overview of your four workspace areas.

Select this function by holding the MENU button down, enclosing the lower left hand corner of the main menu with the selector box using the joystick and tapping the PEN button. (the MENU button is held down through all of the following DISK PAGES operations.) The disk drive will spin and the screen will display the disk pages menu. You will be looking at 30 square "tags". Each "tag" is a copy of the lower right hand corner of the picture it represents. To "pick up" any of the pictures, use the joystick to move the selector box until the box encloses the tag of the picture you want to see, then hold down the PEN button. The picture in question will then fill the screen. For now, release the PEN button WITHOUT MOVING THE JOYSTICK and you'll see the DISK PAGES MENU again.

THE FOUR WORK SPACES

Look at the DISK PAGES MENU. Underneath the first four squares from left to right on the top row, are the numbers 1 through 4. These first four squares are "tags", not for areas on the disk, but for the pictures in the four workspace areas in the computer memory. The fourth tag is labelled both "4" and "stamps" to signify its function both as another workspace and as the location of a fixed stamp set. This special function will be described later. The remaining 26 tags are associated with locations on the pictures disk. The last two on the first row and the first one on the left of the second row are pictures with special significance to the operation of GRAPHICOM.
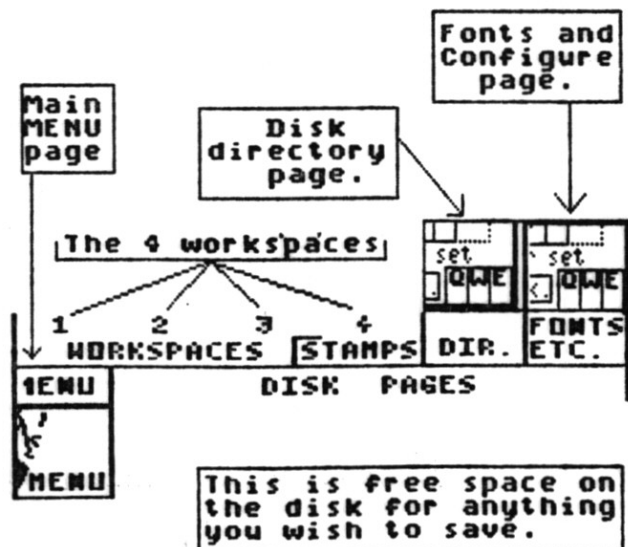
ABOUT THE DISK DIRECTORY

1) WORKSPACES: THE FIRST FOUR TOP ROW AREAS ARE THE WORKSPACES, WHERE PICTURES ARE CREATED AND EDITED. THE WORKSPACES RESIDE IN MEMORY - NOT ON DISK - AND WILL BE ERASED WHEN POWER IS TURNED OFF. IF YOU DON'T WANT TO LOSE YOUR WORK, SAVE IT! NOTE: WORKSPACE 4 IS ALSO USED FOR STAMP SETS. (SEE PAGE 23)

2) DIRECTORY: THE FIFTH AREA ON THE TOP ROW IS WHERE THE DISK DIRECTORY ITSELF IS STORED. YOU CAN LOAD THE DIRECTORY TO PRINT IT OUT OR EVEN MODIFY IT, BUT BE CAREFUL!

3) FONTS ETC.: THE LAST AREA ON THE TOP ROW IS FOR THE CHARACTER FONT AND SELECTION OF PRINTER AND MODEM. (SEE PAGE 13)

4) MENU: THE FIRST AREA BELOW THE LABELS CONTAINS THE MENU THAT YOU SEE WHEN YOU PUSH THE "MENU" BUTTON. IT CAN BE MODIFIED BY TRANSFERRING IT TO A WORKSPACE, EDITING IT AND STORING IT BACK INTO THE MENU AREA.

5) DISK PAGES: THE REST OF THE AREAS ON THE DISK ARE FOR WHATEVER YOU WANT. THESE ARE FILLED ON THE ORIGINAL PICTURE DISK, BUT YOU CAN FORMAT ADDITIONAL DISKS, (SEE PAGE 27), FOR YOUR OWN PICTURES.

"SAVING" IS ACCOMPLISHED BY SELECTING THE "DISK PAGES" FUNCTION ON THE MAIN MENU, HOLDING THE MENU BUTTON DOWN, SELECTING THE "AREA" YOU WANT SAVED, (VIA THE JOYSTICK), PRESSING AND HOLDING THE PEN BUTTON, SELECTING THE DESTINATION "AREA" AND RELEASING THE PEN BUTTON.

DIRECTORY, FONTS and MENU PICTURES

The picture labelled "DIR" is the disk directory for the picture disk. Each time you look at a picture while using Disk Pages, GRAPHICOM internally makes a note of the tag for that spot. Each time you move a picture to a new spot on the disk, the directory picture in the computer memory is updated. You generally should avoid moving any pictures into the directory space. If you accidently write a picture over the directory picture, don't worry. Your pictures are still present on the disk. The directory will repair itself if you look at each picture on the disk. This refreshes the computers memory about what is in the directory picture. To place the repaired directory back on the picture disk, just move a workspace onto any other picture spot on the disk. Later on you may wish to alter the words on the directory. To do so you'd merely edit it like any other picture.

The last tag on the top right is for the character font generator for GRAPHICOM. It also sets GRAPHICOMS communications parameters. This will be discussed in detail in a seperate section. The tag on the second row at the far right is for the picture of GRAPHICOMS MENU. If you later wish to draw your own menu "ICONS", merely alter the picture that resides in the "Menu" location on the disk.

The remaining 23 tags on the Disk Pages Menu represent the lower right hand corners of the general filing spaces available on a GRAPHICOM disk. Every space has been filled on the Pictures disk No. 1 that we include with GRAPHICON. You'll probably want to make a number of picture disks so that you can store your own pictures without destroying the ones from Cheshire Cat. The "Copy/Format" section describes how to do this efficiently.
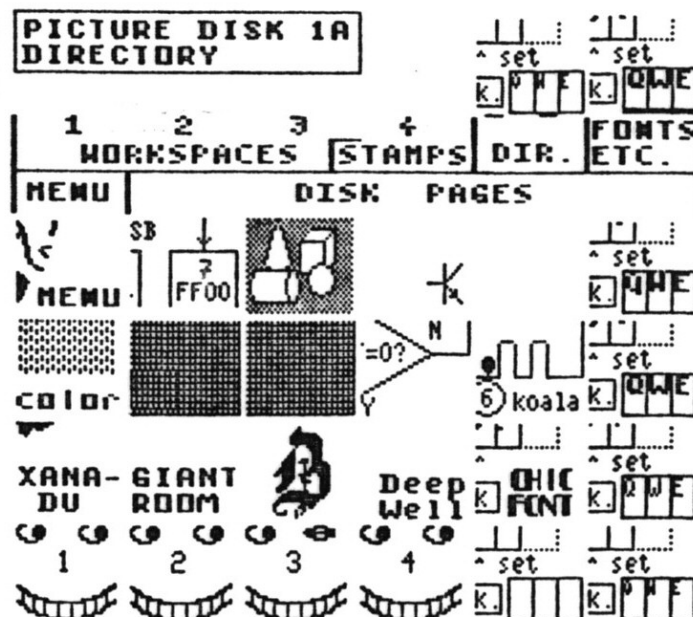
HOW TO MOVE PICTURES

At last we come to the principal purpose of the Disk Pages function: moving pictures around. Get the Disk Pages menu onto the screen. Let's say that you want to move the picture tagged "Xanadu", on picture disk No. 1, into "workspace" No. 1. Move the select box so that it encloses the picture tag. Now "pick up" a copy of that picture by holding down the pen button. (The menu button is still held down from the time you selected the Disk Pages function.) The screen will fill with the full picture of Xanadu. Now move the joystick. The screen will once again show the disk pages menu, but as you move the joystick, you will be carrying the tag for Xanadu around. Move the joystick to put the tag over the top left box, (workspace No. 1), Then release the pen button.

