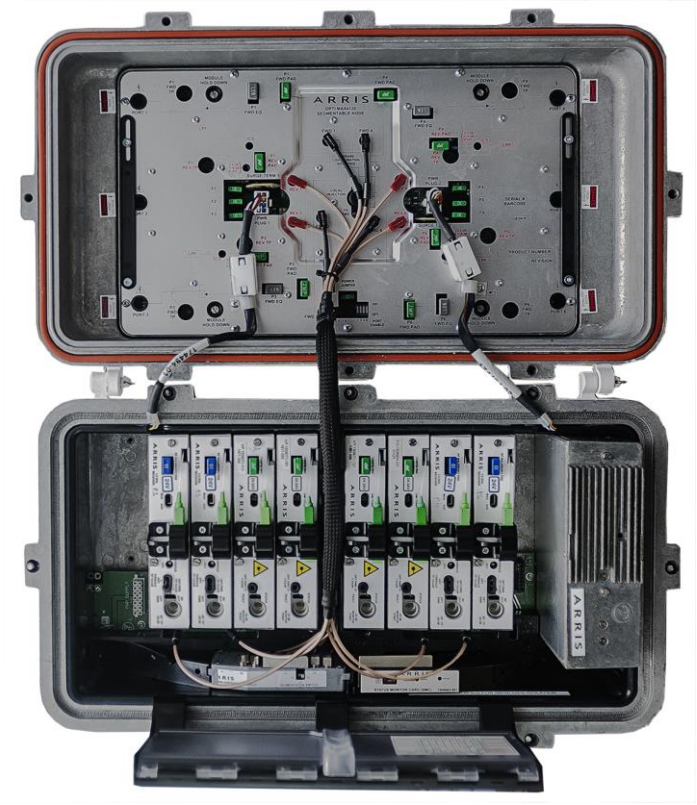
Opti Max™ Optical Node Series

OM4120

1.2 GHz 4x4 HFC Segmentable Node

FEATURES

- Supports 1.2 GHz Downstream and 204 MHz Upstream bandpass for DOCSIS® 3.1 migration
- 1.2 GHz Upgrade pathway for legacy installed base of 1.0 GHz OM4100 nodes
- Integrated segmentation switches simplify future node upgrades
- Select optical module compatibility with Opti Max OM6000 and Opti Max OM2741 nodes leverages sparing and training
- 8 application module slots and the ability to migrate to next generation architectures such as R-PHY and PON
- Supports analog transmitters, including CWDM and DWDM wavelength options
- Supports SFP-based 85 MHz digital return and digital element monitoring for CHP and CH3 digital return receivers
- Optional DOCSIS transponder



PRODUCT OVERVIEW

The ARRIS Opti Max™ OM4120 HFC modular optical node is the latest innovation in network technology for operators seeking to maximize and protect their infrastructure investments. The OM4120 supports full DOCSIS 3.1 capability, with downstream operation out to 1.2 GHz while allowing the upstream to expand to 204 MHz. The OM4120 was designed for full backwards compatibility with the original OM4100 housing base, which provides operators with the ability to economically upgrade to 1.2 GHz operation. With the addition of switchable segmentation, the OM4120 easily scales from its most basic, single-service group configuration to four fully outfitted service groups without any loss of initial investment. The OM4120's modular design also supports future network migration to Remote PHY/CCAP and targeted PON services.

Multi-Architecture Compatibility

The OM4120 features a wide range of return transmitter wavelengths to support various fiber applications. A full suite of cost-effective analog CWDM and DWDM DFB analog transmitters rated to 204 MHz facilitate fundamental node segmentation. The OM4120 also has an advanced 85 MHz Digital Return transmitter option with the DT7x30 "1-fer" or "2-fer" or OM6 "2-fer" series digital return transmitter. ARRIS technology supports a single return path in "1-fer" mode or dual independent returns in "2-fer" mode. SFP modules support 1310 nm short haul and CWDM or DWDM options to enable upstream transmission, further expanding the deployment of advanced "bandwidth-hungry" services into fiber-poor areas while facilitating simple sparing strategies, reducing real estate and powering requirements in the field.

Digital transmitters now support CHP and CH3 headend optics platforms.

Integrated Switchable Segmentation

By coupling best-in-class RF and optical performance, the OM4120 provides operators with a unique opportunity to easily grow in parallel with today's bandwidth hungry networks. The OM4120's simplified switchable segmentation feature provides seamless transition from the basic unsegmented configuration to a fully segmented node with minimal effort. The node features local segmentation switches that support future segmentation without having to add additional configuration modules or RF cables. Instead, a technician can enable new segments by simply adding a transmitter or receiver as required. By reducing the requirement for additional configuration modules and minimizing maintenance time, the OM4120 provides a lower total cost of ownership for the MSO.

