ASCENT
Communication Technology

AON1200
1.2GHz 2-Port Optical Node

Quick Reference Guide

Revision A

ACT AON1212 2 port Optical Node

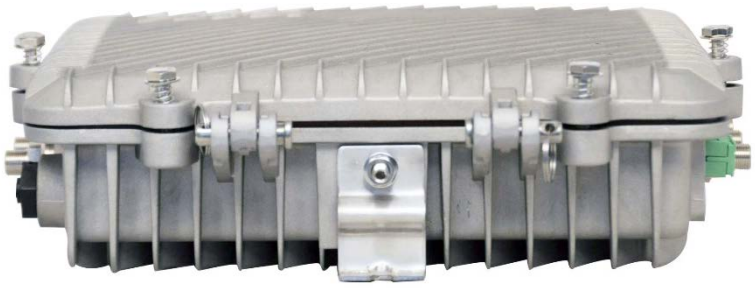
Quick Reference Guide

ACT Document Number: ACT AON1212 Optical Receiver Quick Reference Guide

User Guide Revision A

This document is produced to assist professional and properly trained personnel with installation and maintenance issues for the product. The capabilities, system requirements and/or compatibility with third-party products described herein are subject to change without notice.

For more information, contact ACT: support@ascentcomtec.com



Revision History

Revision	Date	Reason for Change
A	11/10/2016	Initial release

Table of Contents

1 Product Summary 4

2 Performance Characteristics 4

3 Product Specification 4

3.1 Link Testing Conditions 4

3.2 Specification 5

4 Block Diagram 6

5 Relation Table of Input Optical Power and CNR 7

6 Function Display and Operating Instruction 7

7 Structure Diagram 8

8 Set and Use the Network Management Transponder 9

9 Common Failure Analysis and Troubleshooting 10

10 Clean and maintenance method of the optical fiber active connector 11

1 Product Summary

AON1212 is a new 1.2GHz modular two-output CATV network optical node. It adopts modular design, use more flexible. Microprocessor control, digital display the parameters, the engineering debug is especially easy. It is the main equipment to build the CATV network.

2 Performance Characteristics

- High response PIN photoelectric conversion tube.
- Optimized circuit design, SMT process production, optimized signal path, make the photoelectric signal transmission smoother.
- Specialized RF attenuation chip, with good RF attenuation and equilibrium linear, high accuracy.
- GaAs amplifier device, power doubler output, with high gain and low distortion.
- Single Chip Microcomputer (SCM) control equipment working, LCD display the parameters, convenience and intuitive operation, and stable performance.
- Excellent AGC performance, when the input optical power range is - 9 to + 2dBm, the output level keep unchanged, CTB and CSO basically unchanged.
- Reserved data communication interface, can connect with the Ethernet transponder, access to network management system.
- Return emission can select burst mode to sharply decrease the noise convergence and reduce the forepart receiver number.
- ONU module optional.

3 Product Specification

3.1 Link Testing 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 **45/87 MHz to 550 MHz** under the specified link loss. Transmit digital modulated signal at the range of **550 MHz to 862/1003 MHz**, the digital modulated signal level (in **8 MHz** bandwidth) is **10 dB** lower than analog signal carrier level. When the input optical power of optical receiver is **-1 dBm**, the RF output level is **108 dBμV**, with **8 dB** 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 **-1 dBm**, 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.

RF signal is recommended to set with **6 dB to 9 dB** tilt output in the practical engineering application to improve the nonlinear index (behind the node) of the cable system.

3.2 Specification

Item	Technical Parameters	
Optical Parameters		
Receiving Optical Power	-8 dBm to +2 dBm	
Optical Return Loss	>45 dB	
Optical Receiving Wavelength	1100 nm to 1600 nm	
Optical Connector Type	FC/APC, SC/APC or specified by the user	
Fiber Type	Single-mode	
Link Performance		
C/N	≥51 dB (-1 dBm input)	
C/CTB	≥65 dB	Output Level 106 dBμV
C/CSO	≥60 dB	EQ 8 dB 79 ch PAL-D
RF Parameters		
Frequency Range	54/85/105/258 MHz to 1218 MHz	
Flatness in Band	±0.75 dB	
Rated Output Level	≥106 dBμV	
Max Output Level	≥108 dBμV	
Output Return Loss	54/85/105/258 MHz to 550 MHz: ≥16 dB	
	550 MHz to 1218MHz: ≥14 dB	
Output Impedance	75 Ω	
Electronic Control EQ Range	0 dB to 15 dB	
Electronic Control ATT Range	0 dBμV to 20 dBμV	
Return Optical Emission Part		
Optical Parameters		
Optical Transmit Wavelength	1310 nm ± 10 nm, 1550 nm ± 10 nm or specified by the user	
Output Optical Power	0.5 mW, 1 mW, 2 mW	
Optical Connector Type	FC/APC, SC/APC or specified by the user	
RF Parameters		
Frequency Range	5 MHz to 42/65/85/204 MHz	
Flatness in Band	±0.75 dB	
Input Level	72 dBμV to 85 dBμV	
Output Impedance	75 Ω	
NPR Dynamic Range	≥15 dB (NPR≥30 dB)	≥10 dB(NPR≥30 dB)
	Use DFB laser	Use FP laser
General Performance		
Supply Voltage	A: 150 V_{AC} to 265 V_{AC}	
	B: 35 V_{AC} to 90 V_{AC}	
Operating Temperature	-40 °C to +60 °C	
Storage Temperature	-40 °C to 65 °C	
Relative Humidity	0 % to 95% (non-condensing)	

