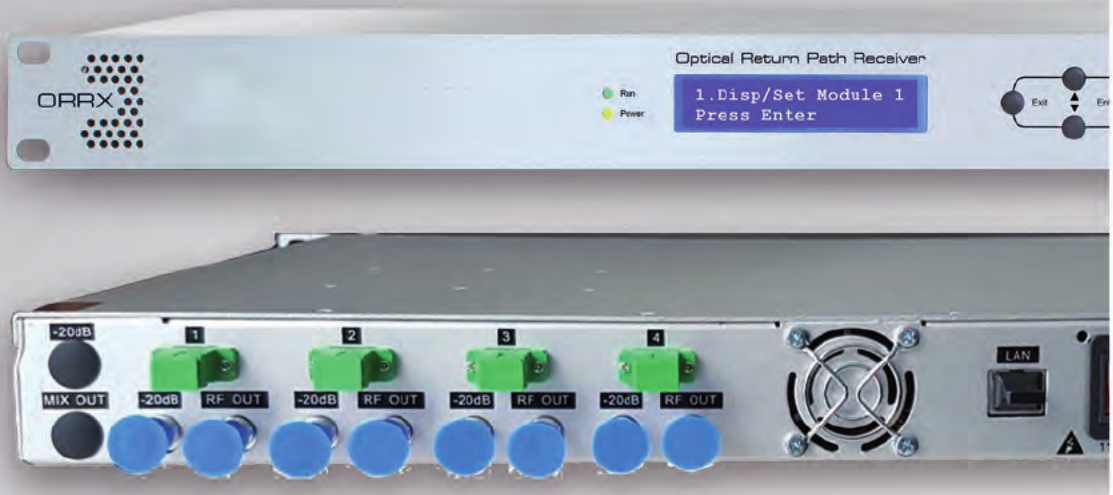
GOING FUTURE TODAY.

ORRX

Optical return path receiver

DRAFT VERSION



Operating Manual

Version 02-2021A

Contents

Before starting operation of the device

HINWEIS: Read this operating manual attentively! It contains important information about installation, ambient conditions and maintenance of the device. Keep this operating manual for future use and for handover in the event of a change of owner. A PDF version of this manual is available to download on the ASTRO website (there may be a more recent version).
The ASTRO company confirms that the information in this manual was correct at the time of printing, but it reserves the right to make changes, without prior notice, to the specifications, the operation of the device and the operating manual.

Symbols and conventions used

Symbols used in these instructions

Pictograms are visual symbols with specific meanings. You will encounter the following pictograms in this installation and operating manual:

Warning about situations in which electrical voltage and non-observance of the instructions in this manual pose a risk of fatal injuries.

Warning about various dangers to health, the environment and material.

Warning about thermal dangers (risk of burns).

Warning about high laser radiation emitted from a device, connector or adapter (risk of eye damage).

Recycling symbol: indicates components or packaging materials which can be recycled (cardboard, inserts, plastic film and bags). Used batteries must be disposed of at approved recycling points. Batteries must be completely discharged before being disposed of.

This symbol indicates components which must not be disposed of with household rubbish.

Proper use

The ORRX module can only be used for transmitting analogue modulated TV and Data services via optical fibre networks.
Modification of the devices or use for any other purpose is not permitted, and will immediately void any guarantee provided by the manufacturer.

Target group of this manual

Installation and starting operation

The target group for installation and starting operation of the ASTRO optical transmission technology are qualified experts who have training enabling them to perform the work required in accordance with EN 60728-11 and EN 62368-1. Unqualified person are not allowed to install and start operation of the device.

Device configuration

Target group for the configuration of the ASTRO transmitters are persons who have received instructions and have training enabling them to perform a configuration. Knowledge of EN 60728-11 and EN 62368-1 is not necessary for configuration.

Device description

The delivery consists of the following parts:

- ☐ ORRX return path receiver
- ☐ Operating manual

Front:
[1] indication LEDs (power, run)
[2] LCD display for information and control
[3] push buttons

Back:
[4] RF test port for ports 1-4 (-20dB)
[5] optical input ports 1 - 4
[6] fan
[7] LAN interface
[8] dual power supplies (no hot plug)
[9] grounding connection

