CORWave™ 1 GHz Variable Output Forward Path Transmitter

C-COR® CHP Max5000

Converged Headend Platform

- 1-GHz technology
- Cost effective alternative to adding fiber infrastructure
- Multiplexes analog forward, reverse, and GbE based data services on limited fiber counts
- Industry's only variable output transmitter
- Saving on spares and external devices for greater operation efficiency and flexibility
- Complements CHP Max® 1 GHz CWDM transmitters

The ARRIS C-COR® CHP Max5000 CORWave™ 1 GHz variable output forward path transmitter is ideal for MSOs that need to support fast-growing residential and business services on a fiber-scarce HFC plant. The CORWave transmitter is an extension of field-proven CHP Max® CWDM transmitter series and delivers more wavelengths over longer link distances on existing fiber plant.

When deployed with the ARRIS C-COR® Opti Max4100 1 GHz 4 x 4 segmentable node, CORWave technology enables multiplexing of four forward wavelengths on one fiber with a link length of up to 25 km. When deployed with any of the Opti Max segmentable nodes in 2 x 2 and 2 x 4 configurations, CORWave technology enables multiplexing of two forward wavelengths on one fiber with a link length of up to 30 km. In addition, two bidirectional GigE links for business services can be delivered on the same fiber—in both configurations. Therefore, service groups can be up to four times smaller than they are today and carry business services without installing new fiber.

CHP Max5000 1 GHz variable output forward path transmitters are dual-input and hot-swappable, with integrated management through the local Craft GUI and remote management via SNMP HMS-compliant interface for external connection to an element manager.

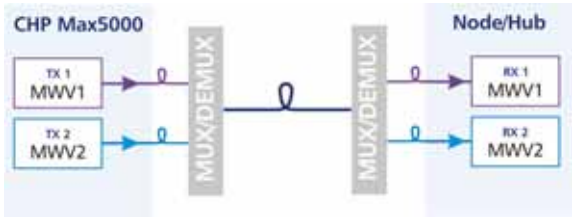
Rigorously tested and field-proven, ARRIS Multi-Wavelength Optical Network Solutions provide the flexibility to create the best wavelength plan—recovering fiber for revenue generating business services.

Features

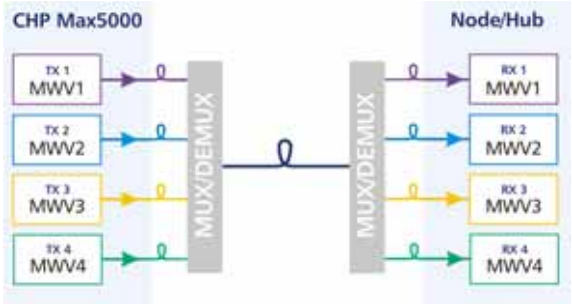
- Variable output in five 2 dB-wide ranges, adjustable in 1/4 dB steps with maximum outputs of 4, 6, 8, 10, and 12 dBm.
- Delivers more wavelengths with more reach on your existing fiber
- Supports forward and return node segmentation and dedicated business service links without new fiber construction
- Multiplexes four forward wavelengths on a single fiber
- High isolation dual input transmitters help minimize complex combining networks and save precious space in the headend
- Service groups can be up to four times smaller than they are today utilizing the same fiber resources
- Management via CORView element management software provides real-time status of the optical platform
- 4 x 4 fully segmentable link when combined with CWDM node return path transmitters

Applications

The following diagrams depict the typical application for combining two or four CORWave wavelengths in the forward path. Then, they are multiplexed onto a single fiber with a maximum launch power of 11 dBm per wavelength—up to four. This facilitates immediate forward path segmentation and reduces the node service group size. Follow the implementation requirements listed in the table below the diagrams to ensure a successful implementation. Contact ARRIS for implementation details and solutions for other applications.



2 x 2 — 30 km



4 x 4 — 25 km

Implementation Requirements for Four-Wavelength Applications

Implementation Requirements	Four Wavelength Application
Unique Requirements	
Recommended wavelengths (note 1)‘	MWV1-1291, MWV2-1293, MWV3-1295, MWV4-1290
Maximum launch power/wavelength	11 dBm (4 wavelengths)
Common Requirements	
Analog broadcast content	Must use identical analog content
Digital broadcast content	Can use different, digitally modulated narrowcast content
Analog RF input level	13.5 to 15 dBmV/channel
Digital RF input level	7.5 to 9 dBmV/channel
Maximum RF input cable length difference to transmitters	100 feet

Notes
1. ARRIS recommends to deploy MW01-1291 as the first wavelength.

