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Technical Note #16

Fiber Optic Modems

Subject: Use of Fiber Optic Modems to connect a PMCS host to remote devices.

Applies To: PMCS Modbus Systems with or considering Fiber Optic Modems.

Fiber optic modems provide immunity to most electrical wiring problems, such as ground potential differences or noise problems.

Fiber optic modems typically connect RS-232 to a phone line. A converter is required to convert the RS-232 signal to RS-485 and vice versa. A typical configuration for a single point-to-point network is shown in figure 1.

If multiple remote sites are required in point-to-point networks, then the above configuration must be duplicated for each site.

A configuration used to extend a current MODBUS network is shown in figure 2.

Remember that all devices, including the modems, must be configured to run at the same baud rate.

Although the above diagrams only represent point to point communications, many modems support point to multipoint systems. In these situations, the host modems' transmit port will daisy chain to all of the slaves receive ports. Also, the host receive port will daisy chain to all the slave transmit ports. It is important not to have duplicate addresses to avoid collisions.

NOTE: For most applications, the RS-232 cable between the computer (DTE) and the modem (DCE) will be a standard straight-through cable while the cable between a modem (DCE) and converter (DCE)will be a crossover or null-modem cable. For more information regarding RS-232 cables, see Application Note 17.

Many fiber optic modems support RS-485 networks and can be configured for either RS-232 or RS-485 operation. This eliminates the need for 232/485 converters. In general, a fiber optic modem should have the following features:

1. Baud rate sufficient to handle application
2. Transmit required distance while communicating at specified baud rate
3. Asynchronous communications
4. No error correction, compression, or flow control.

A fiber optic modem GE has tested with the PMCS network is:

Black Box FOM Line Driver - P/N ME540A -(412) 746-5500

This device is very flexible and can support point to point or point to multipoint topologies as well as RS-232 or RS-485 networks. There is no software configuration or baud rate configuration necessary. Only the network topology and type needs to be configured using hardware jumpers internal to the device. For a point to point configuration, this device must be configured for master/slave mode by changing S1 position 1 from 0 to 1. For connection to the host, the device should be left in RS-232 mode requiring no other changes. However, the remote modem will most likely be RS-485. For a RS-485 network, XW2A should be moved to XW2B, W4 should change from AB to BC, W5 should change from AB to BC, W6 should change from 7 msec to 2 msec, and S1 positions 3 and 4 should be configured from 0 to 1 if the network is not biased elsewhere, and S1 positions 7 and 8 should only be on for termination if placed at the end of the network. Do not use S1 positions 5 and 6 for 2-wire RS-485. The RS-485 network cable must be brought in to the 4 position terminal block inside the modem. Be sure to tie the two '+'s together and the two '-'s together for 2-wire RS-485.

Note: As of 1997, Multilin has added a new 232/485/fiber converter to their product line (model no.: F485-F-120). The new converter adds fiber conversion. This will allow the following configuration:

RS232 or RS485 out of the Host Computer --- to a converter box for conversion to fiber --- over a maximum of 1Km of fiber cable --- to a converter box for conversion to RS485 --- to the device.

Keywords

Fiber; Fiber Optic

Related Notes

Application Note 17: RS-232 Cables for Modem Support

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