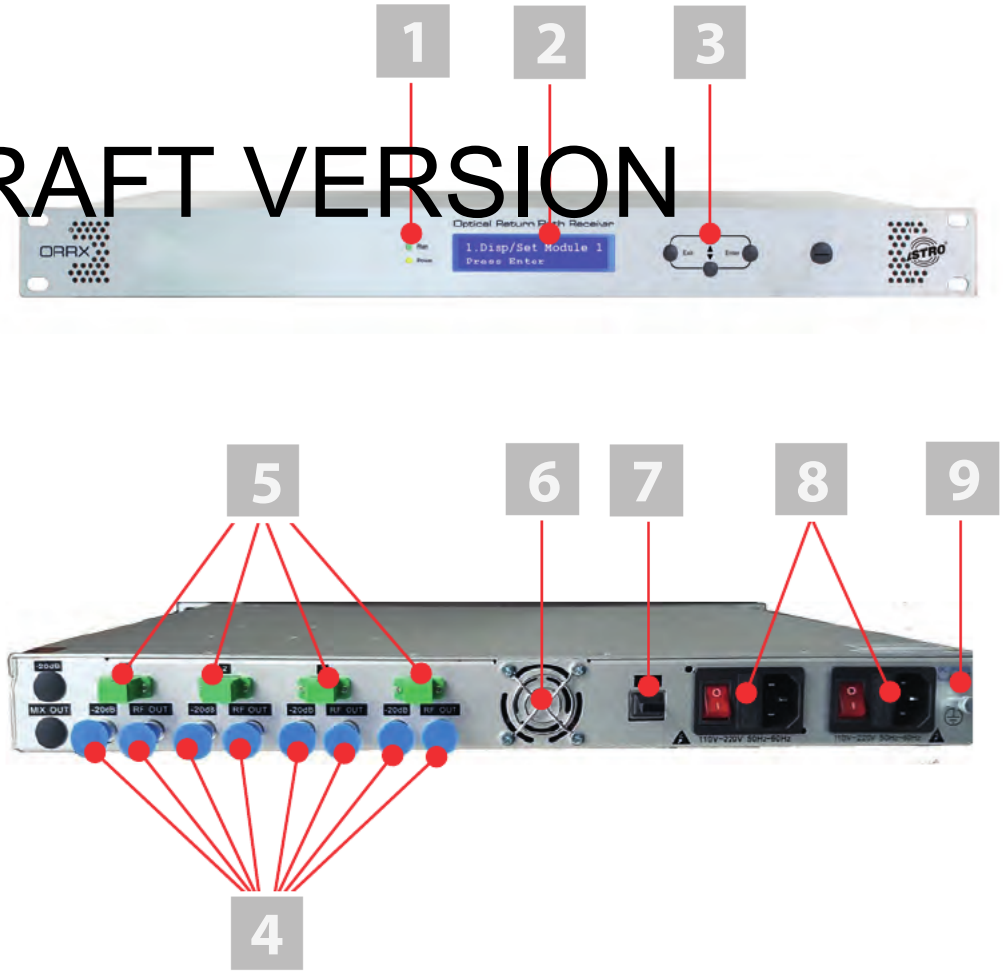


Figure 1: ORRX front and rear side

LED indicators

- Power LED:
  yellow: only one working power supply
  green: both power supplies working in good condition
- Run:
  green: all conditions are OK
  yellow, red or off: check detail alarm

The device can be equipped with either AC power supplies or DC power supplies (see figure below).

[1] power cord connection (150/250 VAC)
[2] fuse holder with one spare fuse inside (fuse type: T2.0 A/250 V)
[3] manual power switch

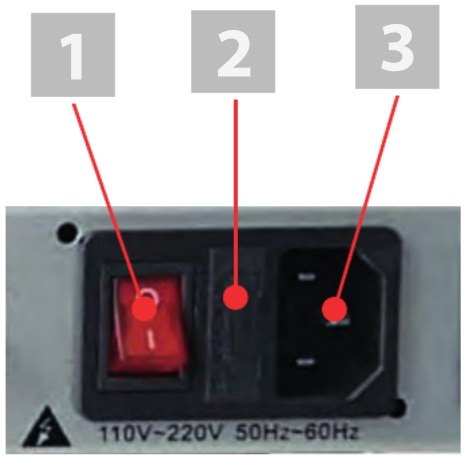


Figure 2: AC power supply (rear side)

[1] 0 VDC connection
[2] -48 VDC connection

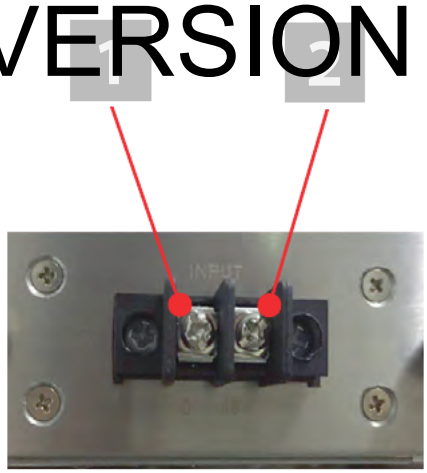


Figure 3: DC power supply (rear side)

CE

The ORRX module features a CE marking. This confirms that the product conforms to the relevant EC directives and adheres to the requirements specified therein.

Important safety information

To avoid any hazardous situations to the extent possible, you must adhere to the following safety information:

ACHTUNG: Failure to observe this safety information may result in personal injury due to electrical and thermal dangers!

Proper use

- ☐ Only use the device at the approved operating sites and in the ambient conditions allowed (as described in the following), and only for the purpose described in the section “Proper use”.

