



Apple II Miscellaneous

#16: Apple II Parallel Interface Card Firmware

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This Technical Note documents the commands the Apple II Parallel Interface Card's firmware supports and how to find the slot occupied by an Apple II Parallel Interface Card.

Parallel Printer Interface Card Commands

The manual that shipped with the Apple II Parallel Interface Card states correctly that its firmware can be “identical to the firmware in the earlier Apple II Centronics® Printer Card” or that it can be “identical to the firmware in the earlier Apple II Parallel Printer Card.” However, the manual did not correctly document the commands the Parallel Interface Cards can handle or explain the commands clearly.

Apple II Parallel Interface Card commands, embedded in the output flow to the card's firmware, are invoked by the BASIC output routines. The following three options affect the output data flow and can be controlled by sending control codes as commands to the firmware:

Flow option	Description
Video echo	When this option is on, characters sent to the printer are echoed to the video screen (via COUT1) after they are sent out the parallel port. Note: When an Apple II Parallel Interface Card in Parallel Printer mode is echoing characters to the video screen, the line length is forced by the card's firmware to 40.
Line length	When the video echo option is off, the line length (the number of character sent before a forced carriage-return) can be set in the range of 40 to 255 characters. When video echo is on, the line length is forced to 40.
Automatic line-feed	When this option is on, the firmware generates and sends a line-feed character after each carriage-return character sent. Note: The automatic line-feed option can only be used when the Apple II Parallel Interface Card is in Parallel Printer mode.

All commands are preceded by a command character. The normal command character is Control-I (ASCII \$09). If you want to change the command character from Control-I to another command character (for example, Control-W), send Control-I, Control-W. To change back, send Control-W, Control-I. The format of the commands is as follows:

{command-character} {command-string}

There are two types of commands:

- Commands that only change the video echo mode or the automatic line-feed mode. The command format for these commands consist of an uppercase letter by itself (for example, *I* to restore the default settings).
- Commands that set the line length and change the video echo mode or automatic line-feed mode. The command format for these commands consists of a number, represented by *n*, followed by an uppercase letter with no space between the characters. The number, in the range of 40 to 255 characters is the new line length setting (for example, *80N* to set the line length to 80).

Commands in Centronics Printer Mode (switch 6 on)

In Centronics Printer mode, the default settings are:

- Video echo option on
- 40-column line length
- Command character = Control-I

The Centronics mode firmware does not support the option to automatically generate line-feed characters after carriage return characters. When the interface card is initialized in Centronics mode, it also sends the Centronics MicroPrinter 40-column mode control character to the printer (ASCII \$9E).

The following are the commands supported by the Apple II Parallel Interface Card when it is in Centronics Printer mode:

nN

The *N* command always does these two things:

- Turn the video echo option off.
- Send the Centronics MicroPrinter 80-column mode control character to the printer (ASCII \$1D).

In addition, if the number *n* is included, the line length is set to *n*. The number *n* must be in the range of 40 to 255 characters.

nO

The *O* command always does the following:

- Turn the video echo option on.

In addition, if the number *n* is included, the line length is set to *n*. The number *n* must be in the range of 40 to 255 characters.

Commands in Parallel Printer Mode (switch 6 off)

In Parallel Printer mode, the default settings are:

- Video echo option on
- 40-column line length
- Automatic line-feed option on
- Command character = Control-I

The following are the commands supported by the Apple II Parallel Interface Card when it is in Parallel Printer mode:

I or M

The *I* and the *M* commands always do these three things:

- Turn the video echo option on
- Force the line length to 40
- Turn the automatic line-feed option on

K or O

The *K* and the *O* commands always do these three things:

- Turn the video echo option on
- Force the line length to 40
- Toggle the automatic line-feed option

nH or nL

The *H* and the *L* commands always do these two things:

- Turn the video echo option off
- Turn the automatic line-feed option off

In addition, if the number *n* is included, the line length is set to *n*. The number *n* must be in the range of 40 to 255 characters.

nJ or nN

The *J* and the *N* commands always do the following:

- Turn the video echo option off

In addition, if the number *n* is included, the line length is set to *n*. The number *n* must be in the range of 40 to 255 characters. These commands do not affect the automatic line-feed option setting.

Finding the Parallel Printer Interface Card

The Apple II Parallel Interface Card manual does a good job of describing the Apple Pascal 1.1 interface standard. However, publishing that information in that manual is very misleading since the Apple II Parallel Interface Card does not support **any** part of the Pascal 1.1 interface standard.

However, since most programs use the Pascal 1.1 device signature bytes to identify peripheral cards, here are the values you find in the Pascal 1.1 device signature byte addresses:

<u>Address</u>	<u>Value</u>
\$Cs05	\$48
\$Cs07	\$48

Remember, these values do not correspond to any signature bytes defined by the Pascal 1.1 interface standard. The address \$Cs0B contains the value \$58 and the address \$Cs0C contains the value \$FF, (the last two bytes of a JSR \$FF58 to identify the slot) but these two locations should not be used to identify parallel cards in general.

Further Reference

- *Apple II Parallel Interface Card Manual*

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