ASCENT
Communication Technology

AON2200C Outdoor Optical Node

Quick Reference Guide

Revision B

ACT AON2200C Outdoor Optical Node

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ACT Document Number: ACT 2200C Optical Node QRG

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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	11/01/2018	Initial release
B	11/4/2018	Updated picture

Table of Contents

1 Product Summary

Ascent's AON2212C outdoor optical node can be configured 2 forward path optical receiver modules, 2 return path optical transmitter modules, 1 Ethernet transponder module and 2 switching power supply modules at most. Adopts advanced optical AGC technology, the output level and output slope both adopt the electric control circuit. Add LED nixie tube display function, the forward path output signal ≥116 dBμV.

2 Performance Characteristics

- Forward path optical receiving part adopts advanced optical AGC technology, the input optical power range extended to -8 to +2dBm.
- Forward path optical receiving part: RF operating bandwidth extended to 1GHz, each way maximum output level up to 116dBμv.
- Full electric adjust attenuation and equilibrium control circuit, and achieve remote operation by NMS.
- RF amplifier part adopts quick plug modular design, can quickly replace RF amplifier module without dismantling the RF cable connector.
- Built-in perfect condition monitoring circuit, and support Ethernet transponder.
- Reserved C-CMTS forward path and return path RF interface, support DOCSIS EOC networking scheme.

3 Technical Specifications

3.1 Link Testing Conditions

The performance parameters of this manual according to the measuring method of GY/T 194-2003 < Specifications and methods of measurement on optical node used in CATV systems >, and tested in the following 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 to 550MHz under the specified link loss. Transmit digital modulation signal at range of 550MHz to 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 -1dBm, the RF output level is 108dBμV, with 8dB output slope, measure the C/CTB, C/CSO and C/N.

2. Return optical transmit part: Link flatness and NPR dynamic range are the link indexes which is composed of return path optical transmitter and optical receiver.

Note

When the rated output level is the system full configuration and the receiving optical power is -1dBm, equipment meets the maximum output level of link index. When the system configuration degrades (that is, the actual transmission channels reduce), the output level of equipment will be increased.

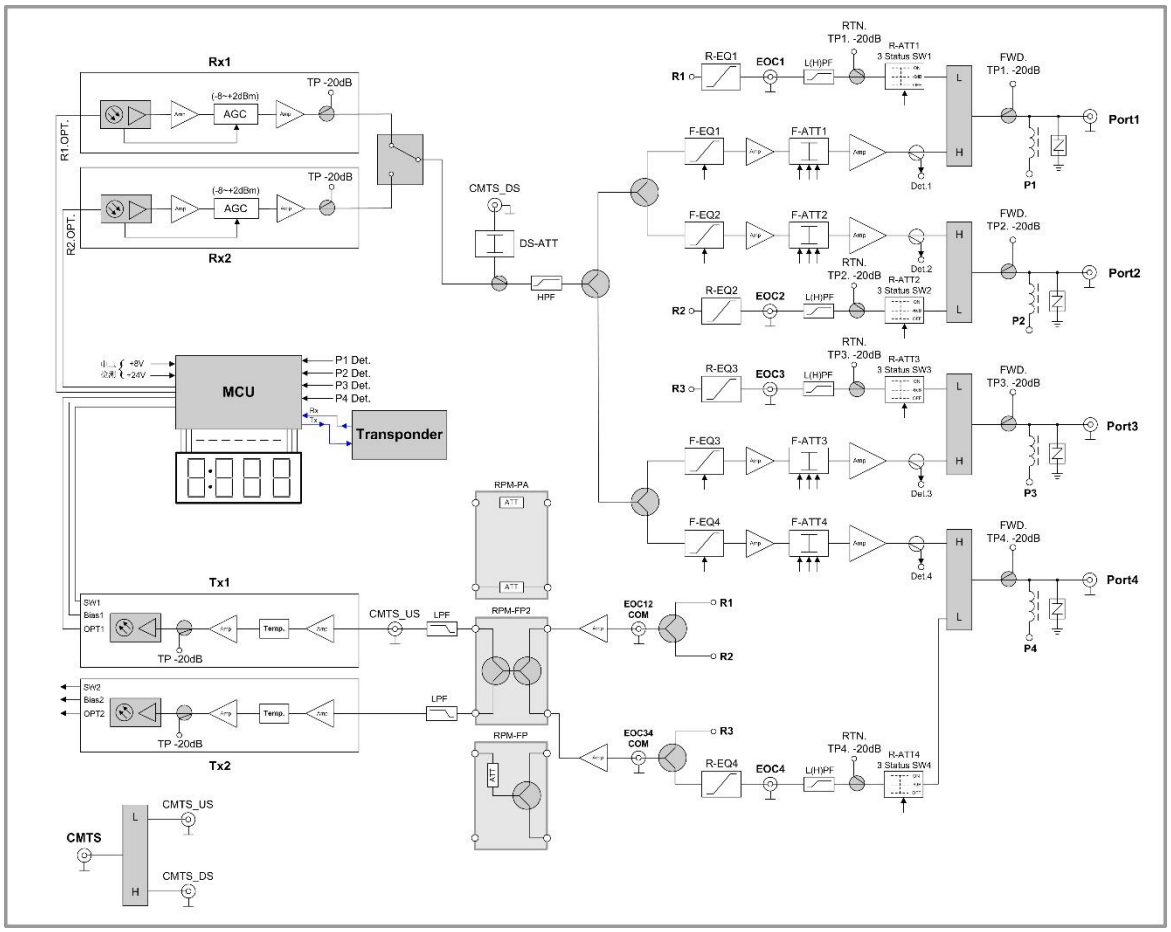
Friendly Notice: Suggest you setting the RF signal to 6 to 9dB slope output in the practical engineering application to improve the nonlinear index of the cable system.

