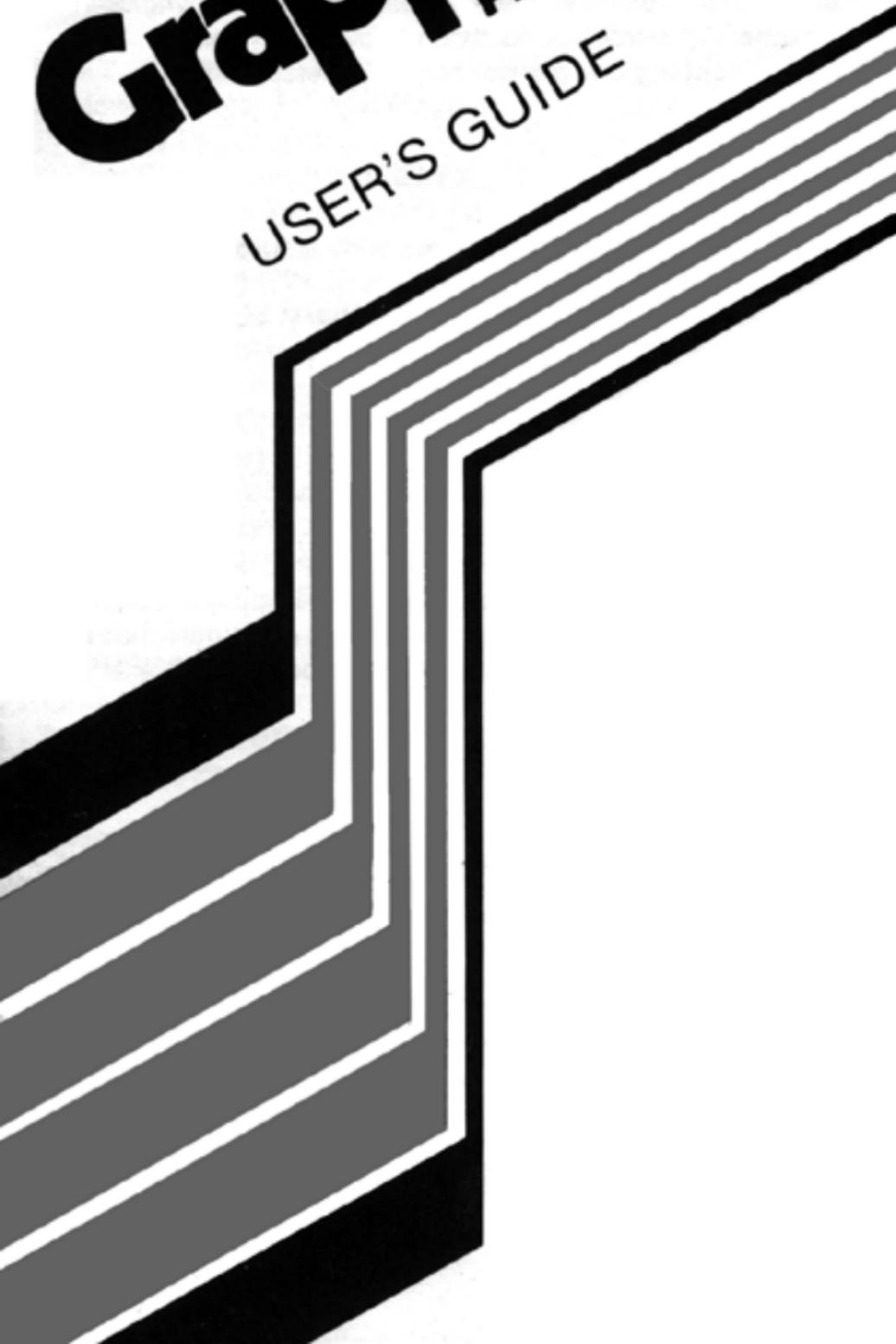




Grapppler[®] +

Printer Interface

USER'S GUIDE



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Need a problem solved?

See page 20.

GRAPPLER. USER'S GUIDE

| | |
|---|----|
| HOW THIS USER'S GUIDE WORKS FOR YOU | |
| INSTALLATION | 2 |
| Testing with Applesoft | 5 |
| Testing with CP/M | 5 |
| HOW TO OPERATE THE GRAPPLER+ | 6 |
| What will the GRAPPLER+ do? | 6 |
| How does the GRAPPLER+ work? | 6 |
| Turning the GRAPPLER+ "on" and "off" | 6 |
| The Keyboard Command | 7 |
| The Print Statement Command | 7 |
| TEXT COMMANDS | 8 |
| How to Format a Printed Page | 8 |
| Normal Text Values | 9 |
| Text Screen Dump and Example | 10 |
| Special Notes for the Apple IIe | 10 |
| Text Commands Chart | 11 |
| GRAPHICS COMMANDS | 14 |
| Adding and Stringing Commands Together | 14 |
| What we mean by HI-RES Pages 1 and 2 | 14 |
| How to do a Graphics Screen Dump While Running A Program | 15 |
| How to Print a Picture Saved to Disk | 15 |
| How to Print Both HI-RES Pages 1 and 2, Side by Side | 16 |
| Graphics Commands Chart | 16 |
| TRANSPARENT MODE | 19 |
| TROUBLESHOOTING | 20 |
| Use with Popular Software | 20 |
| APPENDIX A:Pascal and CP/M Compatibility | 22 |
| APPENDIX B:Graphics Programs | 23 |
| APPENDIX C:Memory Locations & Custom Drivers | 25 |
| APPENDIX D:Routines for Advanced Programmers | 25 |
| APPENDIX E:Use with LOGO | 27 |
| APPENDIX F:Chart Recorder Mode | 28 |
| APPENDIX G:Pin Assignments. Power Consumption | 28 |
| APPENDIX H:Radio Frequency interference | 29 |
| APPENDIX I: Appleworks with the GRAPPLER+ | 30 |
| LIMITED WARRANTY | 32 |

HOW THIS USER'S GUIDE WORKS FOR YOU

Over the years, the GRAPPLER has served many thousands of satisfied Apple customers with its revolutionary text and graphics printing choices. This user's guide covers one of the most prominent members of the product line, the GRAPPLER+.

The aim of this user's guide is twofold: to help you understand the product's operation and to help you overcome any printing problems that may arise. Take a moment to glance over the special section entitled "Troubleshooting" which has been created for answering both hardware and software problems (see pages 20-21).

Closely related to the "Troubleshooting" section is a GRAPPLER+ feature known as the "transparent mode" (see page 19). In those cases when a software program uses the same commands as the GRAPPLER+, the transparent mode can provide an effective temporary by-pass to allow the program to operate.

Be sure to refer to the user's guide as often as necessary to help solve any problems that may arise. Therein lies the best means of keeping your Apple and GRAPPLER+ working smoothly together.

Special Note on the Apple II+

The GRAPPLER+ is designed to be installed in the Apple IIe and the Apple II+. You should be aware that this user's guide is written primarily for the Apple IIe with footnotes and special instructions added whenever the Apple II+ might differ.

INSTALLATION

The installation of the GRAPPLER+ is quick and easy. The only tool required is a screwdriver.

1. TURN OFF THE POWER TO YOUR APPLE AND UNPLUG ALL POWER CONNECTIONS.

2. Notice the grouping of four small switches located on the GRAPPLER+ itself. These switches are labeled 1,2,3,4 and together form what is called the "DIP switch". The GRAPPLER+ DIP switch must be set according to your printer type.

