

Parallel Pro

AND BUFFER PRO

User's Manual

 **APPLIED ENGINEERING®**
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v1.11

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Preface

About the Parallel Pro

The Parallel Pro is a versatile and powerful parallel printer card designed for the Apple][,][Plus, //e, and IIGS computers. The Parallel Pro offers on-board firmware supporting a wide range of features: A screen dump that supports 40 column, //e 80 column and Viewmaster 80 column text; A graphics printing command set that supports Hires, Double Hires, Super Hires (IIGS) and Color Graphics; A special built in program, The Control Panel, that enables you to select print characteristics right from the computer's keyboard. And More. Parallel Pro also has a special connector to support the optional Buffer Pro card.

About the Buffer Pro

The Buffer Pro is an add-on card for the Parallel Pro printer interface card that will buffer up to 256K of data. It connects to the output of the Parallel Pro. Buffer Pro captures data from the Parallel Pro at high speeds and stores it in on-board RAM. The information stored in RAM is then sent as fast as the printer can accept the data. This allows the user to continue working on the computer while Buffer Pro takes care of the printing. The size of the buffer can be from 8K (a single 64K D-RAM) to 256K (eight 256K D-RAMs).

Printers Supported by the Graphics Firmware

The following is a list of printers that will work with the on-board Parallel Pro graphics firmware. This is only a partial list, there are many printers not listed that will work. This includes printers compatible with a standard IBM or EPSON printer.

The Parallel Pro printer card is designed and based on the industry standard of parallel communications. For this reason there are no compatibility problems with any parallel text printers. However, there is no industry standard for parallel graphics printing. Applied Engineering has made every attempt to support most major graphics dump techniques. The following is a list of printers supported by the graphics dump routines of the Parallel Pro:

C.Itoh-ProWriter 8510
Epson-RX, LX, LQ, FX, DX Series, SQ 2000, HS 80
IBM-ProPrinter
NEC-Pinwriter P2, CP2, P3, CP3, and P5
Okidata-80, 90, 190 Series, 2410, 290 Series
Okimate 10 and 20
Star Micronics-SG, SR, SD Series
Toshiba-P-321, P-341, P-350, P-351, P-1341, P-1350, P-1351

CHAPTER ONE

Installation

It's easy to install the cards; just take your time, and read these instructions carefully.

Step 1 - Attach Buffer Pro to the Parallel Pro

If you did not get the Buffer Pro option, go on to Step 2. If you have a Buffer Pro, you will now attach it to the Parallel Pro (Figure 2).

First, take the Parallel Pro and Buffer Pro out of their packages.

WARNING: Handle with care! Hold the Parallel Pro by its edges only and do not touch the gold-plated contacts on the Parallel Pro's edge connector!

The Parallel Pro should have the multicolored ribbon cable attached to its left end. Remove it by grasping the connector's top and bottom edges and rocking it gently while pulling out from the card.

Now line up the pins on the left edge of the Parallel Pro with the female connectors along the right edge of the Buffer Pro. The pins should line up with the holes exactly.

Push the two cards firmly together. Remember not to touch the gold edge connectors (fingers) on the Parallel Pro.

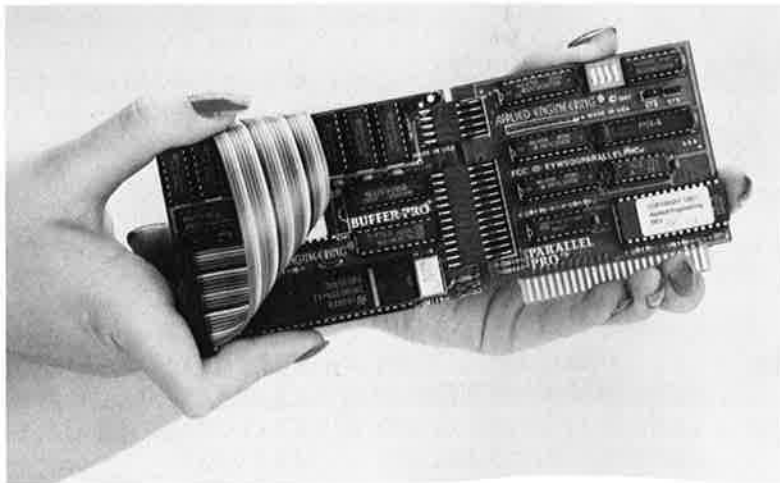


Figure 1 - Attach Buffer Pro to Parallel Pro

Step 2 - Attach the Cable to the Card

If you are using only the Parallel Pro, the multicolored ribbon cable should be attached to the left end with the cable feeding from the chip side of the card as shown in Figure 4.

If you have connected a Buffer Pro, attach the cable to the connector on the left end of the card with the cable feeding toward the Parallel Pro. (Refer to Figure 1.)

Step 3 - Check the Parallel Pro Switches

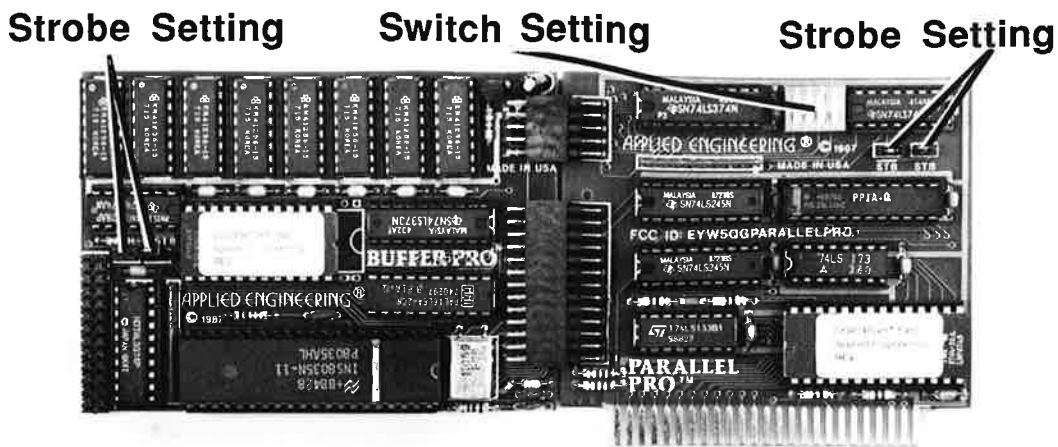


Figure 2 - The Cards' Switch and Strobe Settings

There is a block of switches along the top edge of the Parallel Pro card. These switches select the type of printer you have for graphics screen dumps. See the table following to set the correct switch combination.