You will hear four beeps. By those beeps, GRAPHICOM is telling you that it's about to store a picture somewhere...Are you sure that's what you want it to do? If you PRESS and HOLD the pen button during the four beeps, the picture will not be written out and you can move it elsewhere. (Also, releasing the menu button will prevent the writing of the picture, however, this method will return you to the Simple Draw mode.) If you do nothing at this point, the picture will be stored in workspace No. 1. Similarly, when using the Disk Pages function, a copy of the picture in any of the 26 places on the disk, (including the three special sites described above), can be moved to either a workspace or any other spot on the disk.

NOTE: GRAPHICOM uses the "drive select light" in a special way - DO NOT switch picture disks while it is on!!!

USING THE DISK PAGES

ENSURE THAT YOUR DISKS ARE WRITE PROTECTED UNTIL YOU BECOME FAMILIAR WITH THE OPERATION OF GRAPHICOM.

WHEN YOU SELECT THE "DISK PAGES" FUNCTION, THE DISK'S PICTURE DIRECTORY WILL APPEAR ON THE SCREEN. THE DISK DRIVE WILL REMAIN IN MOTION UNTIL YOU RELEASE THE MENU BUTTON. NOTE: THE MENU BUTTON MUST BE HELD DOWN THROUGHOUT THIS OPERATION.

NEVER CHANGE DISKS WHILE THE DRIVE IS IN MOTION.

THE DISK DIRECTORY CONSISTS OF THE BOTTOM RIGHT CORNERS, (TAGS), OF ALL THE PICTURES ON THE DISK AS WELL AS THOSE OF YOUR WORKSPACES.

TO "PICK UP" ONE OF THE PICTURES ON THE DISK, MOVE THE "SELECT BOX" UNTIL IT ENCLOSES THE "TAG" YOU WANT. NOW PRESS AND HOLD THE PEN BUTTON AND SELECT THE "DESTINATION" SPACE VIA THE JOYSTICK. RELEASING THE PEN BUTTON WILL DEPOSIT A COPY OF THE "PICKED UP" PICTURE IN THIS NEW "SPACE". YOU MAY SIMPLY LOOK AT THE PICTURES BY THE SAME SELECTION METHOD, BUT THE PEN BUTTON MUST BE RELEASED OVER THE ORIGINAL SELECTED SPACE TO ENSURE THAT OTHER AREAS ARE NOT DESTROYED. (IT IS EASY TO NOTICE WHEN THE ORIGINAL AREA IS SELECTED, BECAUSE THE SCREEN WILL BE FILLED WITH THE ACTUAL PICTURE ONLY WHEN OVER ITS OWN AREA.)

WHEN A PICTURE IS ABOUT TO BE "WRITTEN", YOU WILL HEAR 4 BEEPS AS A WARNING THAT DATA IN THE DESTINATION SPACE WILL BE OVERWRITTEN. QUICKLY PRESSING THE PEN BUTTON WILL ABORT THIS. TRYING TO WRITE TO A PROTECTED DISK CAUSES A DISTINCTIVE SOUND.

THE FONTS etc. (Configure) SCREEN

The Fonts etc. page on the disk pages menu contains the information that GRAPHICOM uses to configure itself for one of a number of different printers, baud rates and communications protocols. It also provides GRAPHICOM with its character set, (font), that will appear when you use the keyboard. Placing this screen in a workspace, editing it, then placing the edited picture on top of the former Fonts picture, is the procedure you use to configure GRAPHICOM to your particular needs.

PRINTERS

Using the Print function, (described later), GRAPHICOM version 1.1 will output its pictures to EPSON MX 80, GEMINI 10, C-ITOH 8510, OKIDATA 92 and the following Tandy dot matrix printers: DMP 100, 200, LP VII, LP VIII and CGP 115 Color Graphic Printer. On your picture disk No. 1, the Fonts screen is set for Tandy type printers at 600 baud.

To change the settings, put the Fonts screen in one of the workspaces. Using the Make Stamp and the Reverse Stamp functions, (described later on), make a reverse stamp out of the black rectangle at the bottom center of the Fonts page. (This is called the "select block"). Now precisely position it over the black rectangle you wish to remove ,andStamp it. Use the same stamp again to black in the block under the type printer and baud rate you desire to set up. Remember to put this edited screen back on the disk in the Fonts area, in order for your changes to take effect. If you've had even the slightest difficulty understanding what this paragraph means, don't worry. Just re-read it after you've read the pages describing the Stamp functions.

You have two options for using the CGP 115 printer. CGP-B will yield a monochrome, (only one pen used), rendition of the picture. The CGP-C option will interpret the workspace screen as a kind of PMODE 3 screen. By removing the green pen and ,(perhaps), rearranging the others, you can use the CGP-C option to produce an artifact color printout. You'll have to experiment with this a bit. For both settings of the CGP option, set the printer baud rate to 600.

PRINTER SELECTION

IN ORDER TO CONFIGURE GRAPHICOM FOR YOUR PARTICULAR PRINTER, TRANSFER A COPY OF THE "FONTS ETC" PAGE TO THE CURRENT WORKSPACE. THE TOP PORTION LOOKS LIKE THIS:

EPSON	C-ITOH	TANDY	CGP-B	CGP-C	OKI		

Printer type select

MAKE A STAMP OF THE ▬▬▬ ←Select block AT THE BOTTOM OF THE SCREEN.

SELECT "REVERSE STAMP" AND STAMP OUT THE OLD SELECTION.

EPSON	C-ITOH	TANDY	CGP-B	CGP-C	OKI		

NOW SELECT "CLEAR STAMP" AND STAMP IN THE PRINTER YOU WANT.

EPSON	C-ITOH	TANDY	CGP-B	CGP-C	OKI		

NOTE: ENSURE THAT THESE SELECTION BLOCKS ARE STAMPED PRECISELY AS SHOWN HERE SO THAT GRAPHICOM HAS NO ROOM FOR ERROR!

ABOUT THE FONTS AND CONFIGURE PAGE

THE "FONTS ETC." PAGE ALLOWS YOU TO CUSTOMIZE GRAPHICOM FOR YOUR PARTICULAR NEEDS. IT IS LOADED EVERY TIME YOU RETURN FROM OTHER DISK PAGES. YOU CAN KEEP SEVERAL DISKS AND CHANGE FONTS OR CONFIGURATIONS BY INSERTING THE NEW DISK AND SELECTING DISK PAGES MOMENTARILY TO LOAD THE FONTS ETC. PAGE. BELOW, ARE DESCRIPTIONS OF THE THREE THINGS YOU CAN CONFIGURE IN GRAPHICOM: THE PRINT FUNCTION; THE SEND/RECEIVE FUNCTION; AND THE CHARACTER FONT.

THE PRINTER FUNCTION CAN BE SET TO WHICHEVER ONE YOU HAVE. SOME PRINTERS, NOT LISTED, CAN BE USED AS FOLLOWS:

GEMINI 10: SET TO "EPSON".

RADIO SHACK LPVII, LPVIII, DMP 100, 120, 200, AND OTHERS: SET TO "TANDY".

RADIO SHACK CGP 115: SET TO CGP-B FOR COLOR, (SELECT PEN MANUALLY), PRINTOUT OR CGP-C COLOR PRINTOUT, (RE-ARRANGE PENS IF YOU DON'T LIKE THE COLORS).

THE PRINTER BAUD RATE CAN BE SET FOR 110 TO 9600 TO MATCH YOUR PRINTER.

TELECOMMUNICATIONS

Using the Send function, (described later on), GRAPHICOM can transmit a picture from a selected workspace in three distinctly different ways. Blocking in one of the first three choices on the third row of the configure screen, sets GRAPHICOM to output to the RS-232 port at on e of three given baud rates. These settings can be used to send or receive GRAPHICOM pictures using a standard telephone modem. Most common modems today use 300 baud RS-232. The modem you use must be able to be set into answer or originate mode via a switch. There is no way to use a Hayes Smart modem.

If you fill in the cassette option, GRAPHICOM will, (when you employ the send function), output its pictures to a file on cassette tape. Some others have interfaced our cassette port to the telephone, thus using the cassette option as a software based 1500 baud telephone modem.

A brief description of the Slow Scan TV option is given below. Radio Amateurs are invited to experiment with this feature. We here have successfully transfered an SSTV tape of Viking Mars photos into GRAPHICOM screens using this setting with the receive function.

