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# Comtrol Cable User Guide



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# Getting Started

## Overview

This document describes how to build cables for Comtrol products.

This chapter describes the standard Comtrol cables and the basic types of devices that can connect to Comtrol products. It also explains the difference between shielded and unshielded cables. This chapter covers the following topics:


- *RS-422 Pinouts*
- *Standard Comtrol Cables*
- *DTE versus DCE*
- *Shielded vs. Unshielded*


## RS-422 Pinouts

RS-422 pinouts are not the same across Comtrol product lines. For example, a DB9 loopback plug designed for a RocketPort model will not work on a DeviceMaster model. When you build a cable make sure that you use the correct pinouts for the Comtrol product. The following sections describes the valid pinouts and cabling for each product:


- *Building Cables for RocketPort Products*
- *Building Cables for DeviceMaster Products*


## Standard Comtrol Cables

The following table displays standard cables for RocketPort products.

| Comtrol Product | Cable Type | Connector Type | Part Number | | Cable Length | |
|---|---|---|---|---|---|---|
| | | | New Part Number | Old Part Number | Feet | Meters |
| RocketPort 4,8,16-port ISA/PCI, and 8 port uPCI cables | Interface Cable | DB25 to DB25 | 4000025 | 23601A | 3’ | 0.91 |
| RocketPort Rackmount Cables | Interface Cable | DB25 to DB25 | 4000027 | 23607A | 10’ | 3.05 |
| RocketPort ISA 32-port, PCI, uPCI 16/32-port, CPCI 16-port cables | Interface Cable | DB25 to DB26 | 4000030 | 23701A | 3’[a] | 0.91 |
| | Octacable | DB25 male | 4000032 | 23801-0 | 3.5’ | 1.06 |
| | Octacable | DB9 male | 4000033 | 23901-7 | 3.5’ | 1.06 |
| | Quadcable | DB25 male | 4000034 | N/A | 3.5’ | 1.06 |
| | Quadcable | DB9 male | 4000035 | N/A | 3.5’ | 1.06 |
| | Octacable | RJ45 | 4000036 | N/A | 10” | 0.25 |

a. This is a 3 foot cable. If necessary, you can connect a 10 foot DB25 to DB25 cable to extend the length of the cable.




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# DTE versus DCE

Most devices, except modems, are Data Terminal Equipment (DTE) devices. Modems are Data Communication Equipment (DCE) devices. Comtrol ports are configured as DTE.

How you build a cable depends on which device your are connecting to (DTE or DCE). For example, you need a null-modem cable to connect the COM ports (com1 or com2) on the computer or the DeviceMaster ports to printers, terminals, bar code readers or DNC equipment. If you are connecting a DTE device to a DCE device you need a straight-through modem cable.

- **Straight-through cable (DTE to DCE)** - Connects TxD to TxD and RxD to RxD.
- **Null-modem cable (DTE to DTE)** - Connect TxD to RxD and RxD to TxD.

## RS-232 DTE to DCE

This topic describes how to build a straight-through cable. Use a straight-through cable to connect to a DCE device.

### *Straight-Through Cables*

The following figure shows the most common types of DTE to DCE cables. This cable configuration works with most modems and is generally called a modem cable.

**Note:** If you have a DTE to DCE interface but are uncertain as to which signals are required, you can use a full 25-wire cable. The 25-wire cable is constructed as shown in the following cable example, but the remaining pins are not used.

| RocketPort Connector | | | | | | Customer DCE Connector | | |
|---|---|---|---|---|---|---|---|---|
| Signal Name | DB25 Pins | RJ45 Pins | RJ11 Pins | DB9 Pins | | DB9 Pins | DB25 Pins | Signal Name |
| TxD | 2 | 4 | 3 | 3 | → | 3 | 2 | TxD |
| RxD | 3 | 5 | 4 | 2 | ← | 2 | 3 | RxD |
| RTS | 4 | 1 | N/A | 7 | → | 7 | 4 | RTS |
| CTS | 5 | 8 | N/A | 8 | ← | 8 | 5 | CTS |
| DSR | 6 | 7 | N/A | 6 | ← | 6 | 6 | DSR |
| GND | 7 | 3 | 2 | 5 | — | 5 | 7 | GND |
| DCD | 8 | 6 | 5 | 1 | ← | 1 | 8 | DCD |
| DTR | 20 | 2 | 1 | 4 | → | 4 | 20 | DTR |

## RS-232 DTE to DTE

This topic describes how to build a null-modem cable for connecting to a DTE device.

### *Null-Modem Cables*

If you need RTS-CTS/DTR-DSR hardware flow control, you can use the pinouts provided in the following example.

**Note:** If the wiring on the peripheral device differs from the one shown below, adjust the pinouts accordingly. Refer to the manufacturer's installation document if you need help with connector pinouts or cabling for the peripheral device.

| RocketPort Connector | | | | | | Customer DTE Connector | | |
|---|---|---|---|---|---|---|---|---|
| Signal Name | DB25 Pins | RJ45 Pins | RJ11 Pins | DB9 Pins | | DB9 Pins | DB25 Pins | Signal Name |
| TxD | 2 | 4 | 3 | 3 | → | 2 | 3 | RxD |
| RxD | 3 | 5 | 4 | 2 | ← | 3 | 2 | TxD |
| RTS | 4 | 1 | N/A | 7 | → | 8 | 5 | CTS |
| CTS | 5 | 8 | N/A | 8 | ← | 7 | 4 | RTS |
| DSR | 6 | 7 | N/A | 6 | ← | 4 | 20 | DTR |
| DCD | 8 | 6 | 5 | 1 | ← | 1 | 8 | DCD |
| DTR | 20 | 2 | 1 | 4 | → | 6 | 6 | DSR |
| GND | 7 | 3 | 2 | 5 | — | 5 | 7 | GND |



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*Data-Only Null-Modem Cables*

If no hardware flow is required, use the pinouts in the following figure. If you are using a 3-wire cable and you need control, use software flow control.

| RocketPort Connector | | | | | | Customer DTE Connector | | |
|---|---|---|---|---|---|---|---|---|
| Signal Name | DB25 Pins | RJ45 Pins | RJ11 Pins | DB9 Pins | | DB9 Pins | DB25 Pins | Signal Name |
| TxD | 2 | 4 | 3 | 3 | → | 2 | 3 | RxD |
| RxD | 3 | 5 | 4 | 2 | ← | 3 | 2 | TxD |
| GND | 7 | 3 | 2 | 5 | — | 5 | 7 | GND |

*Control Loopback Cables*

Some equipment may not require hardware handshaking. However, they may require that certain control signals are active before sending data.

| RocketPort Connector | | | | | | Customer DTE Connector | | |
|---|---|---|---|---|---|---|---|---|
| Signal Name | DB25 Pins | RJ45 Pins | RJ11 Pins | DB9 Pins | | DB9 Pins | DB25 Pins | Signal Name |
| TxD | 2 | 4 | 3 | 3 | → | 2 | 3 | RxD |
| RxD | 3 | 5 | 4 | 2 | ← | 3 | 2 | TxD |
| RTS | 4 | 1 | N/A | 7 | ⊐ | 7 | 4 | RTS |
| CTS | 5 | 8 | N/A | 8 | ⊏ | 8 | 5 | CTS |
| DSR | 6 | 7 | N/A | 6 | ⊏ | 6 | 6 | DSR |
| DCD | 8 | 6 | 5 | 1 | ⊏ | 1 | 8 | DCD |
| DTR | 20 | 2 | 1 | 4 | ⊐ | 4 | 20 | DTR |
| GND | 7 | 3 | 2 | 5 | — | 5 | 7 | GND |

