

Overview:

Serial Digital Video (SMPTE 259, CCIR 601) signals are being used with increasing frequency within broadcast facilities as this format maintains signal quality through multiple video processors and multiple generations of recording. For broadcasters, the transition to serial digital (SDI) involves not only an investment in new, digitally-based equipment, but also requires an evaluation of the distribution system necessary to route the wider bandwidth, fast-speed digital signals throughout the facility. Until now, most stations have relied on coax distribution systems to support the traditional analog composite (CVBS) and analog component (YUV or Y/R-Y/B-Y) signals in use. However, it is quickly becoming apparent that these installed, coax systems are limited in their ability to support the more demanding SDI standards.

This TECHnique illustrates how the Pure Digital Fiberlink SDI transmission system, manufactured by Communications Specialties, facilitates distribution of Serial Digital Video (SDI) in a broadcast video environment.

Details:

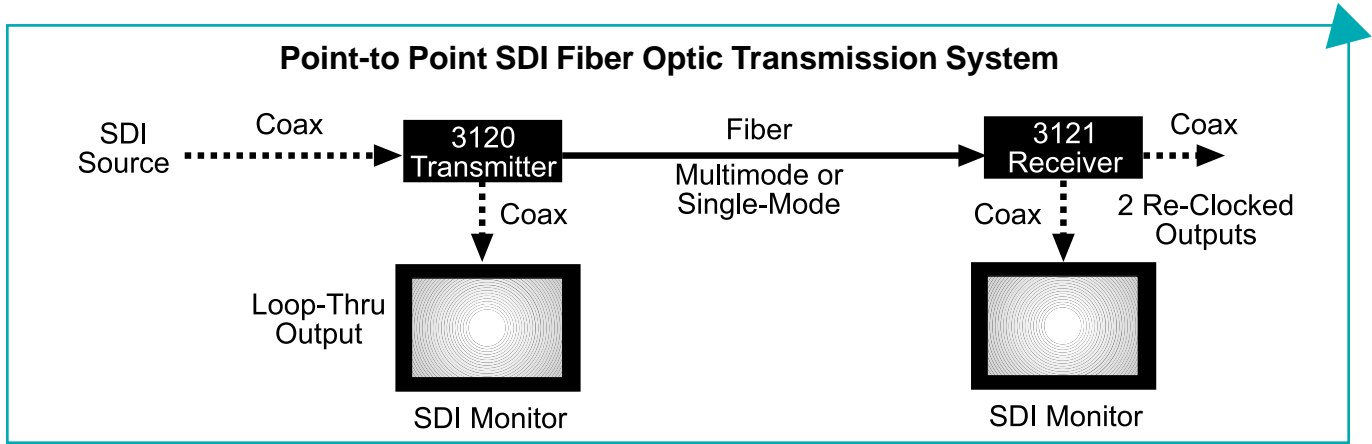
Problem: Even under ideal conditions, the highest quality coax cable is only able to transmit an SDI signal a maximum of 300 meters. Standard RG-59 coax cable is even more limited in its performance and is quite susceptible to electrical and environmental interference.

Solution: Fiber optic transmission is an ideal means for distributing serial digital video signals throughout a broadcast facility. CSI manufactures the Pure Digital Fiberlink transmission system for SDI, designed specifically to support all SMPTE 259M, 294M and 305M signals at data rates of 143, 177, 270 and 360Mb/sec. This point-to-point transmission system may be used to send SDI signals from room to room, floor to floor, building to building, studio to transmitter (STL) and even over long distances up to 60 km.

The advantages of fiber optic transmission include error-free transmission, immunity to interference and no degradation of the signal. CSI's fiber optic transmission system uses high-speed pulse modulation techniques to transmit and receive the digital video pulse stream without any alteration or interpretation of the original signal. Along with the serial digital video, imbedded audio and EDH control signals are also transmitted.

CSI's fiber optic transmitter provides an equalized cable input with a loop-through output for monitoring of the transmitted signal. Two re-clocked outputs at the receiver eliminate any jitter and drive the signal up to an additional 300 m of coax cable. The system cleanly passes pathological test signals up to and including 360Mb/sec.

The SDI transmission system is available for use with multimode or single-mode fiber. The multimode system is suitable for transmission over distances



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up to 2 km. The single-mode system, which is laser-driven, may be used for all applications requiring support for up to 60 km.

Suggestions:

Using SDI Links with Matrix Routers: SDI fiber links can be assigned to several inputs and outputs on SDI matrix routers, thus enabling multi-point as well as mid to long range distribution of SDI signals over fiber.

Selecting Multimode or Single-Mode Versions: If the SDI Link will be used with fiber that is already in place, then it is important to establish whether the fiber is multimode (50 or 62.5 microns) or single-mode (8 or 10 micron). This will determine which version transmitter/receiver pair to specify. If you are specifying a new system, then it is necessary to calculate the loss budget of the system (distance, patches, splices, adapters and type of fiber) in order to determine if multimode or single-mode fiber is appropriate. (See "Introduction to Fiber Optics" to determine the loss budget.)

ST, SMA or FCPC Connectors: CSI recommends the use of ST connectors with multimode fiber. If existing fiber is terminated in an SMA connector, then the 6300 ST to SMA adapter may be used. For use with single-mode fiber, CSI recommends use of FCPC connectors. If existing fiber is terminated in an ST connector, the 6310 FCPC to ST adapter may be used.

CSI Products Used In This TECHnique:

- SDI Transmitter
Multimode 1310 nm, ST connector3120-3
- SDI Receiver
Multimode 1310 nm, ST connector3121-3
- SDI Transmitter
Single-mode 1310 nm, FCPC conn.3120-7
- SDI Receiver
Single-mode 1310 nm, FCPC conn.3121-7
- ST Male to SMA Female adapter
multimode 6300
- ST Male to FCPC Female adapter
Single-mode 6310

Related TECHniques:

- Educational Guide: *An Introduction to Fiber Optics*
- Educational Guide: *An Introduction to Fiber Optic Cable and Connectors*
- T-21 Calculation Transmission Distance of Fiber Optic Equipment