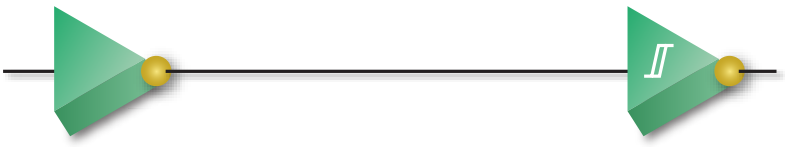
# RS232 Quick Guide



## 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 |

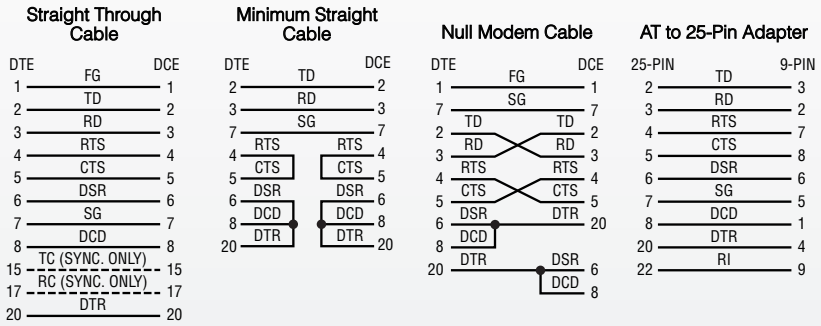
* For 2500pF cable capacitance, as per IEA 232D for data rates less than 20k baud. For data rates greater than 20k baud, $C_{LOAD}$ = 1000pF.

## Signal Pinout

| DB25 | DB9 | Name | ABBR. | DTE ⇔ DCE |
|---|---|---|---|---|
| **1** | | Frame Ground | FG | |
| **2** | 3 | Transmit Data | TD | ⇒ |
| **3** | 2 | Receive Data | RD | ⇐ |
| **4** | 7 | Request to Send | RTS | ⇒ |
| **5** | 8 | Clear to Send | CTS | ⇐ |
| **6** | 6 | Data Set Ready | DSR | ⇐ |
| **7** | 5 | Signal Ground | SG | |
| **8** | 1 | 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 | ⇒ |
| **20** | 4 | Data Terminal Ready | DTR | ⇒ |
| 21 | | Remote Loopback | | ⇒ |
| | | Signal Quality Detect | SQ | ⇐ |
| 22 | 9 | Ring Indicator | RI | ⇐ |
| 23 | | Data Rate Select | | |
| 24 | | Transmitter Clock | (E) TC | ⇒ |
| 25 | | Test Mode | | ⇐ |

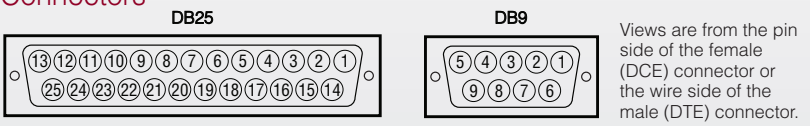
- The DTE ⇔ DCE column indicates data direction.
- Pin numbers in bold indicate commonly used signals.
- Data rate select (Pin 23) can be from DTE or DCE.

## 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.

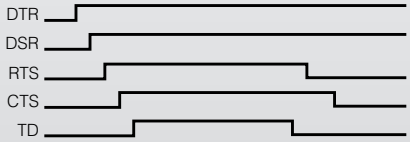
## Connectors



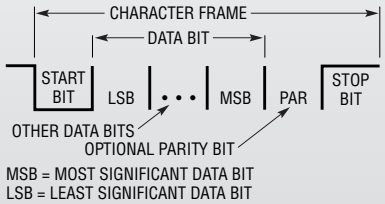

Views are from the pin side of the female (DCE) connector or the wire side of the male (DTE) connector.

