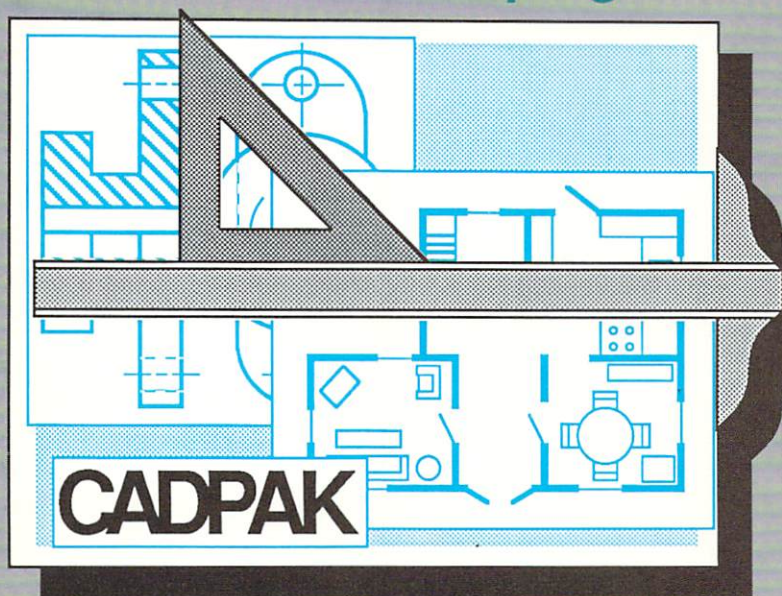



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CADPAK-128

*The full-featured
design and drawing
program*

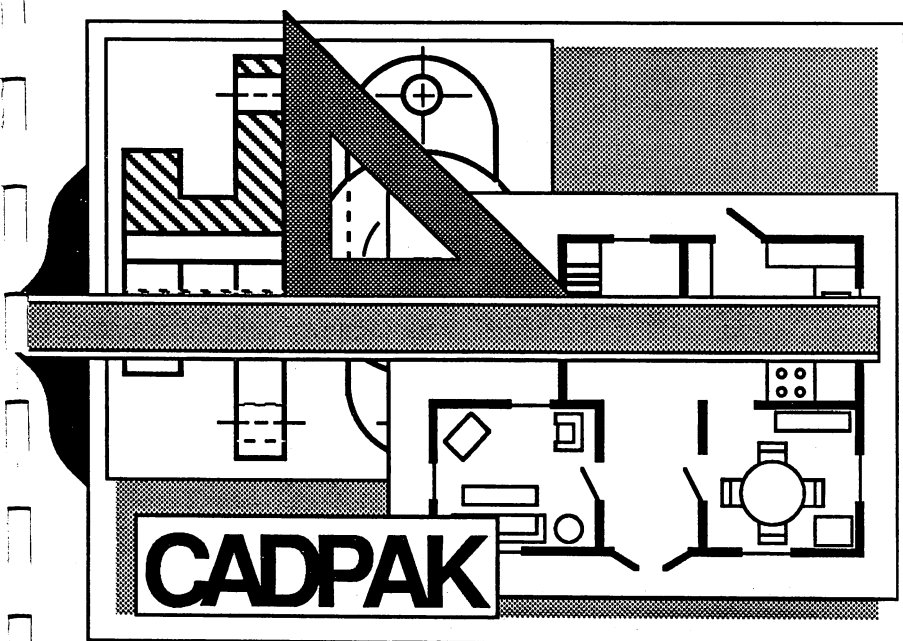


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CADPAK-128

By Roy C. Wainwright



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TABLE OF CONTENTS

1.0	WHAT IS CADPAK-128?	1
2.0	WHAT'S INCLUDED IN THIS PACKAGE	3
3.0	HARDWARE REQUIRED	4
4.0	BEFORE GETTING STARTED	5
4.1	OPERATION KEYBOARD	5
4.2	LIGHTPEN OPERATION	6
4.3	SCREENS	7
4.4	STOP KEY	7
4.5	DRAWING CURSOR	7
4.6	DIMENSIONS INPUT/OUTPUT	7
4.7	ANGLES	9
4.8	COLORS	10
4.9	DRAWING MODES	10
4.10	POSITION	10
4.11	DISK FILES	15
4.12	DIRECTORY DISPLAY	15
4.13	DISK DRIVE NUMBER	16
4.14	DISK SPACE	16
4.15	SCREEN DISPLAY	16
4.16	FUNCTION KEYS	17
5.0	CADPAK PRINTER DIMENSIONS	18
6.0	LOADING CADPAK-128 AND MAIN MENU	20
6.1	MAIN MENU	21
7.0	CADPAK-128 DRAWING MENU	23
7.1	DRAW (REG,EXT,TEM)	25
7.2	POINT (REG,EXT,TEM)	26
7.3	LINE (REG,EXT,TEM)	27
7.4	BOX (REG,EXT,TEM)	28
7.5	CENTERS (REG,EXT,TEM)	29
7.6	DIAMOND (REG,EXT,TEM)	29
7.7	CIRCLE (REG,EXT,TEM)	30

7.8 ARC (REG,EXT,TEM)	30
7.9 ELLIPSE(OVAL) (REG,EXT,TEM)	32
7.10 CURVE (EXT,TEM)	33
7.11 FILL (REG)	34
7.12 LETTER (REG,EXT)	37
7.13 COPY [AREA](REG)	38
7.14 TEMPLATE USE (EXT,TEM)	42
7.15 USE OBJECTS (REG)	43
7.16 MEASURE (REG,EXT)	44
7.17 ERASE (EXT,TEM)	44
7.18 RUBOUT (REG)	45
7.19 UTILITIES (REG,EXT,TEM)	45
7.20 CL(Color) (REG,EXT)	47
7.21 VIEW (REG,EXT,TEM)	47
7.22 ZOOM (REG)	48
7.23 NEW DRAWING (REG,EXT)	48
7.24 CONFLICTS	49
8.0 PRINT MENU	49
9.0 OBJECT/FONT	50
10.0 TEMPLATE CREATE	51
11.0 FILE MENU	53
12.0 CADPAK 128 TUTORIAL	55
12.1 CADPAK TUTORIAL #1 STARTUP	55
12.2 CADPAK TUTORIAL #2 LIGHTPEN	60
12.3 CADPAK TUTORIAL #3 FILL/COPY/ZOOM/OBJECTS/FONTS	62
12.4 CADPAK TUTORIAL #4 REARRANGING THE BEDROCK	66
12.5 CADPAK TUTORIAL #5 USING TEMPLATES FOR MAP FILES	70
13.0 TIPS ON USING CADPAK	73
13.1 DEFINING OBJECTS	74
13.2 DESIGNING FONTS	78
13.3 CURSORS	74

APPENDIX A - PRINTERS/INTERFACES	75
APPENDIX B - TEMPLATE FILES	77
APPENDIX C - DEMONSTRATION DRAWINGS	81
APPENDIX D - THE CONFIGER PRJOGRAM	95
APPENDIX E - 1351 MOUSE INSTRUCTIONS	96
PRINTER INSTALLATION REFERENCE GUIDE	99



1.0 WHAT IS CADPAK-128?

CADPAK-128 is a program for the Commodore 128 which helps you draw pictures and graphics designs easily and accurately. The drawings have a resolution of 640 points wide by 360 points high. When completed, the pictures are printed using a dot matrix printer in various sizes, depending on the printer. The drawings may be saved on disk, both as a protection against loss due to power failure and also for later recall and display.

Unlike other drawing systems, CADPAK allows you to get an exactly scaled printer output on your dot matrix printer. It also allows you to operate in the units of your drawing problem (feet, miles, etc.) and all dimensions you see during the drawing process are those external dimensions. The scale factor is set up when the screen is initialized. The printer distortion is compensated for so that circles are printed as true circles.

All of the functions of the CADPAK-128 program are selected from menus of functions and options. These menus are displayed at the bottom of the drawing screen. An optional lightpen or mouse (see Appendix E for mouse instructions) may be used for drawing and positioning images on the screen. If the lightpen is not used, the cursor keys can provide the same function. Lightpen operation can be turned on and off through a menu option, so part of the drawing can be done using lightpen input and then the keyboard can control the remainder of the drawing.

You have two graphic screens to work with. The first screen is the large screen (640 by 360) called the Main Screen, and the second screen is 320 points wide by 200 points high. A menu function permits copying areas from one screen to another. Copying may include rotation in 90 degree steps, upsizing in multiples and/or reflection of the image. This allows a final design or picture to be developed by copying sections from one or several other screens. Text in four sizes may be placed anywhere on the drawing.

CADPAK includes an object management system of 16 x 16 pixel objects, which are designed on the second screen. Up to 104 objects are available at a time. Once objects have been defined, they can be saved onto disk and recalled for CADPAK drawing. When an object is to be displayed on the

screen, it may be precisely positioned anywhere on the screen and its SIZE, ROTATION in 90 degree increments, and REFLECTION (mirror image) are easily and precisely controlled. The object editor is also used to develop type faces for special printing applications. The special font may be used for text on a drawing instead of one of the Commodore character sets.

You can use any of seven patterns to fill an area of the picture. A pattern editor is included to allow you to easily design your own 8x8 pixel fill patterns. Other sets of patterns can be created, saved on disk and recalled.

A "TRY AGAIN" function is provided which corrects any mistake. The picture on the screen is restored to the state it was immediately prior to the last main menu function selected.

Templates in CADPAK-128 are line drawings which can be created and used within other drawings. You create a template just as you would a drawing by selecting functions and positioning the line elements (LINE, BOX, CIRCLE, ARC, CURVE, ETC.). When a template drawing is finished, you copy it to a template work area in memory. You can then add this template in a different size and rotation to the same or another drawing. The template can also be saved to disk. Because the drawing elements of a template file are quite simple, template files can be read and written by other programs in BASIC. This gives you the ability to use other BASIC programs to create an image, such as a contour map and then bring it into CADPAK-128 and add text and other refinements to create a finished presentation. (See APPENDIX B for details of template files.)

2.0 WHAT'S INCLUDED IN THIS PACKAGE

CADPAK-128 program which uses both keyboard and lightpen drawing inputs and a 1351 mouse version.

Tutorials which lead you step by step through many CADPAK capabilities.

Drawing for the tutorials.

3 special fonts for lettering-Old English, 3-D and Tech.

A set of objects including electronic and math symbols.

A USA and states map templates which you can use for making filled in maps, such as for sales territories.

3.0 HARDWARE REQUIRED

Commodore 128 Computer

Commodore 1571 or 1541 Disk Drive or MSD disk drive

OPTIONAL Good quality light pen (such as Madison Computer McPEN)

OPTIONAL 1351 Commodore mouse

Graphic printers (and interface if needed)

BLACK & WHITE Printers

Epson MX or FX

C. Itoh Prowriter 8510A

Commodore 1525 or MPS 801

Commodore 1526

Star Gemini series

Okidata Microline

Okimate 10

COLOR Printers

Okimate 10

Epson JX-80

See APPENDIX A - PRINTERS/INTERFACES for details of interfaces and secondary address options.

4.0 BEFORE GETTING STARTED

Cadpak 128 also includes a mouse version, please refer to Appendix E for mouse instructions.

4.1 OPERATION WITH KEYBOARD

Function selection means keying the first one or two letters of the function name on the main or drawing menu or the first letter of the option you want on the option menu. (Since the key strokes for drawing menu selection are examined in pairs, it may be necessary to key an extra key to reestablish alignment with the pair groupings if the program doesn't respond.) If an invalid option is selected, the tone will sound to remind you of this. The letters to be pressed are always shown in reverse image on the menu.

Setting a point means pressing the CONTROL key to establish the drawing cursor in the center of the screen and using the cursor control key (with and without shift) to move the drawing cursor to the position you want. The drawing cursor moves in steps of 8 pixels at a time for speed.

The ACCUPOINT feature provides precise positioning. The Accupoint feature is activated by pressing the <RETURN> key after the drawing cursor has been moved with the cursor keys. The border turns light blue, and from that point onward the cursor keys are used to move the drawing cursor one pixel in any direction. When it is properly positioned, press the <RETURN> key again to lock it in place.

4.2 LIGHT PEN OPERATION

The light pen can sense its position only if the area of the tv or monitor screen is lighted. Therefore the normal drawing mode uses a white screen with black color for the lines. The screen border is light green so the light pen can properly sense when it is on the border. Some light pens may react differently to different colors (most light pens don't see red very well). The Commodore 1902 monitor may have to be brighter than a 1702 monitor for proper lightpen operation.

Light pen triggering is through the tip switch (if the light pen includes one) or by pressing the CONTROL key. Throughout this manual we will call this "pressing the CONTROL key". We will also refer to a press and release of the light pen tip switch or the CONTROL key as "cycling the light pen".

Setting a point using the drawing cursor means pointing the light pen at the screen, pressing and holding the CONTROL key and moving the light pen to move the cursor to the position you want.

The ACCUPOINT feature provides precise positioning and is activated when you release the CONTROL key. This is indicated by a light blue border on the screen. You can move the cursor one position in any direction by putting the light pen on one of the four borders and pressing the CONTROL key. When you have finished moving the cursor to the position you want, put the light pen back on the main screen area (not the borders) and press the CONTROL key. At this point the drawing cursor has been set on the point that you want to indicate to the computer.

4.3 SCREENS

Normally approximately 1/4 of the Main (large) drawing screen is visible. You can use the four upper cursor keys to move the visible window around over the entire drawing. You can use the lower cursor keys to instantly jump to one of the four corners. If you want to see the entire drawing (at a reduced resolution) you can select the TOP VIEW. Press V then T. Some details may not be clear because the image is squeezed in half in each direction. You can also use the VIEW option to look at screen 2 for copying, object, and font operations.

4.4 STOP KEY

The STOP key is disconnected to prevent accidental stopping of the program.

4.5 DRAWING CURSOR

The drawing cursor consists of a blue target.

4.6 DIMENSIONS INPUT/OUTPUT

To make it easiest to use, CADPAK-128 has two ways of handling dimensions; The first of these are ordinary decimals which would be typical if you are dealing in metric scale (centimeters or meters). With this method, anytime you need to key in a value, key in the number with a decimal point and then the decimal fraction, such as

1.25. In a similar fashion, when it is time to show you a number, CADPAK will show it to you as a number with a decimal fraction.

The second method is used whenever you are dealing in feet and inches. It is turned on by using the dimension name "FT/IN". Any other units will not enable this function. In this mode of operation, CADPAK-128 will show you all dimensions as the number of feet a ' mark, then the number of inches followed by a " indicating inches. The inches are automatically rounded to the nearest 1/1000 (.001) of an inch. When you enter dimensions into the computer, the same rules apply. Any number to the left of an ' is treated as feet, and then numbers to the left of a " are treated as inches, and then you can even enter fractions of an inch by using standard fractional notations, such as 5/16. If the number is negative, of course a negative sign in front of the number indicates this. For example;

2'3"5/16 will be treated by the computer as 2 feet 3&5/16 inches.

You can also indicate a dimension by stringing together several values with plus or minus signs between them (no parentheses are allowed). Therefore, if you wanted to indicate a dimension of 100 feet minus two and 1/2 feet, you could key 100'-2'6". The size limit is one line on the screen.

Note that whenever the fractional notation is used, such as 3/4, it is assumed to be fractions of an inch, even if you key something such as 1' 3/4, this is interpreted as 1 foot plus 3/4 of an inch, not 1 and 3/4 feet.

4.7 ANGLES

Whenever you need to specify an angle in CADPAK-128, such as for the angle of a template rotation, the angles are always measured in degrees with 0 degrees north, and the degrees increasing in a clockwise direction, just like the points of a compass. Whenever degrees are shown, fractional degrees are converted into minutes. The distinction is shown by the inclusion of a small letter "d" following the degrees and "m" following minutes.

In the same way, whenever you need to key in an angle or a direction, you may key using a "d" or "m" following the number to indicate degrees or minutes. If no letters are included, the quantity is assumed to be in degrees (which may contain decimal fractions). For example, 35d 30m is the same as 35.5.

You may also string together several quantities, and the computer will automatically sum these. For example, in surveying, directions are often given using headings. For example, a direction might be south 15 degrees east. This corresponds with a heading of 165 degrees. To make it easy, you could key it into the computer as 180-15. In a similar fashion, a heading of south 15 degrees west would be 180 + 15. This is especially useful in dealing with combinations of degrees and minutes. For example, a 90 degree angle to a line with a heading of south 27 degrees 18 minutes east can be keyed in as 90+180-27d18m.