PRINTER	SWITCH			
	1	2	3	4
Epson	CLOSED	CLOSED	CLOSED	CLOSED
IBM	OPEN	CLOSED	CLOSED	CLOSED
NEC 8023	CLOSED	OPEN	CLOSED	CLOSED
C.Itoh	OPEN	OPEN	CLOSED	CLOSED
Toshiba	CLOSED	CLOSED	OPEN	CLOSED
Okidata	OPEN	CLOSED	OPEN	CLOSED
Okimate	CLOSED	OPEN	OPEN	CLOSED
Apple DMP	OPEN	OPEN	OPEN	CLOSED

If a piece of tape is covering the switches, remove it.

Pressing the rocker in at the end nearest the word "OPEN" will open the switch (turn it OFF).

The switch can be moved to the **CLOSED** or **ON** position by pressing in at the end nearest the row of numbers on the switch block.

The circle on each switch represents the side that should be down.

Use a small, pointed object, like a wooden toothpick or bent-out paperclip to change a switch setting; never use a pencil or pen.

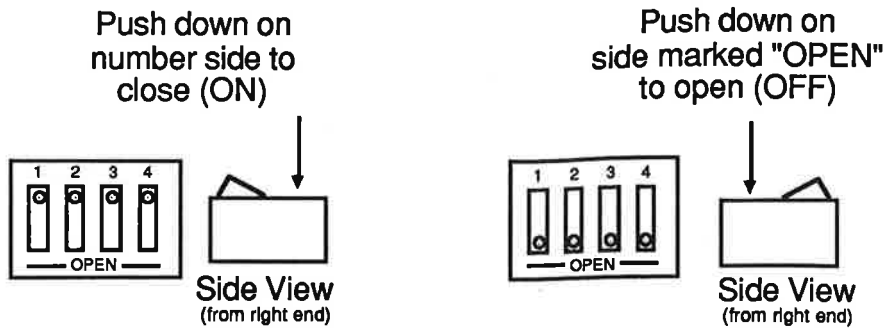


Figure 3 - Setting the Switches

Step 4 - Set the Strobe Polarities

A Parallel printer requires a strobe signal to clock in each character it prints. The strobe can be one of two polarities. The Parallel Pro is shipped with the standard strobe setting. Use the following instructions only if the printer does not work with the standard strobe setting.

The Parallel Pro's strobe jumper is the black plastic rectangle that is covering a two pin connector just below and to the right of the switch box (Figure 1). The jumper should be over the pin connector with the marking:

STB

This setting will work with the majority of printers. If your printer does not operate with the Parallel Pro, try switching the jumper to the other two-pin connector.

The optional Buffer Pro also has a strobe jumper. The Buffer Pro's jumper is located towards the left side of the card near the cable connector pins. Again the jumper should be over the two-pin connector with the marking:

STB

This setting should work with the majority of printers. If your printer does not operate, try switching the jumper to the other two pin connector towards the cable connector pins.

Step 5 - Insert the Card into the Slot

1. **First, turn off the computer.** You can do serious damage to the computer and its peripherals by installing or removing peripheral cards with the power on!
2. **Remove the computer cover.** Pull up on the cover at the rear edge (the edge farthest from the keyboard) until the two corner fasteners pop apart.
3. **Touch the power supply.** Don't ZAP your computer! Before touching any of the cards inside the computer, discharge any static electricity that may be on your body or clothing by touching the power supply. (The power supply is the large metal box inside the computer.)
4. **Align the edge connector's "gold fingers" with expansion slot 1 (Figure 4) and insert the card into the slot (Figure 5).** The card should enter the slot with some friction and then seat firmly. You may want to rock it gently end-to-end to help seat it.

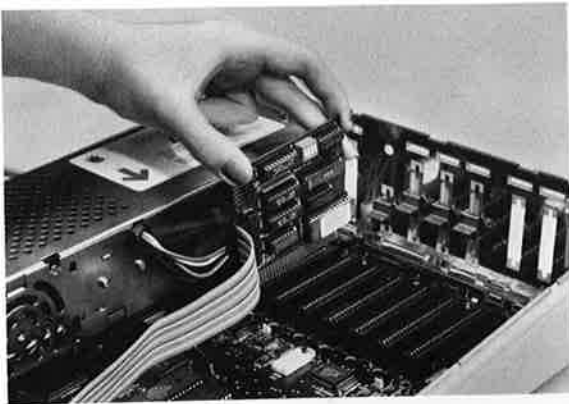


Figure 4 - Align the Parallel Pro with slot 1

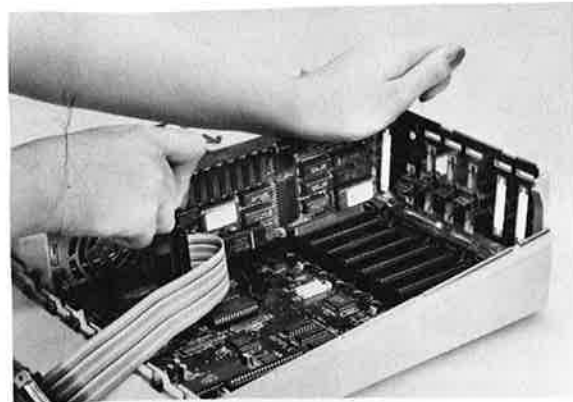


Figure 5 - Insert the Parallel Pro
(shown w/ Buffer Pro)

