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Appendix A C O N T E N T S

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Parallel interface

The printer uses a bi-directional parallel interface for high-speed data transmission for the host computer. This interface includes the buffers which are compatible with the IEEE 1284 standards. The parallel interface provides support for the ECP and nibble modes in this standards.

Port pin assignment

The pins of the parallel interface connector carry the signals listed below.

No.	Terminal	Signal	No.	Terminal	Signal
1	nStrobe	(STBIN1/2*)	19	Ground	GND
2	Data1	(PAD0)	20	Ground	GND
3	Data2	(PAD1)	21	Ground	GND
4	Data3	(PAD2)	22	Ground	GND
5	Data4	(PAD3)	23	Ground	GND
6	Data5	(PAD4)	24	Ground	GND
7	Data6	(PAD5)	25	Ground	GND
8	Data7	(PAD6)	26	Ground	GND
9	Data8	(PAD7)	27	Ground	GND
10	nAck	(ACKOUT)	28	Ground	GND
11	Busy	(BUSYOUT)	29	Ground	GND
12	PError	(PERROR)	30	Ground	GND
13	Select	(SELECT)	31	nInit	(INIT*)
14	nAutoFd	(AUTOFD*)	32	nFault	(FAULT*)
15	Not defined	NC	33	Not defined	Pull-up (1kΩ)
16	Logic ground	GND	34	Not defined	NC
17	Chassis ground	(GND)	35	Not defined	Pull-up (1kΩ)
18	Peri-logic H	(VCC)	36	nSelect In	(SELECTI*)

*: Negative logic

**: Rated current for pin 18 is 0.5A (fused).

***: Pin 17 is grounded through a chip bead or a chip resistor.

Parallel interface connection

Detailed descriptions of the parallel interface signals follow.

Signal	Meaning
Strobe* [nStrobe] (Pin 1)	A negative-going Strobe* pulse causes the printer to read and latch the data on the Data 0 [1] to Data 7 [8] signal lines.
Data 0 [1] to Data 7 [8] (Pins 2 to 9)	These eight signals form the data byte sent from the host computer to the printer. Data 7 [8] is the most significant bit.
Acknowledge* [nAck] (Pin 10)	This negative-going pulse acknowledges the previous character received by the printer. Acknowledge* pulses are sent only when Busy is low.
Busy [Busy] (Pin 11)	This signal is high when the printer is busy and low when it is able to accept more data. Every high-to-low transition is followed by an Acknowledge* pulse.
Paper Empty [PError] (Pin 12)	This signal goes high when the printer runs out of paper.
On-Line [Select] (Pin 13)	This signal is high when the printer is on-line and low when the printer is off-line. It goes low when the upper unit is raised, or when the ON LINE key is pressed to set the printer off-line. <i>Note</i> - The Paper Empty and On-Line signals are not used unless enabled by the FRPO command (O2 parameter).
Auto-Feed [nAutoFd] (Pin 14)	This signal is used in the Epson version of the Centronics interface to receive a carriage return. In high-speed mode, it is used as an interrupt.
+5V DC (pin 18)	This line is connected to the printer's +5V DC line (+5V \pm 0.5V, 250 mA maximum, fused).
Prime [nInit] (Pin 31)	This signal is used in the standard Centronics interface to enable the computer to reset the printer. It is ignored by the printer.
Error* [nFault] (Pin 32)	When the high-speed parallel line control is on (FRPO O2=2), this line returns error status.
Auxiliary output 1 (Pin 33)	This signal line is not used.
Power Ready (Pin 35)	This signal is high when the printer's power is on.
Select In [NSelectIn] (Pin 36)	This signal is used in some versions of the Centronics interface to enable the computer to force the printer on-line. In high-speed mode, it is used as an interrupt.

Serial interface

The printer is equipped with a serial port whose circuitry duplicates the option interface card IB-9. The device responsible for controlling the serial interface is integrated in the gate array in the controller system. The serial interface supports both protocols of RS-232C and RS-422A.

In the RS-232C protocol, CTS and DSR signals are included to support SNMP (Simple Network Management Protocol) protocol (used typically for Windows 95's plug-and-play function). Toggling the protocol between RS-232C and RS-422A is made by a shorting jumper socket that is accessible on the controller board. (The jumper wire arrangement, that used to be provided for the succeeding models to switch the DTR polarity is not used with these models.) To change the serial interface protocol, refer to *Changing the serial interface configuration* section which follows.

