



## MX-ON50-1.2G Bi-directional Optical Node

### Features

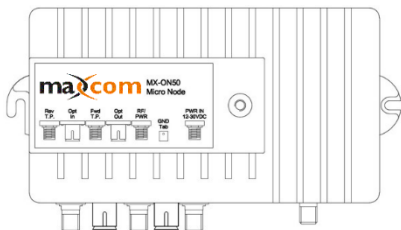
- 1.2 GHz with up to 50 dBmV output
- PON Pass Through Port (Passes G & XGS PON Wavelengths)
- Flexible RF Level and Slope Control Features
- DFB Return Laser
- Multiple Duplex/Frequency splits available (Field Swapable)
- LED indicators
- Excellent Performance Specs
- Compact Design with Flexible Powering



\*Maxcom also offers an Outdoor Model [MX-ODN1.2](#)

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
<b>General Optical and WDM</b>						
$\lambda$	Drop Wavelength Band- Forward	Expanded input 1525~1565nm (Option E53)	1525	1550	1565	nm
$\lambda$	Add Wavelength Band- Return	1610	1600	1610	1620	nm
$\lambda$	Pass Wavelength 1 - Forward	1490	1475		1500	nm
$\lambda$	Pass Wavelength 2 - Forward	1577	1560		1600	nm
$\lambda$	Pass Wavelength Band- Return	1270 & 1310	1260		1360	nm
$\lambda$	Pass Band Insertion Loss				1	dB
$\lambda$	Pass to Add-Drop Crosstalk	Both directions	35			dB
$\lambda$	Forward to Return Crosstalk	Both directions	35			dB
<b>Forward Receiver</b>						
$\lambda$	Optical Wavelength	Extended Input Wavelengths avail 1525~1565nm	1540	1550	1565	nm
Vopt.in	Monitor Voltage	$\lambda=1550$		1		mW/V
Pin	Optical Input Power		-9	-1	3	dBm
	Optical AGC Range	Optical AGC	-8	-1	2	dBm
F	Frequency Range	*based on duplex filter selected	47	258	1218	MHz
FL	Flatness of Frequency Response	258 to 1218MHz	0.5	$\pm 0.7$	1.4	dB
S22	Output Return Loss	258 to 550MHz 550 to 1218 MHz	14	19.8 15.1		dB
Lo	Reference Output Level	1218MHz Adjustable with JXP		50	52	dBmV
	Slope	Adjustable with JXP *Comes 10dB Pre-Slope	10	15	20	dB
	Optical Input Return Loss		45			dB
C/N	C/N	98 Pal-D channel Loading(50-550MHz OMI=3.5%, 550MHz- 860MHz low 10dB) -1dBm Opt receive	50	52.5		dB
CTB	CTB			72.7	-65	dB
CSO	CSO			63.2	-60	dB
f	Equivalent Noise Input	f=270MHz			7	pA/Hz
<b>Return Transmitter</b>						
$\lambda$	Optical Wavelength	*Note (1)		1610	*CWDM	nm
Wout	Optical Output Power	Example: *3mw = 4.5 dBm	2		3	mW
F	Frequency Range	Pluggable Diplex	5		204	MHz
LRin	US RF Input Level	Reference 256QAM Signal	-5	+10	+20	dBmV
FL	Flatness of Frequency Response	f=5 to 204MHz		$\pm 0.35$		dB
S11	Input Return Loss	f=5 to 204MHz	14	18.7		dB
	Optical Output Return Loss		45			dB
<b>General Parameters</b>						
P.S	Power supply (DC)	DCV Input Range	12		30	V
I <sub>tot</sub>	Total Current Consumption (DC)	.6 amps @ 29 VDC 2 amps @ 15 VDC    2.5 amps @ 12 VDC	0.6a		2.5a	Amps
T <sub>mb</sub>	Operating Temperature	Humidity 5% to 95%, none condensing	-40		60	°C
Dim	Dimensions	(L×W×H)	21.5 x 13 x 8.5			cm
			8.5" x 5" x 3.25"			in

Note (1): Standard 1610nm, CWDM wavelengths avail, user selectable wavelength option Not all options available with PON Port





