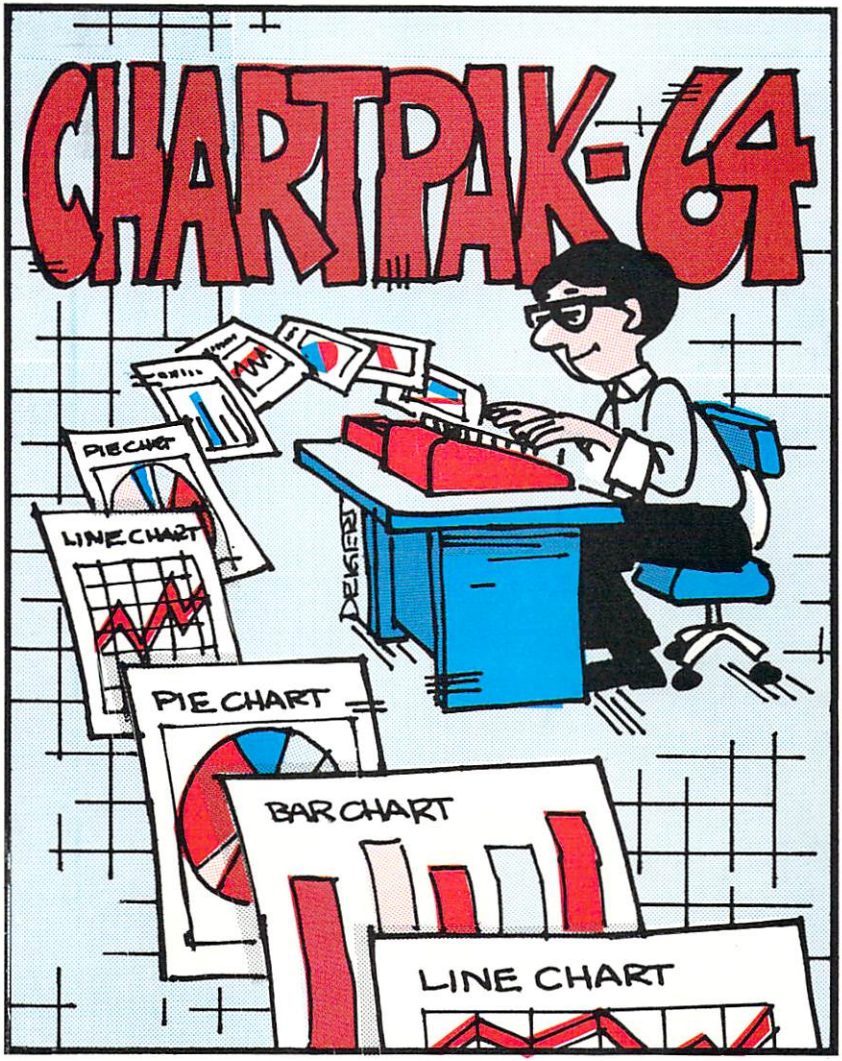


YOU CAN COUNT ON

Abacus Software

ADDENDUM
for CHARTPAK-64

I. ADDITIONAL SUPPORT FOR OKIDATA PRINTERS

If you have any of the following OKIDATA printers and one of the printer interfaces listed on the next page, then you **CHARTPAK-64** can produce hardcopy of your charts.

OKIDATA MODEL
Microline 92
Microline 82A with OKIGRAPH kit
Microline 83A with OKIGRAPH kit
Microline 93
Microline 84 Step 2

Follow these directions instead of STEPS I or II on page 2 of the **CHARTPAK-64** manual. Type:

LOAD "CPOKI",8 and press <RETURN>

When the computer responds with **READY.**, type **RUN** and press <RETURN>. The computer prompts you to enter a:

SECONDARY ADDRESS NUMBER (0-255)

If your printer interface does not need or respond to secondary addresses (see next page), then press <RETURN>. If a secondary address is needed to configure the interface, then key in the number followed by <RETURN>.

The next prompt is:

ASCII TRANSLATE? (Y/N)

If your interface does not change the 8 bit codes of the Commodore 64 in any way, then press N (no). If your interface translates Commodore ASCII to standard ASCII, then answer Y, and CHARTPAK-64 pre-translates the graphic data so your interface prints properly.

After pressing <RETURN>, the reminder **DON'T FORGET TO SET INTERFACE SWITCHES** displays to remind users with manually switched printer interfaces. The remainder of CHARTPAK-64 loads into the computer. It takes about a minute to load. The disk drive makes some noises as loading nears completion, but this is normal. When the loading process finishes, a short introduction is displayed. At this point **CHARTPAK-64 IS INITIALIZED** for your printer.

Now continue on page 4 of the manual.

The backup copy for **CPOKI** is named **BPOKI.**

PRINTER INTERFACE SUPPORT

-----INTERFACE----- MANUFACTURER	MODEL	SECONDARY ADDRESS	(Y/N)	ON
CARDCO, Inc. Wichita, KS	CARD?	5	N	
RCX, Inc. . Walnut Creek, CA	C-6401	0	N	*
MICROWORLD	MW-302	0	Y	3,4
ELECTRONIX Lakewood, CO		0	N	3
MSD, Inc. Dallas, TX	CP1	0	N	1,3,5

* requires that the three position switch is set to the center position

With printers other than the Commodore 1515 or 1525E, you should answer the **SECONDARY ADDRESS** AND **ASCII TRANSLATE** prompts as per the above table.

II. Enhanced HARDCOPY option 6

This version of **CHARTPAK-64** has been changed to include a double-sized printout of your charts.

Screen [6] asks you if you want a small chart (0) or a large chart (1). Enter your choice.

A small chart prints horizontally. A large chart chart prints vertically.

III. SAVE/RESTORE GRAPH option 7

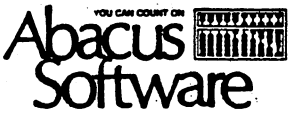
You no longer need to use the Function keys to save or restore a graph to disk. After entering the device number (default of 8), enter: 1 to save a chart, 2 to restore a chart or 8 to display the diskette directory.

CHARTPAK-64

powerful charting software

for your Commodore 64

(C) 1983 Roy C. Wainwright



P.O. BOX 7211, Grand Rapids, MI 49510

PREFACE

Roy Wainwright began writing development software for the new Commodore 64 about a year ago. Two of his products - SCREEN GRAPHICS-64 and ULTRABASIC-64 are familiar tools for thousands of COMMODORE 64 owners. Roy saw the power and usefulness of these development tools and set out to harness this power in CHARTPAK-64. You see, CHARTPAK-64 is written using the commands found in SCREEN GRAPHICS-64 and ULTRABASIC-64. His development tools make the graphics part of chartmaking a relatively minor task.

Roy has strived to make CHARTPAK-64 a user-friendly package. You can sit down at your Commodore 64 with this user's manual and easily create presentation charts in minutes - all interactively. No programming knowledge is required to use CHARTPAK-64.

CHARTPAK-64 is one of the longest projects that Roy has undertaken. The result is that Roy has built almost unlimited flexibility into CHARTPAK-64.

We are very anxious to see how you make use of CHARTPAK-64. We welcome any feedback from you and hope you find CHARTPAK-64 to be a powerful addition to your software library.

Arnie Lee
Grand Rapids, Michigan
July 12, 1983

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INTRODUCTION

CHARTPAK-64 lets you create data chart easily! It also includes a simple data base facility to allow you to create and adjust your statistical data for charting.

OPERATION

The simplest way to use CHARTPAK-64 is to key in your data, adjust the chart specifications using several of the menu options, and then display the chart on the screen. The F5 key returns you to the main menu while keeping the chart available at the touch of the F7 key. If you wish to change any of the chart specifications, you can do so and then immediately redisplay the new chart. After you have designed a chart to your satisfaction, you may get a permanent hard-copy on your printer.

You may save the chart specifications to disk for use at another time or for use with other data files. The data may be saved to disk. Data is saved on disk separately from the chart specifications.

NOTE - In order to allow using the same names for data and chart specifications files, CHARTPAK-64 automatically adds a '.S' to the beginning of each specification file name when writing the specification files to disk.

LOADING CHARTPAK-64

Insert the distribution diskette into the disk drive. There are two different ways to start CHARTPAK-64, depending on the printer you are using. If you are not using a printer, either option may be used.

I. If you have a COMMODORE 1515 or 1525E printer type:

LOAD "CPCBM",8 and press <RETURN>

When the computer responds with **READY.**, type **RUN** and press <RETURN>. The remainder of CHARTPAK-64 loads into the computer. It takes about 1-1/2 minutes to load. Some noises from the disk drive are normal. When the loading process finishes, the CHARTPAK-64 Main Menu appears.

II. If you have an EXSON MX-80 or MX-100 with Graftrax, an EPSON FX-80, a GEMINI-10 or 15 printer type:

LOAD "CPEPS",8 and press <RETURN>.

When the computer responds with **READY**, type **RUN** and press <RETURN>. The computer prompts you to enter a:

SECONDARY ADDRESS NUMBER (0-255) 5

If your printer interface does not need or respond to secondary addresses with the printer OPEN command, then press <RETURN>. If a secondary address is needed to configure the interface, then key in the number followed by <RETURN>. See APPENDIX A for more information.

