

# Cables User Guide



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# Getting Started

## Overview

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This document describes how to build cables for Comtrol products.

This chapter describes the standard Comtrol cables, 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

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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 are building cables make sure 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

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The following table displays standard cables for RocketPort products.

Control 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	RocketPort uPCI 16/32 Interface Cable	DB25 to DB26	4000030	23701A	3' <sup>a</sup>	0.91
	Octacable	DB25 male	4000032	23801-0	3.5'	1.06
	Octacable	DB9 male	4000033	23901-7	3.5'	1.06
	Quadcable	DB25	4000034	N/A	3.5'	1.06

Control Product	Cable Type	Connector Type	Part Number		Cable Length	
			New Part Number	Old Part Number	Feet	Meters
	Quadcable	DB9	4000035	N/A	3.5'	1.06
	Octacable	RJ45	4000036	N/A	10"	3.05

- a. This cable is only available as a 3 foot cable. If necessary, connect a 10 foot DB25 to DB25 cable to extend the length of the cable.

## DTE versus DCE

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

How you pin a cable depends on which device your are connecting to (DTE or DCE). For example, connecting the comports (com1 or com2) built into the PC or DeviceMaster ports to printers, terminals, bar code readers, or DNC equipment requires a null-modem cable. 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.

### DTE to DCE

This topic describes how to build a straight-through cable for connecting 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 like 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

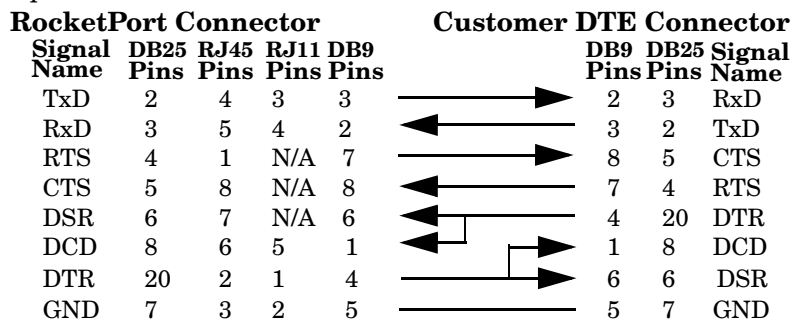
**DTE to DTE**

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

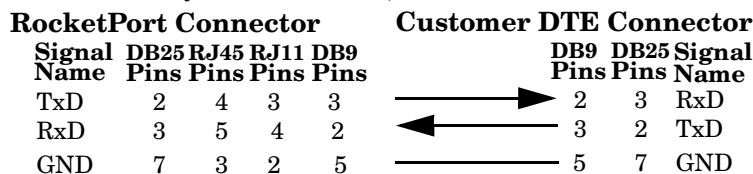
*Null-Modem Cables*

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

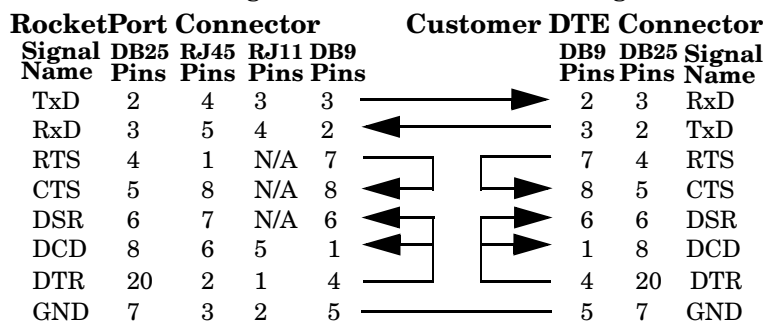
**Note:** If the wiring on the peripheral device differs from the one shown below, adjust the pinouts accordingly. Refer to the manufacturer's installation documentation if you need help with connector pinouts or cabling for the peripheral device.

