

QUESTTEL

Broadcast Systems

CATV RF Optical Receiver 1310-1550 nm 45-862/1003 MHz User Manual

L-RF-19R-RX



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- GzegmpvCI E ej ctcevtkule. y j gp vj g kpr wqr vkcnr qy gt teci g ku $-9 \sim +2\text{dBm}$, the output lever remain unchanged, CTB and CSO basically unchanged.
- Reserved the data communication interface, can connect the Ethernet transponder, access to the network management system.

3. Technical Parameters

3.1 Link testing conditions

The performance parameters of this manual according to the measuring method of < Specifications and methods of measurement on optical node used in CATV systems >, and tested in the following conditions.

Test conditions:

1. Forward optical receive part: with **10km** standard optical fiber, passive optical attenuator and standard optical transmitter composed the testing link. Set **59 PAL-D** analog TV channel signal at range of **45/87MHz ~ 550MHz** under the specified link loss. Transmit digital modulation signal at range of **550MHz~862/1003MHz**, the digital modulation signal level (in **8 MHz** bandwidth) is **10dB** lower than analog signal carrier level. When the input optical power of optical receiver is **-2dBm**, the RF output level is **108dBμV**, with **9dB** output tilt, measure the **C/CTB**, **C/CSO** and **C/N**.

2. Backward optical transmit part: Link flatness and **NPR** dynamic range are the link indexes which is composed of backward optical transmitter and backward optical receiver.

Note: When the rated output level is the system full configuration and the receiving optical power is **-2dBm**, equipment meets the maximum output level of link index. When the system configuration reduce (that is, actual transmission channels reduce), the output level of equipment will be increased.

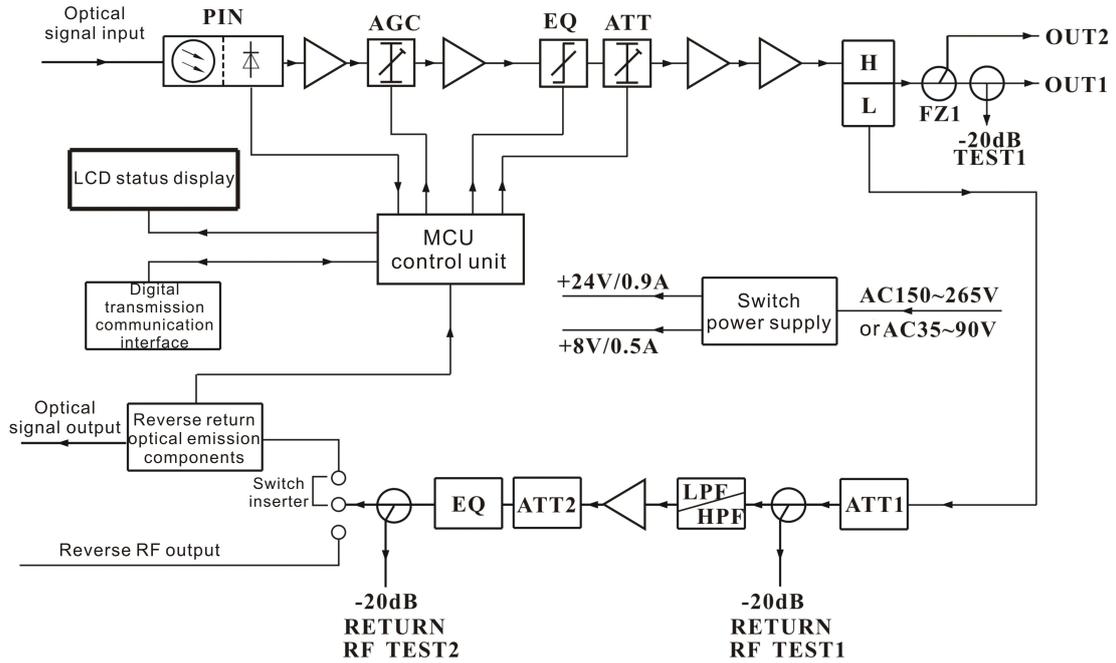
Friendly Notice: Suggest you setting the RF signal to **6~9dB** slope output in the practical engineering application to improve the nonlinear index (under the node) of the cable system.