The next prompt is:

ASCII TRANSLATE? (Y/N) N

If your interface does not change the 8 bit codes in any way, then press N (no). If your interface translates Commodore ASCII to standard ASCII, then answer Y, and CHARTPAK-64 pre-translates the graphic data so your interface prints properly.

After pressing <RETURN>, the reminder **DON'T FORGET TO SET INTERFACE SWITCHES** is displayed for users with manually switched printer interfaces. The remainder of CHARTPAK-64 loads into the computer. It takes about 1-1/2 minutes to load. Some noises from the disk drive are normal. When the loading process finishes, the CHARTPAK-64 Main Menu appears.

DISTRIBUTION DISKETTE

In order to protect the copyright of this program, interlocks have been incorporated to prevent LISTing, PEEKing, SAVEing and LOADing while CHARTPAK-64 is in the computer. Any attempts to do so will completely **reset** the computer.

The distribution diskette cannot be duplicated by standard computer equipment. In order to provide a backup in case of difficulty, a second complete set of software is included on the diskette.

BACKUP PROGRAM NAMES:

The backup version of CPCBM is BPCBM.

The backup version of CPEPS is BPEPS.

If the distribution diskette becomes completely unreadable, return it to ABACUS Software for a replacment at a nominal charge of $5.00 plus postage.

DEFINITIONS

This manual uses a number of terms which may or may not be familiar to you. In order to avoid any confusion, these terms are explained next:

DATA ITEMS AND DATA VALUES
A data item is the name for something (an entity) about which we can associate a number called a data value. Another name for data item is a point. An example of a data item is the high temperature for a given day and the data value is 90 (degrees).

DATA SET
This is a name that applies to a group of related data items. For example, the daily high temperatures, day by day for a month is a data set.

A second data set is the daily low temperatures for a month or year. We call these types of data sets one-dimensional.

Some data sets require two values for each point (an X and a Y coordinate). An example is a data set which has a lifespan value (years) for varying number of cigarettes per day. We call these types of data sets two-dimensional.

DATA GROUPINGS
For one-dimensional data sets, you must have a way to group the data points. This is the data grouping name. It may be day numbers, months, years or any other identification of the individual points.

For two-dimensional data sets, no special data grouping is needed because each point has two values.

INDEPENDENT AXIS
For the one-dimensional case, this is the axis which shows the data grouping information.

For the two-dimensional case, this is the X-axis, which goes from left to right.

DEPENDENT AXIS
In the one-dimensional case, this is the axis which displays the data values.

In the two-dimensional case, this is the Y-axis, which goes from bottom to top.

LEGENDS
These are the "labels" which describe the information about each axis on the chart.

GETTING STARTED WITH CHARTPAK-64

CHARTPAK-64 is operated through menu selections. Each menu and input screen has a number in the upper left corner. This manual is indexed by those numbers to make it easy to find more information about a screen entry.

All of the menus have an option [0] to return you to the main menu if you decide that you don't want to select any options on that menu.

If you accidentally get into a menu option you don't want, press and hold the RUN/STOP key and press the RESTORE key. The screen will clear and say "READY.". Then type **GOTO5** and press the <RETURN> key to go to the main menu. No data will be lost by this method. **Do not type RUN** or you will clear all data, chart specifications, etc.

When you are asked to key data into the computer, a prompt of --> appears for numeric data in front of the default value. Simply press <RETURN> to accept that value or key in your new data and press <RETURN> if you want to change that value.

For string type input (such as labels and titles), the prompt is -->> in fromt of the default value. As with numeric data, press <RETURN> to accept that value or key in your new data and press <RETURN>. If you enter a comma (,) in the data, all characters to the right of the comma are ignored. Therefore if you need to enter data with a comma, surround the entry with quotation marks such as "SALFS, 1982".

The next section is called A **CHARTPAK-64 TUTORIAL** which leads you through some of the basics of this powerful package.

A CHARTPAK-64 TUTORIAL

The first step is to load CHAPTPAK-64 into the computer. If you have not already done so, see the section called **LOADING CHARTPAK-64.**

If you make a mistake during this tutorial, you can probably correct the mistake by returning to the main menu and then reselecting the function. If you are at an input screen, you can always break out by pressing and holding the STOP key down and pressing RESTORE. This clears the screen and computer prints **READY.**. Type **GOTO5** and press <RETURN> and you are returned to the main menu.

For demonstration purposes, let's assume you have a lemonade stand which you operate for ten weeks during the summer. The summer is over and you want to make a chart showing how well (or poorly) you did. Each week, you made a budget based on the expected weather conditions. Your actual sales and budget for the summer were:

WEEK	SALES	BUDGET
1	$15.20	$16.00
2	$17.35	$12.00
3	$20.70	$17.00
4	$33.15	$ 8.00
5	$21.91	$ 8.00
6	$17.16	$ 8.00
7	$13.45	$10.00
8	$ 8.92	$12.00
9	$20.11	$10.00
10	$13.17	$18.00
	$181.12	$109.00

To make a chart using this data, start by selecting the INPUT & MODIFY DATA option. Enter 1 and press <RETURN> at the Main Menu [0].

Next we set up the global information about the data. Select option 5 **GLOBAL DATA SPECS.** The first question on screen [1.5] is TWO DIM (Y/N). Since each set of numbers (sales and budget) has only one value each, answer N and press <RETURN>. The next question is about the data grouping. Since we are using weeks, select option 2. The next prompt is to enter the starting week number. Since we are starting with week 1 (default), press <RETURN>. You are now back at the main menu.

Select INPUT & MODIFY DATA by entering 1 and pressing <RETURN>. Follow this with INPUT DATA FROM KEYBOARD by entering 1 and <RETURN>. The first prompt at screen [1.1] asks you to enter the data set number into which you will enter the data values. We'll put ACTUAL SALES into data set

1 and BUDGET into data set 2. Press <RETURN> to enter data for data set 1. The next prompt is for the data set name. Key **"ACTUAL 1983"** as the name and press <RETURN>. Next you are asked to enter the number of data items. Key 10 (number of weeks) and press <RETURN>. Now key the sales values with decimal points. For example key **"15.20** <RETURN> for the first item. When the tenth value is entered, you are returned to the main menu. If you make a mistake in keying a value, you can correct it before pressing <RETURN>. If you don't realize that you made a mistake until later (or the data has changed for some other reason), the ALTER option [1.2] allows you to change any data value.

Now in a similar manner, enter the BUDGET data. From Main Menu [0] select options 1 (INPUT & MODIFY DATA). Then from screen [1] enter another 1 (INPUT DATA FROM KEYBOARD). Type 2 to select the next data set number. Type **"BUDGET 1983"** for the data set name. The number of data items prompted defaults to 10 so just press <RETURN>. Enter the budget values (since there are no cents, you can type **"16"** <RETURN> for the first value, etc.).

The next step is to define the chart type. From Main Menu [0], select menu option 3 (DEFINE CHART). Next select option 1 (CHART TYPE). Key in "VG" for vertical graph. Type N to the ALTER DISPLAY SEQ prompt and you are returned to the Main Menu.

To see the chart, select option 2 (DISPLAY CHART ON SCREEN) from the Main Menu [0]. To get back to the Main Menu, press the F5 key.

The chart you see contains many options which are selected automatically by CHARTPAK-64. The next steps are to improve the chart by controlling these features.

Before going any further, you should save the data yo keyed in. You should **REMOVE THE DISTRIBUTION DISKETTE** from the drive and replace it with one on which you want to save the new data. If the diskette has not been initialized (NEWed), you can do so by selection option 5 DISK COMMANDS from the Main Menu [0] and then option 6 - NEW DISKETTE. **Be very careful, since the NEW command completely erases all data and programs on a diskette!!**

Now to save the data, select option 4 (SAVE CHART) from MAIN MENU [0]. Select option 1 (SAVE DATA). Unless you are using a diskette drive number other than 8, just press <RETURN>. The data filename may be up to 16 characters long. **"LEMON83"** is a good filename to use. Key the name and press <RETURN>. The disk drive runs for a few seconds and the returns you to the Main Menu.

From here on, option selection from the Main Menu is shown using / /. For example, to get to the chart type selection screen, you have to select option 3, then 1. This is shortened to [3/1].

The chart vertical axis is automatically set to the range of the data - it ranges from the lowest to the highest values of the data values. To make the chart look more normal, we need to fix up the dependent axis (data values). Go to [3/2/2] to input dependent axis information. Key "$$$ SALES $$$" for the legend. Since we want a normal scale, press <RETURN> (0 is the default). The default minimum value is 0 and we probably want to leave it at that value, so press <RETURN>. To make the chart more normal, enter the value 40 for the maximum value instead of 33.15 computed earlier. You'll have to space over the numerals left by "33.15". The base value is left at 0, the bottom for bar charting options. The number of divisions (horizontal lines) is left at 4, since this gives us four lines, each at 10,20,30, and 40 values. Press return to accept the default color.

Display the chart [2] to see the new dependent axis. Remember to press the F5 key to return to the Main Menu. If you want to change it further, simply go back to screen [3/2/2].

The independent axis in this example is the data grouping information (weeks). To improve this, go to [3/2/1]. Key "- - 1 9 8 3 - -" for the legend. The scale is normal, so press <RETURN> to accept the default (0). The minimum, maximum and number of divisions don't matter, so just press <RETURN>. The GRP NAMES are normally shown horizontally, but because they are 4 characters long (WK10) and overlap, we show them vertically. Key 1 and press <RETURN>. Press <RETURN> at the color prompt to accept the default color.