FONTS AND CONFIGURE

SEND AND RECEIVE CAN BE MADE TO USE A VARIETY OF FORMATS: RS-232, 300 BAUD FOR STANDARD MODEMS. RS-232 600 & 1200 BAUD FOR FASTER MODEMS. "CASS TAPE" FOR RECORDING ON TAPE OR TO SEND THROUGH A COUPLER TO TELEPHONE LINES. SSTV ALSO HAS ANOTHER ADJUSTMENT FOR RECEIVE THRESHOLD - ADJUST THIS IF YOUR PICTURES ARE TOO LIGHT OR TOO DARK.

THE CHARACTER FONT CAN BE EDITED AS WELL. NOT ONLY CAN THE SHAPE OF THE CHARACTERS BE CHANGED, BUT THE SIZE OF THE CHARACTER BOX CAN BE MADE LARGER OR SMALLER. THERE ARE TWO SETS OF CHARACTERS ARRANGED IN THE KEYBOARD LAYOUT. THE RIGHT HAND SET CONSISTS OF "SHIFTED" OR UPPER CASE CHARACTERS. EDIT ANY CHARACTER SPACE USING LINE DRAWING, STAMPS ETC. WHEN YOU COPY THE NEW FONTS TO THE "FONTS ETC." SPACE AND RETURN FROM THE "DISK PAGES", THE MODIFIED FONT WILL BE LOADED. THE SIZE OF THE CHARACTERS IS DETERMINED BY HOW MUCH OF THE "CHARACTER SIZE" BOX HAS BEEN FILLED WITH BLACK. MAKE SURE THE BLACK AREA IS A RECTANGLE AND THAT IT AGAINST THE UPPER LEFT OF THE BOX.

USING SSTV WITH RADIO

USE OF SSTV DOES NOT REQUIRE AN INTERFACE. ONLY ONE CONNECTION IS REQUIRED TO RECEIVE AND TWO MORE ARE REQUIRED TO TRANSMIT.

RECEIVE: CONNECT CASSETTE CABLE "EAR" PLUG (THE BLACK ONE), ACROSS THE RECEIVER SPEAKER. (OFTEN YOU WILL BE ABLE TO SIMPLY PLUG IT IN).

TRANSMIT: CONNECT THE "AUX", (THE LARGE GREY PLUG), TO THE TRANSMITTER MICROPHONE INPUT. (A RESISTOR MAY BE REQUIRED TO REDUCE THE LEVEL). ALSO CONNECT THE MOTOR PLUG (THE SMALL GREY ONE), TO KEY THE TRANSMITTER (UNLESS YOU WANT TO DO THIS MANUALLY).
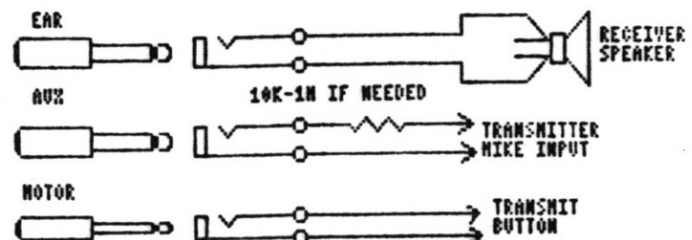
The lower half of the Fonts page contains the templates for the character set. Redrawing the character within the image of the keyboard on the Fonts page, then putting the redrawn page back on the disk in the fonts area will reassign the keyboard to whatever you draw in the little boxes.

There is one other thing you need to know about redrawing the type font. At the lower left corner of the font page is a rectangle drawn with dotted lines. This is the character size block. Part of it has been blacked out. The size of the blacked out area determines the size of the type face. Compare the two type faces shown below. The one on the right, (the bold faced one), is set for a slightly larger type face than the one on the left. If you set the full block to black, you will be able to draw a 32 colomn character set with 8 x 12 pixels.

Picture disk No. 1 comes with a number of different type fonts that can be loaded into the fonts area on the disk. We supply sets that have between 32 and 64 colomns. After you learn how to use more of the editing features of GRAPHICOM, you may want to design your own character sets. To assist you in this matter, we supply on picture disk No. 1 a copy of a blank character set. (Fifth colomn, fifth row.)

<center>EXAMPLES of TYPE FONTS</center>

EXAMPLES OF FONTS

USE ANY METHOD YOU WANT (LINE DRAW, STAMPS ETC.), TO EDIT THE CHARACTERS IN THE BOXES. EACH BOX IS FOR A GIVEN KEY AND THE CONTENTS OF THE BOXES IS WHAT SHOWS UP WHEN A KEY IS PRESSED. THE RIGHT HAND SET IS THE UPPER CASE OR "SHIFTED" SET.

TO CHANGE THE SIZE OF THE CHARACTERS, EDIT THE CHARACTER SIZE BOX. CHARACTER SIZE CORRESPONDS TO THE SIZE OF THE BLACK RECTANGLE, WHICH MUST BE AGAINST THE UPPER LEFT CORNER OF THE BOX. PLACEMENT OF YOUR NEW FONTS PAGE, IN THE "FONTS ETC" SPACE WILL ALLOW ITS USE.

Normal character set   Shifted character set

←Character size.   ←Select block.

THE SELECT / ANIMATE FUNCTIONS

As you learned in the section on disk pages, you have four workspaces available to you in the Simple Draw mode. The Select / Animate function allows you to choose which workspace is currently being displayed. By flipping through the four workspaces, you can achieve simple animation effects.

Most likely your most common use of this function will be to switch workspaces. This helps you to build a picture in one workspace out of pieces you've created in another workspace. Stamps made from one workspace remain in memory even after you flip the workspace, as long as you don't redefine the stamp.

To experience the animation effect, first use the disk pages function to put the four numbered grinning faces, supplied on the bottom row of picture disk No. 1, into workspaces one through four respectively. Now select the Select / Animate function from the main menu by tapping the pen button after encircling that function on the main menu with the selector box. As you tap the pen button more times, you will sequentially select one workspace after another for display. Holding the pen button down continuously, causes the scene to be animated. The rate and direction of the animation is controlled by moving the joystick right or left. You can vary the "projection rate" from very slow up to 60 frames a second.

Tapping the PEN button with this function will select your workspace. It also allows you to create simple animation by flashing through the 4 workspaces at a rate and direction controlled by the joystick.

(current workspace)

When you select this function, you will see the contents of the current workspace. Tapping the PEN button will step through the workspaces. Holding the button down will "scan" at a rate and direction determined by the joystick.

Release the PEN button to stop at any workspace. Release the MENU button and the "current" workspace will be marked on the MENU picture and also on the disk directory.

THE MAKE STAMP FUNCTIONS

The next five menu items to be discussed, (the Make Stamp and the four major types of stamps), comprise the core of what seperates GRAPHICOM from most other graphics programs. Along with the Stamp Set function, (a special sort of Make Stamp function), these functions can be combined in hundreds of ways for extremely powerful and swift graphics editing. In this section I can only provide the simplest information on how to use these tools. I urge you to experiment with them extensively after reading the most elementary tutorial of them. After having gotten a picture or part of a picture into your workspace, GRAPHICOM allows you to create the equivalent of a rubber stamp on any part of that picture, and stamp that stamp over any other part of that, (or any other), picture in a number of different ways. The Make Stamp function allows you to define the content and size of the stamp you are going to use. The other four stamp functions on the second row of the main menu are then used to define the particular way in which your stamp will behave when you use it.

Enter the simple draw mode, (let up on all buttons), and then draw a small square on the screen using the pen button and the rubber band graphics aspect of the Simple Draw mode. Now hold down the menu button. Use the joystick to enclose the Make Stamp function. While still holding down the menu button, select the Make Stamp function by tapping the pen button. Keep holding the menu button down. The speaker will beep and you will be returned to your workspace.

The keyboard cursor and the fine control area brackets will be gone, and the small cross hair cursor will be replaced by cross hairs that extend to the edges of the screen. Keep holding the menu button down. Use the joystick to position the cross hairs at one corner of the square you drew. Then hold down the pen button. The cross hairs will disappear. Move the joystick. You will see a 'rubber band' box appear. One corner of the box is tacked down wher the cross hairs were when you hit the pen button. The diagonally opposite corner of the rubber band box is placed wherever you move the joystick.

