



AT5000 AFDR Rack-Mounted Redundant Forward Receiver

Quick Reference Guide

**Revision D** 



## ACT AT5000 1RU Redundant Forward Receiver

## **Quick Reference Guide**

ACT Document Number: AT5000 AFDR QRG Revision D

Quick Reference Guide Revision D

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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: <a href="mailto:support@ascentcomtec.com">support@ascentcomtec.com</a>



#### **Revision History**

Revision	Date	Reason for Change
Α	02/01/2012	Initial release
В	10/29/2019	Major revisions
С	11/3/2019	Added sections
D	12/15/2019	Updated section 10



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## **1** Precautions



Exposure to class 1M laser radiation is possible. Access should be restricted to trained personnel only. Do not view exposed fiber or connector ends when handling optical equipment.

- Ensure adequate cooling and ventilation as specified.
- The installation and operation manual should be read and understood before units are put into use.
- Always replace protective caps on optical connectors when not in use.
- The typical connectors fitted are SC/APC 8°. Note: 8° angle polished connectors must be used.

#### Cleaning

Use only a damp cloth for cleaning the front panel. Use a soft dry cloth to clean the top of the unit.

Do not use spray cleaner of any kind.

#### Overloading

Overloading wall outlets and extension cords can result in a risk of fire or electric shock.

Use approved electrical cords.

#### Damage requiring service

Unplug unit and refer servicing only to Ascent Communication Technology qualified service personnel.

#### Servicing

Do not attempt to service this unit yourself. Refer all servicing only to Ascent Communication Technology qualified service personnel.

# 2 Overview

AT5000 1RU Redundant Dual Forward Receiver offers a flexible, high performance forward receiver platform for CATV forward path transmission in HFC network. Together with ACT 1RU AT5000 XMOD and EDFA optical amplifiers, the 1RU AFDR forward receiver provides an ideal long distance, optical redundant high-quality video transmission solution in traditional HFC network and also high density FTTX networks to bring back the data signal from business and subscriber home premises.

AT5000 1RU Redundant Forward Receiver is designed with two optical receiver modules which shares one same RF amplifier in one pizza box platform, converting downstream optical signals into RF at the sub Headend or remote hubs. AT5000 AFDR provides superior frequency response, low distortion and noise and also high output level. Internal selectable RF attenuators and equalization can be adjusted to achieve flexible output power.

AT5000 AFDR receiver is equipped with intuitive front panel LCD display to make operator's life easier. The optical receiver is packaged in a self-contained 19" sub-rack of 1 RU with universal mains power supply and SNMP management.



## **3** Features

- 19" Rack, professional heat sink
- Dual inputs, auto/manual switching
- Adopts high-performance PIN photoelectric conversion tube
- Adopts professional RF switch module, low loss but high switching rate
- Optical Control AGC assures the stable output level
- SMT Process, perfect process circuit design
- Adopts low noise all-GaAs MMIC as pre-amplifying IC
- Adopts GaAs module for double amplifying output to assure high gain and low distortion
- LED displays the parameter for easy operation
- AGC control, when the input within the range -7 dB to +2 dB, the output keeps the same but get good CTB and CSO
- Hot-plug dual power supply
- Class II web manager

# 4 Application Diagram



# 5 Block Diagram





# **6** Specifications

Items	Parameters
<b>Optical Parameters</b>	
Wavelength	1200 nm to 1620 nm
Input Ports	2 (one main and one backup)
Input Power	-7 dBm to +2 dBm
Optical Return Loss	>45 dB
Fiber Connector	FC/APC, SC/APC
Fiber Type	SM
RF Parameters	
Frequency	47 MHz to 862/1002 MHz
RF Flatness	±0.75 dB
Standard Output Level	≥106 dBµV
Max. Output Level	≥110 dBµV (single)
Single Channel Isolation	≥60 dB
Isolation Between Channels	≥72 dB
Channel Switch Time	8 ns
Output Return Loss	≥16 dB
Impedance	75 Ω
Electronic Equalizer	0 dB to 15 dB
Electronic Attenuator	0 dB to 30 dB
Link Performance	
C/N*	≥51 dB (-2 dBm Input)
C/CTB	≥65 dB
C/CSO	≥60 dB
General Parameter	
Power Supply Voltage	AC: 90 V <sub>AC</sub> to 265 V <sub>AC</sub>
	DC: -72 $V_{DC}$ to -36 $V_{DC}$
Working Temperature	-5 °C to +65 °C
Storage Temperature	-40 °C to +85 °C
Relative Humidity	≤95 %
Power Consumption	≤28 VA (Dual 1+1 PS)
Dimensions (L×W×H)	483 mm × 228 mm × 44 mm
Weight	3.2kg