4.8 COLORS

The graphic screens are set up in high-resolution mode which normally implies only two colors (black and white). However, ANY color can be used to draw on the screen. The only restriction is that only one drawing color can be used in each 8x8 pixel cell on the screen. If a second color is used in cell, all the points in the cell will show in the last drawing color. As long as there is an adequate amount of space between different color cells, many colors can be used on a screen. The main screen provides 3600 color cells (versus 1000 on the second screen) providing much greater color resolution. Note: When drawing on the main screen, color is not displayed until you finish the function (by pressing the F1 key).

4.9 DRAWING MODES

There are two modes for the drawing functions. The normal mode is WRITE which puts lines onto the screen. You may select ERASE mode which erases the points displayed (see UTILITIES FUNCTION).

4.10 POSITION

There are various ways you can position lines, boxes, etc, on the screen.

First, you select the function you want from the drawing menu, and select options under that function. After all the options have been selected, you will then have to move the drawing cursor on the screen to set the first point.

MOVE DRAWING CURSOR

If the lightpen has not been selected, you must use the cursor keys. To do this, press the CONTROL key to indicate to CADPAK 128 that you want to show the drawing cursor and move it (instead of the other point setting options below). When you release the CONTROL key, the drawing cursor will appear in the center of the screen or on top of the last point you set. Use the four cursor control keys at the upper right of the keyboard or the cursor keys at the lower right corner of the keyboard to move the cursor either down or to the right of its present position. Press and hold the SHIFT key, and use those cursor control keys to move the drawing cursor up or to the left of its present position. The cursor will move in steps of 8 pixels at a time to allow you to get to any area pretty quickly. When you are as close as you can get to the point you want, press the <RETURN> key.

When the cursor is shown on the screen, its position relative to the current origin in your units of measure is shown on the bottom line of the screen. Normally the origin is set at the lower left corner, but you may reposition it. See (UTILITIES FUNCTION). As you move the cursor, the current coordinates of the cursor are shown.

In the regular drawing function, you are limited to the visible window presently shown. In the extended function mode (press F7 on the regular menu) and template creation mode, the drawing window will automatically move to follow the cursor.

The drawing cursor will probably not be exactly where you want it to be because the cursor keys move in 8 point steps. Press the <RETURN> key and the Accupoint feature is automatically activated. The border of the screen will turn cyan (light blue). During Accupoint, the position of the cursor in your external dimensions is

shown. For a second point in a function (such at the second corner of a box), the change in x and y (DX, DY) is also shown, along with the straight-line distance (DIST) and angle from the last point.

Use the cursor keys to move the cursor as before, only now the cursor moves in 1 point steps. Press <RETURN> when it is where you want it. The border will change back to its normal color and the function will proceed.

If you are using the light pen, moving the cursor is accomplished by pressing the light pen to the screen and pressing the CONTROL key and holding it down. The cursor will move to where the lightpen is. You may move the light pen anywhere on the screen and the cursor will follow the tip of the light pen until you release the CONTROL key.

Then the lightpen ACCUPOINT function is activated. To move the cursor up by one pixel, touch the light pen to the top border (cyan area) and press the tip or CONTROL. To move the cursor one pixel to the sides or the bottom, do the same with the corresponding cyan border area. This step may be repeated as many times as necessary to precisely position the cursor. To exit Accupoint, put the light pen anywhere on the main screen area (NOT the cyan borders) and press the tip or CONTROL key.

The ZOOM and COPY BLOCK functions operate on groups of 64 pixels at a time (8x8 cells). With these functions, Accupoint moves the cursor 8 pixels at a time. Accupoint does not operate with the DRAW function.

KEY IN COORDINATES

You can specify a point by keying its coordinates in. Press the Commodore key (C=). This shows your dimensions, the x and y positions of the last point you entered, and asks you if the values to be keyed in are either absolute (A) relative (R) or distance and angle (D) to the last point. (A fourth option (C) is included which takes you back to cursor input in case you press the C= key in error).

If you press A for absolute positioning, you are asked to input the x and y coordinates of the point. Simply key these in as two numbers in your external dimensions with a comma separating them.

If you select the relative option (R), you are asked to key in the x and y change you want to make from the last point. Key in the values and press <RETURN>. The graphic screen is shown and the cursor is positioned at the point you specified.

If you select the D option (Distance-Angle), you will be asked for the distance from the prior point. Key this in and press <RETURN>. Then you will be asked for the angle from the prior point. Using the degrees of the compass where 0= North and the angles go clockwise, key in the angle (you may use degrees and minutes) and press <RETURN>.

Note: See the section - DIMENSIONS INPUT/OUTPUT for an explanation of how to use feet, inches, degrees, minutes and calculations for coordinate inputs.

DIVIDE MODE

The third option for point specification is the divide mode. This allows you to specify a point any fraction of the distance between two other points. The most frequent use is to put a point halfway between two other points. To use this, you do the following:

Press the left-arrow (<-) key. The border of the screen will turn purple to indicate that the divide mode is in effect. Now specify the first of the pair of points by using either the drawing cursor, or the Commodore key and the keyboard.

After you have set the first point, the screen border turns purple again, and now set the second point.

After the second point has been specified, you will see the X and Y coordinates of the first and second point to be used in the division. Then CADPAK prompts you with the word RATIO and shows (1/2 = 1,2). This means you are to enter the fraction but instead of using the normal /, put a comma between the numerator and denominator.

The system will compute the position of the new point using the fraction of the distance you specified, and then move the cursor to the point on the screen. If you just press <RETURN>, the default ratio will be 1/2 of the distance.

4.11 DISK FILES

In order to separate the different types of files on disk (pictures, objects, and patterns), each has been designated with a unique two letter prefix in the file name. All main drawings files are saved with a "M." prefix, all screen2 picture files are saved with "P." all object files are saved on disk with "O." all patterns are saved on disk with "Z." and templates have "T." as the prefix. These prefixes are automatically added to the filename you key or get from a DIRECTORY selection if not already there whenever you READ or WRITE on disk.

4.12 DIRECTORY DISPLAY

A special directory display feature is included in CADPAK. This allows easy selection of a file to be used in a subsequent READ command. When you select the DIRECTORY option the size and name of the first 20 files on disk OF THAT TYPE are shown, following an entry number along the left edge of the screen. To select a file to read, key the entry number corresponding to the name, and press <RETURN>. The file name corresponding to that entry number is automatically supplied at the next file name prompt. If you want to see the next 20 file names or the entire list again, key 0 and press <RETURN>. To see all entries on disk use the DIRECTORY option in the FILE UTILITIES function.

4.13 DISK DRIVE NUMBER

The normal (default) disk device is 8. To use another drive for objects, templates, etc. go to the FILE UTILITIES function and select the UNIT CHANGE option.

4.14 DISK SPACE

Before saving a screen image to disk, the number of free blocks on disk is checked to make sure there is enough room. If there is not, the message "NO DISK ROOM" will appear, and you will be returned to the main menu. You can then either go to the DISK UTILITIES function to perhaps delete some files, or change diskettes and insert one which does have enough room.

4.15 SCREEN DISPLAY

CADPAK-128 uses just about every bit of graphics capability in the 128 Video chip. All the menus are displayed using the split screen mode and in many cases, sprites are displayed simultaneously on the screen. Occasionally, there may be a visible deterioration of screen image quality when the interrupt routines have too much work to do in the time allotted.

This is especially likely to happen when displaying the main screen because a great deal of memory switching takes place during the display of each picture to show your drawing. While CADPAK-128 has been tuned to minimize this disturbance and flicker, some may be visible. Normally, this does not hamper your drawing efforts and will not harm your computer.

4.16 FUNCTION KEYS

- F1** Press this key to indicate end of text input (letters function).
- F3** Press this key to return to main menu. Change cursor priority. Normally the cursors on the screen are displayed IN FRONT of the drawing lines. Pressing F3 temporarily puts the cursors BEHIND the lines. Pressing it again will move them in front again. For a permanent change, go to the UTILITIES function, and the CURSOR PRIORITY option.
- F4** (Press and hold SHIFT and F3) - TRY AGAIN! This key will erase the results of the last function and allow you to continue without having to go back to the main menu. Note this works only after the regular drawing functions (see ERASE function in extended and template drawing modes.
- F7** Used to switch between regular and extended drawing modes.

5.0 CADPAK PRINTER DIMENSIONS

While there are many programs which let you draw on a computer screen and make a printout of your drawing, CADPAK is better because it provides precise **dimensioning** of the printouts. In addition, scale conversions are performed automatically so you can draw and specify things in real world dimensions and CADPAK converts these automatically to a properly scaled printout.

The maximum size and proportions of width to height of the printout will depend on your printer. Since almost every printer is different, and some printers provide a number of size options, CADPAK-128 pre-compensates for the printer proportioning on the screen so that the output will be correct. The proportion information is stored on disk with the printer option information.

In order for this to work, you must select the printout size you want for a drawing **before you start drawing it**. Whenever the screen is cleared (at system startup and whenever you execute the NEW SCREEN command) you are asked to select the printout size. Depending on which printer you have, there will be one or more options displayed. These options will show the maximum dimensions of the printout in inches. You select the one you want, and from that point onward, CADPAK-128 will precompensate for dimensions, circles and angles so that they will appear properly on the printout.

The size you selected when you started the drawing will be marked on the printout options list when you are ready to make the printout. Normally you will press <RETURN> to select the same size that you started with. You can change the size but if you do you will probably not be happy with the results because the circles will be distorted and all the other dimensions will not match the coordinates you have been drawing in. When the main drawing is saved or restored, the printout options selection is also saved with it, so you can later recall the drawing and print it out with the proper proportions (as long as the same printer is used).

It is probably easiest to understand with an example. Suppose you wanted to lay out a room which was 12 feet by 16 feet in size. You probably want to work in inches. When the screen is cleared and when you start up CADPAK-128, the prompt asks whether you want to work in centimeters or

inches. In this example press I for inches. The next prompt asks you to select the printout format. With the Epson FX printer module, the first option says this is a small printout in normal orientation and it is 8 inches wide by 5 inches high. For the Epson FX there are four other choices we could select, but for this example we will take the first. The 8 inches by 5 inches is the maximum drawing size on the printout. The next prompt asks for your units of measure. The default, when inches is selected as the first option, is FT/IN, which means you want to operate in feet and inches. The next prompt asks the number of your units of measure (feet) per inch on the drawing. Since our room is 16 feet long and we want to fit it inside an 8 inch piece of paper, we could select 2 ft. per inch as the scale. However, the room is 12 feet high, and a scale of 2 ft. per inch would be 6 inches, and we only have 5 inches in height on the drawing. Therefore the next logical scale factor would be to pick four feet per inch. The next step is to go into CADPAK and draw the box to define the room (see TUTORIAL for complete example). All that is necessary to do this is to select a BOX function. Pressing the Commodore key (C=) allows you to key in coordinates and all you would have to do is to key in the first corner at coordinates 0,0 (feet) and the other at coordinate 16,12 (feet). The box will be drawn on the screen and in this case it will be four inches wide and three inches high on the final printout. The computer will show you automatically where you are in feet from the origin (lower left corner) whenever you move the cursor on the screen. You can measure straight line distances on the screen (even at angles) by using the MEASURE function. You can key in the position of things, such as a table, and specify one corner of the table in feet from walls, and then specify the other corner using relative foot measurements from the first point. The same system works for metric measurements where the printout size is measured in centimeters and scaling is done to centimeters.

6.0 LOADING CADPAK 128 AND MAIN MENU

Before you begin, make sure the 40/80 column switch is in the up position (i.e. 40 column) and your monitor is set for 40 column mode.

Insert the distribution diskette into the disk drive. Type BOOT and <RETURN> or press the 128's reset button near the power switch. The message BOOTING CADPAK-128 will appear as the program loads and starts up. Then the copyright screen will appear. For a few seconds the screen will turn into blocks of all colors. This is normal.

CADPAK-128 must be configured for your printer. If you have not done this, (if there is no "CDPK. CONFIG" file on disk) then you will be asked to select the printer and go through the configuration process (it's easy) at this time. If you get another printer at a later date and wish to change the configuration, you may do so by separately loading and running a program "CONFIGER". See Appendix D for information on the CONFIGER program.

The remainder of CADPAK-128 will load into the computer. When the loading process is finished, you will be asked to specify the dimensions of the drawing screen;

1. CM or IN. Press C to select centimeters or I to select inches as your primary dimension.
2. You will be asked to select the printout option (note the maximum sizes in inches are shown).
3. Your units. The default units of measure are either centimeters or FT/IN. If you want some other dimension (meters, yards, miles) key that here.
4. Number per (cm. or in.). Key the number of your units per centimeter or inch on the output. (Don't forget to add scale text somewhere on your drawing such as 1"=4'.)

5. **BOX** around drawing (Y/N). This option puts a single line box around the outer edges of the drawing. It is recommended that you do this because it helps on the main drawing screen to let you know when the window is at an edge.
6. **MAX SIZE?** (Y/N). This option appears only if you select a box. If you answer y (Yes), it will draw the box around the maximum size of printout. If you answer No, you will be prompted to set the size (width and height) of this box.

The main menu appears.

6.1 MAIN MENU

The main menu of CADPAK-128 is the menu shown at the bottom of the screen first when the program is started. You can get back to this menu by pressing the F1 key one or more times from other menus.

The Main Menu has the following functions. A function is selected by keying the first letter of the function name.

- | | |
|--------------|---|
| VIEW | This selection lets you use the cursor keys to move the window around on the main drawing screen, or select another view, such as the top view (the over all picture is shown compressed,) the main view, or screen2. |
| DRAW | This selects the drawing function menus. The regular drawing functions are automatically selected unless you are in the process of creating a template, in which case the template functions are shown. |
| PRINT | This option takes you to the printout size selection menu. |

OBJ/FONT This choice takes you to the object and font editor, where you can read, edit, save, and manage all of the objects or special fonts you will need. This option does not use objects or fonts, it is used only to create, modify, and read them from disk.

TEMPL/CR (TEMPLATE CREATE)

This selection takes you to the part of the system for creating and saving templates. The commands to use a template in a drawing are included in the drawing functions.

FILE This option takes you to the picture save and restore utilities as well as a general disk file utility menu.

7.0 CADPAK-128 DRAWING MENU

CADPAK-128 operates in three drawing modes:

1. **The regular function mode.** The drawing function menu appears in blue. In this mode you can operate only on the visible window within a drawing function (you can not draw a box bigger than the current window). For all of the functions in this group, the F4 key is available for the complete "Try again" capability. This means that everything done to the drawing within one of these drawing functions, can be undone by pressing the F4 key immediately upon returning to the drawing menu. The menu shows F4 = TRY AGAIN in the bottom line when this can be done. A number of functions can only be done in this mode.
2. **The extended function mode.** This menu appears in red, and there are two important differences from the regular functions. First is that these drawing functions provide for automatic scrolling at the screen edge, so that you can draw boxes, circles, etc. the size of the entire large screen. The second difference is that the TRY AGAIN function is not available and instead an ERASE function is provided to erase the results of the last function. The TRY AGAIN capability is "perfect" in that the image is exactly as it was beforehand. The ERASE function does what it says. It erases the lines drawn, but that may leave gaps where two lines cross (problems like this can be fixed easily by using the ZOOM function to patch pixels).

3. **The template mode.** This is indicated by the black drawing menu and is active after you have begun a template until you have created it. It operates much the same as the extended functions, in that you can automatically scroll to anywhere on the screen within the DRAWING function, and the ERASE function operates the same way. The only real difference is there are fewer commands allowed in the TEMPLATES mode than the EXTENDED mode.

You will also notice that the system response is slower with the EXTENDED and TEMPLATE drawing. This is because of the way the lines are stored internally in the system so they can be used for templates, etc. Whenever possible, it is most efficient to use the REGULAR mode. Only the regular functions can be used with screen2.

Along with the TITLE of each of the drawing functions in the following pages, the modes in which it is available are also shown.

In each of these functions, you can return to the drawing menu from any selection by pressing the F1 key, except if the lightpen is on DRAW, put lightpen on right border of screen.

Function selection means: Keying the first two letters of the function name.

For many functions, one or more option menus will appear before the function is executed. You select these in the same way, by keying the FIRST LETTER.

Note: In the following pages these abbreviaions are used:

REG	=	REG drawing functions
EXT	=	Extended drawing
TEM	=	Template create menu

7.1 DRAW (REG, EXT, TEM)

FUNCTION - This function provides "free-hand" drawing of lines. Although the line is specified by a series of points, the points are connected by short lines so the FILL function will work properly.