*Data-Only Null-Modem Cables*

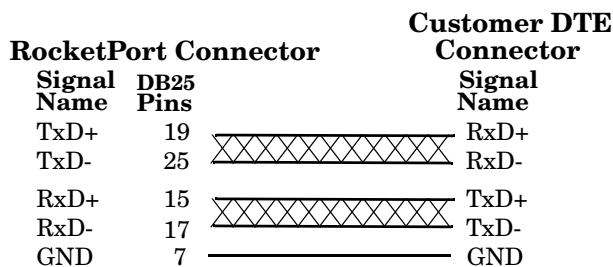
If no hardware flow is required, use the pinouts in the following figure. If you are using a 3-wire cable and you need control, use software flow control.

*Control Loopback Cables*

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

**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.





## Shielded vs. Unshielded

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

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



# Building Cables for RocketPort Products

## Overview

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This chapter 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

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

### Requirements

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

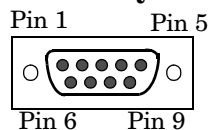
### DB9 Pinouts

This topic describes DB9 pinouts for the following RocketPort Products:

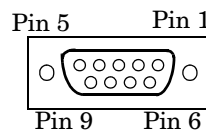
- The RocketPort PCI 422 supports RS-422 mode, Quadcable, Octacable, and 8-port box interface equipped with male DB9 connectors.
- The RocketPort Plus Universal PCI 422 supports RS-422 mode, Quadcable, Octacable, an 8-port box interface equipped with male DB9 connectors, and the 8-port SMPTE 207M interface 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 supports RS-232 and RS-422 mode, Ring Indicator (RI) and Quadcable and Octacable available with DB9 connectors on the fanout cable.

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

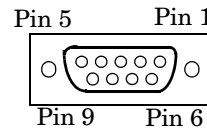
**DB9 Male for Quad/Octa**



**DB9 Female**



**DB9 Female for SMPTE**



<b>Pinouts for Standard DB9 Connector</b>			
<b>Pin</b>	<b>RS-232 Mode</b>	<b>RS-422 DTE Mode</b>	<b>RS-422 DCE Mode</b>
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 <sup>a</sup>	Frame Ground	Frame Ground/Not Used <sup>b</sup>

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.

<b>Pinouts for SMPTE 207M DB9 Female Connector</b>		
<b>Pin</b>	<b>RS-422 DTE Mode</b>	<b>RS-422 DCE Mode</b>
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

## DB9 Loopback Plugs

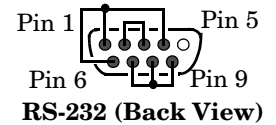
*Loopback plugs* are plugs, with pins wired together, that are used in conjunction with the RocketPort diagnostic software to test serial ports. This topic describes the following DB9 loopback plugs:

- 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 and RocketPort Plus PCI 422.

*RS-232 Female Loopback Plug*

This female loopback plug is used with the Quadcable and Octacable. 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-422 Loopback Plug*

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

- Pin 2 to 8
- Pin 3 to 7

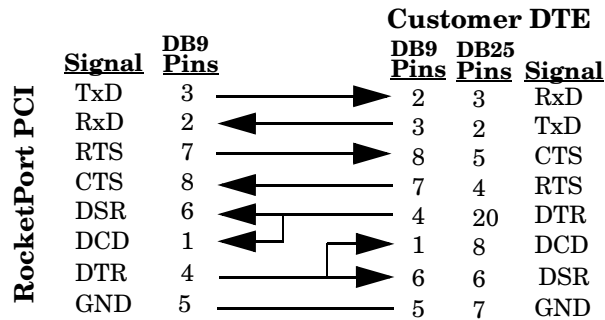
**Note:** Ring Indicator (RI) is only supported on Quad/Octacable cards.

**DB9 Null-Modem Cables**

A null-modem cable is required for connecting two DTE devices. For example, a null-modem cable can be used to connect COM2 of one PC to COM2 of another PC. The DB9 null-modem cables are supported on all RocketPort models.