**RS-422 to DTE Cables**

Most RS-422 communication links do not use hardware handshaking or signal ground lines. The following figure shows twisted-pair transmission lines.

| RocketPort Connector | | | Customer DTE Connector |
|---|---|---|---|
| Signal Name | DB25 Pins | | Signal Name |
| TxD+ | 19 | ⋈ | RxD+ |
| TxD- | 25 | ⋈ | RxD- |
| RxD+ | 15 | ⋈ | TxD+ |
| RxD- | 17 | ⋈ | TxD- |
| GND | 7 | — | GND |

## Shielded vs. Unshielded

If the Comtrol device falls within the limits for a Class A computing device established by the FCC, the serial cables used to connect the Comtrol device to the external devices must be shielded. The cable shield must connected to the chassis ground at both ends to reduce EMI. If the cable shield is not connected to the chassis ground at both ends, the EMI radiation from your system may exceed the limits allowed for FCC class A equipment. You can use an isolation device if you experience problems with ground loops.

Refer to the statement on electromagnetic compliance in the Comtrol hardware document to determine the FCC class for your Comtrol product.



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# Building Cables for RocketPort Products

## Overview

This chapter describes the cables and pinouts for RocketPort products and covers the following topics:


- *DB9 Serial Cables and Loopback Plugs*
- *DB25 Serial Cables and Loopback Plugs*
- *RJ11 Serial Cables and Loopback Plugs*
- *RJ45 Serial Cables and Loopback Plugs*


## DB9 Serial Cables and Loopback Plugs

This section describe how to build your own null-modem or straight-through DB9 serial cables.

### Requirements

Refer to the manufacturer's installation guide if you need help with connector pinouts or cables for the peripheral device.

### DB9 Pinouts

This topic describes DB9 pinouts for the following RocketPort Products:

- The RocketPort PCI *422* supports RS-422 mode, Quadcable, Octacable, and 8-port box interface equipped with male DB9 connectors.
- The RocketPort Plus Universal PCI *422* supports RS-422 mode, Quadcable, Octacable, an 8-port box interface equipped with male DB9 connectors, and the 8-port SMPTE 207M interface module, which is equipped with female DB9 connectors.
- RocketPort PCI supports RS-232 and RS-422 mode, and Quadcable and Octacable available with DB9 connectors on the fanout cable.
- RocketPort Universal PCI and Rocketport Plus Universal PCI support RS-232 and RS-422 mode.

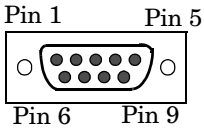
  **Note:** Ring Indicator (RI) is only supported on Quad/Octacable cards.



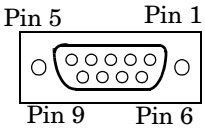
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The following figures and tables illustrate the signals present on DB9 connectors.

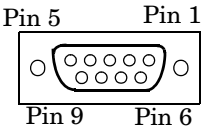
**DB9 Male for Quad/Octa**




**DB9 Female**




**DB9 Female for SMPTE**




| Pinouts for Standard DB9 Connector | | | |
|---|---|---|---|
| **Pin** | **RS-232 Mode** | **RS-422 DTE Mode** | **RS-422 DCE Mode** |
| 1 | DCD | Not used | Not used |
| 2 | RxD | TxD- | RxD- |
| 3 | TxD | RxD+ | TxD+ |
| 4 | DTR | Not used | Not used |
| 5 | GND | Not used | Not used |
| 6 | DSR | Not used | Not used |
| 7 | RTS | TxD+ | RxD+ |
| 8 | CTS | RxD- | TxD- |
| 9 | RI/Not Used[a] | Frame Ground | Frame Ground/Not Used[b] |

a. RI is only supported on the RocketPort Universal PCI and RocketPort Plus Universal PCI. This pin is not used by the other RocketPort models.

b. Frame Ground is only supported on the RocketPort PCI 422 and RocketPort Plus Universal PCI 422. This pin is not used by the other RocketPort models.

| Pinouts for SMPTE 207M DB9 Female Connector | | |
|---|---|---|
| **Pin** | **RS-422 DTE Mode** | **RS-422 DCE Mode** |
| 1 | Frame Ground | Frame Ground |
| 2 | TxD- | RxD- |
| 3 | RxD+ | TxD+ |
| 4 | Not used | Not used |
| 5 | Not used | Not used |
| 6 | Not used | Not used |
| 7 | TxD+ | RxD+ |
| 8 | RxD- | RxD- |
| 9 | Frame Ground | Frame Ground |



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## DB9 Loopback Plugs

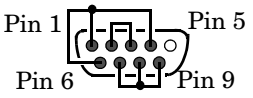
A *loopback plug* is a DB9 female serial port plug with pins wired together. You can use it with application software (for example, Test Terminal) to test serial ports. This topic describes the following DB9 loopback plugs:

- An RS-232 loopback plug is shipped with the following models: RocketPort PCI, RocketPort Universal PCI and RocketPort ISA.
- An RS-422 loopback plug is shipped with the following models: RocketPort PCI 422, RocketPort Plus PCI 422 and RocketPort Plus Universal PCI 422.

### *RS-232 Female Loopback Plug*

The Quadcable and Octacable use the RS-232 female loopback plug. To build a loopback plug for the Quadcable and Octacable, wire the following pins together:

- Pins 1 to 4 to 6
- Pins 2 to 3
- Pins 7 to 8 to 9



**RS-232 (Back View)**

**Note:** Ring Indicator (RI) is only supported on Quad/Octacable cards.

### *RS-422 Loopback Plug*

To build a DB9 loopback plug, wire the following pins together:

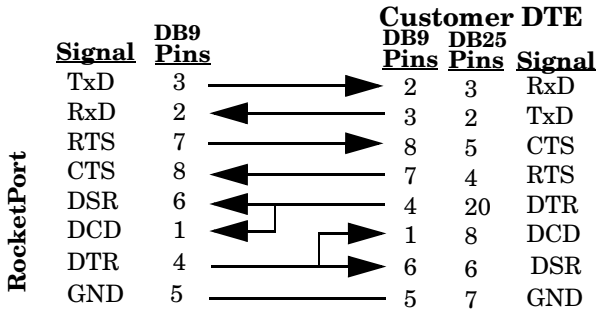
- Pin 2 to 8
- Pin 3 to 7

## DB9 Null-Modem Cables

You need a null-modem cable to connect to DTE devices. For example, you can connect one end of a a null-modem cable to COM2 on one computer and the other end of the null-modem cable to COM2 on another computer. All RocketPort models support DB9 null-modem cables.

### *RS-232 Null-Modem Cable*

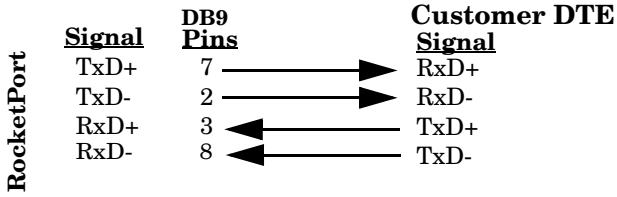
The following image displays the pinouts for an RS-232 null-modem cable.




