

## FEATURES

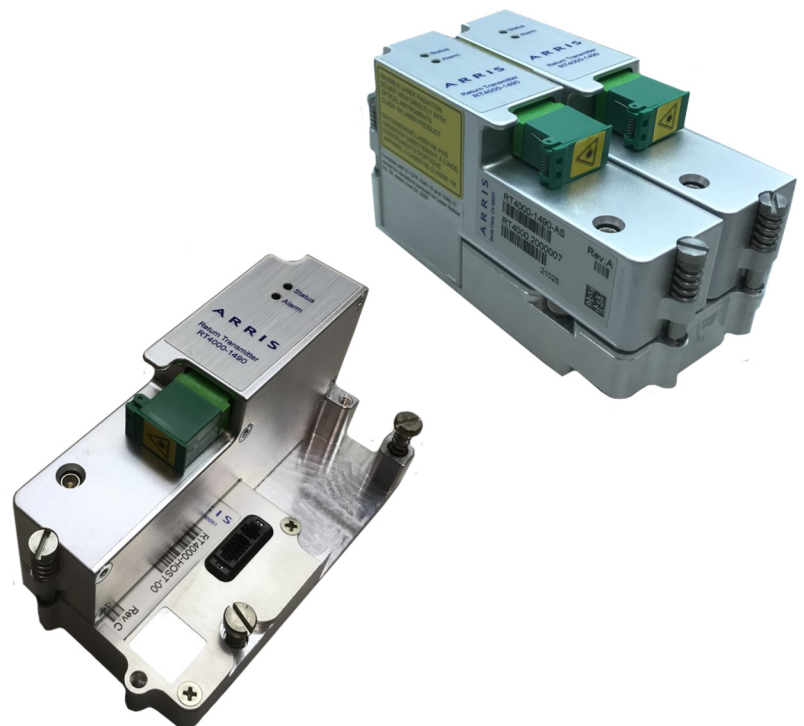
- Compatible with legacy ARRIS headend analog receivers
- Supports 204 MHz upstream performance
- Supports high-loss, high optical output multiwavelength passive architectures
- Available in ITU Channels 19 through 63 (DWDM)
- Available in eighteen 1271–1611 nm wavelengths, spaced in 20 nm increments (CWDM)
- Compatible with NC4000 and NC2000 series nodes
- Host module supports up to 2 pluggable transmitters

CommScope's RT4000 DWDM and CWDM Analog Return Transmitters are fully compatible with NC4000™ and NC2000 series nodes. The transmitter is an excellent choice for facilitating multiwavelength planning over a single fiber, which allows end users to maximize fiber capacity. In addition, the transmitter can support the migration of CWDM wavelengths onto the usable DWDM spectrum.

DWDM Analog Transmitters are available in multiple wavelengths and support a variety of HFC and Fiber Deep wavelength plans and network configurations.

CWDM Analog Transmitters are available in 18 different wavelengths and support a variety of HFC and Fiber Deep wavelength plans and network configurations.

The RT4000 host module installs within a single slot in the NC4000 and NC2000 series nodes and accepts any combination of two pluggable transmitters.