Get the feel of this rubber band box by moving it around for awhile, then position it so that it surrounds the box you drew. Now let go of the pen button. Having defined your stamp, you will return to the main menu. You can define any part of a workspace, from a single pixel to the entire workspace, as your stamp. You can use the joystick to make the rubber band box appear in any direction. Therefore, it makes no difference which corner you choose to tack the rubber band box at, as long as it is at one of the four corners of the area you wish to define. If you release the menu button before completing this process, you will abort the entire procedure.

This allows you to define the area of the screen which is to be made into a "stamp". This stamp can be any size, from a single pixel to the entire screen. Select this function from the menu and keep the menu button down.
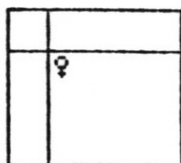
Selecting this function produces a set of "cross-hairs" on the screen. Position the cross-hairs at one corner (any corner is OK), of the area you want to make into a stamp and press and HOLD the PEN button.
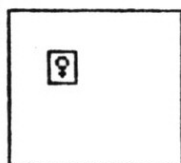
Now, as you move the joystick, an expandable "box" will appear. When the PEN button is released, every-thing within (and under the lines of) the "box" will become a "stamp".

To abort, (and retain an old stamp), release MENU button before finishing.

THE FOUR TYPES OF STAMPS

After having defined a stamp with the Make Stamp function, the actual stamping is accomplished by going back to the main menu and moving the selector box so that it encloses one of the four stamp functions on the second row of the menu that you wish to use. Then tap the pen button. The stamp you defined will then be seen on the screen, overlying the workspace and interacting with the workspace in a fashion determined by which type of stamp you selected.

While in this mode, you can drag the stamp around the screen. When you're ready to stamp it, tap the pen button. The stamp will become a part of the workspace. When in the Stamp mode, you can continuously drag the stamp around while stamping it. This is refered to as the REPEAT STAMP feature. You can use the repeat stamp feature to create double emphasis, to simulate a pen nib or an eraser and probably perform a few thousand other tricks as well.

There are two characteristics of the repeat stamp feature that you should keep in mind. The first is that if you stamp it large, you may have to move it slowly in repeat stamp mode to prevent skipping some pixels as you drag the stamp around. The second is that the repeat stamp feature will cease to work when you come to the edge of a fine control area. To continue stamping, you must release the pen button, shift the fine control area with the joystick, reposition the stamp as needed within the fine control area and then continue repeat stamping by pressing and holding the pen button down again.

To end any of the stamp functions, simply release all buttons. After a stamp has been created, it remains in memory and can be called up any number of times in any of the four stamp types until the stamp is redefined by using the Make Stamp or Set Stamp function.

There are four distinctly different kinds of stamps. For those accustomed to paper, pen, glue and paste type editing, the OPAQUE and the CLEAR stamps will be most easy to understand...so I'll describe them first. The MASK and the REVERSE stamp are in many ways the most subtly powerful of all of GRAPHICOM'S features. They invole operations that are less common in the world of cut and paste editing, because the materials used could not easilt produce these effects. After probing the power and utility of the Mask and Reverse stamps, new users of the physical layout type editing, I suspect, will wonder how they survived without these stamps.
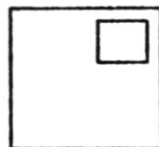
USING THE FOUR TYPES of STAMPS

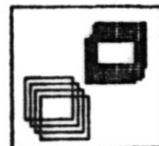The four menu pictures were made with their own type of stamp:

STAMP ─── □▋   EXAMPLE OF OPAQUE STAMP

BACKGROUND ───

When you select a STAMP function, you will see the screen with the stamp superimposed. Move the stamp around until it is where you want it, then tap the PEN button to fix it down at that place.

You can stamp it again as many times as you like, with the PEN button. If you hold the button and move the joystick, you will leave a trail of stamps behind. This can be used like a PEN NIB or PAINT BRUSH.

OPAQUE

The OPAQUE stamp behaves like a rectanguler piece of paper with the picture on it. That is: whatever was under the stamp is erased when the stamp is used.

MASK (OR)

MASK is like a piece of paper with the "black" portions removed or cut out. That is: whatever was under the stamp will show through the "black" areas only.

CLEAR (AND)

CLEAR behaves like a real rubber stamp. The picture under the stamp will show through the stamp's "white" areas, when used.

REVERSE (XOR)

REVERSE stamp reverses the picture wherever the stamp has "black" areas. Thus, if you stamp something and then stamp it again in exactly the same place, it will remove the image. (Reverse it out of existance.)

THE OPAQUE STAMP

The Opaue stamp acts like a paste-over procedure. When a stamp is stamped with the Opaque function, the entire area of the stamp is used to replace the picture that it overlies. Having made a stamp using the Make Stamp function, hold down the menu button and use the joystick to select the Opaque function by tapping the pen button. The screen will return to whatever workspace was being displayed in the simple draw mode. But now the keyboard cursor will be gone and the rectangle of the stamp area will be seen to have replaced whatever area of the picture it is overlying. The fine control area brackets are still there, but they have moved out from the edges of the stamp area.

Move the joystick around. You will see the area you have defined as the stamp moving around on the screen. Remember to keep the menu button down all this time. Now tap the pen button, then move the joystick. You've just stamped the stamp. If you had made a stamp of the square I referred to in the section on the Make Stamp function, you'll have stamped a copy of that square onto the screen. Now move the joystick around, stamping out more squares over the screen. The Opaque stamp is generally of use for grabbing finished portions of a picture and moving them to another part of your workspace, or to another of the workspaces.

You can even move the stamp while holding the pen button down. This is the Repeat Stamp function, in that it is like stamping your stamp again and again for each pixel along the route the joystick moves. Had you defined as your stamp a blank area, then the opaque stamp can act as an eraser, wiping clear any area the stamp passes over. Even though GRAPHICOM has no "clear screen" function, you can quickly clear all or part of a screen by repeat stamping a blank stamp with the Opaque stamp function.
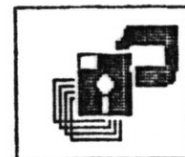
Use this function to put an OPAQUE stamp onto the screen. The area of the screen under the stamp, does not show through.

This selection can be made after creating an image with either the MAKE STAMP or STAMP SET function.
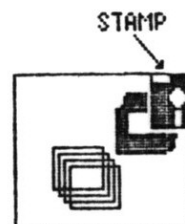
You will then see the screen with your stamp superimposed over it. Position the stamp with the joystick, then tap the PEN button to fix it down.

You can stamp it again and again, in as many places as you like, in the same manner. If you hold the PEN button down, it will auto-repeat.

TO FINISH: Release the MENU button!

THE CLEAR (AND) STAMP

If you think of the Opaque stamp as the equivalent of a cut and paste operation, then think of the Clear stamp as being a true rubber stamp. Define your stamp with the Make Stamp function. Select the Clear Stamp function, (hold down the menu button, move the joystick to encircle the Clear Stamp function, then tap the pen button.) Now, as you drag the stamp around with the joystick, it will appear as though you had the stamp printed on a transparent sheet that you are moving over the workspace. If you stamp it by hitting the pen button, it's as if the picture on the transparent sheet is stamped at that spot, rubber stamp fashion, onto the workspace.

The Clear Stamp can function as a pen nib generator. Let's try a simple example. In the Simple Draw mode, hit the BREAK key. This will generate a black rectangle on the screen. Now we'll use that as an "inkwell". Enter the Make Stamp mode, and move the cross hairs so that they center on the black area. Now tap the pen button. What you've just done is define a single black pixel as your stamp. Now select Clear Stamp from the Main Menu and, while holding the pen button down, drag the stamp around the field. This is another example of the repeat stamp feature of GRAPHICOM. You'll be drawing a line continuously.

When you come to the edge of the fine control area, you'll have to let up on the pen button, reposition the fine control area, reposition the cursor within that fine control area, then start drawing again. We disabled the repeat stamp feature at the edge of the fine control area because had we not done so, the jerky motion of the stamp during shifting of the fine control area tends to produce unpredictable results. Now, instead of using a single pixel as a pen nib, try defining a stamp of a small, odd shaped block of three or five pixels. When repeat stamping such a block with the clear stamp, it's as if you are drawing with a pen with a nib that looks the same as the contents of the stamp.