Flexible Powering

In today's complex system architectures, the opportunity to save power where possible becomes a huge operational advantage. The OM4120 employs the ability to power down and deactivate the active driver elements on a per port basis, providing operational power savings in the field. This options allows operators to save more than 11 Watts DC per deactivated RF port in cases where those ports are not feeding customers by design by simply setting a switch to deactivate the desired port. Reactivating the port is as simple as resetting the switch when necessary to feed additional customers.

Protect Network Investment

A next-generation node, the OM4120 will serve as a key product for future architecture development. Next-generation technologies such as R-PHY and R-MAC-PHY will be inclusive to the OM4120 product family, allowing operators to invest in products today that will provide long-term benefits as their networks evolve. Using simple module and/or lid upgrades in the field will limit the node's down time and provide seamless migration paths to next-generation technologies without forklifting your initial investment.

The OM4120 also incorporates pluggable diplex filters that allow operators to easily upgrade deployed nodes to support future bandwidth expansions. This feature supports economical transitions from lower bandwidth options in conjunction with network upgrades such as R-PHY.

Compatibility

The OM4120 features select optical modules—such as transmitters, EDFAs, optical switches, and future next generation module development—that are compatible with the OM6000 and OM2741 nodes. This compatibility reduces service times and the need for technician training on additional optics module setup. This also allows MSOs to select other nodes in the ARRIS family, depending on the application, without having to track additional part numbers, add inventory, or train staff on new products.

1.2 GHZ PLATFORM COMPATIBILITY

Platform	OM6000 Series	OM2741 Series
Common Digital Return and SFPs	Yes	Yes
FLM PON Extender Module	Yes	Yes
EDFA Optical Amplifier	Yes	Yes
Optical Switch	Yes	Yes
Optical Passives	Yes	Yes
CH3000 Digital Receiver	Yes	Yes
CHP Digital Receiver	Yes	Yes
Select Accessories	Yes	Yes
Analog Transmitters	Yes	Yes
DOCSIS Transponder	Yes	No
Status Monitoring Card	Yes	No

RELATED PRODUCTS

Headend Optics Platforms		Digital Return Transmitters
CHP Max5000® Optics	CH3 Headend Optics	DT7030/OM6 Series
SFP-based Digital Return Receivers		**Virtual Hub**
CHP Digital Receiver	CH3 DR3450	VHub

SPECIFICATIONS

Forward Path	Units	Specifications
Optical Receiver		
Optical Wavelength	nm	1260 to 1620
Optical Input Power Range, continuous	dBm	–6.0 to +1.0
Optical Connector Type		SC/APC
Optical Test Point	Volt/mW	1 ± 0.1%
RF		
Operational Bandwidth [1]	MHz	54 to 1218/85-1218/102 to 1218/258-1218
Flatness [2]	dB	± 1.25
Output Linear Tilt	dB	18.0 ± 1.0 (54 to 1218 MHz) 17.5 ± 1.0 (85 to 1218 MHz) 17.2 ± 1.0 (102 to 1218 MHz) 14.8 ± 1.0 (258 to 1218 MHz)
RF Port Impedance	Ohms	75
RF Return Loss [3]	dB	16
Port to Port Isolation	dB	-70, Minimum downstream bandwidth to 552 MHz -60, 552 MHz to 1218 MHz
Mixed Analog/Digital Distortions [4, 5, 6, 7]		
Reference Level	dBmV	57/39 @ 1218/55 MHz (Virtual)[9]
CTN	dB	60
CTB	dBc	–70
CSO	dBc	–67
CIN	dB	57
MER	dB	41
BER		< $1x10^{-6}$
All Digital Distortions [4, 5, 6, 8]		
Reference Level	dBmV	51/33 dBmV @ 1218/55 MHz (actual) [9]
MER	dB	44
BER		< $1x10^{-6}$

Return Path	Units	Specifications
Optical Transmitter		
Optical Wavelength	nm	CWDM/DWDM
Optical Connector Type		SC/APC
Optical Test Point	Volt/mW	1 ± 0.1
RF		
Operational Bandwidth [1]	MHz	5-42/5-65/5-85/5-204
Flatness [2]	dB	± 1.0
Output Linear Tilt[10]	dB	0 ± 1.0
RF Port Impedance	Ohms	75
RF Return Loss [4,11]	dB	16
Port-to-Port Isolation	dB	–60
Local Injection Port Response	dB	16.0 ± 2.0

