SOFTEL®

SR1002 Mini FTTH

Optical Receiver Manual

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1. Product Summary

SR1002 optical receiver is our latest 1GHz FTTB bidirectional optical receiver. With wide range receiving optical power, high output level, low power consumption. It is the ideal equipment to build the high-performance NGB network.

2. Performance Characteristics

Adopt advanced optical AGC technique, optical AGC control range: +2dBm ～ -9/-8/-7/-6/-5/-4dBm adjustable;
Forward working frequency extended to 1GHz, RF amplifier part adopts the high performance low power consumption GaAs chip, the maximum output level up to 106dBuv;
EQ and ATT both use the professional electric control circuit, make the control more accurate, operation more convenient;
Built-in the standard II class network management responder, support remote network management (optional);
With compact structure, convenient installation, it is the first choice equipment of FTTB CATV network;
Built-in high reliability low power consumption power supply;

3. Technique Parameter

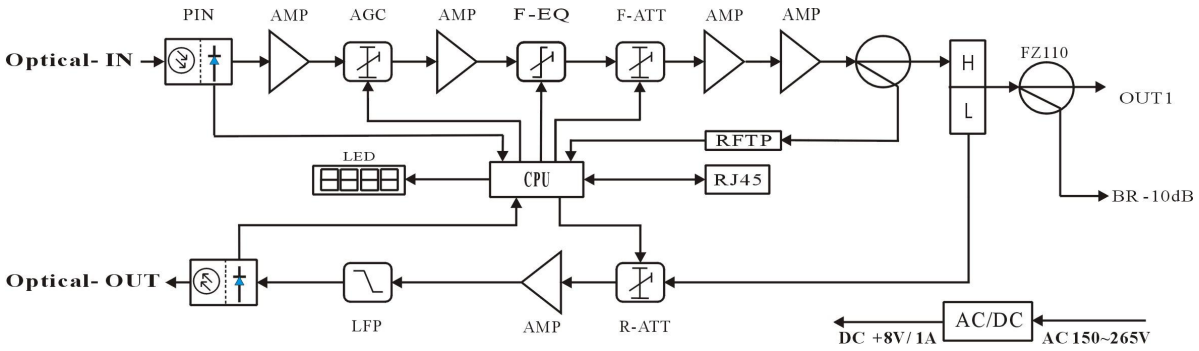
Item	Unit	Technical Parameters	
Optical Parameters			
Receiving Optical Power	dBm	-9 ~ +2	
Optical AGC Range	dBm	+2 ～ -9/-8/-7/-6/-5/-4 (adjustable)	
Optical Return Loss	dB	>45	
Optical Receiving Wavelength	nm	1100 ~ 1600	
Optical Connector Type		SC/APC or specified by the user	
Fiber Type		Single mode	
Link performance			
C/N	dB	≥ 51	Note1
C/CTB	dB	≥ 60	
C/CSO	dB	≥ 60	
RF Parameters			
Frequency Range	MHz	45/87 ~862/1003	
Flatness in Band	dB	±0.75	
		FZ110 output	FP204 output
Rated Output Level	dBμV	≥ 108	≥ 104
Max Output Level	dBμV	≥ 108 (-9 ~ +2dBm Optical power receiving)	≥ 104 (-9 ~ +2dBm Optical power receiving)
		≥ 112 (-7 ~ +2dBm Optical power receiving)	≥ 108 (-7 ~ +2dBm Optical power receiving)
Output Return Loss	dB	≥16	
Output Impedance	Ω	75	
Electrical control EQ range	dB	0～15	
Electrical control ATT range	dBμV	0～15	

Optical Parameters			
Optical Emission Wavelength	nm	1310±10, 1550±10 or specified by the user	
Output Optical Power	mW	1 (or specified by the user)	
Optical Connector Type		SC/APC	
RF Parameters			
Frequency Range	MHz	5 ~ 65 (or specified by the user)	
Flatness In Band	dB	±1	
Input Level	dBμV	75 ~85 (Rated input level 79)	
Output Impedance	Ω	75	
NPR dynamic range	dB	≥15（NPR≥30 dB） Use DFB laser	≥10（NPR≥30 dB） Use FP laser
General Characteristics			
Power Voltage	V	AC（150~265）V or DC 12V	
Operating Temperature	°C	-30~60	
Storage Temperature	°C	-40~65	
Relative Humidity	%	Max 95% No Condensation	
Consumption	VA	≤9	
Dimension	mm	190（L）* 110（W）* 52（H）	

