DATA SHEET

Opti Max™ Optical Node Series

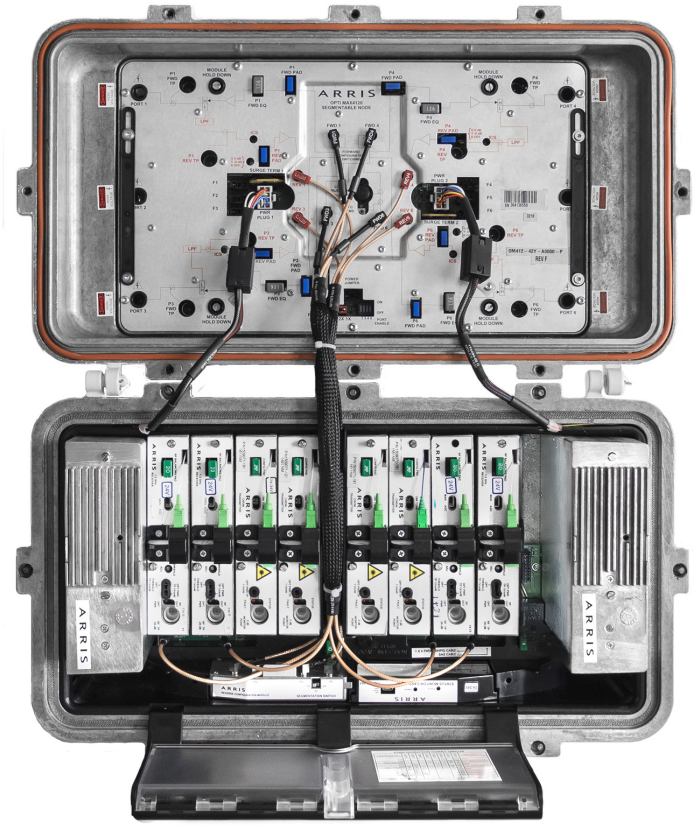
OM4120™

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 OM2741, Opti Max OM4100, and Opti Max OM6000™ 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

The CommScope 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 backward 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. CommScope 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 option 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 CommScope 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

CH3 Headend Optics	CH3 DR3450
CHP Max5000® Headend Optics	DT7030/OM6 Series Digital Return Transmitters
CHP Digital Receiver	VHub

