DATA SHEET

Opti Max® Optical Node Series

OM4120®

1.2 GHz 4x4 HFC Deep Lid Segmentable Node

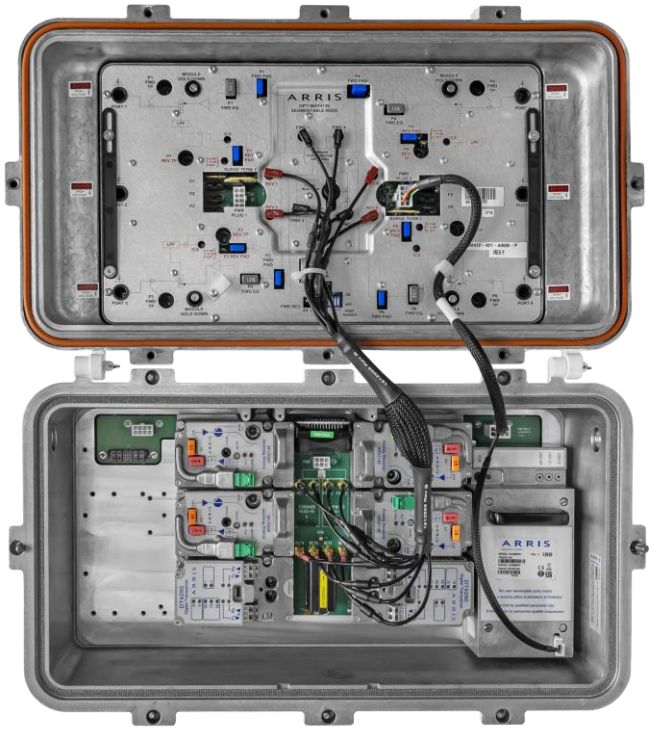
FEATURES

- Full featured, factory configured node or convenient lid upgrade path from legacy installed base of OM4100 or standard OM4120 nodes to mid-split, high-split, and/or DAA network operation
- DOCSIS® 3.1 compliant
- Virtual 57 dBmV output level at 1.2 GHz for maximum service group size
- Supports 1x1, 2x2, or 4x4 forward and return path segmentations
- Leverage installed base of nodes while enhancing plant performance
- Maximized fiber utilization and reach
- Improved headend density and power efficiency

The HFC Deep Lid is available as part of a fully configured OM4120 node, for new node installations, or as a lid upgrade kit for legacy installed OM4100® or standard lid OM4120 nodes. The OM4120 HFC Deep Lid node utilizes the NC-style AR4214 forward receiver modules, NC-style digital transceivers, return segmentation plug-ins, and a PS4201 power supply. The OM4120 node allows operators to easily convert to mid-split (85–102 MHz) or high-split (204–258 MHz) network operation.

The deep lid supports CommScope's RD2322 Remote PHY/Remote MACPHY (RxD) module, providing operators with an easy, cost-effective pathway to future Distributed Access Architecture (DAA) network operation. The deep lid also provides operators with an opportunity to upgrade legacy OM4 nodes from 870 MHz or 1.0 GHz to 1.2 GHz at the same time.*

* Requires 1.2 GHz RF Module for HFC operation in OM4000 and OM4100 node upgrades.



OM4120 with HFC Deep Lid Option

OM4120 HFC Deep Lid Operation

An OM4120 HFC deep lid node replaces standard, OM-style forward receivers and digital return transmitters with NC-style equivalents, which are compatible with the deep lid router board's form factor. In the forward path, HFC deep lid nodes use 1.2 GHz AR4214E high-gain receivers. AR4214E receivers support an operational optical level range of -7 to +2 dBm. Operators can adjust RF output levels as needed using plug-in attenuator PADs and equalizers. The receiver's ALC circuitry allows these levels to be maintained automatically.

In the return path, operators have the option of selecting DT4250N digital transceivers, which support up to 100 MHz network operation, or DT4600N digital transceivers, which support up to 204 MHz network operation. Both models allow users to set the transceiver to operate in 1-fer or 2-fer mode.