3.2 Technical Parameters

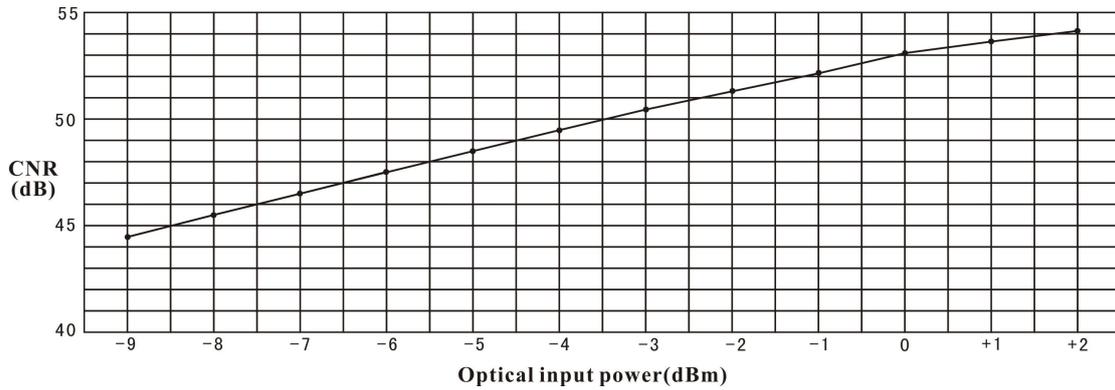
Item	Unit	Technical Parameters
Forward optical receiving part		
Optical Parameters		
Receive Optical Power	dBm	-9 ~ +2
Optical Return Loss	dB	>45
Optical Receiving Wavelength	nm	1100 ~ 1600
Optical Connector Type		FC/APC, SC/APC or specified by the user
Fiber Type		Single Mode
Link Parameters		
C/N	dB	≥ 51 (-2dBm Input)
C/CTB	dB	≥ 65
C/CSO	dB	≥ 60
Output level 108 dBμV Equilibrium 6dB		
RF parameters		
Frequency Range	MHz	45 ~862/1003
Flatness in Band	dB	±0.75
Rated Output Level	dBμV	≥ 108
Max Output Level	dBμV	≥ 114
Output Return Loss	dB	≥14
Output Impedance	Ω	75
Electrical control EQ range	dB	0~10
Electrical control ATT range	dB	0~20
Reverse Optical Transmit Part		
Optical Parameters		
Optical Emission Wavelength	nm	1310±10, 1550±10 or specified by the user
Output Optical Power	mW	0.5, 1, 2
Optical Connector Type		FC/APC, SC/APC or specified by the user
RF Parameters		
Frequency Range	MHz	5 ~ 65 (or specified by the user)
Flatness In Band	dB	±1
Input Level	dBμV	72 ~85
Output Impedance	Ω	75
General Performance		
Power Voltage	V	A: AC(150~265)V; B: AC(35~90)V; C: DC48V
Operating Temperature	°C	-40~60
Storage Temperature	°C	-40~65
Relative Humidity	%	Max 95% no condensation
Consumption	VA	≤ 30
Dimension	mm	483 (L) × 345 (W) × 44 (H)

Note: Forward RF index given above is measured when the final stage using the GaAs 25dB power doubly module. Different modules, different parameters.

4. Block diagram



5. Relation Table of Input Optical Power and CNR



6. Function Display and Operating Instruction

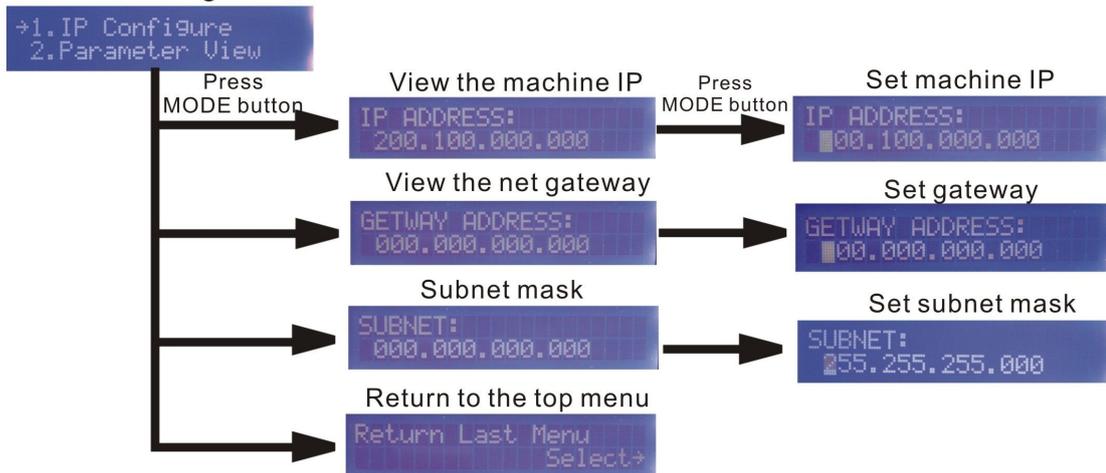
Mode: Mode selection button.

▲ : up button, increase the value of parameters.