SPECIFICATIONS

Return Path (continued)	Units	Specifications
Nominal Return Input Level	dBmV	12 dBmV/6 MHz; 5–42 MHz 8 dBmV/6 MHz; 5–85 MHz
Transmitter Output Power		
Analog CWDM	dBm	3 ± 0.4
Analog DWDM	dBm	7 ± 0.4
DWDM SFP	dBm	+3 to +7
CWDM SFP	dBm	0 to +5
1310 nm SFP	dBm	–8 to –1
Distortion Performance		
NPR Analog CWDM [5, 12]	dB	40/11 (5–85 MHz) 40/8 (5–204 MHz)
NPR Analog DWDM [5,13]	dB	40/11 (5–85 MHz) 40/8 (5–204 MHz)
NPR 2x85 MHz Digital Return [5, 14]	dB	40/20 (5–85 MHz)
NPR 1-fer Digital Return	dB	40/17 (5–85 MHz)
NPR 2-fer Digital Return	dB	40/11 (5–85 MHz)

Node Powering	Units	Specification
AC Input Voltage	Volts AC	40–90
AC Input Frequency Range	Hz	47/63
Hum Modulation [5, 15]		
5 to 10 MHz	dBc	–50 max.
11 to F_{maxret}	dBc	–60 max.
AC Bypass Current [16]	Ampere rms	15

Mechanical/Environmental	Units	Specification
Dimensions	inches	11.7 in. H x 20 in. W x 10.2 in. D
Weight	lb	< 50 lbs
Operating Temperature Range	°C °F	–40 to +60 –40 to +140

Required Accessories	Part Number	Description
RF Pads	**NPB-xx0*** **xx = 00 - 20 (0 – 20 dB)*	Factory Installed in 4 RF modules and as required in optional optical modules. One per receiver module and one per analog transmitter module. Not required for digital return setup. Customer can modify in 1 dB steps as required when purchased as an accessory item.
Linear Equalizers	**1510053-0xx**** ***xx = 02 - 12 (2 – 12 dB)*	Factory Installed in 4 locations. Customer can modify in 1 dB steps as required when purchased as an accessory items.

NOTES:

1. Dependent on the diplex filter option installed
2. Measured with respect to tilt over the operating passband of the node
3. Measured at the node RF input and output port over the specified passband
4. Over operating temperature range
5. Distortion values listed are for the node only. These values should be combined with transmitter values to determine link performance. CTN represents worst case analog reference over all input ranges for entire RF section of node, optics module/photodiode excluded
6. J.83 Annex B, 5.360537 MS/s; 6 MHz/channel. Near noise correction applied to compensate for source MER contribution
7. 30 analog NTSC channels from 55.25 MHz to 253.25 MHz, 160 digital NTSC channels from 261 MHz to 1218 MHz, 6 dB below analog. 57 dBmV (virtual) output at 1218 MHz, 18 dB virtual tilt from 54 to 1218 MHz. Reference input level is 0 dBm, 3% OMI
8. 2 QAM channels replaced with analog channels @ analog/virtual levels to facilitate CTN/CIN measurements
9. For channel loading up to 1.2 GHz and 18 dB of output tilt, the maximum virtual output level @ 1.2 GHz is 57 dBmV. For channel loading up to 1 GHz and 18 dB of tilt, the maximum virtual output level @ 1 GHz is 60 dBmV
10. Output Linear Tilt is -1.0 ± 1.0 dB with 204/258 MHz splits.
11. Return loss is 15 dB from 5 to 15 MHz when ICS is installed in the node
12. The link consists of 20 km of SMF 28 fiber, plus passive loss sufficient to obtain an optical input power of -6 dBm at the test receiver. The test receiver should have minimal contribution
13. The link consists of 40 km of SMF 28 fiber, plus passive loss sufficient to obtain an optical input power of -6 dBm at the test receiver
14. Measured with minimum attenuator setting in Tx and Rx. Specified link for 1310 nm SFP is 10 km fiber. Specified link for CWDM SFP is 50 km fiber, 26 dB link budget. Specified link for DWDM SFP is 80 km fiber, 29 dB link budget. Node measured in 2X configuration, de-rate by 3 dB for 1X configuration
15. Measured from 0-15A, de-rate to 50 dBc from 5 to 10 MHz
16. Max. total current applied

Customer Care

Contact Customer Care for product information and sales:

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Note: Specifications are subject to change without notice.

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