The OM4120 HFC deep lid node's simplified segmentation feature provides seamless transition from the basic unsegmented configuration to a fully segmented node with minimal effort. The node uses a switch in the RF module to support forward path segmentation and local, NC-style plug-ins to support return path segmentation without having to add additional configuration modules or RF cables. Instead, a technician can enable new segments by simply setting the forward path segmentation switch, installing a new return path segmentation plug-in, and adding additional digital transceivers or analog receivers as required. By reducing the requirement for additional configuration modules and minimizing maintenance time, the OM4120 provides operators with a lower total cost of ownership.

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 gain 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.

Network Flexibility

Today's technologies are developing at a rapid pace, which is why it is more important than ever for products to be flexible enough to support next-generation technologies, such as DAA, without major forklift. Keeping these concerns in mind, the OM4120 HFC deep lid node upgrade kit allows operators to transition easily to mid- and high-split network operation using traditional node-based analog/digital optical delivery while providing the option to transition seamlessly to DAA architecture in the future. When operators are ready to transition to DAA, the node's modular design allows them to upgrade previously deployed OM4120 HFC deep lid nodes to support DAA delivery by simply removing the node's existing optical modules and replacing them with an RD2322 RxD module. The ease and simplicity of transitioning the OM4120 to support both standard, mid- or high-split HFC or future DAA operation provides operators with several benefits, including a cost-effective roadmap for upgrading their current network assets and the ability to future-proof today's purchases for long term use.

Small Form-Factor Pluggable (SFPs)

CommScope offers a wide range of 2.125, 4.25, and 10 Gbps SFP modules for the DT series of digital transceivers. These SFP modules are carefully chosen by our design teams to ensure end-to-end performance and stability. Available in CWDM and DWDM 40 ITU wavelengths, CommScope SFP modules support link budgets of up to 80 km. Rigorously tested, SFP modules are designed to withstand the thermal profile of the OM4120 while providing added long-term performance in the field with industrial temperature specifications across the family. The modules provide both design flexibility and the ability to maximize wavelength aggregation, making them the ideal choice to guarantee the transceiver's link performance across a wide range of outdoor temperatures.

SPECIFICATIONS

Characteristics	Specification
Physical	
Dimensions	11.7 H x 20 L x 11.4 W (29.7 cm x 50.8 cm x 29 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	-7.0 to +2.0 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[10]	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]	± 2.0 dB (Typical), ± 2.5 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[9]	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]	
Reference Level	51/33 dBmV @ 1218/55 MHz (Actual)
MER	44 dB
BER	< $1x10^{-6}$
Return Path	
Digital Transceiver	
Optical Wavelength	1310nm/1550 nm/CWDM/DWDM (dependent on SFP module)
Optical Connector Type	LC/UPC Duplex on the SFP+ Transceiver
RF Channels	1 or 2 (manually selectable on module)
RF	
Operational Bandwidth[1]	5–42/5–65/5–85/5–204 MHz
Flatness[2]	± 1.0 dB
Output Linear Tilt[11]	0 ± 1.0 dB
Thermal Gain Stability[3]	± 1.0 dB
RF Port Impedance	75 Ω
RF Return Loss[4, 12]	16 dB
Port-to-Port Isolation	-60 dB
Nominal Return Input Level[13]	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	Refer to the Ordering Information Table on page 6 for minimum output power specifications for specific SFP modules

SPECIFICATIONS

Characteristics	Specification
Return Path Continued	
Distortion Performance	
NPR 1-fer Digital Return, DT4250	47/11 dB (5–50 MHz) 40/11 dB (5–75 MHz) 40/11 dB (5–100 MHz)
NPR 2-fer Digital Return, DT4250	40/11 dB (5–50 MHz) 40/11 dB (5–75 MHz) 40/11 dB (5–100 MHz)
NPR 1-fer Digital Return, DT4600	40/13 dB (5–100 MHz) 40/13 dB (5–204 MHz)
NPR 2-fer Digital Return, DT4600	40/11 dB (5–100 MHz) 40/11 dB (5–204 MHz)
Power Requirements	
Total Power	150 Watts max
AC Input Voltage[14]	44–95 Volts
AC Input Frequency Range	50/60 Hz
AC Bypass Current[15]	15 Ampere rms
Required Accessories	
RF Pads **NPB-xx0*** * xx = 00–20 (0–20 dB)	0 dB NPB-000 factory Installed in the RF module locations. Customer can modify in 1 dB steps as required when purchased as an accessory item.
AP40xx-L-1* *xx=00–18 (0–18 dB)	15 dB AP4015-L-1 factory installed in AR4214E Receivers. 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)	6 dB 1510053-006 factory Installed in RF module locations. Customer can modify in 1 dB steps as required when purchased as an accessory item.
EQ21xxE** ** xx = 02–12 (2–12 dB)	5 dB EQ2105E factory installed in AR4214E Receivers. Customer can modify in 1 dB steps as required when purchased as an accessory item.

