Opti Max™ Nodes Digital Return System

2x85 MHz Legacy ARRIS Protocol Node Transmitter and CHP Receiver

FEATURES

- Digital Return technology for ease of set-up and simplified “plug and play” operation
- 2:1 Time Division Multiplexing solution supporting 5-85 MHz upstream bandwidth
- Improved performance over legacy digital return solutions
- 1310, CWDM, and DWDM Small Form Pluggable (SFP) optics supported for simplified deployment logistics
- Dual Density receiver optimizes valuable headend/hub real estate
- Remote node monitoring with Digital Element Management System (DEMS) eliminates the need for a transponder
- Supports service group aggregation to support optimized scaling of headend/hub infrastructure equipment per service group
- Supports OM6000, OM41xx, and OM27xx nodes

PRODUCT OVERVIEW

The ARRIS Opti Max series of modular optical nodes offer a variety options that support both HFC and Fiber Deep network architectures. To complement these nodes, ARRIS introduces the next-generation digital return system with improved link performance in support of DOCSIS® 3.1 deployments with bonded channels and higher orders of modulation. Digital return solutions offer superior performance that is independent of link distance. This allows the node to be set up easily and does not require detailed optical analysis of individual loss budgets. The new ARRIS digital return system offers two, 5 to 85 MHz Time Domain Multiplexed (TDM) RF channels making it easy to manage node segmentation and subscriber growth.

Digital Transmitter Processor Module

The transmitter can be deployed in 42, 65, or 85 MHz return systems, making it an ideal choice for operators looking to expand their return path in the future by reclaiming forward spectrum. The transmitter delivers improved performance over previous digital return versions and is designed to accommodate fiber deep architectures that may require lower return input levels by accepting an RF input Level of 8 dBmV per 6 MHz channel.

The transmitter supports Service Group Aggregation (SGA), or Daisy Chaining, with improved Noise Power Ratio performance due to advancements in A/D technology. In this process, signals from service groups—up to four nodes—are digitally multiplexed at each node and fed upstream to the master node. SGA preserves CMTS ports and RX slots in the hub or headend, providing the flexibility to expand the service group later in response to increased bandwidth demands.

Two transmitter models are available. OM6DTX-SFP-285-5A8 is the standard model that allows service group aggregation utilizing both RF channels. OM6DTX-SFP-285-5B8 is a premium model that enables the operator to switch to a mode that utilizes a single RF channel, maintaining NPR performance that is equivalent to a single link.

SFP OPTICS/TRANSMITTER SPECIFICATIONS

	OM6DTX-SFP-285-*	
Optical (SFP)		
Optical Center Wavelength		
1310	-25/+35 nm	
CWDM	± 6.5 nm	
DWDM	± 0.1 nm	
SFP Transmitter Optical Output Power	**Min.**	**Max.**
1310	-8.0 dBm	-1.0 dBm
CWDM	0 dBm	+5.0 dBm
DWDM	+3.0 dBm	+7.0 dBm
SFP Transceiver Optical Input Range	**Min.**	**Max.**
1310	-18.0 dBm	-1.0 dBm
CWDM	-23.0 dBm	-7.0 dBm
DWDM	-23.0 dBm	-7.0 dBm
Optical Connector Type	LC/UPC	
Data Rate Gbps	4.25	
RF		
Operational Bandwidth	5 – 85 MHz	
Recommended Total RF Input Power [2]	+8 dBmV per Channel	
Number of Input Channels	2	
RF Input Return Loss	16 dB min.	
RF Input Impedance	75 ohms	
RF Input Test Point	–20 ± 0.5 dB	
General		
Dimensions	6.0 in L x 1.25 in W x 4.3 in H (15.24 cm x 3.17 cm x 10.92 cm)	
Weight	1.0 lb (0.45 kg)	
Node Operating Temperature Range	–40°C to + 60°C (–0°F to + 140°F)	
Power Consumption, W, Typical/Maximum	9/10	

CHP Digital Receiver Module

The dual digital return path receiver module contains two independent receiver circuits in a single width CHP module, enabling up to 20 receivers, or 40 RF streams, in a fully-loaded CHP chassis. With four RF outputs, a single DRR module can support a full, 4x4 segmented node, increasing the efficiency of node splits and preserving valuable real estate in the hub or headend. The Receiver is compatible with the new 2x85 MHz Legacy ARRIS Protocol transmitter only.

The receiver utilizes Avalanche Photo Diode (APD) technology, enabling very high receiver sensitivity to extend link reach. The receiver supports an optical input range of -10 dBm to -26 dBm.

An additional benefit of the next-generation digital return system is the integrated Digital Element Management System (DEMS) monitoring provided by the transmitter modules, which eliminates the need for a separate DOCSIS transponder. Key parameters and module status of the node are communicated to the receiver via overhead bits in the digital return data stream.

The CHP Management Module (SMM-2), combined with the CORView EMS platform, manages the devices through standard SNMP/CLI interfaces and sophisticated Graphical User Interfaces.