# INSTALLER GUIDE:



## OPTICAL, RF & POWER CONNECTIONS

1. The MX-ON50 offers versatile power options and can be powered with 12-30 VDC through the F connector marked "PWR IN". A 100-240 VAC to 29 VDC switching power supply is included in the package.
2. Connect a coaxial cable from the power pack's output to the PWR IN port on the MX-ON50.
3. Alternatively, the MX-ON50 can receive power from the RF OUT/PWR IN port by merging RF and power using a power inserter.
4. After connecting the coaxial cable between the power pack output and the MX-ON50, plug the power pack into a wall outlet.
5. The adjustment plug-ins, status indicator LEDs, and DC test points (TPs) for the MX-ON50 can be found under the ONU lid, which can be opened using the included size #5 Allen Tool or Wrench.
6. When powered on, the DC POWER ON LED of the MX-ON50 will light up. Since the MX-ON50 functions as an HFC node with the upstream transmitter always active, the LASER ON LED will also turn on immediately upon powering. \*Note, the LASER ON LED will not be lit if equipped with the Burst Mode option.
7. Use the grounding screw on the MX-ON50 to connect the chassis to a physical earth (ground).
8. The MX-ON50 is equipped with an internal WDM filter, enabling single fiber operation for RFoG functionality. The receiver accepts downstream wavelengths ranging from 1540 to 1565 nm, while the return optical transmitter functions at 1610 nm. The unit also features a PON port compatible with G-PON (1310 & 1490 nm) and XGS PON (1270 & 1577 nm) wavelengths.
9. The suggested optical input level for the MX-ON50 ranges from -8 dBm to +2 dBm. Utilize an optical power meter at the suitable downstream wavelength to ensure the optical level on the incoming fiber is within this range.
10. Ensure that the optical cable connector matches correctly (e.g., SC/APC to SC/APC). After cleaning all optical connectors, connect the optical fiber(s) to the OPT IN/OUT port on the ONU.
11. An additional feature is provided for users without an optical power meter. This allows the user to assess the optical input power using a digital multimeter. If the optical input power is within the acceptable range, the OPT ON LED on the photo diode will illuminate. Once the optical fiber is connected to the ONU, the O.P. TP 1 mW/1 VDC test point (TP) on the photo diode can be utilized to measure the optical input detected by the ONU's forward receiver. Use a digital multimeter set to DC voltage and measure between the DC TP and the grounding screw. For instance, +3 VDC = 3 mW.
12. The F-port labeled "RF" serves as the bi-directional RF input and output port for the MX-ON50 optical node.
13. There are distinct forward output and reverse input -20 dB TPs designated as "FWD TP" and "REV TP", respectively. When not in use, please cap these -20 dB TPs with a 75-ohm terminator.
14. When measuring RF input/output levels using the -20 dB TP, ensure that the RF port is terminated to 75 ohms. Note that levels from the -20 dB TP will be 20 dB lower than those at the RF port.

\*Continued next page



## FORWARD SETUP GUIDELINES



1. The MX-ON50 incorporates JXP attenuator pads for controlling output/input levels (both forward and reverse) and for adjusting the forward tilt (slope) in the forward equalizer plug-in, enhancing flexibility.
2. When setting up the forward path, ensure that the forward optical input level to the MX-ON50 is within the specified range as outlined in the OPTICAL, RF & POWER CONNECTIONS section on previous page. An optical input exceeding +2 dBm may lead to receiver overload, while an input below -8 dBm results in loss of AGC tracking, leading to suboptimal RF output, which decreases by an additional 2 dB for every 1 dB decrease in optical input. The optimal performance is achieved at an optical input level of -1 dBm.
3. The RF output level of 50 dBmV at 1.2 GHz is available only when the optical input is within the AGC range and the OMI is  $\geq 3.5\%$  on the downstream optical signal. Outside the -8 to +2 dBm optical AGC range, the output will drop by an additional 2 dB for every 1 dB reduction in optical input.
4. To account for RF cable losses, a JXP attenuator pad can be inserted into the forward equalizer JXP slot. This node comes Pre-Sloped internally at 10dB between 258~1218MHz. For example, since this node comes with 10 dB of equalization, adding a 5 JXP pad (in the Forward Equalizer Slot) will create a slope of  $15 \pm 1$  dB on the RF output of the MX-ON50 from low to high frequency. The forward slope (tilt) can be adjusted by changing the forward equalizer plug-in value as desired. Only use a JXP pad (attenuator) in the forward equalizer plug-in.
5. Attach a signal level meter to the RF OUT port to assess the RF output from the MX-ON50. The forward output -20 dB test point can also be utilized to measure the RF output. If using the -20 dB test point, the main output must be terminated or connected to plant, otherwise the test point reading will be in-accurate.\*NOTE: RF levels referenced in this manual may pertain to analog channel levels, unless specified otherwise. For digital channels, assume a level 6 dB lower than that of analog channels.
6. If the output level is not within the desired range, the forward pad plug-in can be replaced to modify the output of the MX-ON50. The forward pad plug-in accommodates a JXP attenuator pad.
7. Confirm that the RF output levels from the MX-ON50 align with expectations.

