This material is based upon work by ®Linear Technology Corporation

RS485 Quick Guide
TIA/EIA-485-A Standard

RS485 conveys data differentially over a terminated twisted pair, permitting up to 10Mbps data rates. The standard specifies electrical characteristics of a driver and receiver, and does not specify any data protocol or connectors. RS485 is popular for inexpensive local networks, multidrop communication links and long haul data transfer over distances of up to 4,000 feet. The use of a balanced line means RS485 has excellent noise rejection and is ideal for industrial and commercial applications. You'll find RS485 in applications as diverse as monitoring oil wells and linking POS terminals, to alarm systems, motion control and HVAC controls. Extended capability transceivers offer data rates up to 100Mbps and up to 256 nodes, as well as 6500VRMS isolation and fault protection up to ±60V.

Specification		RS422	RS485
Mode of Operation		Differential	Differential
Number of Drivers and Receivers Allowed on One Line		1 Driver, 10 Receivers	32 Drivers, 32 Receivers
Maximum Cable Length		4000 Feet	4000 Feet
Maximum Data Rate		10 Mbps	10 Mbps
Maximum Voltage Applied to Driver Output		−0.25 V to 6V	−7 V to 12 V
Differential Driver Output Signal	Minimum Loaded	±2 V	±1.5 V
	Maximum Unloaded	±5 V	±5 V
Termination		100 Ω	20 Ω
Receiver Input Voltage Range		± 7 V	± 7 V
Receiver Input Sensitivity		± 200m V	± 200m V
Receiver Input Resistance		4kΩ (Min)	12kΩ (Min)

What Distance Can Be Achieved?

The achievable distance is a function of the cable. The longer the cable, the greater the attenuation. Because attenuation increases with frequency, cables also exhibit a lowpass filter behavior so that achievable distance diminishes with data rate. The distances recommended by the RS485 standard are shown in the graph to the right. Many cables are capable of higher speed and distance. Consult the cable manufacturer's typical performance curve of 0 to 50% rise time vs cable length.

What is the Failsafe Receiver Output State with No Input Signal?

That depends on the failsafe type of the receiver. Type 1 devices (see over) output a guaranteed 1 state when the receiver inputs are left open, but the output is undetermined when the inputs are shorted. Type 2 devices output a guaranteed 1 state whether the receiver inputs are left open, shorted or terminated but not driven.

What is the Proper Way to Terminate the Cable?

The cable should be terminated at each end with a resistance equal to the cable's characteristic impedance.

Belcom | Cable excellence engineered through quality
T: 01279 871150 | F: 01279 871129 | E: sales@belcom.co.uk | www.belcom.co.uk

Belcom