Before starting operation of the device

HINWEIS: Read this operating manual attentively! It contains important information about installation, ambient conditions and maintenance of the device. Keep this operating manual for future use and for handover in the event of a change of owner or operator. A PDF version of this manual is available to download on the ASTRO website (there may be a more recent version).

- ☐ Check the packaging and the device for transport damage immediately. Do not start operation of a device that has been damaged.
- ☐ Transporting the device by the power cable may damage the mains cable or the strain relief, and is therefore not permitted.

Danger of optical radiation

This product is laser class 1M (according IEC 60825-1 Safety of Laser Products) and therefore several safety precautions must be applied.

- ☐ Exposure to class 1M laser radiation is possible on open connectors or connected fibre patch cords. Do not view exposed fibre or connector ends when handling or maintaining optical equipment. Do not view with optical instruments into open connectors or fibre ends on switched on devices. Make sure all wherever a fibre inspection is required, that the inspected fibre or connector is completely optical radiation free.

- ☐ Due to the high optical radiation and improper handling of optical fibre connections and devices, there could be risks for the operating and service personnel. Access should be restricted to trained personnel only.
- ☐ Never look directly or with optical inspection tools into the end of a fibre which is connected to a transmitter or optical amplifier and which is in operation. If the eyes are exposed to optical radiation, which are above the acceptable maximum, this could cause permanent damage to the eye.

Installation, operation, maintenance

- ☐ The device may only be installed and operated by qualified persons (in accordance with EN 60065) or by persons who have been instructed by qualified persons. Maintenance work may only be carried out by qualified service personnel.
- ☐ The installation site must be planned in a way that prevents children from playing with the device and its connections.
- ☐ Dangerous voltages and the threat of optical laser radiation are present within the powered on unit at all times.
- ☐ Always replace protective caps on optical connectors and patch cords when not in use to avoid dust intake. Before connecting clean connectors with lint free cloth and pure alcohol or with any professional tools for cleaning connectors and adapters. The typical connectors fitted are SC/APC 8° or LC/APC 8° (green couplers).
- ☐ The electrical connection conditions must correspond to the specifications on the device type plate.
- ☐ The ambient temperatures specified in the technical data must be complied with, even when climatic conditions change (e.g. due to sunlight). If the device overheats, the insulation used to isolate the mains voltage may be damaged.
- ☐ The device and its cable may only be operated away from radiant heat and other sources of heat.
- ☐ To avoid trapped heat, ensure there is good ventilation on all sides. Installing the device in recesses or covering the installation location, e.g. with curtains, is not permitted. Ventilation openings may not be covered.
- ☐ If the device is installed in a cabinet, ensure adequate air convection is possible to avoid exceeding the maximum ambient temperature permitted for the device.

- [ ] No objects may be placed on the device.
- [ ] The subscriber network must be earthed in accordance with EN 60728-11, and must remain earthed even when the device is removed. Furthermore, the earth connection on the device can be used. Devices within hand's reach must be integrated into the potential equalisation together. Operating the device without an earth conductor, without earthing the device or without using device potential equalisation is not permitted.
- [ ] The device does not feature protection against water and may therefore only be operated and connected in dry rooms. It must not be exposed to spraying or dripping water, to condensation, or to similar sources of moisture.
- [ ] The electrical system supplying current to the device, e.g. a house installation, must incorporate safety devices against excessive current, earth leakages and short-circuiting in accordance with EN 60950-1.
- [ ] To operate the device (protection class I), it must be connected to mains power sockets with a protective earth conductor.
- [ ] All adhere to all applicable national safety regulations and standards.
- [ ] The mains plug is used as a mains voltage disconnect unit in the event of servicing and danger, and must therefore be accessible and be able to be operated at any time. The device is operational when connected to the mains power.

- [ ] Excess mechanical loads (e.g. falling, impacts, vibrations) may damage insulation used to provide protection from mains voltage.
- [ ] High excess currents (lightning strike, surges in the power utility grid) may damage insulation used to provide protection from mains voltage.
- [ ] Do not insert any objects through the ventilation slots.
- [ ] If there is no information about intended use (e.g. operating site, ambient conditions), or the operating manual does not include the corresponding information, then you must consult the manufacturer of this device to ensure that the device may be installed. If you do not receive any information on this from the manufacturer, do not start operating the device.

Maintenance

- [ ] The operating display only shows whether the DC current, which supplies the device components, has been disconnected. However, operating displays (on the power supply unit or the device) that are not lit up in no way indicate that the device is completely disconnected from the mains.
- [ ] Read carefully: EN 60728 - Part 1 Safety requirements: No service work during thunderstorms.

Repair

- [ ] Repairs may only be performed by the manufacturer. Improperly performed repairs may result in considerable dangers for the user.
- [ ] If malfunctions occur, the device must be disconnected from the mains and authorised experts must be consulted. The device may need to be sent to the manufacturer.

Description of performance

The optical Return Path Receiver ORRX is used to receive optical return path signals in the range of 1100 nm to 1610 nm and convert them to RF levels. The return path signals are launched from a fibre node, which are originated from the connected cable modems. Each of the four independent return path receivers can receive an optical modulated RF return path frequency in the range up to 200 Mhz.

