IPITEK
INTEGRATED PHOTONICS TECHNOLOGY

New Technology Update

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Cost Effective Metro LS HFC Transport Provides an Efficient Method for Expanding Requirements in Broadband Systems

Our last Technology Update discussed solutions for moving fiber deeper in cable systems with IPITEK's new family of nodes especially designed for these applications. In many instances, the rapidly evolving changes in system architecture also require a new look at the way signal generation at the headend is accomplished. Fiber deep architecture generally requires additional transmitters, usually in lower powers, to feed the nodes serving fewer homes. This can result in a very large increase in headend equipment. To meet the needs of the industry to get more transmitters into less space, IPITEK is pleased to introduce the new Metro LS headend platform.

Metro LS is a high performance optical transmission platform, designed for use in broadband systems and supporting any type of transmission application, from 1:1 transmission to 1:*n* transmission. Metro LS utilizes the most current design techniques to meet required performance levels and specifications, while dramatically reducing size and power requirements. The advanced circuit design, coupled with high efficiency electronics, results in a cost-effective package meeting a variety of requirements. Metro LS provides a wide range of forward operating options from a 1:1 transmitter to single node topology to standard higher power, "blast and split" architectures.

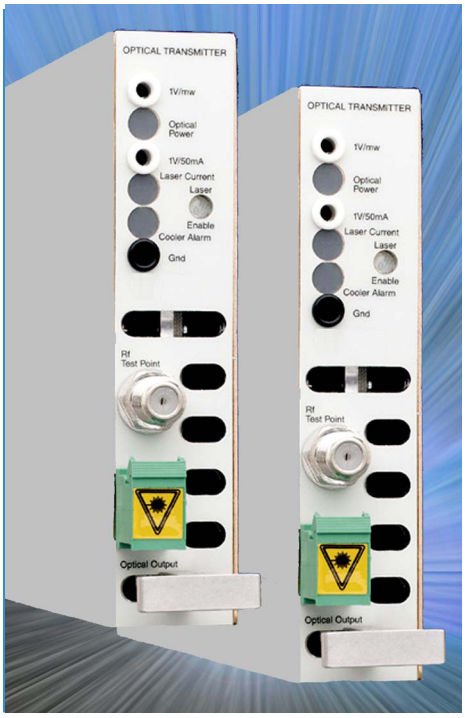
Occupying a minimum rack footprint, the basic Metro LS system offers 15 modules and one power supply. Each single module houses either a transmitter or a return optical receiver module, which can contain 1,2 or 3 return optical receivers.

Metro LS is easily configured for redundant powering by replacing one active module with a second power supply module. All modules, including the power supply, are quick plug-in and easily replaced or reconfigured.

The Metro LS chassis occupies only 3 RU (5.25") of rack space. In addition to its flexible design that accepts any combination of transmitter and receiver modules, it also includes an internal fiber management system. Connecting fiber can enter the chassis from either or both sides. Once the fiber connection is made, the fiber cable is moved into the management tray, located above the modules. Drop slots are conveniently placed along the tray to assure minimum fiber clutter in front of the modules. All coaxial cables are connected at the rear of the chassis.

Optimized design results in a fully loaded system power requirement of only 150 Watts per chassis. The

chassis supports AC or DC power supplies. When using two supplies, 1 AC and 1 DC supply can power the system. High reliability fans located on the rear of the chassis cool the unit. The fans are easily accessible for replacement.



No additional spacing is required between chassis, allowing for maximum use of rack space for equipment. A standard rack can be loaded with as many as 13 chassis, providing a maximum density of 195 transmitters or 585 receivers in one 72 inch rack.

The chassis is also provisioned for an optional interface, providing integration with a network management system and SNMP outbound to a higher level monitoring system. The chassis also provides contact closures for use with other status monitoring systems.

Metro LS 1310 nm DFB Transmitters are based on a new, high efficiency design, engineered specifically to provide the performance necessary in today's systems.