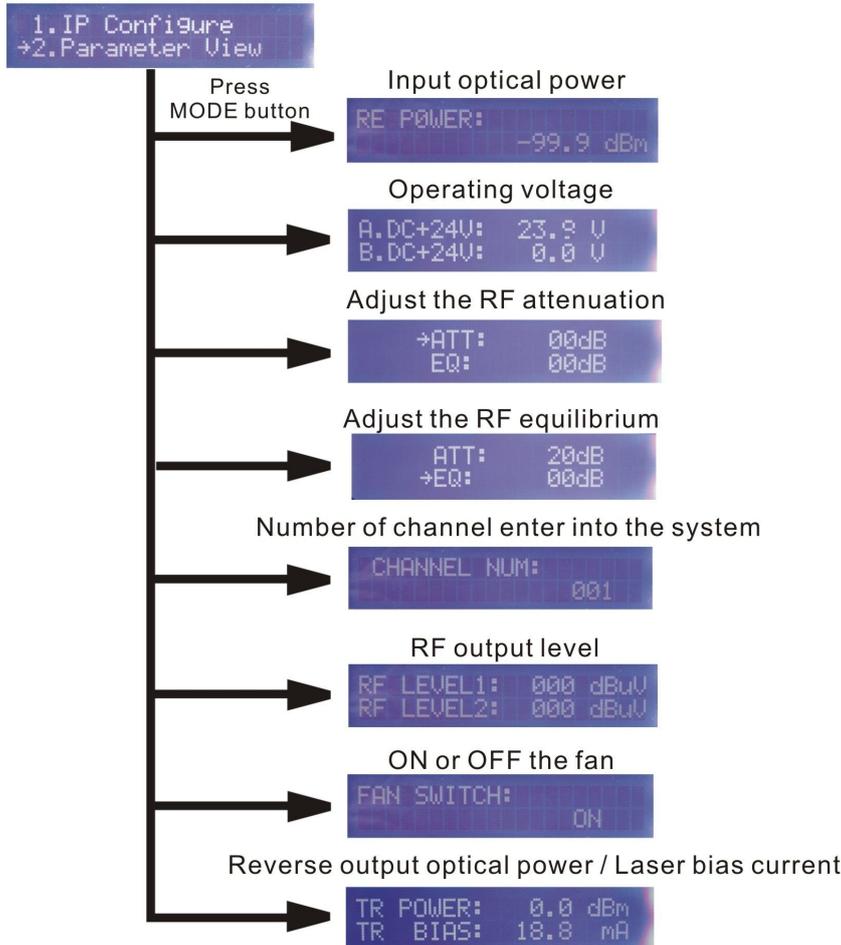
▼ : down button, decrease the value of parameters.

The following is the detailed instructions:

1. IP setting



2. Display and adjust the operating parameters

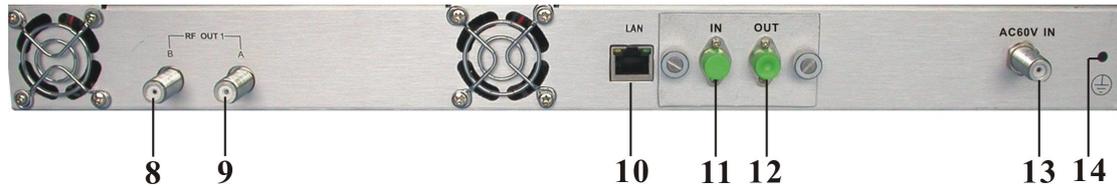


7. Product Schematic Diagram

FRONT



BACK



- | | |
|----------------------------------|---------------------------------------------------|
| 1. Power indicator | 2. Running indicator |
| 3. LCD status display screen | 4. Up button |
| 5. Down button | 6. Mode display and control mode selection button |
| 7. RF test port | 8. RF Output B (branch road) |
| 9. RF Output A (main road) | 10. LAN network management communication port |
| 11. Forward optical signal input | 12. Reverse optical signal output |
| 13. AC 60V power supply input | 14. Grounding terminal |

Note: This equipment can connect the Ethernet transponder, access to the network management system. With the network management transponder or not, it is up to users.

8. Common Failure Analysis and Troubleshooting

Failure phenomenon	Failure cause	Solution
After connecting the network, the image of the optical contact point has obvious netlike curve or large particles highlights but the image background is clean.	<ol style="list-style-type: none"> The input optical power of the optical receiver is too high, make the output level of the optical receiver module too high and RF signal index deteriorate. The RF signal (input the optical transmitter) index is poor. 	<ol style="list-style-type: none"> Check the input optical power and make appropriate adjustments to make it in the specified range; or adjust the attenuation of optical receiver to reduce the output level and improve index. Check the front end machine room optical transmitter RF signal index and make appropriate adjustments.