Display the chart using [2] again to see how the new independent axis looks. Note how the weeks overlap the bottom legent. This can be fixed by altering the chart shape. Press F5 to return to the Main Menu and then go to [3/2/3]. Notice the flashing cursor in the lower left hand corner. Use the cursor up key (with SHIFT) and the flashing cursor moves up. Put it up about halfway between the 0 and 10. You may also move the flashing cursor sideways to allow more room along the left side if needed. Press <RETURN>. Now the flashing cursor is in the upper right corner. Since there is no reason to change anything now, simply press <RETURN>.

Now display the chart [2] to see if the bottom legend is satisfactory.

Next let's fix the title. Press F5 again and then go to screen [3/4/1] and key "** LEMONADE STAND SALES **" and press <RETURN>. The flashing cursor in the top line allows

you to reposition the title (move it to the right a little using the cursor control keys) and press <RETURN>. Press <RETURN> to use the default color.

Now let's move the data set legend to the right. Go to screen [3/4/2] and move the flashing cursor to the right half of the chart (above WK 6) and then press <RETURN>.

Now let's change the line marking. Go to [3/3/1]. For the ACTUAL (data set 1) use a dot for the plotting symbol. Press SHIFT and Q (large dot) and press <RETURN>. Then choose a solid line for ACTUAL data (press S and <RETURN>). Press <RETURN> to default the color to white. Now for the BUDGET (data set 2),, use B for the plotting symbol, a dashed line and the default color (2).

Use option [2] to display your work again.

If you're satisfied, save the chart specifications. First press F5 and then go to [4/2]. After the disk drive device number prompt, you should see the name under which you saved the data. You may use the same name for the specs, since CHARTPAK-64 adds **".S"** in front of the name of specification files. Press <RETURN>. the disk will run for about 10 seconds, and then return to the main menu.

Suppose we want to add last year data to this chart. On the distribution diskette is **LEMON82**, a file with budget and actual from last year. To add this to your chart, go to screen [1.8] to use the directory. After choosing device 8, select data files (press 1 and <RETURN>) to see the directory. Select filename **LEMON82** (item 1 on the list) and press <RETURN>. The READ DATA FILE screen asks for a device so simply press <RETURN> to accept the default. Then the name of the file you selected is displayed. If OK, press <RETURN>. Now you are presented with each data set saved in the file. The first is **"ACTUAL, 1982"**. Since we want that data, press Y to read it in. Select a data set into which CHARTPAK-64 will read the data by pressing 3 and <RETURN>. The next screen shows the next data set in the file (BUDGET). Since it is last year's budget, it is worthless, so bypass it by pressing N. The next prompt is to choose whether or not to accept data group names (WK 1, WK 2, etc). Since the names are already in the computer press N to bypass.

Go to screen [2] to see how that third data set is added to your chart!

Go to screen [3/3/1] to change the plotting character for the new data set to the letter L (last year), and make it a non-connected (N) line. Note that you have to review (and mayu change) the specs for the other lines.

Go to screen [2] to plot the revised chart.

You can easily change this to a bar chart. Press F5 and go to screen [3/1] and select VB as the chart type. Press N to bypass altering the display sequence. Try displaying the new bar chart using [2]. You will get the message **BARS TOO WIDE.** Press <RETURN> and then go to screen [3/3/3] to adjust the bar width. Press <RETURN> at the first prompt (Mixed bar grouping). Change the bar width to 6 and leave the space between the bars at 1. For each bar you may select the filling option and drawing color. Select fill option 3 (horizontal lines) and default the drawing color for data set 1 (ACTUAL). Use fill option 8 (dots) for budget and fill option 2 (vertical lines) for data set 3 (last year).

Go to screen [2] to see the bar chart.

Note how the mixed type of bar chart intersperses the three data sets. Go to screen [3/3/3] and select the G bar grouping, default all the rest and then go to screen [2] to display the chart in grouped format.

To see the use of the sequence alteration, go to screen [3/3/3] and go back to the Mixed bar grouping. Then go to screen [3/1] to select chart type. Then press Y at the ALTER DISP SEQ? prompt. The four data set names in the computer are shown (note 4 still has a default name). Press 1 and <RETURN> to select data set 1 and the press 3 and <RETURN> to select data set 3. This shows **ACTUAL 83** and **ACTUAL 82** only. Press 0 and <RETURN> to end the sequence. Your choice is now shown. If OK, press Y to go back to the main menu. Go to screen [2] to see the chart. You can widen the bars to 9 piexels to make it easier to read by going to screen [3/3/3]. Note also that you should change the data grouping axis legend to something like "SUMMER WEEKS" or "WEEK COMPARISON" by going to screen [3/2/1].

To see how the base value works, let us assume we want to see how much above or below an average of 12 per week our sales are. Go to screen [3/2/2] and key 12 in the base value and press <RETURN>. You can let the other values default. Then go to screen [2]. The value at the left should be 12. Normally you want the same value on the other end (horizontal line). Enter 12 and press <RETURN>. Then enter a second 12 for the other end unless you want to change it to get a sloping line. Then select a solid line (press S and <RETURN>). Enter 2 to choose the color. Now display the chart again with screen [2].

To change this to a horizontal chart, go to screen [3/3/3] to change the bar width to 4 (there are less plotting points in the vertical direction). Go to screen [3/1] to select chart type of HB. Display it. Note that the following changes are needed:

Go to screen [3/2/1]. Change GRP NAMES back to horizontal (0) along the left edge.

Go to screen [3/2/3]. Move the bottom of the rectangle down (under the 0), and then move over to the right (to about 5) and press <RETURN>. Move the top corner down (under ACTUAL 1982) and press <RETURN>.
Now go to [2] to display the chart again.

You can do a pie chart of the current year sales by going to [3/1]. Select a pie chart by pressing P (and a blank to clear the B) and <RETURN>. When you display the chart [2], you are asked which data set you want to display. Key 1 and press <RETURN>. Then you are asked for the color of each segment. To make it easy to start, key a 2 (white) for each segment color. When the last segment color is entered, the pie chart is drawn.

See the sample chart printouts in APPENDIX E.

[0] MAIN MENU

This menu is the main control point for CHARTPAK-64. All functions return to this menu. If for some reason the program stops, you may restart it by typing GOTO5 <RETURN>, which brings you to this menu without losing any data or specifications.

Options:

0.1 **INPUT & MODIFY DATA**
This option takes you to all of the menus concerned with entry and correction of data for the chart. This is normally the starting point for any chart.

0.2 **DISPLAY CHART ON SCREEN**
This option produces the chart on the screen, based on the data and specifications stored in the computer. When the chart is completed, press the F5 key to switch back to the CHARTPAK-64 main menu. To switch back to the chart, press the F7 key.

If you have not specified a chart type, you are transferred to the chart type selection screen [3.1].

If the chart to be drawn is a pie chart, you are asked to specify the color of each pie segment.

If a BASIC error occurs during the drawing of the chart, the drawing process is stopped. Press the F5 key to view the error message. See APPENDIX C - **ERROR MESSAGES** for the messages and their causes.

0.3 **DEFINE CHART**
This option takes you to all of the chart specification and option menus. These menus allow you to select and adjust the chart display parameters.

0.4 **SAVE CHART**
This option takes you to the menu where you can save the data, the chart specfifications or both. They are saved separately so that the same specifications may be used with a variety of data sets to produce a group of comparative charts. Similarly, one set of data may be displayed several different ways using other specifications.

0.5 **FILE COMMANDS**
This menu option takes you to the menu where you can rename, copy and delete files or initialize (NEW) diskettes.

0.6 **PRINT CHART**
This option reproduces the chart display onto an attached printer. Because this function copies the screen display to the printer, the chart must first be displayed on the screen. See APPENDIX A for more information.

0.7 **SAVE/RESTORE CHART SCREEN**
This option lets you save and later restore a complete chart directly to/from the screen. It is useful is cases where a printer is not available or for presentations where it would be time-consuming to recall data sets and recreate the chart.

0.8 **EXIT TO BASIC**
This optin resets the computer for normal BASIC operation. Before the resetting process starts, you are asked "ARE YOU SURE?". Press the "Y" key to do the reset. Pressing any other key returns you to the main menu.

nnnn BYTES FREE
Because the data sets and the display programs take up a good bit of room, the number of available bytes of workspace are displayed on the main menu. If the number of bytes free is less than about 400, consider saving the data.

Additional specification parameters may take up the remaining room and the BASIC message "OUT OF MEMORY ERROR" is displayed. The program can be restarted without losing data by typing **GOTO5** <RETURN>. At this point you should save the data, shorten the legend and titles or cut the number of line or data points and then reload the data and specifications. See screen [1.4] for more details.

[1] INPUT AND MODIFY DATA MENU

1.1 **INPUT DATA FROM KEYBOARD**

The first prompt is for the data set number into which you want to key your data. Enter the number of the data set desired and press <RETURN>. The list of data sets available in memory is displayed with their numbers. Your selection is checked against the maximum you have setup in screen [1.4]. If you are within the maximum, the data set is cleared by setting all data values to zero.

