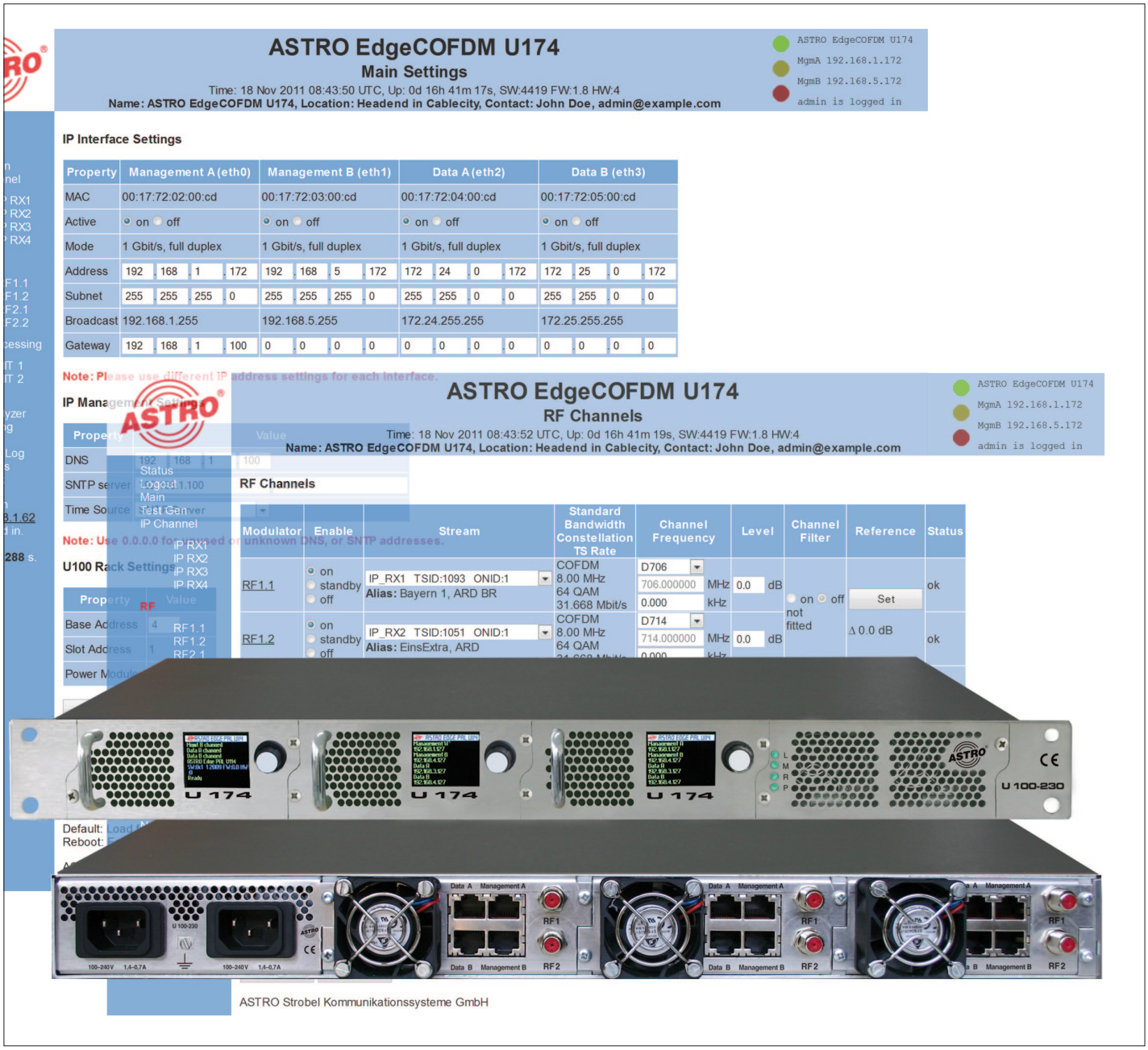
Operating Manual



U174 4-way IP / COFDM converter

U 100 - 230 Base unit

General

Note concerning the U 100-230 base unit:
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Caution!

Changes or modifications of the device not expressly approved by ASTRO Strobel Kommunikationssysteme GmbH or any licensed party responsible for compliance will void the user's authority to operate the equipment!

This operating manual was created to provide the instructions relevant to operating the U174. We expressly recommend reading this manual before installing or operating the device.

The ASTRO company confirms the information in this manual to be 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. The ASTRO company is not responsible for printing errors. The contents of this operating manual are confidential and protected by copyright. This manual may not be reproduced in any form - not even in part - without prior written permission from the ASTRO company.

Pictograms and safety instructions

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

Warning about life-endangering situations due to dangerous electrical voltage or non-adherence to this manual.