<p>After connecting the network, the image of the optical contact point has obvious noises.</p>	<ol style="list-style-type: none"> 1. The input optical power of the optical receiver is not high enough, results in the decrease of C/N. 2. The optical fiber active connector or adapter of the optical receiver has been polluted. 3. The RF signal level input the optical transmitter is too low, make modulation degree of the laser is not enough. 4. The C/N index of system link signal is too low. 	<ol style="list-style-type: none"> 1. Check the received optical power of the optical contact point and make appropriate adjustments to make it in the specified range. 2. Recover the received optical power of the optical contact point by cleaning the optical fiber connector or adapter etc methods. Specific operation methods see “Clean and maintenance method of the optical fiber active connector”. 3. Check the RF signal level input the optical transmitter and adjust to the required input range. (When the input channels number less than 15, should higher than nominal value.) 4. Use a spectrum analyzer to check the system link C/N and make appropriate adjustments. Make sure the system link signal C/N > 51dB.
<p>After connecting the network, the images of several optical contact points randomly appear obvious noises or bright traces.</p>	<p>The optical contact point has open circuit signal interference or strong interference signal intrusion.</p>	<ol style="list-style-type: none"> 1. Check if there is strong interference signal source; change the optical contact point location if possible to avoid the influence of strong interference signal source. 2. Check the cable lines of the optical contact point, if there is shielding net or situation that the RF connector shielding effect is not good. 3. Tightly closed the equipment enclosure to ensure the shielding effect; if possible add shielding cover to the optical contact point and reliable grounding.
<p>After connecting the network, the images of several optical contact points appear one or two horizontal bright traces.</p>	<p>Power supply AC ripple interference because of the bad earth of equipment or power supply.</p>	<p>Check grounding situation of the equipment, make sure that every equipment in the line has been reliably grounding and the grounding resistance must be < 4Ω.</p>
<p>After connecting the network, the received optical power of the optical contact point is unstable and has large continuous change. The output RF signal is unstable, too. But the detected output optical power of the optical transmitter is normal.</p>	<p>The optical fiber active connector types do not match, maybe the APC type connect to PC type, make the optical signal cannot normal transmission. The optical fiber active connector or adapter may be polluted seriously or the adapter has been damaged.</p>	<ol style="list-style-type: none"> 1. Check the type of optical fiber active connector and adopt the APC type optical fiber active connector to ensure the normal transmission of optical signal. 2. Clean the polluted optical fiber active connector or adapter. Specific operation methods see “Clean and maintenance method of the optical fiber active connector”. 3. Replace the damaged adapter.

9. Clean and maintenance method of the optical fiber active connector

In many times, we consider the decline of the optical power as the equipment faults, but actually it may be caused by that the optical fiber connector was polluted by dust or dirt. Inspect the fiber connector, component, or bulkhead with a fiberscope. If the connector is dirty, clean it with a cleaning technique following these steps:

1. Turn off the device power supply and carefully pull off the optical fiber connector from the adapter.
2. Wash carefully with good quality lens wiping paper and medical absorbent alcohol cotton. If use the medical absorbent alcohol cotton, still need to wait 1~2 minutes after wash, let the connector surface dry in the air.
3. Cleaned optical connector should be connected to optical power meter to measure output optical power to affirm whether it has been cleaned up.
4. When connect the cleaned optical connector back to adapter, should notice to make force appropriate to avoid china tube in the adapter crack.
5. The optical fiber connector should be cleaned in pairs. If optical power is on the low side after clean, the adapter may be polluted, clean it. (Note: Adapter should be carefully operated, so as to avoid hurting inside fiber.
6. Use compressed air or degrease alcohol cotton to wash the adapter carefully. When use compressed air, the muzzle aims at china tube of the adapter, clean the china tube with compressed air. When use degrease alcohol cotton, insert directions need be consistent, otherwise can't reach a good clean effect.

Read before operating equipment.

1. **Cleaning** - Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
2. **Power Sources** - Use supplied or equivalent UL/CSA approved low voltage DC plug-in transformer.
3. **Outdoor Antenna Grounding** - If you connect an outside antenna or cable system to the product, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Section 810 of the National Electrical Code, ANSI/NFPA No. 70, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna discharge unit, connection to grounding electrodes, and requirements for the grounding electrode.
4. **Lightning** - Avoid installation or reconfiguration of wiring during lightning activity.
5. **Power Lines** - Do not locate an outside antenna system near overhead power lines or other electric light or power circuits or where it can fall into such power lines or circuits. When installing an outside antenna system, refrain from touching such power lines or circuits, as contact with them might be fatal.
6. **Overloading** - Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.
7. **Object and Liquid Entry** - Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short out parts, resulting in a fire or electric shock. Never spill liquid of any kind on the product.
8. **Servicing** - Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
9. **Damage Requiring Service** - Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
 - When the power supply cord or plug is damaged.
 - If liquid spills or objects fall into the product.
 - If the product is exposed to rain or water.
 - If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions. An improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation.
 - If the video product is dropped or the cabinet is damaged.
 - When the video product exhibits a distinct change in performance, this indicates a need for service.