3.2 Performance Parameters

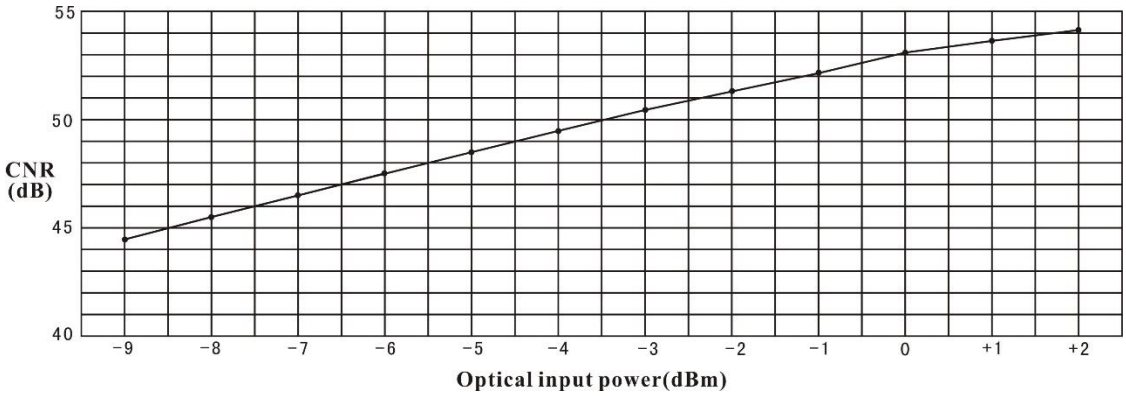
Item	Unit	Description	
Forward Optical Receive Part			
Optical Parameters			
Optical AGC Control Range	dBm	-8 to +2	
Optical Return Loss	dB	>45	
Optical Receiving Wavelength	nm	1100 to 1600	
Optical Connector Type	—	FC/APC, SC/APC or specified by the user	
Optical Fiber Type	—	Single mode	
Link Performance			
C/N	dB	≥ 51	-1dBm optical input, output
C/CTB	dB	≥ 65	level 108 dBμV, EQ 8 dB
C/CSO	dB	≥ 60	
RF Parameters			
Frequency Range	MHz	45/87 MHz to 862/1003 MHz	
Flatness in Band	dB	±0.75	
Rated Output Level	dBμV	≥ 110	
Max Output Level	dBμV	≥ 116	
Output Return Loss	dB	(85 MHz to 550 MHz) ≥16 / (550 MHz to 1000 MHz) ≥14	
Redundant Receiver Isolation	dB	≥75	
Output Impedance	Ω	75	
Electrical Control EQ Range	dB	0 to 15 (1 dB stepping)	
Electrical Control ATT Range	dB	0 to 20 (1 dB stepping)	
Reverse Optical Transmit Part			
Optical Parameters			
Optical Transmit Wavelength	nm	1310±10, 1550±10 or specified by the user	
Laser Type	—	DFB or FP laser	
Output Optical Power	mW	1	
Optical Connector Type	—	FC/APC, SC/APC or specified by the user	
RF Parameters			
Frequency Range	MHz	5 to 65 (or specified by the user)	
Flatness in Band	dB	±0.75	
Input Level	dBμV	72 to 85	
Input Return Loss	dB	≥16	
Independent Transmitter Isolation	dB	≥60	
Input Impedance	Ω	75	
NPR Dynamic Range	dB	≥15 (NPR≥30 dB)	≥10 (NPR≥30 dB)
		Use DFB laser	Use FP laser