## REVERSE SETUP GUIDELINES

1. For the reverse path setup, ensure that the reverse RF input level to the MX-ON50 is within acceptable limits to the ONU. The -20 dB forward out test point is bi-directional and can be used to inject the upstream test carrier. If using the forward test point for this purpose, apply a 20 dB compensation. The injected upstream test carrier can be measured at the -20 dB reverse input test point of the MX-ON50.
2. The upstream transmitter in the MX-ON50 operates as a continuous ON laser transmitter and remains active at all times. The LASER ON LED on the laser diode indicates the status of the laser transmitter, which will illuminate when the MX-ON50 is powered on, regardless of the upstream RF input.
3. Verify that the upstream RF input is within the specified frequency and input level range. The upstream RF input for the MX-ON50 is -5 to +20 dBmV per channel (digital channel level) for 42/54 MHz units and -5 to +18 dBmV per channel (digital channel level) for 85/102 MHz units. These levels assume that a 42/54 MHz split unit has 4 equally loaded channels in the upstream band, while the 85/102 MHz split has 8 equally loaded channels. If employing a different number of channels, adjust for total RF power accordingly. The combined total RF input level to the MX-ON50 (for all channels) should not exceed 27 dBmV (digital channel level) to avoid potential laser clipping and saturation. Use the following formula to calculate total RF power: Total RF power = RF power per channel +  $[10 * \log (\# \text{ of channels})]$ .
4. It is advisable to document both the input and output levels for the node in both upstream and downstream for future reference.



\*All product specifications and data are subject to change without notice to enhance reliability, function, design, or other attributes.

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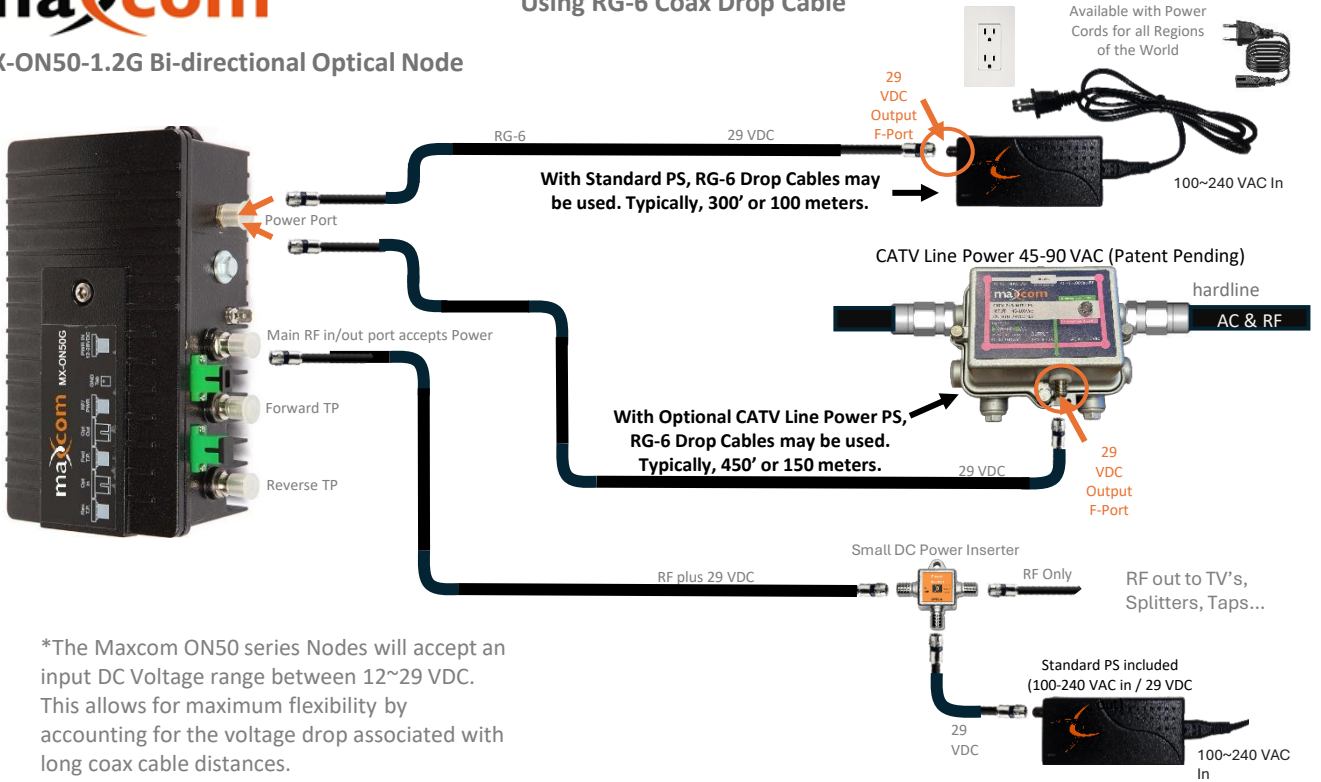
# POWERING GUIDE:



MX-ON50-1.2G Bi-directional Optical Node

## 3 Flexible Powering Options

Using RG-6 Coax Drop Cable



\*The Maxcom ON50 series Nodes will accept an input DC Voltage range between 12~29 VDC. This allows for maximum flexibility by accounting for the voltage drop associated with long coax cable distances.