Step 6 - Attach the Cables to the Backplane

1. **Remove the plastic plate** (if it is still in place) covering the large opening in the backplane through which you will attach the interface cable.
2. **Line up the holes of the ribbon cable's connector plate** with the notches at the top and bottom of the opening in the backplane.
3. **Insert and tighten the included hex screws** using the hex wrench provided. (Figure 6.)
- ❖ *Note:* The hardware packet may contain extra nuts, washers, etc.; you will need only the two hex screws and the wrench.
4. **Attach the shielded cable** to the connector you have attached to the backplane. (Figure 7.)

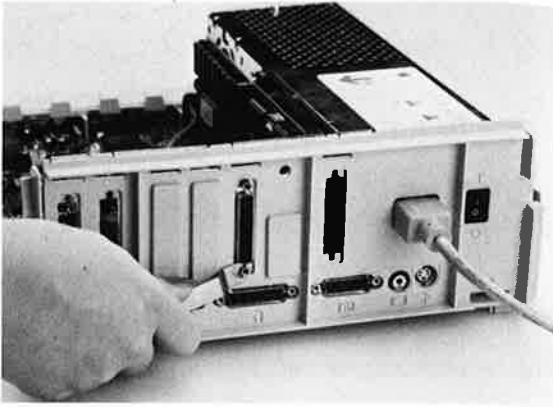


Figure 6 - Attach connector plate to backplane

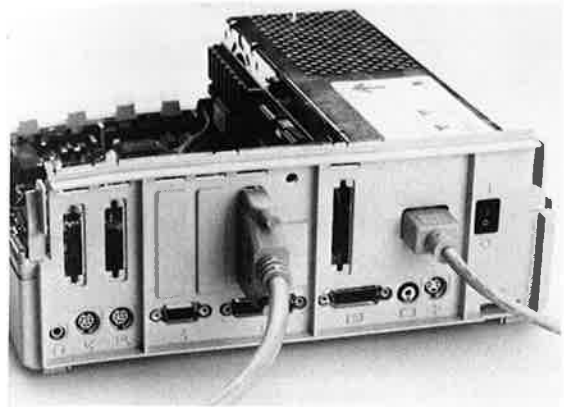


Figure 7 - Attach shielded cable to backplane

Step 7 - Attach your Parallel Device to the Parallel Pro

Connect the Centronics end (36 Pin Delta Connector) of the printer cable to your parallel printer.

Make sure the interface cable is securely fastened to both the Parallel Pro's connector and the Centronics connector on your printer. (Most Centronics connectors use wire clips to hold the connector firmly in place.)

Now put the cover back on the computer.

Installation is Complete

Your Parallel Pro printer interface card is installed and ready for use. The following chapter explains how to test the Parallel Pro and the Buffer Pro and start using it with application software.

CHAPTER TWO

Getting Started Tips

This section will get you started with some general information about the Parallel Pro and optional Buffer Pro.

IIGS OWNERS: Remember to use the Apple IIGS control panel to set the Parallel Pro's slot to "YOUR CARD".

Testing the Parallel Pro

- 1) Turn on the computer.
- 2) Press Control-Reset. You should see the BASIC prompt "]".
- 3) At the BASIC prompt type the following:

]PR#s (*Where s is the Parallel Pro slot number. The bracket, "]" is for reference only.*)

] ^IV (*Press the CONTROL key and the "I" key at the same time then press 'V.'*)

Figure 2.1 - Sample Self Test Screen

```
AE PARALLEL PRO SELF TEST
ROM VERSION 1.0 CHECKSUM GOOD
GRAPHICS PRINTER: 0000

BUFFER ATTACHED
PRINTER BUSY

PRINT TEST PATTERN? (Y/N)
TEST BUFFER OPTION? (Y/N)
```

NOTE: The four numbers next to GRAPHICS PRINTER represent the switch settings on the Parallel Pro (0=CLOSED and 1=OPEN).

A Note About the Optional Buffer Pro

The optional Buffer Pro is always active when the Parallel Pro is activated. See CHAPTER FOUR for information on how to deselect the Buffer Pro if you do not want the buffering feature.

Printing with Your Software

The Parallel Pro is installed and ready. The Parallel Pro does not need any further instructions to begin printing with application software. However, most software has some type of printer configuration menu. If it has one of these menus and Parallel Pro is not listed, look for Practical Peripheral's GraphiCard. "The Print Shop™" users should choose "PRACTICAL PERIPHERALS (OTHER)". "The Parallel Pro, like the GraphiCard, is a standard ProDOS Interface.

CHAPTER THREE

Using the Control Panel

This chapter documents how to control your printer by using the Parallel Pro Control Panel.

About the Control Panel

The Parallel Pro Control Panel selects popular printer options through a convenient automatic menu. Changing options can be done directly through control codes. However, the built in Control Panel makes changing these options easy!

DEFINITION NOTE: The eleven parts to the Control Panel are called menu selections. The different parts to each menu selection are called options.

