



MX4RR-LI

Low Power 4 way Return Path Optical Receiver

I Product Introductions:

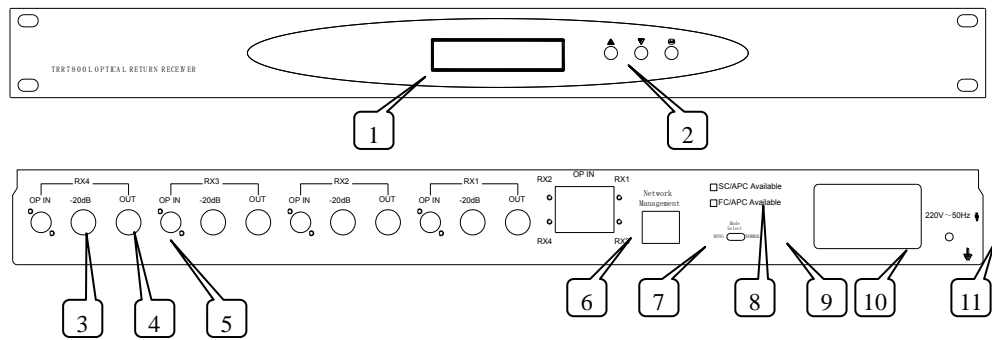
- High quality optical receiver device for photoelectric conversion
- High-performance dynamic noise isolation switch (DNIS optional)
- 5~65 MHz RF bandwidth to meet various CATV system requirements
- High quality low power reverse amplifier module, improves reliability
- Modular design, independent four-channel receiver module, adopts all-metal shielded housing, greatly increasing isolation between ports.
- RFoG or Normal - two operating modes optional
- High quality switching power supply, wide range and high reliability
- Electric circuit safety (over-voltage, lightning protection)
- Simple LCD display control and network management interface

II Performance Introductions:

1、Structure Characteristics

The MX4RR-LI reverse optical receiver is an indoor 1U structure, it has four independent return path optical receivers, 4 optical inputs. 4 independent RF outputs using F-type connectors. The output signal level may be adjusted by pressing the front panel key, the adjustment range is 30dB.

2、 Front and rear panel layout:



NO.	Name	Functions
1	LCD Display	<p>Displays information, parameters and working status:</p> <ul style="list-style-type: none"> ·RFoG ReturnRX (MAXCOM) initial state, indicating the RFoG reverse optical receiver ·MODEL: MX4RR-LI SN: (xxxxxxx) indicating the optical receiver module and cascade ·RX(x) ATT: (x)dB Power In: (low / x dBm) indicates the attenuation and receiving optical power <p>·When display status button has not been pressed for 5 seconds, LCD display back light will dim, unit returns to the initial state.</p>
2	Display Status Button	<p>There are three buttons:</p> <p>“▲”: turns the page in the initial state; increase output power/ decrease the amount of attenuation in the channel status, 1dB step, the minimum amount of attenuation is 0dB.</p> <p>“▼”: turns the page in the initial state; decrease output power/ increase the amount of attenuation, 1dB step, the max amount of attenuation is 30dB.</p> <p>“☺”: the enter key, turns the page</p>
3	FC/ APC Interface	(Optional) Input return optical signal when matching FC/ APC interface, a total of 4.
4	-20dB Detection Port	Indicates the RF signal level of each port, measured values plus 20dB is the true level
5	RF Signal Output Port	Outputs each port RF signal respectively
6	SC/ APC Interface	(Standard) Input return optical signal when matching SC/ APC interface, a total of 4
7	RJ45 Interface	Combined with appropriate hardware and software can be connected to the local computer as a network management interface. (Optional)

8	Check Mark	Indicates the fiber connector type
9	Mode Selection Switch	Indicates the operating mode, there are two selections: ·RFoG Low power receive mode, receiving optical power is -20~-5dBm; ·Normal The normal output receive pattern, the receive optical power is -5~0dBm, with AGC
10	Power Switch and Socket	Power and display for electric circuit, AC 110V, 60Hz exchange input plug
11	Ground Pole	Uses to ground the housing

