OVERCOMING SPACE CHALLENGES AND REDUCING COSTS WITH SMALL-DIAMETER CABLE TECHNOLOGY

Business and residential subscribers all over the world view bandwidth in the same way that many of them view money--you can never have too much. As every service provider knows, the subscriber appetite for bandwidth is getting bigger every day, with no let up in sight. The soaring popularity of mobile applications, along with both fixed and mobile multimedia content and the ongoing enterprise shift to cloud computing and data warehousing are generating enormous amounts of network traffic.

To increase the capacity of their networks, service providers are deploying more and more fiber. However, while that strategy enables them to keep pace with the demand for bandwidth, it creates another set of problems. As service providers continue to add fiber, their vertical and horizontal fiber-routing systems are filling up rapidly. That cabling congestion makes it very difficult for technicians to gain access to existing circuits and to install new ones, a situation which poses a growing risk to network reliability.

Given the limited physical space in their central offices, headends, data centers and other areas of the network, service providers need a way to slow the rate of cable pile-up and thereby ease congestion in their fiber-management systems.

Responding to this challenge, TE Connectivity (TE) has developed a microcable patchcord solution. Measuring 1.2-mm in diameter, this new cable requires half the physical space needed for small form factor 1.6-mm patchcords, one-third of the space needed for commonly-used 2.0-mm patchcords, and is up to 3 times the strength of these larger diameter cables.

No Fiber Congestion Now? Just Wait…

In May 2012, Cisco Systems released its latest Visual Networking Index Global IP Traffic Forecast, which predicts the volume of global IP traffic will grow four-fold between 2011 and 2016, reaching 1.3 zettabytes a year by 2016. A zettabyte is 1 billion terabytes or 1 trillion gigabytes. As an article in PC Mag.com noted, that is equivalent to 38 million DVDs per hour1.

On the mobile side alone, the volume of data traffic around the world will be 18 times larger in 2016 than it was in 2011, reaching an annual level of 130 exabytes or 1 million terabytes. The accelerating number of mobile devices connected to the Internet will power that flood of mobile data. The report states that by 2016, the number of such devices likely will exceed the projected number of people on earth – 7.3 billion.

Further, according to the Cisco report, there will be nearly 19 billion global network connections, fixed and mobile, by 2016, which translates into 2.5 connections for every person on earth. By that same year, the number of Internet users will climb to about 3.4 billion, more than 45 percent of the world's projected population. The report also predicts the average broadband speed will accelerate at a fourfold rate, from 9 Mbps in 2011 to 34 Mbps in 2016, and that collectively, subscribers will view 1.2 million minutes of video every second.

Fiber Can Handle the Traffic, But Where Will All Those Cables Fit?

With its almost limitless capacity, fiber-optic technology clearly is the service-provider solution of choice for satisfying much of the surging demand for bandwidth and ever-faster transmission speeds. Yet as service providers around the globe push more fiber into their networks, many already are experiencing cabling-congestion and slack-storage headaches.

These challenges give rise to worries about how to gain access to existing circuits and install new ones without damaging neighboring fibers and disrupting service to customers. The amount of cabling already is straining the capacity of their vertical and horizontal fiber-management systems, but service providers obviously must continue to install still more fiber.

Smaller-Diameter Cabling is the Answer

To help service providers tackle the cabling-congestion problem, TE has developed a new, thinner cable. Rather than reducing the number of aramid yarns in an effort to shrink the thickness of existing 1.6- and 2.0-mm cables, TE specifically designed the new patchcord to be smaller in diameter, using a proprietary method to bond the jacket to the cable strength members.

As illustrated in the following chart, the 1.2-mm patchcord offers a 65-percent space savings over 2.0-mm patchcords.

Patchcord Diameter	Cables per Square Inch of Vertical Cable Management Space
3.0mm	46
2.0mm	102
1.6mm	142
1.2mm	285

The Added Benefit of Improved Performance

Featuring a look and feel different from that of standard fiber cable, the 1.2-mm cable assembly not only alleviates the cable-congestion problem but it also offers better performance over 1.6-mm or 2.0-mm cables. The OFNP, plenum-rated cable operates in extreme temperatures -20 to +70° C (-4 to 157° F) and is designed to be much more robust than its cable assembly predecessors. Consider the following: With standard cables, the aramid yarn and jacket are not typically bonded. When the cable is handled by an installer, typically, the pull forces get applied directly to the cable jacket. As cable designs move toward smaller and smaller form factors, the jacket material becomes thinner – making it more susceptible to damage or breaks. TE addressed this problem with the new 1.2-mm fiber cable.