**Note:** You can also attach a null-modem adapter to one end of a straight-through cable to create a null-modem cable.

### *RS-422 Null-Modem Cable*

The following image displays the pinouts for an RS-422 null-modem cable.




**Important:** RS-422 pinouts are not standardized. Each peripheral manufacturer uses different pinouts. Please refer to the document for the peripheral device to determine the pinouts for the signals above.



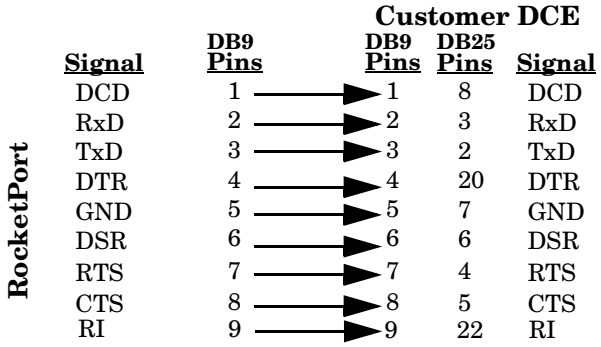
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### DB9 Straight-Through Cables

Straight-through cables connect modems to other DCE devices. For example, you can connect one end of a straight-through cable to COM2 on one computer and the other end of a straight-through cable to a modem. All RocketPort models support DB9 straight-through cables.

*RS-232 Straight-Through Cable*

The following image displays the pinouts for an RS-232 straight-through cable.




**Note:** Ring Indicator (RI) is only supported on Quad/Octacable cards for RocketPort Universal PCI and RocketPort Plus Universal PCI.

## DB25 Serial Cables and Loopback Plugs

This section describes DB25 cables and loopback plugs.

### Requirements

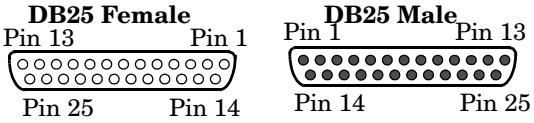
- Refer to the manufacturer's installation guide if you need help with connector pinouts or cables for the peripheral device.

### DB25 Pinouts

This topic describes pinouts for the DB25 interface connectors. The following RocketPort models support DB25 connectors:

- RocketPort PCI
- RocketPort ISA
- RocketPort Universal PCI
- RocketPort Plus Universal PCI

Standard interface modules use female DB25 connectors, while the Surge interface module, Quadcable, and Octacable fanouts use male connectors.






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This table shows connector information for DB25 connectors.

| Interface Modules[a] | | | Quad/Octacable[b] |
|---|---|---|---|
| **Pin** | **RS-232 Signal** | **RS-422 Signal** | **RS-232 Signal** |
| 1 | Not used | Not used | Not used |
| 2 | TxD | Not used[c] | TxD |
| 3 | RxD | Not used[c] | RxD |
| 4 | RTS | Not used[c] | RTS |
| 5 | CTS | Not used[c] | CTS |
| 6 | DSR | Not used[c] | DSR |
| 7 | Signal ground | Signal ground[c] | Signal ground |
| 8 | DCD | Not used[c] | DCD |
| 9 to 14 | Not used | Not used | Not used |
| 15 | Not used | RxD+ | Not used |
| 16 | Not used | Not used | Not used |
| 17 | Not used | RxD- | Not used |
| 18 | Not used | Not used | Not used |
| 19 | Not used | TxD+ | Not used |
| 20 | DTR | Not used[c] | DTR |
| 21 | Not used | Not used | Not used |
| 22 | Not used | Not used | RI[d]/Not Used[e] |
| 23-24 | Not used | Not used | Not used |
| 25 | Not used | TxD- | Not used |

a. The following RocketPort models support interface modules: RocketPort PCI, Rocket, Port Universal PCI and RocketPort Plus Universal PCI.
b. The following RocketPort models support quad/octacable: RocketPort PCI, RocketPort ISA, RocketPort Universal PCI and RocketPort Plus Universal PCI.
c. All RS-232 signals are present in RS-422 mode. The quad/octacables do not support RS-422 mode.
d. RI is only supported on quad/octacable adapters for RocketPort Universal PCI and RocketPort Plus Universal PCI.
e. This pin is not used by RocketPort PCI and RocketPort ISA.



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## DB25 Loopback Plugs

A *loopback plug* is a DB259 serial port plug with pins wired together. You can use it with application software (for example, Test Terminal) to test serial ports.

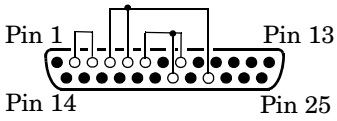
### *RS-232 Female Loopback Plug*

The following RocketPort models support the female loopback plug for RS-232 port:

- RocketPort PCI
- RocketPort Universal PCI
- RocketPort Plus Universal PCI
- RocketPort ISA

Quadcable and Octacable use the RS-232 female loopback plug. To build a DB25 loopback plug for an Quadcable or Octacable, wire the following pins together:

- Pins 2 to 3
- Pins 4 to 5 to 22
- Pins 6 to 8 to 20



**RS-232 Only (Back View)**

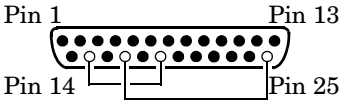
### *RS-422 Female Loopback Plug*

The following RocketPort models support the female loopback plug for RS-422 port:

- RocketPort PCI
- RocketPort Universal PCI
- RocketPort ISA

To build a DB25 loopback plug (surge interface model) for an RS-422 serial connection, wire the following pins together:

- Pins 15 to 19
- Pins 17 to 25



**RS-422 Only (Back View)**

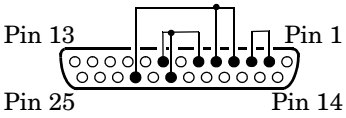
### *RS-232 Male Loopback Plug*

The following RocketPort models support the female loopback plug for RS-232 port:

- RocketPort PCI
- RocketPort Universal PCI

This the standard 8 and 16-port DB25 interface modules use the RS-232 male loopback plug. To build a DB25 loopback plug for an RS-232 serial connection, wire the following pins together:

- Pins 2 to 3
- Pins 4 to 5 to 22
- Pins 6 to 8 to 20



**RS-232 Only (Back View)**

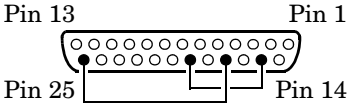
### *RS-422 Male Loopback Plug*

The following RocketPort models support the female loopback plug for RS-422 port:

- RocketPort PCI
- RocketPort Universal PCI

To build a DB25 loopback plug for an RS-422 serial connection, wire the following pins together.

- Pins 15 to 19
- Pins 17 to 25



**RS-422 Only (Back View)**



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# RJ11 Serial Cables and Loopback Plugs

The RocketPort PCI/8J and Universal PCI/8J have eight standard RJ11 modular connectors, located on the controller board mounting bracket. The ports are numbered 0 through 7, with Port 7 being the connector closest to the bus.