The independent receivers can be set in its standard mode (normally used for HFC return path transmission) to Automatic Gain Control Mode (AGC) or to Manual Gain Control Mode (MGC). This is used for point to point connection between return path receivers and upstream lasers of the fibre node.

A second type of reception method can be assigned to each of the four receivers individually, to be able to receive RF-Over Glass (RFoG) bursty upstream signals. In this mode, the fibre nodes return path transmitter is not always on. It just switches on in case there is a cable modem transmitting a signal. After this signal was sent, the transmitter shuts down the laser completely. Therefore, the return path signals to the upstream receivers ports can pass via a return pass splitter connected to several fibre nodes upstream transmitters, since they transmit its signals in a TDM system. To avoid OBI (optical beat interference) it is recommended to use an OBI free CMTS for such signal transmission. Another method is using different wavelength for the nodes upstream lasers to avoid an overlapping of the optical signal.

Warranty conditions

The general terms and conditions of ASTRO Bit GmbH apply. You will find these in the current catalogue or on the Internet under “www.astro-kom.de”.

Disposal

All of our packaging material (cardboard boxes, inserts, plastic film and bags) is completely recyclable. Electronic devices must not be disposed of with household waste, but rather – according to DIRECTIVE 2012/19/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL from 4 July 2012, on waste electrical and electronic equipment – must be properly disposed of. When it is no longer of use, please bring the device for disposal to one of the public collection points for this purpose.

ASTRO Bit is a member of the Elektro system solution for the disposal of packaging materials. Our contract number is 80395.

Installing the device

To install or commission the device, please follow the steps in the sequence as mentioned below.

Mounting the device in the rack / grounding to protective earth

Mount the device in the 19” rack. Make sure that supporting bars or any shelf supports the device. Do not mount solely on the front panel.

After physical installation in the rack, connect the protective earth cable (PE) to one of the device grounding points, with an appropriate eyelet connection. 2 grounding screws on the rear side of the device are marked with the grounding symbol.

Connecting power cables

For mains power supply connect the power cable to the device and power on with the rear power-on switch. Internal fuse on the rear power connection panel is T2,0 A / 250 V. If one fuse is burned, the lid can be opened and one spare fuse must be inserted in the fuse chamber. For -48 VDC power supply, make sure about the correct polarity as indicated on the power supply. External breaker to each power supply must be 2,0 A.

Connecting the optical input / output

Before connection of the optical input, be aware that connection of high optical powers ≥ 16 dBm can damage the physical surface of a patch cord or connection. Therefore, make sure about the optical levels before connecting optical input and output ports. Even if the optical switch is not powered on, the optical signal will pass through the switch’s current switching position.

Configure the return receivers and the ethernet (if required)

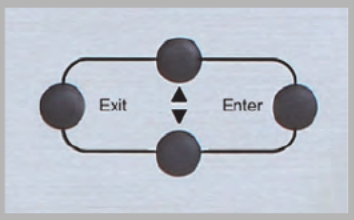
Sweep return channel with appropriate measurement tools and check the optical input level of the connected receiver on the LCD display

To ensure that the device is running properly, first measure if optical input level (for standard mode) on the optical input is present.
To setup the correct attenuation for the RF output level, it is recommended to use a frequency source at the fibre node to sweep the upstream path and setup the corresponding receiver attenuation to meet the requirements for the RF output level at the headend.

In case of device problem

In case of any problems not caused by settings or network parameters please contact
or resend the device with the established valid RMA Procedure (RMA
code/ Error description).

LC display and settings



Using the push buttons

When pressing the “Enter” button for a short time, this will light up the display and show the different menus which are selectable with the up and down keys and confirmed by pressing “Enter” again. To exit a menu, press the “ Exit” button.
To modify any value, press the up button to increase a value respectivley the down button to decrease a value. Confirm your selection by pressing the „Enter“ button. In case the field shall not be modified, exit by clicking the “ Exit” button.
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LCD panel menus

The following flow chart shows the different screens that can be seen when stepping through the different menus:

- Main display: shows the device type
- Display/Set Return RX 1:configuration of return path receiver RX 1
- Display/Set Return RX 2:configuration of return path receiver RX 2
- Display/Set Return RX 3:configuration of return path receiver RX 3
- Display/Set Return RX 4:configuration of return path receiver RX 4
- Display/Set Ethernet: display or change IP address and SDNMP trap receivers
- Display System Parameter: displays internal box temerature