# AT5000 1RU Redundant Forward Receiver



# 7 Panel Guide



1. Path A optical input 2. Path B optical input 3. Path A power indicator 4. Path B power indicator 5. Path A operation indicator 6. Path B operation indicator 7. LCD display 8. Up key 9. Back key 10. Down key 11. Enter key 12. Console port 13. Ethernet port 14. RF test port 15. RF2 output port 16. RF1 output port

# 8 Installation

## **8.1 Equipment Inventory**

On receiving your new AFDR Forward Optical Receiver, you should carefully unpack and examine the contents for loss or damage that may have occurred during shipping. Refer to warranty registration if loss or damage has occurred. The AFDR pack will consist of the following:

Qty	Description
1	AT5000 AFDR, Redundant Forward Receiver
1	Product user manual (individual test sheet) *
1	Power supply cord
	*Manual could be provided in electronic version and not in print

## 8.2 Packaging and Transportation

Keep all packing boxes and packaging of the AFDR for future transport.

Use only the original packaging of the AFDR when transporting. This packaging has been specifically designed to protect the equipment.

## 8.3 Power and Cooling Requirements

The AFDR requires an input of 90 to 264 Vac at 50/60 Hz. The mains input socket on the unit is IEC configuration. Over-load and over-voltage protection is included in the unit, which may cause it to shut down in extreme circumstances. If this occurs, remove the fault condition and the system will recover automatically.

# AT5000 1RU Redundant Forward Receiver



The unit should be located in an environment not exceeding a temperature range from 0 to 50 °C. The internal temperature should never reach 70 °C. If the temperature exceeds the above limits, the unit should be relocated in the equipment rack where the ambient temperature will be less than 50 °C.

### 8.4 Module Installation and Adjustment

The following steps explain how the AFDR Forward receiver is to be installed. Please read them carefully:

Unpack the forward receiver and inspect the unit as stated in Section 3.1.

Locate the forward receiver in a 19" cabinet, ensuring adequate ventilation and space for accessing the rear ports and front-panel keypad.

Prior to connecting any fiber patch leads to optical transmission equipment, always ensure that the ends of the fiber optic connectors are clean and free of contaminants.



Do not view exposed fiber or connector ends when handling optical equipment. Exposure to invisible laser radiation may cause permanent eye damage.

Always place protective dust caps on all optical ports when not in use.

Connect the optical input signal to the rear input port of the AFDR.

#### Ensure the input optical power is within the range of -7 to +2dBm.

Connect the RF cable & the connector on RX output port at the rear panel. RF connector is F type. (F-Female /F-male Optional). The resistance is 75  $\Omega$ .

Use the supplied power cord to apply mains power to the transmitter.

Switch the AC power ON (switch located on the rear panel).

The receiver should be energised for approximately 1 minute in order to reach operating temperature before system alignment commences.

Under normal operating conditions the factory set adjustments should provide optimum system performance

See Section 5 for instructions on how to view the status information about the AFDR.



# 9 Operation Guide







Solutions Provider for FTTx, RFoG, and HFC

# **AT5000 1RU Redundant Forward Receiver**





5 conditions: LOLO, LO , HI, HIHI, and Normal corresponding with the 5 simulation property conditions in SNMP.



# **10** Software Description – Operation

#### **10.1 Web Management**

The user can use web browser to check the working condition and basic parameters of the amplifier, it supports IE, Chrome, Firefox, Opera and other main web browser. The following example are based on Opera browser.

1. Find the IP add in the machine, normally it is 192.168.1.XXX, set the IP add of the PC in the same range as following:

Step 1: Open local Area Connection setting:

		<b>— —</b> X
🕢 🖓 - 🕎 🕨 Control Panel 🕨	Network and Internet > Network and Sharing Center - 47 Search Control Panel	Q
Control Panel Home	View your basic network information and set up connections	0
Change adapter settings Change advanced sharing settings	ADMIN-PC Unidentified network Unidentified network Internet Chis computer) View your active networks Unidentified network View your active networks Connect or disconnect Connect or disconnect Connect or disconnect Connect or disconnect	
	Change your networking settings   Set up a new connection or network  Set up a vireless, broadband, dial-up, ad hoc, or VPN connection; or set up a router or access point.  Connect to a network  Connect or reconnect to a wireless, wired, dial-up, or VPN network connection.  Choose homegroup and sharing options  Choose formed routers located on other network computers, or change sharing settings.	
See also HomeGroup Internet Options Windows Firewall	Troubleshoot problems Diagnose and repair network problems, or get troubleshooting information.	