## 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




LINEAR TECHNOLOGY

# Linear Technology RS232 Transceivers

| Part Number | Number of Drivers | Number of Receivers | Supply (V) | Data Rate (kbps) | ESD (kV) | Driver Disable | Shutdown Mode | Temp. Grade | Packages |
|---|---|---|---|---|---|---|---|---|---|
| **2500$V_{RMS}$ Isolation** | | | | | | | | | |
| LTM2882-3/-5 | 1 | 1 | 3.3/5 | 1000 | 10 | | • | C, I | LGA-32, BGA-32 |
| **General Purpose** | | | | | | | | | |
| LTC2801 | 1 | 1 | 1.8 to 5 | 250 | 10 | • | • | C, I | DFN-12 |
| LTC2802 | 1 | 1 | 1.8 to 5 | 1000 | 10 | • | • | C, I | DFN-12 |
| LT1180A | 2 | 2 | 5 | 250 | 10 | | • | C, I | SW-18, N-18 |
| LT1181A | 2 | 2 | 5 | 250 | 10 | | | C, I | SW-16, N-16 |
| LT1280A | 2 | 2 | 5 | 250 | 10 | | • | C, I | SW-16, N-18 |
| LT1281A | 2 | 2 | 5 | 250 | 10 | | | C, I | SW-16, N-16 |
| LT1381 | 2 | 2 | 5 | 250 | 10 | | | C, I | SO-16 |
| LT1780 | 2 | 2 | 5 | 250 | 15 | | • | C, I | SW-18, N-18 |
| LT1781 | 2 | 2 | 5 | 250 | 15 | | | C, I | SO-16, SW-16, N-16 |
| LTC1080 | 2 | 2 | 5 | 120 | 2 | | • | C, I | SW-18, N-18 |
| LTC1081 | 2 | 2 | 5 | 120 | 2 | | | C, I | SO-16, N-16 |
| LTC1382 | 2 | 2 | 5 | 120 | 10 | | • | C, I | SW-18, N-18 |
| LTC1383 | 2 | 2 | 5 | 120 | 10 | | | C, I | SO-16, N-16 |
| LTC1384 | 2 | 2 | 5 | 120 | 10 | | • | C, I | SSOP-20, DIP-18, SO-18 |
| LTC2803 | 2 | 2 | 1.8 to 5 | 250 | 10 | • | • | C, I | DFN-16 |
| LTC2803-1 | 2 | 2 | 1.8 to 5 | 250 | 10 | • | • | C, I | SSOP-16 |
| LTC2804 | 2 | 2 | 1.8 to 5 | 1000 | 10 | • | • | C, I | DFN-16 |
| LTC2804-1 | 2 | 2 | 1.8 to 5 | 1000 | 10 | • | • | C, I | SSOP-16 |
| LT1039A | 3 | 3 | 5 | 250 | 15 | | • | C, I | SW-16, N-16 |
| LT1032 | 4 | 0 | 5 | 250 | 2 | | • | C, I | SW-14, N-14 |
| LT1134A | 4 | 4 | 5 | 250 | 10 | | | C, I | SW-24, N-24 |
| LT1136A | 4 | 5 | 5 | 250 | 10 | | • | C | SW-28, N-28 |
| LT1139A | 4 | 4 | 5 | 250 | 10 | | • | C | SW-24, N-24 |
| LT1130A | 5 | 5 | 5 | 250 | 10 | | | C, I | SW-28, N-28 |
| LT1131A | 5 | 4 | 5 | 250 | 10 | • | • | C | SW-28, N-28 |
| **PC Port (DTE)** | | | | | | | | | |
| LT1133A | 3 | 5 | 5 | 250 | 15 | | | C, I | SW-24, N-24 |
| LT1137A | 3 | 5 | 5 | 250 | 15 | • | • | C, I | SSOP-28, SW-28, N-28 |
| LT1141A | 3 | 5 | 5 | 250 | 10 | • | | C | SW-24, N-24 |
| LT1237 | 3 | 5 | 5 | 250 | 15 | • | • | C | SSOP-28, SW-28, N-28 |
| LT1330 | 3 | 5 | 5 | 250 | 10 | • | • | C, I | SSOP-28, SW-28, N-28 |
| LT1342 | 3 | 5 | 5 | 250 | 10 | | • | C | SSOP-28, SW-28, N-28 |
| LT1537 | 3 | 5 | 5 | 250 | 2 | • | • | C | SSOP-28, SW-28 |
| LTC1337 | 3 | 5 | 5 | 120 | 10 | | • | C | SSOP-28, SW-28, N-28 |
| LTC1347 | 3 | 5 | 5 | 120 | 10 | | • | C | SSOP-28, SW-28, N-28 |
| LTC1348 | 3 | 5 | 3 to 5.5 | 120 | 10 | | • | C, I | SSOP-28, SW-28 |
| LTC1349 | 3 | 5 | 5 | 120 | 10 | | • | C, I | SSOP-28, SW-28, N-28 |
| **Peripheral (DCE)** | | | | | | | | | |
| LT1135A | 5 | 3 | 5 | 250 | 10 | | | C | SW-20, N-20 |
| LT1138A | 5 | 3 | 5 | 250 | 10 | • | • | C, I | SSOP-28, SW-28, N-28 |
| LT1140A | 5 | 3 | 5 | 250 | 10 | • | • | C | SW-24, N-24 |
| LTC1338 | 5 | 3 | 5 | 120 | 10 | • | • | C, I | SSOP-28, SW-28, N-28 |
| **RS562** | | | | | | | | | |
| LTC1386 | 2 | 2 | 3.3 | 120 | 10 | | | C, I | SO-16 |
| LT1331 | 3 | 5 | 3 to 5 | 250 | 10 | • | • | C | SSOP-28, SW-28, N-28 |
| LTC1327 | 3 | 5 | 3.3 | 120 | 10 | | • | C | SSOP-28, SW-28, N-28 |
| LTC1350 | 3 | 5 | 3.3 | 250 | 10 | | • | C, I | SSOP-28, SW-28, N-28 |