# Fiber Optic Transmission System Checkout

Occasionally, during the installation of a fiber optic system, difficulties arise that are the result of factors beyond the control of the inexperienced installer.

As a result, to simplify the task of the installer, the following is a suggested general checkout procedure that will enable many common fiber system-related problems to be quickly identified:

## *A. Check Transmitter or Transmit Section of a Transceiver*

1. Is operating power (DC, AC, Voltages) correct?
2. Are the correct pins on the connector or terminal block being used?
3. Is the correct signal level present at transmitter input?
4. If the unit is a digital transmitter, does the transmitting LED glow dimly when a signal is applied? Note that this can only be seen at an operating wavelength of 850 nm. Units at 1310 or 1550 nm are totally invisible.*
5. If the unit is an analog or video transmitter is there a continuous dim glow from the transmitting LED? Note that this can only be seen at an operating wavelength of 850 nm. Units at 1310 or 1550 nm are totally invisible.*

*** The above visual check should only be attempted with LEDs.**

***NEVER LOOK DIRECTLY AT AN OPERATING LASER DIODE REGARDLESS OF THE OF THE OPERATING WAVELENGTH!!!***

***US Government regulations require that all equipment using Laser Diodes be clearly identified with warning labels.***

6. Is the optical connector on the transmitting optical port clear of any obstruction or minute dirt particles? This is especially important with single-mode fiber.
7. Does the fact that the power ground and signal ground of many systems are common, matter?

8. Does the fact that the power ground, signal ground, and case are common cause a short circuit anywhere in the system?

### *B. Check Optical Connectors*

1. If stepped 906 type SMA optical connectors are being used, are the short plastic alignment sleeves normally supplied with the connectors being used? If they are not present, the system may not work properly! Note that this procedure is not necessary with ST type connectors.

2. Are the connectors are being used the correct size for the fiber being used? Some multimode connectors look and mate the same as single-mode connectors, particularly the ST variety, but are not as accurate.

3. Are the ends of the connectors free of all dust or dirt? If not, gently clean the tip of the connector with a clean cloth or gauze moistened with alcohol.

4. Is the fiber broken in the connector? A quick inspection with an inexpensive jeweler's loop can determine this.

5. Is the fiber protruding from the tip of the connector? If so, refinishing will be necessary.

### *C. Check Fiber Optic Cable*

1. Is the fiber optic cable pulled too tightly around a sharp corner?

2. Is the correct fiber size being used with the correct transmitter/receiver combination? Single-mode fiber will not work with multimode systems and multimode fiber may cause a receiver overload when used with single-mode systems.

3. Does the fiber pass light at all? A small penlight or flashlight can usually be used for this test. If you can see the light at the far end of the fiber it is almost always intact.

4. Does the fiber have too much attenuation for the system? The attenuation measured on a reel will always be different after the cable is installed in the "real world".

5. When using very short lengths of fiber, usually less than 10 meters (30 feet) for example, overloading of the receiver may occur. The shorter the length of the fiber, the greater the possibility for this condition so be sure

there is adequate attenuation in any system. If moving the optical connector slightly out of the mating optical transmitting port cures the problem this is probably the case. If operation with a meter or so of fiber is required, contact the factory.

### *D. Check Receiver or Receiving Section of a Transceiver*

1. Is the operating power (DC, AC, Voltages) correct?

2. Are the correct pins on the connector or terminal block being used?

3. Is light coming out of the fiber optic cable? This may be difficult to see in many cases but dim glow may be present with 850nm light. Other wavelengths such as 1310 or 1550 nm are totally invisible.

**Note the previous caution regarding laser diodes!**

4. Is the optical connector on the receiver optical port clear of any obstruction or minute dirt particles? This is especially important with single-mode fiber.

5. Does the fact that the power ground and signal ground of many systems are common, matter?

6. Does the fact that the power ground, signal ground, and case are common cause a short circuit anywhere in the system?

While the above may seem simple at first glance, when a problem does occur, especially when there is pressure to complete an installation, following these steps may be “just what the doctor ordered”.