LIGHT PEN OPERATION - Put light pen on screen at start point and press CONTROL. Move light pen to end of line and release CONTROL. The smoothness of the lines will depend on the precision of your light pen and how fast you move it. It can be improved by increasing the value of the smoothing control in the UTILITIES function, drawing cursor option and/or moving your hand slower. To return to drawing menu, place lightpen on right border.

KEYBOARD OPERATION - The keyboard version of the DRAW function is slightly different. The first step is to set the first point in the normal way (use the cursor control keys to move to the general area, press <RETURN>, and then use the cursor control keys to move to the specific starting point of the line you want to draw, then press <RETURN>). This sets the first point of the line.

Next, use the cursor control keys to move the drawing cursor one pixel at a time in any direction. When you get to the end of the first line segment, press the <RETURN> key to draw the line from the first point you set to this current point. Then use the cursor controls keys to move the cursor some more, press <RETURN> to draw the line, and so on. When you have drawn the last segment, press the F1 key to return to the main menu.

Although this is slightly more time-consuming than free-hand drawing using the light pen, the results can be similar. The curve you are drawing will be connected so it can be filled without bleeding out of the area. If you need

to go large distances for each segment, use the JOINTED option of the LINE function.

7.2 POINT (REG,EXT,TEM)

FUNCTION - You can place single dots or a spray of dots on the drawing using this function.

OPTIONS:

SINGLE POINT - This option places a single dot on the screen.

OPERATION - Set point

Point is drawn

Set next point or go to drawing menu

SPRAY - (Light Pen Only) - This is like the DRAW function only it sprays a series of single dots as long as the CONTROL key is held down.

OPERATION - Put the lightpen on the screen where you want to start.

Press the CONTROL key to start spray.

Move lightpen to direct spray of points.

Release CONTROL key to stop.

Place pen on right border to return to main menu.

7.3 LINE (REG,EXT,TEM)

FUNCTION - This function draws lines by defining the endpoints.

OPTIONS

LINE TYPE

You can draw either a solid line or a dashed line.

LINE SLOPE

ANY - Lets you draw a line at any slope on the drawing.

JOINTED - This lets you draw a series of connected straight lines.

HORIZONTAL - This allows you to draw only horizontal lines.

VERTICAL - This forces the line to be vertical.

PARALLEL TO LAST - This constrains the line you are drawing to be parallel to the last line you drew.

90 (RIGHT ANGLE) - This draws a line at a right angle (perpendicular) to the last line drawn. (The angle on the screen may look odd because of the printer compensation, but it will be correct on the printout.)

RAYS - This lets you draw a series of lines from a common point (the first).

OPERATION - The graphic screen is shown.

Set the first point of the line.

Set the point for the other end of the line.

The line will be drawn.

In the jointed option, the beginning of the second line will automatically be the end of the first. In rays, the second and subsequent lines will always start from the same point. For all others, you must specify both ends of the next line. To go back to drawing menu press F1.

7.4 **BOX (REG,EXT,TEM)**

FUNCTION - This function draws rectangular boxes on the screen.

OPTIONS - Solid/Dashed

OPERATION - Set point for one corner.

The other corners of the tentative box are shown by 3 red targets and moved by the drawing cursor.

Set point for opposite diagonal corner.

The box is drawn.

Set point for first corner of next box or return to drawing menu.

7.5 CENTERS (REG, EXT, TEM)

FUNCTION This draws a series of four straight lines out from a starting point to be used as centering marks for circles or reference points.

OPTIONS Line type can be either solid or dashed.

OPERATION Set the first point for the center of the cross.

Move the cursor, preferably out to the right, and the other three cursors will show the ends of the other lines to set the size of the cross.

The centering cross is drawn.

Set point for center of next cross or press F1 to return to drawing menu.

7.6 DIAMOND (REG, EXT, TEM)

FUNCTION This function draws a diamond with sides of equal length.

OPTIONS Solid or dashed lines.

OPERATION Set point for one corner.

The marker shown at first point and one side point of diamond.

Set point for opposite diagonal corner.

The diamond is drawn.

Set point for first corner of next diamond or press F1 to return to drawing menu.

7.7 CIRCLE (REG,EXT,TEM)

FUNCTION - The circle function draws one or more circles with the same center. It is distorted on the screen so the printout will be a true circle.

OPERATION - Set point for center of circle.

The left, top and bottom points of tentative circles of a radius equal to the distance of the drawing cursor from the center are shown.

Set radius by setting point at the 3 o'clock position.

The circle will be drawn.

Set point for second radius or return to main menu.

Note: In EXT and TEM modes the circle is drawn as 48 straight line elements. You may increase or decrease the number of segments with the # seg. option of the UTILITIES function.

7.8 ARC (REG,EXT,TEM)

FUNCTION This allows you to draw part of a circle (ARC) between two points. The curvature of the arc is determined by its center and the radius is determined by the distance between the center and the FIRST point. The arc is always drawn in the clockwise direction.

OPERATION Set the point for the center of the circle.

Move the cursor to the starting point of the arc. The left, top, and bottom points of the whole circle are shown with a radius equal to the distance from the center to this start point.

Set the radius of the arc by setting the point.

Set the point for the other end of the arc. NOTE that this only sets the angle from the center at which the arc stops. It does not change the radius.

The arc will be drawn clockwise from the start point to the last point you set (this may be up to a full circle in size).

Additional arcs based on the same circle center may be drawn by setting the cursor at the starting point of the second arc and then setting the third point, etc. These subsequent arcs may be at different distances from the center.

NOTE: In EXT and TEM modes, the arc is drawn the same way as the circle where a whole circle is 48 straight line segments. This may be changed through the # seg. option in the Utilities Menu.

The distance-angle (D) option of keyboard input can easily set the starting point of the arc in relation to the center, since the distance will be the radius and the angle will be the compass heading from the center of the starting point. This input method does not work for the ending point of the arc because the calculations in the distance/angle input routine are based on the prior point rather than the center of the arc circle.

7.9 ELLIPSE(OVAL) (REG,EXT,TEM)

FUNCTION - An ellipse requires three points to specify it. The ellipse can be at any angle and any shape. Because of the large number of calculations involved after the second point is set, cursor positioning is slower than other functions.

OPERATION - Ellipses are specified as follows:

Set the point which is the end of the long dimension of the ellipse, (either end).

Set the point which is one side (short dimension) of the ellipse.

Set the center of the ellipse. As you position the center, cursors will mark the first two points and the other end of the long dimension of the ellipse.

The ellipse will be drawn.

Go back to main menu or step 1 above.

Note: In EXT and TEM modes the ellipse is drawn as 48 straight line elements. You may increase or decrease the number of segments with the # seg. option of the UTILITIES function.

7.10 CURVE (EXT, TEM)

FUNCTION This function allows you to draw a smooth curve based on 3 to 11 points. These points are used in a blending function to push and pull a curve to the shape you want. The rules are that the curve starts at the first point and ends at the last point, but all the points in between are used to push and pull the curve. Each of the

points are shown on the screen and can be moved to shape the curve as needed, and then the points are removed. The curve is drawn and can be modified by moving individual points.

SEE APPENDIX C DEMONSTRATION DRAWINGS for example of simple and complex curves.

OPERATION The first prompt asks for the number of points in the curve (include the first and last points). Each point is specified by setting it on the screen. When all the points have been specified the curve will be drawn.

When the curve has been drawn, the prompt is "MODIFY/ANOTHER/F1". If you press F1 (NO) you exit the CURVE function.

If you press A (another) you can define and draw another curve.

If you press M (MODIFY) you may move the points and the curve will be redrawn. Do this as follows:

Press M. The points which you use to define the curve are shown again on the screen. The drawing cursor moves to the first point. If that point is okay, press the Commodore key (C=) to move on to the next point. If you want to change that first point, press the CONTROL key and move the cursor using the keyboard cursors or lightpen, and the Accupoint function. After you move or bypass the first point, the drawing cursor moves to the second point and you may change it, etc. After you have altered or bypassed the last of the points defining the curve, the points are removed from the screen, the prior curve is erased from the screen, and the new curve is drawn. At that time you may repeat this process until you are satisfied with the shape of the curve.

Note that the number of segments used to draw the curve can be changed by altering the SEGMENTS function in the UTILITIES menu.

Also note that if you decide you need more or fewer points to define the curve, then you should take the normal exit of the CURVE function (press F1 at the prompt) and then select the erase function which will completely erase the curve and let you define a new one from scratch.

7.11 FILL (REG)

FUNCTION: - The fill function fills in an area, either in a solid color or a pattern from a set of pre-developed patterns on the screen or disk.

OPTIONS:

SOLID - fills in the area with the current drawing color.

Set a point inside the area to be filled.

The area will be filled with the proper color.

Move point to next area to be filled or press F1 return to drawing menu.

PATTERN - fills in the area with a selected pattern.

For the pattern option, another menu is shown. Select the USE option to use one of the patterns in memory. The other options are described after the operations.

OPERATION PATTERN Use the cursor down and up key to move the marker up or down to the one

you want. Press <RETURN> and the patterns will be removed.

Set the drawing cursor at a point *INSIDE* the area to be filled.

If for some reason, you missed an enclosed area and the fill bleeds out to the whole screen or starts to fill an area you don't want, press the SPACE BAR to stop the fill operation. Then you can undo the bad filling by pressing the F4 key (SHIFT and F3). The graphic screen will be restored to the picture as it was prior to the fill function.

With patterns, the area will first be filled with solid color, then the pattern will be copied into the area.

At any one time there are 7 patterns which may be selected in the FILL function. The set of patterns may be changed. Each set of patterns is stored as a small program file on disk. The standard pattern set loaded when CADPAK is started has the name "Z.FILL.P". From the pattern option in the FILL function you can select the pattern editor.

OTHER PATTERN FILL OPTIONS

EDIT This option allows you to select one of the seven patterns and edit it using the same kind of technique as with the zoom function, as follows:

The screen is cleared and the seven patterns are shown at the right hand side of the screen. Use the cursor up/down keys to select the pattern. The pattern will be presented to you in zoom format. Each pattern is made of an 8x8 set of dots (pixels). Each of the 64 pixels can either be on or off. In order to see how adjacent rows and columns of the same pattern fit together, four patterns are displayed together when you select them during this editing process. Only the lower right pattern is active. The other ones are automatically made to be identical copies of it. Then press <RETURN>. Move the cursor over the pixel in the lower right corner that you wish to change and press the CONTROL key to flip the pixel (if its on turn it off, if its off turn it on), press the left arrow key to turn off the pixel or press the Commodore key to turn the pixel on. Do the same with other pixels in the pattern to achieve the pattern you wish.

Press the <RETURN> key when finished.

- READ** This option allows you to read in a pattern file from diskette.
 - DIRECTORY** This option lets you display the directory of all pattern files on the diskette drive, and lets you select the one you want for the next READ or SAVE.
 - SAVE** Saves the current set of patterns to disk.
- To return to the CADPAK main menu press the F1 key.

7.12 LETTER (REG,EXT)

FUNCTION - This function permits writing text or graphics character strings on the screen in various sizes using either the standard Commodore characters or a special font. For a special font, it must be loaded into screen2 BEFORE this can be used (press F1 to go to main menu then use OBJ/FONT function).

OPTIONS - Character Set

1. UC/(symbols) = Uppercase & Graphics
2. RV UC/(symbols) = Reversed Uppercase & Graphics
3. UC/LC = Upper & Lower Case
4. RV UC/LC = Reversed Upper & Lower Case
5. SPECIAL FONT (only REG mode)

SIZE OPTION - [except special font]

Normal

HIGH - Double height

WIDE - Double width

Large - Double height and width

OPERATION - Commodore fonts

Set point at upper left corner of the first character.

Type text. Use the <RETURN> key to go to a new line. Press the F1 key to exit back to the main menu. The DELETE key erases incorrect letters within a line. The cursor control keys move the letter placement cursors

around in one pixel increments. This is useful for superscripts and subscripts.

Press F1 to exit and return to drawing menu.

OPERATION - Special fonts

If you haven't loaded any font into screen2, the message "LOAD OBJ/FONT" will appear. Press any key, go to main menu (F1) and then use OBJECT/FONT MGR. option to load it.

Set point at lower left corner of 1st character.

Four size cursors will show minimum size.

Set point at upper right corner of first character to set size.

Type text. Use the <RETURN> key to go to a new line. Press HOME key to exit back to the main menu. Type carefully since the DELETE KEY ONLY ERASES THE LAST LETTER. The two cursor control keys [CRSR] and with SHIFT on the keyboard will move the letter placement cursors around in one pixel increments. This is useful for super and subscripts.

7.13 COPY [AREA] (REG)

FUNCTION - This function lets you take a rectangular area of one screen and copy it to another area on the same screen or the other graphic screen.

The copy function operates in one of two modes. The first mode is the block mode. It operates using 8x8 cells of the screen and allows you to copy a section of the screen, including color, to the same screen or to another screen.

The second mode is point mode. The point mode allows you to copy any rectangular area, and also has the advantage that when you copy it back, you can change its size, turn or mirror image it.

When this function is selected, you must also choose the **EXTRACT** or **COPY IN** functions. The **EXTRACT** is the one which copies the picture area to the save area in the computer. The **COPY IN** option copies the save area to the screen (you may swap screens in between these steps to copy images from one screen to another).

OPTIONS:

EX-BK [Extract Block]

OPERATION - Set point at one corner of area to be copied.

Set point at opposite diagonal corner.

Area is copied to save area and you are returned to drawing menu.

CO IN-BK [Copy in Block]

FUNCTION - This option moves the save area to the current screen.

OPTIONS:

REPLACE - The image is moved into the screen (overlying anything in the area before).

COMBINE - The image is added to the screen area, adding to the points already turned on, but not deleting any other on-points.

GHOST - This shows the new pattern, as a "ghost" on the old screen. This option can also be used to erase a copy pattern by displaying it a second time (it reverses itself).

MATCH - This option leaves only those points which exactly match in the two images.

COLOR + IMAGE - This option moves both the image and the associated color to the screen. This would normally be used with the REPLACE option above.

IMAGE ONLY - This option moves the image but not the color information. Therefore the image will take on the colors of the new area. COMBINE, GHOST AND MATCH are normally used with the options above.

OPERATION - Set point at the LOWER RIGHT corner of the area where the saved image is to go.

The image is copied and the cursors will show the other corners where the area will be copied into.

For another copy, repeat above steps or press F1 to go to drawing menu.

PT EX (Point Extract)

FUNCTION - To use this function specify the two corners of the rectangular area to be copied as with the box.

OPERATION - Set point for one corner

Set point at opposite diagonal corner.

The border of the screen turns red to indicate that the computer is copying the pixels to the save area. For large areas it takes some time.

You are returned to main menu.

MIRN-PT (MIRROR COPY IN-PT) &

TURIN-PT (TURN COPY IN-PT)

FUNCTION - These are the two copy back functions for the point mode. The only difference between the two is that the turn option allows the image to be rotated in 90 degree increments and the mirror option instead makes mirror images in either the horizontal, vertical, or both directions.

OPERATION - Set the point where the LOWER LEFT corner OF THE ORIGINAL IMAGE is to go.

Set point where upper right corner of original should be. If no rotation or reflection is desired, simply move the light pen to the UPPER RIGHT the amount desired to scale the copy back image in its x and y dimensions. NOTE that the scaling is only done in integer multiples of the original size. After the second point is set, the image is copied to the screen. If you want to rotate or reflect the image, move the second point to the left or below the first point and the image will be rotated and sized in the same way.

The image is combined with the screen image.

You can make a second copy by simply positioning the light pen at the lower left of the area where you want the second copy to be or press F1 to return to drawing menu.

7.14 TEMPLATE USE (EXT,TEM)

FUNCTION - This function takes a template from the template work area and copies into the current drawing, allowing you to position it, size it, and rotate it.

OPTIONS

USE - The first prompt asks you to enter an angle if you want to rotate the template (the default is 0, meaning no rotation). Angles are measured in degrees clockwise, like points of the compass.

The next prompt displays the current size in height and width (based on the template when it was created) of the template currently in memory. You may change these values or press <return> two times to accept these values.

The next prompt asks you to position the template. Note that you position this like objects, where you control the lower left corner of the template, and move it around on the screen. The four corners plus the marker are shown based on the size and rotation you specified. When the template is in the proper position, press <RETURN> (after Accupoint) to draw the template. You may place it again on the drawing in the same size and rotation by pressing the CONTROL key and positioning it.