[1] Moscaritolo, Angela. „Internet Traffic to Reach 1.3 Zettabytes by 2016."
PCMag.com. May 30, 2012 <http://www.pcmag.com/article2/0,2817,2405038,00.asp>

Leveraging a new cable strengthening technology, the 1.2-mm cable allows pulling forces to be distributed more evenly to its strength members and cable jacket. Traditional larger cables only meet the "small form factor" tensile requirement of 9 lb in industry standards such as Telcordia GR-409. TE's 1.2mm cable is rated at 30 lb, which is three times stronger. The result is a more robust fiber cable, less susceptible to breaks and damage, and more wire-like in its handling capabilities.

Further, because the 1.2-mm patchcord uses reduced bend radius fiber (RBRF), technicians can route the cable more easily into electronic equipment bays which typically provide few, if any, cable-management features. Technicians will also have an easier time splicing the 1.2-mm patchcord in the field, as a simple pair of wire strippers or scissors is sufficient for stripping and accessing the fiber for splicing.

TE designed the 1.2-mm fiber optic cable assembly from the ground up to meet or exceed Telcordia GR-409 Issue 2 requirements for both interconnect and small form factor cables, as well as GR-326 CORE mechanical and performance requirements for the assembly or connector.

The 1.2-mm patchcord is designed to meet the intermateability requirements of TIA-604-3-B and IEC 61754-4 for SC connectors, as well as TIA-604-10-B and IEC 61754-20 for LC connectors. In addition, the 1.2-mm is designed to meet the performance requirements of IEC 61753-1 and TIA-568-C.3, and the cable specifications of IEC 11801.

Maximize Space, Reduce Heat, Reduce Costs

Available with single-mode SC and LC connectors in both UPC and APC versions, the 1.2-mm cable delivers the flexibility service providers need to increase termination densities in limited physical space--and to reduce associated capital/operating expenditures.

- temperature shock
- cable flex
- humidity
- cable retention
- temperature life
- cable twist
- mating durability
- impact
- vibration
- reliability/extended environmental

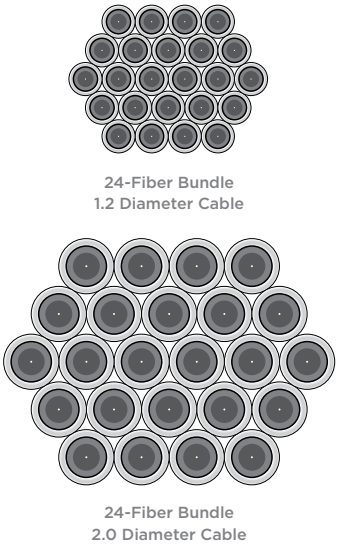
Among the applications for the smaller-diameter cable are:

- service-provider and private networks
- headends
- data centers
- equipment test/distribution areas
- cross-connects
- transmission systems
- storage systems
- switching systems
- DWDM systems

Extend the Life of Existing Cable-Management Systems

The 1.2-mm cable also enables service providers in many instances to leverage their existing investments in cable-management systems. For example, if overhead raceways now are at 60-percent capacity and line-ups are at 20-percent capacity, service providers can extend the life of these systems by adopting the smaller-diameter cable now.

As a result, by capping their investments in 1.6- and 2.0-mm cabling, service providers can delay having to invest in additional vertical and overhead systems while continuing to deploy more fiber in the network.



Size comparison of 1.2mm and 2.0mm bundled cable

Pave the Way to More Space Savings

Over the long term, the 1.2-mm cable also has the potential to deliver yet another space-saving benefit to service providers. Vendors such as TE can take advantage of the smaller cable size to develop new fiber-management solutions that allow more terminations per square foot of physical space.

Squeezed between the surging subscriber demand for bandwidth on one side and growing cable congestion on the other, service providers need cabling solutions that literally give their networks room to grow. By saving significant space, reducing costs and providing easier, safer access to circuits, the 1.2-mm cable from TE relieves the cable-congestion problems confronting service providers right now.

It also opens the door to future cable-management solutions, namely, those designed to handle, within a limited amount of space, the fiber counts that will be necessary to satisfy subscribers' never-ending demand for bandwidth.

For more information on TE's 1.2mm patchcord solution, visit: www.te.com/smallfiber

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