Accessing the Parallel Pro Control Panel

- 1) Turn on the computer.
- 2) Press Control-Reset.
- 3) There are two ways to access the Parallel Pro Control Panel from BASIC (indicated by the right bracket] prompt):

FIRST METHOD

]PR#s (*where s is the Parallel Pro slot number.*)

Using PR#s will activate the Parallel Pro and the printer.
Again at the BASIC prompt enter:

]^I? (*where ^I = control-I*) or]<TAB>? (*The TAB key is the same as ^I*)

Parallel Pro's menu should now be on the screen! (See figure 3.1)

SECOND METHOD

]IN#s (*where s is the Parallel Pro slot number.*)

Using IN#s will not activate the printer.
Parallel Pro's menu should now be on the screen! (See figure 3.1)

Using the Control Panel

Use the following keys to change menu selections:

↓ or M or RETURN DOWN to the next menu selection
↑ or I UP to previous menu selection

Use the following keys to change options within a menu selection:

← or J Scroll option to the left
→ or K Scroll option to the right

The scroll left and scroll right options select 1 of 2 defaults in the OPTIONS and NUMERIC ITEMS of the Control Panel. The OPTIONS have only 2 settings. However, the NUMERIC items have a range of numeric settings. These numeric settings can be entered directly by using numeric keys.

ESCAPE Exit Control Panel and save configuration

FIGURE 3.1 - Sample Control Panel Setting

AE PARALLEL PRO CONTROL PANEL (SLOT 1)

OPTIONS:

LF AFTER CR: ON
FORMAT BASIC: OFF
 ECHO: ON
CHAR BIT 7: ALWAYS ZERO
PRINTER BELL: OFF
 MAINTAIN: OFF
TRANSPARENT: NO
 SELF TEST: NO

NUMERIC ITEMS:

LEFT MARGIN: NONE
LINE LENGTH: UNLIMITED
PAGE LENGTH: UNLIMITED

USE ARROWS OR RETURN TO SELECT/MODIFY
USE <ESCAPE> TO LEAVE THE MENU

Control Panel Option Descriptions

Below is a description of the Control Panel Options:

LF AFTER CR: If this option is (ON), a line-feed will be inserted after each carriage return. Most software needs the extra line feed. Turn this option off if double spacing occurs.

FORMAT BASIC: This convenient feature formats a BASIC listing for easier reading. This includes breaking multiple statement lines at the colons and indenting each line.

ECHO: If this options is (ON), data sent to the printer will echo back to the screen. If (OFF), data is sent to the printer only.

CHAR BIT 7: ALWAYS ZERO will cause a 0 to be sent as bit 7. **PASS AS IS** will pass bit as is. Most printer require bit 7 to be sent as a 0.

PRINTER BELL: If this option is (OFF), the Control-G bell character will not pass to the printer. **NOTE:** Many printers do not have bells.

MAINTAIN: Preserves all printer setup parameters except for Transparent.

TRANSPARENT: When this mode is (YES), Parallel Pro will not interpret subsequent firmware commands. The feature allows binary information to be sent to the printer without having control codes intercepted. Transparent mode is disabled only by reinitializing the firmware.

SELF TEST: Tests the Parallel Pro and Buffer Pro.

Note: The following options have not only two default settings but also numeric ranges. Choose any number within the numeric range by selecting the option (up and down arrow keys) and then entering the number from the keyboard.

LEFT MARGIN: (UNLIMITED, 010) and (1-127 – enter manually)
Selects the number of spaces from the left margin.

LINE LENGTH: (UNLIMITED, 080) and (1-255 – enter manually) Selects the line length from the left margin. Data over the line length will wrap around on the same line.

PAGE LENGTH: (UNLIMITED, 060) and (1-127 – enter manually)
Selects the number of lines on a page.

CHAPTER FOUR

Parallel Pro Firmware Commands

This chapter is for advanced Apple II users!... It explains how to use the Parallel Pro command set to select and control printer options.

Firmware is software that is resident on the Parallel Pro in the form of a ROM chip. It allows the user to control the printer without the use of disk based software.

NOTE: Some of the commands listed below are also available in the Parallel Pro Control Panel.

Using the Firmware Commands

Commands are signaled by a Control Character followed by one of the character strings listed below in the command summary. Control Characters are indicated by the ^ symbol. The Control Characters are:

In BASIC	^I	(Control-I, Hex \$09, ASCII HT)
In Pascal/CPM	^Y	(Control-Y, Hex \$19, ASCII EM)
or	^]	(Control-], Hex \$1D, ASCII GS)
		(^] is Control-Shift-M on][Plus)

Using the Graphics Commands

The Graphics commands are functions that may be used together in a single operation. For example, the command ^IGIR will print an inverse and rotated image of the primary Hires page. Only the functions M (mixed graphics and text) and R (rotate 90°) cannot be used together (the M will be ignored).

A Space character will terminate the command and cause it to be executed, but the card will remain in the Graphics Mode. Additional commands can then be entered without the need for the ^IG header. For example, the compound command ^IGIR 2IR will print the primary Hires page inverse and rotated and then it will print the secondary Hires page inverse and rotated.

Note: ^I is the default command prefix setting. You can change the setting using the ^I^_ command.

Command Summary

^IA	Add Line Feed
^IK	No Line Feed
^IF	Format BASIC Listing
^IL / ^I<n>L	Set Left Margin
^IN / ^I<n>N	Line Length without Echo
^II / ^I<n>I	Line Length with Echo
^IP / ^I<n>P	Set Page Length
^IH	Pass Bit 7 Intact
^IX	Mask Bit 7 to '0'
^I<n>C	Control Character ASCII 'n'
^I^n	Control Character '^n'
^IM	Set Maintain Mode
^IT	Set Transparent Mode
^IV	Self Test
^ID	Set Default Values
^IO	Screen Echo On
^IS / ^I<n>S	Dump Text Screen
^IW / ^I<n>W	Dump Viewmaster Screen
^IB	Printer Bell On
^IC	Printer Bell Off
^IE	Print Escape Character

Graphics Command Summary

^IG	Print Hires Graphics Page 1
^IGI	Inverse Graphics
^IGL	Left Justified Graphics
^IGM	Mixed Text and Graphics
^IGR	Rotated Graphics
^IG2	Print Hires Graphics Page 2
^IGS	Side-by-Side Graphics
^IGH	Print Double Hires Graphics (/e and IIGS)
^IGG	Print Super Hires Graphics (IIGS)
^IGC	Print Color Hires Graphics