Press F1 to go back to the template menu.

DIRECTORY - This option displays the directory of all template files on disk ("T." as first two characters). Key the number of the one you wish you select and press return. Its name will be supplied at the next file name prompt.

READ - This option allows you to read a template from disk into the template work area. You must supply a file name or use the DIRECTORY option to get it.

7.15 USE OBJECTS (REG)

FUNCTION - This copies objects from the object work area on screen2 to your drawing.

OPTIONS: - See Appendix C, Demonstration drawings for comparison of the results of different options.

NORMAL - This copies an object in normal form to screen (you can control the size).

MIRROR - This copies an object with mirror reflection.

TURN - This copies an object with rotation.

OPERATION - You must create or load a set of objects. [Use the OBJECT/FONT MGR function on main menu]. Choose normal, mirror, or turn option. [This determines what happens when you move the cursor for the second point below, or to the left of the first point.]

The set of objects on screen2 is shown and you use the cursor or cursor keys to move the target over the one you want. You are automatically returned to the main screen.

Set a point where you want the LOWER LEFT corner of the object to go.

Set a point where you want the upper right corner of the original object to be. This also sets the sizing in increments of 16 pixels in the x, y, or both directions. The object is copied to the screen.

Another copy of the same object may be made without having to re-select it by simply setting the point for the lower left corner of the next copy.

7.16 MEASURE (REG,EXT)

FUNCTION - This function operates just like a box, the only difference is that after the second point has been specified, the graphic screen is not changed, but instead the distances are shown. This is used primarily to measure straight line distances and angles between points on the screen. It is useful because the distance is computed in your external dimensions.

OPERATION - Set point at one end of the distance to be measured.

The other corners of a box are shown by 3 red targets and moved by the drawing cursor.

Set point for the other end of the distance to be measured.

The coordinates of the second point are shown along with the x distance (DX) the y distance (DY) and the straight line distance between the points and angle.

Press any key, then set point for the 1st point of the next distance or return to drawing menu.

7.17 ERASE (EXT, TEM)

FUNCTION - This erases the last drawing command. Because it erases lines already on the screen, it may leave slight gaps where two lines cross and one is erased. These can be fixed with the ZOOM function.

OPERATION - All of the lines drawn on the screen in the last drawing command are erased.

7.18 RUBOUT (REG)

FUNCTION - This function works like an eraser on a pencil. When pressed, the light pen erases 8x8 pixel areas.

OPERATION - Move cursor to first position to be erased.
(Will erase area between 4 gray cursors.)

Press <RETURN> to erase the area.

Move cursor to next point and press <RETURN>.

Press F1 to return to drawing menu.

7.19 UTILITIES (REG, EXT, TEM)

FUNCTION - These utilities help you manage the lightpen, dash sizes, etc.

OPTIONS -

Cursor Selecting this function permanently changes the cursor priority, meaning that the cursor will appear behind the lines on the screen until it is changed again. You can make a temporary change of this type by pressing the F3 key. This is useful at times when drawing very small lines and the cursors interfere with you being able to see other lines and reference points. By selecting this option the cursor appears behind the lines until the option is selected again.

Seg - This option selects the number of segments to be used in drawing circles, ellipses, arcs, and curves in the template and extended modes. The default is 48. The current value of the number of segments is shown, and you are allowed to enter a new value of 12 or greater. Obviously, the higher the number of segments you specify, the smoother the curves will be, but the time to draw the curves will increase. Key value and press <RETURN>.

Dash Size - This option allows you to change the number of pixels used for each dash in DASHED LINES. The default is 6. Key a value and press <RETURN>.

Mode - You can select either WRITE or ERASE mode for the drawing functions. The normal mode is WRITE but occasionally you may wish to go back and erase a box or line, which can be done using the ERASE mode for that line. Press either W or E to select the mode you wish.

Origin - The normal origin for all of the coordinates is the lower left hand corner of the drawing. This can be moved to any place on the drawing. When you select this option, the current origin and dimensions are shown, and you can key in a new origin X and new origin Y directions. Once this new origin has been set, all dimensions are figured from that point rather than the lower left corner.

L-Pen - Another Menu is shown:

Yes - This option turns the lightpen on and is used for coordinate inputs until you turn it off. When this option is selected, the lightpen alignment screen is shown. Place the lightpen over the small cross in the center of the screen, hold it there, and then press the CONTROL key and hold the key down until the graphic screen reappears. If the lightpen gets out of

alignment, you can select the Align option below to do this.

No - This turns the lightpen off.

Weight - This controls the number of lightpen readings used and averaged to determine the position of the lightpen. Normally, with a good quality lightpen, only one reading is necessary, but this can be increased to smooth out the result of a jittery lightpen.

Align - This option takes you to the lightpen alignment screen. This can be used when the lightpen does not seem to be tracking properly. Place the lightpen over the small cross in the center and press the CONTROL key.

7.20 CL (Color) (REG,EXT)

FUNCTION - This lets you select the drawing color.

A bar of all 16 colors is shown with an arrow pointing to the current color selected. Use the cursor left and right keys to move the arrow under the color you want and press <RETURN>.

7.21 VIEW (REG,EXT,TEM)

This option takes you directly to the VIEW screen where you can use the cursors or select the top view, or screen2.

7.22 ZOOM (REG)

FUNCTION - This function lets you "zoom in" on an area of the screen and see/change individual pixels. This permits fine adjustment of pictures, beyond the resolution of the light pen and tv systems.

OPERATION - Put drawing cursor at lower right corner of area to be zoomed. Four cursors outline the area.

When the point is set, the expanded area is shown with one pixel (white point) flashing. Use cursor keys to move white pixel.

Edit the pixels by:

<- (left arrow)-force pixel OFF

C= (Commodore key) force pixel ON

CONTROL key =flip pixel.

Press F1 to go back to drawing menu.

7.23 NEW DRAWING (REG,EXT)

FUNCTION - This function clears the current drawing screen and sets up the standard color (black) and screen dimensions for drawing.

OPTIONS:

1) **YES** - Continue to clear the drawing and erase anything on it.

2) **NO** - Returns you to the main menu.

You must specify the dimensions and printout size, as when you startup the system.

7.24 CONFLICTS

The DISK I/O function, the FILL (pattern only), DIRECTORY, COPY, USE OBJECT and SPECIAL FONT functions all share the same workspace. This means that you cannot copy an area out of one screen, load another screen in from disk and still have the copied area available. Likewise a pattern fill will overwrite the COPY AREA function.

8.0 PRINT MENU

This option lets you print out your drawing. The marker is placed next to the size you selected when you initialized the drawing or restored it from disk. You may select another size or select just the window or screen2. Use the up and down cursor key to select the option you want and press <RETURN> If you need to stop the printout, press and hold the space bar and the printing will stop shortly.

9.0 OBJECT/FONT

This automatically displays screen2 and displays the object/font menu as follows:

READ - Read an object or font from disk.

DIRECTORY - Display the directory of the current disk showing only object/font files (Those with "O" as the first two letters).

EDIT - This allows you to edit objects.

Under the **EDIT** option, another menu is shown as follows:

MODIFY - This lets you select one of the objects by moving the cursor over the screen and then turn the pixels on or off to design it. When you are finished modifying an option, press the <RETURN> key to get back to the Object Selection display. When you are finished modifying one or more objects, press the F1 key to return to this menu.

READ - This lets you read an object file from disk.

DIRECTORY - This lets you select an object file from disk.

SAVE - This writes the currently displayed object file to disk.

CLEAR - This clears out the object screen and initializes it with the lettering and squares.

10.0 TEMPLATE CREATE

This function lets you take all of the LINES since the begin template command functions in the drawing you have created to this point and transfer it to the template work area in memory. NOTE: It will over write any other template which may be in the template work area.

OPTIONS:

BEGIN - Select this option to start creation of a template drawing. You are asked for the template name (which will be supplied when you are ready to write it on disk). Then you are returned to the main menu. Select D to draw and then the template drawing menu is shown. When finished press F1 to get back to main menu, then select template again and press C (create).

CREATE - This function actually does the transfer from the current drawing to the work area.

The first prompt is "MARK BOX". Press any key then put a box around the template by positioning two diagonal corners. Note that this box is only used as a size and cursor reference when you bring a template back to use.

After you have marked the second corner of the box, you will be prompted to PLACE MARKER. This lets you place a marker (an additional cursor) on the template, which will be helpful to see its orientation and also to position perhaps some inner part of the template over something else on your drawing. Press any key to set this as you would any other point. When this has been done, you will see the message "Copying" and the line #s will show. When this is completed, you will be returned to the Template Creation menu.

SAVE - This option saves the current template in the template work area to disk. If another template exists on the disk with the same name, you will be asked if you wish to replace it or not.

DIRECTORY - This option lets you view the directory of the current disk, showing only template files on the disk (those with "T." as the first two letters). You can use this to select the name which you will append a suffix.

11.0 FILE MENU

This lets you save and restore screens (drawings) to disk and manage all of the disk file utilities in the system.

MAIN - This lets you save or restore the main drawing.

LOAD - Loads a previously saved drawing from disk into memory. Note that the size option selected at the time the drawing was originally written to disk is restored automatically.

SAVE - This writes the current drawing to disk.

DIRECTORY - This shows the directory of all files on disk with the master prefix (M).

Note that before saving, a disk capacity check is made, and if it is insufficient a message is shown unless you are saving it with the same file name, in which case the old file is scratched.

SCREEN2 - This lets you save and restore screen2 images. You can use this option also to read drawings created by CADPAK-128. All of these options have a "P." prefix.

LOAD - This reads the screen2 file from disk.

SAVE - This saves the screen2 file to disk.

DIRECTORY - This displays the directory of all P. files on disk.

UTILITIES (DISK)

OPTIONS:

NEW DISK - This option lets you initialize a disk, WHICH WILL ERASE EVERYTHING ON IT - BE CAREFUL! You will have to key in the disk name (up to 16 characters) and press <RETURN>. Then you will be asked for a two character identification. Key it and press <RETURN>. There will be some noise from the disk drive. The process takes about 3 minutes.

SCRATCH FILE - This option lets you erase a single file from disk. The filename can be keyed in or selected from a directory function before this option.

COLLECT - This option performs the disk collect function, checking the disk directory and Block Availability Map. Most important, Collect removes any incompletely written files from the diskette (those with an * in the directory listing).

UNIT CHANGE [DEV] - This option is used to select another disk drive for all disk operations except program loading. Key in the new drive number and press <RETURN>. The default is drive 8.

DIRECTORY - This option displays the directory of all files on disk and makes the selected filename available to the next disk operation.

RENAME FILE - This lets you rename a file on disk. The filename from the last disk or directory is shown. Then the prompt "NEW=OLD". Key the new filename, then an "=" and then the present name of the file you wish to change.

12.0 CADPAK 128 TUTORIAL

The easiest way to learn is by doing. This tutorial will acquaint you with many of the functions of CADPAK-128.

TUTORIAL #1 STARTUP

First, load "CADPAK-128" into the computer (See LOADING CADPAK).

The first prompt asks for external dimensions CM or IN. For this example press I (INCHES).

The next prompt asks you which size printout you want (You can select the size at print time but circles may be distorted and the dimensions will be wrong unless it is the same one you select at this prompt.) For this demonstration select the first one by pressing <RETURN>. Note that the printout size in inches is shown in each.

The next prompt asks you for the external dimensions. The numbers above refer to the paper size and the size the image will be when printed. Now you get a chance to tell the computer the dimensions you want to work in and also give it the scaling factor to use. (You can simply default to the same CM or inches size you selected above. Or, for example, you might choose to represent a twenty foot room on a five inch width piece of paper. In this case, your external dimensions would be feet, and so you simply key the word FEET at this prompt and press <RETURN>. The next question is the number per inch. In this example you would key four (feet) per inch. Now everything that you do in this drawing could be based on the foot measurements and not the inches. See the CADPAK SETUP section.

For this example, simply press <RETURN> to accept the defaults (1FT/IN (foot)=1 inch on paper).

The next prompt in "Box around DWG" press "y".

The next asks if the box is to be max size. Press "y".

The outline of the lower left corner of drawing is shown with main menu. Press "D" to go to drawing functions.

To get a feel of the way CADPAK works, try something you're familiar with putting text on the screen:

Go to the LETTERS function by keying "LE". You should see the menu with the font selections (1= UP/GR, 2=RV UP/GR etc). Press 3 to select the Upper/lower case option.

The next menu shows the size options. Press H to select HIGH (Double height).

Press the CONTROL key. The blue cursor appears near the center of the screen. Press and hold the SHIFT key and press the left/right cursor control key (lower right of the keyboard) to move all the cursor to the left (to about halfway from the left edge) or you can use one of the four upper cursor keys.

Press the <RETURN> key and press cursors again and notice how the cursors move only 1 position at a time. This is ACCUPOINT mode.

Press <RETURN> to set the cursors for text.

Now type your name, using the SHIFT key for capital letters (like a typewriter).

When you have finished, press the F1 key to go back to the drawing menu.

BOX

Select the BOX option (key BO) to enclose your name. Select solid (S) when the keyboard prompt appears, press CONTROL to move the cursor to the place where you want one corner to go, say lower left. The cursor moves. When you press <RETURN> the border will turn cyan (light blue). This is the ACCUPOINT function. The cursors all move one pixel at a time. The actual x and y coordinates are shown at the bottom. Note feet are shown first, then inches. When the cursor is exactly where you want it, press <RETURN>. The border will turn green to let you know the ACCUPOINT feature is released.

Now press CONTROL. Use the cursor control keys to move the drawing cursor to the other corner of the box on the screen and a lot of things move too! First the main cursor always follows your commands. There is a red cursor at the corner of the box you just set. Then there are two other red cursors which show where the other two corners of the box are. They move to show you where the box will be drawn. When you press <RETURN> next, you will be setting the box by fixing its other diagonal corner. ACCUPOINT is activated. Note that in addition to the coordinates of the new point the difference in x and y distances plus the straight line distance and angle are shown. Use it to position the corner exactly where you want it. Note that the other two corners move to stay coordinated. When you press <RETURN> again, you exit ACCUPOINT and the box is drawn.

TRY AGAIN!

To see how the last function can be erased, go to the drawing menu by pressing F1. Select the TRY AGAIN! function by pressing the F4 key (shift + F3). It erased the box only the last function performed, not your name.

CIRCLE

Let's put a circle around your name instead. Select the CIRCLE function from the drawing menu by pressing CI. The first point to define is the center. Press CONTROL and put the cursor in the center of your name and cycle it ACCUPOINT will be activated, but just press <RETURN>, you will bypass ACCUPOINT. Now press CONTROL and put the cursor at the approximate 3 o'clock position on the circle. You will see three red cursors moving to show the 12, 6 and 9 o'clock positions of the circle. When you press <RETURN>, ACCUPOINT will be activated and you can precisely set the circle size. When you exit ACCUPOINT by pressing <RETURN>, the circle will be drawn. To draw another with the same center, simply press CONTROL and move the cursor to the new radius. To quit drawing circles, press F1.

LINE

The LINE function operates similar to the BOX in that you must define with the cursor the two points for the two ends of the line. Press LI and before you get a chance to specify the end points of a line, you must select the line type (either solid or dashed). You must also select whether a line can have any slope (drawn in any direction on the screen) or if you wish the line to have be either horizontal, vertical, or a slope parallel or right angles to the last line you drew. Select the A (any slope) option. After you select these options, then use the cursor keys and <RETURN> key, and ACCUPOINT, the same as with the box.

Try LINE, BOX, and CIRCLES now. Use the TRY AGAIN function or the F4 key to erase your mistakes. It restores the screen to the last FUNCTION. If you drew three circles after coming from the drawing menu, the TRY AGAIN will erase all three. When you have to draw a number of copies of the same shape, go back to the drawing menu after a few, so they will be saved in case the

last one is bad. So far we have been drawing in only 1/4 of the screen. Press V to change the view. Use the upper cursors now to move the window around over the big drawing, then press T for a overall view of your picture so far. Press V, then M to go back.

You can also do many functions over the whole screen by using the extended functions. Press D to get to Drawing menu then press F7 to get the red menu. Now do letters again. When you are ready to set the cursor move it up to the top of the screen. Notice how in this mode the window moves automatically until the top. Press <RETURN> twice to set the position then type several lines of text. Notice how it scrolls both ways!

12.2 TUTORIAL #2 LIGHTPEN

OPERATION WITH LIGHTPEN

If you want to use a lightpen with CADPAK-128, the following steps will demonstrate its use. If you do not have a light pen, you can skip this tutorial.

