DATA SHEET

Optical Node Series (NC)

RP4111 Remote PHY Device (RPD)

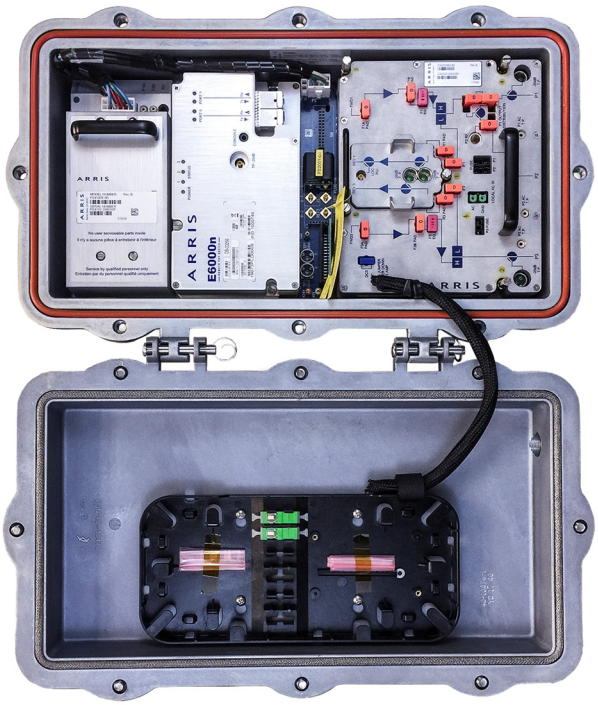
for NC2000 1.2 GHz and NC4000H4, NC4000H3 Fiber Deep Nodes

FEATURES

- Industry leading compact node RF output capability of 60 dBmV at 1.2 GHz for maximum service group size
- DOCSIS® 3.1 compliant
- Seamless upgrade from traditional optics to distributed access architectures (DAA)
- Enhances plant performance
- Maximizes fiber utilization and reach
- Improves headend density and power efficiency
- Simplifies plant maintenance via digital optics
- Reduces transmission costs
- Multiple return bandwidths offering 42, 60, 65, 85, and 204 MHz

The Remote PHY Device (RPD) is a component in CommScope's Distributed Access Architecture (DAA) portfolio. It offers significant operational benefits—including increased bandwidth capacity, greater fiber efficiencies (wavelengths and distance), simplified plant operations with digital optics, and reduced loads on facility space and power systems—by extending the digital portion of the headend or hub to the node and placing the digital/RF interface at the optical/coax boundary.

The RPD works in conjunction with the CCAP Core to extend the PHY layer from the CCAP into an NC2000 1.2 GHz node or NC4000H3/ NC4000H4 Fiber Deep node. MAC processing, provisioning, and monitoring functions remain in the headend. The RPD provides full spectrum support for digital broadcast TV, VoD, and DOCSIS 3.0 and DOCSIS 3.1, as well as strategic alignment with future NFV/SDN/FTTx systems.



RPD Module Operation

The RPD emulates the downstream receiver and upstream transmitter modules inside the node. The RPD module generates the RF signal, replacing a traditional forward receiver. The node output level and tilt is set by installing RF attenuator pads and equalizers in the node's RF module. The RPD module's channel configuration is received from the CCAP Core in the headend; no manual configuration of the module is necessary after it is optically linked to the headend. The CommScope RP4111 RPD supports a 1x1 configuration with one downstream segment and one upstream segment.

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 a major network upgrade. Keeping these concerns in mind, the NC2000 and NC4000™ nodes allow operators to transition seamlessly from traditional node-based analog/digital optical delivery to a DAA architecture by using the NC2000/NC4000 housing and leveraging current network assets. When operators are ready to transition to DAA, the node's modular design allows them to upgrade previously deployed NC2000 1.2 GHz and NC4000H3/H4 nodes to support R-PHY delivery by simply removing the node's existing receivers and transmitters and replacing them with the appropriate RPD module. The ease and simplicity of transitioning to support 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)

TTA, TTB, TTC, and TTD series high-speed 10 Gbps SFP+ modules are the only approved SFP+ modules for the RPD application in the NC2000/NC4000. These rigorously tested, high temperature SFP+ modules are designed to withstand the increased thermal profile of the NC2000/NC4000 ensuring long-term performance in the field. The modules provide both design flexibility and the ability to maximize wavelength aggregation, making them the ideal choice to guarantee the RPD's link performance across a wide range of outdoor temperatures.