Consult the following chart to find your printer. Then set each individual switch handle to either ON or OFF. (If your switch is marked OPEN/CLOSED, OPEN=OFF and CLOSED=ON.)

If your printer emulates (Copies the codes and behavior of) any of the printers on the list, use the DIP switch setting listed for the printer emulated.

It your printer is not listed in the DIP switch table, try the Epson Dot Matrix Printers setting. The Epson code set is the most widely used in the printer manufacturing industry. If this fails, contact your printer manufacturer and ask with which major brands your printer is compatible. If your printer is not compatible with any of the printers listed in the following chart, contact your dealer immediately. The GRAPPLER's built-in graphics features may not be available to your printer.

GRAPPLER DIP SWITCH SETTINGS

| DIP SWITCH POSITIONS | 1* | 2 | 3 | 4 |
|--|-----|-----|-----|-----|
| Analex Printers | OFF | ON | OFF | OFF |
| Apple Dot Matrix | OFF | OFF | ON | OFF |
| C.Itoh 8SIOEP | OFF | ON | ON | ON |
| Epson Dot Matrix Printers | OFF | ON | ON | ON |
| Hewlett Packard Think-Jet | OFF | ON | ON | ON |
| NEC 8023, C. Itoh 8510/ProWriter | OFF | ON | ON | OFF |
| Okidata 82A, 83A, 84, 182, 183, 92, 93, 192, 193 (Okidata Version only, not Imagewriter or IBM) | OFF | OFF | ON | ON |
| Okidata 84 w/o step ii Graphics | OFF | OFF | OFF | ON |
| Panasonic KXP-109011 091 | OFF | ON | ON | ON |
| Smith-Corona D-10012001300 | OFF | ON | ON | ON |
| Star Micronics Series | OFF | ON | OFF | ON |
| Letter Quality Printers | OFF | OFF | OFF | OFF |
| Transparent Mode | OFF | OFF | OFF | OFF |

*Switch 1 controls the MSB (Most Significant Bit, or 8th data bit). When this switch is in the ON ('1' position, the MSB is **NOT** transmitted to the printer. When the switch is in the OFF (-) position, the MSB is under software control (see Control-I H and Control-I X under TEXT COMMANDS on page 13).

- After the GRAPPLER DIP switch is set, refer to your **printer** manual. Look up the section on the printer DIP switch. The **printer** DIP switch settings must conform to 7 data bits, no line feed.
- Remove the cover slowly from the Apple by lifting it at the rear edge (the edge farthest from the keyboard) until the two corner fasteners release. At this point, slide the cover backward until it becomes free.
- Looking down into the Apple, you will notice a series of narrow sockets called "slots." These slots are used for expanding your computer by adding disk drives, printers, or other peripherals. Note that for the IIe, slot Ø is below slot 1. For the Apple II+, the slots are in one straight row.

6. Find slot 1, **IT IS RECOMMENDED THAT THE GRAPPLER BE INSTALLED IN SLOT 1**, although it may be installed in any slot (except slot zero). Most programs will look for the GRAPPLER in slot 1, and this user's guide assumes that you have installed it there.
7. At the rear of the Apple will be a series of openings that correspond to the slots. Find the case opening nearest to slot 1. Take the printer cable in hand and route the end with the ground clamp and screw through this opening.
8. Examine both the Grappler Printer port and the printer cable. Recognize that one position on the cable is blocked so that there is only one way that the connector will fit. Attach the printer cable to the Grappler printer port in this manner.
9. Locate the "edge connector on the GRAPPLER: this is the extension on the GRAPPLER that allows it to fit into the Apple. **Double check to see that the power is off.** Grasping the GRAPPLER firmly, insert the edge connector into slot 1 and press down with a gentle rocking motion until the GRAPPLER is seated.
10. Federal Communications Commission regulations require that the printer cable be grounded to the Apple computer. The purpose of the ground clamp is to eliminate computer interference with nearby radio and television reception, within FCC Class B limits.

FOR THE APPLE IIe: Using a screwdriver, loosen the clamp on the cable. (Do not remove screw from clamp.) Slide the clamp up inside the Apple's metal notch so that the screw fits into the notch itself. Now tighten the screw.

The Apple II+ cannot be properly grounded and due to its date of production is exempt from FCC regulations.

- 11 To replace the Apple's cover, slide the front edge into place and then press down on the rear corners until they are firmly seated. Re-connect all power cords.
12. Test the installation by referring to the following sections.

Testing with Applesoft

Insert an Apple DOS diskette into disk drive 1 and close the drive door.

Turn on both the Apple computer and the printer.

With the system prompt (or "J" sign) showing on the computer screen, type:

PR#1

Remember that the GRAPPLER may be in any slot, but this user's guide assumes that it is slot number 1.

Now hit the RETURN key five or six times. Your printer should be printing the prompt character "J" each time you strike the RETURN key. If not, double check each of your installation procedures and glance over these reminders:

1. Is the cable correctly attached between GRAPPLER and printer?
2. Is the printer on?
3. Is the printer "on line," or ready to receive information from the computer?
4. Is there paper in the printer?

Testing with CP/M

If your Apple is set up with a CP/M operating system, insert the CP/M diskette into drive A and close the drive door. **NOTE: If you are using CP/M, the GRAPPLER must be in slot 1.**

Turn on both the Apple computer and the printer.

With the system prompt, or "A>" showing on your computer screen, locate the Control key (marked CTRL on the Apple II+) on the left hand side of the computer keyboard. Press the Control key, hold it down and press the "P" key. Release both.

You have just executed the Control-P command which turns on the GRAPPLER. There will be no visible printer response when the two key combination is pressed. However, anything typed on the screen will now be sent to the printer each time the RETURN key is pressed. For example:

1 Issue a Control-P command as described above.

2. Type the letters DIR after the A> prompt. Press RETURN.

Your CP/M directory should now be printed to the screen as well as to the printer.

To turn off the GRAPPLER, repeat the same Control-P procedure. Press the Control key, hold it down and then press the "P" key. Release both.

HOW TO OPERATE THE GRAPPLER

If this is your first encounter with the GRAPPLER, take a few moments to glance over the basics detailed in this section.

What will the GRAPPLER do?

The GRAPPLER allows you to:

1. Print graphics or text files created with a program on your Apple computer.
2. Give your printer text commands to set up each printed page with margins, line length, page length, line feed, etc.
3. Print graphics, drawings and charts in a number of different ways including rotated, inverse, double-sized and others.
4. Do screen dumps in either graphics or text.

How does the GRAPPLER work?

First, assume that you are using an Apple software program that has its own printing commands. In this instance, you are using the GRAPPLER merely as an "dumb" interface, a medium to transfer information from computer to printer. You do not need to issue any special GRAPPLER commands.

The second way the GRAPPLER works is through a series of special text and graphics commands. These can be issued 1) from the keyboard, or 2) from a print statement within a program. These direct commands are used by you to tell your printer exactly how you want the information printed.

Turning GRAPPLER "on" and "off"

You cannot use the GRAPPLER commands unless you first turn "on" the GRAPPLER. How does this happen?

To turn on the GRAPPLER in Applesoft BASIC, type: PR#1 (and press the RETURN key)

To turn off the GRAPPLER, type: PR#0 (and press the RETURN key). For a Ile with an 80 column screen, see how to enter a Control command as described under "Keyboard Command" and then type: Control-I e.