## SPECIFICATIONS (DWDM)

Characteristics	Specification
<b>Optical</b>	
Optical Output Power <sup>1</sup>	7.0 ± 0.4 dBm
Transmitted Wavelength	100 GHz spacing, ITU channels 19–63
Wavelength Accuracy <sup>2</sup>	± 0.05 nm (max)
Output Power Stability Over Temperature	± 0.6 dB (max)
Optical Connector	SC/APC
<b>Optical LED Indicators</b>	
Fault	Optical Output Power: Red = high alarm (5.51 mW limit); low alarm (4.51 mW limit); Off = normal operating limits Laser Bias Current: Red = high alarm (100 mA limit); Off = normal operating limits Laser Temperature: Red = high alarm (+1.5°C limit); low alarm (-1.5°C limit); Off = normal operating limits
Status	Green = transmitter is on; Off = transmitter is disabled
<b>RF</b>	
RF Bandwidth	5–204 MHz
Input Level (Total Power) <sup>3</sup>	17 dBmV (nominal); 47 dBmV (max)
Return Loss <sup>4</sup>	19 dB, 5–120 MHz; 17 dB, 120–204 MHz
Test Point Insertion Loss <sup>5</sup>	20 ± 0.5 dB
Frequency Response Flatness <sup>6</sup>	± 0.5 dB (max)
Response Deviation <sup>7</sup>	0.35 dB <sub>pk-pk</sub> (max)
Average RF Gain <sup>1</sup>	-14 ± 0.4 dB
Gain Variation Over Temperature <sup>8</sup>	± 2.0 dB (max)
Peak Optical Modulation Index (OMI), % per channel <sup>9</sup>	25 ± 1.2%
<b>Powering</b>	
Supply Current @ +24V	125 mA (max)
Supply Current @ +5V	500 mA (max)
<b>Link Performance<sup>10</sup></b>	
Dynamic Range for NPR > = 40 dB <sup>11</sup>	
• 80 MHz Loading (5–85 MHz)	12 dB (min)
• 199 MHz Loading (5–204 MHz)	9 dB (min)
Peak NPR	
• 80 MHz Loading (5–85 MHz)	46 dB (min)
• 199 MHz Loading (5–204 MHz)	43 dB (min)
Dynamic Range for BER < = 1.00E-06 <sup>12</sup>	
• 80 MHz Loading (5–85 MHz)	24 dB (min)
• 199 MHz Loading (5–204 MHz)	19 dB (min)
Intermodulation Spurious Outputs	-55 dBc (max)
Broadband Spurious Outputs	-60 dBc (max)
<b>Environmental and Physical</b>	
Dimensions (H x L x W)	10.7 cm x 5.6 cm x 2.8 cm (4.2 in x 2.2 in x 1.1 in)
Weight	≤ 1.1 lb (≤ 0.5 kg)
Operating Temperature (Node)	-40° to 60°C (-40° to 140°F)
Operating Humidity	95% non-condensing

### NOTES:

- Measured at Ta = 25 ± 5°C.
- The wavelength accuracy is determined by measuring the worst-case high and low wavelengths as the module is operated over the full operating temperature range. The worst-case measured values are then subtracted from the nominal wavelength and the results are compared to the wavelength accuracy specification. The “Start-of-Life” specification value shall apply until the first 1,000 hours of operation have elapsed, after which time the “End-of-Life” specification value shall apply.
- The maximum RF input level must be tolerated for at least one hour with no damage.
- Measured in a 75 Ω system.
- The RF test point insertion loss is measured relative to the module input with a 0 dB JXP PAD installed. The entire RF test point response must be contained within the indicated limits over the 5–204 MHz RF bandwidth. The RF test point return loss is measured in a 75 Ω system.
- Measured over the 5–204 MHz RF bandwidth. The specified plus/minus value may be interpreted as a peak-to-peak value of twice the indicated value (e.g., ± 0.5 dB may be interpreted as 1.0 dBpk-pk) to simplify the measurement.
- The RF response deviation applies to any 6 MHz band within the 5–204 MHz RF bandwidth.
- The RF gain variation over temperature is the change in the average RF gain as the DUT is operated over temperature. The receiver temperature is held at Ta = 25 ± 1°C, and the optical power at the receiver input is held constant to within ± 0.1 dB. The gain will vary in an approximately linear manner as the base plate temperature deviates from Tbp = 25 ± 5°C.
- The peak optical modulation index (OMI) is specified at Ta = 25 ± 5°C and is derived from the specified average RF gain value and 17 dBmV nominal RF input level.
- Test link consisted of 40 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 was a CHP-2RRX, CHP-4RRX, GX2-RX200BX2, or GX2-RX200BX4 return path receiver set to medium gain.
- Tested with a 41 MHz notch (5–85 MHz loading) and a 100 MHz notch (5–204 MHz loading).
- The BER dynamic range is tested with a 13 channel (5–85 MHz loading) and a 33 channel (5–204 MHz loading) QAM-64 load at a total nominal input power equal to 17 dBmV. The BER is measured without any forward error correction (Pre-FEC).