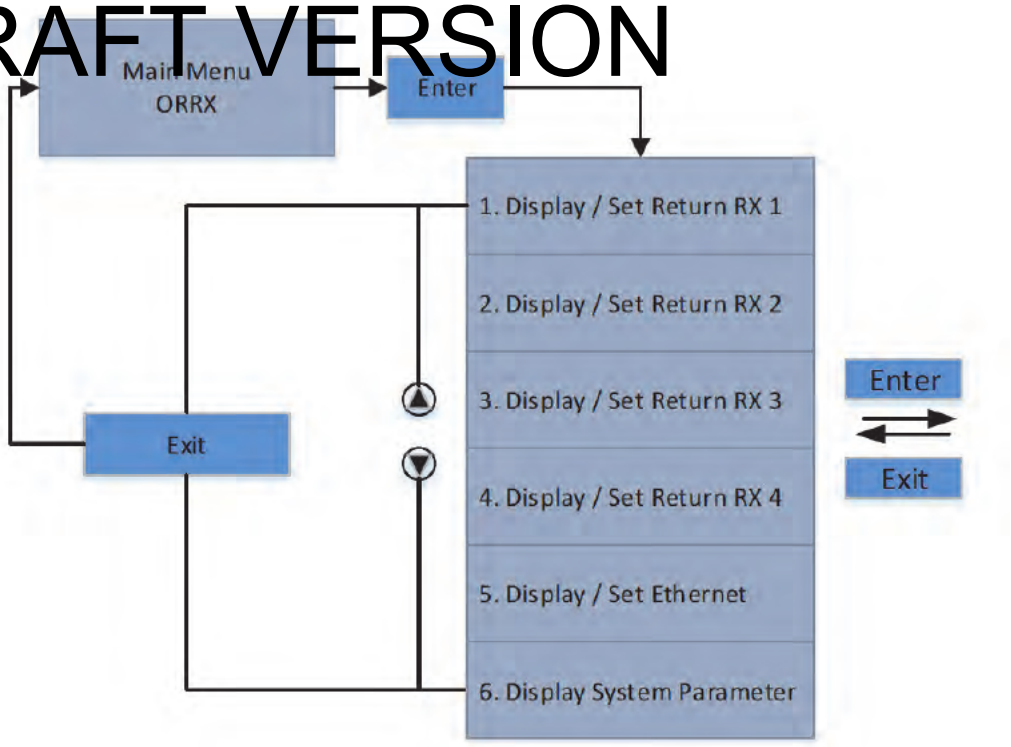


Figure 4: LCD panel menus

„Display / Set Return Receiver 1 … 4“ menu

The flowchart below shows the “Display / Set Return Receiver” menu for the device. Each of the four return receivers can be selected and adjusted seperately. Receiver 1 is set in menu 1, Receiver 2 in menu 2 and so on. All the information can be shown in cyclic sequences by pressing the „down“ arrow key. Pressing the „Up“ arrow key will rotate in upwards direction.

HINWEIS: If RFoG mode is selected in the „Set RF Output Mode“ menu, some parameters are not visible and only the attenuator for setting for adjusting the RF output level can be set.