A 25-pin D-sub connector is used for the serial interface. The extra signals used for RS-422A are assigned to these pins that are not used for RS-232C according to the IBM pin assignment scheme. Certain other unused pins are also used for internal debugging.

Changing the serial interface configuration

To change the serial interface protocol from RS-232C to RS-422A, or vice versa, the main controller board must be taken out of the printer. Protect the electronics by taking these precautions:



Before touching the main circuit board, touch a water pipe or other large metal object to discharge yourself of static electricity. While doing the work, it is recommended that you wear an antistatic wrist strap.

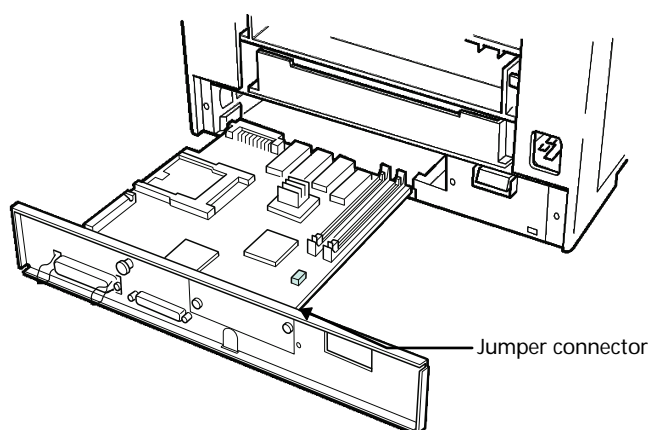
Touch the main circuit board only by the edge.



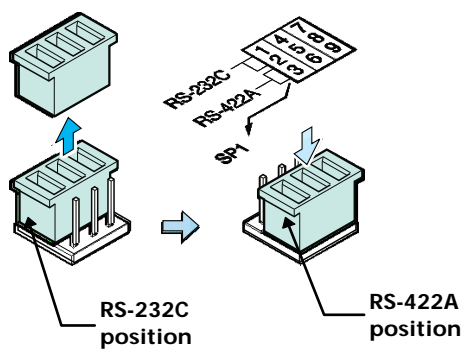
Be sure to remove the memory card first if inserted in the printer's memory card slot.

Refer to chapter 3 and remove the main circuit board out of the printer.

Locate the jumper connector.



To change the serial protocol from RS-232C to RS-422A, for example, carefully remove the jumper connector from the main circuit board, and reconnect to the pin position shown in the diagram.



Replace the main controller board back into the printer. Secure the board by the three screws.

Serial port pin assignment

The pins of the parallel interface connector carry the signals listed below. The RS-422A specific signals are noted in the *Definition*.

No.	Signal	Flow	Definition
1	FG		Frame ground
2	TxD	Printer → host	Transmit data: RS-232C
3	RxD/RDA	Printer → host	Receive data/receive data (Reversed)
4	RTS	Printer → host	Transmit request
5	CTS	Host → printer	Transmit permitted
6	DSR	Host → printer	Data-set-ready
7	SG		Signal ground
9	SDA	Printer → host	Transmit data (Reversed): RS-422A
10	SDB	Printer → host	Transmit data: RS-422A
(14)	DBTXD	Printer → host	Transmit data: Debugger
(16)	DBRXD	Host → printer	Receive data: Debugger
18	RDB	Host → printer	Receive data: RS-422A
20	DTR	Printer → host	Data-terminal-ready
(23)	DBCLK	Host → printer	Transfer clock: Debugger
Other	Not connected		Undefined

Parallel interface connection

Detailed descriptions of the parallel interface signals follow.

Signal	Meaning
FG (Pin 1)	This pin is connected directly to the printer frame.
T _x D (Pin 2)	RS-232C only: This output carries asynchronous data sent by the printer to the computer. It is used mainly in handshaking protocols.
R _x D/RDA (Pin 3)	This input carries serial asynchronous data sent by the computer to the printer. In RS-422A, this carries the inversed differential data (RDA).
RTS (Pin 4)	This output is always held high (above 3 V).
CTS (Pin 5)/DSR (Pin 6)	Unused.
SG (Pin 7)	All signals can transmit between the printer and the host computer to send each signals with a signal ground.
SDA (Pin 8)	This output transmits asynchronous inversed form of differential data from the printer to the computer.
SDB (Pin8)	This output carries asynchronous non-inversed form of differential data from the cmputer to the printer.
DTR - Data Terminal Ready (Pin 20)	This output is used as a buffer nearly-full handshake line. It is held high (above 3 V) when the buffer can accept more data.