RECEIVER SPECIFICATIONS

	CHP-D2RRX-85-6Z-S
Optical	
Input Wavelength Range	1200 to 1620 nm
Optical Input Range	–26 to –10 dBm
Optical Connector Type	SC/APC (8 degrees)
RF	
RF Output Bandpass	5 – 85 MHz
Output Level	+40 dBmV max [3]
Channel to Channel Isolation	65 dB
Output Return Loss	16 dB min.
Output and Test Point Impedance	75 ohms
RF Output Test Point	–20 ± 0.5 dB
RF Connector Types	
Output	F-type
Test Points	F-type
General	
Dimensions	3.44 in H x 1.25 in W x 18.5 in D (8.44 cm x 3.18 cm x 46.99 cm)
Weight	3.0 lbs (1.35 kg)
Operating Temperature Range	0°C to +50°C (32°F to +122°F)
Power Consumption, W, Typical/Maximum	15.7/18.7

SFP Optics

Small Form Pluggable, MSA compliant optics are available in a selection of technologies designed to satisfy a wide range of network requirements. ARRIS provides these 4.25 Gbps, industrial temperature-rated SFP transceivers to ensure the overall link performance is maintained.

For short links less than 10 km, a low-power 1310 nm SFP transceiver is available that delivers a lower-cost solution than analog return transmitters on a per RF stream basis.

To take advantage of longer links up to 50 km, CWDM SFP transceivers are available in 16 wavelengths. With the addition of ruggedized optical passives, wavelengths can be multiplexed for better fiber utilization.

For greater distances up to 80 km, DWDM SFPs are available in 40 ITU wavelengths to maximize wavelength aggregation and design flexibility. In the DWDM series, customers can select transmitter only SFPs or transceiver SFPs if Service Group Aggregation (SGA) is intended.

The complementary optical passive demux is required at the headend to decouple wavelengths prior to the CHP-D2RRX-85-6Z-S Receiver.

LINK SPECIFICATIONS

Link Budget	
1310	10 km fiber
CWDM	50 km fiber, 26 dB link budget
DWDM	80 km fiber, 29 dB link budget
Peak Noise-Power Ratio (NPR), typical	53 dB
Dynamic Range, @ ≥ 40 NPR, typical [1,3]	20 dB
BER Dynamic Range, @ ≤ 10^{-6} BER [1,3]	26 dB (256-QAM)
RF Link Gain, dB [4]	32
Link Flatness, dB [4]	± 1.0

NOTES:
1. Typical performance provided for the transmitter installed in the OM6000/OM4100 at 23°C; 6 dB NPR degradation with four nodes in Standard Service Group Aggregation (SGA) mode.
2. Per port.
3. With minimum transmitter and receiver attenuation setting.
4. Measured from input of OM6000/OM4100 node to DRR output.

ORDERING INFORMATION

Model Name	Part Number	Description
Digital Transmitter Processor Modules		
OM6DTX-SFP-285-5A8	OM6DTX-SFP-285-5A8	2x85 MHz Digital Return Transmitter, Standard (2x Service Aggregation Mode Only), OM6000/OM4100/OM2741, Digital Element Management System, Service Group Aggregation
OM6DTX-SFP-285-5B8	OM6DTX-SFP-285-5B8	2x85 MHz Digital Return Transmitter, Premium (1x or 2x Service Aggregation Mode Switch), OM6000/OM4100/OM2741, Digital Element Management System, Service Group Aggregation
CHP Digital Receiver Module		
CHP-D2RRX-85-6Z-S	CHP-D2RRX-85-6Z-S	Digital Return Receiver, dual optical inputs, four RF outputs, 5-85 MHz
SFP 1310 10 km		
OM6-SFP-1310-XCVR-4.25	1509443-001	SFP, 1310 nm Transceiver, 4.25 Gbps LC/UPC, 1.0 mW
SFP CWDM 40 km 16 Wavelengths Available[1]		
OM6-SFP-CWDM-XXXX-XCVR-4.25	1509444-XXX	SFP, Transceiver, 4.25 Gbps, sixteen CWDM wavelengths from 1271 nm to 1611 nm, LC/UPC
SFP DWDM 80 km 40 ITU Wavelengths Available (Transmitter only)[2]		
OM6-SFP-DWDM-CHXX-XMTR-4.25	1509445-XX1	SFP, Transmitter, 4.25 Gbps, 40 ITU channels from 20 to 60, LC/UPC
SFP DWDM 80 km 40 ITU Wavelengths Available[3]		
OM6-SFP-DWDM-CHXX-XCVR-4.25	1509522-XX1	SFP, Transceiver, 4.25 Gbps, Ch 20, 40 ITU channels from 20 to 60, LC/UPC, 2.0 mW

NOTES:
1. XXX = 271 – 611; XXXX = 1271 – 1611
2. XX = 20 – 60
3. XX = 20 – 60

RELATED PRODUCTS

OM6000 Optical Node	Optical Patch Cords
SFPs	Optical Passives
Fiber Service Cable	Installation Services

Customer Care

Contact Customer Care for product information and sales:
- United States: 866-36-ARRIS
- International: +1-678-473-5656

Note: Specifications are subject to change without notice.

OM6000_DRT_DS_13MAR18 (rev 03-2018)