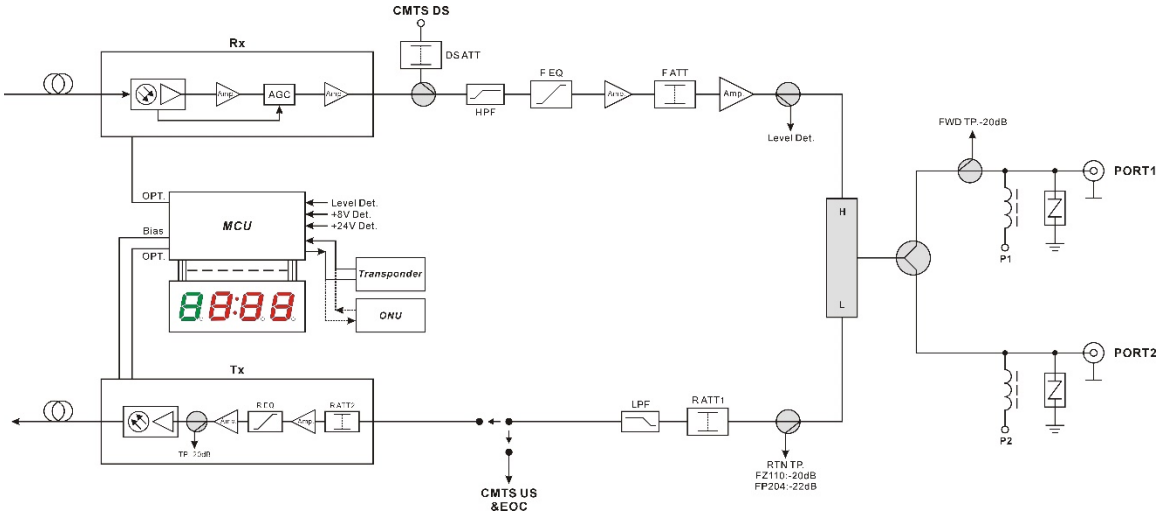
Consumption	≤20 W
Dimensions (L × W × H)	280 mm × 260 mm × 70 mm
Net Weight	2.8 kG

Note: The forward RF parameters are tested under the condition of using GaAs 25dB power doubler module in the last stage. Use other module, the parameters will be slightly different.

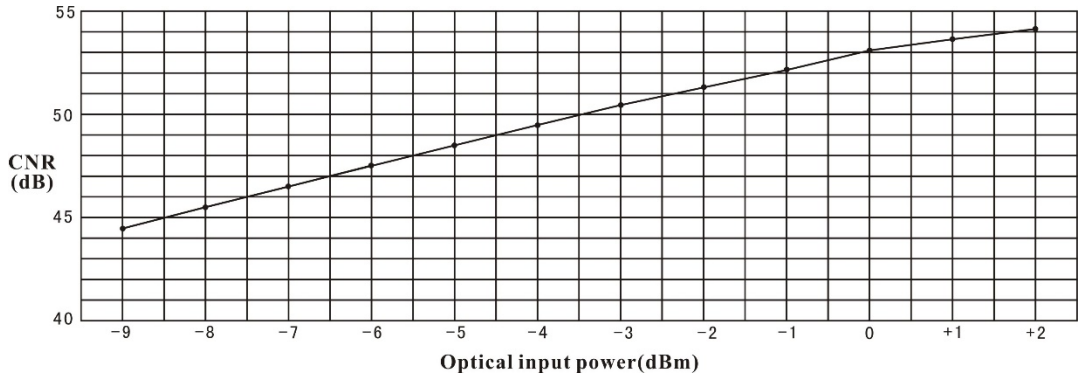
Burst Mode (Select this mode, see below)

Optical Output Power	-30 dBm
(Close the burst mode)	
Laser Turn On Threshold	≥70 dBμV
Laser Turn Off Threshold	≤62 dBμV
Laser Turn On Time (t1)	0.5 μs ≤ t1 ≤ 1 μs
Laser Turn Off Time (t2)	0.5 μs ≤ t2 ≤ 1.5 μs