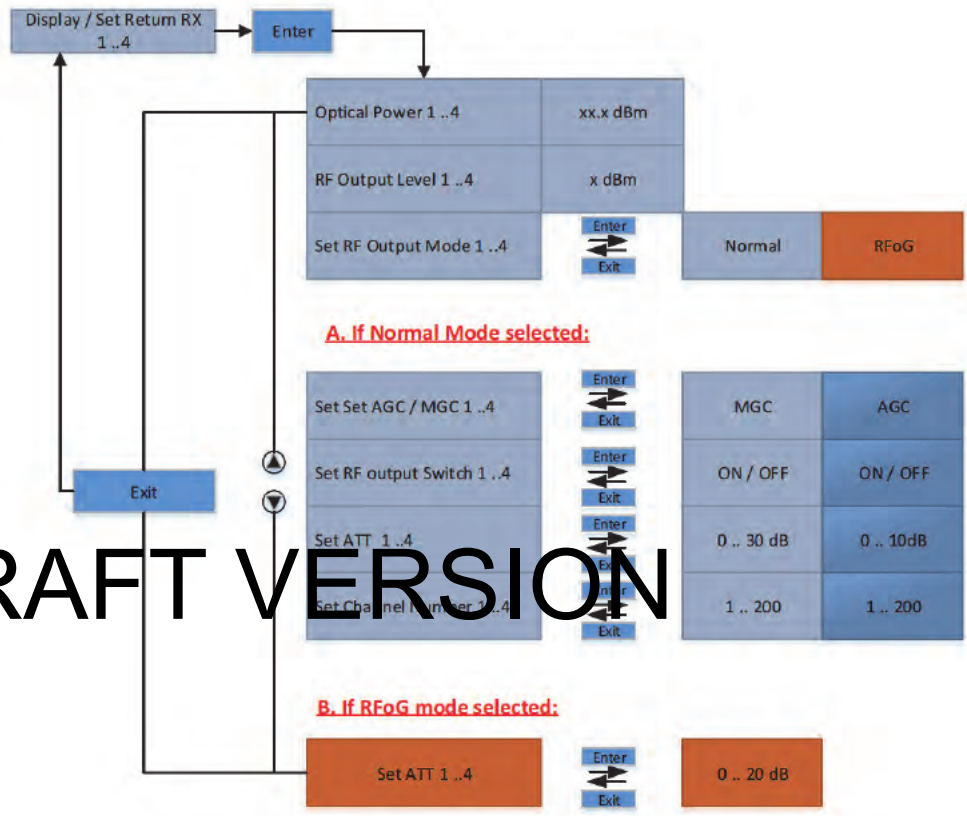


Figure 5: „Display / Set Return Receiver 1...4“ menu

- Optical Power: displays the optical input power at the corresponding receiver
- RF Output Level: displays the RF output level of the corresponding receiver
- Set RF Output Mode: For standard HFC return channel, select the „Normal“ type. For RFoG bursty upstream mode, select „RFoG“ type. (Please note, that in RFoG type some parameters, which make no sense to change, are not visible.)
- Set AGC or MGC (not in RFoG mode): For AGC RF output mode, the RF level is kept constant if the input level is within the range of -10 ... 0 dBm.
  For MGC the RF level will be higher or lower for changing the optical input level but the dynamic range for ATT setting is wider.
- Set RF Output Switch (not in RFoG mode): Set the corresponding receiver ON or OFF by switching the output switch.
- Set ATT: Adapt the RF output level with this parameter. Recommended RF level is < 105 dBµV.
  For MGC the value is 0...30 dB attenation.
  For AGC the value is 0...10 dB attenation.
  For RFoG the value is 0...20 dB attenation.
- Set Channel Number (not in RFoG mode): Enable to give each channel a unique ID.

„Display / Set Ethernet“ menu

The following figure shows the menu entries of the “Ip configuration” submenu. When pressing “Enter” on any menu, the parameter can be changed with “up“ or „down“ arrow key Confirm your selection by pressing “Enter”, or leave the parameter unchanged by pressing “Exit”. All changes made with the “up“ or „down“ arrow keys must be confirmed by pressing „Enter“.

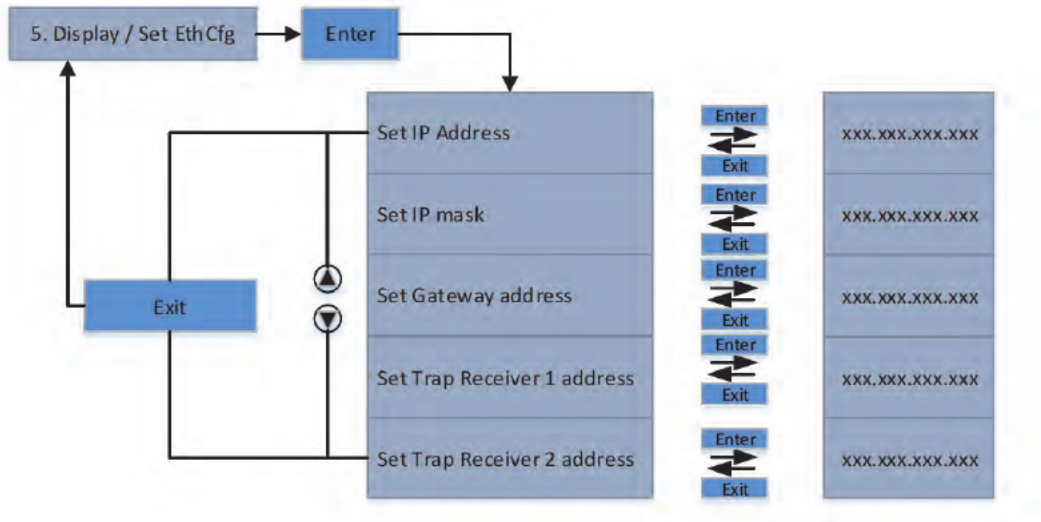


Figure 6: „Display / Set Ethernet“ menu

- Set IP Address: Display or set the IP address of the device.
- Set Netmask: Display or set the netmask.
- Set Gateway IP Address: Display or set the Gateway IP address of the device.
- Set Trap receiver 1 address: Set the address of the first trap receiver.
- Set Trap receiver 2 address: Set the address of the second trap receiver.

Configuring the device via web interface

Logging in

To login in the web interface, check first the IP address of the device. The device IP address could be set or viewed via the LCD front panel.

Connect your computer to the same IP subnet as the transmitter. With a ping test make sure that physical connection via the IP Network is obtained.

With any Web browser you can type in the address line of the browser the IP address of the transmitter.

Figure 7: Login

Log in with the following data:

User name: admin
Password: lifion

Configuring the upstream receivers

Click on one of the four entries for receivers („RTN-Recv XX Path“) in the main menu on the left side. You will now see the following table. Here you can make the desired adjustments.

Figure 8: Upstream Receivers

Configuring the trap receivers

In the main menu, click on „Trap Parameters“. You will see the following table. Here you can make your adjustments.

