

# RS232 Quick Guide



## TIA/EIA-232-F Standard

RS232 conveys data over a simple unterminated, multiconductor cable at rates up to 20kB. The RS232 standard specifies the electrical characteristics and connector for an all encompassing point-to-point modem interface. Although the original specification was intended for modems, subsequent renderings shed unneeded signals to expand its scope and use as a general purpose serial interface at data rates up to 1MB.

Specification		RS232
Mode of Operation		Single-Ended
Number of Drivers and Receivers Allowed on One Line		1 Driver, 1 Receiver
Maximum Cable Length		50 Feet*
Maximum Data Rate		20kB/s
Maximum Voltage Applied to Driver Output		±25V
Driver Output Signal	Minimum Loaded	±5V
	Maximum Unloaded	±15V
Termination		3kΩ to 7kΩ
Output Slew Rate		30V/μs (Max)
Receiver Input Voltage Range		±25V Max
Receiver Input Sensitivity		±3V
Receiver Input Resistance		3kΩ to 7kΩ

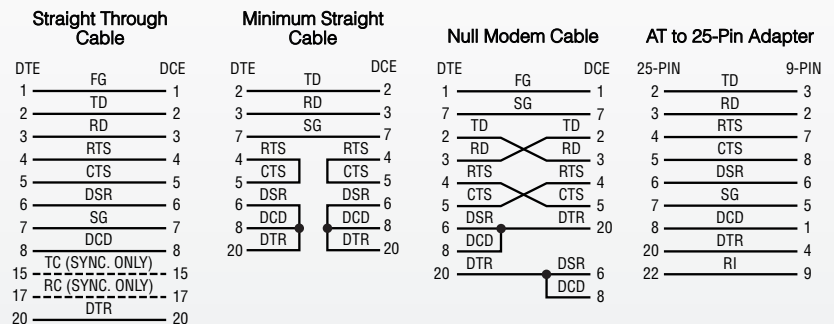
\* For 2500pF cable capacitance, as per IEA 232D for data rates less than 20k baud. For data rates greater than 20k baud,  $C_{LOAD} = 1000pF$ .

## Signal Pinout

DB25	DB9	Name	ABBR.	DTE ↔ DCE
<b>1</b>		Frame Ground	FG	
<b>2</b>	<b>3</b>	Transmit Data	TD	⇒
<b>3</b>	<b>2</b>	Receive Data	RD	⇐
<b>4</b>	<b>7</b>	Request to Send	RTS	⇒
<b>5</b>	<b>8</b>	Clear to Send	CTS	⇐
<b>6</b>	<b>6</b>	Data Set Ready	DSR	⇐
<b>7</b>	<b>5</b>	Signal Ground	SG	
<b>8</b>	<b>1</b>	Data Carrier Detect	DCD	⇐
9		(Reserved)		
10		(Reserved)		
11		Unassigned		
12		Sec. Carrier Detect	(S) CD	⇐
13		Sec. Clear to Send	(S) CTS	⇐
14		Sec. Transmit Data	(S) TD	⇒
15		Transmitter Clock	TC	⇐
16		Sec. Receive Data	(S) RD	⇐
17		Receiver Clock	RC	⇐
18		Local Loopback		⇒
19		Sec. Request to Send	(S) RTS	⇒
<b>20</b>	<b>4</b>	Data Terminal Ready	DTR	⇒
21		Remote Loopback		⇒
		Signal Quality Detect	SQ	⇐
22	<b>9</b>	Ring Indicator	RI	⇐
23		Data Rate Select		
24		Transmitter Clock	(E) TC	⇒
25		Test Mode		⇐

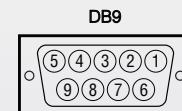
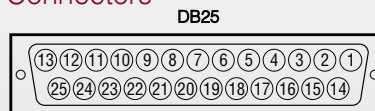
- The DTE ↔ DCE column indicates data direction.
- Pin numbers in bold indicate commonly used signals.
- Data rate select (Pin 23) can be from DTE or DCE.

## Cable and Adapters



A minimum null modem cable is the same as a minimum straight cable except that RD and TD (Pins 2 and 3) are cross-connected as in the null modem cable.

## Connectors



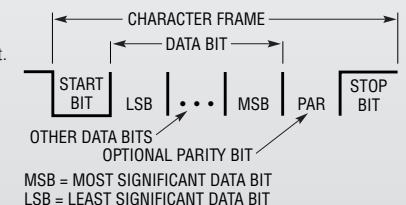
Views are from the pin side of the female (DCE) connector or the wire side of the male (DTE) connector.

## Relative Signal Timing

Normal timing sequences during establishment of communications are shown below. On half-duplex circuits, RTS is dropped as soon as the data is sent. This is to signal a turnaround of the circuit.



## Character Frame



LT, LT, LTC, LTM, Linear Technology and the Linear logo are registered trademarks of Linear Technology Corporation. All other trademarks are the property of their respective owners.