Transmitter Specifications

Optical	
Optical Wavelength	MWV-1291, MWV2-1293, MWV-1295, MWV4-1290
Optical Output Power	4, 6, 8, 10, 12 dBm (Refer to CNR vs. Link Budget Tables)
RF	
Bandwidth	
Operational Range	54 to 1002 MHz
Analog Channel Range	54 to 550 MHz
Digital Channel Range	550 to 1002 MHz
Response Flatness, P–V, typ./max.	1.0/2.0 dB
Input Return Loss	16 dB
Port-to-Port Isolation	≥60 dB, 54 to 800 MHz, ≥54 dB, 800 to 870 MHz, ≥50 dB, 870 to 1002 MHz
Port-to-Port Gain Variation, typ./max.	±0.5 dB/±1.0 dB
Powering	
Power Consumption, max.	17.4 W
Performance	
Channel Plan	78 NTSC channels and up to 75 256-QAM channels
Input RF Power	
Analog Channels (Notes 1 and 2)	15.0 dBmV/ch
Digital QAM Channels	9.0 dBmV/ch
Composite Second Order, typ. (Notes 1 and 3)	–63 dBc
Composite Triple Beat, typ. (Note 1)	–70 dBc
Mechanical	
Optical Connector	SC/APC
RF Connector	F-type
RF Input Test Point (Note 4)	–20 ± 1.0 dB
Dimensions (W x H x D) (Note 5)	1.25 x 3.4 x 18.5 in. (3.2 x 8.7 x 47.0 cm)
Weight	2.75 lbs (1.24 kg)
Environmental	
Operational Temperature (Note 6)	32 to 122°F (0 to 50°C)
Storage Temperature	–40 to 158°F (–40 to 70 °C)
Humidity, noncondensing, max.	85%

Notes:

1. Distortions are measured using only CW analog carriers per SCTE recommendation by standard RF test methods. Performance shown represents typical performance for ≥85% of production units tested over typical Corning SMF-28 fiber (or equivalent). For minimum CSO and CTB, subtract 2dB from typical. CSO performance is for the transmitter only. CSO specifications for CORWave transmitter is obtained over specified fiber links. The typical system CSO is –60 dBc assuming an11 dBm launch per wavelength for a four-wavelength system.
2. OMI is 3.9% at 78 NTSC channel loading.
3. CSO performance for NTSC channels is for the in-band (high-side) beats.
4. Relative to main port with 0 dB pad and 0 dB EQ.
5. Includes handles and connectors.
6. Temperature measured at transmitter module's air inlet.

Specifications subject to change without notice

CNR vs. Link Budget: CHP-MWxx-xxxx-xx-S 1 GHz CORWave Transmitters

	-04	-06	-08	-10	-12
Output Power (dBm)	4.0	6.0	8.0	10.0	12.0
Fiber Length (km)	7.0	13.0	15.0	15.0	20.0
Optical Loss Budget (dB)	**CNR (dB) for part fiber/part passive link (typical)**				
3	54.5	—	—	—	—
4	54.0	—	—	—	—
5	53.4	53.9	—	—	—
6	52.7	53.3	—	—	—
7	51.8	52.7	53.8	—	—
8	—	52.0	53.2	—	—
9	—	51.1	52.6	53.8	—
10	—	—	51.9	53.2	—
11	—	—	51.0	52.6	53.4
12	—	—	—	51.9	52.8
13	—	—	—	51.0	52.2
14	—	—	—	—	51.5
15	—	—	—	—	50.6

Notes:

1. Optical output power specified before transmitter's bulkhead.
2. CNR is measured using only CW analog carriers per SCTE test procedures. Performance shown is ambient. Subtract 0.5 dB for performance over full temp. range.
3. Specifications measured using typical receiver with 0.85 mA/mW, 7 pA/$Hz^{0.5}$ performance.
4. Performance valid for 78 NTSC modulated channels at 15 dBmV/channel and 450 MHz of QAM loading at 6 dB below equivalent video channels.
5. Multiple forward wavelengths on a single fiber requires specific application considerations, please contact ARRIS for system design guidance.

Specifications subject to change without notice

Ordering Information

				1	2	3	4	5	6	7	8	9		10	11		12
C	H	P	–	M	W	x	x	–	x	x	x	x	–	x	x	–	S

1–9	CWDM Optical Wavelength
MWV1-1291	MultiWave #01 - 1291 nm (first wavelength to be deployed)
MWV2-1293	MultiWave #02 - 1293 nm
MWV3-1295	MultiWave #03 - 1295 nm
MWV4-1290	MultiWave #04 - 1290 nm

10–11	Optical Output Level
04	Variable output power of 2-4 dBm
06	Variable output power of 4-6 dBm
08	Variable output power of 6-8 dBm
10	Variable output power of 8-10 dBm
12	Variable output power of 10-12 dBm

12	Connector Type
S	SC/APC