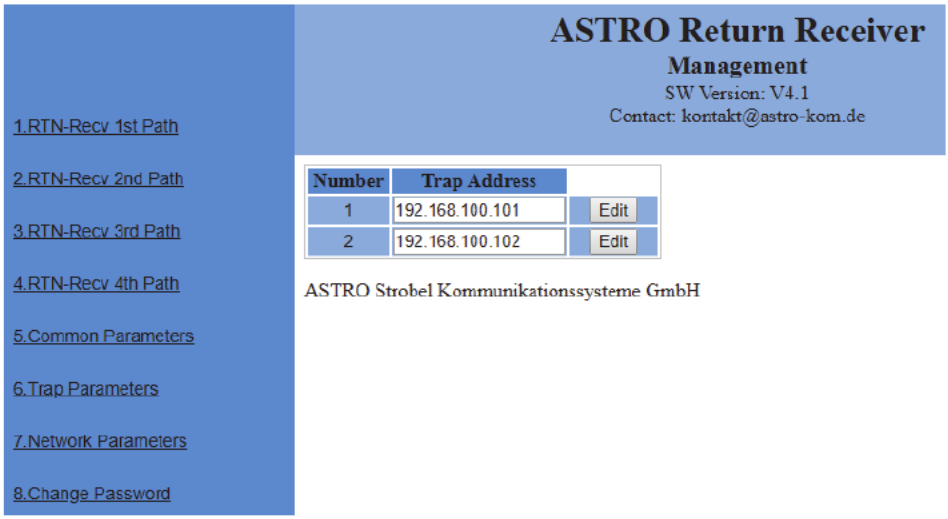


Figure 9: Trap parameters

Configuring network parameters

In the main menu, click on „Network Parameters“. You will see the following table. Here you can make your adjustments.

Abbildung 9: Netzwerkparameter

Modifying the password

This panel is used to modify the user name or password. Type in the current user name and password to modify this.

Confirmation of the new password is required.

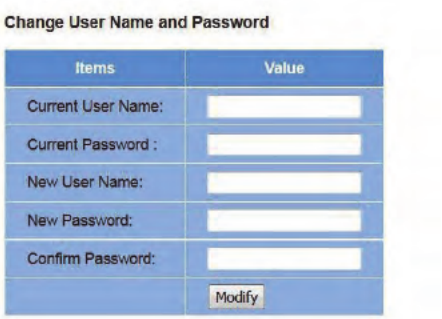


Figure 10: Modifying the password

Troubleshooting

If the device is not functioning correctly, please perform the following checks:

- ☐ Check whether the device is connected to the required mains voltage (230 V~, 50 Hz).
- ☐ Check whether the signal cable is connected correctly, and that there are no breaks or short circuits in the connectors.

If the problem cannot be resolved, please contact the ASTRO customer service.

Maintenance and repair

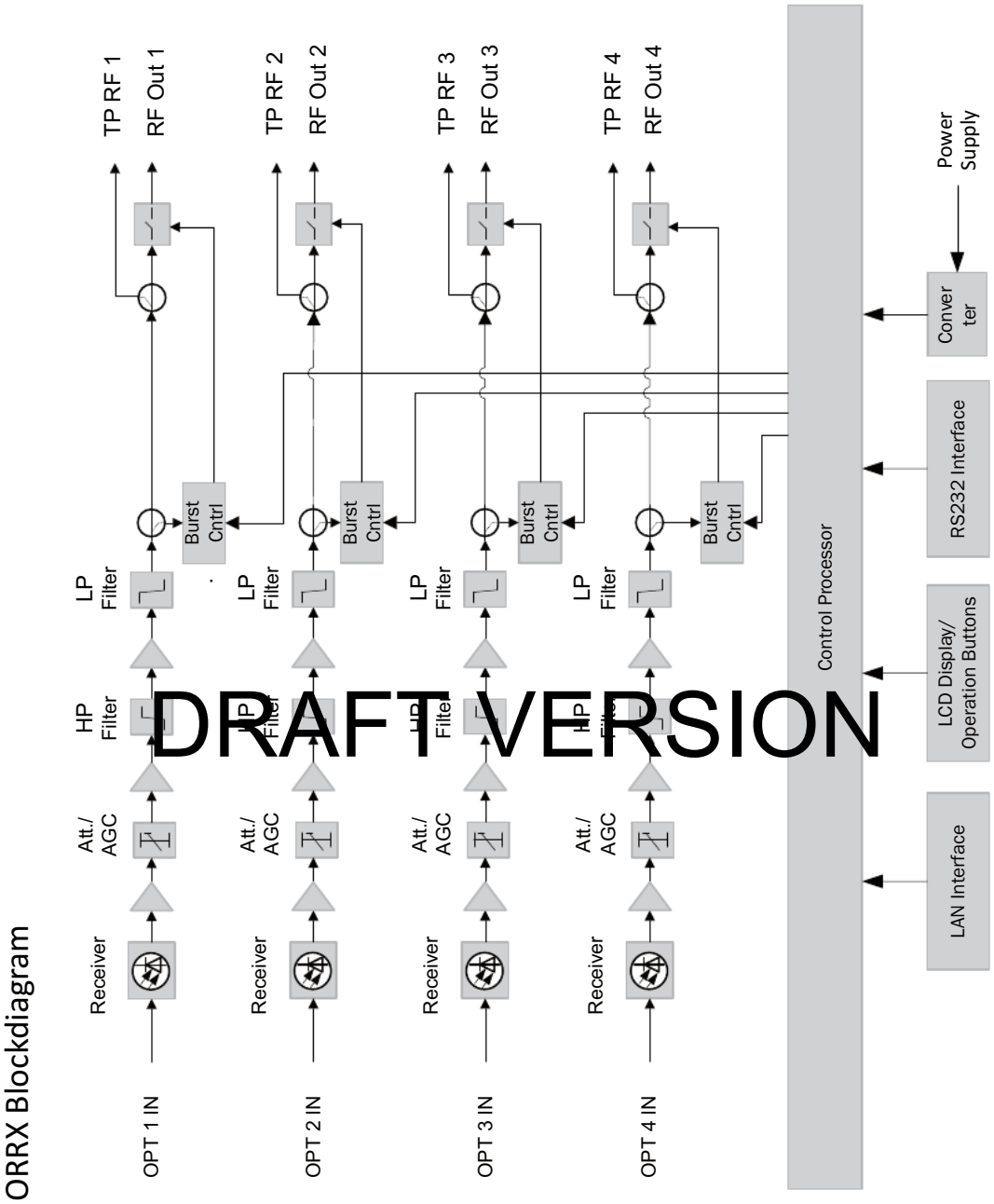
ACHTUNG: The following safety information must be observed when performing maintenance and repair work. Failure to observe this safety information may result in personal injury due to electrical and thermal dangers!