The TTA series of SFP+ modules are standard 1310 nm and support fiber distances of up to 40 km. The TTB series of SFP+ modules are standard 1550 nm and support fiber distances of up to 80 km. The TTC series of SFP+ modules are CWDM, support fiber distances of up to 40 km, and are available in 15 wavelengths. The TTD series of SFP+ modules are DWDM, support fiber distances of up to 80 km, and are available in 40 wavelengths.

SPECIFICATIONS

Characteristics	Specification
General	
RF Port Configuration (RPD)	1 DS-SG x 1 US-SG
RF Port Configuration (Node)	1x1, (single active hybrid in NC2000)
CIN Connectivity	Dual 10 GbE SFP+ Path Redundancy Daisy Chain
Channel Capacity	
Downstream	Annex B 6 x 192, configurable as SC-QAM or OFDM Annex A 5 x 192, configurable as SC-QAM or OFDM
Upstream	12 SC-QAM 12 SC-QAM and 1 OFDMA (96 MHz) or 2 OFDMA
Set Top Box Out-of-Band (OOB)	SCTE 55-1 SCTE 55-2
CW Tone Generation	AGC, Alignment, Leakage Detection (up to 10)
High Speed Data	DOCSIS 3.0, DOCSIS 3.1
Video	Broadcast Video, Narrowcast Video
Designed for Compliance to CableLabs® MHAv2 Standards	CM-SP-R-PHY Remote PHY Specification CM-SP-R-DEPI Remote Downstream External PHY Interface Specification CM-SP-R-UEPI Remote Upstream External PHY Interface Specification CM-SP-R-GCP Generic Control Plane Specification CM-SP-R-DTI Remote DOCSIS Timing Interface Specification CM-SP-R-OOB Remote Out-of-Band Specification CM-SP-R-OSSI Remote PHY OSS Interface Specification CM-SP-DRFI Appendix D
RF	
Downstream Operational Bandwidth	54–1218 MHz/88–1218 MHz/108–1218 MHz/258–1218 MHz
Upstream Operational Bandwidth	5–42 MHz/5–65 MHz/5–85 MHz/5–204 MHz
Output Linear Tilt	22 dB (54 to 1218 MHz)
RF Port Impedance	75 Ω
RF Return Loss	16 dB
Test Points	-20 dB
Node Power	
Output Level (Node)	60 dBmV @ 1218 MHz/22 dB tilt
Power Consumption (Node)	< 85 W AC (NC2000) < 150 W AC (NC4000)
AC Input Voltage (NC2000)	44–95 V AC (PS4102, cable powered) 30–64 V AC (PS4102E, cable powered)
AC Input Voltage (NC4000)	44–95 V AC (PS4101, cable powered)
AC Input Frequency Range	47–63 Hz
AC Bypass Current	10 A per port, 15 A combined
Environmental/Mechanical	
Dimensions (Module)	4.0 in L x 6.75 in W x 1.75 in H
Weight (Module)	2.05 lbs
Operating Temperature (Node)	-40° to +60°C (-40° to +140°F)
Operating Humidity	5%–95% non-condensing

ORDERING INFORMATION

Model Name	Part Number	Description
RP4111 RPD Device	1000746	R-PHY RPD (1xDS-SG, 1xUS-SG), plug-in for NC2000 (node and transceivers not included, priced separately). All PHY channels are enabled with this RPD part number.

RELATED PRODUCTS

E6000® CCAP Core	Headend Optics and Passives
NC2000 Node	NC4000 Fiber Deep Node
DWDM SFP+	Installation Services

Contact Customer Care for product information and sales:

- United States: 866-36-ARRIS
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Note: Specifications are subject to change without notice.

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