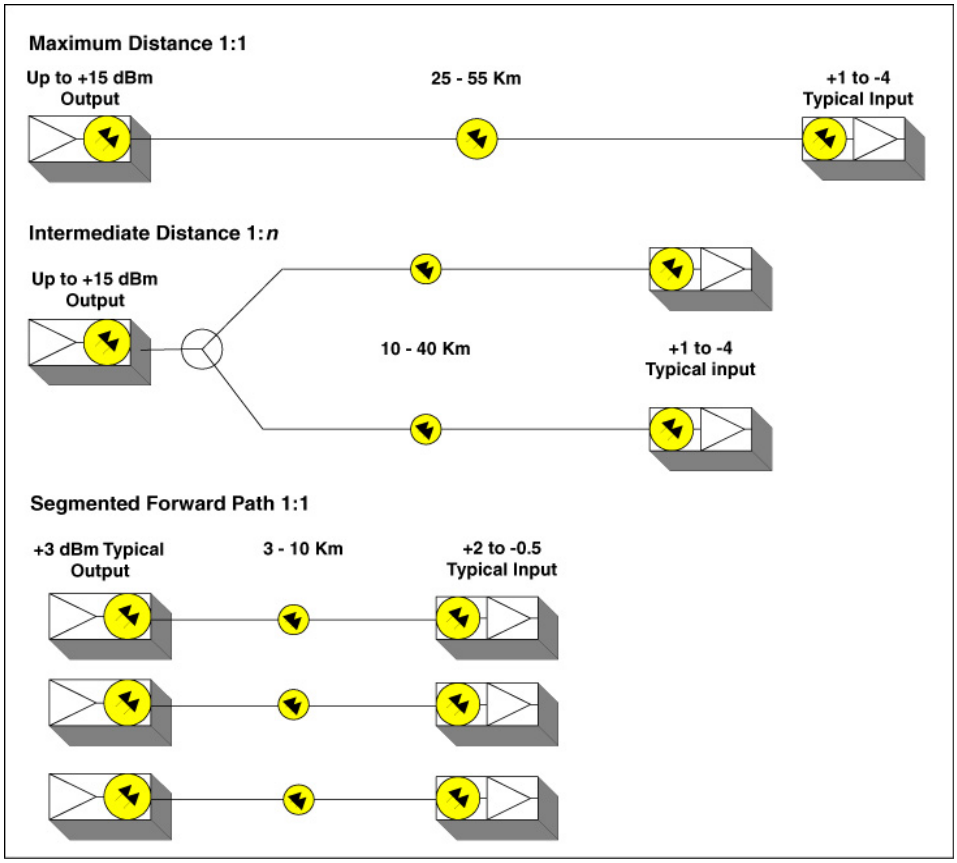
The transmitter family provides a wide range of optical output powers from 2 dBm to 15 dBm. This allows the same system to meet the requirements for a 1:1, one transmitter to one node system being implemented in many metropolitan areas, as well as a wide variety of 1:*n* transmitter split feed to multiple node architectures.

The advanced design eliminates complicated setup and requires only a simple gain adjustment to bring the unit on-line. The transmitter provides full 50 MHz to 1 GHz bandwidth and meets industry requirements necessary to carry standard analog signals plus digital tiers, Internet traffic, telephony and video on demand (VOD).

Front panel indicators provide immediate visual status of the unit. A standard 75 ohm front panel test point is provided for ease of monitoring. The standard SC/APC optical connector has a protective flip-up cover which provides complete protection when the connector is removed or not in place.

All Metro LS transmitters, regardless of output, offer options for combined Broadcast and Narrowcast inputs or separate Broadcast and Narrowcast inputs. Operations with dual input configurations provide high isolation between the two inputs to assure the highest quality performance. .

For use in 1:1 transmitter to node operations, Metro LS utilizes a group of DFB lasers, typically with average outputs from +3 dBm to +6 dBm. This is based on a typical link budget for most metropolitan systems. Metro LS is a model of efficient design. The Metro LS transmitter meets design criteria which assumes a short optical path from the headend or hub to the node,



Typical Applications with the Metro LS Transmitters

usually 6 dB or less. A power output of 6 dBm can provide a single transmitter to node connection over distances of 15 to 20 Km., depending on fiber loss.

Metro LS can also function in more complex short haul systems. When the transmitter is used with a 1x2

optical splitter, it is possible to use shared feeds to several nodes over distances typically from 5.5 to 10.5 Km. The ability to split the output also provides an effective method of providing a dual redundant feed to a single node, using diverse optical paths. Since Metropolitan areas may include nodes at even shorter distances, it is even possible to use a balanced or unbalanced optical splitter to feed nodes typically 1 to 5 Km from the hub.