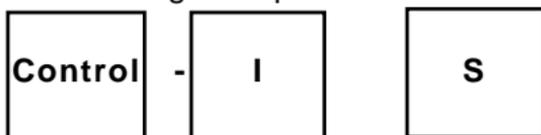
NOTE: With a CP/M operating system, use the Control-P command to turn the GRAPPLER on and off. See "Testing with CP/M" on page 5.

After you turn "on" the GRAPPLER, you may use either a keyboard command or print statement to issue a command.

1. Keyboard Command

After turning the GRAPPLER "on," you can issue a command directly from the keyboard. This is done by pressing a combination of three keys.

See the following example.



First, check to see that your printer is turned on and that it is "on line" or ready to receive information from the computer. Locate the Control key on the left hand side of your keyboard. (For Apple II+, the key is marked CTRL.) Now follow these steps (for Applesoft BASIC, 40 column display only):

1. Type PR#1 to turn "on" the GRAPPLER.
2. Press the Control key and hold it down.
3. Now, press the I key.
4. Release the I key, then release the Control key.
5. Type the S key
6. Finally, type PR#0 to turn "off" the GRAPPLER

If you have an Apple IIe with 80 column display, you would type Control-I e to turn "off" the GRAPPLER, using the same sequence.

Every GRAPPLER Applesoft keyboard command is a combination of the control character (the Control key and the I key) plus any additional character(s) representing the GRAPPLER command. The above command executes a text "screen dump" which transfers the current text information from the screen directly to the printer.

2. Print Statement Command

Another method of issuing a GRAPPLER command is in a print statement. A print statement is one line within a program. For example, see line 20:

```
10 PR#1
20 PRINT CHR$(9);"S"
30 PR#0
```

The same keyboard command (Control-I S) could also be written CHR\$(9);"S". In the Applesoft program shown above, the print statement on line 20 represents the GRAPPLER command to do a screen dump, (For a IIe with 80 column display, use: 30 PRINT CHR\$(9);"e" for line 30,)

Print statements can be written for text or graphics commands. Note that when issuing a command the GRAPPLER is always turned "on" and "off," as shown in lines 10 and 30. If you wish to run the program, type in the three lines, pressing the RETURN key after each line. Once the program is entered, type RUN to execute and press RETURN. The contents of your Apple screen will now be printed on the printer.

In CP/M, the LPRINT command is used to send data to the printer. The LPRINT command itself turns the GRAPPLER "on" and "off," using the Correct codes. Thus, when doing a screen dump with CP/M, you would only type the LPRINT command along with the GRAPPLER command Control-V S. In line 10 below, Control-Y is CHR\$(25); and "5" is CHR\$(83). To do a CP/M screen dump from a print statement, you would type:

```
10 LPRINT CHR$(25);CHR$(83);
```

After typing the three lines, type RUN to execute and press RETURN.

NOTE: Executing GRAPPLER commands in CP/M directly from the keyboard (not a print statement) requires the CP/M Control-P command. See Testing with CP/M on page 5.

TEXT COMMANDS

The GRAPPLER provides valuable tools for printing text. The text commands allow you to format a printed page and do text screen dumps. Both of these features are described in this section.

How to Format a Printed Page

What do we mean by "format a printed page"?

To format a page is to give the printer exact commands as to how you want the text printed. If you don't have a word processor to set the margins, line length, or page length, you can send GRAPPLER commands instead. The GRAPPLER text commands set up your printer to give you the kind of final page layout or design you want.

The most popular use of the text formatting commands is for printing Out a program listing. When your screen will only display 23 lines, it is difficult to look over a program that may be hundreds of lines long. Printing the program on paper is important not only for record keeping, but also from the standpoint of reading the program itself.

The following program, written in Applesoft, provides a practical demonstration of setting the line length, right margin, left margin and page length with text commands. Begin typing at line 10. Do not type the remarks to the left. NOTES: when typing line 80, include two blank spaces between the period and the end quotation marks. For a Ile with 80 columns, use: PRINT I\$;"e" for line 110.

```

GRAPPLER "on"      10 I$=CHR$(9)
Line length        20 PR#1
Right margin       30 PRINT I$"80N"
Page length        40 PRINT I$;"75R"
Left margin        50 PRINT I$;"60P"
                   60 PRINT I$"10L"
                   70 FOR I=1 TO 100
                   80 PRINT "THE QUICK BROWN FOX
                       JUMPED OVER THE LAZY DOG.";
                   90 NEXT I
                   100 END
GRAPPLER "off"    110 PR#0

```

When you have finished typing the program, check to see that your printer is turned on and is "on line" or ready to receive information from the computer. Then type RUN to execute the program, and press the RETURN key.

Normal GRAPPLER Text Command Values

As soon as you turn on the GRAPPLER with a PR#1, all text commands can be activated either from the keyboard or a print statement. If you do not assign any numbers to the commands (for example, 60P for page length), then the GRAPPLER assumes that it is zero. Other values are shown here:

```

Left margin      = 0           Line length = 0
Right margin    = 0           Page length = 0
Screen display   = ON (with Applesoft BASIC)
Screen display   = OFF (with PASCAL and CP/M)
Line feed after carriage return = YES with BASIC
                                           NO with Pascal and CP/M

```

Eighth bit = OFF When GRAPPLER+ DIP switch #1 is in the ON (+) position, the 8th bit is not transmitted. When the DIP switch is in the OFF (-) position, the 8th bit is under program control. (See Control-I H.)

Text Screen Dump

A text "screen dump" is the process of sending what is currently displayed on the computer screen to the printer. You are actually printing a one full screen of text information.

The text screen dump demonstration shown under "Keyboard Command" is for Applesoft BASIC, 40 column screen display. The following table provides the commands for other popular hardware and software combinations.

Computer Display

| | |
|---------------|---------------------|
| Apple IIe/II+ | 40 column Applesoft |
| Apple IIe/II+ | 40 column CP/M |
| Apple IIe | 80 column Applesoft |
| Apple IIe | 80 column CP/M |
| Apple II+ | 80 column |

Command

| |
|-------------------------|
| Control-I S |
| Control-Y S |
| Control-I 8S* |
| Control-V 8S |
| Screen Dump Unavailable |

*Requires an Apple 80-column card

IMPORTANT: Whenever a GRAPPLER command appears in this user's guide, there will be a space shown between the control character and the command itself (for example, the space between the I and the S.) **This space should NOT be typed when entering the command.**

Text Screen Dump Example

To do a quick screen dump, follow these instructions:

1. Select your hardware/software configuration from the table shown above, and make note of the command.
2. insert a system diskette into drive 1, close the door and turn on the computer. Turn on the printer, and make certain that it is 'on line" or ready to accept information from the computer.
3. To fill the screen with text information, type either CATALOG (for Applesoft) or DIR (for CP/M). Now press the RETURN key several times.
4. Turn on" the GRAPPLER. For Applesoft, type PR#1. For CP/M, press Control-P
5. Type the text screen dump command. Refer to the Keyboard Command section on page 7, if you have any questions on how to press the keys. Do not insert any spaces between characters.
6. The contents of the screen (catalog or directory) should now be printed Out on the printer.
7. Turn off" the GRAPPLER. if you have a IIe with 80 ccl, see the next section entitled "Special Notes.

Special Notes for the Apple IIe

On the Apple IIe, it is not necessary to use an ESC Control-Q command prior to typing PR#1 to turn "on" the GRAPPLER.

To turn "off" the GRAPPLER on an Apple IIe with 80 column board, at the same time leaving the screen intact and the 80 column active, you must type a Control-I e. No PR#3 is required.