#### Step 2: Set Properties

General		
Connection		
IPv4 Connectivity	:	Internet
IPv6 Connectivity	:	No Internet access
Media State:		Enabled
Duration:		00:20:39
Speed:		100.0 Mbps
Details		
Activity		
	Sent —	Received
Bytes:	4,344,304	100,897,055
Properties		Diagnose
		Close



Step 3: Set the PC IP address in the same range with device IP address. For example the device IP address is 192.168.1.122, pls set PC IP address to 192.168.1.X (X different to 122).

Local Area Connection Properties	X
Networking	
Connect using:	
Atheros AR8151 PCI-E Gigabit Ethernet Controller (NDIS 6	
Configure	
This connection uses the following items:	_
Client for Microsoft Networks	
🗹 📮 QoS Packet Scheduler	
🗹 🚚 File and Printer Sharing for Microsoft Networks	
Internet Protocol Version 6 (TCP/IPv6)	
Internet Protocol Version 4 (TCP/IPv4)	
Link-Layer Topology Discovery Mapper 1/0 Driver	
Link-Layer Topology Discovery Responder	
Install Uninstall Properties	
Description	
Transmission Control Protocol/Internet Protocol. The default	
wide area network protocol that provides communication across diverse interconnected networks	
OK Cano	el

You can get IP settings assigned a this capability. Otherwise, you nee for the appropriate IP settings.	automatically if your network supports ed to ask your network administrator
🕘 Obtain an IP address automa	atically
Output the following IP address:	
IP address:	192.168.1.5
Subnet mask:	255.255.255.0
Default gateway:	192.168.1.1
💮 Obtain DNS server address a	automatically
O Use the following DNS server	r addresses:
Preferred DNS server:	192.168.1.1
Alternate DNS server:	
Validate settings upon exit	Advanced



2. Open web browser, input the IP add and login in. The IP factory setting is 192.168.1.122.

User Name: admin

Password: ascent

SEL-MATE		١.														×
新标金贝	×	+										-	•			_
192.168.	.122			▽.	<u>∢</u> ¢	ez		ជ		+	俞	9	Ś		•	=
	_							_	-			_	-	_		57
Authentication	Required				_		_	-	_			_	_		_	~
?	http://192.168 Manager"	.1.122 is	s reque	esting yo	our userr	name a	ind pas	sword	l. The	site s	ays: "	Embe	eddeo	WEE	3	
User Name:	admin															
Password:	•••••															
				0	к	Ca	ancel									

3. The web management consist of five submenus. Items guide on the left, click to enter.

# AT5000 1RU Redundant Forward Receiver



Device Status
Device Settings
Alarm Status
Alarm Properties
Network Settings
Change Password
Reset Settings

## **10.2 Device Status**

evice Status evice Settings	- Device Status					
evice Settings						
	Device Model	AT-51-AFDR-SC-AC2				
larm Status	Serial Number	201117111029				
In the second	Unit Temprature	32	°C			
arm Properties	Input Power	-99.9	dBm			
etwork Settings	Output RF-Level 1	72.1	dBuV			
hange Password	Switch Position	Path A				
eset Settings	Fan Status	OFF				
pdate Firmware	DC Power +5V	4.9	v			
evice Logs	DC Power +8V	81	v			
	DC Power +2/1/ A	24.3	v			
	DC Power +24V_A	24.3	v			
	DC Power +24V_B	24.3	V			
	Agent Version	V1.2.0				
	Device Version	V1.00				
	Index Input Power	Thresho	ld	Description		
	1 -99.9 dBm	-5.0 dB	m	PATH A	]	
	2 -99.9 dBm	-5.0 dB	m	PATH B	]	