You'll find the clear stamp to be very useful with the Stamp Set function, as it will allow you to rapidly draw electronic circuits, place musical notes on a staff, etc. The Clear Stamp can also be used to create a double emphasis effect. Type a few letters on the screen. Make a stamp out of that batch of letters. Now stamp that batch of letters on the screen, hold the pen button down, (repeat stamp), and drag them a pixel or two. You'll have created a double set, (or triple or more), emphasis letters. This technique is also very useful in changing the appearance of small sketches to make them more bold.

Use this function to put a clear or transparent stamp onto the screen. The area of the screen under the stamp shows through in the "white" areas of the stamp only.

This selection can be made after creating an image with either the MAKE STAMP or STAMP SET function.

You will then see the screen with your stamp superimposed over it. Position the stamp with the joystick, then tap the PEN button to fix it down.

You can stamp it again and again, in as many places as you like, in the same manner. If you hold the PEN button down, it will auto-repeat.

TO FINISH: Release the MENU button!

The MASK STAMP

The Mask operation causes the stamp to act as if it were a cookie cutter shaped like all the black areas on the stamp. Those familiar with photo finishing may be aquainted with this sort of manipulation. As you drag a Mask stamp over a picture, the picture beneath will "show through" those black areas on the stamp. Thus, an all black Mask stamp would be invisable - and useless! If you made a mask stamp of a black rectangle with a circular white hole in the center, That stamp would produce circular blank holes in whatever it is stampted on. Combined with the reverse stamp it can be used to snuggly fit objects into a background texture or color. (See the picture at the bottom of the "Parting Notes" page for an example of how to do this.)

The REVERSE STAMP

The Reverse Stamp is the hardest to describe. I'ts manipulation is not directly mirrored in everyday operations. When activated, it causes the area under the black areas of the stamp to reverse colors. Stamp a square on a blank background using the reverse stamp. The stamp seems to behave like a clear stamp. Now try to stamp that rectangle again precisely over itself. This second stamping causes the rectangle to disappear. This property of the reverse stamp allows you to stamp an object on any background, then later remove that object while leaving the background unchanged. Repeat Reverse stamping of simple patterns tends to produce a "propagation" of complex, Moire-like patterns.
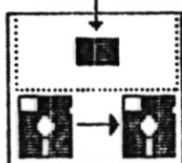
. The Reverse stamp can even be employed to encrypt a picture. One merely Reverse stamps some very dense, random pattern over the picture one wants to hide. This pattern becomes the key. Anyone having this key can Reverse stamp it over an encoded picture and, (after lining up the key stamp properly), cause the decoded picture to appear. Without the key, the pictue appears to be a totally random peppering of black dots and lines.
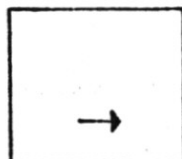
MASK (OR)	Use this function to MASK areas of the screen or to put stamps on black areas. The area of the screen under the stamp shows through in the black areas of the stamp only. This selection can be made after creating an image with either the MAKE STAMP or STAMP SET function.
STAMP ↓	You will then see the screen with your stamp superimposed over it. Position the stamp with the joystick, then tap the PEN button to fix it down.
→	You can stamp it again and again, in as many places as you like, in the same manner. If you hold the PEN button down, it will auto-repeat. TO FINISH: Release the MENU button!

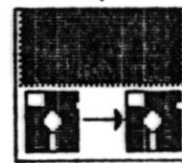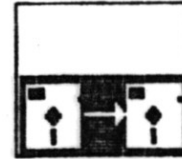|	
REVERSE (XOR)	Use this function to put a reversing stamp onto the screen. The area of the screen under the stamp reverses color under the "black" areas of the stamp only. This selection can be made after creating an image with either the MAKE STAMP or STAMP SET function.
STAMP ↓	You will then see the screen with your stamp superimposed over it. Position the stamp with the joystick, then tap the PEN button to fix it down.
	You can stamp it again and again, in as many places as you like, in the same manner. If you hold the PEN button down, it will auto-repeat. TO FINISH: Release the MENU button!

ROTATE and MIRROR STAMPS

These two functions help you manipulate a stamp you have created using either the Make Stamp or the Stamp Set function. One first makes a stamp, then from the Main Menu, selects the Mirror or Rotate function in the usual fashion. Tapping the pen button will cycle the appearance of the stamp through all of its possibilities allowed by the function selected. When you have the image you want, release the Menu button. You can now go to one of the four stamp functions and stamp the rotated or mirrored stamp. Like every other part of GRAPHICOM, you should experiment with these to get the feel of them. Feel free to combine both of these operations, (by doing one, then another on the same stamp), as needed.
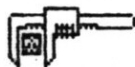
Use this function to rotate the stamp made with the MAKE STAMP or STAMP SET.

After a stamp has been made, select this function from the MENU and tap the PEN button.
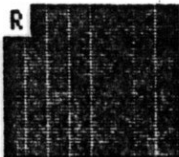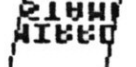
Your stamp will appear in the upper left of an otherwise "black" screen. Tapping the PEN button will rotate your stamp 90 degrees for each tap. When your stamp is the way you want it, release the MENU button and you'll be back in your workspace.
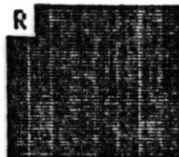
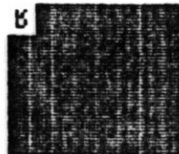Now you may select the "stamp type" and stamp away.

Use this function to mirror the stamp made with the MAKE STAMP or STAMP SET.

After a stamp has been made, select this function from the MENU and tap the PEN button.

Your stamp will appear in the upper left of an otherwise "black" screen. Tapping the PEN button will produce a mirror image of your stamp. When your stamp is the way you want it, release the MENU button and you'll be back in your workspace.

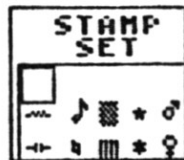Now you may select the "stamp type" and stamp away.

STAMP SET

There are many kinds of drawings that require repeated use of a number of stock symbols. Electronic schematics and musical notation are two examples. For such drawings, the Stamp Set function was created.

The Stamp Set function allows you to put a number of frequently used symbols on a single page, then rapidly grab those symbols for use in a workspace. We supply, on picture disk No. 1, (fourth coloam, second and third row), two pictures to be used as transfer sets. These are a set of electronic schematic symbols and a set of programming flow chart symbols. You can create your own sets of Stamp Set pages.

To use the Stamp Set, first put the electronic symbol set, (fourth coluam, second row on picture disk No. 1), into workspace number four. (Remember that workspace number four has the dual function of serving as a plain workspace and as the site of a stamp set.) Using the Main Menu, select the Stamp Set function by enclosing that item in the select box, then tapping the pen button, (keeping the Menu button down throughout al of this and what follows).

You will see the stamp set that you placed in workspace four. A selecting box will be visible. You may move this box to surround any given symbol of the set. Having done so, you can turn it into a stamp by tapping the pen button. Now you will be back in the Main Menu. Using the Select/Animate function and one of the four stamps, you can now transfer that selected symbol to anywhere in the current workspace.

When you make up your own Stamp Set page, you may draw the reference box to any size to suit the size of the symbols you are creating. But you MUST have a reference box of <u>some</u> size, drawn with its edge against the upper right hand corner of the Stamp Set screen.

Use this function to get stamps from the "stamp set(s)" for later use by one of the four types of stamps.

Before you use this function, the desired stamp or transfer set <u>must</u> be placed in WORKSPACE 4. Now you may select the STAMP SET function and tap the PEN button.
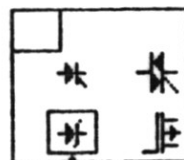
The "stamp set" will appear on the screen with a "box", which is controlled by the joystick. This box is the same size as the one in the upper left corner and may be edited.

SELECTING BOX

To select an item from the transfer set, simply enclose the item with the box and tap the PEN button. The MENU will now appear...select your stamp type and you'll be back in your workspace –with your new stamp.