*RS-232 Null-Modem Cable*

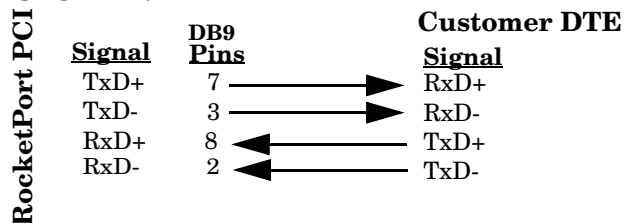
Use the following figure if you need to build an RS-232 null-modem cable.



**Note:** You may want to purchase or build a straight-through cable and a null-modem adapter. For example, a null-modem cable can be used to connect COM2 of one PC to COM2 of another PC.

*RS-422 Null-Modem Cable*

Use the following figure if you need to build an RS-422 null-modem cable.



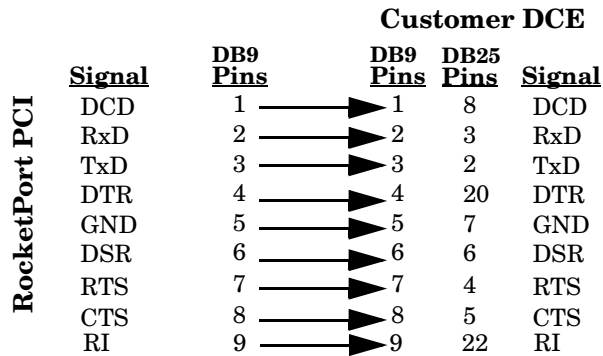
**Note:** RS-422 pinouts are not standardized. Each peripheral manufacturer uses different pinouts. Please refer to the documentation for the peripheral to determine the pinouts for the signals above.

**DB9 Straight-Through Cables**

Straight-through cables are used to connect modems and other DCE devices. For example, a straight-through cable can be used to connect COM2 of one PC to COM2 to a modem. DB9 straight-through cables are supported on all RocketPort models.

*RS-232 Straight-Through Cable*

Use the following figure if you need to build 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 documentation if you need help with connector pinouts or cabling for the peripheral device.

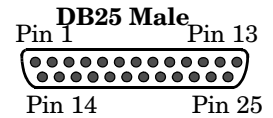
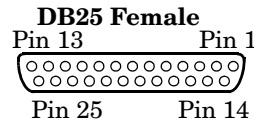
### DB25 Pinouts

This topic describes pinouts for the DB25 interface connectors. DB25 connectors are supported on the following RocketPort models:

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

#### *DB25 Pinouts*

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



This table shows connector information for DB25 connectors.

Interface Modules <sup>a</sup>			Quad/Octacable <sup>b</sup>
Pin	RS-232 Signal	RS-422 Signal	RS-232 Signal
1	Not used	Not used	Not used
2	TxD	Not used <sup>c</sup>	TxD
3	RxD	Not used <sup>c</sup>	RxD
4	RTS	Not used <sup>c</sup>	RTS
5	CTS	Not used <sup>c</sup>	CTS
6	DSR	Not used <sup>c</sup>	DSR
7	Signal ground	Signal ground <sup>c</sup>	Signal ground
8	DCD	Not used <sup>c</sup>	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 <sup>c</sup>	DTR
21	Not used	Not used	Not used
22	Not used	Not used	RI <sup>d</sup> /Not Used <sup>e</sup>
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.

## DB25 Loopback Plugs

### RS-232 Female Loopback Plug

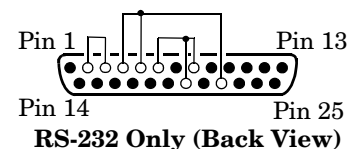
*Loopback plugs* are plugs, with pins wired together that are used in conjunction with the RocketPort diagnostic software to test serial ports.