Next you are asked to key in a name for this data set. CHARTPAK-64 supplies a default name (DATA SET N) if you just press <RETURN>. If you do not want the default, key in the name of your choice and press <RETURN>. You may also change the data set name later through the ALTER DATA screen [1.2].

Next you are asked to key in the number of points contained in this data set. CHARTPAK-64 supplies a default number (2) if you just press <RETURN>. If you do not want the default, key in the numnber of your choice and <RETURN>.

Next you are prompted for the data values. For one-dimensional data, you are prompted for only one value per data item. For two-dimensional data, you are prompted for both an X and Y value (unless you previously selected automatic X or Y option).

When the last data value is entered, you are returned to the main menu.

1.2 **ALTER DATA**

The first prompt is for the number of the data set to be changed. The list of data set names and their numbers is displayed. Enter the number of the data set. If you want to change the data set name, key in -1. if you want to change the data group namness, key a 0. Then press <RETURN>.

Next you are prompted to enter the starting data item to be changed (1 = first item, 2 = second, etc.) . Key in the item number and <RETURN>.

The display shows the data item number, the data group name and the data value (x and y values for two-dimensional data sets) for up to 13 data items, beginning at the specified data item. To change a value, key in the data item number and

press <RETURN>. Then you are prompted for the new data value. For two-dimensional data, both X and Y data are shown. If you want to add a data item before the entry number (and push the rest of the list up), type an up-arrow (↑) and then the data value to be added. If you wish to delete a data item (and slide the rest down), type a left-arrow (←).

After each data item is entered, the revised list is shown. You may quit by typing a 0 and <RETURN>. You are then returned to the Main Menu.

1.3 **CLEAR/COPY/MOVE DATA SET**
This option presents another menu.

1.3.1 **CLEAR**
CLEARing a data set sets all data values within that data set to zero. You are prompted to enter the number of the data set to be cleared. Key in the data set number and <RETURN>.

1.3.2 **COPY**
COPYing a data set moves all data items from the FROM data set to the TO data set and leaves the FROM data set intact. First you are prompted to enter the number of the FROM data set. Key data set number and <RETURN>.

Next you are prompted to enter the number of the TO data set. Key in the data set number and <RETURN>.

1.3.3 **MOVE**
MOVing a data set moves all data items from the FROM data set to the TO data set and clears the FROM data set to zero. First you are prompted to enter the number of the FROM data set. Key in the data set number and <RETURN>.

Next you are prompted to enter the number of the TO data set. Key in the data set number and <RETURN>.

1.4 **DATA SET SIZE**
This option lets you set the number of data sets and the maximum size of all the data sets. Initially, CHARTPAK-64 defaults to 4 data sets, each containing 50 points. The NUMBER OF DATA SETS * NUMBER OF POINTS IN EACH DATA SET must be kept at or below 200 because of memory limitations.

WARNING--Beacuse this option establishes arrays in BASIC, **all of memory is cleared.** Therefore all

data values, chart specifications and names are lost when this option is selected.

1.5 **GLOBAL DATA SPECS**

This option sets up data grouping information.

The first prompt asks if you are using TWO DIM (Y/N) (two-dimensional data). Press <RETURN> to accept the default (N). Otherwise key Y and press <RETURN> for two-dimensional data.

If you are using two-dimensional data, then the following prompts appear:

X OR Y AUTOMATIC? Answer with an X for x-values automatically increasing, a Y or y-values automatically increasing or press <RETURN> for neither.

When you select X or Y the following prompts appear:

STARTING VALUE? Enter the starting value for automatic numbering and <RETURN>.

INCREMENT? Enter the amount (may be negative) to be added to the value of each data item and <RETURN>.

At this point, for two-dimensional data, you are returned to the main menu.

For all other cases, you are asked:

HOW IS THE DATA GROUPED? The first six options are:

```
1 BY DAY       [SMTWTFS...]
2 BY WEEK      [WK1..WK2..]
3 BY MONTH     [JFMAMJJASOND]
4 BY MONTH     [JAN.FEB.MAR..]
5 BY QUARTER   [QTR1.QTR2...]
6 BY YEAR      [1982 1983...]
```

Key in the number of the starting period and pres <RETURN>.

For each of these options you are asked for a starting period (which month, which day, etc.). CHARTPAK-64 later automatically fills the data group names with these selected names.

The seventh option allows you to specify each name:

7 BY OTHER [ACTUAL BUDGET FORECAST..]

First you are prompted to enter the number of names within the group. Enter the number and press <RETURN>.

Next you are prompted for each name. To conserve memory and for printing space, each name is limited to 9 characters (including spaces). Enter each name and press <RETURN>. An error message appears if the name is too long. In this case CHARTPAK-64 asks you to repeat the entry.

You are then returned to the main menu.

1.8 **DISPLAY DIRECTORY**

This option allows you to scan the diskette directory and to select the file you want to read. CHARTPAK-64 supplies a default value of 8 for the disk drive device number if you press <RETURN>. If you don't want the default, key in your device number and <RETURN>.

Next you are asked for the type of files to be searched.

1 DATA FILES (all files on diskette except those beginning with ".S" or "!")
2 SPECIFICATION FILES (only those beginning with ".S")
3 BUSICALC FILES (only those beginning with"!")

Key in 1, 2, or 3 and press <RETURN>. CHARTPAK-64 shows you a partial list (up to 9 filename entries). If the file you want is shown, enter its number and <RETURN>. If the file is not shown, enter 0 to continue. When all entries have been shown, the list starts over again. When you key in a file number and <RETURN>, that filename is noted and automatically supplied at the next filename prompt. If for some reason you do not see the name you want, select one anyway. You are taken to the READ DATA FILE screen [1.9]. You can enter the correct name manually at the filename prompt.

1.9 READ DATA FILE

This option allows you to read a data file. The first prompt is for the disk drive device number. Enter the device number and <RETURN>.

Next you are prompted for the filename of the data file to be read. If you previously used the DIRECTORY DISPLAY function, the name you selected is automatically shown here. Otherwise enter the

filename and press <RETURN>.

For non-BUSICALC files, the following prompts appear:

DATA SET NAME followed by the name of the first data set from the disk file. You are asked to Y TO ACCEPT, N TO BYPASS and must press Y or N. This allows you to selectively read saved data sets into differing data set numbers.

When all of the data sets are reviewed, you are prompted ACCEPT DATA GROUP NAMES - Y TO ACCEPT, N TO BYPASS. If you key Y, the data group names previously saved in the file area read in. If you key N, the default data group names are used (which may be changed later).

BUSICALC is a general-purpose spreadsheet calculation program. Normally, worksheets are saved in internal format, specifying formulas for each cell. However, for charting purposes, you can save a worksheet in calculated format. You do this from BUSICALC by specifying a save filename with ! as the first position. CHARTPAK-64 requires that BUSICALC files contain a ! in the first position of the filename.

For BUSICALC files, the first prompt is ARE DATA SETS ROWS (Y/N). BUSICALC worksheets may be organized in many ways. In order to create charts from BUSICALC data, it must be organized so that the data sets are either rows or columns and the other dimension is the data grouping.

For example, if you want to chart two columns of quarterly sales for two different years and one column of variance, your data sets are columns so answer N to the prompt. If your worksheet had rows of sales, costs, expenses, etc. and the columns were months, then answer Y to the prompt.

If the data sets are in rows (Y), then the first prompt is DATA GROUP NAMES FROM 1ST ROW? (Y/N). This allows you to control whether to read the first row of the worksheet as data group names or as data set values. The next prompt is HOW MANY COLS TO USE. It is assumed that the first column are the data set names. This prompt allows you to ignore perhaps a total column at the right of the worksheet. The default is to read all columns.

The next prompt is ROW nn DATA SET NAME Y TO ACCEPT N TO BYPASS. This display shows the row

number and the name or each row (including blank and literal rows). You may select up to 10 of these to be read into CHARTPAK-64. For each row accepted, you are asked for a data set number to put it into. If you want more than 4 data sets read in, you have to change the data set sizes [1.4].

When all data sets (rows) are reviewed, the message NOW READING REST OF DATA appears. Then you are returned to the main menu.

If the answer is N (data sets are columns), you are asked if the data group names are in the first column (Y/N). If you answer Y, then the first column is read in a data group names, If you answer N, then you must key the data group names.

[2] DISPLAY CHART

When this option is chosen CHARTPAK-64 will draw the chart according the the chart specifications previously selected. After the chart is drawn, you may use the F5 key to return to the Main Menu. The F7 key allows you to review the chart screen at any time.

[3] DEFINE CHART MENU

Options:

3.1 **CHART TYPE**
There are 7 types of charts:

P	PIE CHART
HB	HORIZONTAL BARS
HG	HORIZONTAL GRAPH
VB	VERTICAL BARS
VG	VERTICAL GRAPH
X	X-Y PLOT
C	COMPARISON PLOT

The pie chart displays only one one-dimensional data set at a time.

The X-Y PLOT displays only two-dimensional data.

All other types work with one-dimensional data sets.

This menu also appears automatically when you display a chart [2] and no chart type has been selected.

After selecting a chart type, you are asked ALTER DISPLAY SEQ? (Y/N). Normally data set 1 is shown first, data set 2 second, etc. and all data sets in memory are shown on a chart. This option lets you choose the data sets to be shown and the sequence in which they are to be shown.