3、 Principle of MX4RR –LI low power return path optical receiver

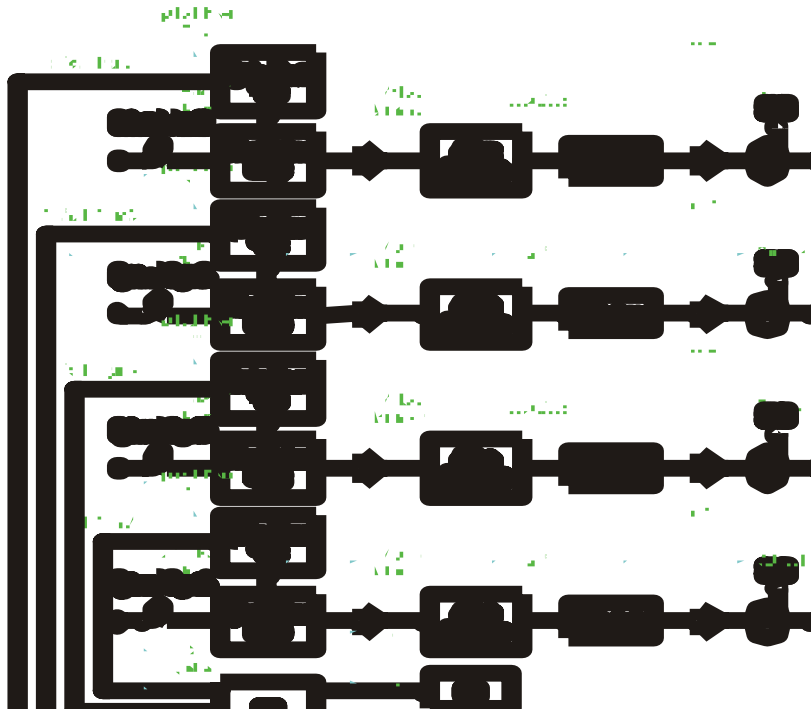


Figure 3

MX4RR –LI low power return optical receiver has is fully functional; it has an excellent RF signal amplifier and flatness correction circuit. Modulation laser signal feeds into optical receiver detectors, converts optical signals to RF signals. In order to avoid excessive or too high RF signal level caused by optical modulation increases, the attenuator is designed after the amplification stage, CPU controls adjust the RF signal level. CPU control displays the circuit and is also responsible for the collection and display of relevant parameters, basis warning, and at the same time, it is also responsible for the display and the external communications capabilities.

III Specifications

NO.	Items	Unit	Performance	Remark
Optical				
1	Wavelength	nm	1260~1590	
2	Input Power Range	dBm	-20~0	Recommended range, receiver will operate to -27dBm
3	Return Loss	dB	>45.0	
4	Power Instruction Precision		5%	
RF				
5	RF Passband	MHz	5~65	
6	Output Level	dBmV	≥20	Input optical power is -20dBm, ATT is 0dB, 4% OMI
7	Flatness	dB	≤±0.75	
8	Output Return Loss	dB	≥16	
9	Output Test Point	dB	-20±0.75	
10	Isolation between Channels	dB	>70	
11	CNR	dBc	≥51	
12	CSO	dBc	≥60	
13	CTB	dBc	≥65	
User Interface				
14	Optical Connector		SC/ APC	Default value, FC/APC optional
15	Optical Fiber Type		Single-mode fiber	
16	RF Test Port Type		Metric F head	
17	RF Output Port Type		Metric F head	
18	Power Interface		AC 110V	
General				
19	Dimension	mm ³	184×43×432	W×H×L
20	Power Supply		AC60Hz 110/220V 30VA	
21	Operating Temperature	°C	0~+50	
22	Storage Temperature	°C	-25~+65	

Note: Although the optical fiber link total carrier-to-noise ratio performance is primarily determined by the laser transmitter's performance, it simultaneously is affected by many factors. For example, the amount of the laser power added to the optical receiver, the quality of the optical receiver noise characteristic, the length of the transmit optical fiber and so on, will cause transmission link total carrier-to-noise ratio performance changes. Lower optical laser power, higher receiver OVN noise, longer transmit optical fiber, are all factors that may increase or decrease the carrier-to-noise ratio.