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

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

This loopback is used with the Quadcable and Octacable. 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



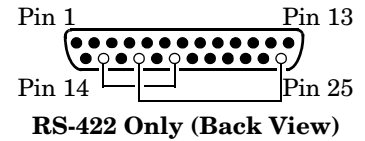
*RS-422 Female Loopback Plug*

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

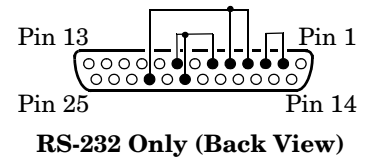
*RS-232 Male Loopback Plug*

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

- RocketPort PCI
- RocketPort Universal PCI

This loopback plug is used with the standard 8- and 16-port DB25 interface modules. 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

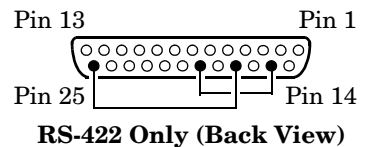
*RS-422 Male Loopback Plug*

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



## 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

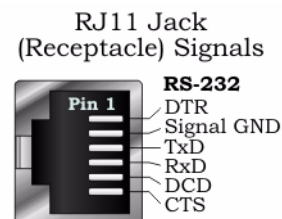
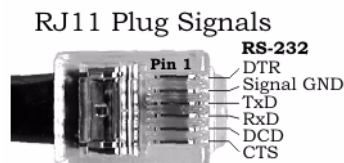
There are no standards for the RJ11. Before you build the custom RJ11 serial cable for your terminal equipment or device you should:

- Refer to the manufacturer's installation documentation if you need help with connector pinouts or cabling for the peripheral device.
- See the documentation for your Control device for supported RS-Modes.



## 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

*Loopback plugs* are plugs, with pins wired together that are used in conjunction with the RocketPort diagnostic software to test serial ports.

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

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



## 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 documentation if you need help with connector pinouts or cabling for the peripheral device.
- See the documentation for your Control device for supported RS-Modes.

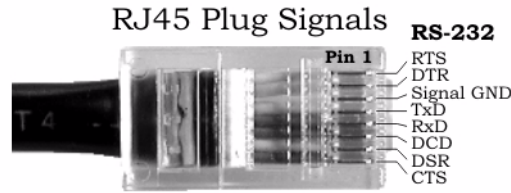
## RJ45 Pinouts

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

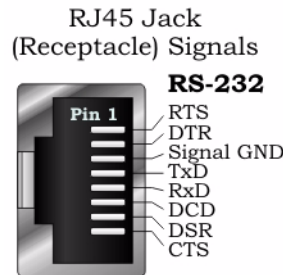
The following RocketPort models support the octacable interface module (RS-232):

- 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.

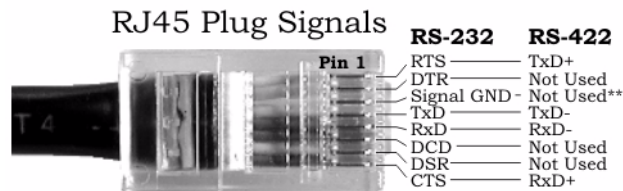


*RJ45 Pinouts for RJ45 Interface Module (RS-232 and RS-422 Port)*

The following RocketPort models support the RJ45 interface module (RS-232 and RS-422):

- RocketPort PCI
- RocketPort Universal PCI

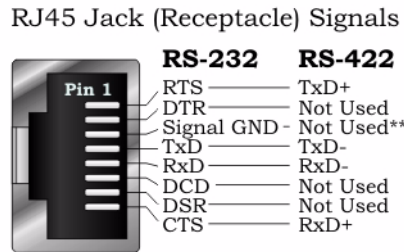
The following figures provide pinout information for the RJ45 plug and receptacle for the RJ45 interface module.