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

Recycling: all of our packaging material (cardboard boxes, accompanying papers, plastic film and bags) is completely recyclable.

Used batteries must be disposed of at approved recycling points. Batteries must be completely discharged before being disposed of.

Electronic devices must not be disposed of with household waste, but rather – according to directive 2002/96/EG OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL from 27 January 2003, on waste electrical and electronic equipment – must be properly disposed of. When they are no longer of use, please bring these devices for disposal to one of the public collection points for this purpose.

Copyright notice

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The source code of the free parts of the software is distributed on request for an administration fee.

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All other parts of the software of this product is Copyright by Astro Strobel Kommunikationssysteme GmbH.

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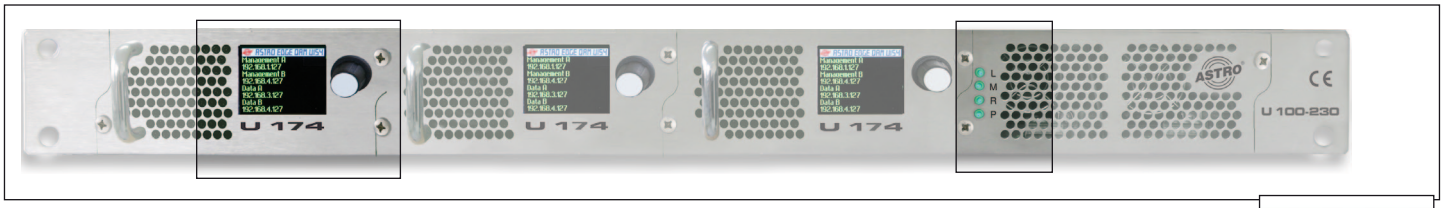
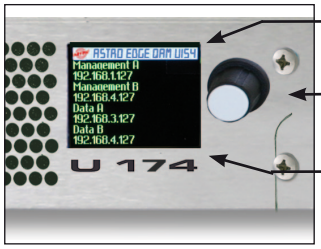
1 Figure

The figures show the U 174 installed in the U 100 - 230 base device.



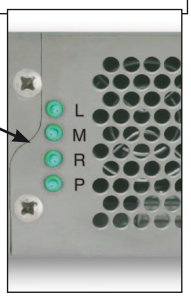


Status display

Control and data wheel, menu switch

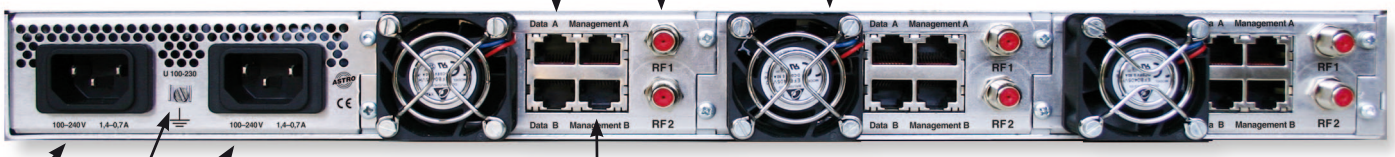
Display of management IP addresses, data IP addresses, status messages, etc.

Status display
for slots
L = left
M = middle
R = right
P = power supply unit

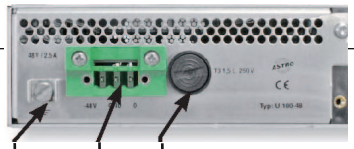


Data ports HF outputs Ventilator

230 V power supply



48 V power supply



Mains supply

Earthing connection

Mains supply

Management ports

Fuse

Mains supply

Earthing connection

1.1 Operation using the rotary knob

Once the device has been switched on, the boot process can be observed on the display. The display switches off if there is no status signal and / or input using the rotary knob for one minute.
Pressing the rotary knob switches the display on. Turning the rotary knob changes the display.

Network interface display in the front display:	RED = switched on by SW, but no link GREEN = switched on by SW and 100 MBit/s link TURQUOISE = switched on by SW and 1000 MBit/s link GREY = switched off by SW
Logfile in the front display	GREY = debug messages TURQUOISE = info messages GREEN = notice messages YELLOW = warning message RED = error message VIOLET = critical, alert and emergency messages
Service status display	First line: channel name / channel frequency Second line: service name, if not “Off”
	GREY channel “Off” DARK GREEN: OK; but “standby” RED: error LIGHT GREEN: OK

2 Introduction

The instructions in chapter 2 mainly apply to the U 100 - 230 base device.

2.1 Description of functions

The U 100 series is used to convert IP data streams into CATV signals. The U 100-230 base device can accommodate up to three U 1xx signal converters, as well as up to two U 100-SNTs for supplying the voltage to the U 1xx signal converters. The U 174 receives up to four video data streams encapsulated according to the internet protocol (IP) and converts them into up to four standardised COFDM output signals.

