

MX-ON50-1.2G Bi-directional Optical Node

Features

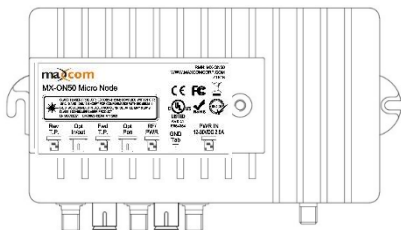
- 1.2 GHz with up to 50 dBmV output
- PON Pass Through Port (Passes G & XGS PON Wavelengths)
- Flexible RF Level and Slope Control Features
- DFB Return Laser
- Multiple Duplex/Frequency splits available (Field Swapable)
- LED indicators
- Excellent Performance Specs
- Compact Design with Flexible Powering

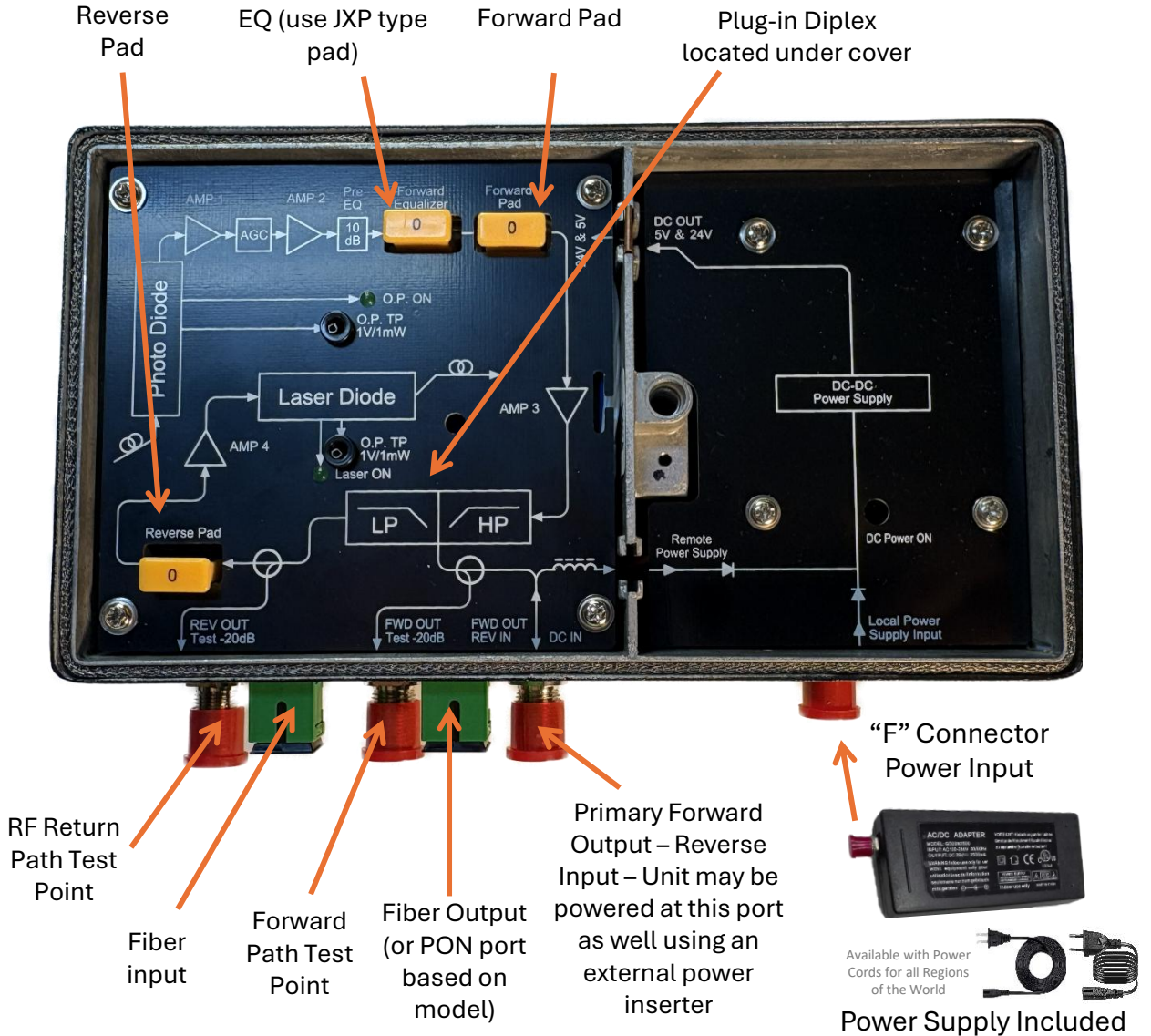


*Maxcom also offers an Outdoor Model [MX-ODN1.2](#)