*\*\*Pin 3 is tied to ground on the board, but is not used in the cable.*



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



*\*\*Pin 3 is tied to ground on the board, but is not used in the cable.*

**RJ45 Null-Modem Cables**

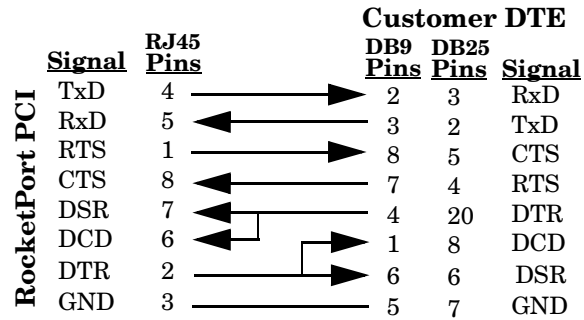
A null-modem cable is required for connecting DTE devices. For example, a null-modem cable can be used to connect COM2 of one PC to COM2 of another PC.

*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

Use the following figure if you need to build an RS-232 null-modem cable.



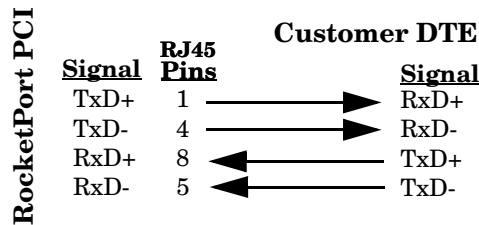
**Note:** You may want to purchase or build a straight-through cable and purchase a null-modem adapter. For example, a null-modem cable can be used to connect COM2 of one PC to COM2 of another PC.

*RS-422 Null-Modem Cable*

The following RocketPort models support RJ45 null-modem cables on RS-422 ports:

- RocketPort PCI
- RocketPort Universal PCI

Use the following figure if you need to build an RS-422 null-modem RJ45 cable.



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

**RJ45 Straight-Through Cables**

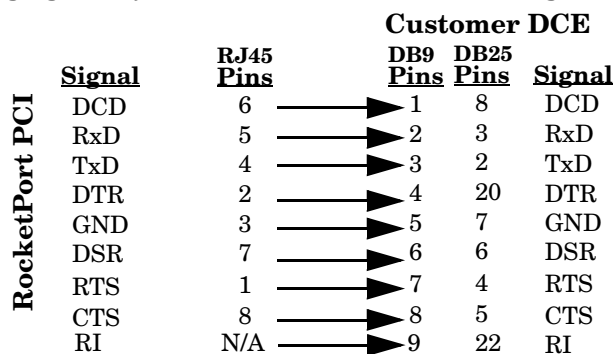
Straight-through cables are used to connect modems and other DCE devices. For example, a straight-through cable can be used to connect COM2 of one PC to COM2 to a modem.

*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

Use the following figure if you need to build an RS-232 straight-through cable.



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

## RJ45 Loopback Plugs

*Loopback plugs* are plugs, with pins wired together as shown, that are used in conjunction with the RocketPort diagnostic software 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**

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 Online Help distributed in Test Terminal (WCom2.exe) for more information on testing serial ports. Test Terminal is installed when you install PortVision.



# Building Cables for DeviceMaster Products

## Overview

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This chapter covers the following topics:

- [DB9 Serial Cables and Loopback Plugs](#)
- [RJ45 Serial Cables and Loopback Plugs](#)

## DB9 Serial Cables and Loopback Plugs

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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

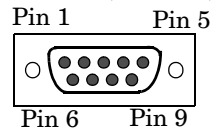
## Requirements

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

## DB9 Pinouts

The following figure 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 <sup>a</sup>	Not used <sup>a</sup>
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 on page 23](#) for additional information.

**DB9 Loopback Plug**

Loopback plugs are DB9 female serial port plugs, with pins wired together as shown, that are used in conjunction with application software (for example, Test Terminal or MiniCom) to test serial ports. This topic describes the following DB9 loopback plugs:

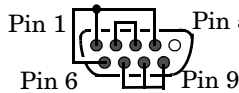
- An RS-232 loopback plug is shipped with the DeviceMaster Serial Hub.
- An RS-232/422 loopback plug is shipped with the following models: DeviceMaster AIR, DeviceMaster PRO, DeviceMaster RTS, and DeviceMaster UP.