- ☐ The operating display only shows whether the DC current, which supplies the device components, has been disconnected from the mains voltage. If the operating display (for the power supply unit or the device) does not light up, this does not mean that the device has been fully disconnected from the mains voltage. There may still be voltages in the device that are dangerous to touch. You may therefore not open the device.
- ☐ The cover for the power supply unit is designed to prevent accidental contact with voltages that are dangerous to touch, and must not be removed.
- ☐ Read carefully: EN 60728 - Part 1 Safety requirements: No service work during thunderstorms.
- ☐ A defective device may only be repaired by the manufacturer to ensure that components with the original specification are used (e.g. power cable, fuse). Improperly performed repairs may result in considerable dangers for the user or installer. If malfunctions occur, the device must therefore be disconnected from the mains and authorised experts must be consulted. The device may need to be sent to the manufacturer.

Service tasks

HINWEIS: The device must only be operated with the original power module!

Block diagram



Technical data

Type		ORRX DC	ORRX AC
Order number		212 157	212 149
EAN-Code		4026187196707	4026187194734
Power supply		2 hot plug AC	2 hot plug DC
Optical characteristics			
Optical input wavelength	[nm]	1100…1610	
Optical AGC range	[dBm]	-10…0	
Maximum receiving optical range	[dBm]	-27…0	
Attenuation adjustment range separately for each RX for different operation modes	[dB]	0 .. 10: Normal HFC mode with AGC function 0 .. 30: Normal HFC mode with MGC function 0 .. 30: RFoG burst mode	
Optical return loss	[dB]	> 45	
Flatness	[dB]	± 1	
Return loss	[dB]	≥ 16	
Receiver noise current (Pin = 5 dB)	[pA/Sqrt Hz]	< 5	
Output Impedance	[Ω]	75	
Fibre type		Single mode fibre 9/125	
Optical connector type		SC/APC (other on request)	
RF characteristics			
Frequency range for upstream signals	[MHz]	5…200	
Typical RF output level	[dBµV]	≥ 105 (in optical range of -10...0 dBm)	
RFoG Burst mode timing and thresholds: RF-ON for threshold of RF-OFF for threshold of Signal turn on time	 [dBµV] [dBµV] [µs]	 ≥ 70 ≤ 62 0.5 ≤ t ≤ 1	
RF test port	[dB]	-20	
Common data			
Management		front panel / SNMP	
Chassis type		1 RU, 19" rack mounted	
AC Power supply	[VAC]	150 - 250	
DC Power supply	[VDC]	-36 .. 72 (on request)	
Power consumption	[W]	≤ 20	
Dimensions (W x H x D)	[mm]	483 x 44 x 365 (1 RU)	
Ambient temperature	[°C]	-5 .. +55 (ETSI EN 300019-3 Class 3.2)	
Maximum relative humidity	[%]	95 (no condensation)	

DRAFT VERSION

ASTRO Strobel Kommunikationssysteme GmbH

DRAFT VERSION

These operating instructions have been written by:
ASTRO Bit GmbH
Olefant 3, D-51427 Bergisch Gladbach (Bensberg)
Tel.: 02204/405-0, Fax: 02204/405-10
eMail: kontakt@astro.kom.de
Internet: www.astro-kom.de