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 node output level at 25°C ± 5°C.
4. Measured at the node RF input and output port over the specified passband.
5. The forward band segmentation isolation is measured between all independent forward paths over the specified frequency bands.
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. 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).
11. Output Linear Tilt is -1.0 ± 1.0 dB with 204/258 MHz splits.
12. Return loss is 15 dB from 5 to 15 MHz when ICS is installed in the node.
13. Maximum total composite power is 20 dBmV.
14. The AC input voltage waveform is quasi-square wave.
15. Maximum total current applied to or from any one port.

ORDERING INFORMATION

Part Number	Description
	Factory Configured Deep Lid Nodes
OM412DxxYAE1XN1XU000[1] xx= frequency split	1.2 GHz 1x1 Segmented Node, 6 Port Housing with Deep Lid, Internal Test Points, GaN RF Module w/ ICS, One PS4201 Power Supply, One 1.2 GHz AR4214E Receiver, One DT4250N Digital Transceiver
OM412DxxYAE2XN2XU000[1] xx= frequency split	1.2 GHz 2x2 Segmented Node, 6 Port Housing with Deep Lid, Internal Test Points, GaN RF Module w/ ICS, One PS4201 Power Supply, Two 1.2 GHz AR4214E Receivers, One DT4250N Digital Transceiver
OM412DxxYAE4XN4XUU00[1] xx= frequency split	1.2 GHz 4x4 Segmented Node, 6 Port Housing with Deep Lid, Internal Test Points, GaN RF Module w/ ICS, One Enhanced PS4201 Power Supply, Four 1.2 GHz AR4214E Receivers, Two DT4250N Digital Transceivers
OM412DxxYAE1XN1XV000[2] xx= frequency split	1.2 GHz 1x1 Segmented Node, 6 Port Housing with Deep Lid, Internal Test Points, GaN RF Module w/ ICS, One Enhanced PS4201 Power Supply, One 1.2 GHz AR4214E Receiver, One DT4600N Digital Transceiver
OM412DxxYAE2XN2XV000[2] xx= frequency split	1.2 GHz 2x2 Segmented Node, 6 Port Housing with Deep Lid, Internal Test Points, GaN RF Module w/ ICS, One Enhanced PS4201 Power Supply, Two 1.2 GHz AR4214E Receivers One DT4600N Digital Transceiver
OM412DxxYAE4XN4XVV00[2] xx= frequency split	1.2 GHz 4x4 Segmented Node, 6 Port Housing with Deep Lid, Internal Test Points, GaN RF Module w/ ICS, One Enhanced PS4201 Power Supply, Four 1.2 GHz AR4214E Receivers, Two DT4600N Digital Transceivers
	Deep Lid Upgrade Kits
OM41XDUP00E1XN1X0000	For 1x1 Segmentation, Deep Housing Lid, One Enhanced PS4201 Power Supply, One 1.2 GHz AR4214E Receiver, HFC Adapter Bracket, Powering Cable, RF Cable Bundle Digital return transceiver sold separately. Order one DT4250 or DT4600 module.
OM41XDUP00E2XN2X0000	For 2x2 Segmentation, Deep Housing Lid, One Enhanced PS4201 Power Supply, Two 1.2 GHz AR4214E Receivers, HFC Adapter Bracket, Powering Cable, RF Cable Bundle Digital return transceiver sold separately. Order one DT4250 or DT4600 module.
OM41XDUP00E4XN4X0000	For 4x4 Segmentation, Deep Housing Lid, One Enhanced PS4201 Power Supply, Four 1.2 GHz AR4214E Receivers, HFC Adapter Bracket, Powering Cable, RF Cable Bundle Digital return transceivers sold separately. Order two DT4250 or DT4600 modules.
	Optical Modules
DT4250N-50-00	Digital Return Transceiver, User Configurable 5–50 or 5–100 MHz return
DT4250N-75-00	Digital Return Transceiver, User Configurable 5–75 or 5–100 MHz return
DT4600N-200-00	Digital Return Transceiver, User Configurable 5–100 or 5–204 MHz return
XE4202M-00-D	R-OLT Module
	1.2 GHz OM4120 RF Modules
OM4120-RF-42-ICS	OM4120 1.2 GHz GaN RF Module, 42/54 MHz split with reverse switches
OM4120-RF-65-ICS	OM4120 1.2 GHz GaN RF Module, 65/85 MHz split with reverse switches
OM4120-RF-85-ICS	OM4120 1.2 GHz GaN RF Module, 85/102 MHz split with reverse switches
OM4120-RF-204-ICS	OM4120 1.2 GHz GaN RF Module, 204/258 MHz split with reverse switches