The following RocketPort models support the female loopback plug for RS-232 port:

- RocketPort PCI
- RocketPort Universal PCI
- RocketPort ISA

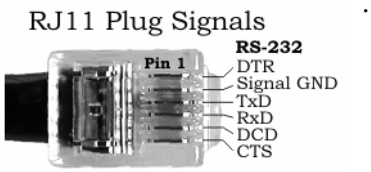
## Requirements

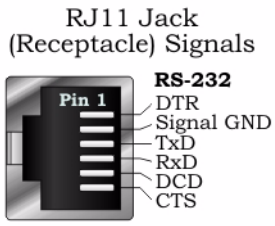
There are no standards for the RJ11. Before you build the custom RJ11 serial cable for your terminal equipment or device you should:

- Refer to the manufacturer's installation guide if you need help with connector pinouts or cables for the peripheral device.
- Supported RS-modes are described in the electronic document shipped with your Comtrol device.

## RJ11 Pinouts

This topic describes pinouts for the RJ11 interface connector for an RS-232 port. The following figures provide pinout information for the RJ11 jack plug and receptacle



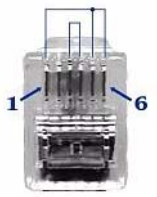




## RJ11 Loopback Plugs

A *loopback plug* is an RJ11 serial port plug with pins wired together. You can use it with application software (for example, Test Terminal) to test serial ports.

To build an RJ11 loopback plug, wire these pins together:

- Pins 3 to 4
- Pins 1 to 5 to 6






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# RJ45 Serial Cables and Loopback Plugs

This section describe how to build your own null-modem or straight-through RJ45 serial cables. The following models have RJ45 connectors:

- **RocketPort PCI**: 4J (4-port RJ45), the Octacable model, and the Rack Mount interface module
- **RocketPort Universal PCI**: Octacable model, the 4J (4-port RJ45) model and the Rack Mount interface module. The ports on the 4J model are numbered 0 to 3 and port 3 is the connector closest to the bus.
- **RocketPort Plus Universal PCI**: Octacable model.

## Requirements

There are no standards for the RJ45. Before you build the custom RJ45 serial cable for your terminal equipment or device you should:

- Refer to the manufacturer's installation guide if you need help with connector pinouts or cables for the peripheral device.
- Supported RS-modes are described in the electronic document shipped with your Comtrol device.

## RJ45 Pinouts

*RJ45 Pinouts for Octacable Interface Module (RS-232 Port)*

The following RocketPort models support the octacable interface module (RS-232):

- RocketPort PCI
- RocketPort Universal PCI
- RocketPort Plus Universal PCI

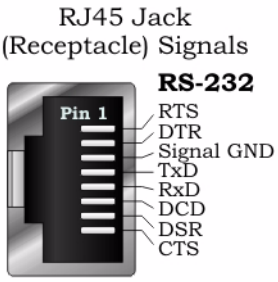
The following figures provide pinout information for the RJ45 connectors used on the octacable interface module.







**Note:** Ring indicator is not supported on the RJ45 connector.






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## RJ45 Null-Modem Cables

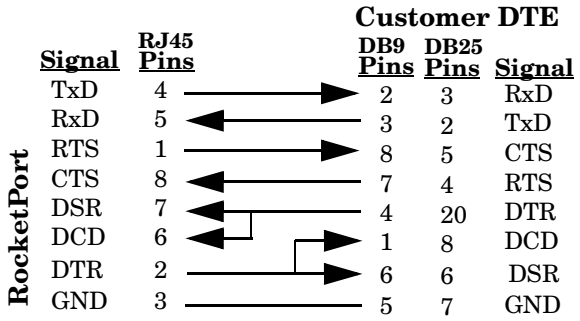
You need a null-modem cable to connect to DTE devices. For example, you can connect one end of a null-modem cable to COM2 on one computer and the other end of the null-modem cable to COM2 on another computer.

### *RS-232 Null-Modem Cable*

The following RocketPort models support RJ45 null-modem cables on RS-232 ports:

- RocketPort PCI
- RocketPort Universal PCI
- RocketPort Plus Universal PCI

The following image displays the pinouts for an RS-232 null-modem cable.




**Important:** RJ45 pinouts are not standardized. Each peripheral manufacturer uses different pinouts. Please refer to the document for the peripheral device to determine the pinouts for the signals above.

**Note:** You can also attach a null-modem adapter to one end of a straight-through cable to create a null-modem cable.

## RJ45 Straight-Through Cables

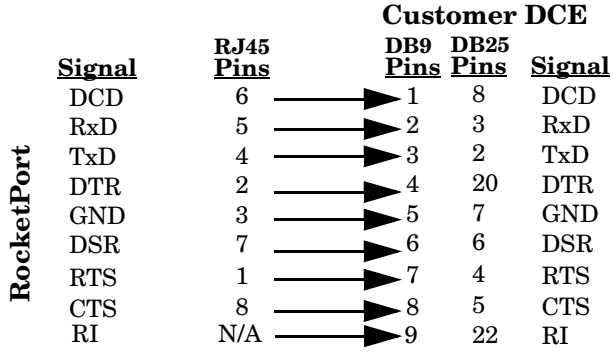
Straight-through cables connect modems to other DCE devices. For example, you can connect one end of a straight-through cable to COM2 on one computer and the other end of the straight-through cable to a modem.

### *RS-232 Straight-Through Cable*

The following RocketPort models support RJ45 straight-through cables on RS-232 ports:

- RocketPort PCI
- RocketPort Universal PCI
- RocketPort Plus Universal PCI

The following image displays the pinouts for an RS-232 straight-through cable.




**Note:** If your RJ45 wiring differs from the one shown above, adjust the RJ45 pinouts accordingly.



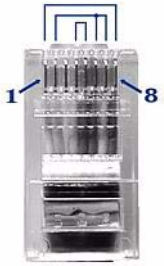
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## RJ45 Loopback Plugs

A *loopback plug* is an RJ45 serial port plug with pins wired together. You can use it with application software (for example, Test Terminal) to test serial ports.

The following RocketPort models support RJ45 loopback plugs:

- **RocketPort PCI**: 4J (4-port RJ45), the Octacable model, and the Rack Mount interface module
- **RocketPort Universal PCI**: Octacable model, the 4J (4-port RJ45) model and the Rack Mount interface module.
- **RocketPort Plus Universal PCI**: Octacable model.
- **RocketPort ISA**




### *RS-232 Loopback Plug*

To build an RJ45 loopback plug, wire the following pins together:

- Pins 4 to 5
- Pins 1 to 8
- Pins 2 to 6 to 7

**Note:** See the Help distributed in Test Terminal (WCom2.exe) for more information on testing serial ports. Test Terminal is installed when you install PortVision.



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# Building Cables for DeviceMaster Products

## Overview

This chapter describes the cables and pinouts for DeviceMaster products and covers the following topics:

- *DB9 Serial Cables and Loopback Plugs*
- *RJ45 Serial Cables and Loopback Plugs*

## DB9 Serial Cables and Loopback Plugs

This section describe how to build your own null-modem or straight-through DB9 serial cables and loopback plugs.