If you type N, then you are returned to the main menu.

If you type Y, then CHARTPAK-64 shows you the current selected data sets and their names and then the list of all data sets and names. You are then asked to enter the numbers of the data sets you want to appear on the chart and the sequence in which you want to see them. Type the data set number and <RETURN> for each dat set you want to display. When you have entered all of the data set number you want to display, type a 0 and <RETURN>. Then the new selected list is shown and the prompt OK (Y/N). If the list is correct, key Y and <RETURN> and you are returned to the main menu. If not, key N and <RETURN> and you can redo the selection process.

For a chart type C (comparison), data set selection is required, as you must select the two data sets to be compared. The first data set is

shown in the horizontal direction and the second in the vertical direction.

3.2 **CHART SHAPE**
This option does not appear on the DEFINE CHART menu for a PIE chart type.

The menu has three options:

3.2.1 **INDEPENDENT AXIS INFO**
LEGEND - This is the name to be displayed along this axis. Key in the name of the legend desired and press <RETURN>.

NORMAL (0) OR LOG (1) SCALE - This option allows either a normal or a logarithmic scale on this axis. Note that all values must be greater than 0 for log scale to work. Key in a 0 or 1 and press <RETURN>.

MIN VALUE - This is the smallest value along the axis. This value defaults to the smallest data value after keying [1.1] or file reading [1.9]. Key in the desired value and press <RETURN>.

MAX VALUE - This is the highest number along the axis. This value defaults to the largest data value after keying [1.1] or file reading [1.9]. Key in the desired value and press <RETURN>.

NUMBER OF DIVISIONS - This is the number of reference lines and values (in addition to the minimum line) along the axis. Normally you adjust the minimum, maximum and number of divisions to get even values long the axis. Key in the desired value and press <RETURN>.

GRP NAMES -> (0) or V (1) - This option lets you control whether the group names are shown horizontally (0) or vertically (1) along the axis. Key in 0 for horizontal names or 1 for vertical names and press <RETURN>.

COLOR - This option lets you select a color for the axis, legend, group names and scale lines. Key in the number of the color desired and press <RETURN>.

You are then returned to the main menu.

3.2.2 **DEPENDENT AXIS INFO**
LEGEND - This is the name to be shown along this axis. Key in the name of the legend desired and press <RETURN>.

NORMAL (0) OR LOG (1) SCALE - This options allows either normal or logarithmic scale on this axis. Note that all values must be greater than 0 for log scale to work. Key in 0 or 1 and press <RETURN>.

MIN VALUE - This is the smallest value along the axis. This value defaults to the smallest value after keying [1.1] or file reading [1.9]. Key in the desired value and press <RETURN>.

MAX VALUE - This is the largest value along the axis. This value defaults to the largest value after keying [1.1] or file reading [1.9]. Key in the desired value and press <RETURN>.

BASE VALUE - This is the number to be used as the bottom or starting point of bars on bar charts. Normally this is equal to the minimum. However, in the case of a variance bar chart, where the values can be both positive and negative, set the maximum to the largest positive number, the minimum to the largest negative number and then the base value to 0. This draws the bars going both up and down.

NUMBER OF DIVISION - This is the number of reference lines and values (in addition to the minimum line) along the axis. Normally you adjust the minimum, maximum and number of divisions to get even values along the axis. Key in the desired value and press <RETURN>.

COLOR - This option lets you select the color for the axis, legend, group names and scale lines. Key in the number of the color desired and press <RETURN>.

You are then returned to the main menu.

3.2.3 **SELECT GRAPH RECTANGLE**

This option lets you adjust the shape of the chart by moving the two diagonal corners with the cursor control keys. When this option is selected, the graphics screen (displaying the last chart drawn) is shown with a flashing cursor in the lower left corner. Use the cursor control keys tomove the corner where you want it to appear and then press <RETURN>. Then the flashing cursor appears in the upper right corner. Again, move the cursor with the cursor control keys and then press <RETURN>. You are then returned to the main menu.

3.3 CHART OPTIONS & COLORS MENU

Only some of these options appear, depending on the type of chart selected.

3.3.1 SELECT LINE CHARTING OPTIONS

This process repeats for each data set:

PLOTTING SYMBOL - The default for each plotting symbol is the data set number. You may change to any letter (or two letters) or graphic symbol. Key in the desired symbol and press <RETURN>.

LINE TYPE - There are three choices:
- S - solid line (default)
- D - dashed line
- N - no line

Key in the desired choice and press <RETURN>.

LINE COLOR - The default line color is white (2). Key in the number of the color desired and press <RETURN>.

When all line are reviewed, you are returned to the main menu.

3.3.2 SELECT SCREEN COLORS

This option lets you select:

SCREEN COLOR - This is the background color of your chart. Key in the number of the color desired and press <RETURN>.

BORDER COLOR - This is the border color surrouding the background color. Key in the number of the color desired and press <RETURN>.

CHAR SET (1-4) - This lets you change the character set to upper and lower case (3) or the reversed normal characters (2) or reversed upper and lower (4). You may have to shift the screen toread options 3 & 4 on the entry screens. Do this by pressing both the shift and C= keys at the same time.

You are then returned to the main menu.

See APPENDIX C for color numbers.

3.3.3 BAR CHART OPTIONS

BAR GROUPINGS - There are three ways to show the data sets in bar chart form.

The first is MIXED, where all of the data from all data sets for the first data grouping is shown, then all data for the second data

grouping, etc.
The second is GROUPED, where all of data set 1 data is shown first, then all of data set 2 is shown next, etc.

The third is STACKED, where data set 1 data is shown first, then data sets 2 data is stacked on top of data set 1, etc.

Enter M, G or S and press <RETURN>.

CHARTPAK-64 computes the minimum and maximum values after the data is entered, assuming normal bar charting is used. Therefore when you select stacking, the maximum value of the dependent axis needs to be increased to handle the sum of the data values.

You also must enter:

BAR WIDTH - This is the width of each bar on the screen in pixels. Enter the desired bar width and press <RETURN>.

SPACE BETWEEN BARS - This is the number of pixels left between each bar. Enter the desired number of pixels and press <RETURN>.

BAR FILLING OPTIONS - There are 24 ways to fill a bar. Select one of the following for each data set:

1 NONE - the bar is not filled in
2 VERTICAL LINES - the bar is filled with vertical lines
3 HORIZONTAL LINES - the bar is filled with horizontal lines
4 CROSSHATCH - the bar is filled with both vertical and horizontal lines.
5 LEFT DIAG BARS - the bar is filled with diagonal bars going down from left to right
6 RIGHT DIAG BARS - the bar is filled with diagonal bars going up from left to right
7 DIAG CROSSHATCH - the bar is filled with both diagonal bars creating a diagonal crosshatch
8 DOTS - the bar is filled with dots

The first 4 options fill bars much faster than the others. Bars may be filled with colors. Simply enter the color number + 100 (101 = black, 102 = white, etc.).

There are two cautions. First because of the way the Commodore 64 high resolution mode works, there may be color bleeding into adjacent bars or

points unless there is a lot of room around each bar. Second, colors give no difference on a printout, so all bars look alike on paper.

The last prompt asks for the bar drawing color. This is useful with the bar filling options to give color on the screen and still have a difference on the printout. Enter the color number (1-16). See APPENDIX C.

You are then returned to the main menu.

3.3.4 **PIE CHART SEGMENT SEPARATION**
The separation of each section of the pie chart from the center of the circle is specified. This may be reduced from the default value, at the risk of some color bleeding.

3.4.1 **CHART TITLE**
The first prompt asks you for the title of the chart. Key the title (which may be 40 characters long) and <RETURN>.

Next the graphic screen (displaying the last chart drawn) is shown with a flashing cursor in the last title position (normally the upper left corner. Use the cursor control keys to move the flashing cursor to the desired position and then <RETURN>.

Next you are asked for the color number of the title. Key in the number of the color desired and press <RETURN>.

You are then returned to the main menu.

3.4.2 **DATA SET LEGEND POSITIONS**
This option displays the graphic screen and shows a flashing cursor at the last position of the data set legend (normally upper left corner). Use the cursor control keys to move the flashing cursor to desired position and then press <RETURN>.

3.5 **CHART LINES**
You may add up to three "help" lines to the chart. They may represent any data values, such as the minimum, maximum and average of a salary scale for a job.

In the one-dimensional case, the lines are drawn across the chart. Normally both ends are the same values, although you can make them different.

In the two-dimensional case, you must give the x

and y values of the end points of each line.

LINE NUMBER
Enter the number of the line you wish to describe (1-3) and then <RETURN>.

VALUES
< and up-arrow END. This is the value (or x & y coordinates) of the left end of the line in the vertical graph or bar case, or the upper end in the horizontal or bar graph case. Key in the value desired and press <RETURN>.

>V END. This is the value of the right or lower end of the line. Key in the value desired and press <RETURN>.

(S)OLID or (D)ASHED - Key S for a solid line or D for a dashed line and press <RETURN>.

COLOR - Key the color number of the line and then <RETURN>.

3.8 **DISPLAY DIRECTORY**
The prompts and their meanings are the same as the DISPLAY DIRECTORY screen [1.8].