RF Parameters of C-CMTS Interface			
CMTS_DS	dBμV	≥102	
Level of Forward Path Insert Port			
CMTS_US	dB	1±1	Port to CMTS_US output
Gain of Return Path Output Port			
Isolation of Forward Path to CMTS_US	dB	≥70	
Return Path Output Port			
General Performance			
Power Voltage	V	A: AC (150 to 265) V	
		B: AC (35 to 90) V	
Feed Current Through	A	10	
Operating Temperature	°C	-40 to +60	
Storage Temperature	°C	-40 to +70	
Relative Humidity	%	0 % to 95 % (non-condensing)	
Consumption	VA	≤ 65	
Dimensions (L×W×H)	mm	360 × 330 × 161	

4 Block Diagram



5 Relation Table of Input Optical Power and CNR



6 Function Display and Operating Instructions

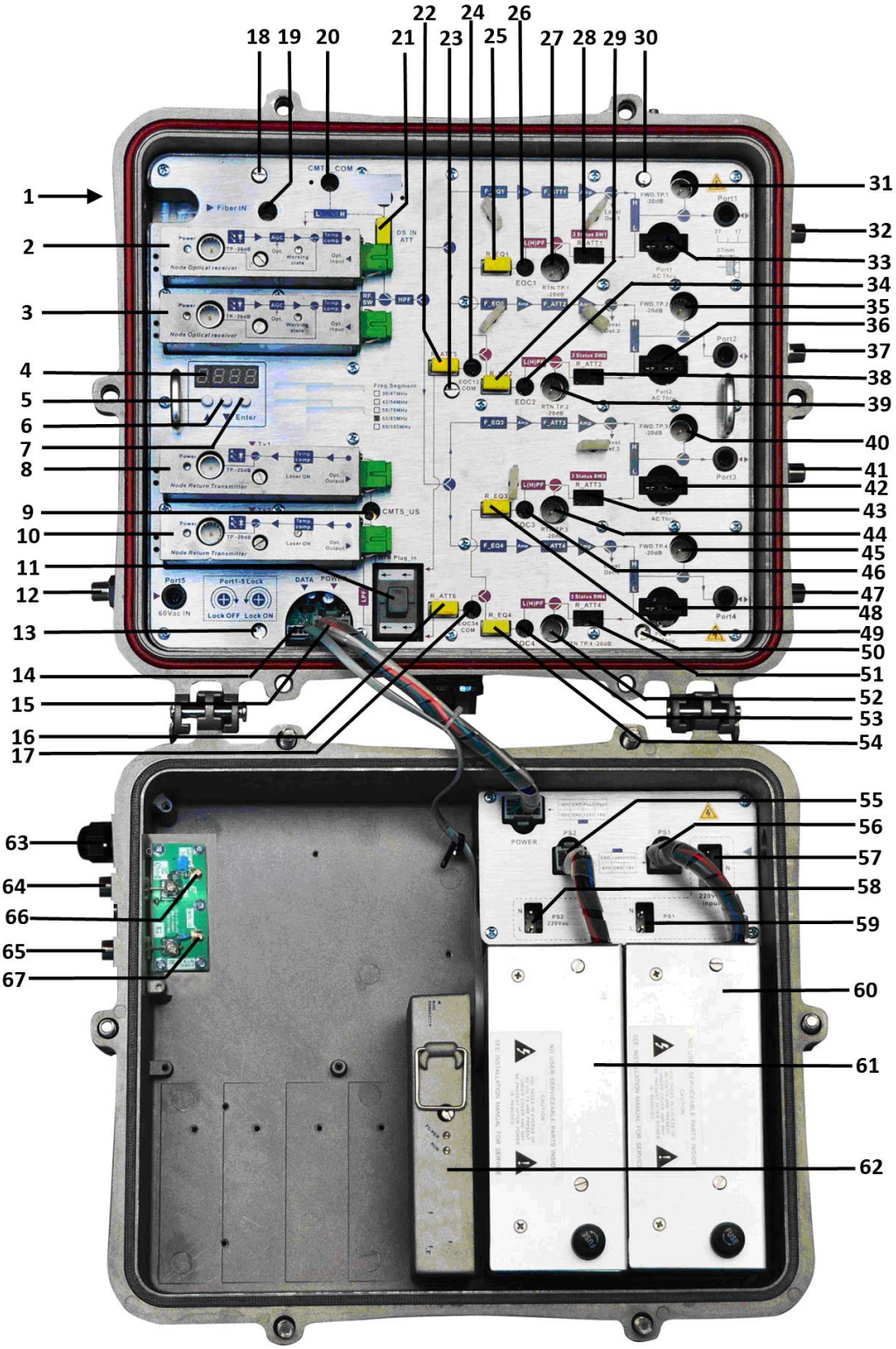
Menu Display and Operating Instruction

▲ Up key, select menu or adjust the variable parameters;