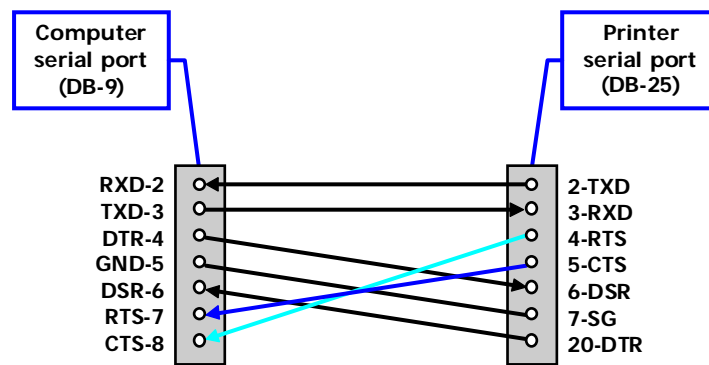
RS-232C interface voltage levels

The voltage levels of the RS-232C signals conform to EIA RS-232C specifications. FALSE is from 3 volts to 15 volts. TRUE is from -3 volts to -15 volts. Voltages between -3 volts and 3 volts are undefined. The voltage levels of the RS-422A signals are equivalent to those of the RS-232C signals except the signals used for transmission and reception.

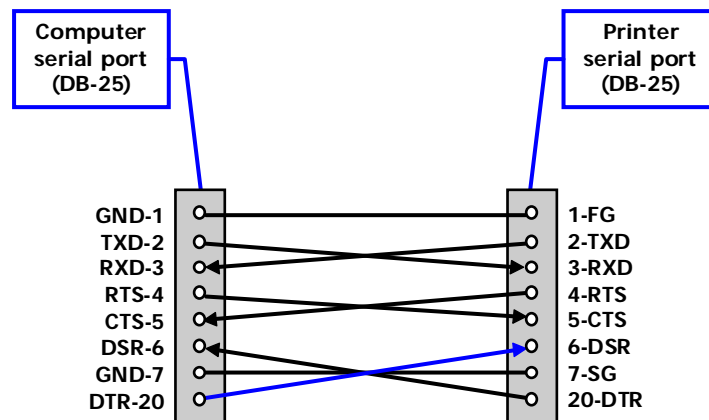
Connector configurations

The printer uses a DB-25 connector for the serial interface. Depending on the computer configuration for serial interface, use either of the appropriate configurations. A special cable must be prepared or obtained for the RS-422A configuration by referring to the diagram (last) below.

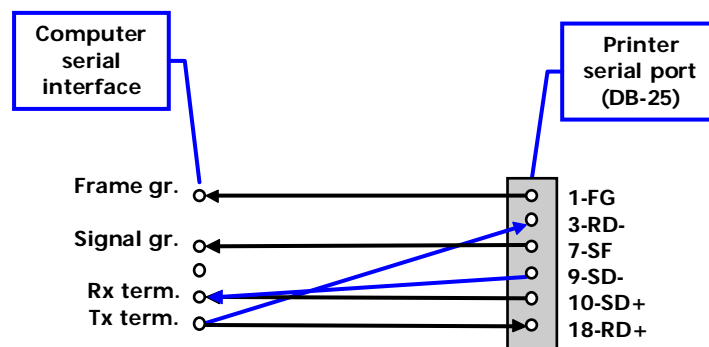
RS-232C - FOR COMPUTERS WITH A DB-9 CONNECTOR:



RS-232C - FOR COMPUTERS WITH A DB-25 CONNECTOR:



RS-422A



On the computer serial port, investigate pin assignments depending on the computer manufacturer's instruction. Since the RS-422A configuration does not employ control lines except for data transmission/reception, select a mode in which signals such as DTR are not used.

RS-232C protocol

The serial interface supports the full baud rates of: 300, 600, 1,200, 2,400, 4,800, 9,600, and 19,200, 38,400, 57,600, and 115.2k (bps). For adjusting serial interface parameters including baud rate, parity, etc., refer to chapter 7 in the printer's *User's Manual*.