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## COMMUNICATOR



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## Predicting the Fiber Optic Market

By Frank Giotto

Each of today's Fiber Optic Companies has their story to tell. The market you serve, new product offerings and the ability to satisfy your customer's requirements may be some good indicators of your company's performance.

It's interesting that this year's normal price increases may falsely appear that you are selling more or capturing new markets. Remember, as well, increased net profits have to be adjusted by the inflation factor. For example two present building expansions became double the cost of my estimated building price.

I am glad to report FIS sales performance for the past eighteen months far exceeded our expectations. The big question is how long will our industry provide us this opportunity? Bandwidth demands supported by government money certainly play as an important component.

I questioned my management staff in order to gain insight into what they felt the most important decisions and commitments were that most influenced our growth.

I thought you might be interested to know our thoughts on what the 6 key points to achieving our growth were.

### The 6 Key Points to Our Growth

1. *Our ability to intelligently purchase large quantities for inventory that met our customer's requirements, during a time of shortages.*
2. *We were able to focus on Fiber to the Home demands including Splice-On Connectors and cable.*
3. *We continued to stand by our reputation to technically support and fairly treat every transaction.*
4. *FIS employees continue to use their amazing expertise to provide customer satisfaction.*
5. *Our catalog and website continue to provide the most comprehensive fiber optic information in the industry.*
6. *We expanded our training resources to include classes via Zoom and the creation of a free two-hour training video.*

Please allow me to add to this list. Over the past decade FIS's Fiber Optic Manufacturing ability was recognized and utilized by many major companies in our industry providing us the opportunity to become a supplier to them often in their name. Partnerships that endure, and create a base of business - that is how real growth is achieved.

I wish the best of luck to you moving forward. I am optimistic and thankful that we have chosen the right technology. Let's prosper together!

Best Regards,

*Frank Giotto*

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## OTDR Service/Connector Repair Annual Calibration May Not Be Enough

### Annual Calibrations

If you are a happy owner of an OTDR, chances dictate you are aware that these little beauties require annual calibrations. These annual calibrations are generally required by job sites and ensure your equipment is testing according to factory specifications. Did you know that the standard annual calibration service may not be enough?

### Abused Parts

For so many OTDR users out there these units are being used and abused daily. What is the most abused part of these units? The connector... Now in a perfect world most professionals highly suggest you utilize a pulse box (or pulse suppressor/launch reel). Not only do these items allow you to test the first and last connector more accurately but they save the wear and tear on your OTDR ports. With that being said, of course we know many do not use these pulse boxes and plug directly into the fibers they are testing. Now there is one major thing we strive to teach our customers, and that is the number one enemy to the fiber optic industry is dirt/ dust/grime/ debris.

### This Happens Far More Than We Would Like

It's shocking but literally specs of dust have brought down entire networks, cell towers, company buildings...you name it. Improperly handling fiber ends and connectors are generally where all the issues in the fiber optic world stem from. We have seen techs take a connector, breath on it and wipe it on their work pants. Then they plug that into a potentially million dollar system... it is in these moments that the fiber gods cringe... Now this happens far more than we would like to see, but it is what it is. But when this happens to OTDR ports it generally causes damage to the internal connector on the unit. That is something you cannot repair in the field. The bad news is, if you cause enough damage, your unit is down, including your current project and possibly income. Many of you during your career have probably seen an error message on your unit stating something along the lines of "High reflectance at OTDR port". This is bad news. Generally this means either the internal ferrule inside the connector is extremely dirty or in the worst case, damaged. Plugging in dirty connectors is generally the main issue; however, you can actually plug in the wrong style as well. If you have UPC style port but plug in an APC connector, this will probably damage the ferrule as well. Always watch out for color schemes. Generally blue is UPC and green is the APC style. Do not mix them!

### Common Issues

The following chart will show you some examples of different images of ferrule end faces. Including clean and proper, and the several most common issues you will see.

	OK	Dirt/ Particles	Oil/Finger print	Scratches/ Grooves	Cleaning agent residues	Adhesive residues
Single-mode						
Multi-mode						

### There Is More to This Most People Think

Now I would like to talk to you about what it takes to repair a connector (ferrule) on an OTDR. There is more to it than most think.

- First the unit needs to be carefully and professionally opened up exposing the internal components. There you will find fiber which can be either jacketed or bare. The fiber connects the connector (ferrule) to other components deeper inside the unit and then to the board. We will not get too technical here but give more or less a general overview. Now if the ferrule is damaged and needs to be replaced, the connector is cut off and a new connector and ferrule is spliced on. If it is not entirely ruined, the end face can be repaired by being re-polished. Now you may have sent in a unit for this service in the past and wondered why you are also charged for a calibration on top of the repair. The simple answer is: when you change the physical properties of either the end face or the length of fiber inside the unit you need to ensure the unit still runs at factory spec. You can think of a high end sports car, you wouldn't just slap in high performance aftermarket parts and drive down the road. You need to tune it and make sure everything is running as it should.
- Once the connector or ferrule is repaired or replaced a reputable calibration lab (such as FIS) will then test it using an interferometer. An interferometer is a device that can provide a profile of the end of the connector. It can verify the end radius and its conformance to standards. It can also profile the polished fiber end, show how well it fits the profile of the connector ferrule, protrusion of the fiber from the ferrule, quality of the polish and find the center of the radius of the curvature of the end of the polished fiber.
- Then your unit is carefully put back together and then a general calibration is performed. Below is a good example of both the internal structure of an OTDR along with a sample image of an interferometer test.