## **10.3 Device Settings**

**OMI mode:** switch AGC/MGC statuses.

**OMI Value:** -3 dB to +3 dB adjustable, factory setting is 0 dB.

**SBS:** 13 dB to 19 dB continuously adjust, 0.1 dBm step 0.1 dB.

Device Status	Device Settings	4550		
Device Settings	Wave Length:	1550	nm	
larm Status	Channel Number:	84		
larm Properties	Switch Mode:	Preter A	•	
etwork Settings	Switch Inreshold:	-5.0	asm	
hange Password	Fan Mode:	Auto		
leest Sattinge	Part Triteshold.	50		
east Stanga	RF Wode.	constantLever(AG	-) T	
poate Firmware	RP Output Conig.	100	dBuv	
levice Logs	80.	10	uB	



## 10.4 Alarm Status

	AT5000 AFDR Re WEB Manager	dundant Forward Received	ver the second
Device Status	Alarm Status		
Device Settings	Index	Daramotor Namo	Alarm Status
Sence octaings	1		
Jarm Status	2	Input Power B	1010
larm Properties	3	Path 4	DiscreteMajor
etwork Settings	4	Path B	Nominal
	5	Tamper Status	DiscreteMajor
hange Password	6	Box Temp	Nominal
eset Settings	7	Input Power (mW)	1010
odate Firmware	8	Input Power (dBm)	1010
wine Less	9	Output RE-Level 1	
wice Logs	10	DC +5V	Nominal
	11	DC +8V	Nominal
	12	DC +24V A	Nominal
	13	DC +24V B	Nominal
		Copyrigh	nt © Ascent Communication Technology Limit

## **10.5 Alarm Properties**

Settings	Index	Parameter Name	ніні	н	LO	LOLO	Deadband	Action
Status	1	Input Power A (dBm)	☑ 3.0	2.5	✓ -5.5		0.2	Set
Properties	2	Input Power B (dBm)	☑ 3.0	2.5	₹ -5.5	₹ -6.0	0.2	Set
Settings	3	Box Temp ('C)		☑ 70	✓ 10	✓ 5	2	Set
Password	4	Input Power (mW)	2.0	✓ 1.8	☑ 0.3	. 0.1	0.1	Set
attings	5	Input Power (dBm)	☑ 3.0	2.5	€ -5.5		0.2	Set
irmware	6	Output RF-Level 1 (dBuV)	✓ 113.0	✓ 108.0	፼ 95.0	90.0	1.0	Set
oos	7	DC +5V (V)	€ 6.0	€ 5.5	☑ 4.5	₹ 4.0	0.5	Set
ogo	8	DC +8V (V)	✓ 10.0	9.0	₹ 7.0	€ 6.0	0.5	Set
	9	DC +24V_A (V)	28.0	26.0	22.0	20.0	0.5	Set
	10	DC +24V_B (V)	28.0	≥ 26.0	22.0	₹ 20.0	0.5	Set
	Index	Paran	neter Name			Cont	rol	Action
	1	1	Path A			EnableMajor	•	Set
	2	I	Path B			EnableMajor 🔻		Set
	3	Tam	per Status			EnableMajor	•	Set



## **10.6 Network Settings:**

	AT5000 AFDR Re WEB Manager	edundant Forward Receive	
Davico Status	-Network Settings		
Device Status	Device MAC:	D8: 29: 16: 57: 05: 11	
Device Settings	Update Identifier:	DOR138 SG01	
Alarm Status	Agent Version:	V1.2.0	Refresh
Alarm Properties	Static IP Addroce:	102 169 0 22	Rat
Network Settings	Static IF Address.	192 . 100 . 0 . 22	Set
Change Password	Subnet Mask:	255 . 255 . 0 . 0	Set
Reset Settings	Default Gateway:	192 . 168 . 0 . 1	Set
Ladata Circurae	Trap Address 1:	192 . 168 . 1 . 200	Set
opdate miniware	Trap Address 2:	192 . 168 . 1 . 201	Set
Device Logs	Trap Address 3:	192 168 0 106	Set
	Trap Address 4:	0.0.0.0	Set
	Trap Address 5:	0.0.0.0	Set
	Trap Address 6:	0.0.0.0	Set
	Trap Address 7:	0.0.0.0	Set
	Trap Address 8:	0.0.0	Set
	IPv6 Global Unicast:		
	IPv6 Local Link:	fe80::da29:16ff:fe57:511	
	Trap IPv6 Host1:	::	Set
	Trap IPv6 Host2:	:	Set
	Trap IPv6 Host3:	:	Set
	Trap IPv6 Host4:	:	Set
	Trap IPv6 Host5:	:	Set
	Trap IPv6 Host6:		Set
	Trap IPv6 Host7:	:	Set