**Note:** See the Online Help in Test Terminal (WCom2.exe) for more information on testing serial ports. 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

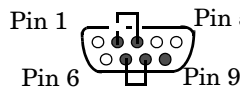


**RS-232 Only (Back View)** *The RS-232 loopback plug also works for RS-422.*

*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)**

**DB9 Null-Modem Cable**

A null-modem cable is required for connecting two DTE devices. For example, a null-modem cable can be used to connect COM2 of one PC to COM2 of another PC.

*RS-232 Null-Modem Cable*

Use the following figure if you need to build an RS-232 null-modem cable. A null-modem cable is required when connecting DTE devices.

	<u>Signal</u>	<u>DB9 Pins</u>		<u>DB9 Pins</u>	<u>DB25 Pins</u>	<u>RJ45 Pins</u>	<u>Signal</u>
<b>DeviceMaster Female</b>	TxD	3	→	2	3	5	RxD
	RxD	2	←	3	2	4	TxD
	RTS	7	→	8	5	8	CTS
	CTS	8	←	7	4	1	RTS
	DSR	6	←	4	20	2	DTR
	DCD	1	←	1	8	6	DCD
	DTR	4	→	6	6	7	DSR
	GND	5	→	5	7	3	GND

**Note:** You may want to purchase or build a straight-through cable and a null-modem adapter. For example, a null-modem cable can be used to connect COM2 of one PC to COM2 of another PC.

*RS-422 Null-Modem Cable*

Use the following figure if you need to build an RS-422 null-modem cable.

	<u>Signal</u>	<u>DB9 Pins</u>		<u>Signal</u>
<b>DeviceMaster Female</b>	TxD+	7	→	RxD+
	TxD-	3	→	RxD-
	RxD+	8	←	TxD+
	RxD-	2	←	TxD-

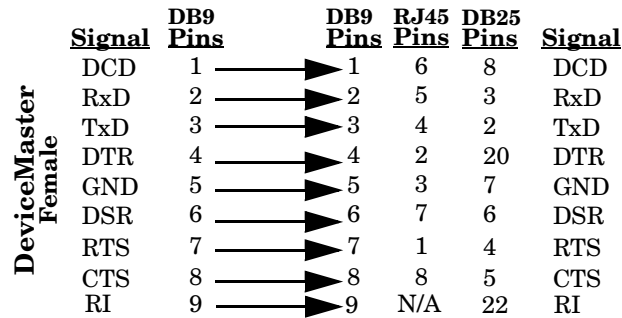
**Note:** RS-422 pinouts are not standardized. Each peripheral manufacturer uses different pinouts. Please refer to the documentation for the peripheral to determine the pinouts for the signals above.

**DB9 Straight-Through Cable**

Straight-through cables are used to connect modems and other DCE devices. For example, a straight-through cable can be used to connect COM2 of one PC to COM2 to a modem.

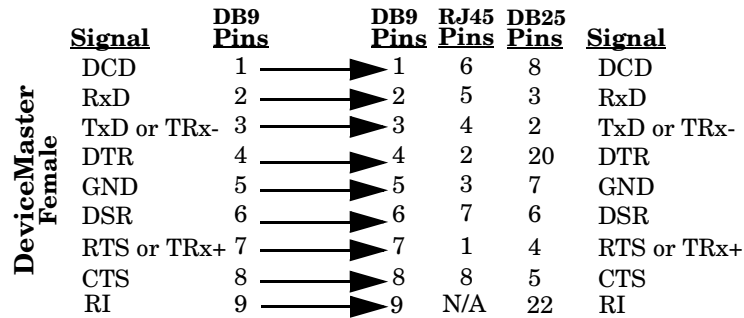
*RS-232 Straight-Through Cable for DeviceMaster Serial Hub*

Use the following figure if you need to build an RS-232 straight-through cable.



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

Use the following figure if you need to build an RS-232 or RS-485 straight-through cable.