I hope this information today provided you a general overview of connector/ferrule service along with why you always want to ensure your equipment and connectors are clean and well kept.

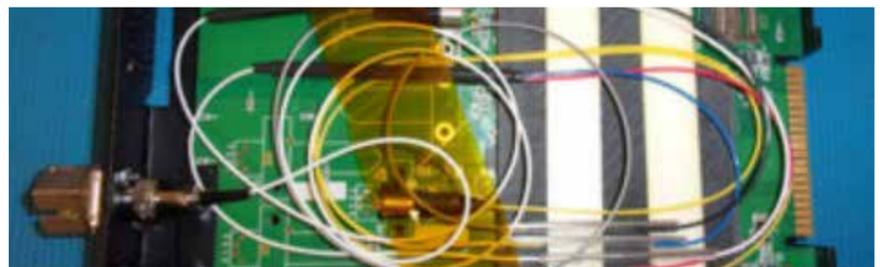


Image of Internal Structure & Components of an OTDR

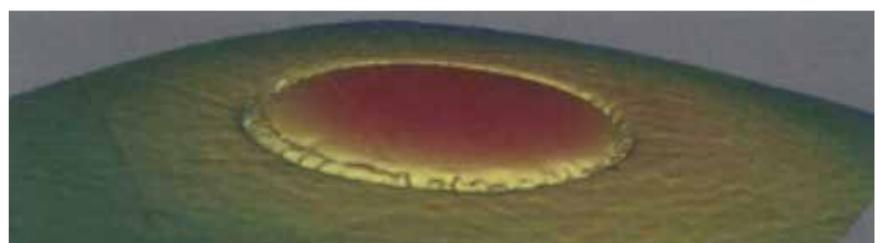


Image of End Face Shown in an Interferometer Test (without measurements)

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# To Move Forward!



## Featured Products

### FIS Cheetah Splice-On Connectors



The FIS Cheetah Splice-On Connectors have become a top choice of termination with the cost, space, and time savings they offer. In addition to working with most Splicer manufacturers, Cheetah SOC's provide factory-terminated connectors that can be spliced in the trunk cable. This saves the installer time and space while maintaining a minimum Insertion Loss of .20dB and a minimal return loss as low as -65dB. The FIS Cheetah Splice-On Connectors are the low-cost, high-value termination you need.

**Steve Casaletta**

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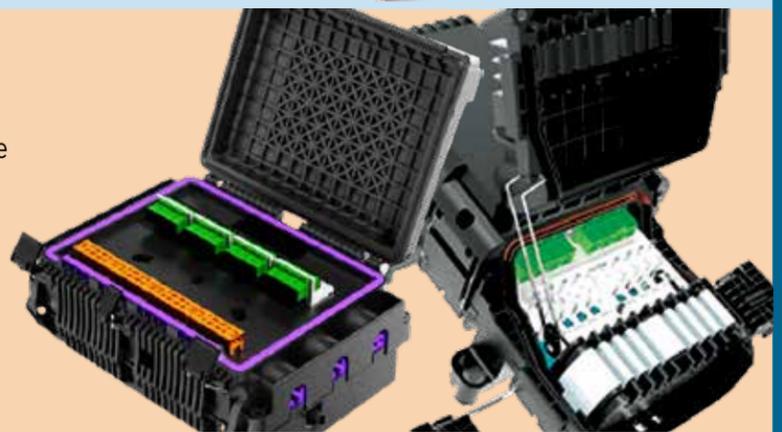
### FIS OSP Splice and Drop Enclosures



Fiber-to-the-home networks require splicing throughout the build process. The OSP Distribution Enclosure 8 Port and the Drop Termination Enclosure 16 port are used to house and protect splices and manage fibers. Both offer a plug-and-play style option decreasing the technician install time and increase in efficiency. Deploying the right enclosure and confirming the correct number of ports is essential for success.

**Anthony Russo**

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### The FIS Atlas Hand Held OTDR



The FIS Atlas OTDR is a hand-held Singlemode OTDR (1310/1550nm) that is used in multiple fiber optic testing applications. It also has an onboard Visual Fault Locator and an all-in-one optical loss test set (OLTS). The Atlas comes with reporting software that will print large batches of OTDR scans into professional, easy-to-read PDF reports. Our user-friendly graphical mapping software (gMAP) breaks the scan down into an easy-to-read set of icons. This alternative scan allows inexperienced users to easily interpret the information needed to verify and troubleshoot the characteristics of a fiber optic cable.