To abort and retain the "old" stamp, release the MENU button any time before finishing.
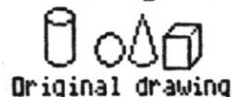
Each of these four stamps can be used in various combinations. As long as you do not redefine the stamp, you can stamp it first as a Clear stamp, then as a Reverse stamp, look at the disk pages, change your workspace, then stamp it as a Mask stamp. When combined with the Mirror and Rotate stamp functions, (to be discussed soon), the stamp system gives the artist simple and convenient control of an extremely broad range of powerful operations. Intricate pictures can be rapidly generated, (see the two scenes on the picture disk from the adventure game, Pirate's Treasure, available from Cheshire Cat). Illistrated below, is a technique for placing objects snugly on a background of any given pattern or color. There are hundreds, perhaps thousands, of similar little techniques you will discover as you experiment with GRAPHICON.

The pictures, (ICONS), that accompany each of the stamp functions on the main menu page are meant as a quick reference to show you how each stamp behaves. In each case, a stamp that was defined as a half black and half white rectangle has been stamped with the given type stamp onto a background consisting of diagonal lines. The result shown may help you visualize just what each stamp does.
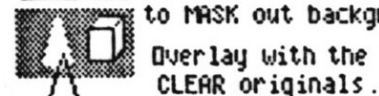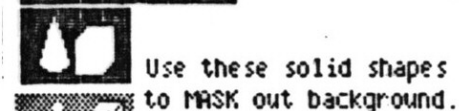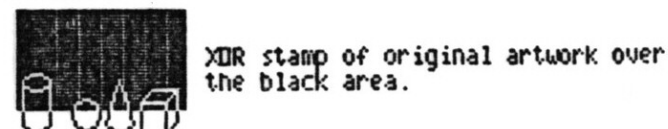
TECHNICAL NOTE

As those of you familiar with computer programing and digital handling of video information have probably realized, three of the stamp results are accomplished by having the pixels of the stamp and those of the underlying picture operate on each other with logical AND, OR and exclusive NOR operations. For the computer and Boolean algebra types among us, the precise technical names of these operations are given on the Main Menu along with the "varnacular" names for them.

Making odd shaped paste-overs.

Original drawing

Position text cursor and make a black area

XOR stamp of original artwork over the black area.

Make stamp of edge
Fill in from edge

Use these solid shapes
to MASK out background.

Overlay with the
CLEAR originals.

PRINT, SEND and RECEIVE

   The operation of these three very useul commands is quite simple. They are selected from the Main Menu. The section on the Fonts, (Configure), page covers the details on how to set up for them.

PRINT

   This function will output a picture on the scren to a printer, via the RS-232 port. It is selected from the Main Menu by tapping the pen button. If your printer is NOT ready to receive data, the print function will make a noise and return you to the Main Menu. If you wish to abort the print function in the middle of a print run, hold down on the pen button until you hear a beep. You may need to abort a print operation if you discover you've set the Configure, (Fonts), page incorrectly and your printer is printing garbage. The technically minded might wish to note that all the print routines in GRAPHICOM call Basic's RS-232 routine.

SEND and RECEIVE

   These two functions are for telecommunications. When selected from the Main Menu in the familiar fashion, the picture inthe selected workspace of the sender's screen is transmitted to the selected workspace of the receiver's screen. As sending takes place, the picture will disappear, row by row, from the sender's screen. As it is received, it will appear on the screen in the receiver's selected workspace. In all of the receive options, and some of the send ones, available from the Fonts page, if proper communication does not occur, you will be stuck in the given telecommunications mode. To escape, tap the pen button.


As those familiar with CoCo Basic already may know, the CoCo can be made to display the same graphic information in different "color modes". GRAPHICOM starts out in the high resolution, black or green mode, (PMODE 4,0). The vertical columns in the Screen Mode box will appear to be black, (or grey), on green. Try changing the Screen Mode. Select the screen mode function from the Main Menu by enclosing it with the select box, then tap the pen button slowly a few times. Each time you tap the pen button, you change the color mode. The colors of the bars in the Screen Mode box will change as detailed below and the rest of the picture will change too.

ARTIFACT COLORS

With the SCREEN MODE function, select the color set that sets the bars to white, blue, red and black. This is the "artifact color" mode. Now go to the disk pages and examine the first three screens on the third row of picture disk No. 1. These give an idea of the variety of artifact color patterns that can be generated with GRAPHICOM. In the picture tagged "Color", the patterns on the left were created by using either the Mask or Reverse stamp function to combine two of the patterns on the right. Try using those stamps yourself to mix up a few shades of paint. For really fine control over such pattern making, it is advantageous to have a video display system consisting of both a color and a monochrome monitor. Using such a system and starting from a blank screen, I created the entire "Color" page in less than 30 minutes.

```
SCREEN
MODE

▐ ▌▐ ▌▌▐ ▌
```
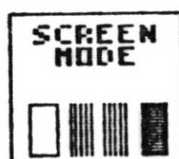
This function change the colors that the screen uses to on of the predefined sets.

When you select this function, you will hear a beep and see the colors in the MENU picture change. Keep tapping the PEN button until you see the color set you want.

One of the four screen modes has only two colors -GREEN/BLACK, (this is how GRAPHICOM starts out). The other three sets give you four basic colors each.
NOTE: All of this applies only to color TV's and monitors. If you have a black & white TV or monitor the original set will suffice, (although a brighter screen will occur with a different set).

| COLORS AVAILABLE	EQUIVALENT IN BASIC
1 GREEN/BLACK	PMODE 4,1:SCREEN 1,0
2 WHITE/BLUE/RED/BLACK	PMODE 4,1:SCREEN 1,1
3 RED/BLUE/YELLOW/GREEN	PMODE 3,1:SCREEN 1,0
4 ORANGE/MAGENTA/CYAN/BUFF	PMODE 3,1:SCREEN 1,1

The Copy/Format function is designed to create new Picture disks for GRAPHICOM. Before you use it, make sure you /e a picture disk in the disk drive. Then obtain the Main Menu by holding down the menu button, and select the _opy/Format function by tapping the pen button after enclosing that item on the menu with the selector box. You will hear several beeps.

At this point you can abort this function by releasing the menu button. If you keep holding down the menu button, your disk drive will turn on and GRAPHICOM will read the Menu, Fonts and Directory pages from your existing picture disk. During this process, the left picture of the disk in the menu square will light up, signifying: "reading source disk".

After this process is completed, the picture of the right disk in the menu box will light up, signifying: "place a blank destination disk in the drive". You now must remove your existing picture disk from the drive and replace it with a blank, unformatted one, which you wish to turn into a new picture disk. If you use a formatted disk, it will simply be erased and rewritten. When you have the blank disk in the drive, tap the pen button again.

You will hear a series of beeps, which warns that the disk in the drive is about to be erased and reformatted. GRAPHICOM will format the disk with its own special picture disk format and then copy onto the newly formatted disk, the Fonts, Menu and part of the Directory pictures of the old disk. When the process is completed, you will have a new picture disk that is blank, except for its Menu, Fonts and Directory pages. You may now remove your disk from the drive, and leave the Copy/Format function by placing your old picture disk in the drive and releasing the menu button, (which you have been holding down throughout this process), or you may place another blank, unformatted disk in the drive and tap the pen button again, thereby creating an additional blank picture disk.

If you wish to duplicate, (back up), an existing picture disk in its entirety, just format a blank disk by using the Copy/Format function, then return to Basic and use the BACKUP command to backup the picture disk onto the one you just formatted. Had you chosen to use a disk, formatted with Basic's DSKINI command, (instead of GRAPHICOM'S Copy/Format nction), the resulting picture disk would work with GRAPHICOM, but would run much more slowly during "read" and rite" operations.
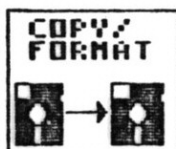
COPY/FORMAT — Formats new disk and copies DIRECTORY, FONT and MENU to it. Any previous data on destination disk will be erased.
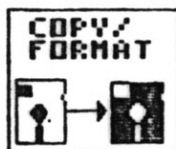
COPY/FORMAT — Reads your source picture disk. When motion stops, exchange with destination disk. (MENU button MUST be held in throughout this operation!)
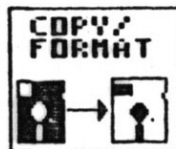
COPY/FORMAT — Now tap the PEN button and your new disk will get formatted. If you keep the MENU button down, you can format more disks without re-inserting the original.