## 10.7 Change Password

	AT5000 AFDR Redu WEB Manager	Indant Forward R	eceiver	
Device Status Device Settings Alarm Status Alarm Properties Network: Settings Change Password Reset Settings	- Change Password Username: Password: New Username: New Password: Confirm Password:	Submit Reset		
Update Firmware Device Logs				
		Cc	pyright © Ascent Communic	ation Technology Limited



### **10.8 Reset Settings**

	AT5000 AFDR Redundant Forward Receiver
Device Status	Restore settings and Reboot device
Device Settings	Reboot device
Alarm Status	Reboot device
Alarm Properties	Contra de la contr
Network Settings	Restore factory settings
Change Password	Click the restore button, all parameters will be restored to factory default.
Reset Settings	Beston Exten
Update Firmware	
Device Logs	Restore Net parameters:         PAdress: 192:168.18         Subnet Mask: 255.255.255.0         Gateway Address: 192.168.1         All Trap Address: 192.168.1         All Trap Address: 0.0.0      User parameters:         User name: admin         Password: 123456
	Restore net
	Copyright S Ascent Communication Technology Limited

## **10.9 Update Firmware**





## 10.10 Device Logs

Settings	Posix TimeSync			Clear Loge
itatus				Ciear Loga
	Posix Time	System UpTime	Record Content	
Proportion	1970/1/1 上午8:00:01	00:00:01	DC +24V_B NOMINAL 24.3V	
ropenies	1970/1/1 上午8:00:01	00:00:01	DC +24V_A NOMINAL 24.3V	
ettings	1970/1/1 上午8:00:01	00:00:01	DC +8V NOMINAL 8.1V	
	1970/1/1 上午8:00:01	00:00:01	DC +5V NOMINAL 4.9V	
assword	1970/1/1 上午8:00:01	00:00:01	Input Power (dBm) LOLO -99.9	
	1970/1/1 上午8:00:01	00:00:01	Path A MAJOR	
ings	1970/1/1 上午8:00:01	00:00:01	Input Power B LOLO -99.9dBm	
mware	1970/1/1 上午8:00:01	00:00:01	Input Power A LOLO -99.9dBm	
	1970/1/1 上午8:00:00	00:00:00	DC +24V_B LOLO 0V	
gs -	1970/1/1 上午8:00:00	00:00:00	DC +24V_A LOLO 0V	
	1970/1/1 上午8:00:00	00:00:00	DC +8V LOLO 0V	
	1970/1/1 上午8:00:00	00:00:00	DC +5V LOLO 0V	
	1970/1/1 上午8:00:00	00:00:00	Output RF-Level 1 LOLO 0dBuV	
	1970/1/1 上午8:00:00	00:00:00	Input Power (mW) LOLO 0	
	1970/1/1 上午8:00:00	00:00:00	Tamper Status MAJOR	
	1970/1/1 上午8:00:00	00:00:00	Device started.	
	1970/1/1 上午8:05:57	00:05:57	Tamper Status MAJOR	
	1970/1/1 上午8:05:37	00:05:37	Tamper Status NOMINAL	
	1970/1/1 上午8:04:59	00:04:59	Tamper Status MAJOR	
	1970/1/1 上午8:04:43	00:04:43	Tamper Status NOMINAL	
	1970/1/1 上午8:00:00	00:00:00	Output RF-Level 1 LOLO 71.3dBuV	
	1970/1/1 上午8:00:00	00:00:00	Input Power (dBm) LOLO -99.9	
	1970/1/1 上午8:00:00	00:00:00	Input Power (mW) LOLO 0	
	1970/1/1 上午8:00:00	00:00:00	Tamper Status MAJOR	
	1970/1/1 上午8:00:00	00:00:00	Path A MAJOR	
	1970/1/1 上午8:00:00	00:00:00	Input Power B LOLO -99.9dBm	
	1970/1/1 上午8:00:00	00:00:00	Input Power A LOLO -99.9dBm	
	1970/1/1 上午8:00:00	00:00:00	Device started.	

# 11 Notes

- 4. Make sure the machine is well grounded before connect the power supply.
- 5. Use 100% alcohol to wash the fiber connector before connect the fiber.
- 6. The voltage of the power supply must be stable and has anti-thunder function.
- 7. Don't open the case when the machine is working.

## 12 Troubleshooting

- 8. If no RF output, first check the power supply, fiber input, and the parameter in LED display.
- 9. If the above information is normal, do not open the case and contact Ascent.
- 10. The factory provides one-year limited warranty.



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