NOTES:

1. Available frequency splits are: 42 (42–54 MHz split); 65 (65–85 MHz split); and 85 (85–102 MHz split)
2. Available frequency splits are: 42 (42–54 MHz split); 65 (65–85 MHz split); 85 (85–102 MHz split); and HS (204–258 MHz split)

ORDERING INFORMATION

Part Number	Description
	Ethernet SFP Optical Transceiver Modules for DT4250 Transceivers
TR4000-PI	2.125 Gbps 10 km 1310 nm Transceiver, -6 dBm min, -40° to +85°C
TR4040-PI	2.125 Gbps 40 km 1310 nm Transceiver, -1 dBm min, -40° to +85°C
TR4440B-xxxx-PI (xxxx = wavelength)	2.125 Gbps 60 km CWDM Transceiver, 15 Wavelengths Supported (1270 nm to 1350 nm; 1470 nm to 1610 nm), -2 dBm min, -40° to +85°C
TR4540-0000-PI	2.125 Gbps 40 km 1550 nm Transceiver, -1 dBm min, -40° to +85°C
TR4580-xx-PI (xx = 20–59)	2.125 Gbps 120 km DWDM Transceiver, 40 Wavelengths Supported (ITU Channels 20–59), +3 dBm min, -40° to +95°C
TKA1310-TL10	4.25 Gbps 10 km 1310 nm Transceiver, -8 dBm min, -40° to +85°C
TKA1310-TL40	4.25 Gbps 40 km 1310 nm Transceiver, 0 dBm min, -40° to +85°C
TKCxxxx-TL40 (xxxx = wavelength)	4.25 Gbps 40 km CWDM Transceiver, 15 Wavelengths Supported (1270 nm to 1350 nm; 1470 nm to 1610 nm), 0 dBm min, -40° to +85°C
TKD4580-xx-PI (xx = 20–62)	4.25 Gbps 80 km DWDM Transceiver, 43 Wavelengths Supported (ITU Channels 20–62), +4 dBm min, -40° to +95°C
	Ethernet SFP+ Optical Transceiver Modules for DT4600 Transceivers
TTA1310-TL10	10 Gbps 10 km 1310 nm Transceiver, -8.2 dBm min, -40° to +95°C
TTA1310-TL40	10 Gbps 40 km 1310 nm Transceiver, +1 dBm min, -40° to +95°C
TTD4540-xx-PI (xx = 20–59)	10 Gbps 40 km DWDM Transceiver, 40 Wavelengths Supported (ITU Channels 20–59), -2 dBm min, -40° to +95°C
TTD4580-xx-PI (xx = 20–59)	10 Gbps 80 km DWDM Transceiver, 40 Wavelengths Supported (ITU Channels 20–59), 0 dBm min, -40° to +95°C
TTCxxxx-TL40 (xxxx = wavelength)	10 Gbps 40 km CWDM Transceiver, 8 Wavelengths Supported (1470 nm to 1610 nm), -2 dBm min, -40° to +95°C
TTCxxxx-TL80 (xxxx = wavelength)	10 Gbps 80 km CWDM Transceiver, 8 Wavelengths Supported (1470 nm to 1610 nm), 0 dBm min, -40° to +95°C

RELATED PRODUCTS

E6000® CCAP Core	CHP Max5000® and CH3000 Headend Optics
OM41xx Node	Headend and Field Passives
Complete SFP Portfolio	Installation Services

Contact Technical Services for product support:

- United States: +1-888-944-4357
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Note: Specifications are subject to change without notice.

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