

Appendix A P R I N T E R I N T E R F A C E

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 power | (VCC) | 36 | nSelect In | (SELECTI*) |

*: Negative logic

**: Maximum rated current for pin 18 is 0.25A (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±0.5V, 250 mA maximum [serial and parallel total], 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.

Serial interface specifications

The table below summarizes the specifications for the serial interface used in the printer. The parameter options can be selected using either the printer's front panel or Prescribe FRPO command.

| Item | Option parameters | Selection | Default |
|-----------------------------|---|--|---------------------------|
| Interface mode ¹ | RS-232C or RS-422C | By changing hardware jumper (See the next section) | RS-232C (factory setting) |
| Baud rate | 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 | Front panel or FRPO H1 command | 9600 (96) |
| Data bit length | 7, 8 | Front panel or FRPO H2 command | 8 |
| Parity bit length | None (0), odd (1), even (2), ignore | Front panel or FRPO H4 | None (0) |

¹ The serial interface mode currently engaged is indicated at the bottom of the service status page as: RS2=RS-232C mode, RS4=RS-422C mode.

| Item□ | Option parameters□ | Selection□ | Default |
|-----------------------------------|--|---|-----------------------------|
| | (3)□ | command | |
| Protocol ² | DTR [pos] & Xflow [buf] (0), DTR [pos] (1), DTR [neg] (2), Xflow [buf] (3), ETX [nobuf] (4), Xflow [nobuf] (5), ETX [buf] (6), Xflow [buf] & ETX [nobuf] (7) | Front panel [(1) through (4) only] or FRPO H5 command | DTR [pos] & Xflow [buf] (0) |
| Error robust control ³ | Robust On (0), Robust Off (1), Error Control & Robust Off (10), Error Control & Robust On (11) | FRPO D0 command□ | Robust On (0) |
| Status send□ | ^C, ^T, Esc.B, Esc. | | |

Data error information (Snn)

A data error occurred on the serial interface is indicated on the service status page. The *Snn* code in the same row as *Service* information on the status page shows various error conditions as follows:

| S code□ | Meaning |
|---------|--|
| S00□ | No error |
| S01□ | Framing error |
| S02□ | Overrun error |
| S03□ | Overrun error and framing error |
| S04□ | Parity error |
| S05□ | Parity error and framing error |
| S06□ | Parity error and overrun error |
| S07□ | Parity error, overrun error, and framing error |

² In the protocols that do not use DTR, DTR is fixed to be positive.

³ Robust: Xon is sent every 3 to 5 seconds during ready or waiting. Error Control: Sets the printer off line when an error occurs or at off line state.

Changing the serial interface configuration

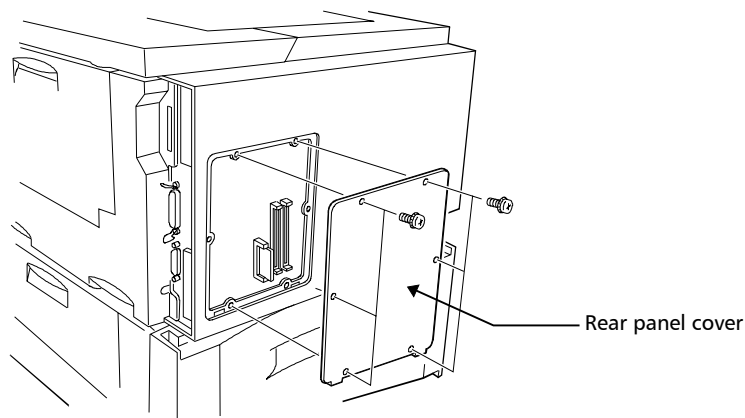
To change the serial interface protocol from RS-232C to RS-422A, or vice versa, the main controller board must be taken out of the printer. Protect the electronics by taking these precautions:



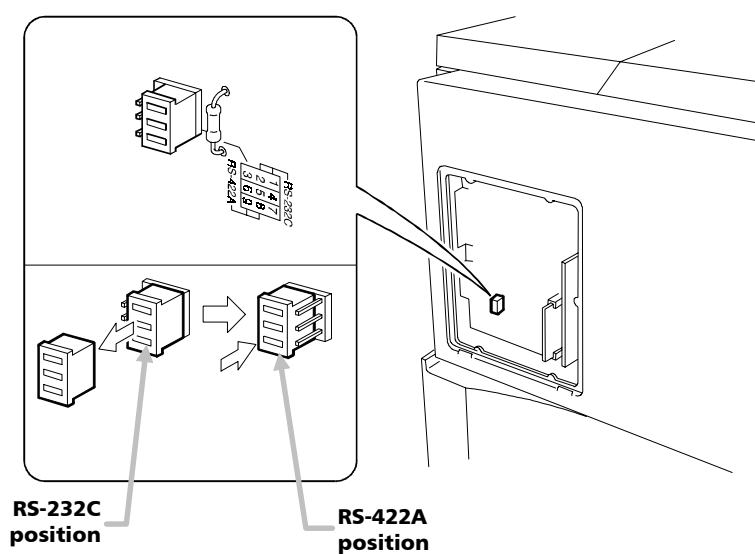
Before touching the main circuit board, touch a water pipe or other large metal object to discharge yourself of static electricity. While doing the work, it is recommended that you wear an antistatic wrist strap.