- 1、 Optical receiver – as the received optical power decreases by each 1dB, CNR will deteriorate by 1dB, and vice versa.
- 2、 Theoretical analysis and experimental studies indicate that the optical receiver received optical power decreases each 1dB, then the optical receiver's detector output RF signal level will decrease 2dB, and vice versa.
- 3、 When the received optical power in the same circumstance, link loss is determined by the fiber composition or the passive loss which will impact the carrier-to-noise ratio of the link.

IV Operating method

1、 Open box inspection

The low power return optical receiver produced by Maxcom undergoes strict production checks, carefully packed before leaving the plant. There is an operating manual and appendix in the packing case. After receiving the equipment, the user should inspect the packing box. If there is damage, you should notify the delivery service to indicate a possible claim. You should then inspect the equipment to determine if it was damaged during the delivery, and contact Maxcom as soon as possible.

2、 Equipment installation

The MX4RR –LI reverse optical receiver is an indoor 1U rack structure with natural ventilation cooling. The working environment temperature is 0°C~50°C, the nominal power is AC 110/220V, 50/60Hz, power fuses is 1A, 20mm long. Receiver's optical input port is SC/ APC connector (FC/ APC optional), high quality APC connector is recommended.

3、 Energized Inspection

Necessary test tools should be used for set-up. Such as a digital multimeter, SC/ APC optical fiber jumper, optical power meter, RF signal level meter, spectrum analyzer, etc.

The optical power transmitted from the reverse laser transmitter, to the reverse optical receiver should be designed and set up to target the optical receiver input power range. Before connecting the optical signals to the optical receiver, you should use an optical power meter to verify the optical level, the level should not exceed 0dBm, between 0dBm~-20dBm is preferable.

4、 Mode Selection Switch

Optical receiver's rear panel is equipped with a mode selector switch. The switch sets the status to determine the receiver's working mode—— RFoG (high sensitivity) mode, or Normal mode.

·RFoG Low power receive pattern, the received optical power range is -20~-5dBm

·Normal Normal power receive pattern, the received optical power range is -5~0dBm, with AGC function.

5、 Button

The front panel has 3 buttons:

“▲”: turns the page in the initial state; increases output power/ decreases the amount of attenuation in the channel status, 1dB step, the minimum amount of attenuation is 0dB.

“▼”: turns the page in the initial state; decreases output power/ increases the amount of attenuation, 1dB step, the max amount of attenuation is 30dB.

“Ⓜ”: the enter key, turns the page

6、 User Note:

The laser receiver is precise opto-electronic equipment, the user should follow the operating standards strictly when using and operating. Improper operation may cause laser receiver damage or personal injury.

Laser is harmful to eyes, to avoid retina damage, never look into the optical output port directly.

The optical connector and fiber jumpers performance has significant impact on the laser transmission link index, MX4RR -LI low power return optical receiver's optical input port adopts high-quality SC/ APC connectors, you must choose the same type high quality active optical fiber connector in order to ensure the system stability and reliability.

7、 Fault Handling

- 1) If the measured value of the optical power, which is transmitted from the transmitter to the receiver, measured by optical power meter is low. If this occurs, you may first inspect the optical transmitter's output power. If the optical transmitter's output power is normal, then a fault may exist in the transmission link. Fiber optics, fusion and related active optical fiber equipment.
- 2) If optical output power is within proper operating window of the transmitter and calculated loss budget, but the receiver output RF signal level is below the normal value. Common issues may prevent the optical link from operating properly, the transmitter output optical connector may be polluted/dirty or poorly spliced, the receiver input connector is polluted and so on. These will cause the optical receiver power to be too low. Check the optical transmission link carefully.
- 3) If the input optical level is good, the transmitter is working properly, but the receiver's output RF signal level is higher than the normal value. Common reasons for such breakdown may be the receiver input optical power is too

high or the transmitter's modulation index has increased. If affected by this situation, you may need to adjust the attenuator on the optical receiver, adjust the receiver output power to appropriate level.

⚠ This equipment should be installed and serviced by personnel familiar with RF and optical equipment, and trained for laser safety!



Provided by: Mega Hertz 800-883-8839 info@go2mhz.com www.go2mhz.com