TEXT COMMANDS

Before entering any command, you must first turn "on" the GRAPPLER. Please see HOW TO OPERATE THE GRAPPLER, on page 6.

Command

Command Description

LINE LENGTH

Control-I nN
PRINT CHR\$(9);"80N"

Set line length. The "n" designates the number of character spaces from the left edge of the paper (not the left margin) at which the line will end. A carriage return will be generated following the nth character. This command causes the Apple screen to be turned off and characters sent only to the printer (see Control-I l). Line length must be set before setting the right margin. Note: If line length is set for 0 (meaning "infinity"), the GRAPPLER will not issue a line feed until the Apple sends one.

LEFT MARGIN

Control-I nL
PRINT CHR\$(9);"10L"

Set left margin to nth column. All subsequent printing will have "n" (n-number) spaces at the beginning of each line.

RIGHT MARGIN

"Word Wrap"
Control-I nR
PRINT CHR\$(9);"70R"

Set right margin to nth column from LEFT edge of the paper (NOT the left margin). This command will prevent words from being split. The GRAPPLER will issue a carriage return at the first space following the right margin, but prior to the end of the line as set by Control-I nN. A right margin of zero disables this command. When listing BASIC programs, printing will automatically be formatted in 40 column mode unless this command is used. The

POKE 33,33 command should be used in order to retain the integrity of the right margin. Example:

```
]POKE 33,33  
]PR#1 ]Control-I 75R  
]LIST  
]TEXT
```

Set the page length to n (n=number) of lines. The printer will generate six linefeeds after a specified ("n") number of lines have been printed. Thus, if you specify a printed page length of 60 lines, your printer will print 60 lines and automatically skip over the perforation with six linefeeds. A page length of zero disables this feature.

PAGE LENGTH

Control-I nP
PRINT CHR\$(9);"60P"

Add line feed onto carriage return. BASIC will not send a linefeed after a carriage return. This means that the printhead will return to the left margin but will not advance the paper. The GRAPPLER will automatically advance the paper after every carriage return. If your printer is performing double line spacing, check your printer DIP switches for auto line feed selection.

ADD LINE FEED

Control-I A
PRINT CHR\$(9);"A"

Do not add line feed onto carriage return. This command overrides Control-I A (see above).

CANCEL LINE FEED

Control-I K
PRINT CHR\$(9);"K"

When used with Control-I nN shown above, the Control-I I command will allow characters to be printed and shown on the Apple screen simultaneously. However, this command does not work when listing a program.

SCREEN ECHO

Control-I I
PRINT CHR\$(9);"I"

SCREEN DUMP

Control-I S
PRINT CHR\$(9);"S"

Sends the present 40 column text screen information to the printer. The screen will be printed 20 spaces from the left edge of the paper. This command is not compatible with 80 column text display boards (see SPECIAL NOTES FOR THE APPLE IIe, page 10).

Control-I 2S
PRINT CHR\$(9);"2S"

Control-I 2S duplicates the text screen memory located in TEXT pages 1 and 2 and prints them side by side for an 80 column output. This command is not compatible with 80 column boards.

HIGH ORDER BIT

Control-I H
PRINT CHR\$(9);"H"

Allows high order (8th) bit to be passed to the printer to permit the printing of special characters, block graphics, or whatever your printer may print for the upper ASCII character set. When these characters are being printed, standard characters are not accessible.

CANCEL HIGH ORDER BIT

Control-I X
PRINT CHR\$(9);"X"

Don't output the high order (8th) bit. This puts the printer back into standard text mode and overrides the Control-I H command.

CHANGE CONTROL

Control-I Control Y
PRINT CHR\$(9);CHR\$(25);

This command changes the control character from Control-I to Control-Y. Control-Y is used when entering commands in either CP/M or PASCAL. If desired, any control character may be used here instead of Control-Y; but you should avoid characters used by your printer or normal text control characters such as Control-M, (carriage return).

Control-Y Control-I
PRINT CHR\$(25);CHR\$(9);

When Control-Y is in use, this command changes the control character back to Control-I.

GRAPPLER VERSION

Control-I V
PRINT CHR\$(9);" V"

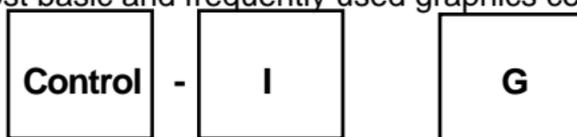
This command prints Out the version number of the GRAPPLER firmware.

GRAPHICS COMMANDS

GRAPPLER Graphics commands can be used as follows:

1. To print in double sized, rotated 90 degrees, emphasized, inverse and a variety of other features.
2. To do a graphics screen dump while running a program.
3. To print a picture saved to disk.
4. To print HI-RES Page 2 instead of 1.
5. To print both HI-RES Pages 1 and 2, "side by side"

The most basic and frequently used graphics command is



This is the keyboard command (in Applesoft BASIC) that takes the picture currently displayed (in HI-RES Page 1) on the Apple screen and sends it to the printer.

Adding and Stringing Commands Together

All graphics commands consist of Control-I G. However, other features can be added by merely typing the letter command after the "G." For example, D is for double sized. To print a graphics picture double-sized, you would type Control-I GD.

Graphics commands can also be strung together for compound features such as Control-I GDR, which tells the GRAPPLER to print the graphics image double-sized and rotated 90 degrees clockwise. Another example might be Control-I GDIR2 which will print the inverse of HI-RES page 2, double-sized and rotated.

Options may be typed in any order, as long as they are preceded by a Control-I G.

What We Mean by "HI-RES Pages 1 and 2"

The Apple has two areas in memory set aside for storing graphics information. These areas are called Page 1 and Page 2 (HI-RES is short form for "high resolution" which refers to the dot density used for graphics on the Apple screen.)

When you wish to print a picture, you must tell the computer which Page you are using and the memory location. You have the option of loading a graphics picture

into either Page. If you load the picture into Page 1, the memory location is A\$2000. For Page 2, the location is A\$4000.

By itself, Control-I G always refers to Page 1. To print Page 2, you must specify a 2 in the command sequence. For example, Control-I G2.

How to do a Graphics Screen Dump While Running a Program

If you are running a program and run across a graphics picture that you would like to print, use the following procedure:

1. Press both the Control and Reset keys simultaneously in order to freeze the program. (You should be aware that some copy protected programs may not allow interruption or may not preserve the screen data when interrupted. Screen dumps cannot be performed from these programs.)
2. Turn "on" the GRAPPLER by typing PR#1, and then press the RETURN key.
3. Press Control-I G, and then press RETURN. If the program uses Page 2 for its graphics, you must enter Control-I G2 and press RETURN. (See Keyboard Commands on page 7, if you are unsure of how to execute a command.)

How to Print a Picture Saved to Disk

Assume that you are in the Applesoft text screen mode and the "j" prompt is showing on the screen. The disk with the graphics picture you wish to print is in Drive A, and the name of the file is CHART. Use the following sequence of keyboard commands to load the picture into Page 1, and then print. Type:

```
HGR (and press the RETURN key)
BLOAD CHART,A$2000 (and press the RETURN key)
```

Wait for the file to be displayed on the computer screen.

Once the file is on the screen, you can turn on the GRAPPLER, using PR#1, and then use Control-I G to print the picture. The contents of screen will be printed. Type TEXT and press RETURN, to return to the text mode.