Buffer Pro Command Summary

^IZ	Clear Printer Buffer
^IQ	Disable the Printer Buffer
^IR	Enable the Printer Buffer
^IU	Pause Printing from the Printer Buffer
^IY	Resume Printing from the Printer Buffer

Command Descriptions

- ^IA** Add a Line Feed after each Carriage Return. Adding a Line Feed is default in BASIC. No Line Feed is default in CP/M and Pascal.
- ^IK** Stop adding a Line Feed after each Carriage Return.
- ^IF** Format a BASIC Program Listing. This includes breaking multiple statement lines at the colons and indenting each line for easier reading. The format BASIC listing command will be canceled by any other commands, so use printer formatting commands before it.
- ^IL or ^I<n>L** Set the Left Margin to <n> where <n> is a number 0 to 255 (example, '^I10L'). If the string <n> is omitted ('^IL'), then the Left Margin is set to the default value of none.
- ^IN or ^I<n>N** Set the Line Length to <n> where <n> is a number 1 to 255 (example, '^I80N') and disable screen echo. At the end of <n> characters in a line, a Return will automatically be generated. If the string <n> is omitted ('^IN'), then the Line Length is set to unlimited and no Returns will be generated.
- ^II or ^I<n>I** Set the Line Length to <n> where <n> is a number 1 to 255 (example, '^I80I') and enable screen echo. At the end of <n> characters in a line, a Return will automatically be generated. If the string <n> is omitted ('^II'), then the Line Length is set to unlimited and no Returns will be generated.
- ^IP or ^I<n>P** Set the Page Length to <n> where <n> is a number 1 to 127 (example, '^I60P') and enable auto skip over the page break. At the end of <n> lines, six Line Feeds will be generated to skip over the perforated page break. If the string <n> is omitted ('^IP'), then the automatic page break feature is turned off (default).
- ^IO** Enable Screen Echo (40/80). Data sent to the printer will be echoed to the screen in 40 or 80 (/e) columns, depending on the screen mode and will not affect the line length. Also see the commands ^I<n>I, ^IN and ^I<n>N.

- ^IH** Leave the high order bit (bit 7) intact on data sent to the printer. This is useful in sending binary or graphics data to the printer.
- ^IX** Strip off the high order bit (bit 7) when sending data to the printer and substitute a '0'. This is the default state used for printing standard text.
- ^I<n>C** Change the command character from ^I to the character with the ASCII value of <n>. The value <n> is a representation of the numbers 0 to 255 (all subsequent commands would then be '^<n>cmd').
- ^I^n** Change the command character n to ^n where 'n' is equal to any character or number). All subsequent commands would then be '^n cmd' (control and n followed by the command). To change back, send ^n^I. No Return needed.
- ^I^** Change the command character to the '^' character. All subsequent commands would then be '^cmd' (control followed by the command).
- ^IM** Set the Maintain Mode active. This mode enables the setup parameters to be maintained when the firmware is reinitialized as long as the memory contents are not destroyed. Other programs can be run and even the operating system changed without altering the card set up. It is disabled by the Set Default command (^ID), or by turning off the computer. When the card is in Maintain Mode, only the Transparent Mode will be changed during the initialization.
- ^IT** Set the Transparent Mode active. This mode stops the card from interpreting any subsequent commands so that binary information can be sent to the printer without having control codes intercepted. Any previously setup parameters will be maintained. Transparent Mode is disabled only by reinitializing the firmware.
- ^IV** Perform Self Test. The following tests will be performed:
 Display EPROM Revision.
 EPROM Checksum Test
 Read the switches and display the settings.
 Indicate if a Buffer Pro is connected.
 Display printer status (paper empty, ready, etc.).
 Test Pattern Print
 Buffer Self Test

- ^ID** Restore Default settings. This command will set the following parameters:
 Page Length = UNLIMITED (No skip over page break)
 Line Length = UNLIMITED (No extra Returns)
 Left Margin = NONE
 Printer Bell Disabled
 Disable Bit 7 (Strip high order bit)
 Maintain Mode Off
 Transparent Mode Off
- In BASIC:
 Automatic Line Feed after Return
 Echo print data to screen (40/80 columns)
- In CP/M or Pascal:
 No Line Feed after Return
 No Echo to screen
- ^IS or ^I<n>S** Print text screen. Dump the text from the current 40 or 80 (/e) column screen to the printer. <n> is the line number 1 to 23 where the screen dump will start. If the <n> (^IS) is omitted, the full screen will be printed. This command will not work with][Plus 80 column cards.
- ^IW or ^I<n>W** Print current Viewmaster Text screen. This is similar to the ^IS/^I<n>S command except that it is for Viewmaster compatible][Plus 80 column cards. The Viewmaster compatible card must be in Slot 3 of the][Plus.
- ^IB** Enable Printer Bell. This command will pass all Bell characters (^G or \$07 Hex) to the printer.
- ^IC** Disable Printer Bell. All Bell characters will be absorbed and will not be sent to the printer. This is the default setting.
- ^IE** Send an Escape character(^[or \$1B Hex) to the printer. Many printers use Escape characters to indicate a formatting command. This command must be used with Integer BASIC because the escape character cannot be generate.

Graphics Commands Descriptions

NOTE: Be sure the graphics switch settings are properly configured for your graphics printer. (See Chapter One)

- ^IG** Enter the Graphics Print Mode and print the Primary screen. Each white dot on the screen will be printed as a black dot on paper.