The following DeviceMaster models support DB9 connectors:

- DeviceMaster AIR
- DeviceMaster PRO
- DeviceMaster RTS
- DeviceMaster Serial Hub (RS-232 only)
- DeviceMaster UP

**Requirements**

Refer to the manufacturer's installation document if you need help with connector pinouts or cables for the peripheral device.

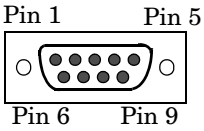


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## DB9 Pinouts

The following figure and table illustrates the DB9 connector signals.

**DB9 Male for RS-232, RS-422, and RS-485**




| Pinouts for Standard DB9 Connector | | | |
|---|---|---|---|
| **Pin** | **RS-232 Mode** | **RS-422 DCE Mode** | **RS-485 Mode** |
| 1 | DCD | Not used | Not used |
| 2 | RxD | RxD- | Not used |
| 3 | TxD | TxD- | TxD/RxD- |
| 4 | DTR | Not used | Not used |
| 5 | GND | Not used[a] | Not used[a] |
| 6 | DSR | Not used | Not used |
| 7 | RTS | TxD+ | TxD/RxD+ |
| 8 | CTS | RxD+ | Not used |
| 9 | RI | Not used | Not Used |

a. Pin 5 is tied to ground on the board, but is not used in the cable.

**Note:** If you are using a DB9 to RJ45 adapter, see "RJ45 Serial Cables and Loopback Plugs", page 22 for additional information.

## DB9 Loopback Plug

A *loopback plug* is a DB9 female serial port plug with pins wired together. You can use it with application software (for example, Test Terminal) to test serial ports. This topic describes the following DB9 loopback plugs:

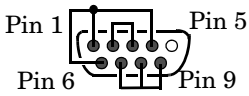
- An RS-232 loopback plug is shipped with the DeviceMaster Serial Hub.
- An RS-232/422 loopback plug is shipped with the following models: DeviceMaster AIR, DeviceMaster PRO, DeviceMaster RTS, and DeviceMaster UP.

**Note:** For more information on testing serial ports, see the Help in Test Terminal (WCom2.exe). Test Terminal is installed when you install PortVision.

### *RS-232 Loopback Plug*

To build an RS-232 loopback plug, wire the following pins together:

- Pins 1 to 4 to 6
- Pins 2 to 3
- Pins 7 to 8 to 9



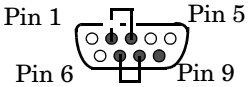

**RS-232 Only (Back View)**

*The RS-232 loopback plug also works for RS-422.*

### *RS-422 Loopback Plug*

To build an RS-422 loopback plug, wire the following pins together:

- Pins 2 to 3
- Pins 7 to 8




**RS-422 Only (Back View)**



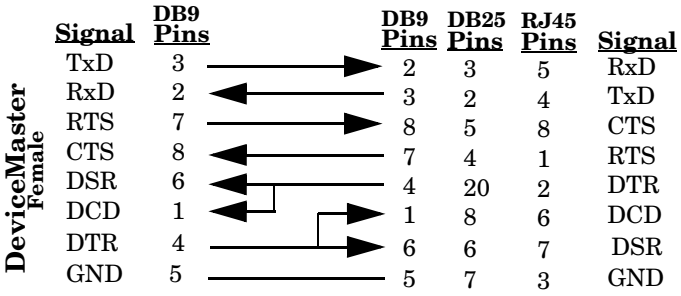
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## DB9 Null-Modem Cable

You need a null-modem cable to connect to DTE devices. For example, you can connect one end of a null-modem cable to COM2 of one computer and the other end of the null-modem cable to COM2 of another computer.

### *RS-232 Null-Modem Cable*

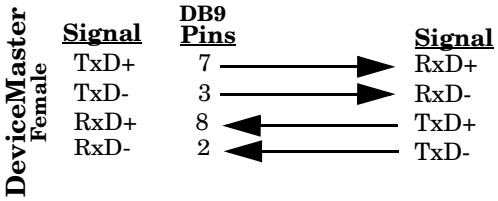
The following image displays the pinouts for an RS-232 null-modem cable. You need a null-modem cable to connect to DTE devices.




**Note:** You can also attach a null-modem adapter to one end of a straight-through cable to create a null-modem cable.

### *RS-422 Null-Modem Cable*

The following image displays the pinouts for an RS-422 null-modem cable.



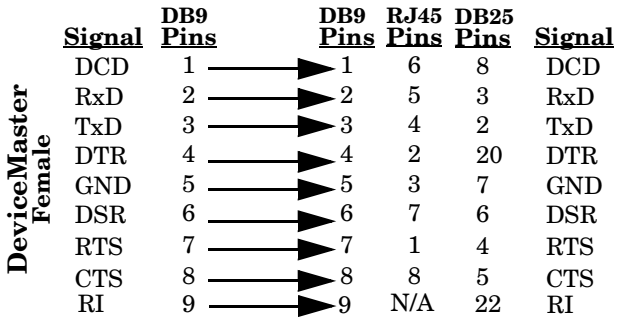

**Important:** RS-422 pinouts are not standardized. Each peripheral manufacturer uses different pinouts. Please refer to the document for the peripheral device to determine the pinouts for the signals in the previous picture.

## DB9 Straight-Through Cable

Straight-through cables connect modems to other DCE devices. For example, you can connect on end of the straight-through cable to COM2 on a computer and the other end of the straight-through cable to a modem.

### *RS-232 Straight-Through Cable for DeviceMaster Serial Hub*

The following image displays the pinouts for an RS-232 straight-through cable.

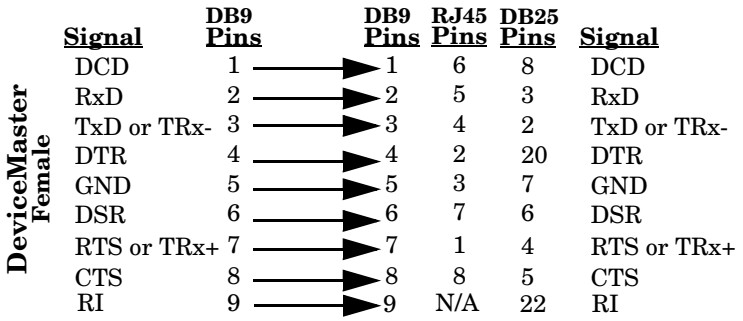





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*RS-232 and RS-485 Straight-Through Cable for DeviceMaster AIR, PRO, RTS or UP*

The following image displays the pinouts for an RS-232 or RS-485 straight-through cable.




## RJ45 Serial Cables and Loopback Plugs

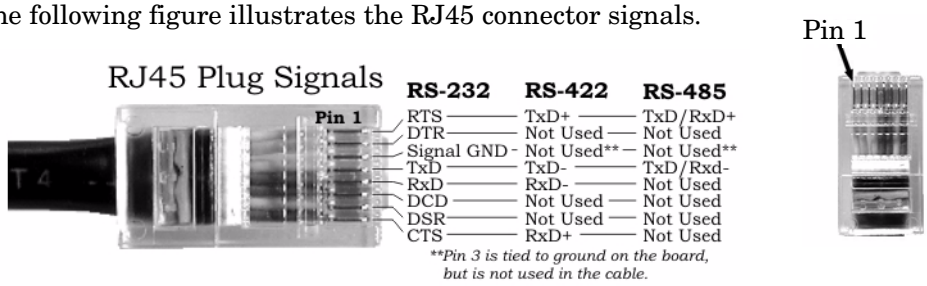
This section describe how to build your own null-modem or straight-through RJ45 serial cables and loopback plugs.