For loading a picture into Page 2, substitute HGR2 and A\$4000 in the above sequence. Use Control-I G2 to print the picture

Included in Appendix C, are two useful Applesoft BASIC programs designed to help you execute the GRAPPLER commands while printing a picture saved to disk. See page 26.

If you are writing a program and wish to load a file, use the print statement (see page 7) as follows:

For Page 1, type:

```
PRINT CHR$(4):"BLOAD [filename],A$2000"
```

For Page 2, type:

```
PRINT CHR$(4):"BLOAD [filename],A$4000"
```

How to Print Both HI-RES Pages 1 and 2, Side by Side

The GRAPPLER will allow you to print both HI-RES Pages side by side. (This feature cannot be used in conjunction with the rotated or double-sized options, except for NEC and ProWriter printers which handle double-wide in normal operations.)

With keyboard commands, use the sequence shown in the above section to load the files into the Pages. After turning on the GRAPPLER with a PR#1. use the Control-I GS command to print.

If you wish to use an Applesoft program, type the following lines, pressing RETURN after each line. Substitute your file names for CHART1 and CHART2:

```
10PRINT CHR$(4);"BLOADCHART1 ,A$2000
20PRINT CHR$(4);"BLOAD CHART2,A$4000
30PRINT CHR$(4);"PR#1 "
40PRINT CHR$(9);"GS"
50PRINTCHR$(4);"PR#0"
60END
```

After you have finished typing the program, type RUN to execute, and then press the RETURN key.

GRAPHICS COMMANDS

Before entering any command, you must first turn 'on' the GRAPPLER. Please see HOW TO OPERATE THE GRAPPLER, on page 6.

Command

Command Description

SCREEN DUMP Page 1

```
Control-I G
PRINT CHR$(9);"G"
```

Print HI-RES screen page 1 on the printer. Every white dot on the screen appears as a black dot on the paper. To reverse this color scheme, see the "I" or inverse option.

SCREEN DUMP Page 2

```
Control-I G2
PRINT CHR$(9);"G2"
```

Print HI-RES page 2 instead of 1.

SCREEN DUMP Pages 1 & 2

Control-I GS

PRINT CHR\$(9);"GS"

Print HI-RES page 1 and 2 side by side. This feature cannot be used in conjunction with the rotated or double-sized options.

See Appendix F: Chart Recorder Mode, page 28.

DOUBLE HI-RES SCREEN DUMP

Control-I Ge

PRINT CHR\$(9);"Ge"

For Apple IIe only. Prints the image using Apple's Double Hi Resolution Graphics. Requires an extended 80-column card and "REV B" or later IIe. This command cannot be used with either rotate or double-size options.

DOUBLE-SIZE

Control-I GD

PRINT CHR\$(9);"GD"

Print the graphics screen double-size. A double-size image is actually four times the area of the original, printing four dots for every one.

EMPHASIZED MODE

Control-I GE

PRINT CHR\$(9);"GE"

Prints an "emphasized image." When in this mode, the printer will print two closely spaced dots for every one dot it would normally print. The image becomes denser, but takes twice as long to print.

IN VERSE

Control-I GI

PRINT CHR\$(9);"GI"

Invert the image before printing. Normally, every white dot on the screen is printed as a black dot on the paper. However, this would make an actual picture of a person or object appear like a negative photograph.

ROTATE

Control-I GR

PRINT CHR\$(9);"GR"

TEXT WINDOW

Control-I GM

PRINT CHR\$(9);"GM"

PRINT IMAGE AT LEFT MARGIN

Control-I GL

PRINT CHR\$(9);"GL"

CHANGE ASPECT RATIO

Control-I G*n

PRINT CHR\$(9);"G*n"

Using the inverse command will print the black portions of the screen as black, allowing the picture to appear normally.

Rotate the graphics image 90 degrees clockwise. Note: only HI-RES graphics (and not text) can be rotated.

Print the graphics picture and the four line text window 20 spaces from the left edge of the paper. Rotate, double-size and left margin features do not work with this command. NOTE: Text may not align or fall directly under the picture.

Print the image at the left margin previously set with the Control-I nL command (see text commands, page 11). The actual print position may be affected by the current print density (dots per inch) or may be automatically set to seven dots per character as in graphics. When this command is not in use, the image will appear centered on an 8/2 inch page.

The Epson EX, RX and LX printers provide the ability to change the aspect ratio from 1 to 6. See your respective printer manual. NOTE: Aspect Ratio 5 is not available on the RX series.

TRANSPARENT MODE

In some instances, a program that you are running may be using one or several of the same commands that the GRAPPLER is using. The GRAPPLER would then begin intercepting commands meant only for the printer and prevent proper execution of the program's printing functions. An example would be the WORDSTAR program when used with a BROTHER HR letter quality printer.

To avoid a conflict between a program and the GRAPPLER, you can use the "transparent mode." The transparent mode allows all codes sent by the computer to by-pass the GRAPPLER command structure. In the transparent mode, the GRAPPLER performs strictly as a "dumb" rather than "intelligent" printer interface. The transparent mode can be activated in two ways: through the keyboard or by setting the GRAPPLER DIP switch.

Transparent Mode Keyboard Command

To activate the transparent mode by keyboard, type PR#1 and press the RETURN key. Then type the "Control-I T" command and press RETURN. If there was a conflict between the program's printing commands and the GRAPPLER, the transparent mode will now allow the program's commands to pass through the GRAPPLER unaffected.

All GRAPPLER commands will now be ignored until the transparent mode is turned off with a PR#0, or the computer is reset. Note that once this mode is entered via the keyboard, the display screen will go blank: no characters that are typed at the keyboard nor sent to the printer will subsequently be shown on the Apple screen.

Transparent Mode DIP Switch Setting

If you wish the transparent mode on a more permanent basis, the GRAPPLER DIP switch may be changed. First, refer to the installation section of this user's guide for removal and re-installation of the GRAPPLER. Observe all safety precautions, **DO NOT ATTEMPT TO RESET SWITCHES WHILE THE COMPUTER IS IN OPERATION**. Turn off the power to the computer and printer.

After removing the cover on the Apple, locate the DIP switch on the side of the GRAPPLER. To change the setting to transparent mode un the all the switch handles to OFF.



Replace the Apple cover and re-boot the system,

TROUBLESHOOTING/Use with Popular Software

| Hardware/Software | Problem | Solution |
|--|---|---|
| Appleworks Version 1.1 Apple Computer Company | An "80N" appears in the upper left hand corner of all printouts. Strange text formatting. | Refer to Appendix I, Appleworks with the Grappler+ |
| Appleworks Version 1.2. 1.3, 2.0,3.0 | Same as 1.1 | Refer to Appendix I. Appleworks with the Grappler+ |
| PFS:Write, PFS:Graph Software Publishing Company | When you merge a graph with a text file, the printer prints garbage | The solution is a two step process. First set the Grappler DIP switches to transparent mode as shown on page 19. (Or you may use the PFS software command P09 84 to change transparency.) Then change the printer option on the installation section from GRAPPLER to your specific printer name. |
| Wordstar, MicroPro, when used with CP/M and a Letter Quality Printer | When you print, you get garbage. | Set the GRAPPLER DIP switch to transparent mode when printing. See page 19. If your program allows, insert a Control-T in the printer installation area. |

Homeward Sierra On-Line
Software Co.

No printing. System hangs.

Go into the installation program. Change selection from Grappler to "other."