- ^IGI** Print the Primary Hires screen inverted with each white dot on the screen printed as a white dot on paper.
- ^IGL** Print the Primary Hires screen at the Left Margin as defined by the **^I<n>L** command instead of being centered.
- ^IGM** Print the Primary Hires screen with mixed text and graphics. The lower four lines of the primary text screen are printed below the image.
- ^IGR** Print the Primary Hires screen rotated 90°.
- ^IG2** Print the Secondary Hires screen.
- ^IGS** Print Both Hires screens together side-by-side. The primary Hires screen is first unless a 2 is in the command line. If there is a "R" in the command, the images will be rotated and printed top to bottom.
- ^IGH** Print Double Hires Graphics (**//e** and **IIGS**) screen. If there is a 64K memory card in the **//e** or if the computer is a **IIGS**, the double hires screen will be printed as modified by the other graphics commands.
- ^IGG** Print Super Hires Graphics (**IIGS**) screen. If it is a **IIGS**, the super hires screen will be printed as modified by the other graphics commands.
- ^IGC** Print Color Hires Graphics. If the selected printer is capable of color printing, the graphics page will be printed in color. The normal mode for this command is inverted (true color) so the invert command (**^IGI**) will be ignored.

Buffer Pro Command Description

- ^IZ** Clear Printer Buffer. This command will reset the Buffer Pro and empty the buffer
- ^IQ** Disable the Printer Buffer. This command will turn off the Buffer Pro buffering functions. All subsequent characters will be sent directly to the printer.
- ^IR** Enable the Printer Buffer. This command will re-enable the printer buffer.
- ^IU** Pause printing from the Printer Buffer. This command will cause the Buffer Card to stop printing until told to restart.
- ^IY** Resume printing from the Printer Buffer. This command will restart printing from the Buffer Pro.

Glossary

Applesoft BASIC The version of the BASIC programming language built into the Apple II Plus, IIe, and IIGS computers. Applesoft BASIC programming mode is indicated by the right-square-bracket (]) screen prompt.

AppleWorks A ProDOS-based application program which combines a word processor, a database, and a spreadsheet program into one integrated package.

Application program Often referred to as "off-the-shelf software," is a computer program written for a particular purpose. AppleWriter, Print Shop, and AppleWorks are application programs.

ASCII An acronym for American Standard Code for Information Interchange. It is a standard 8-bit information code used by most computers and data terminals. Each of the 128 ASCII letters, numbers, special characters, and control characters are assigned a unique value from 0 to 127.

Auxiliary slot Similar in appearance to an expansion slot and often referred to as the AUX Connector, it is a separate, single connector inside the Apple IIe for cards that add more auxiliary memory or enhance the computer's video display. Applied Engineering's RamWorks III is such a card. Parallel Pro does not fit in the auxiliary slot.

BASIC Beginner's All-purpose Symbolic Instruction Code. BASIC is one of the easiest computer programming languages to learn. See also Applesoft BASIC and Integer BASIC.

BIT A BInary digiT; the element of computer information. A 1 or 0.

Board Computer jargon for printed circuit board. Synonymous with "card" (printed-circuit card).

Card Computer jargon for printed circuit card. Synonymous with "board" (printed circuit board).

Chip Computer jargon for integrated circuit. Also referred to as an I.C. A tiny wafer (chip) of silicon containing thousands of micro-electronic circuits encapsulated in a hard plastic case. See DIP Chip.

Command character An ASCII control-code character which sets the Parallel Pro firmware into command mode. The standard command character is a Control-I.

Control code Any of the non-printing ASCII characters used to start, stop, or modify various data transmission functions or control the operation of a parallel device. e.g. A line-feed character causes a printer to advance one line or a video display to scroll one line.

Control panel A permanent program built into the Parallel Pro which displays a menu of options on the video screen and allows you to change the option settings with keyboard commands.

CP/M An acronym for Control Program / Monitor. A disk operating system which supports the Z-80 microprocessor. To run CP/M (or CP/AM) on an Apple computer, you must have a Z-80 co-processor card installed. See also Z-80 Plus and CP/AM.

DIP Chip DIP is an acronym for Dual-Inline-Package and refers to the two-row pin arrangement of the plastic integrated-circuit case. See Chip.

Edge connector The tab of gold-plated finger-like contacts along the lower edge of an accessory printed circuit board. The card's edge connector is inserted into one of the computer's slots.

Expansion slot One of seven narrow connectors (an Apple][has eight) on the main circuit board near the back of the computer.

Firmware Computer jargon for a computer program (software) permanently stored in a ROM chip (hardware) in the computer, accessory card, or peripheral device.

Hexadecimal Notation of numbers in base-16. (Decimal numbers are base-10.) Numbers written in hexadecimal notation are preceded by a dollar sign. (e.g. \$AA)

Interface A combination of software and hardware devices that enable the computer to be connected to a peripheral device. Sometimes called a peripheral interface or peripheral card.

Operating System A set of specialized programs that are loaded into a reserved portion of the computer's memory whenever a system disk is booted. These programs contain the instructions called upon by the application program (software) to manage and coordinate the routine input and output activities of the computer system (hardware).

Parallel A form of data transmission in which all bits of a character are sent simultaneously along separate wires. Contrast: Serial.

Pascal A popular programming language that emphasizes a structured approach to computer programming.

Peripheral A device that is connected to and operated by the computer but is not part of the computer. Printers, disk drives, and game paddles are peripheral devices.

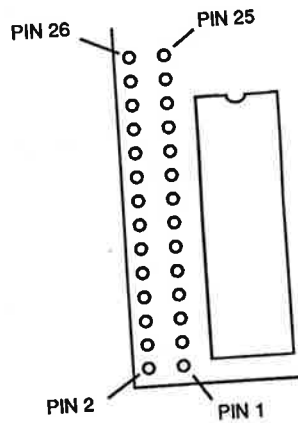
ProDOS Apple Computer's PROfessional Disk Operating System.