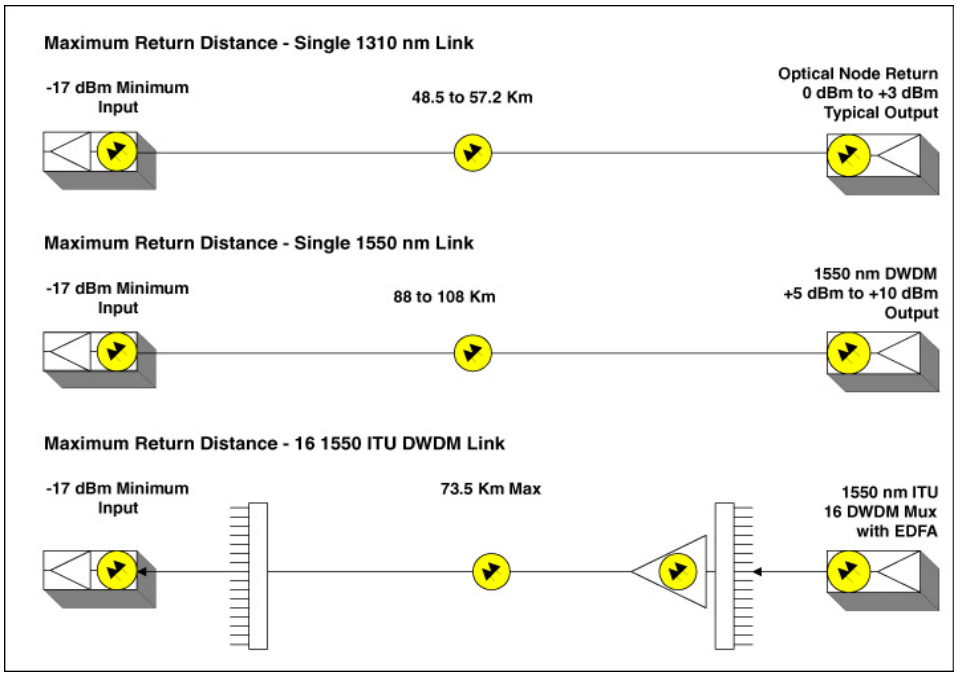
Metro LS transmitters with average output powers from 8 dBm to 15 dBm support more traditional system design with one transmitter output split to provide 1:*n* (typically from 1:3 to 1:6 or higher) number of feeds to multiple nodes. Higher power transmitters are specifically designed for these types of topology. However, they can also be used for long distance 1:1 transmission with loss budgets from 6 dB to 19 dB, depending on the node receiver sensitivity.

As with the lower power Metro LS transmitters, the higher power transmitters also support system designs that use an optical split, providing a dual redundant feed to a single node, using diverse optical paths

The Metro LS Return Optical Receiver provides a very efficient method of handling return path signals. The receiver module is available with 1, 2 or 3 receiver modules per unit.

The fully populated receiver module provides three return receivers per unit, grouping up to 45 return signals in 3 RU (5.25") of rack space. A dual return receiver module provides 30 return signals in the same space. The Return Optical Receiver includes front panel indicators, which provide immediate visual status of each of the receivers in the unit. The unit also includes a 75 ohm front panel test point for ease of monitoring. The standard SC/APC optical connectors have a protective flip-up cover, which provides complete protection, when the connector is removed.