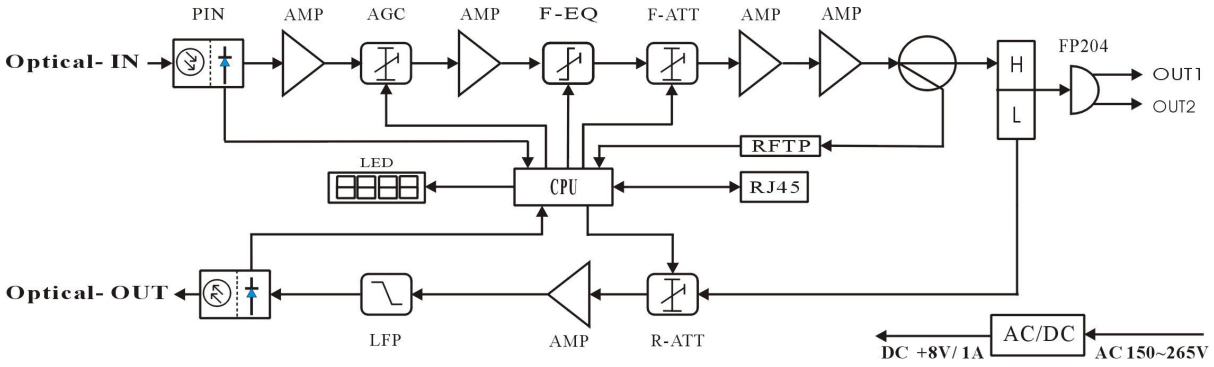
Note 1: Configure 59 PAL-D analog channel signals at the 550MHz frequency range. Transmit digital signal at the frequency range of 550～862/1003MHz. The digital signal level (in 8MHz bandwidth) is 10dB lower than analog signal carrier level. When the input optical power of the optical receiver is -1dBm, the output level: 108dBμV, EQ: 8dB.

4. Block Diagram

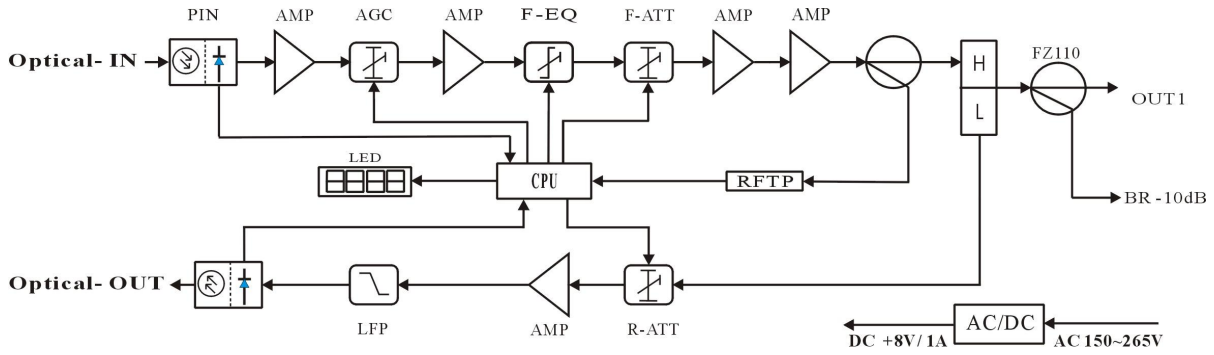
SR1002 with II class network management transponder, FZ110 (tap) output block diagram



