

Apple IIe Technical Note #7

Interfaces -- Serial, Parallel, and IEEE-488

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This Technical Note describes the pin configurations of three different interface types offered on the Apple II family of computers.

Serial

Currently, Apple sells a card, called the Super Serial Card (SSC), that can be used to connect an Apple printer to an Apple II. The SSC replaces both the Communications Card and the Hi-Speed Serial Card. The SSC supports the firmware (Pascal 1.1) protocol except for the optional control and interrupt handling routines.

The SSC has a 10-pin header on it, but comes with a cable which connects the header to a female DB-25 connector. The SSC can be configured as either a modem (DCE) or as a terminal (DTE) using a jumper block (in the latter case the jumper block acts as a modem eliminator). Though the pin configuration of the DB-25 connector is well defined, there is no standard use of the handshake signals. Different printers will use the handshake lines for different functions. Table 1 shows the pin configuration for the DB-25 on the SSC. Consult your printer manual for more specific information on which signals are used.

Table 1 - Pin Configuration for SSC DB-25 Connector

10-Pin Header	Signal Name	Female Terminal	DB-25 Modem
1	Frame Ground (FRMGND)	1	1
2	Transmit Data (TxD)	3	2
3	Receive Data (RxD)	2	3
4	Request to Send (RTS)	8	4
5	Clear to Send (CTS)	8	5
6	Data Set Ready (DSR)	20	6
8	Signal Ground (SGLGND)	7	7
10	Data Carrier Detect (DCD)	4, 5	8*
7	Secondary Clear to Send (SCTS)	19	19**
9	Data Terminal Ready (DTR)	6	20

* Only if SW₁₋₇ is closed (on) with SSC.

** Only if SW₂₋₇ is closed (on) with SSC.

Parallel

Apple formerly shipped a parallel card, called the Parallel Interface Card (PIC), which can be used to connect a parallel printer to an Apple II. The PIC replaced the Parallel Printer Interface Card and the Centronics Interface Card. The PIC does not support the firmware protocol, so Pascal identifies the card as a printer card (described in Pascal protocols).

Most commonly used printers operate properly if the switches on the PIC are set as in Figure 2.

Figure 2 - PIC Switch Configuration

	1	2	3	4	5	6	7
On				X	X		
Off	X	X	X			X	X

This setting prepares the parallel interface to transfer data using a 1 microsecond strobe pulse of negative polarity when sending data, while receiving a negative acknowledge signal, with interrupts disabled.

The PIC has a 26-pin header, but it comes with a cable which connects the header to a female DB-25. The Parallel Printer Card and the Centronics Card used a 20-pin header. Most parallel printers (90%) use a "microribbon 36" as the connector. The pin configuration varies from printer to printer, but Table 2 (next page) covers most printers (Apple DMP, Epson). For other printers, refer to page 7 of the Parallel Interface Card Manual.

IEEE-488

The IEEE-488 bus standard is a well defined eight-bit parallel, byte serial, asynchronous data transfer interface. The standard has been thoroughly documented with the most complete description available from the Institute of Electrical and Electronic Engineers (IEEE) in New York. Standard cables are manufactured by many companies and usually advertised as either IEEE-488, General Purpose Interface Bus (GPIB), or Hewlett-Packard Interface Bus (HPIB) cables.

IEEE-488 cards do not support Apple firmware protocols, so an assembly language driver must be used to access the cards from high level languages (see Appendix F of the IEEE-488 Interface User's Guide).

Table 2.

PIC Function	Printer Function	26-Pin	DB-25	36-Pin	20-Pin
Ground	Ground	3	2	19	1
Ground	Ground	22	24	16	20
Ground	Ground	7	4		
Ground	Ground	14	20		
ACK	Acknowledge	6	16	10	2
Strobe	Strobe	4	15	1	8
DO0	Data 1	9	5	2	10
DO1	Data 2	11	6	3	11
DO2	Data 3	15	8	4	12
DO3	Data 4	18	22	5	13
DO4	Data 5	20	23	6	14
DO5	Data 6	21	11	7	15
DO6	Data 7	23	12	8	16
DO7	Data 8*	25	13	9	17
DI3	Fault	24	25	32	6
DI4	Busy	2	14	11	7
DI5	Paper Out	12	19	12	9
DI6	Select	16	21	13	8
DI7	Enable	10	18	35	19
	**		7		

* This may be assigned a "hard" value for some printers to distinguish between graphics and normal character sets.

** Pin 7 is blocked on the female DB-25 connector and omitted on the male DB-25 connector to prevent the insertion of serial connectors into parallel ports.

Further Reference:

Apple IIe Technical Reference Manual

Parallel Interface Card Manual

IEEE-488 Card Manual