Touch the main circuit board only by the edge.

Refer to the diagram below and remove the rear panel cover.



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.



After finishing the above procedure, replace the rear panel cover back by referring the diagram above. Secure the panel cover by the six 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 | Host → Printer | 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 |
| 11 | +5VDC | — | Peri-logic power |
| 18 | RDB | Host → printer | Receive data: RS-422A |
| 20 | DTR | Printer → host | Data-terminal-ready |
| Others | Not connected | — | Undefined |

Serial interface connection

Detailed descriptions of the serial 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 9) | This output transmits asynchronous inversed form of differential data from the printer to the computer. |
| SDB (Pin 10) | This output carries asynchronous non-inversed form of differential data from the computer to the printer. |
| +5V DC (Pin 11) | This line is connected to the printer's +5V DC line (+5V±0.5V, 250 mA maximum [serial and parallel total], fused). |
| 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. |

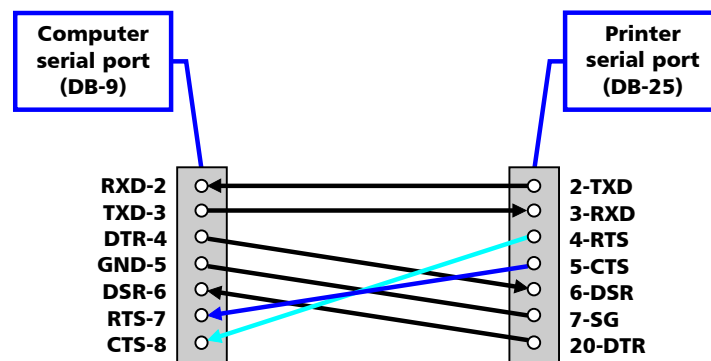
RS-232C interface voltage levels

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.

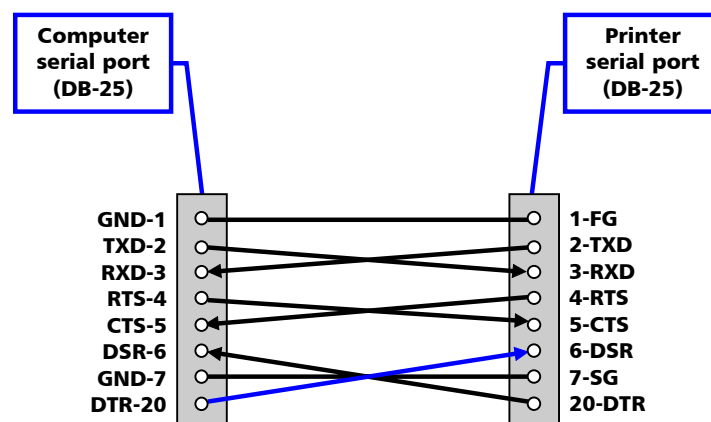
Connector configurations

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.

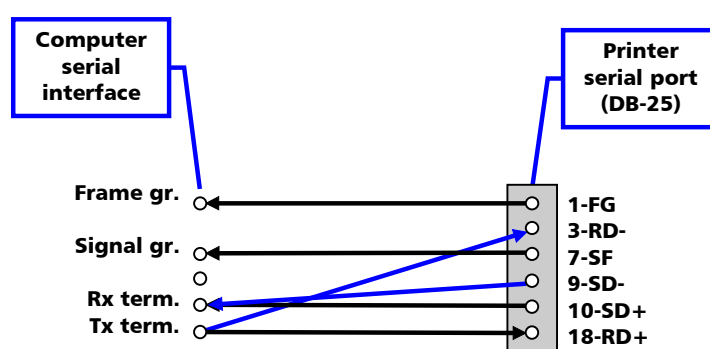
RS-232C - FOR COMPUTERS WITH A DB-9 CONNECTOR:



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*.