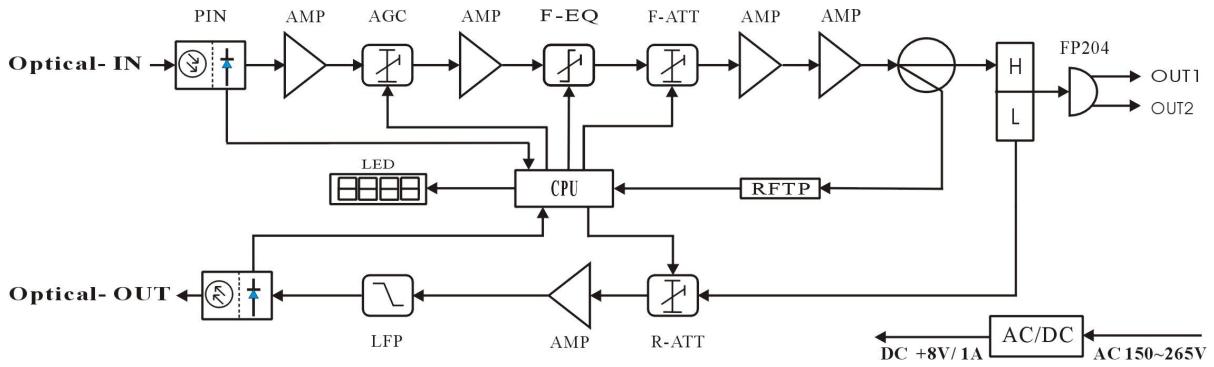
SR1002 with II class network management transponder, FP204 (two-way splitter) output block diagram



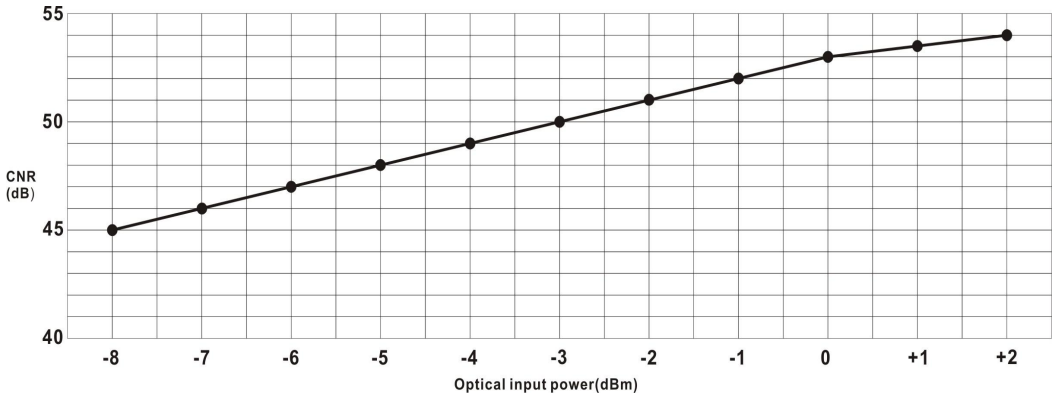
SR1002 without network management transponder, FZ110 (tap) output block diagram



SR1002 without network management transponder, FP204 (two-way splitter) output block diagram



5. Relation Table of Input Optical Power and CNR



6. Function Display and Operating Instruction

Mode: Mode selection button, total eleven modes. Press the mode selection button to enter the corresponding status display, eleven modes to cycle.

The following is the detailed instructions：

Mode 1: 

Input optical power (unit dBm)

Lo: Means that the optical power is low or none

1: Means that the displayed data is the input optical power

Mode E1: 

Forward RF equilibrium, press "▲ "or " ▼" button for a few seconds until the data flicker. Then adjust and press "Mode" to confirm. The maximum adjustment range is 15dB.

E1: EQ mode, means that the controlled and displayed data is the forward RF channel equilibrium.

Mode A1: 

Forward RF attenuation, press "▲ "or " ▼" button for a few seconds until the data flicker. Then adjust and press "Mode" to confirm. The maximum adjustment range is 15dB.

A1: ATT mode, means that the controlled and displayed data is the forward RF channel attenuation.

Mode 2: 

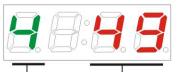
The actual number of channels enters into the current network system. Press " ▲"or " ▼ " button for a few seconds until the data flicker. Then adjust and press "Mode" to confirm. The maximum number is 200.