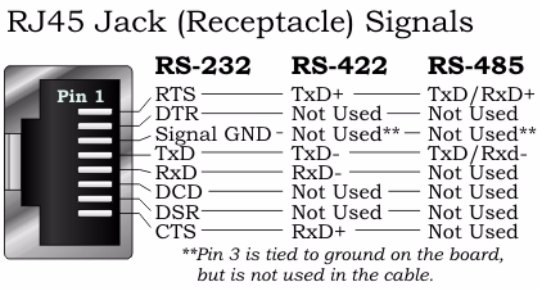
The following DeviceMaster models support RJ45 connectors:

- DeviceMaster PRO
- DeviceMaster RTS
- DeviceMaster UP

### RJ45 Pinouts

The following figure illustrates the RJ45 connector signals.





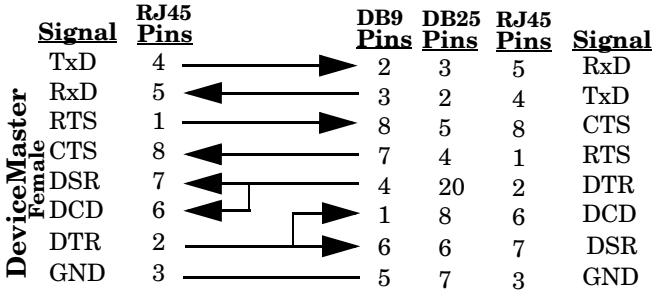

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## RJ45 Null-Modem Cable

You need a null-modem cable to connect to DTE devices. For example, you can connect one end of a null-modem cable to COM2 on a computer and the other end of the null-modem cable to COM2 on another computer.

### *RS-232 Null-Modem Cable*

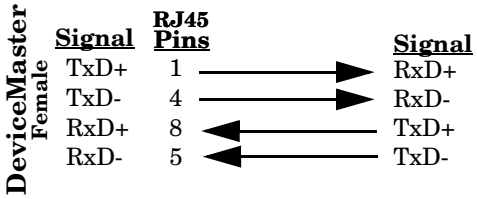
The following image displays the pinouts for an RS-232 null-modem cable.




**Note:** You can also attach a null-modem adapter to one end of a straight-through cable to create a null-modem cable.

### *RS-422 Null-Modem Cable*

The following image displays the pinouts for an RS-422 null-modem RJ45 cable.



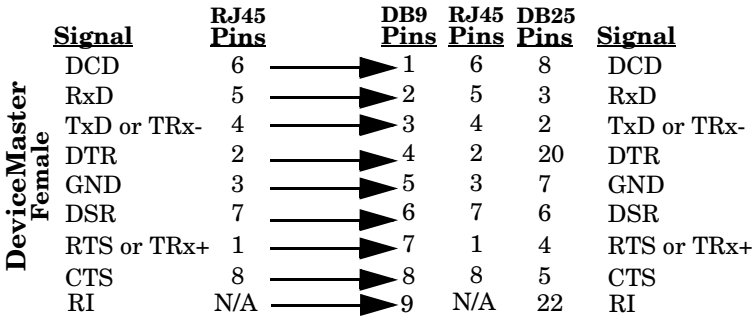

**Important:** RS-422 pinouts are not standardized. Each peripheral manufacturer uses different pinouts. Please refer to the document for the peripheral device to determine the pinouts for the signals in the previous picture.

## RJ45 Straight-Through Cable

Straight-through cables connect modems to other DCE devices. For example, you can connect one end of a straight-through cable to COM2 on one computer and the other end of the straight-through cable to a modem.

### *RS-232 and RS-485 Straight-Through Cable*

The following image displays the pinouts for an RS-232 or RS-485 straight-through cable.




**Note:** If your RJ45 wiring differs from the one shown above, adjust the RJ45 pinouts accordingly.



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## RJ45 Loopback Plug

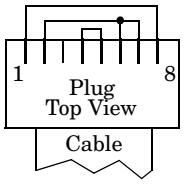
A *loopback plug* is an RJ45 serial port plug with pins wired together. You can use it with application software (for example, Test Terminal or MiniCom) to test serial ports.

The RS-232/422 single loopback plug is shipped with the following DeviceMaster models: DeviceMaster RTS, DeviceMaster PRO and DeviceMaster UP.

### *RS-232/RS-422 Loopback Plug*

To build an RS-232/RS-422 loopback plug, wire the following pins together:

- Pins 4 to 5
- Pins 1 to 8
- Pins 2 to 6 to 7




*The RS-232 loopback plug also works for RS-422.*

**Note:** For more information on testing serial ports, see the Help in Test Terminal (WCom2.exe). Test Terminal is installed when you install PortVision.

## RS-485 Test Cable

You can use a straight-through cable as illustrated previously, or build your own cable.

| Signal | RJ45 Pins | | Signal |
|---|---|---|---|
| TRX- | 4 | ◄► | TRX- |
| TRX+ | 1 | ◄► | TRX+ |



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# Building Basic Cables

## Overview

This chapter covers the following topics:


- *RocketPort 4/8/16 Interface Cable Assembly Wire Detail*
- *RocketPort 32 ISA, PCI 32, uPCI 16/32, and CPCI 16 Interface Cable Assembly Wire Detail*
- *DB25 Interface to Controller Pinouts for RocketPort ISA/PCI 4, 8 and 16-ports*
- *78-pin Connectors*


## RocketPort 4/8/16 Interface Cable Assembly Wire Detail

| Source DB25 Male | Destination DB25 Female | Base Color/Band Color | Twisted Pair # |
|---|---|---|---|
| J1-1 | J2-1 | Green/Black | No Pair |
| J1-2 | J2-2 | Blue/White | 1A |
| J1-3 | J2-3 | White/Blue | 1B |
| J1-4 | J2-4 | Orange/White | 2A |
| J1-5 | J2-5 | White/Orange | 2B |
| J1-6 | J2-6 | Green/White | 3A |
| J1-8 | J2-8 | White/Green | 3B |
| J1-7 | J2-7 | Brown/White | 4A |
| J1-9 | J2-9 | White/Brown | 4B |
| J1-10 | J2-10 | Gray/White | 5A |
| J1-14 | J2-14 | White/Gray | 5B |
| J1-11 | J2-11 | Blue/Red | 6A |
| J1-12 | J2-12 | Red/Blue | 6B |
| J1-13 | J2-13 | Orange/Red | 7A |
| J1-15 | J2-15 | Red/Orange | 7B |
| J1-16 | J2-16 | Green/Red | 8A |
| J1-17 | J2-17 | Red/Green | 8B |
| J1-18 | J2-18 | Brown/Red | 9A |
| J1-19 | J2-19 | Red/Brown | 9B |
| J1-20 | J2-20 | Gray/Red | 10A |
| J1-22 | J2-22 | Red/Gray | 10B |
| J1-21 | J2-21 | Gray/Red | 11A |
| J1-23 | J2-23 | Black/Blue | 11B |
| J1-24 | J2-24 | Orange/Black | 12A |
| J1-25 | J2-25 | Black/Orange | 12B |



