

# The Beacon

Alcatel Fiber-to-the-User Newsletter

[www.alcatel.com/fttu](http://www.alcatel.com/fttu) > 4Q2003

ALCATEL

## Upcoming Events

### January

January 13-14  
Mid-State Consulting '04  
Showcase  
Nephi, UT

January 17-21  
OPASTCO  
Orlando, FL

### February

February 8-11  
NTCA  
Miami, FL

February 13-16  
NRECA Annual Meeting  
New Orleans, LA

February 18-20  
Louisiana/AMTA Convention  
New Orleans, LA

February 22-27  
Optical Fiber Conference  
Los Angeles, CA

TBD  
UTC Telecom Forum  
Reno, NV

### March

March 2-3  
ITA Showcase  
Portland, OR

March 21-24  
Minnesota MTA Annual  
Convention  
Minneapolis, MN

March 25-26  
MTIA's Show-Me Spring Expo  
Columbia, MO

## Hello!

Welcome to the first issue of The Beacon, Alcatel's Fiber-to-the-User (FTTU) newsletter. Each quarter we hope to "shed some light" on the many topics covering FTTU. Many of you have heard of and seen the terms FTTx, FTTP, FTTB, FTTH. At Alcatel, we call it FTTU, which covers our FTTU product portfolio for residential, business, and MDU segments. In The Beacon, we'll be discussing new feature releases and functionality, industry topics, standards, technology philosophies and choices. The bottom line is, we are going to keep you up to date on Alcatel's view of all things fiber!

With many successful deployments in 2003, Alcatel is very excited about the prospects in

2004. From telcos to municipal utilities, from the RBOCs to home developers—fiber to the end users, providing voice, data, and video services, is the hot topic. In this issue, we will highlight Alcatel's 7340 FTTU product, the FGU 1.1 release, Telco TV 2003, and GPON.

We welcome your feedback and look forward to working with you on potential customer opportunities. Please don't forget to check out [www.alcatel.com/fttu](http://www.alcatel.com/fttu) for regular updates.

Sincerely,  
Brian Mehta  
Alcatel Consultant Sales

## What's new with Alcatel FTTU?

### Feature Group 1.1

Earlier this year, Alcatel released Feature Group 1.1 (FGU 1.1). FGU 1.1 builds upon the features of Feature Group 1.0 (FGU 1.0) and introduces a number of enhancements to the Alcatel FTTU platform. The features utilize the same hardware components as FGU 1.0 and introduce the B-ONT hardware for business applications. The new features are enabled through a software enhancement to FGU 1.0. The three major FGU 1.1 features are expanded upon in the following sections.

### Support for General Bandwidth G6.3 Software release

Feature Group 1.1 supports the latest release of General Bandwidth G6.3 software. This provides a number of operational enhancements to Alcatel's FTTU voice solutions by improving the link between the P-OLT and the General Bandwidth Voice Gateway.

### Metallic Loop Testing for POTS

Feature Group 1.1 introduces metallic loop testing for the POTS service. This is a key

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feature for test and turn-up as well as for troubleshooting on POTS lines, further enhancing Alcatel's FTTH voice solution.

**Introduction of Business ONT**

This is the key new feature in FGU 1.1 and allows Alcatel to address both residential and business customers on a single comprehensive PON network. The business solutions provided by FGU 1.1 provide a broad range of voice, data, and video services on a cost competitive fiber architecture. The business solutions are provided over a complete fiber solution and are cost competitive with copper alternatives. The major B-ONT services include the following:

- > Four DS1 data links for connection of customer premises equipment, such as PBXs
- > One 10/100BaseT Ethernet drop with routing and VLAN capabilities for LAN/WAN connectivity
- > Eight POTS lines for standard voice grade lines
- > One video stream for advanced video applications such as video conferencing or video streaming

Customers are encouraged to explore how Alcatel Feature Group 1.1 can help enhance their FTTH product offerings. The introduction of FGU 1.1 will allow service providers to address small and medium business markets with a comprehensive service offering involving minimal change to present mode of operation for end users. In addition, it will help carriers address a more lucrative business segment with a quality service offering providing unlimited bandwidth scalability.

**Telco TV**

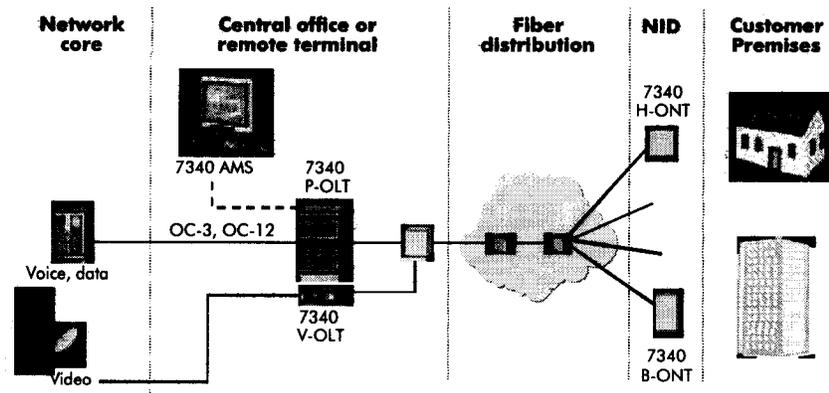
On November 12-14, several hundred telecom, consulting, vendor, utility, and other technology professionals gathered in Las Vegas to attend *Telco TV 2003 Delivering the "Triple Play"—Video, Voice and Data*. This year's conference featured industry speakers, technology panels, and a vendor expo.