**Robert Licari**

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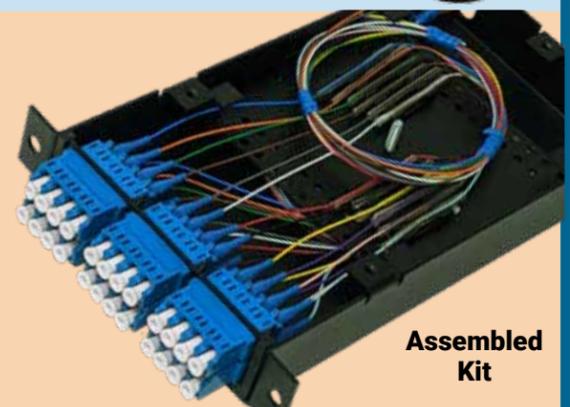
### FIS Patch & Splice Cassette Kit



The FIS Patch & Splice Cassette Kit is designed to hold 12 or 24 (LC) fibers. SC and LC configurations are available in both singlemode (UPC, APC) and multimode. The kit includes a removable adapter panel and splice tray, making splicing a breeze. Pigtails and splice sleeves are also included with each kit. LGX compatible footprint.

**Steve Ermacor**

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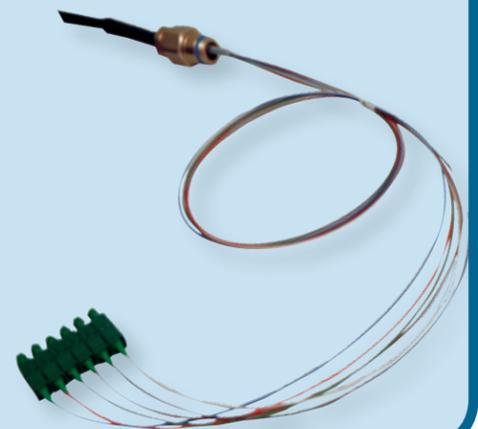
### Node Cables / Service Cables



Node cables, also known as Service Cables, provide connectivity to an Optical Network Unit (ONU). FIS provides a compact node cable using an epoxy-based node connector. These cables are made using OSP cable giving them the flexibility to work in aerial, pedestal, and vault applications. The epoxy connector is terminated in a factory setting and provides both strength and mechanical isolation of the fibers. These are easy to install due to their central tube construction and break out easily into splice trays and enclosures. They fit standard CATV receiver boxes with a 5/8" thread. Offered in various lengths and up to 12 fibers.

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# Product Spotlight

## FIS Preloaded Fiber Optic Interconnects

Preloaded Interconnects Include: Pigtails, Splice Trays, & Adapter Plates

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# Ask Bruno

**Vice President of Technical Services**



*I am upgrading my network to 40 gig Ethernet using multimode fiber; I understand I need to use a 40GBASE-SR4 format using a 12 fiber MPO connector. Can I use this same fiber when I need to upgrade to 100 Gig?*

Recently, developments have been made that will allow you to keep your MPO connectors and network cables the same. Understand that only OM3 and OM4 (50/125) multimode fibers can be used for the following discussion. The 40BASE-SR4 utilizes 8 of the 12 fibers in an MPO connector. Fibers 1-4 and 9-12 each transmit 10 Gig per fiber, these groups of 4 fibers combined will give you the 40 Gig required in each direction (4 x 10 Gig = 40 Gig).

Traditionally, the same concept is used when upgrading to the 100BASE-SR10 standard, but a total of 20 fibers is needed. Fibers 2-11 and 14-23 each transmit 10 Gig per fiber, these groups of 10 fibers combined will give you the 100 Gig required in each direction (10 x 10 Gig = 100 Gig). Multimode VCSEL (Vertical Cavity Surface Emitting Lasers) transmitter's operational limit originally peaked at 10 Gig.

Recently the 100GBASE-SR4 format has been introduced, and newer technology now allows for the use of 25 Gig VCSELs. What does this mean to you? When you upgrade to 100 Gig using 25 gig VCSELs, the same SR4 (fiber 1-4 and 9-12) can be used (4 x 25 = 100 Gig) with no need for additional fibers or 24 fiber MPO connectors. In addition, the advantages of the 100GBASE-SR4 are reduced cost, lower power consumption, and less cable management. The 100BASE-SR4 format will become the standard for 100 Gig transmissions. Please note that the 100GBASE-SR4 does have reduced maximum distances compared to 100GBASE-SR10. When using 100GBASE-SR10 over a multimode cable, the maximum distances are 100 meters using OM3 and 150 meters using OM4. While 100GBASE-SR4 maximum distances are 70 meters for OM3 and 100 meters for OM4.

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