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# RocketPort 32 ISA, PCI 32, uPCI 16/32, and CPCI 16 Interface Cable Assembly Wire Detail

| Source DB26 Male | Destination DB25 Female | Base Color/Band Color | Twisted Pair # |
|---|---|---|---|
| J1-1 | J2-1 | Violet/White Ring | No Pair |
| J1-2 | J2-2 | Yellow | 1A |
| J1-3 | J2-3 | Yellow/Gray Ring | 1B |
| J1-4 | J2-4 | Green | 2A |
| J1-5 | J2-5 | Green/Gray Ring | 2B |
| J1-6 | J2-6 | Blue | 3A |
| J1-8 | J2-8 | Blue/Gray Ring | 3B |
| J1-7 | J2-7 | Violet | 4A |
| J1-9 | J2-9 | Violet/Gray Ring | 4B |
| J1-10 | J2-10 | White | 5A |
| J1-14 | J2-14 | White/Gray Ring | 5B |
| J1-11 | J2-11 | Pink | 6A |
| J1-12 | J2-12 | Pink/Gray Ring | 6B |
| J1-13 | J2-13 | Red | 7A |
| J1-15 | J2-15 | Red/Gray Ring | 7B |
| J1-16 | J2-16 | Orange | 8A |
| J1-17 | J2-17 | Orange/Gray Ring | 8B |
| J1-18 | J2-18 | Brown/White Ring | 9A |
| J1-19 | J2-19 | Red/Brown | 9B |
| J1-20 | J2-20 | Gray/Red | 10A |
| J1-22 | J2-22 | Red/Gray | 10B |
| J1-21 | J2-21 | Gray/Red | 11A |
| J1-23 | J2-23 | Black/Blue | 11B |
| J1-24 | J2-24 | Orange/Black | 12A |
| J1-25 | J2-25 | Black/Orange | 12B |
| J1-26 | No Pin | N/A | N/A |



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# DB25 Interface to Controller Pinouts for RocketPort ISA/PCI 4, 8 and 16-ports

| Pin | Function |
|---|---|
| 1 | GND |
| 2 | RXCLK+ |
| 3 | RXCLK- |
| 4 | RXDAT+ |
| 5 | RXDAT- |
| 6 | RXDAT1+ |
| 7 | GND |
| 8 | RXDAT1- |
| 9 | VCC |
| 10 | VCC |
| 11 | V+ |
| 12 | V+ |
| 13 | RXCNVT+ |
| 14 | GND |
| 15 | RXCNVT- |
| 16 | TXCLK+ |
| 17 | TXCLK- |
| 18 | TXDAT+ |
| 19 | TXDAT- |
| 20 | TXDAT1+ |
| 21 | V- |
| 22 | TXDAT1 |
| 23 | V- |
| 24 | TXCNVT+ |
| 25 | TXCNVT- |

**Wire**

- 28 AWG or larger
- Twisted pair

**Shield**

- AL-Foil/Mylar-overlap 25% minimum (AL side outside)
- Braid 24/8/0.12 TA coverage 85% minimum

**Voltage Rating**

- 30v

**Capacitance**

- **Wire to wire:** 44pf/M
- **Wire to other wires connected to a shield:** 87pf at 1000Hz

**Shell**

Fully-shielded with copper foil soldered to the connector shell and cable braid. Foil entire connector and solder all seams.



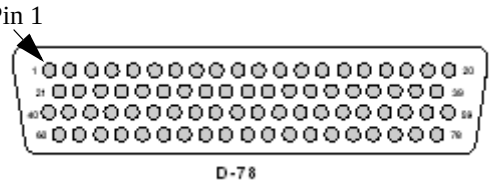
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# 78-pin Connectors

### 78-pin Connector for RS-232 Quadcable/ Octacable Controllers

The following table lists the pinouts for a 78-pin connector. The 78-pin connector is available on the following RocketPort models:

- RocketPort PCI quadcable and octacable.
- RocketPort Universal PCI quadcable and octacable.
- RocketPort Plus Universal PCI quadcable and octacable.




| Pin | RS-232 Function | | Pin | RS-232 Function |
|---|---|---|---|---|
| 1 | DTR Port 7 | | 40 | TxD Port 4 |
| 2 | TxD Port 5 | | 41 | RTS Port 5 |
| 3 | DTR Port 5 | | 42 | DSR Port 5 |
| 4 | CTS Port 5 | | 43 | DCD Port 4 |
| 5 | DSR Port 4 | | 44 | RI Port 4[a] |
| 6 | DCD Port 7 | | 45 | CTS Port 7 |
| 7 | RI Port 7[a] | | 46 | RxD Port 6 |
| 8 | RxD Port 5 | | 47 | RI Port 6[a] |
| 9 | CTS Port 6 | | 48 | DCD Port 6 |
| 10 | TxD Port 3 | | 49 | DTR Port 0 |
| 11 | TxD Port 2 | | 50 | TxD Port 1 |
| 12 | RTS Port 2 | | 51 | RTS Port 0 |
| 13 | DTR Port 2 | | 52 | DTR Port 3 |
| 14 | RTS Port 3 | | 53 | CTS Port 1 |
| 15 | RI Port 1[a] | | 54 | DSR Port 0 |
| 16 | CTS Port 0 | | 55 | RxD Port 0 |
| 17 | RxD Port 1 | | 56 | RxD Port 3 |
| 18 | DCD Port 3 | | 57 | CTS Port 3 |
| 19 | RI Port 3[a] | | 58 | DSR Port 2 |
| 20 | RI Port 2[a] | | 59 | CTS Port 2 |
| 21 | RTS Port 4 | | 60 | RTS Port 7 |
| 22 | DTR Port 4 | | 61 | DTR Port 6 |
| 23 | DCD Port 5 | | 62 | RTS Port 6 |
| 24 | RI Port 5[a] | | 63 | TxD Port 6 |
| 25 | CTS Port 4 | | 64 | TxD Port 7 |
| 26 | DSR Port 7 | | 65 | SigGnd |
| 27 | RxD Port 7 | | 66 | SigGnd |
| 28 | RxD Port 4 | | 67[b] | Special |
| 29 | DSR Port 6 | | 68 | SigGnd Port 0 |
| 30 | TxD Port 0 | | 69 | SigGnd Port 1 |
| 31 | RTS Port 1 | | 70 | SigGnd Port 2 |
| 32 | DTR Port 1 | | 71 | SigGnd Port 3 |
| 33 | DCD Port 1 | | 72 | SigGnd Port 4 |
| 34 | DSR Port 1 | | 73 | SigGnd Port 5 |
| 35 | DCD Port 0 | | 74 | SigGnd Port 6 |
| 36 | RI Port 0[a] | | 75 | SigGnd Port 7 |
| 37 | RxD Port 2 | | 76 | SigGnd |
| 38 | DSR Port 3 | | 77 | SigGnd |
| 39 | DCD Port 2 | | 78 | SigGnd |

a. RI only applies to the RocketPort uPCI, RocketPort Plus, and Hostess 554 products.

b. When grounded, Pin 67 indicates to the host adapter and software that it is a 4 port adapter instead of an 8 port adapter.