3.9 **READ CHART SPECS FILE**
This option allows you to read a chart specification file. The first prompt is for the disk drive device number. Enter the device number and press <RETURN>.

Next you are prompted for the filename of the specification file. If you previously used the DISPLAY DIRECTORY function, the name you selected is automatically shown here. You may press <RETURN> to accept that filename. Otherwise enter a new filename and press <RETURN>. After the specification file is read, you are returned to the main menu.

[4] SAVE CHART MENU

4.1 **SAVE DATA**

All of the data sets in the computer are saved to disk. If you want to select only certain data sets to load, this is done when reading them into the computer [1.9].

The first prompt is for the disk drive device number. Enter the device number and press <RETURN>.

The second prompt is for the filename. The filename must not have ".S" or "!" as the first haracter. Enter the filename and press <RETURN>.

CHARTPAK-64 saves the data file to disk. If a file with the same name already exists, you see the prompt REPLACE? (Y/N). If you press Y, the data from memory overwrites the old file on the disk. If you press any other key (including <RETURN>), you are returned to the start of this menu.

4.2 **SAVE CHART SPECS FILE**

All of the chart specifications in the computer are saved to disk.

The first prompt is for the disk drive device number. Enter the device number and press <RETURN>.

The second prompt is for the filename. Enter the filename and press <RETURN>.

CHARTPAK-64 saves all of the specs to disk. If a file with the same name already exists on the disk, you see the prompt REPLACE? (Y/N). If you press Y, the specs from memory overwrite the old file on the disk. If you press any other key (including <RETURN>), you are returned to the start of the menu again.

4.8 **DISPLAY DIRECTORY**

The prompts and their meaning are the same as the DISPLAY DIRECTORY screen [1.8].

[5] FILE COMMAND MENU

5.1 **DELETE DATA FILE**
This option removes the specified data file from the disk.

The first prompt is for the disk drive device number. Enter the device number and press <RETURN>.

The second prompt is for the filename to be deleted. Enter the filename and press <RETURN>.

5.2 **DELETE SPECIFICATION FILE**
This option removes a specification file from disk.

The first prompt is for the disk drive device number. Enter the device number and <RETURN>.

The second prompt is for the filename to be deleted. Enter the filename and <RETURN>.

5.3 **DELETE BUSICALC FILE**
This option removes a BUSICALC file from disk.

The first prompt is for the disk drive device number. Enter the device number and press <RETURN>.

The second prompt is for the filename to be deleted. Enter the filename and <RETURN>.

5.4 **RENAME FILE**
This option allows you to rename a file on disk (perhaps to avoid a conflict with another filename).

The first prompt is for the disk drive device number. Enter the device number and <RETURN>.

The second prompt asks you to specify the new name, followed by an "=" and then the name of the file to be copied and press <RETURN>.

5.6 **NEW DISKETTE**
This option initializes a diskette. Be aware that **all data on the diskette is destroyed** by this option.

The first prompt is for the disk drive device number. Enter the device number and press <RETURN>.

The second prompt asks you for a diskette name. You may enter up to 16 characters and press <RETURN>.
The third prompt asks you for a diskette identifier. Enter a number between 0 and 255 and press <RETURN>.

5.8 **DISPLAY DIRECTORY**
The prompts and their meaning are the same as the DISPLAY DIRRECTORY screen [1.8].

[6] PRINT CHART

This option reproduces your chart onto an attached printer.

6 **PRINT CHART**
Enter the printer device number to be used to print the chart. The default is device 4. Printing takes about 1.5 minutes on an EPSON FX-80 and about 4.5 minutes on a CBM-1525. After printing is completed, you are returned to the main menu.

See APPENDIX A for information about printer support.

see ADDENDUM for small chart/large chart option

[7] SAVE/RESTORE GRAPH SCREEN

7 **CHART SCREEN SAVE/RESTORE**
This option instructs you to use the F2 and F4 * keys to save or restore the chart. Note the F2 key is a SHIFTed F1 key and F4 is a SHIFTed F3). The computer will respond with:

```
SAVE SCREEN
"FILENAME"[,DEV]
```

Key the filename in quotation marks. If the disk drive device is 8, you do not have to key anthing after the second quoation mark. If another device is used, key a comma followed by the device number (e.g. **"SAMPLESCREEN",8**).

After the screen is saved or loaded, press F5 to return to the control screen. To resume CHARTPAK-64, put the cursor on the line with **GOTO5** and press <RETURN>.

Loading a screen follows the same pattern.

* See ADDENDUM for use of 1, 2, 8 keys instead of fn keys.

[8] EXIT TO BASIC

8 **EXIT TO BASIC**
This option resets the computer for normal BASIC operation. Before the resetting process starts, you are asked "ARE YOU SURE? (Y/N)". Press the "Y" key to do the reset. Pressing any other key returns you to the Main Menu.

DEMONSTRATION CHARTS

Now you have mastered the basics of chartmaking with your '64! To show some of the other features of this powerful package, there are a series of data file and chart specifications included on the distribution diskette. To see these, simply follow these instructions:

If CHARTPAK-64 is not in the computer, load and run it.

Go to screen [1/8] and select data files (1). Select data file name **DATA.1** (2) and press <RETURN>. Then press <RETURN> two more times and the disk drive should start reading. You are prompted for data set selection. Press **Y/<RETURN>/Y/<RETURN>/Y/<RETURN>** and **Y** to read in all of the data sets and data group names.

You should be returned to the main menu. Go to screen [3/8] to read in the spec file. After the disk drive device default, select spec files (2) and <RETURN>. Select **.SDATA.1A** (1) and read it into CHARTPAK-64.

When the main menu reappears, go the screen [2]. This is a 12 month bar chart of three sales regions. Note the three different types of bar filling and that these are mixed bars (M).

The next several examples all use the same data sets, as you can display a group of data sets many different ways.

Go to screen [3/9] (from now on we will key the filenames directly and always default the device number) and change the A in **.SDATA.1A** to a B (to read in **.SDATA.1B**). Then display it. Note that this is similar, only uses the grouping (G) bar option. The rainbow in the left group is not intentional, it is due to the TV system with high density vertical lines.

Now go to screen [3.9] and select **.SDATA.1C** spec file and display it. This is an example of stacked bars. Note that the bars asre wide and easier to read, and the top shows the total sales of the three combined.

Go to screen [3.9] and read in **.SDATA.1D.** Again this is the same data, only shown in a vertical graph format.

Go to screen [3.9] and read in **.SDATA.1E.** This is a horizontal graph of the data. Note how the top is lowered, and the bottom of the scale is 20, not 0.

One of the fatures of CHARTPAK-64 is the ability to plot using logarithmic scales. Log scales are used to find constant RATES of change, because they show up as straight line on a log chart. Go to screen [3.9] and read in

.SDATA.1EL and display it. Note how the dependent (value) scale is compressed at the right side?

Go to screen [3.9] and read in **.SDATA.1F** and display it. This is an example of stacked horizontal bars. It uses diagonal filling and dots. Note also that the right side is moved in slightly to show all ofthe top value (250).

If you have a printer attached to your computer, try printing some of these pictures. The resolution of the printer is higher than most TV sets.

To clear all of the data sets, go through screen [1/4]. Use default sizes - 4 data sets and 50 points. Go to screen [1/9] and after the device default, type **DATA.2** as the filename. Accept all data sets and group names. Then go to screen [3/9] and read in **DATA.2A** and display. Since this is a pie chart, you are first asked to select a data set to display. Select 1 and then you are asked for colors, press <RETURN> to accept the saved values.

Again reset the data sets by going to screen [1/4].

Read in data file **DATA.3** and spec file **DATA.3A.** This is a vertical graph comparison of actual data versus budget for a fiscal year.

Reset the data sets [1/4] and read in data file **DATA.4** and spec **DATA.4A.** This is an example of using color, although you will notice it is impossible to keep it from bleeding into the horizontal lines (due to the '64 hires design). This is a Mixed bar chart.

Go to scren [3/9] and read in spec file **DATA.4b** and display. This is the same data and chart, except for the Grouped sequence instead of Mixed sequence.

Reset CHARTPAK-64 using screen [1/4] and read in data file **DATA.5** and spec file **DATA.5A.** This is a wage scale comparison, and includes three lines, a solid one for the mid-range ($23500), and dashed lines at the edges of the range.

Go to screen [3/9] and read in **DATA.5AL** and see the same data on a log scale.

The next example requires changing the data set size to 1 X 108. Simply go to screen [1/4] and enter 1 for the number of data sets, and 108 for the maximum number of points. Go to screen [1/9] and read in **DATA.6** and spec file **DATA.6** . Note that the bottom of the chart has been moved up, the bar width is 1 and the bar spacing is 0.

A BUSICALC example is included. Start by resetting the data sets using screen [1/4], but key 4 for the number of data sets and 50 for the number of points. All BUSICALC data files have a ! as the first character of the filename. Look at the printout of the BUSICALC worksheet. It is arranged in rows and columns. The data sets we want to read and chart are: sales, gross profit, total expenses and net profit by quarter. The leftmost column can be read by CHARTPAK-64 as the data set names. The column heading may be read as data grouping names. Both of these options and the selection of whichrows to read in as data sets (and which data sets to put them into) are controlled during the file reading. Also, we can ignore any number of columns on the right side if we wish.