## SPECIFICATIONS (CWDM)

Characteristics	Specification
<b>Optical</b>	
Optical Output Power <sup>1</sup>	3.0 ± 0.4 dBm
Transmitted Wavelength	1271 nm to 1611 nm ± 6.5 (18 CWDM channels, 20 nm spacing)
Output Power Stability Over Temperature	± 1.0 dB (max)
Optical Connector	SC/APC
<b>Optical LED Indicators</b>	
Fault	Optical Output Power: Red = high alarm (2.2 mW limit); low alarm (1.8 mW limit); Off = normal operating limits Laser Bias Current: Red = high alarm (110 mA limit); Off = normal operating limits
Status	Green = transmitter is on; Off = transmitter is disabled
<b>RF</b>	
RF Bandwidth	5–204 MHz
Input Level (Total Power) <sup>2</sup>	17 dBmV (nominal); 47 dBmV (max)
Return Loss <sup>3</sup>	-19 dB, 5–120 MHz; -17 dB, 120–204 MHz
Test Point Insertion Loss <sup>4</sup>	20 ± 0.5 dB
Frequency Response Flatness <sup>5</sup>	± 0.5 dB (max)
Response Deviation <sup>6</sup>	0.35 dB <sub>pk-pk</sub> (max)
Average RF Gain	-14 ± 0.4 dB
Gain Variation Over Temperature <sup>7</sup>	± 2.0 dB (max)
Peak Optical Modulation Index (OMI), % per channel <sup>8</sup>	25 ± 1.2%
<b>Powering</b>	
Supply Current @ +24V	125 mA (max)
Supply Current @ +5V	500 mA (max)
<b>Link Performance<sup>9</sup></b>	
Dynamic Range for NPR >= 40 dB <sup>10</sup>	
• 80 MHz Loading (5–85 MHz)	12 dB (min)
• 199 MHz Loading (5–204 MHz)	9 dB (min)
Peak NPR	
• 80 MHz Loading (5–85 MHz)	45 dB (min)
• 199 MHz Loading (5–204 MHz)	43 dB (min)
Dynamic Range for BER <= 1.00E-06 <sup>11</sup>	
• 80 MHz Loading (5–85 MHz)	24 dB (min)
• 199 MHz Loading (5–204 MHz)	19 dB (min)
Intermodulation Spurious Outputs	-55 dBc (max)
Broadband Spurious Outputs	-60 dBc (max)
<b>Environmental and Physical</b>	
Dimensions (H x L x W)	10.7 cm x 5.6 cm x 2.8 cm (4.2 in x 2.2 in x 1.1 in)
Weight	≤ 1.1 lb (≤ 0.5 kg)
Operating Temperature (Node)	-40° to 60°C (-40° to 140°F)
Operating Humidity	95% non-condensing

### NOTES:

1. Measured at Ta = 25 ± 5°C.
2. The maximum RF input level must be tolerated for at least one hour with no damage.
3. Measured in a 75 Ω system.
4. The RF test point insertion loss is measured relative to the module input with a 0 dB JXP PAD installed. The entire RF test point response must be contained within the indicated limits over the 5–204 MHz RF bandwidth. The RF test point return loss is measured in a 75 Ω system.
5. Measured over the 5–204 MHz RF bandwidth. The specified plus/minus value may be interpreted as a peak-to-peak value of twice the indicated value (e.g., ± 0.5 dB may be interpreted as 1.0 dBpk-pk) to simplify the measurement.
6. The RF response deviation applies to any 6 MHz band within the 5–204 MHz RF bandwidth.
7. The RF gain variation over temperature is the change in the average RF gain as the DUT is operated over temperature. The receiver temperature is held at Ta = 25 ± 1°C, and the optical power at the receiver input is held constant to within ± 0.1 dB. The gain will vary in an approximately linear manner as the base plate temperature deviates from Tbp = 25 ± 5°C.
8. The peak optical modulation index (OMI) is specified at Ta = 25 ± 5°C and is derived from the specified average RF gain value and 17 dBmV nominal RF input level.
9. Test link consisted of 40 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 was a CHP-2RRX, CHP-4RRX, GX2-RX200BX2, or GX2-RX200BX4 return path receiver set to medium gain. The passive loss must be located between the fiber and the test receiver.
10. Tested with a 41 MHz notch (5–85 MHz loading) and a 100 MHz notch (5–204 MHz loading).
11. The BER dynamic range is tested with a 13 channel (5–85 MHz loading) and a 33 channel (5–204 MHz loading) QAM-64 load at a total nominal input power equal to 17 dBmV. The BER is measured without any forward error correction (Pre-FEC).