▼ Down key, select menu or adjust the variable parameters;

Enter The OK button, press this button for 3 seconds to enter the adjustment mode, then adjust by the Up and Down keys.

7 Structure Diagram



1. Optical fiber in
2. Forward path optical receiver modules1
3. Forward path optical receiver modules2
4. Nixie tube display screen
5. Up key
6. Down key
7. Enter key
8. Return path optical transmit modules1
9. CMTS return path output
10. Return path optical transmit modules2
11. Return path component
12. AC60V independent feed port
13. Fixed screw
14. NM interface
15. Main board power input
16. Com ATT inserter of return path port3, port4
17. EOC com insertion port of port3, port4
18. Fixed screw
19. CMTS_US interface (used when CMTS forward path and return path mixed input)
20. CMTS forward path and return path mixed input port
21. CMTS_DS input ATT inserter
22. Com ATT inserter of return path port1, port2
23. Fixed screw
24. EOC mixed insertion port of port1, port2
25. Port1 return path input EQ inserter
26. Port1 EOC insertion port
27. Port1 return path input test port (-20dB)
28. Port1 input ATT inserter (-E type)
29. Port2 return path input EQ inserter
30. Fixed screw
31. Port1 forward path output test port (-20dB)
32. PORT1
33. Port1 feed fuse
34. Port2 EOC insertion port
35. Port2 forward path output test port (-20dB)
36. Port2 feed fuse
37. Port2
38. Port2 input ATT inserter (-E type)
39. Port2 return path input test port (-20dB)
40. Port3 forward path output test port (-20dB)
41. Port3
42. Port3 feed fuse
43. Port3 input ATT inserter (-E type)
44. Port3 return path input test port (-20dB)
45. Port4 forward path output test port (-20dB)
46. Port3 EOC insertion port
47. Port4
48. Port4 feed fuse
49. Port3 return path input EQ inserter
50. Fixed screw
51. Port4 input ATT inserter (-E type)
52. Port4 return path input test port (-20dB)
53. Port4 EOC insertion port
54. Port4 return path input EQ inserter
55. Power module 2 socket
56. Power module 1 socket
57. 220Vac input socket
58. Power module 2 220Vac socket
59. Power module 1 220Vac socket
60. Power module 1
61. Power module 2
62. NMS transponder module
63. Network cable in
64. CMTS_DS input or CMTS mixed input
65. CMTS_US input
66. CMTS_DS input or CMTS mixed input
67. CMTS_US input

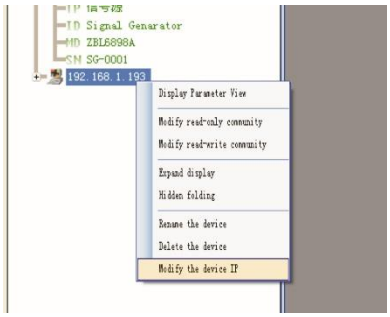
8 NMS Setup Instructions

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

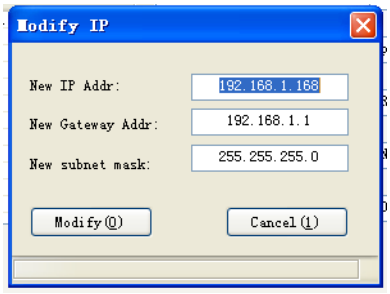
Responder IP setup instruction:

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.



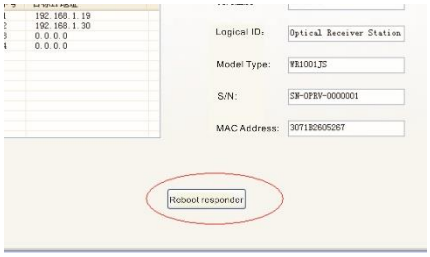
4. Enter new IP address, gateway and subnet mask.



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 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 <4 Ω.

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 Optical Fiber Active Connector Cleaning & Maintenance

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 to 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 cannot reach ideal cleaning effect.

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