Make sure the lightpen is plugged into control port 1 (the one closest to the keyboard). Go to the drawing menu and select option NE (New Drawing). Respond Y to the CLEAR DRAWING prompt. You are next asked the same series of questions about the dimensions as when you started the system. Select centimeters and take the defaults. Put a box around the drawing in maximum size.

You should be back at the main menu. Press D for drawing menu. The lightpen is controlled through the UTILITIES option, so press the letters UT. Then press L for lightpen options. Press Y (yes) to turn the lightpen on. You will notice that the drawing screen disappears and a small cross appears in the center of the screen. The blue cursor target shape appears somewhere on the screen also. Put the lightpen at the screen, right over the small cross in the center and then press and hold the CONTROL key down. The target should move quickly over the cross, and then you will be returned to the drawing menu. If this does not happen, try adjusting the lightpen sensitivity (if it has a control) or the brightness of the monitor.

Next select the Draw function (DR). Put the lightpen on the screen and draw arbitrary shapes. When the CONTROL key is pressed, a line should be drawn on the screen following the lightpen. You can get back to the drawing menu by putting the lightpen over the right hand border of the screen. The most critical test of the lightpen and brightness is to draw a series of vertical lines on the screen. If the adjustments aren't right you will see spikes

to the right edge of the screen. Adjust brightness and lightpen until these are minimized. If you still can't eliminate, put pen on right border and go back to the lightpen Utilities. Select the WEIGHT option, and increase to 3 (reads). See if averaging the three reads helps. If when drawing, the lightpen seems to be out of alignment, select the ALIGN option to correct.

Drawing with the lightpen is similar to drawing with the keyboard except the lightpen is used to position the cursor. Select the Box command (BO) and the dashed line option. Notice the prompt now says LIGHTPEN/CONTROL.. instead of KEYBOARD/... Put the pen on the screen about where you want one corner of the box to be and then press and hold the CONTROL key. Notice the blue cursor moves and stays under the lightpen and its coordinates are shown. When you release the CONTROL key, the ACCUPOINT function is activated and the border of the screen turns light blue. To adjust the position of the cursor one pixel at a time, put the lightpen on any of the four screen borders and press the CONTROL key. (Note that on the left border the cursor may move in the wrong direction if you get too far on the left.) When the cursor is where you want it, put the lightpen on the main screen area (white) and press the CONTROL key and the point will be set. Do the same series of steps to set the other corner of the box. It's just that easy. When you are finished with the lightpen, go to the lightpen options of the Utilities function and select No to turn it off. Do that now, since the rest of the tutorials assume no lightpen and use keyboard input.

12.3 TUTORIAL #3 FILL/COPY/ZOOM/OBJECTS/FONTS

Clear the screen using the NE (NEW SCREEN) option and select centimeters and accept all of the defaults. Go to the drawing menu and select the Box option to draw a box in the lower left corner of the screen. (see Tutorial #3 example). Next put a circle inside the box and be sure that it is small enough not to touch the edges of the box.

Select the FILL function, Solid option and then set the cursor inside the circle. It will be filled solid black. Next press F1 and again select the FILL function, but select the Pattern option. Press U (USE) to use the patterns already in CADPAK-128. Note that the red target shows next to the brick pattern. Use the cursor up and down keys to select another pattern if you wish. Press <RETURN> to finalize your selection. Now set the cursor inside the box area. The area is first filled with solid color, then the pattern is copied in.

You can make a copy of this brick wall with a hole in it by using the COPY function. From the drawing menu, press CO for copy. Select the first option EX-BK (Extract Block). Then simply put an imaginary box by setting the two corners around the area you want to copy (in this case the rectangle filled in with bricks.) NOTE: The Accupoint function moves 8 pixels at a time instead of individual pixels because the copy function copies cells at a time. If you need to copy something on a pixel basis, there is a pixel copy function included - see the writeup for explanation of how it works.) After you have set the cursors around the area to be copied, you are returned to the drawing menu. What has happened is that the image has been put into an internal save area.

To bring back the copy, select the COPY option and then the COIN-BK (Copy in-Block) option. The next menu gives you four choices for the way the image is brought back. Either a REPLACE where the copy image over-

writes anything currently on the screen. The combine, where the patterns are merged, ghost and match are explained in the Drawing Menu section of this manual. For this example we will use the REPLACE.

The next menu gives you the choice of whether you want to bring back the color plus image or the image only. In this case, select C for Color plus Image (even though it is all black). The next prompt is the KEYBOARD prompt. When you press the Control key, four gray cursors will outline where the pattern will go. Use the cursor keys to move this around. To see best how it works, overlap the two pattern areas, and press the <RETURN> key to make the copy. Then press the F1 key. You should experiment with the other options such as the COMBINE and GHOST to see the different results they can provide. Press F1 to get to the drawing menu, then select the copy, combine, color plus image and then over write something else on the screen.

The ZOOM function lets you take a microscope to a small section of the screen. Select the ZOOM function by pressing ZO. When you press the control key the four gray cursors outline the area which will be "ZOOMED". Pick some area of the drawing and then press <RETURN>. You will notice a rapidly flashing little box in the center of the screen. This is the cursor in the ZOOM mode and you can move it around using the cursor keys. The <- key forces the flashing pixel to be in the off position (white). The Commodore key forces it to be on (black) and the control key switches it between on and off. When you have finished making any changes in the ZOOM mode, press the F1 key to return to the drawing menu. NOTE: You can scroll by putting the cursor near the screen edges in ZOOM mode.

OBJECTS - Before using OBJECTS, you must go back to the Main Menu. Press F1 from the drawing menu. Then press O for object/font. Notice that the screen turns light gray. Make sure the disk containing the objects or font

you want is in the disk drive (for these examples, you will need the CADPAK-128 disk). Press D for Directory and you will be shown all the object files on the disk. For this example, select TUTOR OBJECTS by keying the number shown along the left hand edge of the screen, and press <RETURN>. Now press R (read), and that name should appear just above the file name prompt. Press <RETURN> to use that name. In a few seconds the screen will be filled with 104 little boxes, each containing an object. These are the Tutor Objects. If this is not what you want, you can go back and use the DIRECTORY function and/or read other object files. If you wish to edit these, you can do so by selecting the EDIT option and then MODIFY. The object will be shown in ZOOM format and you can modify it just as you did with the ZOOM function. For our purposes, we want to go back to the DRAWING menu by pressing F1 and then selecting D for Draw. To use an object you key the letters US (Use object). Then you must select whether you want this object brought back in normal orientation (straight up and down) or if you want it to be mirrored or turned. For now select N - normal. Then the OBJECT page is shown again with a blue cursor in the center. Use the cursor keys to move the blue cursor over the heart image in the lower right corner. Press the <RETURN> key to indicate this is your choice. Now you should be returned to the drawing screen. Move the cursor to where you want the lower left corner of the object to be. Set the upper right corner of the object with the cursor. Notice that the cursors jump in intervals of 16 pixels as you upscale the size of object. When you set the second point, the object is copied into your drawing. You can make additional copies of the same object by setting the two corners again.

Objects can also be mirror imaged and rotated using the other two options. The size and reflection/rotation is controlled by where you set the second corner of the object rectangle.

A special font uses the objects as the letters. To use the special font, go back to the main menu by pressing F1 key from the drawing menu. Select OBJECT font again, then DIRECTORY, and this time select OLD ENGLISH by pressing its number and <RETURN> and read it in. Notice how each of the Old English letters and numbers is above the dark gray corresponding letter in the light gray grid. To modify or make another font you follow the same guide. Now press F1 to get back to the main menu. Then select the drawing function by pressing D. Before selecting lettering, use the cursor to move you to a clear area on the drawing. Press LE for lettering, and select S for special font. Set the cursor at the lower left corner of where you want the first letter to be. Then you must set the upper right corner of the first letter. This lets you adjust the size of the lettering, just as you did with objects. When that is done, the four gray cursors outline where the letter will go. Press a key on the keyboard (using shift for Capital letters) and you will see the letter copied in. Note that you can only back space one letter (because of the proportional spacing). If you need to correct more than the last letter, you can go to the TRY AGAIN function (F4) and redo the special lettering without losing anything else on the drawing.

12.4 TUTORIAL #4 REARRANGING A BEDROOM

This tutorial will go through the steps necessary to make a useful drawing, something we are all familiar with-- a typical bedroom. It also will give us a good opportunity to explain the foot and inch techniques included for easy drawing.

The first step is to clear the drawing screen, NEW DWG. The next prompt asks you for the drawing dimensions. This time we will pick "i" for inches. Select any format you wish - but note the size should be at least 5 X 5 inches. The next prompt asks for your units. The default is ft/in. This means that the units we will operate in will be feet and inches. Press <RETURN> to accept. The next asks the number per inches on the drawing. In this example our room is 15 feet long, so if we use a scale of 4 feet = 1 inch (key 4 and hit <RETURN>), the 15 feet of our room will only take up about 7 1/2 inches on the drawing. Put a maximum size box around the drawing.

Next go to the drawing function D, select the UTILITIES function, ORIGIN option and now you get a chance to move the origin up from the lower left corner of the drawing. In this case, lets move it the equivalent of 4 feet in from the edge, so simply key in 4 for the X value we want to move the origin, and 4 for the Y value. On all of these prompts, you can key in distances by using the apostrophe (') following feet, and the quote (") mark following inches.

We can make our room outline by simply drawing a box in the right size on the screen, and then we could cut in windows and doors. Instead, we will use the various LINE options to draw the outline of the room. Because our room outline is larger than the visible window, press F7 for the extended functions (red menu).

Start with a solid, (LINES, SOLID, ANY SLOPE). Use the Commodore key to key in the co-ordinates, and notice the origin x,y now says 4 feet. All co-ordinates show for X and Y will be computed from to that point. To put in the first line of the room we have to start at the origin, so we simply key in (A)BSOLUTE value X=0 and Y=0 computed from the origin, so that will start our line at the grid origin. The front wall of the room is 103 inches (8' 7") long so we can press the COMMODORE key again and key in a (R)elative distance of X of 103 inches (remember to use the " mark to indicate inches), and the Y distance is 0 and the line will be drawn. Now to draw the next line we can continue relative to that first one by simply pressing the COMMODORE key and indicating the start point is relative to that last point by 33 inches (the width of the door). So key in 33" and Y of 0. The remaining front wall is 2 feet long, so again we can use the relative function and X, in this case, just key in a 2 with no " marks, automatically means feet, Y=0 and the front wall is drawn. You can continue up the right side by again selecting the RELATIVE option to the last point and put in 0 and 0, which means that this next line starts at the end point of the prior line. Then enter relative distance of 120 inches up the back wall. The X distance is 0, since this is a vertical line, and the Y distance is 120 inches (remember to use the " marks to indicate inches). Continue on this way to the window. Select relative - 0,0 to start this next line at the last point. The distance you want to go back to the left. You key this in as -5'6". The Y distance is 0 since it is a horizontal line. Now the width of the window is 36 inches so we leave that space by using the relative -X of 36" for the first point. Now, we know that the other end of this last line of the back wall will reach to co-ordinates X=0 since it is against the left hand edge of the room rectangle. So select absolute (A) instead of relative. We key in X=0 and Y=10 feet (120 inches). Now you can finish the room by using the RELATIVE option of 0,0 to go from our current position down to absolute X=0 and Y=0.

At this point you should have the room outline completed. Press F1 and then F1 again. (Go back to the main menu and top view to see it).

Putting the door in is really easy by the use of the LINE and ARC commands. First of all, go to the LINE command and select SOLID and ANY SLOPE line. Move the cursor using CONTROL key to place the first point to the right edge of the door frame, then press the COMMODORE key. Then use the distance and angle by keying in 33" for distance (the door width) and the angle you can make equal to a -45 degrees. (F1 Go back to drawing menu). Next, doors are normally shown with arcs. Remember that arcs are always drawn clockwise in CADPAK- 128 so first set the center equal to the right door post, set the start point at the left door post, and draw the third point part way around.

Next you can put in a box at the window to indicate the window.

Now use the LINE function with horizontal and vertical lines to set the dimension lines around the outside of the room as in the example. Use the Zoom function for arrowheads. Next, use the LETTERS function with normal size letters to mark the dimensions. You will find it easiest to select the extended functions F7 and then go to the upper left hand corner to start and use the space bar to rapidly space horizontally and use the carriage return to go down rows. Do all the lettering at one shot.

Now draw a box for the bed. Since we want to put it in the lower left corner, you can start a box with one corner at the origin (use the ABSOLUTE key in function with X=0 and Y=0) and the second one can be relative to that by the bed dimensions, 82 inches wide by 43 inches high. Now put lettering on the bed to describe it. In a similar fashion draw a box each for the nightstand 19 inches by 15 inches, the desk 36 inches by 20 inches.

To show how template can be used to make copies of a shape we will make the dresser as a template, then we can move it around.

Go to the main menu and select the TEMPLATE/CREATE option. Then B for begin. Give the template a name "dresser". Then go to the drawing menu (note it is now black). Select BOX (dash) and set one point on the right wall, then set the other -18 inches in the X direction and 45 inches in the Y direction using the RELATIVE input commands. The box will be drawn.

Nothing more is needed in the template so go to F1 (main menu), select TEMPLATE/CREATE and the CREATE function. Now you must put a box using the cursors around the dresser and also place a marker on the the template anywhere. Then the copy message will show. We will use the template by trying the dresser at a 22 degree angle in the corner. Go to the drawing menu-press F7 to get extended functions, then select (TE)MPLATE). Then select the USE option.

The first prompt is the angle. Since we want it to be 22 degrees counterclockwise, key -22. The next prompt shows the size of the template (the box you put around). Since we didn't want it to change it press (RETURN) to accept current values. Next you must place the template on your drawing. The four gray cursors identify the corners and the red one is the marker. Set the position and it will be drawn.

The same kind of template manipulation could be done on each of the objects in the room, which can make room rearrangements a little more pleasurable, accurate, and a lot less work! You can use the MEASURE function to measure the distance between the foot of the bed and the front of the dresser.

12.5 TUTORIAL #5 - USING TEMPLATES FOR MAP FILES

In addition to providing a handy way to generate images internally in CADPAK-128, templates provide an efficient means for bringing images in from other systems. Because template files are ordinary sequential files, they can be read and written in BASIC (See APPENDIX B for sample programs.) An example of this use is with a digitizing tablet whereby a photograph or map can be digitized and written on disk and read into CADPAK-128. There are seven such files on the CADPAK-128 disk. These are all map files of the continental U.S.A. One is the outer edge outline, another contains the internal state boundaries, the mark for Washington, D.C., the major cities, the state capitals, the major rivers, and the mountain ranges. Any or all of these can be read in and you can set the final size and rotation of the final image to generate maps with any of these images. Once the template image(s) has been read in, then you can use all of the other CADPAK-128 functions to fill in states, add lettering, etc.

Start by clearing the screen and set up dimensions as being inches, and accept the defaults (FT/IN) and 1 foot to 1 inch. Next go to the drawing menu. Next press F7 for Extended Functions, and then TE for the Template command. Before any template on disk can be used, it must be read into memory. Do this by pressing D for the Directory function, which will list the template files on disk. For the first example, select the file USA OUTLINE by pressing its number and <RETURN>. Then press R for read and press <RETURN> to accept the file name you just selected in the directory. The system will show the prompt READING.... followed by the record number it is reading, as the template file is being stored in memory. When this is completed, select the USE option to put it on your drawing. The first prompt is ANGLE. In this example, we will make it 0 degrees - no rotation (press <RETURN>). The next prompt shows you the inches for the X and Y sizing of the template. Select the size that will

fit on your paper, for the Epson FX first printout option it is suggested you use the dimensions of X=7 and Y=4. The next prompt is to set the position of the template. Since we want several templates to overlap it will be far easiest if we use absolute positioning from the keyboard. For this example lets use the lower left corner, which in this example means pressing the Commodore key and then the letter A for absolute, and then pressing 0 for X and 0 for Y. Because the screen automatically scrolls to the cursor position, you are forced to look at the lower left corner. Most of the drawing takes place in the top and right hand edge of the screen, so you won't see it for about 1 min. When it is finished drawing, the DRAWING menu appears. You can go to the top view to see the whole image which should nearly fill the screen. If for some reason you wish to make additional copies of the USA outline on the same drawing, you can do so now by going to the EXTENDED FUNCTIONS menu (F7) then use that same template in another size and perhaps another rotation. Instead, we will want to add other templates for State outlines and rivers. Do this as follows:

Go back to the DRAWING menu and then press F7 for the extended functions. Select TEMPLATE and DIRECTORY again. Now read in the file STATES by keying the number next to its directory entry and then pressing the READ prompt and <RETURN>. You will see the READING... prompt again as the state boundaries come into memory over-writing the outline. When this is complete, do the USE option again, selecting a 0 angle, the same width and height as you used before (7,4), and set the position using the ABSOLUTE 0,0. In the same way, add the ST CAPITOLS and RIVERS to your drawing.