Here's how it is done:

After selecting [1/9] and keying in **!BUSDATA** and pressing <RETURN>, the first prompt is ARE DATA SETS ROWS (Y/N). Answer Y. The next prompt is DATA GRP NAMES FROM 1ST ROW (Y/N). Answer Y. Next you are asked how many columns to use (do not include the data set name column). Since we want to ignore the total column, answer 4 (the prompt shows how many are available). Then CHARTPAK-64 shows the row number and the data set name (if you select it). Since row four (the first one saved in our example) is blank in the first column, nothing shows on the screen. Press N to bypass this. Row 5 is also blank, press N. Row 6 is sales, and we want this data so press Y. The next prompt is for the data set, press 1 and <RETURN>.

Press N to bypasss rows 7 and 8. Accept row 9 and put it into data set 2. In the same way select rows 16 and 18 and put them into data sets 3 and 4 respectively. Press N a few more times to go through all of the rows on the worksheet. The message NOW READING REST OF DATA will appear for 10 seconds or so. Now read spec file BUSDATA and display the chart. Note how the base value is 0.

See BUSICALC sample in APPENDIX F.

The final examples are X-Y charts is taken from a high school chemistry lab. The experiement is to measure the solubility (amount of a substance which can be dissolved) of three compounds at various temperatures of the solution. The three compounds are Ammonium Chloride, Sodium Nitrate and Potassium Nitrate. There are four data points for each compound. The temperature of the solution is the X-value and the number of grams which can be dissolved in 10 milliliters is the Y-value.

Go to screen [1/4] and use the two defaults for number of data sets and data items. Then go to screen [1/9] and read the data file **"SOL-CURVE"**. Respond **Y** and <RETURN> to the

data set name and number prompts for the three compounds and Y to the data grouping names. Don't worry about the 'funny' characters in the names.

Next go to screen [3.9] and read the chart specifications. The filename is also "**SOL-CURVE**". Display the chart on screen [2]. Note that the a "help" line (entered on screen [3.5]) was used to extend the line for Potassium Nitrate (P line) down into the lower corner. Note also that this chart uses the upper/lower case features of CHARTPAK-64. The normal character set is "1" which displays upper case and graphics. Character set "3" gives upper/lower case. When using these you must switch the normal screen displays to upper/lower case (press the SHIFT and C= keys at the same time) in order to see the legends, etc. as you enter or alter them.

Look at the charts and notice how all of the curves seem to have a slight bend in them, bending up towards the right. This is ususally the case when a relationship has a constant RATE of increase. To see if this is true, we changed the dependent axis to a log scale. To see the resulting chart, go to screen [3/9] and load "**SOL-CURVEL**". Then display the chart using screen [2]. Note also how the data set legends are moved to a free space on the chart.

See APPENDIX G for sample charts.

APPENDIX A

PRINTER / INTERFACE SUPPORT

CHARTPAK-64 support the Commodore 1515 and 1525E printers if they are connected directly to the Commodore 64 or 1541 disk drive. To support these printers you should load and run **CPCBM** at startup.

CHARTPAK-64 also supports the Epson MX-80 and MX-100 with Graftrax, the EPSON FX-80, and the GEMINI-10 and 15. To support these printers you must connect the printer to the Commodore 64 or 1541 disk drive with one of the following parallel printer interfaces:

MANUFACTURER	MODEL	SECONDARY ADDR	TRANSLATE	SWITCHES ON
CARDCO	CARD?	5	N	
ECX, INC.	C-6401	0	N	*
MICPOWORLD ELECTRONIX	MW-302	0	Y	3,4
		0	N	3
MSD INC.	CPI	0	N	1,3,5

* requires that the three position switch is set completely on.

You should load and run **CPEPS** at startup. The **SECONDARY ADDRESS** and **ASCII TRANSLATE?** prompts should be answered as per the above table.

APPENDIX B

ERROR MESSAGES

ARS TOO WIDE - occurs when the width of the bars and spaces between the bars exceeds the display area. When this occurs, press <RETURN> and then go to screen [3/3/3] to change the bar width and/or space between the bars.

DISKETTE ERRORS - occur during diskette operations. The error number, message, track and sector are shown. The only message not shown is number 63 FILE EXISTS. When this occurs, it is handled by asking you if you want to replace the file or not.

GREATER THAN MAX-RESIZE - occurs when trying to put a data item into the computer which exceeds the size of the arrays set up. If the data must be read in, go to screen [1/4] to adjust the size of the data set, but beware that all of the data in memory is erased during the resizing.

TOO LONG-REINPUT - occurs when the length of a data group name exceeds 9 characters. Simply abbreviate the name and re-enter.

ERROR-NO 2-DIM PIE occurs when attempting to display a pie chart and the data is two-dimensional. Either select a differnt chart type (X) or use the global data specs on screen [1.5] to change the data to one-dimensional.

OUTSIDE RANGE - occurs when the base value selected on screen [3/2/2] is outside of the minimum-maximum range at the time. Enter a number within the range.

OUT OF RANGE - occurs when selecting a data set outside of the range of number currently in the computer.

INCREASE DATA SET SIZE TO nn - occurs when reading data sets from diskette which have more points than setup in the computer. The data set size may be change on screen [1.4], but all data in the computer is erased.

OTHER BASIC ERRORS - Should you encounter any BASIC errors when using CHARTPAK-64, you can recover without losing any data by typing **GOTO5** and pressing <RETURN>.

APPENDIX C

COLOR NUMBER TABLE

COLOR NUMBER	COLOR
1	BLACK
2	WHITE
3	RED
4	CYAN
5	PURPLE
6	GREEN
7	BLUE
8	YELLOW
9	ORANGE
10	BROWN
11	LIGHT RED
12	DARK GRAY
13	MEDIUM GRAY
14	LIGHT GREEN
15	LIGHT BLUE
16	LIGHT GRAY

APPENDIX D

CHARTPAK-64 FILE FORMAT

DATA FILES
Data files written and read by CHARTPAK-64 are standard Commodore sequential files. The data is in the following sequence:

(N = NUMERIC DATA, $ = STRING DATA IN QUOTES)

N	1	the number of data sets in the file
N	2	the maximum number of points in any data set

For each data set:

N	1	the number of points in the data set
$	2	the data set name (in quotes)
N	3	the x/y pairs of data values (for one-dim data the y values are 0).

After the last data set:

$	1	the data group names (in quotes)

BUSICALC FILES
Although CHARTPAK-64 cannot create BUSICALC files, it can read them. BUSICALC files have an ! as the first position of the filename on dis. The file is organized as follows:

N	1	column number of the upper left cell in the file
N	2	row number of the upper left cell in the file
N	3	column number of the lower right cell in the file
N	4	row number of the lower right cell in the file
N	5	the column width
N	6-n	the data values from the cells in column by column sequence

BUSICALC is a product of SKYLES ELECTRIC WORKS

ACHARTPAK-64 SPECIFICATION FILES
CHARTPAK-64 specification files are standard COMMODORE sequential files. The diskette filename has **".S"** as the first two characters.

N	1	background screen color number
N	2	border color number
N	3	independent axis number of divisions

N	4	dependent axis number of divisions
N	5	x-position of lower left graph rectangle
N	6	y-position of lower left graph rectangle
N	7	independent axis color number
N	8	dependent axis color number
N	9	character set code (1-4)
N	10	printer device number
N	11	bar width
N	12	bar spacing
N	13	chart title x-coordinate
N	14	chart title y-coordinate
N	15	chart title color number
N	16	auto increment starting number
N	17	auto increment increment
N	18	group code selection
N	19	starting number
N	20	number of active data sets
N	21	max. number of points in all data sets
N	22	min x-value (ind. axis)
N	23	min y-value (dep. axis)
N	24	max x-value (ind. axis)
N	25	max y-value (dep. axis)
N	26	number of data sets to be selected for display
N	27	pie chart segment separation
N	28	data set legend x-coordinate
N	29	data set legend y-coordinate
N	30	x-position of upper right graph rectangle
N	31	y-position of upper right graph rectangle
N	32	group name switch 0=horiz,1=vertical
N	33	bar chart base value
N	34	log switch-independent axis(0=norm,1=log)
N	35	log switch-dependent axis(0=norm,1=log)
$	36	chart type
$	37	dependent axis legend
$	38	independent axis legend
$	39	bar grouping (M,G or S)
$	40	chart title
$	41	two dimension (Y/N)
$	42	automatic numbering(Y or N or null)

For each active data set:

$	43	line type (S,D or N)
$	44	not used
$	45	plotting character
N	46	line color number
N	47	bar filling number

For the maximum number of data points:

$	48	data group names

For the three possible "help" lines:

$	49	line type (S,D, or null)

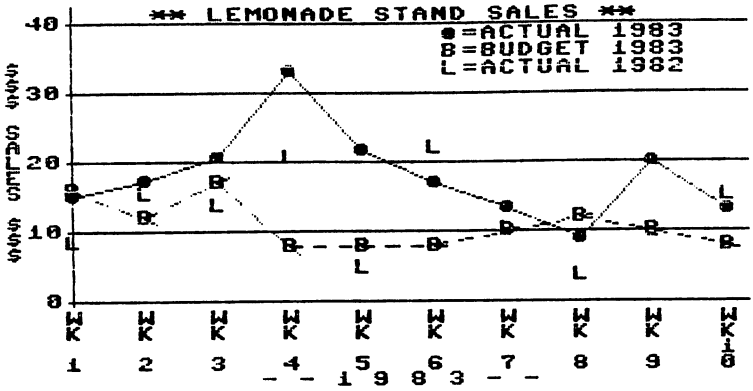
N	50	line color number
N	51	end point x-value
N	52	end point y-value
N	53	other end point x-value
N	54	other end point y-value

