

# Fiber Cable Management in the Studio

For years, television broadcasters have relied on coax cable to route video, audio and control signals and RF around their facilities. Coax has proven itself to be relatively easy to work with and reliable.

However, as the television broadcast business evolves from a single analog channel to a digital broadcast world, the continued roll of coax cable is being re-evaluated. In its place, fiber optic cable is emerging as a logical solution for next generation television signal routing, where greater bandwidth is needed to accommodate HD signals and multicast SD channels.

Unfortunately, the knowledge that television engineers have gained about working with coax cable isn't particularly transferable to using fiber. New issues, such as signal attenuation or complete loss from severe bending, proper troughing, crush load tolerance and cable density and accessibility, must be considered when managing a fiber optic network.

Proper cable management practices make fiber networks less susceptible to accidental damage, quicker to install, less expensive to own and operate over the long haul and easier to expand as needs grow.

## Key cable management concepts include:

- *Bend radius:* At turns in fiber runs, maintain a 2-inch bend radius. Tighter bends may cause micro bending of individual fibers that allow light to escape the signal path resulting in signal attenuation. More severe bends can break fiber strands completely resulting in signal loss.
- *Cable troughing:* Used to route fiber optic cable, troughing systems provide a protected pathway for fiber to traverse spans between rooms and equipment racks. Good troughing systems will keep fiber separate from coax cable, protect it from out-of-tolerance bends and promote neat, easily accessible runs.
- *Vertical cable protection:* Allowing fiber to hang unprotected from the back of equipment can be a recipe for disaster. Exposed cables are easy to snag accidentally with a wandering hand or foot, which can result in damage to the connector or fiber itself. Additionally, the weight of hanging fiber over time can cause bends outside the acceptable limit and consequential damage to the fiber. Proper vertical cable management in panels or equipment bays provides adequate support, cable protection and a transition from the vertical run to the back of the equipment that does not damage the fiber.
- *Cable pile-up:* In horizontal fiber runs, it is unacceptable to allow a pile of fiber cable to exceed two inches. Beyond that point, the weight of the bundle will surpass the crush tolerance limit of the fiber at the bottom of the stack, resulting in microscopic damage and signal attenuation.
- *Cable segregation:* Keep fiber runs separate from legacy coax cable. Coax is relatively heavy and can crush fiber cables. Additionally, segregating coax from fiber ensures that technicians repairing coax do not accidentally damage the fiber cable while working on the copper.
- *Labeling:* Develop good labeling practices. Know where fibers originate and terminate. Doing so will reduce maintenance time and the likelihood that a maintenance tech will make hasty decisions on fiber routing that can lead to a rat's nest of cable and patchcords.

- *Density:* When selecting products for a fiber network, remember future maintenance. The more densely connectors are packed onto a panel, the more difficult it will be for even the most dexterous technicians to maintain. Remember, inevitably cables will be moved, so the ability to trace and re-route them is critical to working efficiently.
- *Future proofing:* When planning rack configurations with a given number of terminations to accommodate a relatively low number of fibers for today's requirements, don't forget the future. A fiber path that easily supports 12 fibers today may be inadequate in supporting the 200 fibers needed in a couple of years. Planning up front for the future can save the expense of ripping out outgrown capacity down the road.

Proper cable management is critically important to the successful conversion of television broadcasters from coax to fiber. The fact that a single fiber may transmit mission-critical signals, such as revenue-generating commercial and programming, underlies the importance of taking the steps necessary manage fiber's installation and use.

**For More Information on this Topic:**

Managing Density in the Data Center: A Long Term Approach for the Future, 105455AE

The Elements of Fiber Cable Management, 104962AE

ADC's Optical Distribution Frame: The Data Center's Main Cross-Connect, 106781AE



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ADC Telecommunications, Inc., P.O. Box 1101, Minneapolis, Minnesota USA 55440-1101

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