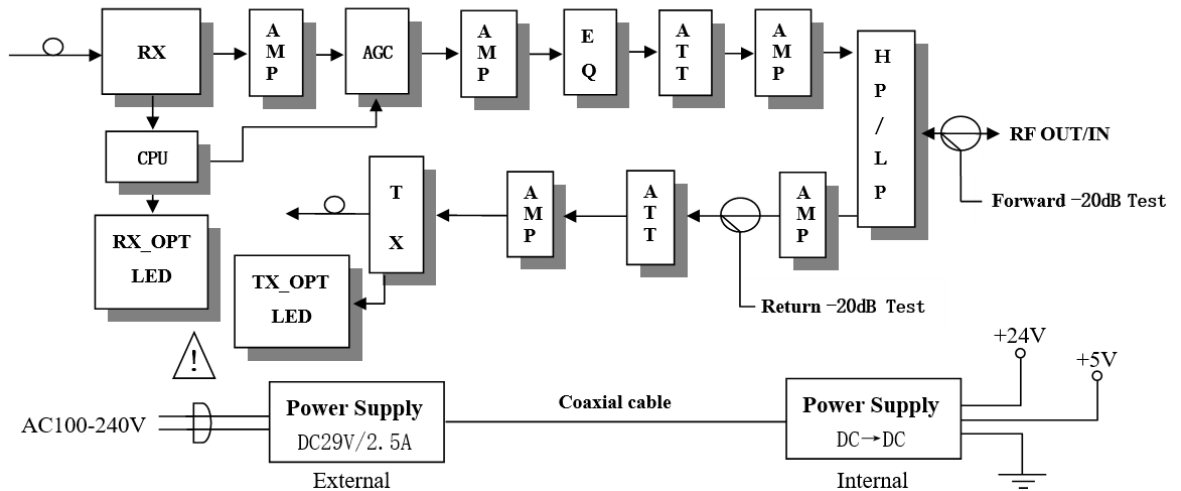
| SYMBOL | PARAMETER | CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------------|--------------------------------|--|-------------------|----------|-----------|-------|
| General Optical and WDM | | | | | | |
| λ | Drop Wavelength Band- Forward | Expanded input 1525~1565nm (Option E53) | 1525 | 1550 | 1565 | nm |
| λ | Add Wavelength Band- Return | 1610 | 1600 | 1610 | 1620 | nm |
| λ | Pass Wavelength 1 - Forward | 1490 | 1475 | | 1500 | nm |
| λ | Pass Wavelength 2 - Forward | 1577 | 1560 | | 1600 | nm |
| λ | Pass Wavelength Band- Return | 1270 & 1310 | 1260 | | 1360 | nm |
| λ | Pass Band Insertion Loss | | | 1 | 1.5 | dB |
| λ | Pass to Add-Drop Crosstalk | Both directions | 35 | | | dB |
| λ | Forward to Return Crosstalk | Both directions | 35 | | | dB |
| Forward Receiver | | | | | | |
| λ | 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 | 54 | 258 | 1218 | MHz |
| FL | Flatness of Frequency Response | 258 to 1218MHz | | ± 1 | ± 1.5 | dB |
| S22 | Output Return Loss | 258 to 550MHz 550 to 1218 MHz | | 16 14 | | dB |
| Lo | Reference Output Level | 1218MHz Adjustable with JXP | | 50 | 52 | dBmV |
| | Slope | Comes default w/ 5dB JXP installed as forward Equalizer *10dB Pre-Slope built-in internally | 10 | 15 | | dB |
| | Optical Input Return Loss | | 45 | | | dB |
| C/N | C/N | 98 PaI-D channel | 50 | | | dB |
| CTB | CTB | Loading(50-550MHz OMI=3.5%, 550MHz- 860MHz low 10dB) | | | -65 | dB |
| CSO | CSO | -1dBm Opt receive | | | -60 | dB |
| f | Equivalent Noise Input | f=270MHz | | | 7 | pA/Hz |
| Return Transmitter | | | | | | |
| λ | 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 | 0 | +10 | +20 | dBmV |
| FL | Flatness of Frequency Response | f=5 to 204MHz | | ± 1 | | dB |
| S11 | Input Return Loss | f=5 to 204MHz | 14 | | | dB |
| | Optical Output Return Loss | | 45 | | | dB |
| General Parameters | | | | | | |
| P.S | Power supply (DC) | DCV Input Range | 12 | | 30 | V |
| I _{tot} | Total Current Consumption (DC) | 0.55amps @ 29 VDC 1.05 amps @ 15 VDC 1.35 amps @ 12 VDC | 0.55a | | 1.35a | Amps |
| T _{mb} | Operating Temperature | Humidity 5% to 95%, none condensing | -40 | | 60 | °C |
| Dim | Dimensions | (L×W×H) | 21.5 x 12.5 x 8.2 | | | 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





Block diagram of MX-ON50 optical node:



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.
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 OP 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, +0.794 VDC = 0.794 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 ± 2 dB on the RF output of the MX-ON50 from 258~1218 MHz. 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 0 to +20 dBmV per channel (digital channel level) for 42/54 MHz units and -3 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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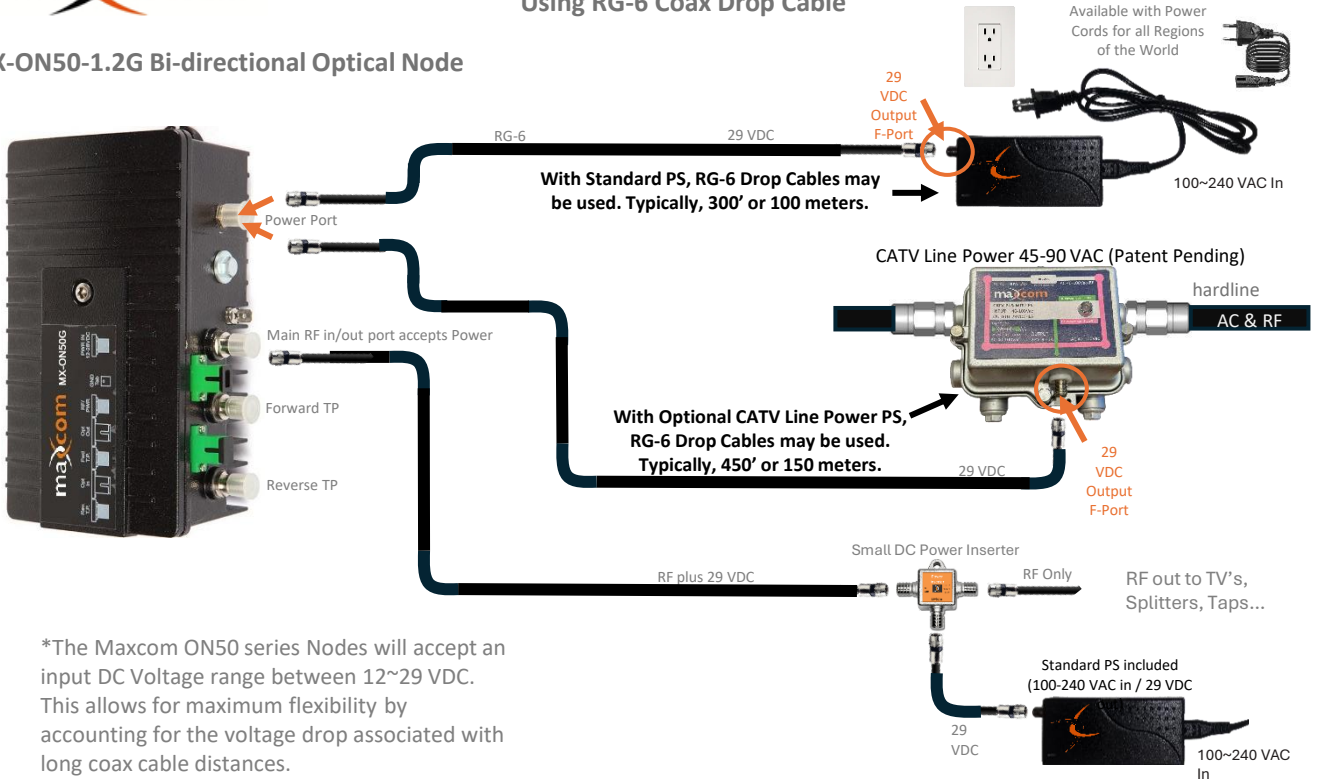
POWERING GUIDE:



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:
 0.55 amps @ 29 VDC
 1.05 amps @ 15 VDC
 1.35 amps @ 12 VDC

MX-ON50 Certifications:



CLASS 1 LASER PRODUCT; IEC 60825-1:2014; COMPLIES WITH 21 CFR 1040.10 AND 1040.11 EXCEPT FOR CONFORMANCE WITH IEC 60825-1 Ed. 3, AS DESCRIBED IN LASER NOTICE No. 56, DATED MAY 8, 2019
 CLASS 1 CONSUMER LASER PRODUCT
 EN 50698:2021 EN 60825-1:2014+A11:2021

RMN: MX-ON50
 WWW.MAXCOMCORP.COM
 Z1818



Standard PS Certifications:

Maxcom PS cert info by Yingjiao

| | |
|-----------------------|--|
| SAFETY & EMC | UL62368-1, EN62368-1 |
| Safety Regulations: | UL62368-1, EN62368-1 |
| Withstand Voltage: | IP-OP: 2KVAC, 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 |

CB FC UL CE RoHS SCHEME

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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 ^① | | X | | XXXX ^② | | XX ^③ | | 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 |
| | | | | 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

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. 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.
- Contact Maxcom with any questions
- 1-877-330-5333 or 209-339-2333



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

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