Dollars and Sense
Monogram Software

Graphics cannot be printed from within the program

Exit program to operating system. Boot System Master 3.3 and load in the Dollars and Sense graphics diskette. Then use the BLOAD command as described under "How to Print a Picture Saved to DiSk" on page 15 of this user's guide.

VisiPlot, VisiTrend
Version 1.0 and 1.1
VlsiCorp

Program will not screen dump when using certain printers.

Save graphics to data disk. Exit program then BLOAD picture as described under "How to Print a Picture Saved To Disk" on page 15 of this user's guide.

Mannesmann Talley
Centronics

No graphics printing.

Grappler screen dumps not available with these printers.

Toshiba

No graphics printing

Graphics screen dumps can be obtained by using Amperdump from MadWest Software, (608) 238-4875.

APPENDIX A: PASCAL AND CP/M COMPATIBILITY

The GRAPPLER is compatible with both Pascal and CP/M. Pascal 1.0 and CP/M will both recognize the card as a serial interface. Entry points have been provided to mimic a serial interface so that the card will function properly with these systems. Pascal 1.1 will correctly interpret that it is a firmware printer interface and access it accordingly. In either case the card will function normally with a few minor exceptions as detailed in the following paragraphs.

Since both systems use Control-I to represent a horizontal tab, the default command character has been changed to Control-Y. If you are listing a file that contains tabs, be certain the printer tabs have previously been set (see your printer manual).

Both Pascal 1.0 and CP/M use one of the I/O RAM locations to pass the output character, Since the GRAPPLER was already using all available locations for its variables, the right margin function had to be deleted to make it compatible. This feature is still available from BASIC or Pascal 1.1.

APPENDIX B: GRAPHICS PROGRAMS

The following programs allow you to test the graphics capability of the GRAPPLER. NOTE: In the following programs, REM stands for "remark." The letters "REM" and anything following "REM" need not be typed.

Far Applesoft Basic Users:

```
5 TEXT
10 HOME
20 PRINT "ENTER THE SLOT YOU GRAPPLER IS IN AND"
30 INPUT "HIT THE RETURN KEY'S:";S
50 HGR:REM CLEAR HIRES PAGE 1
60 HCOLOR 3:REM SET COLOR TO WHITE
70 POKE 49234,0:REM SWITCH TO FULL-SCREEN
  GRAPHICS
80 HPLOT 0,0 TO 279,0 TO 279,190 TO 0,190 TO 0,0:REM
  DRAWS RECTANGLE
90 FOR X = 0 TO 279 STEP 9:HPLOT X,0 TO X,190;REM PLOT
  VERTICAL LINES
100NEXT X
110FOR Y = 0 TO 190 STEP 5:HPLOT 279,Y TO 0,Y:REM PLOT
  HORIZONTAL LINES
120NEXT Y
130PRINT CHR$(4);"PR#";S:REM TURNS ON GRAPPLER
140PRINT CHR$(9);"G":REM DUMP HIRES PAGE 1 NORMAL
150PRINT CHR$(4);"PR#0":REM TURNS OFF GRAPPLER
160TEXT:REM HOME CURSOR
999END
```

If you are not using DOS (Disk Operating System), type line 130 and 150 as follows:

```
130 PR#S
150 PR#0
```

To experiment with different options, try changing line 140. You don't have to retype the whole *program*, just type a new line 140. Two examples in Applesoft would be:

```
140 PRINT CHR$(9);"GI"
140 PRINT CHR$(9);"GDR"
```

The following two examples are for Pascal users only:

Example #1

```
FOR PASCAL USERS:
PROGRAM DEMO;
USES TURTLE GRAPHIOS,APPLESTUFF;
VAR ANGLE,DISTANCE:INTEGER; PRINT:TEXT
BEGIN
  ANGLE: = 80;
  INITTURTLE;
  PEN COLOR (WHITE)
  FOR DISTANCE: = 1 TO 99 DO
    BEGIN
      MOVE (2*DISTANCE);
      TURN (ANGLE);
    END;
    RE WRITE (PRINT,' PR INTER:');
    WRITELN(PRINT.CHR$(25),'G');
    ("USE CHR(25)(CTRL-Y) IN PASCAL*");
  END.
```

Example #2

```
PROGRAM Load Pic:
(This program demonstrates how to load a picture which has
been saved to disk using a BLOCKWRITE command.)
USES TURTLEGRAPHICS.APPLESTUFF:
CONST Hires_Page_1 = 8192:
VAR DiskBlock: RECORD CASE BOOLEAN OF TRUE:
  (Intpart:INTEGER);
  FALSE: (Ptrpart: A INTEGER);
END:
  ch:CHAR;
fname:STRING:
prnt:TEXT:
PROCEDURE Bload(Filename: STRING);
VAR io:INTEGER:
  fFILE:
BEGIN
  Disk .Block.Intpart; HiresPagel:
  RESET(f,Filename);
  io: = BLOCKREAD(f,DiskBlockPtrpart A .16):
  C LOS E (f,LOG K):
```

```

END;
PROCEDURE Print_Picture;
VAR options:STRING;
BEGIN
    WRITE('Enter options:');
    READLN(options);
    FIEWRITE(prnt,'PRINTER:');
    WRITELN(prnt,CHR(25),'G'.options);
    CLOSE(prnt);
END;
BEGIN
    INITTURTLE;
REPEAT
TEXTMODE
WRITELN (Enter picture name (specify drive:'))
(An example of an entry would be:
#5: Picture, Foto
Where PictureFoto is a picture on drive 2.)
READLN(fname);
GRAFMODE;
Bload (fname);
REPEAT UNTIL KEYPRESS:(wait until key is pressed)
READ (KEYBOARD,ch);lclear keyboardl
TEXTMODE;
PrintPicture;
WRITE('Print more pictures?');
READLN(ch);
UNTIL(ch= 'N') or (ch='n');
END.

```

Programs to Print Graph Saved to Disk

The following programs will allow you to print a graph that has been previously saved to the disk. For example, after saving the graph created by one of the popular graphing programs for the Apple, run this Basic program to print the graph on your printer.

NOTE:

If your GRAPPLER is not in slot #1, change line 5 so that S equals the slot number of your GRAPPLER.

```

5 S=1
10 HOME
20 D$ = CHR$(4):REM CTRL-D FOR APPLE DOS
30 1$ =1 CHR$(9):REM CTRL-I
40 PRINT "ENTER THE NAME OF THE GRAPH:"
50 INPUT N$
60 HGR:REM CLEAR HIRES PAGE 1
70 PRINT D$:"BLOAD":N$;"A$2000":REM LOAD PICTURE
    INTO HIRES PAGE 1
80 VTAB 22
90 PRINT "ENTER OPTIONS (D.I.R,L.E,NORMAL)";
100 INPUT A$
105 IF LEFT$(A$,1) "N"THEN A$ ':REM IF NORMAL
    THEN NO OPTIONS
110 PRINT D$:"PR#":S:REM TURNS ON GRAPPLER
120 PRINT I$:"G":A$REM DUMP HIRES PAGE 1 WITH
    OPTIONS

```

```

130 PRINT D$:"PR#0":REM TURNS OFF GRAPPLER
140 TEXT:HOME
999 END

```

APPENDIX C: MEMORY LOCATIONS & CUSTOM DRIVERS

The GRAPPLER uses those RAM locations set aside for its particular slot and the slot scratchpad area common to all slots. The ROM is turned on using the standard ROM expansion protocol and resides in the locations \$C800 to \$CFFF. The entry points and the various RAM variables are listed below (N slot number).

