

Cabling to Support Healthcare Advances

Robust communications are key to modern medical systems

The world of healthcare is changing as populations age, chronic diseases increase, systems for diagnoses and treatment become more sophisticated and more healthcare and monitoring is done remotely. This, in turn, is driving demand for the collection, storage and transmission of ever-larger volumes of data at ever higher speeds – demands that can be met by choosing optimized fiber optic cabling technology.



Figure 1: Modern medicine increasingly relies on data and communication

Much of the innovation in modern medicine has been data centric, reflecting the need for more accurate diagnosis and increasing use of remote monitoring. Artificial intelligence, for example, is being incorporated for applications such as reviewing scans - often finding issues that a human reviewer may miss; robotics are being introduced to the operating theater to assist surgeons in tricky procedures; and technologies such as 3D printing now create customized medical devices and implants. At the same time there is a trend towards healthcare away from a medical facility with portable and wearable devices delivering 24/7 monitoring, while the rapidly growing sector of telemedicine is using video conferencing to deliver healthcare to remote and often inaccessible areas.

Connecting these technologies requires a reliable network with the ability to deliver large amounts of data without the possibility of corruption.

Challenges of Medical Technology Networks

With the volume, importance and sensitivity of the data being carried, the requirements for medical networks are challenging. Due to these factors, fiber optic is becoming the preferred solution as it offers significant bandwidth as well as reliability and security.

Interference between equipment and cabling is often a challenge in hospital facilities with a mixture of high-voltage and RF-based diagnostic equipment alongside highly accurate and precise instruments. As fiber optic cable transmits data in the form of light pulses, it is neither susceptible to electrical interference from HV/RF sources, nor does it generate EMI that can interfere with sensitive equipment. This also all but eliminates the potential for 'snooping' on sensitive patient data as splicing into fiber optic cables is a skilled job.

Often, hospitals upgrade existing network infrastructure as part of a rollout of new equipment. This normally entails running the new cabling through existing conduits that may already be congested. Clearly, thin cables with the ability to withstand tight bend radii help here.

With the huge bandwidth associated with fiber, there is usually additional capacity available to allow more equipment to be added in future, saving costs.

The patented Micro Armor Fiber™ Optic cable from TiniFiber is often a preferred choice for upgrading or extending existing network infrastructure in hospital environments. As it is 65% smaller in diameter and 75% lighter than normal Aluminum Interlock Armor (AIA) cable it can be pulled through congested conduits with relative ease, where other cables may not fit or be damaged with the force needed to install.



Figure 2: TiniFiber's LSZH jacketed Micro Armor Fiber cable is suited to use in medical applications

The all-important fiber optic strands sit within a tightly wrapped tubular stainless steel outer coil with an inner layer of Kevlar®. Not only does this provide strength during installation, but it also offers significant protection against crushing, tampering and chewing by vermin once the cable has been deployed.

With the smallest outside diameter of any armored cable, Micro Armor will fit where other cables will not, and leave space for future upgrades, if needed. What's more, the armor does not detract from the flexibility of the cable, permitting the necessary bend radii that are essential for deployment inside small or congested conduits. With this level of protection, damage during install is a very rare occurrence.

Even before installing, the small size reaps benefits. As reels of Micro Armor are smaller, more can be fitted inside a van, reducing the cost of delivering to site and positively impacting the environment by saving fuel. The reels are also lighter – a fact that is appreciated by any installer that has to carry them to a height, or maneuver them into a tight space.

With reliability paramount in hospital installs, network operators highly value the full 25-year TiniFiber warranty. This comes as standard, provided that the selected installation firm is registered under the TiniFiber Certified Installer (TCI) Program.

TiniFiber Cables

TiniFiber has a very broad selection of fiber cables – all of which are armored. Within the portfolio are types for indoor, outdoor, or mixed use – so that networks that transition between hospital buildings are also accommodated. This is augmented by a wide range of jackets and colors for riser, plenum, indoor/outdoor, LSZH, and burial installs.

Ensuring that installers are properly equipped, TiniFiber offers a range of tools and accessories alongside the cable portfolio. This includes armor stripping tools, cable cutters and fusion splicers as well as other essentials.



Figure 3: TiniFiber cable is significantly smaller and lighter than competitive solutions

The fiber heart of the cable is formed from modern bend-insensitive glass (Corning LBL G.657.A2) in two coated sizes (250 μm and 900 μm). The 900 μm tight buffer cables contain up to 24 strands while the gel-free sub-unitized 250 μm breakout style cables are available with up to 12, 24, 36, 48, 72, 96 or 144 strands.

Finally, with cost being a significant factor, especially where funding is tight in medical facilities, customers will be happy to know that despite its strength and high performance, TiniFiber Micro Armor has a low total cost of ownership. As a result, users enjoy reduced costs during installation and throughout the cable's lifetime.