Included on your GRAPHICOM Boot disk are three utilities designed to facilitate transferring pictures between GRAPHICOM and other programs. They will allow you to incorporate pictures made with GRAPHICOM into Basic or machine language, (ML), programs, or to take pictures created by Basic or ML programs and place them on GRAPHICOM picture disks for editing. Some small degree of experience with programming the color computer is needed to use these programs.

GC>BIN

This utility will enable you to take a GRAPHICOM picture and save it out as a 6K binary file that loads in at $E00, (the start of Disk Basic's screen area). Type RUN"GC>BIN and hit ENTER. The program will instruct you to put a GRAPHICOM picture disk in the drive and hit ENTER. Upon doing so you'll see a directory of the disk, like the GRAPHICOM disk pages menu. Using the joystick and Pen button, select the menu item you want. The picture you selected will fill the screen. Now tap the pen button again. You'll be asked to place a Basic type disk in the drive, and give the file a name. After doing so, hit ENTER, and the picture will be written to that disk as a 6K binary file. To display the picture using a Basic program, merely include in the program the following statements: LOADM"filename":PMODE4,1:SCREEN1,1. This will load the bit image of the picture into Basic's graphic page, then display the picture. This feature should aid folks who program only in Basic, but want to create and call up detailed pictures from within their Basic programs. You can put numerous picture files on a Basic disk and call them up out of a simple Basic progrm. This has already been used to create illustrated adventure games and educational sofware.

BIN>GC

This program is designed to allow you to transfer a picture residing in the computer to a GRAPHICOM picture disk. It lets you search through all 64K of your CoCo RAM, looking at the memory as a grphic picture. Simply type RUN"BIN>CC. Use up and down arrows to search. If you find something you like, center it on tyhe screen and hit ENTER. Upon doing so you'll see the menu of that disk appear. Use the joystick to position the select box over the place you want to store the pictue on your GRAPHICOM picture disk, then hit the pen button. The picture will be written to the GRAPHICOM pictue disk. Try using this program immediately after using GRAPHICOM itself. You'll find memory littered with pictures and parts of pictures. This program can be used to transfer parts of pictures drawn with a Basic program into GRAPHICOM format. Thus you can obtain a set of stock circle and elipse symbols by using Basic to draw them and then saving them on a GRAPHICOM picture disk.

SUXPIX

SUXPIX allows you to break out of most "protected" and "self resetting" games to a cold start in Basic. It is included to help you suck pictures out of games for your amusement and education. LOADM and EXEC SUXPIX before loading a "protected" arcade game. When you find a picture on the screen that you like, hold down the ZERO, 6 and 7 keys and hit RESET. In most cases you will be returned to BASIC. You may now use BIN>GC to look for and save the picture you wanted. As some arcade game pictures may enjoy copyright protection, use SUXPIX only for your private amusement. Detective work by Art Flexser of SpectroSystems made SUXPIX possible.

BBS COMMUNICATIONS

Using GRAPHICOM and the utility GC>BIN you can produce 6K long binary files of the pictures you've drawn. But many computer Bulletin Board Systems and Terminal Programs don't support binary file transfers. Virtually all such systems, however, support 7 bit ASCII transmissions. Unfortunately, the ASCII character 7F and those with values from 0 to 1F are special control characters, and are often dealt with in curious ways by both Terminal and BBS programs. Also, the ASCII quotation mark $22 can't be easily incorporated into a string variable in a Basic program. Programs that convert GRAPHICOM pictures into files for BBS use, must deal with these sorts of problems.

Mike Ward, a systems programmer and rock musician in Miami, working closely with us at Cheshire Cat, has developed what we believe should be the standard set of utilities to be used to transform a binary file GRAPHICOM picture into an ASCII file. His utilities accomplish both efficient data compression and will produce ASCII files that are likely to be compatible with virtually every BBS and Terminal program currently in use. Even better, once the BBS type file is created, it can be downloaded and viewed by anyone with a CoCo, whether they own a copy of GRAPHICOM or not. After downloading, all one needs to do with Mike's PIX files is RUN them as if they were Basic programs - which in fact, they are. The ASCII picture files created, are generally not more than 6 or 7 thousand characters long. So the time for transmission of a picture at 300 baud is usually under 3 1/2 minutes.

PIXCMP

This utility was written by Mike Ward and Art Flexser. It is public domain. To use it, first take the GRAPHICOM picture you wish to "post" on a BBS access area and convert that picture to a binary file using the GC/BIN utility, discussed earlier. Now, from a cold start, RUN"PIXCMP. When asked, type in the file name of the binary picture file you just created. DO NOT give the extension - PIXCMP assumes an extension of "BIN". Mike's program will the input the binary picture, compress it, if possible, and then convert it into an ASCII file. It will then ask you to name the ASCII file it is about to put on your disk. Give only a filename - PIXCMP will supply the extension "BAS". On receiving your choice of filename, PIXCMP will then output the ASCII picture file to your disk.

The file that PIXCMP creates is actually a Basic program. To recreate the picture encoded in a file created by PIXCMP, all you have to do is LOAD and RUN that file. When this is done, the encoded picture will appear on the screen. After about 30 seconds, the screen will flash and the DEcoded picture will appear briefly on the screen. You are then prompted to supply a filename, (the extension "BIN" will be supplied). After you type in the name, a binary file of that picture, (6K long and starting at $E00), is written to your disk. This file is the same as the one you get using GC>BIN. Such files can be viewed by LOADing and RUNning this simple Basic program: 10 PMODE 4,1:screen1,1:goto 10.

The Structure of the Picture Disks:

    GRAPHICOM'S picture disks differ in a number of respects from other operating system formats. The order of the sectors on a track is different. GRAPHICOM version 1.2, when it formats a disk, uses a skew factor of 1, whereas the CoCo DSKINI command uses a skew factor of 4. Also, the sectors are not only skewed on a given track, but they are arranged differently from track to track with a track skew factor of 3. If a picture disk is copied, (using the BACKUP command), to a disk that was formatted with Basic's DSKINI format command, that disk will work, but it will be noticeably slower during I/O operations. The proper way to backup GRAPHICOM picture disks, is to format a disk with GRAPHICOM's Format command, then use Basic's BACKUP command.

    The pictures themselves are stored as a simple bit image, on the picture disk. As each picture requires 6Kbyte, a quick calculation reveals that there is room for 26 pictures on a Radio Shack 35 track, single sided, double density disk, with 6 sectors left over. GRAPHICOM stores its pictures one after the other on the disk, but it skips track 17, sectors 2 and 3. These sectors, (Basic's FAT sector and first directory sector), are set to look as if the disk had a single file on it, ("PICTURES/GCM"), that occupies all 68 granules. This causes a picture disk to alert you to the fact that it is a picture disk if you should accidently attempt to read its directory using Basic's DIR command. The first picture on the disk occupies track 1 in its entirety, and the first 6 sectors of track 2. The picture is stored in 26 consecutive, (by number), sectors. i.e. 24 X 256=6144 and 6144=6 X 1024. When a picture is converted to a binary file using GC>BIN, what results is a 6K machine language file containing the raw bit image of the picture, set up to load in, starting at $E00, (Basic's first graphic page).