**RJ45 Serial Cables and Loopback Plugs**

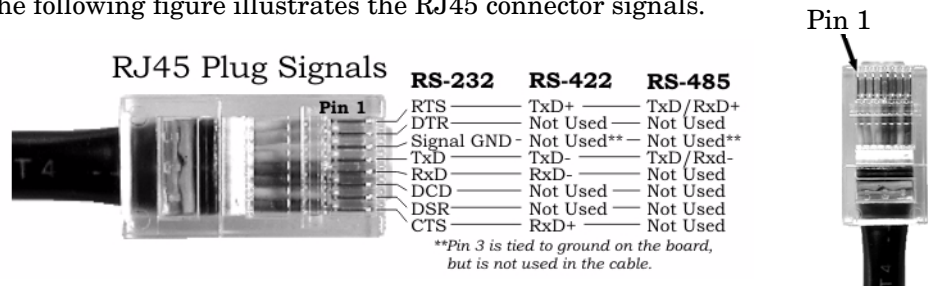
This section describe how to build your own null-modem or straight-through RJ45 serial cables and loopback plugs.

The following DeviceMaster models support RJ45 connectors:

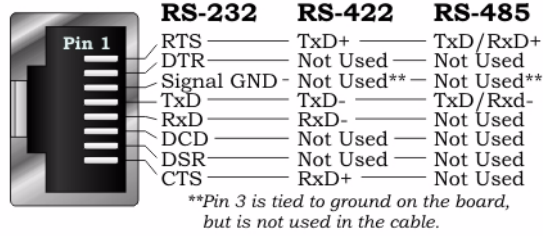
- DeviceMaster PRO
- DeviceMaster RTS
- DeviceMaster UP

**RJ45 Pinouts**

The following figure illustrates the RJ45 connector signals.



RJ45 Jack (Receptacle) Signals

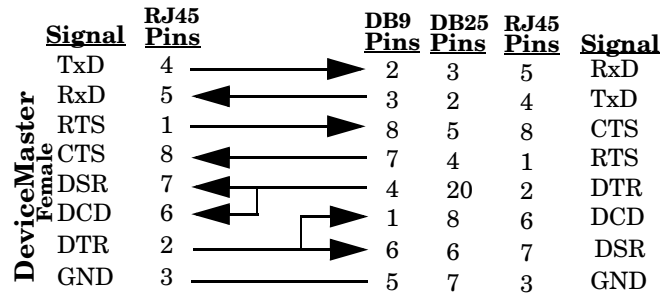


**RJ45 Null-Modem Cable**

A null-modem cable is required for connecting DTE devices. For example, a null-modem cable can be used to connect COM2 of one PC to COM2 of another PC.

*RS-232 Null-Modem Cable*

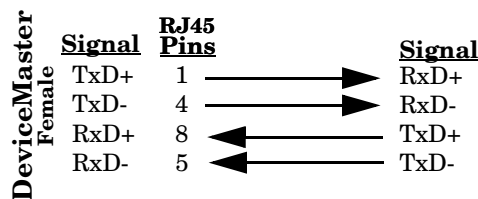
Use the following figure if you need to build an RS-232 null-modem cable.



**Note:** You may want to purchase or build a straight-through cable and purchase a null-modem adapter. For example, a null-modem cable can be used to connect COM2 of one PC to COM2 of another PC.

*RS-422 Null-Modem Cable*

Use the following figure if you need to build an RS-422 null-modem RJ45 cable.



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

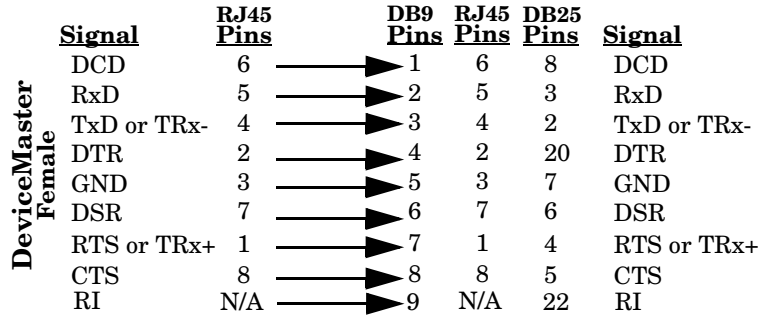
**RJ45 Straight-Through Cable**

Straight-through cables are used to connect modems and other DCE devices. For example, a straight-through cable can be used to connect COM2 of one PC to COM2 to a modem.