| | |
|--------------------|----------------|
| Gold Entry | = \$CN00 |
| Warm Entry | = \$CN02 |
| Left Margin | = \$478 + \$0N |
| Right Margin | = \$678 + \$0N |
| Line Length | = \$578 + \$0N |
| Page Length | = \$5F8 + \$0N |
| Character Counter | = \$4F8 + \$0N |
| Line Counter | = \$6F8 + \$0N |
| Current Cmd. Char. | = \$778 + \$0N |
| Text Flags | = \$7F8 + \$0N |

Text Flag Bit Representations:
 (Bit 7—Output high order bit)
 (Bit 6—Video turned on)
 (Bit 5—LF after a CR)
 (Bit 4—Bell On)
 (Bit 0-3—Reversed)

Custom Drivers

If you are writing your own drivers, the following locations are used to access the card (Y = NO where N = slot#)

| ADDRESS | READ | WRITE |
|-----------|--------|---|
| \$C080, Y | Status | Output |
| \$C081, Y | Status | Select bank 2 of ROM |
| \$C082, Y | Status | Reset Interrupt Request and IRO data bit |
| \$C084, Y | Status | Output/Interrupt on ACK |

NOTE

A READ in the range of \$CN0 to \$CNFF (N = slot#) will select bank 1 of ROM. When an interrupt (IRQ) has been generated by the GRAPPLER+, bit 7 (MSB) of the status byte will be set to 1 (High).

The following routine gives an example of how to output a character using these locations:

```
          PHA          ;SAVE OUTPUT CHARACTER
                      ON STACK
          LDY 10       ;SET UP Y-REGISTER FOR SLOT
                      1
PAPER?    LDA $C080, Y CHECK STATUS FOR PAPER
          AND 04       CHECK BIT 2
          BNE PAPER?  IF SET THEN NO PAPER,
                      RECHECK
SLCT?     LDA $C080, Y ;CHECK STATUS FOR PRINTER
          AND 02       ;CHECK BIT 1
          BEG SLCT?   ;IF ZERO THEN NOT SELECTED
ACK?      LDA $C080, Y ;CHECK STATUS FOR PRINTER
          AND 01       ;CHECK BIT 0
          BEG PAPER?  ;IF SET THEN PRINTER IS
                      BUSY
OUTPUT?   PLA         ;RESET OUTPUT CHARACTER
          STA $C080, Y ;STORE TO OUTPUT LATCH
          RTS         ;RETURN FROM SUBROUTINE
```

For Assembly Language Users

The following routine shows how to send a GRAPPLER command to the GRAPPLER.

```
          LDA #$00     SET OUTPU TO GRAPPLER
          STA $36
          LDA #$C1
          STA $37
          LDA #$89     SEND A CTRL-I
          JSR $FDED
          LDA #$C7     SEND AG
          JSR $FDED
          LDA #$8D     SEND A CARRIAGE RETURN
          JSR $FDED
          RTS
```

NOTE: Characters sent to GRAPPLER must have the 8th bit on.

APPENDIX D: USER ROUTINES FOR ADVANCED PROGRAMMERS

The following features are included in the GRAPPLER for the benefit of advanced (assembly language) programmers

CTRL-IU Jump to the user routine starting at \$300. This feature is for advanced programmers who wish to bypass the GRAPPLER firmware. The accumulator will contain the Output character. The user routine should "JMP" to \$CF03 when

finished, which will restore the stack and registers.

CTRL-I1U Jump to the user routine starting at \$D000, bank A of a RAM card in slot 0. The GRAPPLER will enable the RAM card prior to the jump. As with CTRL-I U, the accumulator will contain the output character. The user routine should "JMP" to \$CF000 to disable the RAM card and restore the tack and registers when finished.

NOTE: To restore the normal GRAPPLER firmware, you must execute a PR#0 followed by a PR#n (n = slot#).

APPENDIX E: USE WITH LOGO

The following programs are used in LOGO to create the procedure HC. HC is called up when a hard copy of the graphics screen is wanted.

FOR TERRAPIN & KRELL LOGO USERS:

```
TO HC
OUTDEV 1
(PRINT1 CHAR 9 "G CHAR 13)
OUTDEV 0
END
```

```
FOR APPLE
LOGO USERS:
TO HC
.PRINTER 1
(TYPE CHAR 9 "G CHAR 13)
.PRINTER 0
END
```

```
FOR APPLE
LOGO II USERS:
TO HC
OPEN 1
SETWARE 1
PRINT WORD CHAR 25
"GDR
SETWRITE []
CLOSE 1
END
```

The GRAPPLER+ graphics commands (rotate, inverse, etc.) can be incorporated within the LOGO screen dump by placing the proper command immediately after the "G" in the third program line of the LOGO program listing. Refer to the Graphics Commands listed on page 16 for detailed descriptions of each command.

APPENDIX F: CHART RECORDER MODE

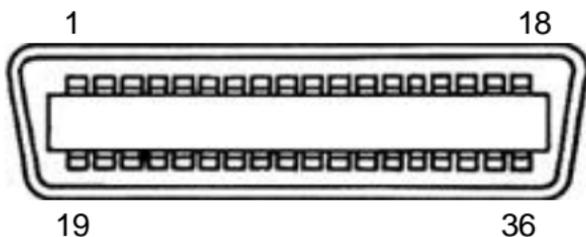
A chart recorder prints a continuous graph on a roll of paper. If you need to chart more information than can be done with a single HI-RES or DUAL HI-RES screen dump, you can simulate a chart recorder by printing successive screens without any intervening spaces. This feature works in both normal and rotated modes. The following program loads a graph into HI-RES pages 1 and 2 and dumps them continuously without a space separating the two images:

```
10PRINT CHR$(4);"BLOAD GRAPH1 ,A$2000"  
20PRINT CHR$(4);"BLOAD GRAPH2,A$4000"  
30PRINT CHR$(4);"PR#1"  
40PRINT CHR$(9);"GR"  
50PRINT CHR$(9);"G2R"  
60PRINT CHR$(4);"PR#0"  
70END
```

APPENDIX G:

PIN ASSIGNMENTS, POWER CONSUMPTION GRAPPLER+ PIN ASSIGNMENTS

| Grappler Header Connector | Signal | 36 Pin Male Centronics |
|------------------------------|-------------|---------------------------|
| 1 | Strobe | 1 |
| 2 | Ground | 19 |
| 3 | Data Bit 0 | 2 |
| 4 | Ground | 20 |
| 5 | Data Bit 1 | 3 |
| 6 | Ground | 21 |
| 7 | Data Bit 2 | 4 |
| 8 | Ground | 22 |
| 9 | Data Bit 3 | 5 |
| 10 | Ground | 23 |
| 11 | Data Bit 4 | 6 |
| 12 | Ground | 24 |
| 13 | Data Bit 5 | 7 |
| 14 | Ground | 25 |
| 15 | Data Bit 6 | 8 |
| 16 | Ground | 26 |
| 17 | Data Bit 7 | 9 |
| 18 | Ground | 27 |
| 19 | Acknowledge | 10 |
| 20 | Ground | 28 |
| 21 | Busy | 11 |
| 22 | Ground | 29 |
| 23 | Paper Empty | 12 |
| 24 | Ground | 30 |
| 25 | Select | 13 |
| 26 | Ground | 31 |



36 Pin Male Centronics

GRAPPLER+ POWER CONSUMPTION

| | STANDBY MODE | ACTIVE |
|---------|---------------------|---------------|
| Typical | 88mA | 158mA |
| Maximum | 162mA | 283mA |

**APPENDIX H:
INFORMATION ON RADIO FREQUENCY
INTERFERENCE**

"This equipment generates and uses radio frequency energy, and if not installed and used properly, i.e., in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for class B computing device in accordance with the specifications in Subpart of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation, If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
 - Relocate the computer with respect to the receiver.
 - Move the computer away from the receiver.
 - Plug the computer into a different outlet so that the computer and receiver are on different branch circuits.
- If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems"

This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402.
Stock No. 004-000-00398-5."