Included: The Standard 100~240 VAC to 29 VDC switching power pack is supplied with the MX-ON50 Node.

Optional: The CATV Line Power 45~90 VAC to 29 VDC outdoor power supply may be ordered separately from Maxcom. Part # MX-ON50-RLPS-29 (Pre-Release, patent pending)



MX-ON50 Node Power Draw:  
 .6 amps @ 29 VDC  
 2 amps @ 15 VDC  
 2.5 amps @ 12 VDC

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### MX-ON50 Certifications:

\*Pending

<b>N.American:</b>
UL/CUL/CB/LVD 62368-1:2025 Safety
IEC 60825-1; Class 1 Laser CDRH+FDA
FCC EMC
USA: (FCC CFR47 Part 15)
Canada, ICES-003
<b>European:</b>
EN 60825-1
EN50689
ROHS + REACH (Will be used for N America also)
CE EMC
EN 55032 (specific part of CE EMC)
EN 55035 (specific part of CE EMC)

### Standard PS Certifications:

Maxcom PS cert info by Yingliao	
<b>SAFETY &amp; EMC</b>	
Safety Regulations:	UL62368-1, EN62368-1
Withstand Voltage:	IP-OP/3KVAC, IP-FG/2KVAC, O/P-FG/0.5KVAC
Isolation Resistance:	IP-OP, IP-FG, O/P-FG: 100M Ohms / 500VDC / 25°C/70% RH
EMC Emission:	Compliance to BS EN/EN55032 (CISPR32), BS EN/EN61204-3 Class B, BS, EN/EN61000-3-2,-3, EAC TP TC 020, CNS13438 Class B

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## Ordering information

MX-ON50-1.2G



### Maxcom High Output MDU Mini Optical Node Modeling Matrix

Maxcom ON50 Optical Node Series		DFB Return Laser Type		Optical Power of Return Laser		Transmitter wavelength		Sub Split Modular Diplex		Power Adaptor		Options	
MX-ON50-1.2G-x (substitute x with S, D, or P)		X <sup>①</sup>		X		XXXX <sup>②</sup>		XX <sup>③</sup>		XX		XXX	
MX-ON50-1.2G-S	"S" Single Fiber I/O, (Bi-Directional Forward and Return over Single Fiber, No PON Port)	C	CW (Continuous) "ON"	3	3 dBm	1310	1310nm	45	42/54	01	North America	-	Standard 1540~1565nm
		B	Burst Mode	4	4.5 dBm	1470	1470nm	57	55/70	02	E.U.	E53	Extended input RX wavelength 1525~1565nm
MX-ON50-1.2G-D	"D" Dual Fiber I/O, (One Fiber for Forward, Second Fiber for Return, No PON Port)					1490	1490nm	68	65/85	03	Other		
MX-ON50-1.2G-P	"P" One Fiber I/O, Second Fiber Port for PON (Passes GPON & XGS-PON Wavelengths) *1270nm & 1577nm, and 1310 & 1490nm					1510	1510nm	81	85/102				
						1530	1530nm	22	204/258				
						1550	1550nm						
						1570	1570nm						
						1590	1590nm						
				1610	1610nm								



All versions come standard with SC/APC optical connectors, and include the Power Supply



Note:① CW Laser is always ON, Burst Laser will only trigger ON when return frequency carrier is present

Note:② Not all TX wavelengths are available on the "P" model due to conflict of PON wavelengths ("P" Model comes standard with 1610nm)

Note:③ sub-split diplex filter is field swappable.

- The MX-ON50 Series Optical Nodes are Designed for Maximum Versatility and Performance. They are ideal for fiber-to-the-building and MDU applications. The high RF output, available Return DFB Laser Options, Gain and Slope control, Pluggable Diplex Filter, and Powering offer the Technician the Flexibility Needed for Individual Customer Situations and Installations.
- Maxcom provides professional optical solutions for both long and short haul transport needs for point-to-point or point-to-multi point locations. Our engineers can help you with any project design and equipment needs. We offer an outstanding warranty on all of our products, along with strong technical support staff.
- Please feel free to contact Maxcom with any questions
- 1-877-330-5333 or 209-339-2333
- [www.maxcomcorp.com](http://www.maxcomcorp.com)



\*Maxcom also offers an Outdoor Model [MX-ODN1.2](#)

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