ROM An acronym for Read Only Memory. A set of computer programs permanently stored in a ROM chip is often referred to as firmware.

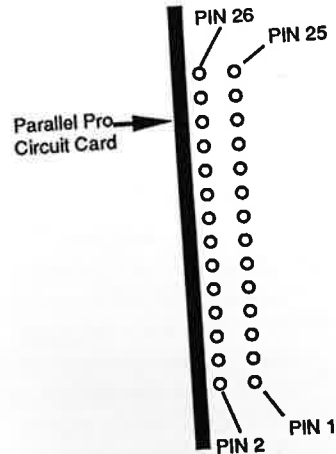
Serial A form of data transmission in which each character is sent one bit at a time along a single wire. Contrast: Parallel.

APPENDIX A The Parallel Connector

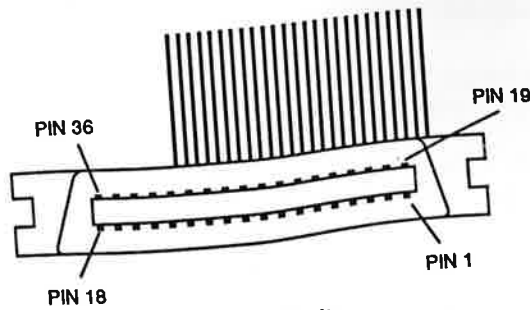
<u>Signal</u>	<u>26 Pin Header</u>	<u>36 Pin Delta</u>
Strobe	1	1
Data Bit 0	3	2
Data Bit 1	5	3
Data Bit 2	7	4
Data Bit 3	9	5
Data Bit 4	11	6
Data Bit 5	13	7
Data Bit 6	15	8
Data Bit 7	17	9
Acknowledge	19	10
Printer Busy	21	11
Paper Empty	23	12
Ground	2 - 24 Even	19 - 30
No Connect	25 and 26	13 and 31



Buffer Pro
26 Pin Header



Parallel Pro
26 Pin Header



36 Pin Delta
Connector
(Centronics)

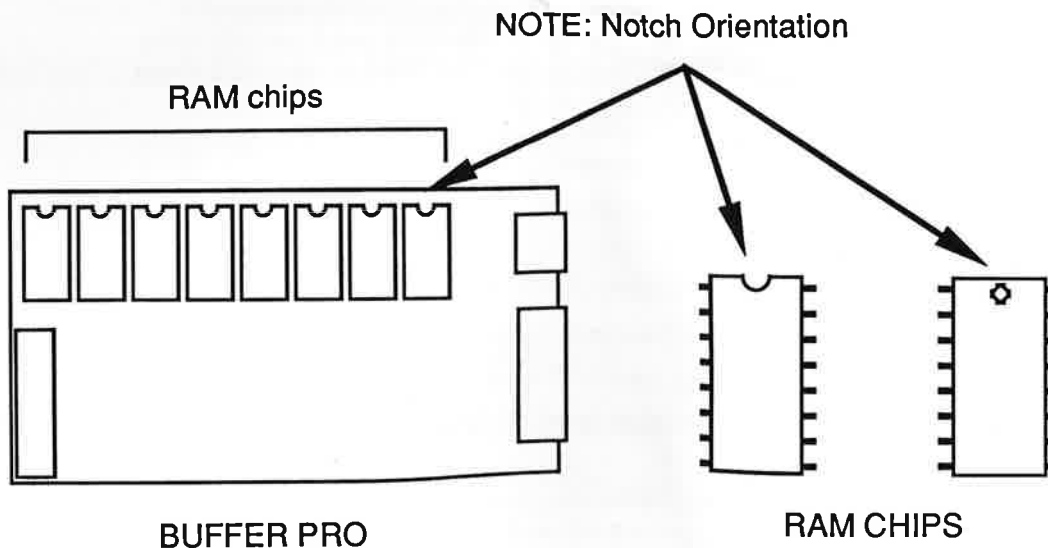
APPENDIX B

Adding Memory to the Buffer Pro

The optional Buffer Pro is expandable to 256K. There are eight sockets on the Buffer Pro where memory can be added. These memory expansion sockets will accept either 256K or 64K D-RAM Chips. Almost any variety and speed of RAM chip can be used. The 256K and 64K chips can be used together and can be installed in any open RAM chip socket!

Each 64K chips will buffer 8K. Each 256K chip will buffer 32K. For example, two 64K RAM chips and one 256K RAM chip will buffer 48K of RAM.

WARNING! When adding RAM Chips be sure to orient the notch on the RAM chip with the notch on the RAM socket. See Figure Below.



APPENDIX C

Where to Get More Information

For most user applications, this manual provides all of the information required to install and set up your Parallel Pro card.

About Your Parallel Device

For specific information about your printer or other parallel device, you should refer to the instruction manual that came with the device. If the manual doesn't have the information you need or you don't have the manual, contact the manufacturer of the device or the dealer from whom you purchased the device.

Applied Engineering Technical Support

If you have a technical question relating to your Parallel Pro or Buffer Pro card that is not covered in the manual, please contact the dealer from whom you purchased the card. If you are experiencing difficulties with one particular program, contact the program's author or publisher.

In the event that the dealer or the publisher's support personnel cannot answer your question, call Applied Engineering Technical Support. The support representatives are experienced in the applications and uses of Applied Engineering products, but in order to provide a quick and effective answer to your question, they will need to know as much as possible about the hardware and software specifically related to your question. Please provide the technical support representative with the following information:

- ◇ The Applied Engineering product related to your question and its revision number.
- ◇ The original and current memory configuration of the card (if applicable).
- ◇ The model and revision of your computer.
- ◇ What peripherals are being used and what cards are in each slot.
- ◇ The name, version, and revision level of the software that you are experiencing problems with.
- ◇ The results of any test programs, diagnostics, or troubleshooting done by you, your dealer or your software publisher's support department.