SPECIFICATIONS

Characteristics	Specification
Physical	
Dimensions	11.7 H x 20 L x 10 W (29.7 cm x 50.8 cm x 25.4 cm)
Weight	< 50 lbs
Housing Ports	6
Environmental	
Operating Temperature Range	-40° to +60°C (-40° to +140°F)
Storage Temperature Range	-40° to +85°C (-40° to +185°F)
Humidity	5%–95%, non-condensing
Forward Path	
Optical Receiver	
Optical Wavelength	1260 to 1620 nm
Optical Input Power Range, Continuous	-6.0 to +3.0 dBm
Optical Connector Type	SC/APC
Optical Test Point	1 ± 0.1% Volt/mW
RF	
Operational Bandwidth[1]	54/85/102/258 to 1218 MHz
Flatness[2]	± 1.25 dB
Output Linear Tilt[11]	18.0 ± 1.0 dB (54 to 1218 MHz) 17.5 ± 1.0 dB (85 to 1218 MHz) 17.2 ± 1.0 dB (102 to 1218 MHz) 14.8 ± 1.0 dB (258 to 1218 MHz)
Thermal Level Stability[3]	± 1.5 dB (Typical), ± 2.0 dB (max)
RF Port Impedance	75 Ω
RF Return Loss[4]	16 dB
Port to Port Isolation[5]	-70 dB, minimum downstream bandwidth to 552 MHz -60 dB, 552 MHz to 1218 MHz
Mixed Analog/Digital Distortions[6, 7, 8, 9]	
Reference Level[11]	57/39 dBmV @ 1218/55 MHz (Virtual)
CTN	60 dB
CTB	-70 dBc
CSO	-67 dBc
CIN	57 dB
MER	41 dB
BER	< $1x10^{-6}$
All Digital Distortions[6, 7, 8, 10]	
Reference Level[10]	51/33 dBmV @ 1218/55 MHz (Actual)
MER	44 dB
BER	< $1x10^{-6}$
Return Path	
Optical Transmitter	
Optical Wavelength	CWDM/DWDM
Optical Connector Type	SC/APC
Optical Test Point	1 ± 0.1 Volt/mW
RF	
Operational Bandwidth[1]	5–42/5–65/5–85/5–204 MHz
Flatness[2]	± 1.0 dB
Output Linear Tilt[12]	0 ± 1.0 dB
Thermal Gain Stability[3]	± 1.0 dB
RF Port Impedance	75 Ω
RF Return Loss[6, 13]	16 dB
Port-to-Port Isolation	-60 dB
Local Injection Port Response	16.0 ± 2.0 dB
Nominal Return Input Level[14]	12 dBmV/6 MHz; 5–42 MHz 10 dBmV/6 MHz; 5–65 MHz 8 dBmV/6 MHz; 5–85 MHz 5 dBmV/6 MHz; 5–204 MHz
Transmitter Output Power	
Analog CWDM	3 ± 0.4 dBm
Analog DWDM	7 ± 0.4 dBm
DWDM SFP	+3 to +7 dBm
CWDM SFP	0 to +5 dBm
1310 nm SFP	-8 to -1 dBm

SPECIFICATIONS

Characteristics	Specification
Return Path Continued	
Distortion Performance	
NPR Analog CWDM[7, 15]	40/11 dB (5–85 MHz) 40/8 dB (5–204 MHz)
NPR Analog DWDM[7, 16]	40/11 dB (5–85 MHz) 40/8 dB (5–204 MHz)
NPR 2x85 MHz Digital Return[7, 17]	40/20 dB (5–85 MHz)
NPR 1-fer Digital Return	40/17 dB (5–85 MHz)
NPR 2-fer Digital Return	40/11 dB (5–85 MHz)
Power Requirements	
AC Input Voltage	40–90 Volts
AC Input Frequency Range	47/63 Hz
Hum Modulation[7, 18] 5 to 10 MHz 11 to F_{maxret}	 -50 dBc max -60 dBc max
AC Bypass Current[19]	15 Ampere rms
Required Accessories	
RF Pads **NPB-xx0*** * xx = 00–20 (0–20 dB)	Factory Installed in 4 locations 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.
1.2 GHz 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. Thermal level stability is measured relative to the gain at 25 ± 5°C and applies from any node port to the corresponding return transmitter input
4. Measured at the node RF input and output port over the specified passband
5. The isolation between 1000 MHz and 1218 MHz may de-rate to 55 dB over the operational temperature range.
6. Over operating temperature range
7. 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
8. J.83 Annex B, 5.360537 MS/s; 6 MHz/channel. Near noise correction applied to compensate for source MER contribution
9. 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
10. 2 QAM channels replaced with analog channels @ analog/virtual levels to facilitate CTN/CIN measurements
11. For channel loading up to 1.2 GHz and 18 dB of output tilt, maximum output level @ 1.2 GHz is 59 dBmV virtual/53 dBmv actual. For channel loading up to 1 GHz and 17 dB of tilt, maximum output level @ 1 GHz is 60 dBmV (virtual)/54 dBmV (actual)
12. Output Linear Tilt is -1.0 ± 1.0 dB with 204/258 MHz splits
13. Return loss is 15 dB from 5 to 15 MHz when ICS is installed in the node
14. Maximum total composite power is 20 dBmV
15. 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.
16. 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
17. 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
18. Measured from 0-15A, de-rate to 50 dBc from 5 to 10 MHz
19. Max total current applied