If you are interested or have uses for other map files, contact ABACUS SOFTWARE.

Although these TUTORIALS only scratch the surface of the potential of this system, they have acquainted you with most of the functions of the system and more detailed explanations are contained in the function descriptions and the rest of the manual.

13.0 TIPS ON USING CADPAK

13.1 DEFINING OBJECTS

It is very tempting to design four copies of an object, each in a different rotation (such as marker arrows for a drawing). The problem is that the only good reference point you have on any object when you are positioning it in a drawing is the lower left corner. Therefore, if you design something such as a right pointing arrow and the positioning of the RIGHT END of the arrow is important, it will be almost impossible to do because the positioning of an object is based on the LOWER LEFT corner of the object. Instead, design it so that the arrow is pointing to the left and is as far down in the object as possible. Then when you go to use the object, choose either the reflection or rotation option and position the LOWER LEFT corner of the object (the point in this case) at the significant position on the diagram. Then move the light pen to the lower left of that point to set the sizing of the object and reflection or rotation, but this way the significant part of the object will be positioned properly. See the tutorial for an example of this.

Objects are not specifically dimensionable. An object is nothing more than a pixel pattern, and although it can be scaled up in multiples of its size, you can not make it a true exact sizing. Therefore if you wanted to have office furniture as a set of objects, you would have to accept the fact that these are only approximate sizes and not exact. Instead, you could use the 2nd screen to define specific sized shapes and the copy these onto your drawing and the size will be correct.

13.2 DESIGNING FONTS

When designing fonts, keep in mind that a special font is automatically proportionately spaced. CADPAK automatically senses the right most significant columns of each character and positions the next character against that row. (There is a minimum character size of 6 pixels) If you want the characters to flow together, such as in a script text, start each character against the left edge of the object block. If you do not want the characters to ever flow together, leave the left most column of pixels blank (such as on the OLD ENGLISH font included).

In designing fonts, remember that you will normally leave one or two blank rows under each character for descenders (such as under the g, y, q, etc.).

13.3 CURSORS

CADPAK was designed using sprites for the cursors used in drawing. This occasionally presents problems when you try to draw a very short line or very small box, etc. The cursors simply overlap and often cover-up your reference point. The cursor priority adjustment was designed to get around this problem by moving all the cursors behind your screen reference point instead of in front of it. This can be done either with the F3 key or with the cursor priority adjustment on the utilities function. Even with this, it is sometimes easier to go to the zoom function to draw very small things on the screen.

APPENDIX A - PRINTERS / INTERFACES**BLACK & WHITE PRINTERS**

Printer: Commodore 1525 / 801
select CBM 1525 printer

Interface: none needed

Printer: Commodore 1526
select CBM 1526 printer

Interface: none needed

Printer: Okimate 10 Black & White
select Okimate 10 B&W printer

Interface: none needed

Printer: Epson FX-80
Epson MX-80
Epson MX-100
Star Gemini 10 & 15
All work using EPSON printer

Printer: C Itoh 8510 Prowriter
(Switch 1-7 open & 1-8 closed)
select PROWRITER printer

INTERFACES :

Cardco '64 to Centronics model A
 Secondary address 5
 ASCII Translate NO

ECX Inc C-6401
 Switches- all 3 ON
 Secondary address 0
 ASCII Translate NO

Microworld Electronics MW-350
 Switches 1-3 to set printer
 Secondary address 5
 ASCII Translate NO

Microworld Electronics MW-302
 Switch 3 ON
 Secondary address 0
 ASCII Translate NO

MSD Inc CPI
 Switches 1,3,5 ON
 Secondary address 0
 ASCII Translate NO

COLOR PRINTERS

Printer: Okimate 10 Color
 select Okimate 10 Color printer
 Interface: none needed

Printer: Epson JX-80
 select JX-80 printer
 Interface: same as FX-80 above

APPENDIX B TEMPLATE FILES

A template file on disk is read and written as ordinary sequential files in Commodore BASIC. Each template is a single file on disk. All coordinates in templates are based on .001 centimeter. The points are stored in the file on a normalized basis, which means that the x and y resolutions and distances are the same. For example, a box which starts at the origin (.001) and is 2 centimeters by 3 centimeters on the printout, would be stored in this file with X-coordinates of 0 and 2000 and Y-coordinates would be 0 and 3000. Each record consists of three fields, a drawing code, an X coordinate, and a Y coordinate.

The drawing codes are the following:

- | | | |
|----|---|--|
| 0 | = | Draw dashed line to X,Y |
| 1 | = | Draw solid line to X,Y |
| 2 | = | Move to X,Y |
| 10 | = | lower left corner of template X,Y
(this is set with the box around the
template) |
| 11 | = | upper right corner of the template X,Y |
| 12 | = | Marker position X,Y |

The records in the template file are as follows:

- First record: Drawing Code 10 (lower left corner)
- Second record: Drawing code 11 (upper right corner of rectangle)
- Third record: Drawing code 12 (position of marker)
- Fourth record: Drawing code 0,1,2 and x,y coordinate)
- Fifth record and subsequent records are additional drawing codes.
- Last record: drawing code = 999 (end of templat file)

LINE DRAWING/TEMPLATE WORK AREA STORAGE

Each of the line drawing elements and each of the template elements in the template work area are stored in the 16K of "Hidden Memory" used for the 80 column screen display. There is room for a total of 3275 elements. The drawing screen elements start at one end of the area and the template work areas starts at the other end of this area. It should be more than adequate for most drawing functions. If you det the message "OUT OF TEMPLATE/LINE ROOM" you can do one of two things:

If you are finished using the template, you can clear the template area of memory. Note that if you have not already saved the template to disk you may want to do so before clearing this area.

The other alternative you have is to reset the line drawing pointer. This means that you will not be able to go back and recreate anything in the line drawing up to this point (it would be a good idea to save the line drawing to disk before choosing this option).

PROGRAM TO READ TEMPLATE FILES

```
10 REM PROGRAM TO READ AND LIST TEMPLATE FILE
20 REM KEY IN FILENAME
30 REM ASSUMED DEVICE IS #8
40 INPUT "TEMPLATE FILENAME;Z$"
50 DOPEN #8, (Z$)
60 TC=1
70 INPUT#8, B:IFB=999THENDCLOSE#8:STOP
80 R0=B:INPUT #8, R1:INPUT#8, R2
90 PRINTTC, R0, R1, R2
100 TC=TC+1:GOTO70
```

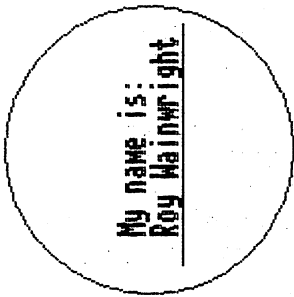
PROGRAM TO CREATE TEMPLATE FILE

```
10 REM PROGRAM TO CREATE A TEMPLATE FILE
20 REM REMEMBER THAT ALL COORD ARE IN .001CM
30 REM THIS PROGRAM CREATES A SIMPLE SPIRAL WITH
  DASH LINE TO CTR
40 REM OVERALL SIZE IS SET AT 10CM BY 8CM HIGH
50 REM MARKER IS AT X=3CM,Y=2CM
60 REM INPUT FILENAME
70 REM ASSUMED DEVICE IS 8
80 PI :REM DEFINE PI
90 INPUT"TEMPLATE FILENAME";Z$:Z$="T."+Z$
100 DOPEN#8,(Z$),W
110 REM FIRST WRITE OUT THE 10,11,12 RECS FOR
  SIZING
120 WD=10000 : REM WIDTH IN .001CM
130 HT=8000 : REM HEIGHT IN .001CM
140 MX=3000 : REM X MARKER
150 MY=2000 : REM Y MARKER
160 CX=WD/2:CY=HT/2 :REM DEFINE CENTER X,Y
170 PRINT#8,10:PRINT#8,0:PRINT#8,0 :REM 10 REC
180 PRINT#8,11:PRINT#8,WD:PRINT#8,HT :REM 11 REC
190 PRINT#8,12:PRINT#8,MX:PRINT#8,MY :REM 12 REC
200 REM NOW DO SPIRAL WITH SOLID LINES
210 REM FIRST MOVE TO CTR
220 PRINT#8,2 :PRINT#8,CX:PRINT#8,CY
230 FORJ=0TO10*PI STEP .1 :REM STEP .1 RADIANS
240 X=INT(CX+J*100*SIN(J)):Y=INT(CY+J*100*COS(J))
250 PRINT#8,1; PRINT#8,X:PRINT#8,Y :REM MOVE COMMAND
260 PRINTJ,X,Y:REM LET US SEE TOO
270 NEXTJ
280 REM NOW DO DASH LINE BACK TO CTR
290 PRINT#8,0:PRINT#8,CX:PRINT#8,CY
300 PRINT#8,999:DCLOSE#8 :REM TRAILER AND CLOSE
310 STOP
```


APPENDIX C DEMONSTRATION DRAWING

EXAMPLE OF TUTORIAL #1

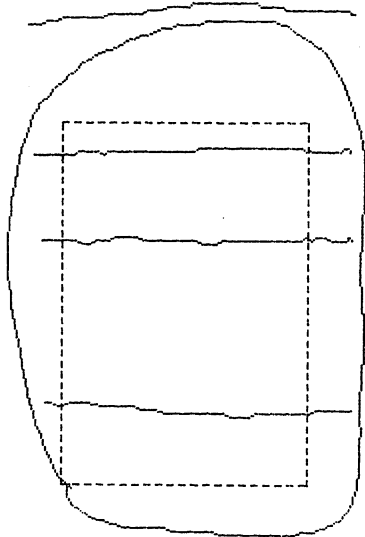
This is an example of the automatic scrolling of the screen when
lettering in the EXTENDED mode of CADPAK-128!



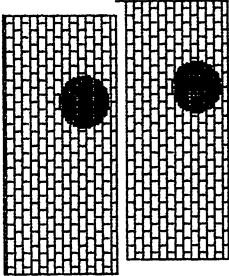
My name is:
Roy Wainwright

**EXAMPLE OF
TUTORIAL #2
(OPTIOPEN)
LIGHTPEN)**

Your lightpen should be able to do nearly as well as below with proper adjustment of screen brightness and contrast.



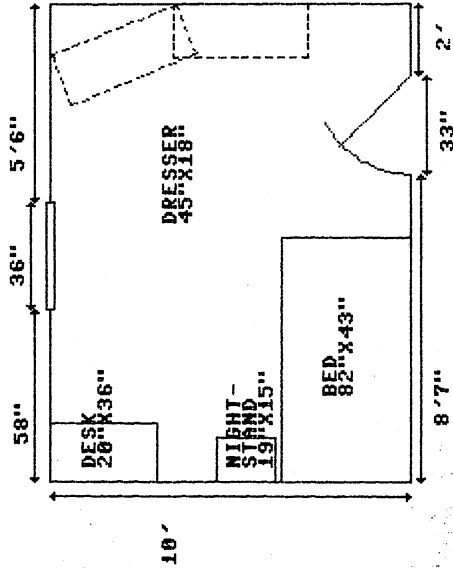
TUTORIAL #3
FILL COPY
& OBJECTS



This is an example of the
Old English special font
in




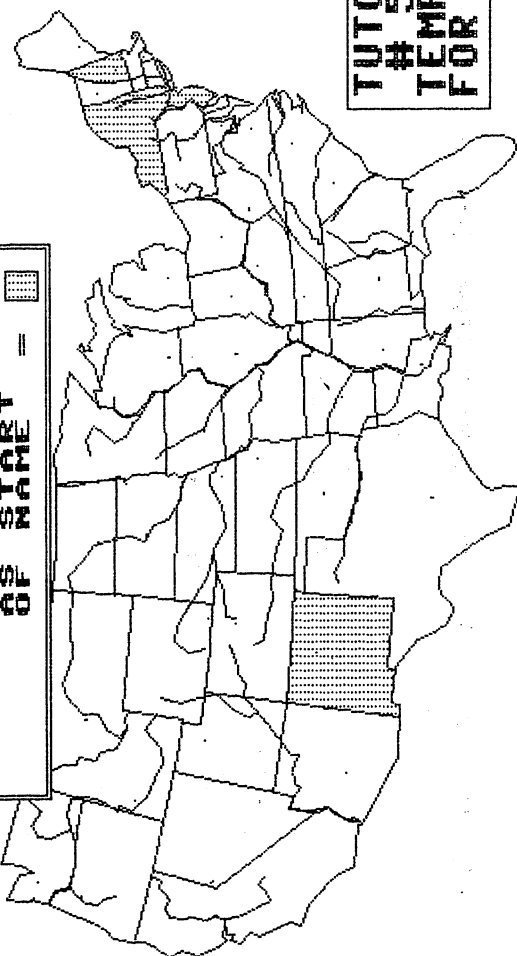
Tutorial #4 - Rearranging a bedroom



SCALE: 1"=4'

This is a continental USA map made from the template files included in CADPAK-128. The USA OUTLINE, STATE BOUNDARIES, STATE CAPITOLS and MAJOR RIVERS were selected. All of the drawing and filling functions may now be used to fill and letter it. For example:

STATES WITH "NEW"
OF STATE = 



TUTORIAL
#5
TEMPLATES
FOR MAPS

CADPAK-128 Lettering capabilities:

This is LARGE size

This is the HIGH size

THIS IS THE WIDE SIZE
This is plain old "NORMAL" size

These are easiest to use for letters or numbers on drawings.

CADPAK 128 ALSO HAS SPECIAL FONTS

THIS IS THE TECH FONT

This is the "famous" CADPAK TECH font... If none of these suit your need, you can easily design your own font using the built-in FONT editor..

See, these can be **WIDE** too!

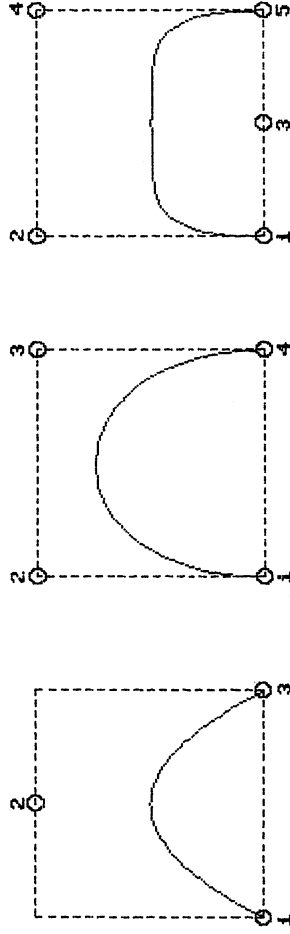
Special fonts are designed as 16x16 pixel objects and may be saved/read from disk. You can design fonts for almost any language;.... Greek for example....

α β γ δ ε ζ η θ ι κ λ μ
ν ξ ο π ρ σ τ υ φ χ ψ ω

The CADPAK-128 CURVE function draws a smooth curve between the starting and ending points. The minimum number of points is 3 and the maximum is 11.

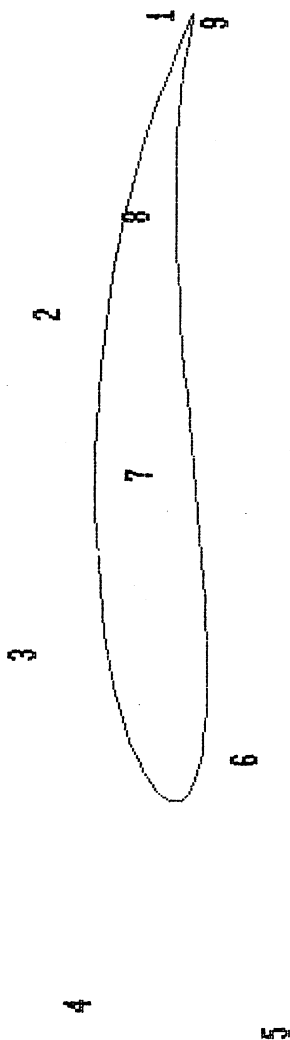
The points between the first and last "pull" the curve into the shape you want. After it is drawn the points may be moved to adjust the shape easily.