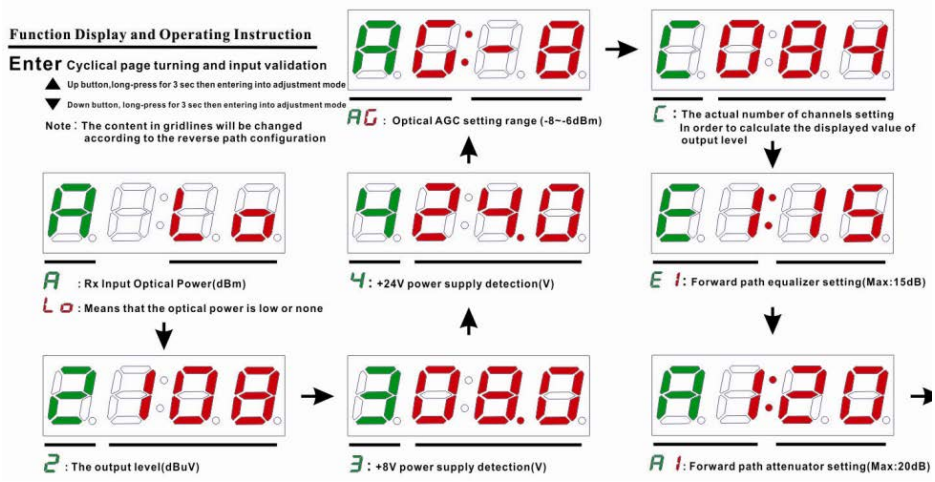
4 Block Diagram

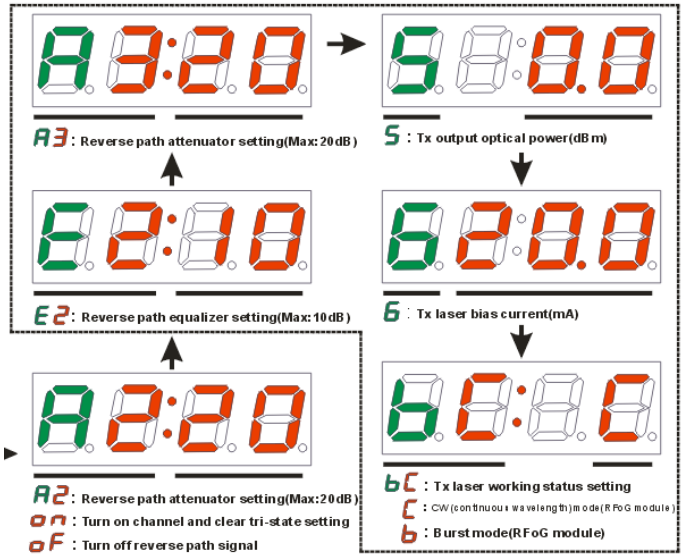


5 Relation Table of Input Optical Power and CNR

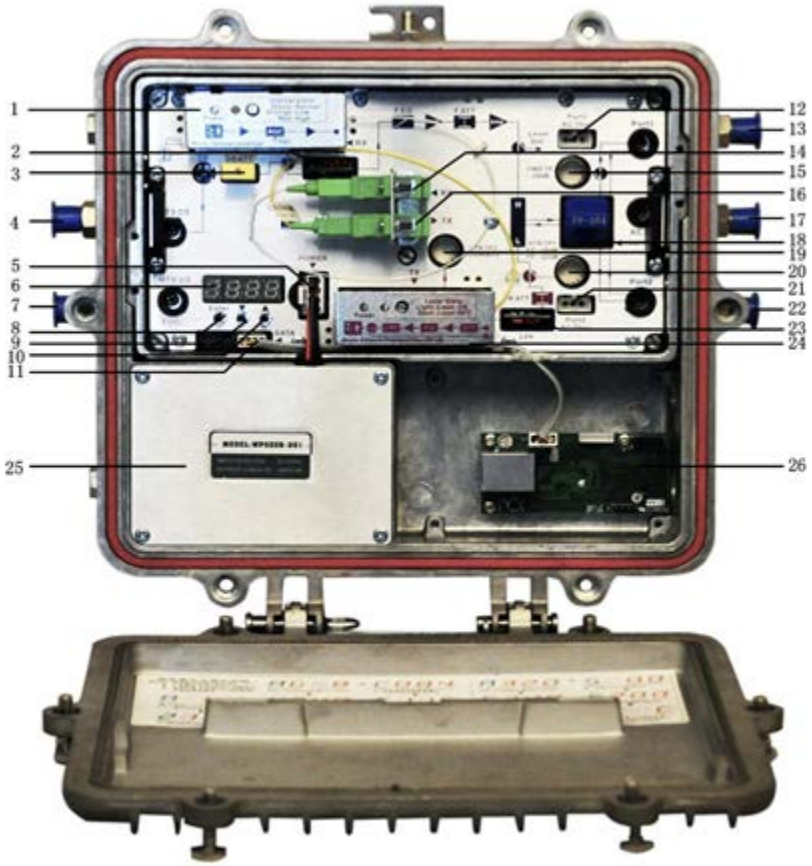


6 Function Display and Operating Instruction





7 Structure Diagram



1. Optical receiving module
2. HPF (high pass filter)
3. DS attenuator
4. CMTS DS port(without installing by default)
5. Mainboard power supply interface
6. Seven-segment digital tube status display
7. CMTS US port/EOC signal interface (without installing by default)
8. Control mode selectable button (Enter)
9. Parameters adjustment button (Down)
10. Parameters adjustment button (Up)
11. Mainboard network management interface
12. Power-pass inserter
13. Output port1
14. Optical input port
15. RF output test port (-20dB)
16. Optical output port
17. AC60V input port
18. Splitter or tap output
19. Laser drive level test port (-20dB)
20. Reverse path RF input test port (-20dB)
21. Power-pass inserter
22. Output port2
23. LPF (low pass filter)
24. Optical transmitter module
25. Switching power supply
26. ONU unit or transponder

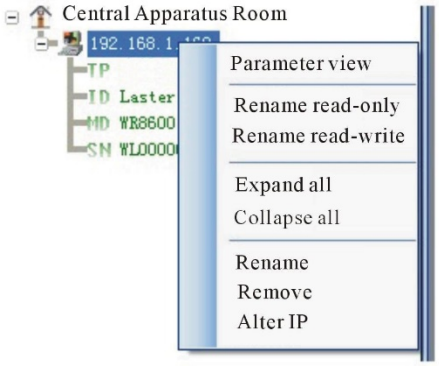
8 Set and Use the Network Management Transponder

Note: This equipment can connect the Ethernet transponder, access to the network management system. The network management transponder is optional, users decide whether use according to actual requirement.

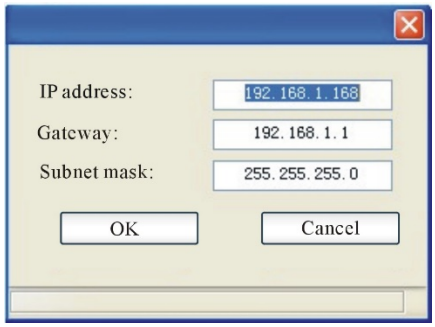
If Network Management Transponder is needed, please set it as follows:

Transponder IP setup

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 transponder (directly), and change IP to 192.168.1.XXX (XXX is any number from 0 to 255 except 168); Start host computer Network Management software, then search the device and log in.
3. Right-click this icon and choose alter IP.



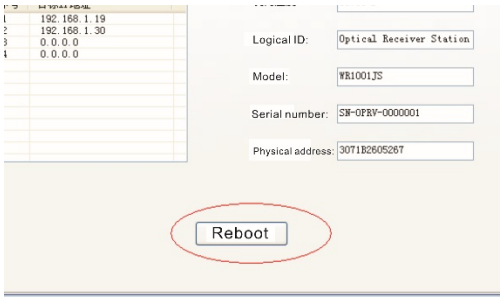
4. Enter new IP address, gateway and Subnet Mask.



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

No.	Type	Content	Date
1752	Change IP Address	Change IP address192.168.1.168 new IP:192.168.1.167 newgateway:192.168.1.1	2009-9-9 02:39:03

6. Reboot the transponder, the new IP become effective (Click 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 optical input 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 optical input 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 optical input power of the optical receiver is not high enough, results in the decrease of C/N. 2. The optical fiber connector or adapter of the optical receiver has been polluted. 3. The RF input signal level of the optical transmitter is too low, make the 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. Improve the optical received 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 connector”. 3. Check the RF input signal level of the optical transmitter and adjust to the required input range. (When the input channels number less than 15, should be higher than the 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 a strong interference signal source; change the optical contact point location if possible to avoid the influence of the 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 changes continuously. The output RF signal is also unstable. But the detected optical output power of the optical transmitter is normal.	The optical fiber connector types do not match, maybe the APC type connect to PC type. The optical fiber connector or adapter may be polluted seriously or the adapter has been damaged.	1. Check the type of optical fiber connector and adopt the APC type optical fiber connector to ensure the normal transmission of optical signal. 2. Clean the polluted optical fiber connector or adapter. Specific operation methods see “Clean and maintenance method of the optical fiber connector”. 3. Replace the damaged adapter.

10 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 to 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.

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