Applied Engineering

Technical Support

(214) 241-6069

9 AM to 12:30 PM & 1:35 PM to 5 PM(CST)

Monday Through Friday

(Please call only the number above for technical support. Our sales office cannot transfer calls to the support lines.)

Returning a Product

If your product needs to be returned, the technical support representative will give you a Return Material Authorization (RMA) number.

- Record the RMA number for your own records.
- Write the RMA number on the outside of the package you send to us.
- Write the RMA number at the top of the return form included with your product package.

Fill out the Return Form on back of the yellow sheet marked, "Attention!" A correctly completed form will greatly reduce the time it takes to process and return your product.

Attach a copy of your original invoice to the return form.

- ❖ **Warning:** If you don't include an invoice products will be treated as out of warranty products and will be returned to you C.O.D. for the amount of the service charge.

A completed form should look something like the one below.

Invoice

If you should ever have to return your PC product for repair, please complete this form and attach a copy of your original invoice.

RMA Number: 905706666

<input type="checkbox"/> Computer	<input checked="" type="checkbox"/> Keyboard <u>Generic</u>	OS/2 Settings 1: <input type="checkbox"/> Your <input type="checkbox"/> Printer 2: <input type="checkbox"/> Your <input type="checkbox"/> Modem 3: <input type="checkbox"/> Your <input type="checkbox"/> Test 4: <input type="checkbox"/> Your <input type="checkbox"/> Mouse 5: <input type="checkbox"/> Your <input type="checkbox"/> Smart 6: <input type="checkbox"/> Your <input type="checkbox"/> Disk 7: <input type="checkbox"/> Your <input type="checkbox"/> QA-Test Startup: _____
<input type="checkbox"/> //c	<input checked="" type="checkbox"/> Printer <u>EPSON</u>	
<input type="checkbox"/> //e Non-Behanced	<input checked="" type="checkbox"/> Modem <u>Generic</u>	
<input type="checkbox"/> //e Enhanced	<input type="checkbox"/> Other (list) <u>IBM</u>	
<input type="checkbox"/> I/O ROM # _____		
<input type="checkbox"/> Other (list) _____		

Slot 0 (if Present) _____	Slot 5 _____
Slot 1 <u>Par Pro & Buf</u>	Slot 6 <u>Transfer</u>
Slot 2 <u>Parallel</u>	Slot 7 <u>Apple II Controller</u>
Slot 3 _____	Aux. Slot (if any) _____
Slot 4 <u>RAMFaster</u>	Mem. Exp. (if any) <u>RAMWorks III</u>

Comments: Although I'm very happy with the printer interface, ever since I joined the Buffer Pro to my Parallel Pro they've been making little RAM chips. I hate to separate them because they work so well together.

Description of Software (name, vendor, version, any enhancements, etc.):
It's been most noticeable when using Reading Rabbit and Multiplying Rabbit even though we don't print while using these.

Steps to Duplicate Problem: Attach Buffer Pro to Parallel Pro. Insert in computer. Close lid. Turn computer on and wait 'til warm. Minutes later, tiny little RAM chips (about 6K-8K apiece) start crawling out the opening in the back of the computer.

When You Ship

If you don't have the original packing material, wrap the board in anti-static material (preferably the anti-static bag in which the card was originally shipped, however, aluminum foil will work fine). Pack it in a sturdy box cushioned with wadded papers (i.e. used computer paper or newspaper).

- ❖ **Warning:** If your product is damaged due to inadequate packing, your warranty will be void.

Include the return form and invoice.

Send the package, shipping prepaid, to:

RMA# ?
Applied Engineering
Technical Support
3210 Belt Line Road, Suite 154
Dallas TX 75234

You should insure your package. \AE will not assume any responsibility for inadequate packing or loss or damage during shipping.

When We Receive

Our service department will use your completed form in an attempt to duplicate the problem.

If it is determined that your product is defective due to a manufacturing defect, your card will be repaired or replaced at \AE 's option.

Any misuse, abuse, or non- \AE authorized alteration, modification and/or repair to the Applied Engineering product will void the warranty. This warranty will also be void if you use the \AE product for any purpose other than its intended use.

Your product will be fully tested before it is shipped back to you, transportation prepaid, via UPS regular delivery.

Once your product is received by Technical Support, it will be processed and delivered to our shipping department within 7 to 10 working days.

Federal Communications Commission Radio Frequency Interference Statement

Warning: The equipment described in this manual generates and uses radio frequency energy. If it is not installed and used properly (i.e. in strict accordance with these instructions), it may cause interference to radio or television reception.

FCC I.D. Number: EYW5QGPALLELPRO

This equipment has been type tested and found to comply with the limits for a class B computing device in accordance with the specifications in Subpart J of Part 15 of the FCC Rules. These rules are designed to provide reasonable protection against radio and television interference in 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 equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

The effects of interference can be minimized or eliminated by one or more of the following measures:

- Reposition the receiver's antenna. Also make sure the antenna wires are making good electrical contact.
- Use a roof-mounted antenna rather than a "rabbit-ear" antenna or an antenna mounted in the attic.
- Make sure that all electrical connections on the computer are secure and any shielded I/O cables are properly fastened.
- Move the computer farther away from the receiver.
- Plug the computer and receiver into separate electrical circuits.

If the interference persists, you should seek advice or service from your dealer or a reputable radio/television technician.

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 Solve Radio-TV Interference Problems"

This booklet is available from the U.S. Government Printing Office, Washington, D.C. 240402, Stock No. 004-000-00345-4.

Warning: This equipment has been certified to comply with the limits for Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with non-certified peripherals is likely to result in interference to radio and TV reception.

Applied Engineering is not responsible for any radio or television interference caused by unauthorized modifications to this equipment. It is the responsibility of the user to correct such interference.