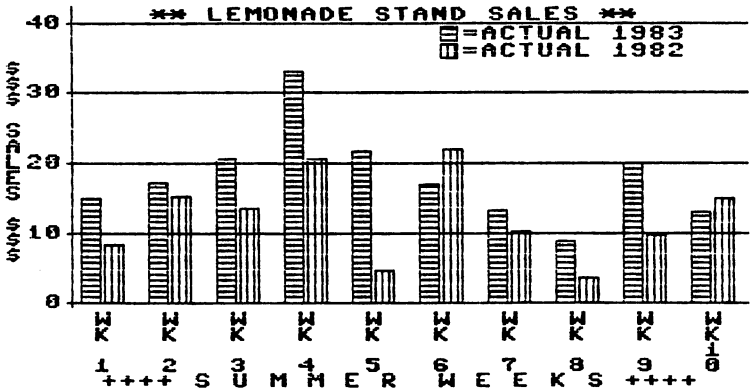
For the maximum number of data sets

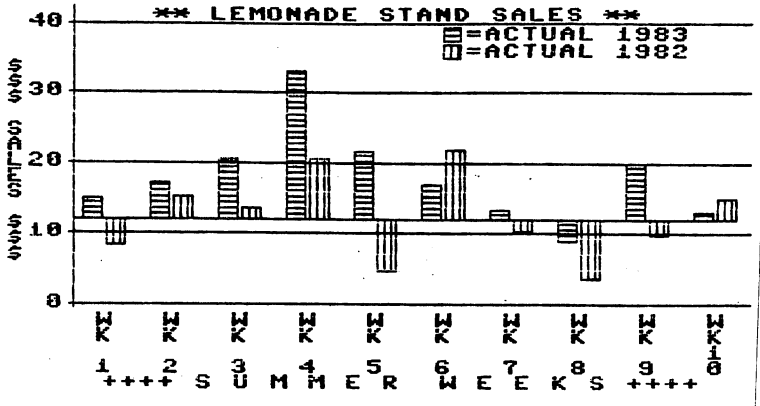
N	55	data set numbers in display sequence

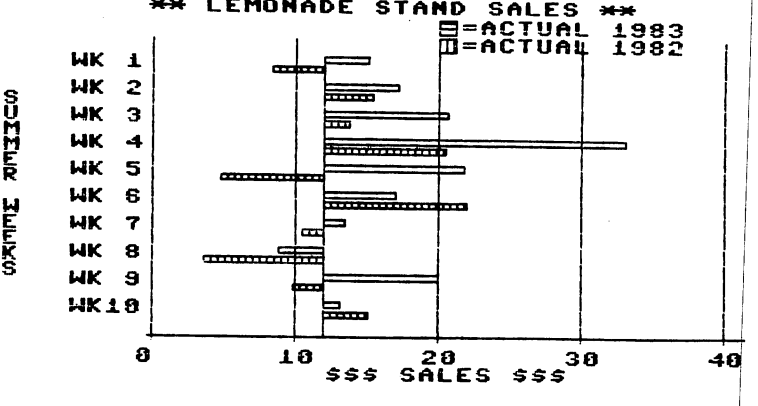
APPENDIX E

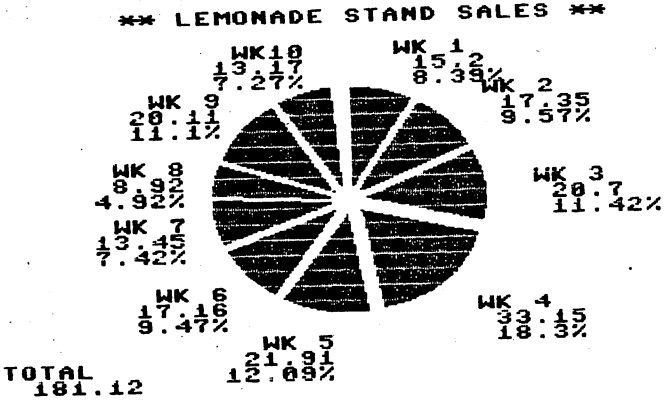
SAMPLE LEMONADE STAND CHARTS






** LEMONADE STAND SALES **
=ACTUAL 1983
=ACTUAL 1982
$$$ SALES $$$
40
30
20
10
0
WK 1
WK 2
WK 3
WK 4
WK 5
WK 6
WK 7
WK 8
WK 9
WK10
++++ SUMMER WEEKS ++++

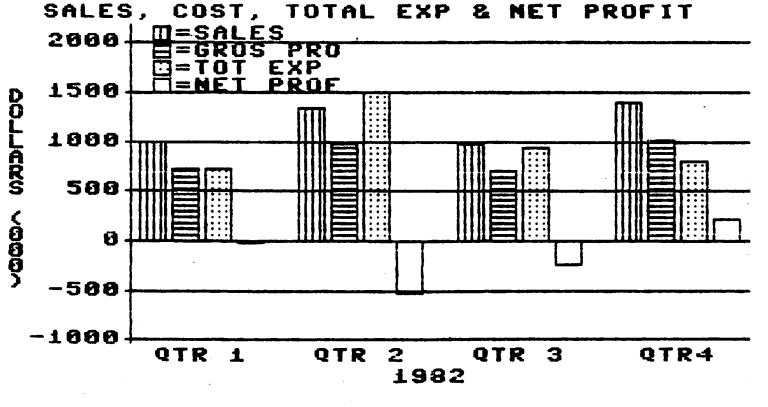

** LEMONADE STAND SALES **
=ACTUAL 1983
=ACTUAL 1982
WEEKS SUMMER
WK 1
WK 2
WK 3
WK 4
WK 5
WK 6
WK 7
WK 8
WK 9
WK10
0
10
20
30
40
$$$ SALES $$$


** LEMONADE STAND SALES **
WK 1
15.2
8.39%
WK 2
17.35
9.57%
WK 3
20.7
11.42%
WK 4
33.15
18.3%
WK 5
21.91
12.09%
WK 6
17.16
9.47%
WK 7
13.45
7.42%
WK 8
8.92
4.92%
WK 9
20.11
11.1%
WK10
13.17
7.27%
TOTAL
181.12

APPENDIX F

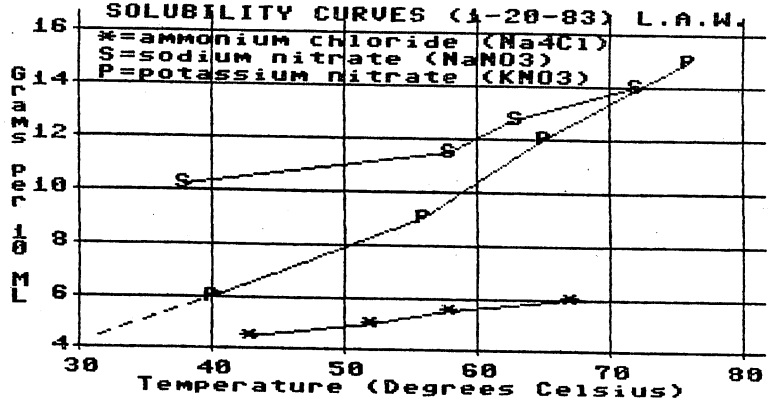
SAMPLE BUSICALC CHARTS AND DATA

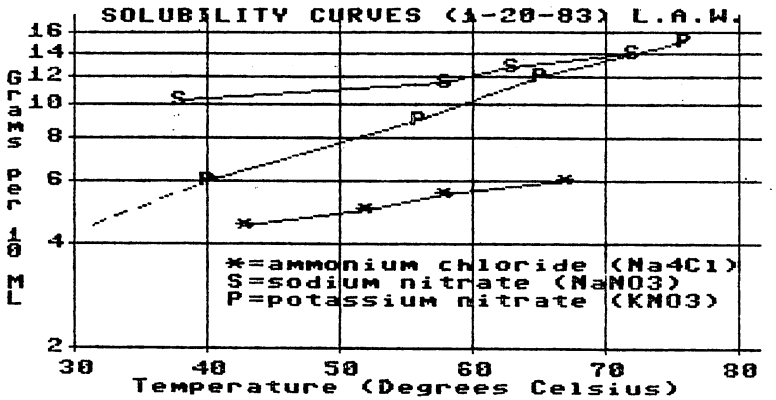
	QTR 1	QTR 2	QTR 3	QTR4	TOTAL YR
SALES	1000	1345	981	1409	4735
COST	280	377	275	395	1327
					0
GROS PRO	720	968	706	1014	3408
					0
SELL EXP	302	300	271	320	1193
ADV EXP	0	700	100	5	805
SAL	400	405	410	415	1630
TRAVEL	26	89	150	64	329
					0
TOT EXP	728	1494	931	804	3957
					0
NET PROF	-8	-526	-225	210	-549



APPENDIX G

SAMPLE CHEMISTRY CHARTS





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