Shielded cables must be used with this unit to meet compliance requirements of the FCC.

APPENDIX I: APPLEWORKS WITH THE GRAPPLER+

For your GRAPPLER+ to work correctly with Appleworks, you must have the correct revision level of Appleworks, and must install the correct control characters into the Interface cards section of Appleworks.

If your revision level is wrong, or you do not have the control characters installed correctly, your Appleworks printouts may have strange characters in the upper left hand corner of the page, incorrect margins and line spacing, and/or overprinting.

1. Determining Revision Level Compatibility

For complete compatibility, your revision of Appleworks must be 1.2, 1.3, 2.0 or 3.0. To determine your revision level, boot your Appleworks startup disk. Five lines from the bottom of the screen; immediately following the copyright statement, will be the revision level of your copy of Appleworks.

If you have revision level 1.2, 1.3, 2.0 or 3.0 continue to step 2, inserting the Control Characters. If you have an earlier version (rev 1.1 or lower) contact CLARIS concerning upgrade of original Appleworks.

2. Inserting the Control Characters

To insert the proper control characters for the GRAPPLER+ you must first go to the Interface Card selection in Appleworks. To do that:

- A) Boot up Appleworks to the main menu.
- B) Select "5. Other Activities."
- C) From the new menu, select "7. Specify Information About Your Printer(s)"
- D) If you already have your printer installed, pick printer from under the heading "Change Printer Specifications." The screen should now display five possible selections. Choose "5. Interface cards." Skip to step E.
If you are just now installing your printer, select "1. Add a Printer." At this point, you will be asked to pick your printer from a list of printers. If your printer is not on the list, choose a compatible printer. Now type in the name of your printer. The program will now ask you which slot your GRAPPLER + card is installed in (usually slot 1). After you have answered this question, the screen will display five selections. Pick "5. Interface cards."

- E) Your screen should now display the Interface Card explanation screen. Press the space bar. The program will now show you the present interface card control characters and ask you if this is okay. Choose no." The screen will now read None."
- F) The control characters you wish to install are "Control-I ON."
— Hold down the Control key and press the I key once. Release the Control key. ("Control-I" should now be printed on your screen.)
— Now type a 0 (Zero). (Do not put in any spaces.)
— Next type an N (Capital letter N).
— Finally, type a ^ (Hold down the Shift key and press the 6 key). This will return you to either the Add a Printer or Change a Printer menus.

Your GRAPPLER+ control characters are now installed. This procedure is the same whether installing a printer on the list or a custom printer. Other information you may need for custom installation should be available in your Appleworks and/or printer manuals.

3. Miscellaneous Problems

If you have problems when printing tabs, i.e., columns run together, or tabs are uneven, it could be because the GRAPPLER+ is intercepting the code your printer uses to signify a tab. To prevent the GRAPPLER + from intercepting any printer codes, you should put it in the Transparent mode. To do this within Appleworks, insert Control-I T instead of Control-I ON, following the above procedure.

Other problems, such as a strange character printing out at the beginning of each line, or double spacing, do not relate to the GRAPPLER+ and are most often traced to incorrect printer installation within Appleworks.

Appleworks 3.0 Menu Item Numbers may be different than earlier versions.

LIMITED WARRANTY

Every Grappler+ interface is fully tested and quality checked before shipment and is warranted to be free from defects in materials and workmanship for a period of one year from date of purchase. During that time period, Orange Micro will at no charge to the purchaser of record, repair or replace any defective unit returned to its Service Department in accordance with the following instructions.

NOTE: Do NOT return the Grappler, to Orange Micro Inc. until you have received a Return Authorization number. Phone the Orange Micro Technical Support Department at 714/779-2772 between 8 am and 4 pm PST to obtain a Return Authorization Number.

1. Provide Orange Micro Inc. with: Model, Serial Number, Proof of Purchase with Date, Return Address, and preferred return shipping method. Enclose a clear description of the problem experienced and any sample printouts showing the problem, if possible. Be sure that your printer properly executes its "self test" as described in its own documentation.
2. Ship in the original carton or securely packaged in a cardboard carton with at least two inches of cushioned packing material on all sides. Mark the package "FRAGILE" and ship via UPS, Parcel Post, or Air Freight, insured and prepaid.

NOTE: Do not send COLLECT- collect shipments will be refused and returned to sender.

Orange Micro Inc. disclaims any liability to users of the Grappler+ for consequential damages of any kind arising from or connected with the use of the Grappler+ interface.

This warranty is void in cases of misuse, abuse, abnormal conditions of operations or attempts to alter or modify the function of a part or assembly.

This limited warranty is in lieu of all other warranties expressed or implied, and no representative or other person is authorized to represent or assume for Orange Micro Inc. any warranty liability beyond that set forth herein.

This warranty gives you specific legal rights, and you may also have additional rights which vary from state to state. The warranty expressed herein applies only to the Grappler+ sold and used in the United States of America.

QWIK-REFERENCE COMMAND CHART in Applesoft BASIC

Before using any of the following commands, refer to page 6 for "How to Operate the Grappler." Remember, you must first turn on the GRAPPLER before any commands can be issued. Do not type a space between the I and the GRAPPLER command.

Text

| Feature | Command |
|--|---------------------|
| Line Length | Control-I nN |
| LefiMargin | Control-I nL |
| Right Margin (word wrap) | Control-I nR |
| Page Length | Control-I nP |
| Line Feed | Control-I A |
| Cancel Line Feed | Control-I K |
| Screen Echo - | Control-I I |
| Screen Dump (40col display) | Control-I S |
| Pages 1 & 2 (40col only) | Control-I 2S |
| High Order Bit | Control-I H |
| Cancel High Order Bit | Control-I X |
| Changing Control Character | Control-I Control-Y |
| Print Grappler Version | Control-I V |
| 80 Column Text Screen Dump | Control-I 8S |
| Not available when listing programs. For other screen dump applications, see page 10. | |

Graphics

| Feature | Command |
|-----------------------------|---------------|
| Screen Dump (HI-RES Page 1) | Control-I G |
| Screen Dump (HI-RES Page 2) | Control-I G2 |
| Screen Dump (Pages 1 & 2) | Control-I GS |
| Screen Dump (Double HI-RES) | Control-I Ge |
| Double-sized | Control-I GD |
| Emphasized Mode | Control-I GE |
| Inverse | Control-I GI |
| Rotate | Control-I GR |
| Text Window | Control-I GM |
| Epson Aspect Ratio | Control-I G*n |
| Print Image at Left Margin | Control I GL* |

Other Commands

| Feature | Command |
|--------------------------------|-------------|
| Turn Off (Ile, 80 column card) | Control-I e |
| Transparent Mode | Control-I T |



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FCC ID: DIH6(VORG001)

Certified to comply with Class B limits part 15 of FCC Rules.

See instructions if interference to radio reception is suspected.

Rew. 1-90

75MAN00002

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