Presentations included video over copper, cable competition, video negotiations, and fiber to the user. Alcatel was honored to be this year's Educational Sponsor for Telco TV and

was host to the pre-conference educational workshop. In addition, Alcatel supported the conference with guest speakers including Derek Kuhn, Director of Marketing and Business Development; Matt James, Manager of Broadband Access Product Marketing; and keynote speaker Jim White, Vice President of Alcatel Marketing.

**BPON and GPON Technology**

Passive optical networks (PON) is one of the few hot topics in the telecom industry in 2003. PON is being explored by a number of carriers as the next generation access solution that provides unlimited bandwidth to end-users through efficient use of fiber in the local loop. PON is very popular because it eliminates the use of active components in the outside plant and uses only passive optical splitters to distribute traffic. Active equipment consists of the optical line terminal located in the central office and optical network terminal located at the customer premises. PON solutions have been available since the '80s, but all solutions have been proprietary.



In 1995, an FSAN group was assembled to begin work on PON standardization. A number of standards were proposed over the next several years, but it was not until June 2003—when the Joint Procurement Consortium of BellSouth, Verizon, and SBC endorsed broadband PON (BPON)—that a clear leader emerged. The JPC requested BPON in its fiber-to-the-premises RFP based on the ITU G.983 specifications.

The standard most widely deployed presently is BPON, defined in ITU-T G.983. It allows up to 1.2 Gbps downstream and 622 Mbps upstream for data and voice traffic. Video traffic is provided on a separate wavelength of downstream transmission. The standardization of G.983.3 in 2002 allowed the full triple play offering of voice, video, and data on BPON. While this technology addresses near-term data needs, many feel the long-term solution requires higher bandwidth rates and more efficient transport for data services.

GPON has been proposed as the next evolution of PON technology. GPON provides symmetrical rates of 2.4 Gbps for both downstream and upstream connections and more efficiently supports data traffic. It is optimized on the physical layer to support higher data rates, greater distances, and support for more fiber splits to reach more customers. The same wavelengths of 1480 to 1500 nm for downstream and 1260 to 1360 nm for upstream are used for both BPON and GPON transmission. In addition, GPON uses the same overlay wavelength standard for video transmission. As shown in the following table, GPON can support up to seven different combinations for downstream and upstream data rates, with 2.4 Gbps symmetrically being the highest order combination.

Downstream Gbps	Upstream Gbps
1.244	0.155
	0.625
	1.244
2.488	0.155
	0.625
	1.244
	2.488

GPON can support distances from 20 km to 60 km when forward error correction is used. The fiber/split ratio is increased to 1:64 initially, with a migration path to 1:128 in the future if additional layers are used. In addition, protection switching of 1+1 and 1:1 is supported on GPON, as with BPON. GPON allows multiple services to be supported in their native formats of ATM, packet, or TDM. This yields a more bandwidth efficient protocol for data centric services. Following is a summary of the advantages of GPON.

**GPON Advantages**

- > Both GEM and ATM partitions are supported—more efficient for Ethernet
- > Robust support for OAM, QoS, protection, and survivability.
- > Both symmetric and asymmetric rates supported at ~2.5G, 1.2G DS and 2.5G, 1.2G, 622M, 155M U.S.
- > Increased number of splits per fiber of 64
- > Greater reach of 10 km/Class A, 20 Km/Class B, and Class C ODNs supported
- > Higher transport efficiency: 93% for a mix of 10% TDM and 90% data traffic; lower PHY overhead for upstream bursts 12B per frame, efficient (NRZ) line coding, 5B header for GEM encapsulation
- > Embedded security support for downstream traffic
- > Standardized support for TDM and voice services along with data
- > Supports IP video over Ethernet or ATM
- > Supports ATM layer multicast and broadcast
- > Standardized support for RF video overlay

While GPON offers a number of advantages over BPON, most experts feel it will take another two to three years before it reaches a comparable maturity level. In addition, GPON standards still must be implemented. BPON functionality is available today in robust silicone components that GPON does not yet have. It appears, however, that the transition from BPON to GPON can be supported since a number of standards overlap. In fact, a number of vendors—including Alcatel—are positioning their BPON products to support GPON in the future. The standards for GPON are targeted for completion in 2004.

Alcatel fully supports a migration from the current PON standard (622/155 BPON) to GPON as it will support future higher bandwidth service models. The Alcatel Research and Innovation (R&I) organization in Antwerp, Belgium is presently involved in the development of this technology. Alcatel's strategy for PON data rates is to implement ITU-T G984 technology supporting the higher



data rates of 1.25G and 2.5G in the downstream and 155M, 622M, 1.5G, and 2.5G in the upstream. The Alcatel 7340 OLT will support multiple line interface types and a mix of BPON and GPON interface cards. The current schedule calls for introduction of proof of concept in late 2004 with an initial product offering in 2005.

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**About Alcatel**

Alcatel provides end-to-end communications solutions, enabling carriers, service providers, and enterprises to deliver content to any type of user, anywhere in the world. Leveraging its long-term leadership in telecommunications networks equipment as well as its expertise in applications and network services, Alcatel enables its customers to focus on optimizing their service offerings and revenue streams. With sales of Euro 16.5 billion in 2002, Alcatel operates in more than 130 countries.