Three examples of the relationship between the points and curve:



This is an example of the CURVE function of CADPAK-128.

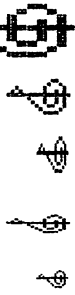
The entire curve is defined by just 9 points-- it's sort of like connect the dots, except that the curve only goes through the first and last points, the rest "pull" the curve to the shape you want.



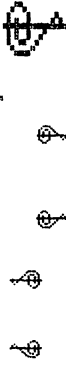
(the points don't show on the final drawing like this, only on the screen during creation and editing of the curve.)

THESE ARE EXAMPLES OF THE DIFFERENT OPTIONS
 OF THE --USE OBJECTS-- FUNCTION
 IN EACH CASE THE SAME OBJECT IS USED (CLEF SIGN)

NORMAL-----



MIRROR-----



TURN-----

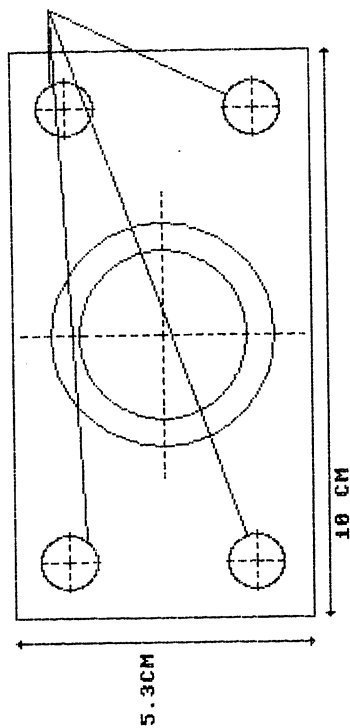
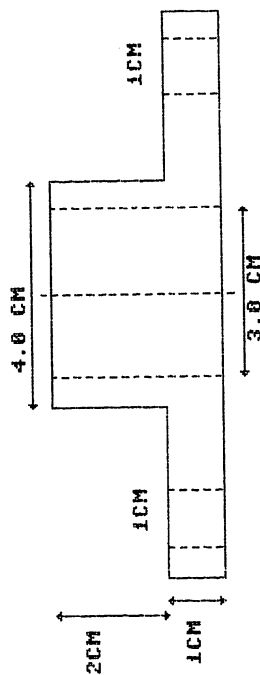


IN EVERY CASE THE SIZE IS SET BY POSITIONING
 THE CURSORS, THE ONLY DIFFERENCE IS
 WHETHER ROTATION OR MIRRORING OCCURS.

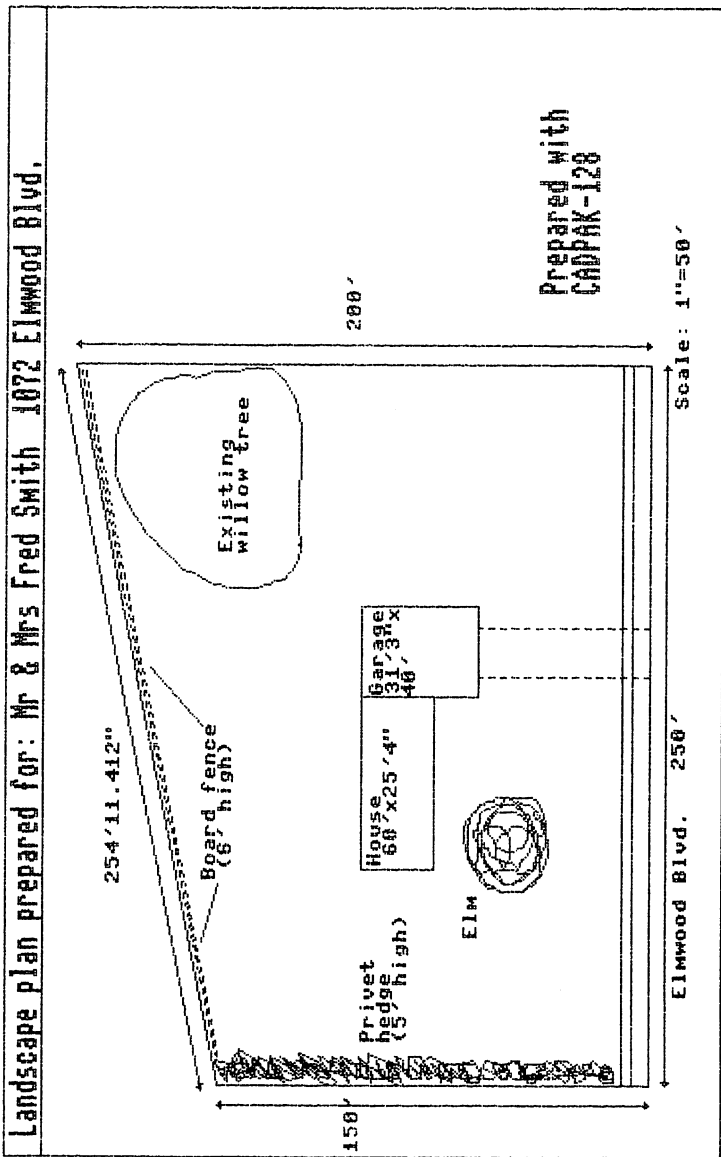
Machined Collar
Part # 4536-678A

Revision: 2B 4/1/86
By: RCM-Dept 197
Approval:

Magnesium Alloy #24S

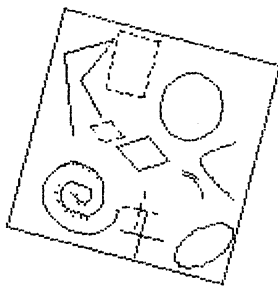
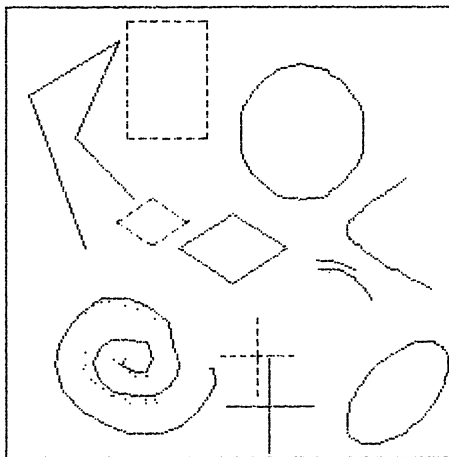


CREATED WITH
CADPAK-128



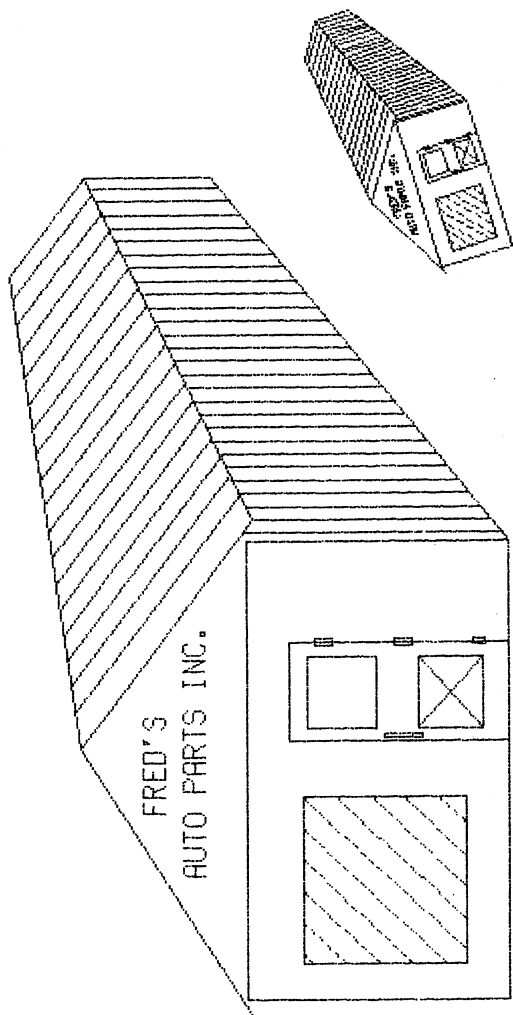
CADPAK-128 Templates are drawing files which are created from normal drawing functions and then may be included in a drawing at any size and rotation. They may also be saved to disk.

For example:
The box below is a template and was also included below here at a 20 degree rotation and smaller dimensions.

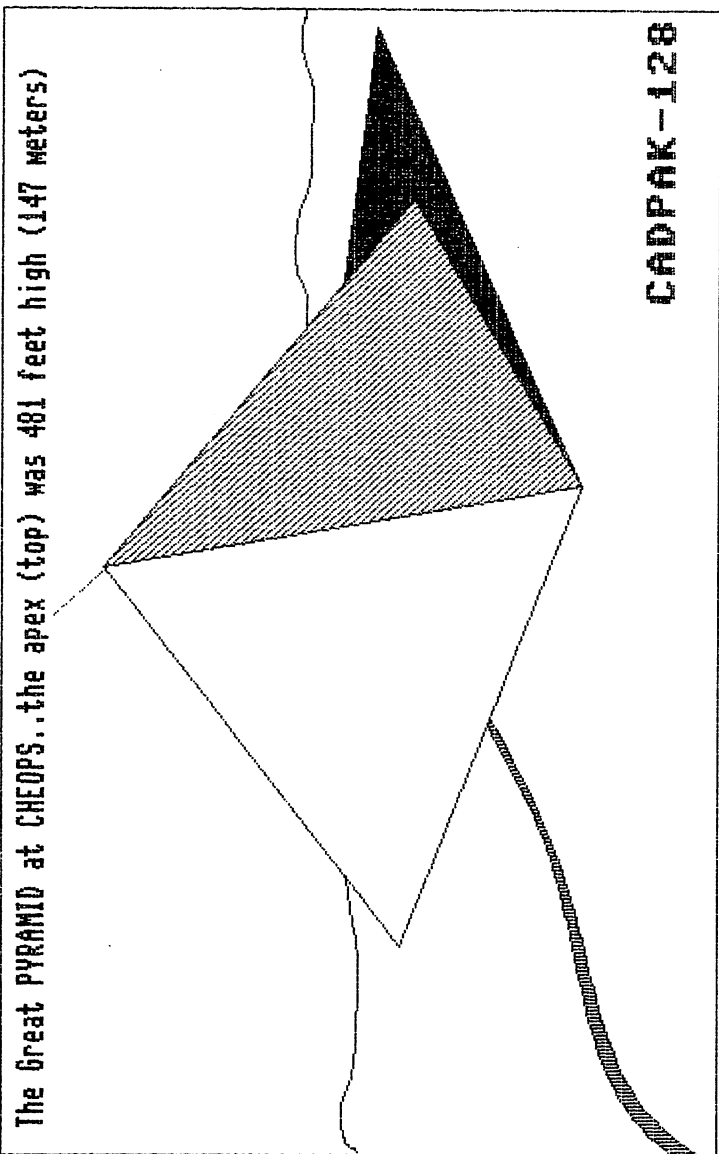


Since template files are ordinary 128 seq. files they can be created from another BASIC program and read into CADPAK-128!

This is an example of CADPAK-128 being able to use a template file created by another drawing program. Notice how the template can be sized and rotated to any degree.



The Great PYRAMID at CHEOPS..the apex (top) was 481 feet high (147 meters)



CADPAK-128



APPENDIX D THE CONFIGER PROGRAM

To configure CADPAK-128 for your printer LOAD and RUN the CONFIGER program on the master diskette.

Be sure that the write-protect notch is uncovered on the master diskette. This means that you may have to remove the write-protect tab on the diskette.

Next choose the type of printer you own. Star and Panasonic printers are usually EPSON MX compatible. The cursor keys are used to pick the selection. Press the <RETURN> key when you have selected your printer.

The correct printer driver will then be loaded from diskette.

Next input the DEVICE ADDRESS, usually 4.

Then input the GRAPHIC SECONDARY ADDRESS, this address is very important. Check your interface manual and input the address that will put your interface into transparent mode. Some interfaces use a DIP switch to accomplish this. The default value is 5, this should work on most interfaces.

At the ASCII TRANSLATE prompt, the usual answer is N for NO. The individual printer drivers are printer specific and usually you will not want the ASCII TRANSLATE mode enabled.

Next select the format that you wish the final printout to be. There are various choices for different printers supported. Again the cursor keys are used to select your choice. When you have decided on a format press the <RETURN> key to select the format. NORMAL will print across the page, SIDE will print the drawing sideways in the paper.

When you have finished with the configuration program, replace the write-protect tab on the master diskette.

APPENDIX E 1351 MOUSE INSTRUCTIONS

CADPAK-128 now includes a version that works with the Commodore 1351 Mouse.

Please note the following changes:

The keyboard/lightpen version is on one disk exactly as described in the manual. The mouse version and all supplemental programs and files are on a second disk. To use the mouse version, simply insert the second disk into the drive. Then follow the loading instructions in the manual (page 20).

Commodore 1351 Mouse Version:

The mouse must be connected to joystick port 1 on the right side of the '128 (the port closest to you).

The mouse version includes all of the features described in the manual except for the lightpen centering and control commands (since they are not needed).

So that all of the menu command words can fit into the space available, some words have been shortened and a couple of menus have had their sequences altered.

The TRY AGAIN function actuated by the F4 key in the keyboard/lightpen versions is now a menu function: AGAIN.

Switching between the Regular and Extended drawing modes is done with the menu option, REGFN or EXTFN.

When CADPAK starts, the mouse cursor appears just below the bottom of the drawing area. Anytime you need to find the cursor, just move the mouse up toward the center of the screen.

The mouse cursor changes to a small green arrow during menu selection. When it gets near the bottom of the screen, it is replaced by a flashing character in the menu area. Move the mouse to place the cursor over the word for the command you want to execute. CADPAK responds by placing a "greater-than" sign (>) to the left of the drawing function you have selected. Select the command by pressing the LEFT mouse button.

Setting a point with the mouse is similar to the lightpen. Move the mouse to position the drawing cursor where you want it, then press the LEFT mouse button. The mode is activated (the border of the screen turns light blue). In mode the mouse motion is reduced to make it easier to precisely position the cursors accurately. When the point is where you want it, press the LEFT mouse button to set the point.

Press the C= (Commodore) key to key in the point coordinates. Then use the mouse to select the coordinate option you want (Absolute, Relative or Distance-angle). Or press the ← (Left-arrow) key to use the divide mode.

To leave a drawing function, press the RIGHT mouse button. (This corresponds to the F1 key described in the manual).

The RIGHT mouse button also takes you out of menus to the next higher level menu.

In the DRAW and POINT/SPRAY commands, the cursor moves with the mouse. When you press the LEFT mouse button, the writing (or erasing) begins and continues as you hold the button down and move the mouse.

Use the F1 key to exit the LETTERING function and to escape the printout size selection.

Use the LEFT mouse button to toggle a pixel, pixel editing in FILL PATTERNS, OBJECT EDITING and ZOOM .

Hold the left arrow (←) key held down while the LEFT mouse button to turn on a pixel.

Hold the Commodore key (C=) pressing down while the LEFT mouse button to turn off a pixel.

The out of space message displayed (when no more room exists for template creation/drawing; see manual, pg. 78) lets you select which area will be deleted.

The only time the CTRL key is used is in the curve modification commands manual pg. 33.

The selection of printout size uses the up and down cursors keys.

Note: Don't press the LEFT mouse button while inputting text (dimensions, filenames, and values). This sometimes inserts extra spaces or other unwanted characters.

Printer Installation Reference Guide

Our technical support staff finds that the most frequently-asked questions are those having to do with printer installation for the popular Abacus package CADPAK-128 (Versions A and B).

The following information details the installation of most commonly-used printers/interfaces with the Abacus products for the Commodore C-128 listed above. If you have any other questions or suggestions, please contact our Technical Support department.

For these printers:
 MPS801, 802, 803, 1000
 Comrex CR-220
 Epson Homewriter 10
 Seikoska 1000
 Any STAR Gemini 10C model.

CADPAK-128 (Ver. A & B) Load CONFIGER (but do not RUN)
 LIST line 8—look for second
 POKE command = POKE 48129, 5
 Change the 5 to a 0
 (i.e. POKE 48129, 0)
 Press <RETURN>
 RUN the CONFIGER program
 Choose the 1525/801 option.

Additional Printers / Interfaces for CADPAK-128

The printer interface is usually set in TRANSPARENT mode, then the correct printer driver selected.