## ORDERING INFORMATION

Model Name	Description
<b>DWDM Transmitters</b>	
RT4000-Dxx-AS	RT4000 NC2000/NC4000 Analog Return DWDM Transmitter. Replace the "xx" in the part number with the required ITU Channel (21, 22, 24, 27, 29, 31, 33, or 35).
<b>CWDM Transmitters</b>	
RT4000-1270-AS	RT4000 NC2000/NC4000 Analog Return CWDM Transmitter, SC/APC, 1271 nm
RT4000-1290-AS	RT4000 NC2000/NC4000 Analog Return CWDM Transmitter, SC/APC, 1291 nm
RT4000-1310-AS	RT4000 NC2000/NC4000 Analog Return CWDM Transmitter, SC/APC, 1311 nm
RT4000-1330-AS	RT4000 NC2000/NC4000 Analog Return CWDM Transmitter, SC/APC, 1331 nm
RT4000-1350-AS	RT4000 NC2000/NC4000 Analog Return CWDM Transmitter, SC/APC, 1351 nm
RT4000-1370-AS	RT4000 NC2000/NC4000 Analog Return CWDM Transmitter, SC/APC, 1371 nm
RT4000-1390-AS	RT4000 NC2000/NC4000 Analog Return CWDM Transmitter, SC/APC, 1391 nm
RT4000-1410-AS	RT4000 NC2000/NC4000 Analog Return CWDM Transmitter, SC/APC, 1411 nm
RT4000-1430-AS	RT4000 NC2000/NC4000 Analog Return CWDM Transmitter, SC/APC, 1431 nm
RT4000-1450-AS	RT4000 NC2000/NC4000 Analog Return CWDM Transmitter, SC/APC, 1451 nm
RT4000-1470-AS	RT4000 NC2000/NC4000 Analog Return CWDM Transmitter, SC/APC, 1471 nm
RT4000-1490-AS	RT4000 NC2000/NC4000 Analog Return CWDM Transmitter, SC/APC, 1491 nm
RT4000-1510-AS	RT4000 NC2000/NC4000 Analog Return CWDM Transmitter, SC/APC, 1511 nm
RT4000-1530-AS	RT4000 NC2000/NC4000 Analog Return CWDM Transmitter, SC/APC, 1531 nm
RT4000-1550-AS	RT4000 NC2000/NC4000 Analog Return CWDM Transmitter, SC/APC, 1551 nm
RT4000-1570-AS	RT4000 NC2000/NC4000 Analog Return CWDM Transmitter, SC/APC, 1571 nm
RT4000-1590-AS	RT4000 NC2000/NC4000 Analog Return CWDM Transmitter, SC/APC, 1591 nm
RT4000-1610-AS	RT4000 NC2000/NC4000 Analog Return CWDM Transmitter, SC/APC, 1611 nm
<b>Host Module</b>	
RT4000-HOST-00	RT4000 NC2000/NC4000 Host Module

## RELATED PRODUCTS

NC2000/NC4000 Nodes	Headend Optics and Passives
Power Supplies	Optical Passives
Optical Patch Cords	Installation Services

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.

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