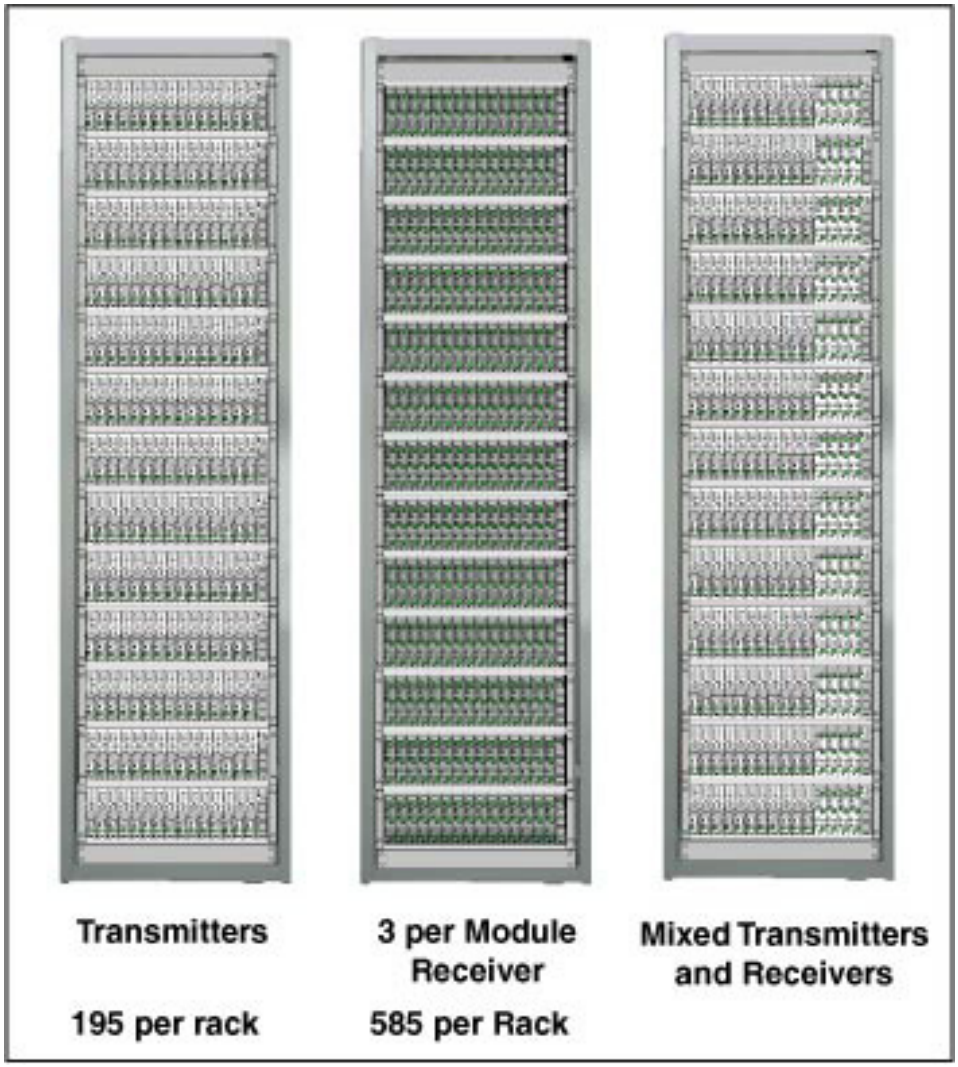
The receiver design utilizes a new, high efficiency photo detector and advanced RF circuitry. The optical input range accepts optical input levels from -17 dBm to 0 dBm without the need for padding the optical input or using different modules with varying input ranges. The receiver has a bandwidth of 5-300 MHz, assuring the ability to handle a wide variety of return signals. Using Noise Power Ratio (NPR) as the criteria for return path performance, Metro LS provides both high performance and wide dynamic range. The receiver has an NPR of >41 dB, with a dynamic range of >15 dB.



Typical Applications with Metro LS Optical Receivers

With an optical input range of –17 to 0 dBm, the Metro LS receiver is not restricted to short haul duty only and may be used for virtually any application. The receiver has a wide input detector and will operate with either 1310 nm or 1550 nm signals. The receiver can handle any signal over a range of 0 Km to greater than 57 Km when used with 1310 nm return transmitters.

Since the Metro LS receiver uses a dual window detector, it can easily be used at the receiving end of a 1550 nm standard or 1550 nm ITU-DWDM return path system. The receiver can serve as the termination of a single standard or ITU-DWDM 1550 nm transmitter over a distance greater than 80 Km. It can also serve as the receiver for any wavelength of an 8 or 16 DWDM system. The system can easily terminate an 8 wavelength system, allowing it a 60 Km budget without additional amplification being required. The receiver can also serve as the termination for a 16 channel DWDM system, which has additional optical amplification. Properly designed, a DWDM return path network can deliver signals over distances of 120 Km.



Space and Power Efficient Metro LS Fits More Equipment in Less Rack Space

For additional product or ordering information related to the featured products or any of IPITEK's family of transmission products, visit our web site **www.ipitek.com** or send a message to **sales@ipitek.com**.

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