2: The menu is used to display the actual number of channels enters into the current network system, in order to calculate the RF output level more accurately.

Mode 3: 

RF output level (unit dBuV)

3: Means that the displayed data is the RF output level under the current system.

Mode 4: 

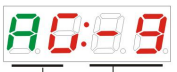
Working temperature (unit℃)

4: Means that the displayed data is the internal actual ambient temperature.

Mode 5: 

The actual value of +8V working voltage

5 : Means that the displayed data is the actual voltage of +8V

Mode AG: 

AGC adjustment range (adjustment range -4～-9dBm)

Press "▲ "or " ▼ " button for a few seconds until the data flicker. Then adjust and press "Mode" to confirm.

AG: Means that the AGC range under the current system is +2～-9dBm

If the displayed data is -4, means that the AGC range is +2～-4dBm

If the displayed data is -5, means that the AGC range is +2～-5dBm

If the displayed data is -6, means that the AGC range is +2～-6dBm

If the displayed data is -7, means that the AGC range is +2～-7dBm

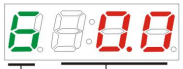
If the displayed data is -8, means that the AGC range is +2～-8dBm

Note: AGC range per reduce 1dBm, the output level is raised by 2 dBuV

ModeA2: 

Backward RF attenuation, press "▲ "or " ▼ " button for a few seconds until the data flicker. Then adjust and press "Mode" to confirm. The maximum adjustment range is 20dB.

A2: ATT mode, means that the controlled and displayed data is the backward RF channel attenuation.

Mode6: 

Backward laser power (unit dBm)

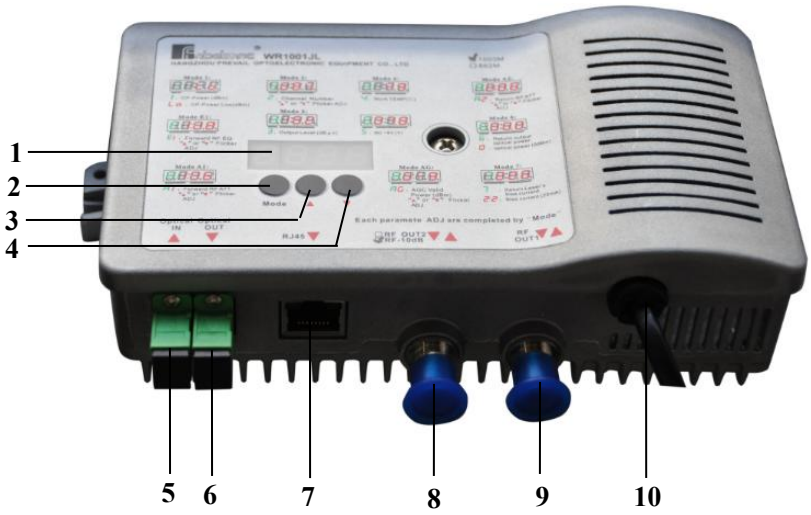
6: Means that the displayed data is the backward laser output power.

Mode7: 

Backward laser current (unit mA)

7: Means that the displayed data is the backward laser operating current.

7. Structure Description



1	LED digital display tube	2	Mode key	3	Up key
4	Down key	5	Optical receiving port	6	Optical output port
7	Network management RJ45 interface	8	Output 2	9	Output 1
10	Power input				

8. NMS setup instructions

If users configured the network management responder, need to do the following settings:

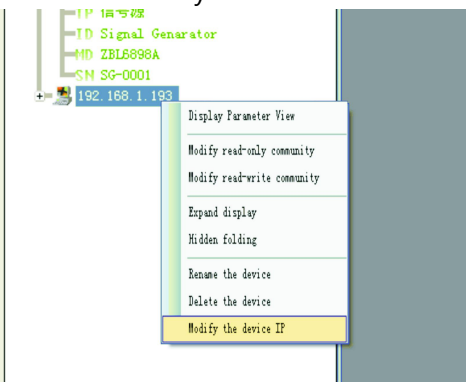
Responder IP setup instruction:

Network management directly modify:

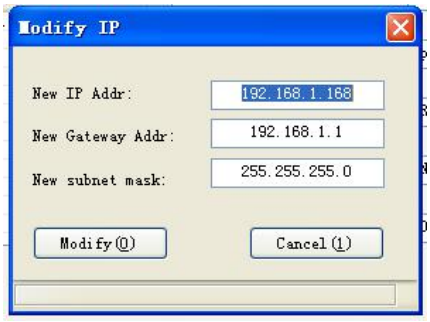
1. Default IP is 192.168.1.168， default gateway is 192.168.1.1， default subnet mask is 255.255.255.0

2. Connect the computer and responder (can be direct connected), and change the computer IP to 192.168.1.XXX (XXX is any number from 0 to 255 except 168); start upper computer network management software, then search the device and log in.

3. Right-click device icon and choose modify the device IP.



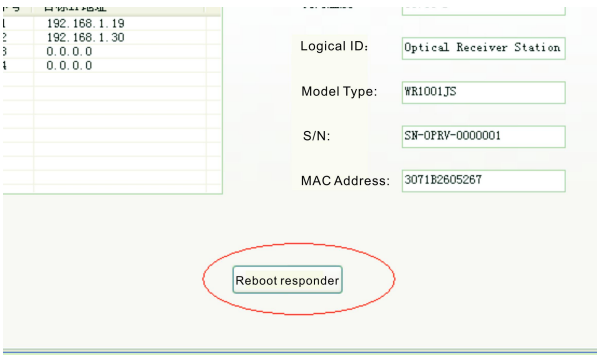
4. Enter new IP address, gateway and subnet mask.



5. Click modify，then exit, it is done. There will show new IP address and gateway on operational logbook.

Log Number	Log Type	Log Contents	Login time
1752	ChangIPAddress	Modify equipment192.168.1.168 IP address: New IP: 192.168.1.167;New gateway:192.168.1.1	2009-9-9 12:39:03

6. Reboot the responder, the new IP take effect (Click the reboot button in the network management software or power on again)



9. 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.	1. 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. 2. The RF signal (input the optical transmitter) index is poor.	1. 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. 2. Check the front end machine room optical transmitter RF signal index and make appropriate adjustments.
After connecting the network, the image of the optical contact point has obvious noises.	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.	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.
After connecting the network, the images of several optical contact points randomly appear obvious noises or bright traces.	The optical contact point has open circuit signal interference or strong interference signal intrusion.	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.
After connecting the network, the images of several optical contact points appear one or two horizontal bright traces.	Power supply AC ripple interference because of the bad earth of equipment or power supply.	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.

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.	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.	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.

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

In many times, we misjudge the decline of the optical power or the reduce of optical receiver output level as the equipment faults, but actually it may be caused by the incorrect connection of the optical fiber connector or the optical fiber connector has been polluted by the dust or dirt.

Now introduce some common clean and maintenance methods of the optical fiber active connector.

1. Carefully pull off the optical fiber active connector from the adapter. The optical fiber active connector should not aim at the human body or the naked eyes to avoid accidental injury.
2. Wash carefully with good quality lens wiping paper or medical degrease alcohol cotton. If use the medical degrease alcohol cotton, still need to wait 1~2 minutes after wash, let the connector surface dry in the air.
3. The cleaned optical fiber active 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 fiber active connector back to adapter, should notice to make the force appropriate to avoid the ceramic tube in the adapter crack.
5. If the output optical power is not normal after cleaning, should pull off the adapter and clean the other connector. If the optical power still low after cleaning, the adapter may be polluted, clean it. (Note: Be carefully when pull off the adapter to avoid hurting inside fiber.)
6. Use the dedicated compressed air or degrease alcohol cotton bar to clean the adapter. When use the compressed air, the muzzle of the compressed air tank should aims at the ceramic tube of the adapter, clean the ceramic tube with compressed air. When use degrease alcohol cotton bar, carefully insert the alcohol cotton bar into the ceramic tube to clean. The insert direction should be consistent, otherwise can not reach ideal cleaning effect.