# RS-232 Cable Specifications

## Cables
RS-232 serial interface cables should be shielded, low capacitance cables, ideally designed specifically for serial data transmission.

## Grounding
The shield should be grounded at both ends of the cable. Chassis Ground, available on the shell of Digi's DB-25 and DB-9 connectors, and pin 4 of our 10-pin RJ-45 connector, is ideal for this purpose.

## Environment
While good shielding provides reasonable protection against "noise" (Electro-Magnetic Interference, or EMI), cables should still be routed away from noise sources wherever possible. Avoid laying cables in close proximity to transformers, generators, motors, fluorescent lights, etc.

## Capacitance vs. Length of Run
The total capacitance of a cable affects the integrity of transmitted data. As a rule of thumb, the *total* capacitance of a cable (including the connectors) should not exceed 2500 pF. Serial interface cable is usually rated in Pico Farads per foot. Therefore, if a cable has a capacitance of 50 pF/ft, and the connectors are 100 pF each, the maximum recommended cable length is 46 feet. If the cable is rated at 12.5 pF/ft, the maximum recommended cable length is 184 feet, and 5 pF/ft cable can be run up to 460 feet. In situations where low-capacitance cable is unavailable, or very long cable runs are required, "short-haul" modems, available from suppliers such as Black Box, can be used to increase the effective range of the RS-232 interface. Short-haul modems are similar to standard modems, except that they are connected directly to each other via a cable instead of going through a telephone circuit.

*NOTE—Use only externally powered short-haul modems with Digi products.*