Printer/Interface:
 Gemini 10x/Cardco G-Wiz

Procedure:
 Select Epson Printer
 Printer: DIPS 1 & 2 ON, 3 & 4 OFF

Panasonic KXP 1080/
 Cardco G+

Interface: DIPS all off
 Select Epson Printer
 G+ DIP switch #7 off
 Secondary graphics address = 7
 ASCII translate = 0 (or N)

- Panasonic KXP 1080/Uprint Select Epson printer
 Send BASIC command
 OPEN 1, 4, 1 (transparent mode)
 Secondary graphics address of 1
 ASCII translate = 0 (or N)
- SG 10/TYMAC Connection Select Epson Printer
 Lock interface into transparent mode
 in BASIC
 Load program
- SG 10/ MW 350 Select 1525 printer
 Set MW-350 to emulate 1525
 (switch #1 on)
 Choose 1525 option with secondary
 address of 7
- SG 10/ Xetec Select Epson Printer
 (MX for 128 versions)
 Lock interface into transparent mode
 Secondary graphics address of 5
 Secondary text of 7
 ASCII translate = 0 (or N)
- Epson FX85/Xetec Select Epson Printer
 (MX for 128 versions)
 Lock interface into transparent mode
 Secondary graphics address of 5
 Secondary text of 7
 ASCII translate = 0 (or N)
- Gemini 15X/Cardco G+ Select Epson Printer
 Secondary graphics address 5
- Okimate 192/Tymac Select Okidata
 Lock interface into transparent mode
 Secondary graphics address of 4
 Secondary text of 7
 ASCII translate = 1 (or Y)
- SP 1000A/CardCo GWIZ Select Epson Printer
 Interface: DIPS 1 & 6 on,
 all the rest off

Chartpak

Professional charting & graphing package for the C-64 or C-128

Charts and graphs are the most effective method of representing statistical data from business and science in a comprehensible, easy to digest format that quickly and accurately conveys numerical information.

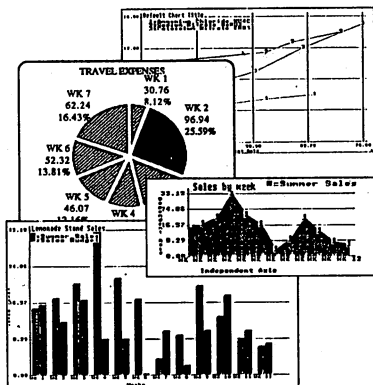
Chartpak 64 or 128 makes it simpler than ever before for the professional who wants to easily create high-quality charts and graphs without any time-consuming programming. Chartpak's defaults let the user build professional quality charts or graphs right off the bat, or charts and graphs can be built to specification by selecting from Chartpak's easy-to-use menus. Every option is menu-driven—all the user has to do is enter the required data, choose the chart format and then watch the chart as it's drawn.

Chartpak quickly draws any one of 8 different formats of pie, bar, line and scatter graphs. Since Chartpak is an interactive software tool, changing a feature in the Chartpak graph is no problem. The user can immediately change the scaling, labels, axis, colors or bar-filling options at any time. Chartpak also has built-in features for statistical functions: least squares, regression, mean and exponential smoothing, and can be added to chart and graphs.

The 140-page manual contains several tutorials to walk the user through the easy process of building charts and graphs using extensive examples and sample charts. In addition, the screen menus are identified and cross-referenced to the user's guide for added convenience and ease of use.

When the user's created a chart or graph to satisfaction, they can get a hardcopy of it with most popular dot-matrix printers in either of two sizes. Many Chartpak users have reproduced these charts and graphs for reports and presentations.

The C-128 version that takes advantage of the added features and extra memory of the Commodore 128 computer. More data can be entered to build charts, and charts and graphs can contain more detail. In addition, Chartpak-128 gives 3 times the resolution of the 64 version. This permits an entire chart or graph to be previewed on the screen, or it can be scrolled to show the higher resolution detail.



Chartpak 64 and Chartpak 128 Features:

- Enter data manually, or use data straight from Basicalc 1, Multiplan and Calc Result
- Draws pie charts, vertical or horizontal line charts, vertical or horizontal grouped, mixed or stack bar charts, scatter diagrams
- Statistical routines include average, standard deviation, least squares, two-dimensional data, exponential smoothing
- Easy to use menu operations
- Handles up to four data sets totaling 200 points (more with C-128 version)
- Saves data and/or chart specifications separately
- Complete manual with Chartpak data reduction tutorials
- Printout in two different sizes
- Chartpak 128 has 3X the resolution of the '64 version.

Hardware requirements:

Chartpak 64:
Commodore 64
1541 disk drive (or MSD disk drive).

Chartpak 128:
Commodore 128 with 40- or 80-column monitor
1571/1541 disk drive (or MSD disk drive)

Printers:
Commodore 1525 and 1526, MPS 801, Epson, Star Gemini, Okidata, Okimate, Siemens, others.

Suggested retail price:

C-64 version **\$39.95**
C-128 version **\$39.95**

Abacus Inc.
5370 52nd Street SE
Grand Rapids, MI 49508
Phone (616) 698-0330

SpeedTerm

Terminal Software
for both the C-128 and C-64

As a group, Commodore owners are one of the largest users of online communication services, such as CompuServ, The Source, Delphi and GEnie. SpeedTerm was designed to handle the communication needs of this rapidly growing base of Commodore owners who access these services. Both programs are packaged together, so it's easy for you to order and stock SpeedTerm.

SpeedTerm sets a high standard in economical telecomputing software—this package offers more power per dollar than any other terminal program for the '64 and '128. SpeedTerm is a completely command-driven program that is easy to learn and use, yet provides great power and flexibility.

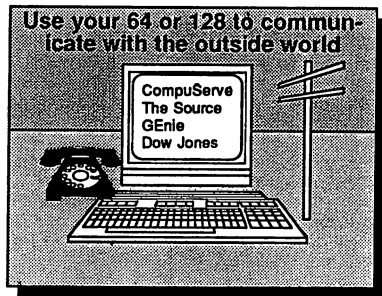
Even though SpeedTerm is simple in design, it packs numerous features that aren't found in others terminal packages. For instance, it supports both Xmodem and Punter file transfer protocols so that large files can be uploaded and downloaded without error. In addition to these popular file transfer protocols, SpeedTerm includes partial DEC VT52 terminal emulation. In addition to the standard options found in other terminal programs, manages a large 45K capture buffer and permits user defined function keys. SpeedTerm understands more than 30 powerful commands.

SpeedTerm is compatible with most of the inexpensive modems for the C-64 and C-128, and if properly interfaced, will function with all Hayes® compatible RS-232 modems. SpeedTerm's versatile capture buffer which can be used to both send and receive ASCII text files, or to record an online session.

The complete SpeedTerm package includes a 70 page manual with easy to understand tutorial.

Modems:

- Commodore 1600, 1650, 1660
- Hayes and Hayes-compatibles



SpeedTerm Features:

- Xmodem and Punter protocols for error-free filetransfer
- Supports partial VT52 terminal emulation
- Manages large capture buffer for recording long sessions (C-128 version has a 45K buffer, C-64 version has 24K)
- Use buffer to copy sequential files from disk to disk, and split files too large to fit into wordprocessors.
- Execute disk commands, e.g. scratching/renameing files
- Lists sequential files on the screen or printer.
- Displays directory listings
- Send commands to the disk and read the error channel
- Has powerful command mode with over 30 commands
- Complete access to the DOS
- Permits flexible user-defined function keys
- Works with most popular modems
- Works with either 40 or 80 column monitors
- Includes 70-page manual with easy to understand tutorial

Hardware requirements:

SpeedTerm-64

- Commodore 64
- 1541/MSD or 1571 disk drive
- 40-column monitor

SpeedTerm-128

- Commodore 128
- 1541/MSD or 1571 disk drive
- 40- or 80-column monitor

Suggested retail price:

Program disk contains
both '64 and '128 versions

\$39.95

Abacus Inc.

5370 52nd Street SE
Grand Rapids, MI 49508
Phone (616) 698-0330

Super Pascal

Pascal language development package for the C-64 or C-128

Super Pascal is a complete program development system for the Commodore 64 or Commodore 128. Super Pascal is so capable that hundreds of schools are using it to teach Pascal programming to their students. But Pascal is more than just a learning language. Super Pascal features language extensions for serious system level programming.

Super Pascal implements the full Jensen & Wirth compiler plus extensions for graphics. The package consists of an easy-to-use, very complete source file editor; an online assembler for optionally coding in machine language; and a super-fast compiler to turn the source file into executable code and a high-speed DOS for speeding up disk access to the 1541/1571.

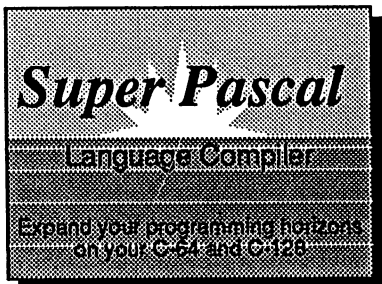
Other Super Pascal package features include a high-precision 11-digit arithmetic; a very fast compiler; overlays; automatic loading of editor and source program; exact error messages and localization during compilation; complete statistics reporting; free runtime package, and much more.

Super Pascal 128 contains all the features found in our popular C-64 version while taking advantage of the C-128's 40/80 column modes; it's high-resolution graphics package runs in 80 columns and makes some truly remarkable artwork possible.

Another "extra" of Super Pascal 128 is its RAM disk, which allows for *ultra-fast* loading/compiling, and supports 1571 Burst mode.

Super Pascal Features:

- Full implementation of Jensen & Wirth Pascal
- High speed DOS is three times faster than 1541 DOS
- Includes many language extensions for systems programming
- Integrated assembler for machine code requirements
- Built-in editor with renumber, auto, find, etc.
- Includes fast graphics libraries
- Works with one or two disk drives
- Large 48K workspace
- C-128 version supports 80-column hi-res graphics and supports RAM disk
- Complete with 200-page manual



```

GET_NUM(FROM);
IF NOT EOLN THEN GET_SECND('-') ELSE
TIL:=FROM
END
END
END;

PROCEDURE GET_TITLE(FOR_GET:BOOLEAN);
BEGIN
TEST_SYNTAX
IF INPUT^='*' THEN
BEGIN
IF NO_DEF THEN STOP (TITLE_ND);
IF FOR_GET THEN TEST_FOR_SAVE
END
ELSE
BEGIN
IF NOT (INPUT^ IN LETTER) THEN
STOP (ILL_TITLE);
READ (TITLE);
IF FOR_GET THEN TEST_FOR_SAVE;
NOT_DEF:=FALSE;COMMON^:=TITLE
END
END;

```

Hardware requirements:

Super Pascal-64:
Commodore 64 with 1541 or 1571 disk drive

Super Pascal-128:
Commodore 128 with 1541 or 1571 disk drive
(supports 40- or 80-column monitor)

Printer optional

Suggested retail price:

C-64 version **\$59.95**
C-128 version **\$59.95**

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Selected Abacus Products for Commodore computers

TAS Technical Analysis System for the C-64 or C-128

"TAS attempts to do a great deal... and delivers in a superb fashion. Furthermore, Abacus provides helpful user support. TAS is a great learning tool and a great value. 'A' for performance"

—Lyle M Johnson
Computerized Investment

Many sophisticated investors use technical indicators to determine when to buy and sell securities. Our popular, powerful Technical Analysis System package is a comprehensive charting and analysis package for these sophisticated stock market investors. TAS is for the serious stock market investor who requires the charting capabilities that only a computer can provide. TAS can analyze and chart these indicators to help him or her make investment decisions.

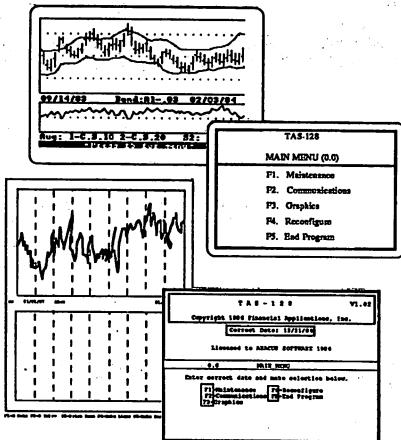
The Technical Analysis System package has features that were formally available only on much more expensive personal computers at a much higher cost. It allows the user to automatically update his/her portfolio through Dow Jones News/Retrieval Service or Warner Computer Service. Alternatively, the portfolio can be manually updated. TAS then draws a variety of charts and graphs that help the investor decide the "right" time to buy/sell stocks or bonds to realize the greatest profit.

The user can automatically download the indicators from Dow Jones/New Retrieval Service or Warner Computer Systems with TAS, or can manually enter, edit, review and recall this information. TAS can track high, low, close, volume, bid and ask by date, and can handle large data volumes, since the user can place 300 periods of information run up to 10 different stocks on one data diskette (even more with C-128/1571). If a user's portfolio is larger, he can use multiple data diskettes.

TAS-128 is based on our successful TAS-64, but has been very much enhanced by author Don Baulch at the request of users. This new '128 version includes macros, automatic unattended log-on, and quick-draw charts using from 1 to 4 windows.

Modems (required for online data capture):

- Commodore 1600, 1650, 1660
- Westridge
- Telelearning (and compatibles)



TAS Enhanced Versions

TAS Features:

- Extensive online data capture using Dow Jones/News Retrieval and Warner
- Plot 7 moving averages, 5 volume indicators, least squares, trading band, comparison and relative charts, and more
- Track 300 trading days for up to 10 stocks per disk—unlimited number of disks
- Autorun feature automatically plots charts for every stock on the data disk
- Vertical line plotting to identify monthly and yearly dates more precisely
- Pinpoint exact dates with accurate vertical line plotting—no more guessing
- Works with one or two disk drives

Hardware requirements:

TAS-64
Commodore 64
1541/MSD or 1571 disk drive

TAS-128
Commodore 128
1541/MSD or 1571 disk drive
80-column monitor

Printers:

Commodore 1525 and 1526, MPS 801, Epson, Star Gemini, Okidata, Okimate, Siemens, others.

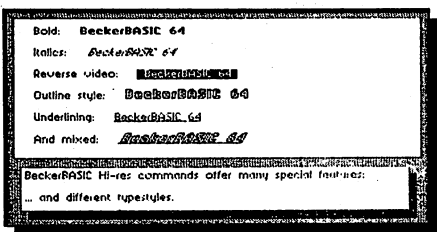
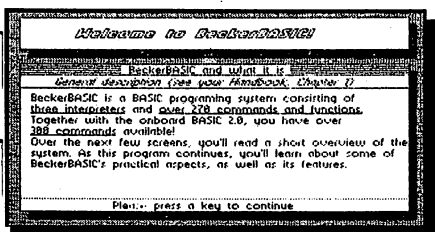
Suggested retail price:

C-64 version \$39.95
C-128 version \$59.95

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hires programming needs. Create boxes, plot points, and draw lines.

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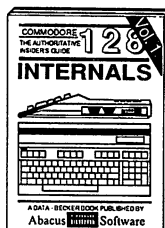
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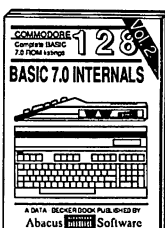
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C-128[™] REQUIRED READING

and C-64[™]



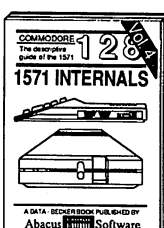
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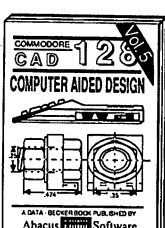
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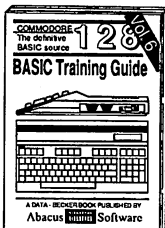
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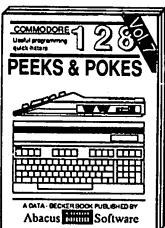
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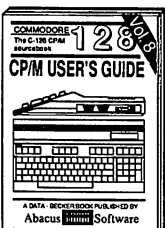
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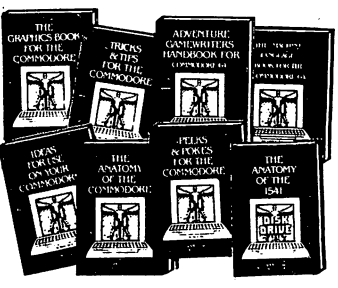
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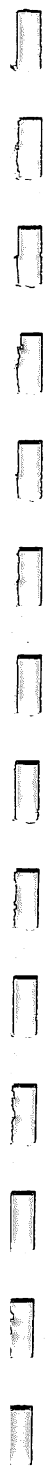
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