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

Use the following figure if you need to build an RS-232 or RS-485 straight-through cable.



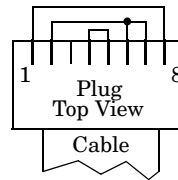
**Note:** If your RJ45 wiring differs from the one shown above, adjust the RJ45 pinouts accordingly.

**RJ45 Loopback Plug**

*Loopback plugs* are RJ45 serial port plugs, with pins wired together as shown, that are used in conjunction with application software (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.

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

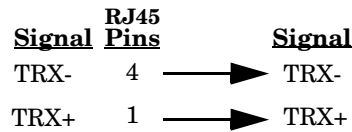


*The RS-232 loopback plug also works for RS-422.*

**Note:** See the Online Help distributed in Test Terminal (WCom2.exe) for more information on testing serial ports. 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.





# Building Basic Cables

## Overview

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This chapter covers the following topics:

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

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

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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

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

Source DB25 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 4, 8, 16, and 32-ports

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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.

## 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 <sup>a</sup>
6	DCD Port 7	45	CTS Port 7
7	RI Port 7 <sup>a</sup>	46	RxD Port 6
8	RxD Port 5	47	RI Port 6 <sup>a</sup>
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 <sup>a</sup>	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 <sup>a</sup>	58	DSR Port 2
20	RI Port 2 <sup>a</sup>	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 <sup>a</sup>	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 <sup>b</sup>	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 <sup>a</sup>	75	SigGnd Port 7
37	RxD Port 2	76	SigGnd
38	DSR Port 3	77	SigGnd
39	DCD Port 2	78	SigGnd

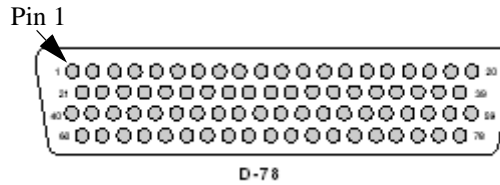
a. RI only applies to the RocketPort uPCI, RocketPort Plus, and Hostess 554 products.

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.

**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 and octacable.
- RocketPort Plus Universal PCI 422 quadcable and octacable.



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 <sup>a</sup>	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.





# Cable Adapters

## Overview

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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

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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 <sup>a</sup>		9	RI

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

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

The following table displays the modem wiring connection from a Control 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 <sup>a</sup>			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 <sup>b</sup>
			5	CTS <sup>b</sup>
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 Control 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 <sup>a</sup>			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 <sup>b</sup>
			8	CTS <sup>b</sup>
			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.

# Technical Support

Comtrol has a staff of support technicians available to help you. In addition, the Web site has **Online Technical Support** available. If you call for Technical Support, please have the following information available:

<b>Comtrol</b>	<b>Headquarters</b>	<b>Europe</b>
Phone	(763) 494-4100	+44 (0)1869 323220
FAX	(763) 494-4199	+44 (0)1869 323211
E-mail	<a href="mailto:support@comtrol.com">support@comtrol.com</a>	<a href="mailto:support@comtrol.co.uk">support@comtrol.co.uk</a>
Web support	<a href="http://support.comtrol.com/">http://support.comtrol.com/</a>	
Downloads	<a href="http://.support.comtrol.com/download.asp">http://.support.comtrol.com/download.asp</a>	
Web site	<a href="http://www.comtrol.com">www.comtrol.com</a>	<a href="http://www.comtrol.co.uk">www.comtrol.co.uk</a>
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