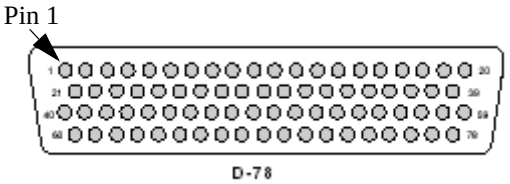


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## 78-pin Connector for RS-422 Quadcable/ Octacable Controllers

The following table lists the pinouts for a 78-pin connector. The 78-pin connector is available on the following RocketPort models:

- RocketPort PCI 422 quadcable, octacable and SMPTE.
- RocketPort Plus Universal PCI 422 quadcable, octacable and SMPTE.




| Pin | RS-422 DTE Function | RS-422 DCE Function | | Pin | RS-422 DTE Function | RS-422 DCE Function |
|---|---|---|---|---|---|---|
| 1 | | | | 40 | RxD5+ | TxD5+ |
| 2 | RxD6+ | TxD6+ | | 41 | TxD6+ | RxD6+ |
| 3 | | | | 42 | | |
| 4 | RxD6- | TxD6- | | 43 | | |
| 5 | | | | 44 | FRM GND 5 | |
| 6 | | | | 45 | RxD8- | TxD8- |
| 7 | FRM GND 8 | | | 46 | TxD7- | RxD7 |
| 8 | TxD6- | RxD6- | | 47 | FRM GND 7 | |
| 9 | RxD7- | TxD7- | | 48 | | |
| 10 | RxD4+ | TxD4+ | | 49 | | |
| 11 | RxD3+ | TxD3+ | | 50 | RxD2+ | TxD2+ |
| 12 | TxD3+ | RxD3+ | | 51 | TxD1+ | RxD1+ |
| 13 | | | | 52 | | |
| 14 | TxD4+ | RxD4+ | | 53 | RxD2- | TxD2- |
| 15 | FRM GND 2 | | | 54 | | |
| 16 | RxD1- | TxD1- | | 55 | TxD1- | RxD1- |
| 17 | TxD2- | RxD2- | | 56 | TxD4- | RxD4- |
| 18 | | | | 57 | RxD4- | TxD4- |
| 19 | FRM GND 4 | | | 58 | | |
| 20 | FRM GND 3 | | | 59 | RxD3- | TxD3- |
| 21 | TxD5+ | RxD5+ | | 60 | TxD8+ | RxD8+ |
| 22 | | | | 61 | | |
| 23 | | | | 62 | TxD7+ | RxD7+ |
| 24 | FRM GND 6 | | | 63 | RxD7+ | TxD7+ |
| 25 | RxD5- | TxD5- | | 64 | RxD8+ | TxD8+ |
| 26 | | | | 65 | | |
| 27 | TxD8- | RxD8- | | 66 | | |
| 28 | TxD5- | RxD5- | | 67[a] | Special | |
| 29 | | | | 68 | | |
| 30 | RxD1+ | TxD1+ | | 69 | | |
| 31 | TxD2+ | RxD2+ | | 70 | | |
| 32 | | | | 71 | | |
| 33 | | | | 72 | | |
| 34 | | | | 73 | | |
| 35 | | | | 74 | | |
| 36 | FRM GND 1 | | | 75 | | |
| 37 | TxD3- | RxD3- | | 76 | | |
| 38 | | | | 77 | | |
| 39 | | | | 78 | | |

a. When grounded, Pin 67 indicates to the host adapter and software that it is a 4 port adapter instead of an 8 port adapter.

The pins with no description are floating and have no connection.



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# Cable Adapters

## Overview

This chapter covers the following topics:


- *RJ45 to DB9 Connector Pinouts for DeviceMaster and RocketPort*
- *8J RJ11 to Standard DB25 (Null-modem Configuration)*
- *8J RJ11 to Standard DB9 (Null-modem Configuration)*


## RJ45 to DB9 Connector Pinouts for DeviceMaster and RocketPort

The following table displays the modem wiring connection from a Comtrol RJ45 connector to a standard DB9 connector.

**Note:** If your DB9 wiring differs from the one shown below, adjust the DB9 pinouts accordingly.

| RJ45 Connector Pinouts | | | DB9 Connector Pinouts | |
|---|---|---|---|---|
| **Pin** | **RS-232 Signal** | | **Pin** | **RS-232 Signal** |
| 6 | DCD | → | 1 | DCD |
| 5 | RxD | → | 2 | RxD |
| 4 | TxD | → | 3 | TxD |
| 2 | DTR | → | 4 | DTX |
| 3 | Signal GND | → | 5 | Signal GND |
| 7 | DSR | → | 6 | DSR |
| 1 | RTS | → | 7 | RTS |
| 8 | CTS | → | 8 | CTS |
| | NC[a] | | 9 | RI |

a. Ring indicator is not supported on the RJ45 connector.




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## 8J RJ11 to Standard DB25 (Null-modem Configuration)

The following table displays the modem wiring connection from a Comtrol 8J RJ11 to a standard DB25 connector.

**Note:** If your DB25 wiring differs from the one shown below, adjust the DB25 pinouts accordingly.

| 8J RJ11 Connector Pinouts[a] | | | DB25 Connector Pinouts | |
|---|---|---|---|---|
| **Pin** | **RS-232 Signal** | | **Pin** | **RS-232 Signal** |
| | | | 1 | NC |
| 4 | RxD | ← | 2 | TxD |
| 3 | TxD | → | 3 | RxD |
| 6 | CTS | | 4 | RTS[b] |
| | | | 5 | CTS[b] |
| 1 | DTR | → | 6 | DSR |
| 2 | SigGnd | — | 7 | SigGnd |
| 5 | DCD | — | 8 | DCD |
| | | | 20 | DTR |

a. RJ11 does not have all of the signals for RTS CTS (hardware handshaking). Use the cable for XON/XOFF (software handshaking).
b. RTS and CTS may be jumpered together.

## 8J RJ11 to Standard DB9 (Null-modem Configuration)

The following table displays the modem wiring connection from a Comtrol 8J RJ11 to a standard DB9 Connector.

**Note:** If your DB9 wiring differs from the one shown below, adjust the DB9 pinouts accordingly.

| 8J RJ11 Connector Pinouts[a] | | | DB9 Connector Pinouts | |
|---|---|---|---|---|
| **Pin** | **RS-232 Signal** | | **Pin** | **RS-232 Signal** |
| 5 | DCD | — | 1 | DCD |
| 3 | TxD | → | 2 | RxD |
| 4 | RxD | ← | 3 | TxD |
| | | | 4 | DTR |
| 2 | Signal GND | — | 5 | Signal GND |
| 1 | DTR | → | 6 | DSR |
| 6 | CTS | ← | 7 | RTS[b] |
| | | | 8 | CTS[b] |
| | | | 9 | NC |

a. RJ11 does not have all of the signals for RTS CTS (hardware handshaking). Use the cable for XON/XOFF (software handshaking).
b. RTS and CTS may be jumpered together.



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|---|---|---|
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| Downloads | support.comtrol.com/download.asp | |
| Online | support.comtrol.com/support | support@comtrol.co.uk |
| Web site | www.comtrol.com | www.comtrol.co.uk |
| Fax | (763) 494-4199 | +44 (0) 1 869-323-211 |
| Phone | (763) 494-4100 | +44 (0) 1 869-323-220 |



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