

Maximum cable lengths

Cable length is one of the most discussed items in **RS232** world. The standard has a clear answer, the maximum cable length is **50** feet, or the cable length equal to a capacitance of **2500 pF**. The latter rule is often forgotten. This means that using a cable with low capacitance allows you to span longer distances without going beyond the limitations of the standard. If for example **UTP CAT-5** cable is used with a typical capacitance of **17 pF/ft**, the maximum allowed cable length is **147** feet.

The cable length mentioned in the standard allows maximum communication speed to occur. If speed is reduced by a factor **2** or **4**, the maximum length increases dramatically. Texas Instruments has done some practical experiments years ago at different baud rates to test the maximum allowed cable lengths. Keep in mind, that the **RS232** standard was originally developed for **20 kbps**. By halving the maximum communication speed, the allowed cable length increases a factor ten!

RS232 cable length according to Texas Instruments

Baud rate	Maximum cable length (ft)
19200	50
9600	500
4800	1000
2400	3000

Note: CAT-5 cable doesn't hold up very well in broadcast environments, also it is un-shielded and data noise may get into microphone lines. Using Hi-Def coax cable like Belden 1694A has the same low capacitance as CAT-5 and uses a shield around the center conductor. A custom made pair of DB9 to BNC adapters, center conductor to pin 2, shield to pin 5 offers better versatility in the broadcast environment.