    The directory of a picture disk is merely a picture made up of the lower right hand corners of all other pictures. It is updated automatically as you leave the Disk Pages function, if you write to the disk. Bad sectors are read in as garbage. For all these reasons, GRAPHICOM's picture disks have a much more "rugged" structure than disks of other operating systems. All readable data on a GRAPHICOM disk is easily accessible, regardless of what or how many other sectors have been physically destroyed or erased.
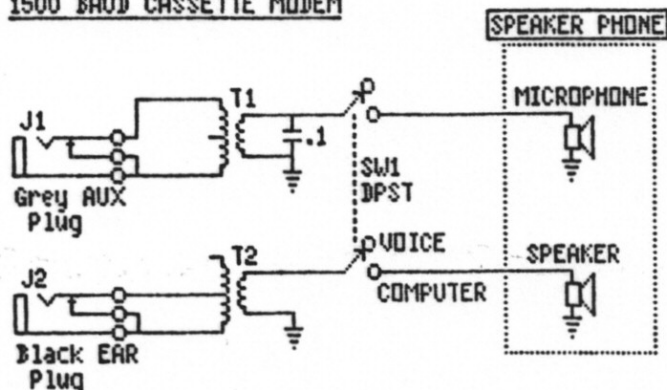
VERSION 1.1 verses VERSION 1.2

In the months that have passed since we sold 100 copies of Ver. 1.1 at Expo '83 in Pasadena, a number of minor changes have been made that merited renumbering the program to Version 1.2. Most significantly, we discovered that the program would crash if run on a CoCo with the new, (Basic 1.2, Ext Basic 1.1, Disk Basic 1.1), ROMs when the PRINT function was selected. This flaw has been fixed. We have also found that Version 1.1 would not run properly on systems using the J & M ROM. We believe that Version 1.2 will now run properly with a J & M ROM if you have Ver. 1.6 or newer. We also have added the format function to the main GRAPHICOM menu, and made a minor change, (track to track skewing), in the format routine that results in picture disks with slightly faster disk I/O. All disks made with Version 1.1 are compatible with Ver. 1.2, though they will work slightly slower, and you'll have to edit the menu picture to replace the former Do Nothing box with the Copy/Format ICON and Label.

The CASSETTE MODEM

Pictured below is the information needed to convert a $30.00 Radio Shack speaker phone into a modem capable of interfacing the CoCo cassette port to your telephone. Be sure to use Radio Shack catalogue No. 43-278. This device is strictly experimental, and generally works only over local phone links. However, we at Cheshire Cat have used it as a 1500 baud modem to exchange tens of megabytes of data all over the San Francisco Bay area. When using it to transmit pictures with GRAPHICOM, set the Fonts screen to "cass tape".

```
1500 BAUD CASSETTE MODEM                    SPEAKER PHONE

                    T1                        MICROPHONE
    J1                     .1
                                   SW1
    Grey AUX                       DPST
    Plug
                    T2                VOICE    SPEAKER
    J2
                                   COMPUTER
    Black EAR
    Plug


    T1 : 273-1380        C1 : 272-111 (0.1 mfd)
    T2 :  "    "         SW1: 275-614
    J1 : 274-297         SPEAKER PHONE: 43-278
    J2 :  "    "
```

The KOALA PAD

You can modify a Koala Pad graphics tablette to work with GRAPHICOM, (or any other joystick requiring CoCo program). Start with a Koala pad designed for an Atari, Vic 20 or Commodore 64. This should cost between $60.00 and $90.00. The frames below show how to get signals out of it that will supply the X and Y axes of a joystick input port and supply signals for both the left and right fire buttons as well.

Note that a power supply of roughly 8.3 volts is required. You can make such a supply using a 12 volt input and the circuit given below. We here at Cheshire got our 12 volts right out of the CoCo...bringing it out via the, (ordinarily grounded, but redundant), center pin on the 6 pin DIN joystick connector. This, of course, requires a minor modification inside the CoCo. If you don't want to do that, or if you have a CoCo 2 that doesn't have a 12 volt supply, then you can build an external power supply for your Koala Pad.

The voltage is adjusted so that a full 0-63 range is obtained while moving the stylus up and down and right and left. This will come out to be roughly 8.3 volts. For the interest of the curious, we also provide the relevant schematics for that part of the Koala circuitry we are using.

One annoying ideosyncracy of the Koala Pad is that whenever you lift your stylus off the pad, the sensed pen position springs to roughly the center of the pad. There is no electrical signal provided to the computer to let it know you've lifted your pen. Despite this limitation, we have found the Koala pad to be of great value in drawing continuous curves with GRAPHICOM. For most other GRAPHICOM functions, we prefer the joysticks.

Modification of Atari Koala Pad for CoCo joystick Port of TRS80 COLOR COMPUTER.

Merely add 6 wires to the board, solder in two resistors and add 8.3 V power supply.

1) Hook up X axis to pin 4 of 339 chip.
2) hook up Y axis to pin 6 of 339 chip.
3) Connect left fire button.
4) Connect right fire button.
5) Connect to ground
6) Connect 8.3 volts

Add two 1 meg ohm resistors as shown
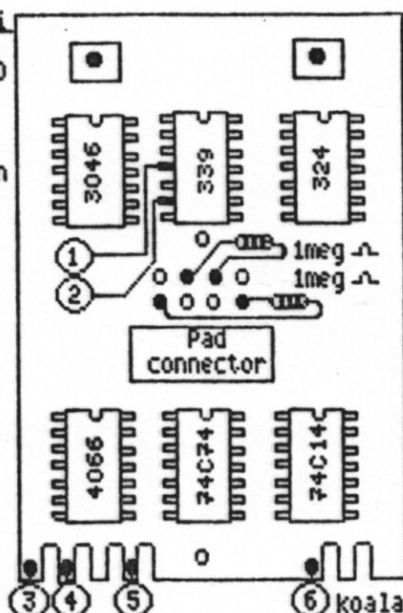
Relevent cct. of Atari Koala Pad modified for CoCo.

This simple schematic shows how to use a 7805 as a variable voltage regulator that can be adjusted to provide the 8.3 volts required by the CoCo Koala Pad modification.
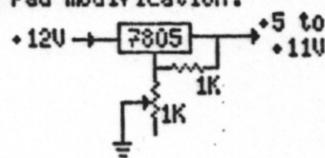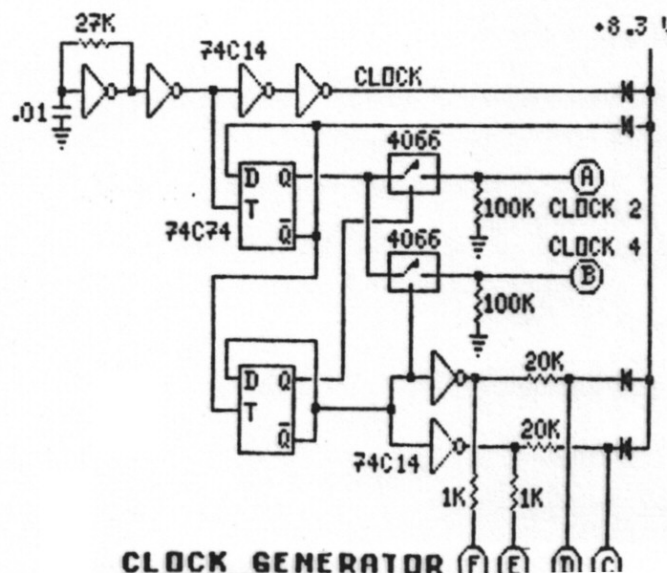

It is suggested that you get the +12 volts from the CoCo motherboard and run it to the Koala Pad via the center pin of the joystick connector. The connection from this pin to ground must be broken first.
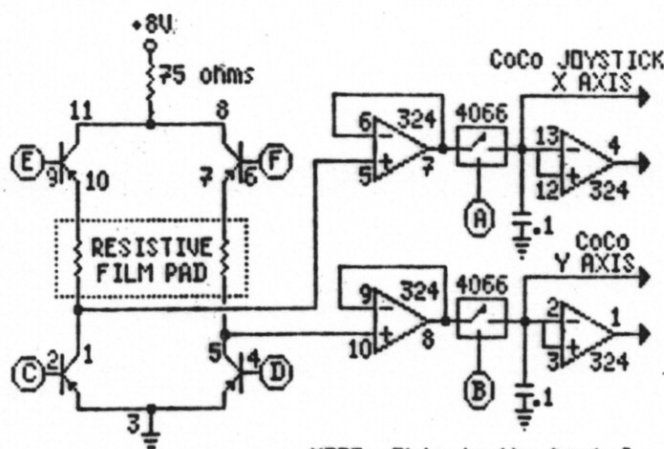
TRANSISTOR PINS ARE FOR 3046 ARRAY CHIP.

NOTE: This is the best I could make out from research and the copy I had to work from. (W.P.)

MAIN CIRCUIT

CLOCK GENERATOR