2.2 Safety instructions

Disconnect both mains plugs before opening the device!

The device must not be opened - for exceptions, see the maintenance and repair, and the service tasks! Power supply units must not be opened!

The device must be connected to a power supply with an earth contact, and should be positioned close to the mains socket.

The electrical system supplying current to the device, e.g. a house installation, must incorporate safety devices against excessive current, short-circuiting and earth leakages in accordance with EN 60950-1.

Both mains plugs are used to disconnect the device from the mains, therefore they must be easy to access and use at all times. The device is already in operation when one power unit is connected to the operating voltage. When the second power unit is also put into operation, one of the power units runs in idle mode as long as the other unit is supplying power to the device. The device may only be repaired by sending it to ASTRO along with a precise description of the error.

This device is Class A equipment. It may cause radio interference in living areas. In this case, the operator may be obliged to take appropriate precautions!

Displays indicate the status of the device operation, as well as the existence of DC voltages separate from the mains that are supplying the components of the device. However, operation displays that are not lit up in no way indicate that the device is completely disconnected from the mains or is voltage-free.

Read carefully:
EN 60 728 – Part 11, Safety requirements / No service tasks during electrical storms!

2.3 Mounting instructions

The U 100 base device may only be mounted using guide rails! If the device is only fastened by means of the screws in the front panel, this will damage the base device!

The outputs of the signal converter must not be operated without connecting a combining network or terminating impedance!

Protection from environmental factors:
The device must only be connected and operated in dry rooms. It must not be exposed to spraying or dripping water, or to similar phenomena. If condensation appears, wait until the device is completely dry. Objects containing liquid must not be placed on top of the device.

The permitted ambient temperature range is 0 … 45°C (ETS 300 019-1-3 class 3.1).

Mounting environment:
The device is designed for operation in, preferably, metallically conductive 19" racks with sufficient air convection. It should be operated away from heat radiation and other heat sources. The device my only be installed in rooms in which the permitted ambient temperature can be adhered to, even under changing climatic conditions. To avoid trapped heat, it must be freely ventilated on all sides. You absolutely must avoid mounting the device in a niche or covering the ventilation openings.

2.4 Potential equalisation / earthing

The subscriber network must be earthed correctly in accordance with EN 50083-1, and must remain earthed even when the device is removed.
The potential equalisation on the U 100-230 is effected via the fastening plates of the device, or via the earthing connection on the back of the device. Devices within hand's reached must be incorporated into the potential equalisation among one another.

It is not permitted to operate the device without an earth conductor, device earthing or device potential equalisation!

2.5 Maintenance and repair

Disconnect both mains plugs before opening the device!
The device must not be opened other than for repair purposes. In general, power units must not be opened. Repairs may only be carried out at the plant or at workshops, or by persons, authorised by ASTRO Strobel Kommunikationssysteme GmbH.

Read carefully: DIN VDE 0701- 0702, Repairs

Note: The device must not be opened by the user!

2.6 Service tasks

The following tasks, in which screw connections have to be opened, can be performed by appropriately instructed service personnel: removal and installation of signal converters (e.g. U 154) and power units, also in the operating mode of the U 100-230.

Replacing power units
After the screws on the cover of the power unit chamber (ASTRO logo) are removed,
the power units can be pulled out by hand, forwards along the mounting panel.
When power units are being installed, there should be no contact with the ventilator or the fan grid,
and only the mounting panel attached to the power unit should be used.
When the tasks are complete, the cover of the power unit chamber must be replaced;
continuous operation of the device is not permitted without this cover.

Note: Do not put your hand or any objects into the power unit chamber.

The U 100 - 230 must only be operated with the original power unit(s)!

Replacing converter modules:
Converter modules can be pulled outwards after the safety screw on the front panel has been unscrewed.

2.7 Technical data for the mains supply (U 100 SNT)

Mains voltage:	100 – 240 V
Mains frequency:	50 / 60 Hz
Current consumption:	1.4 – 0.7 A per power unit
Protection class according to EN 60529:	IP 20
Permitted ambient temperature range:	0 … 45°C
Secondary fuse in U100-230:	T3,15A L 250 V IEC 60127-2/3
Secondary fuses in U114:	SMD, various values

2.8 Installing and coding the backplane

The scope of delivery of every U 1xx signal converter includes a backplane which creates the physical connection between the signal converter and the base device. Both the mains HF connections and the network connections are connected to this backplane. The temperature controlled fan for cooling the U 1xx signal converter is installed on the backplane.

2.8.1 Coding the backplane

To determine the correct position of the backplane, and therefore the position of the respective signal converter in the U 100 base device, the jumper on the board of the backplane, which is described in the following section, must be configured.

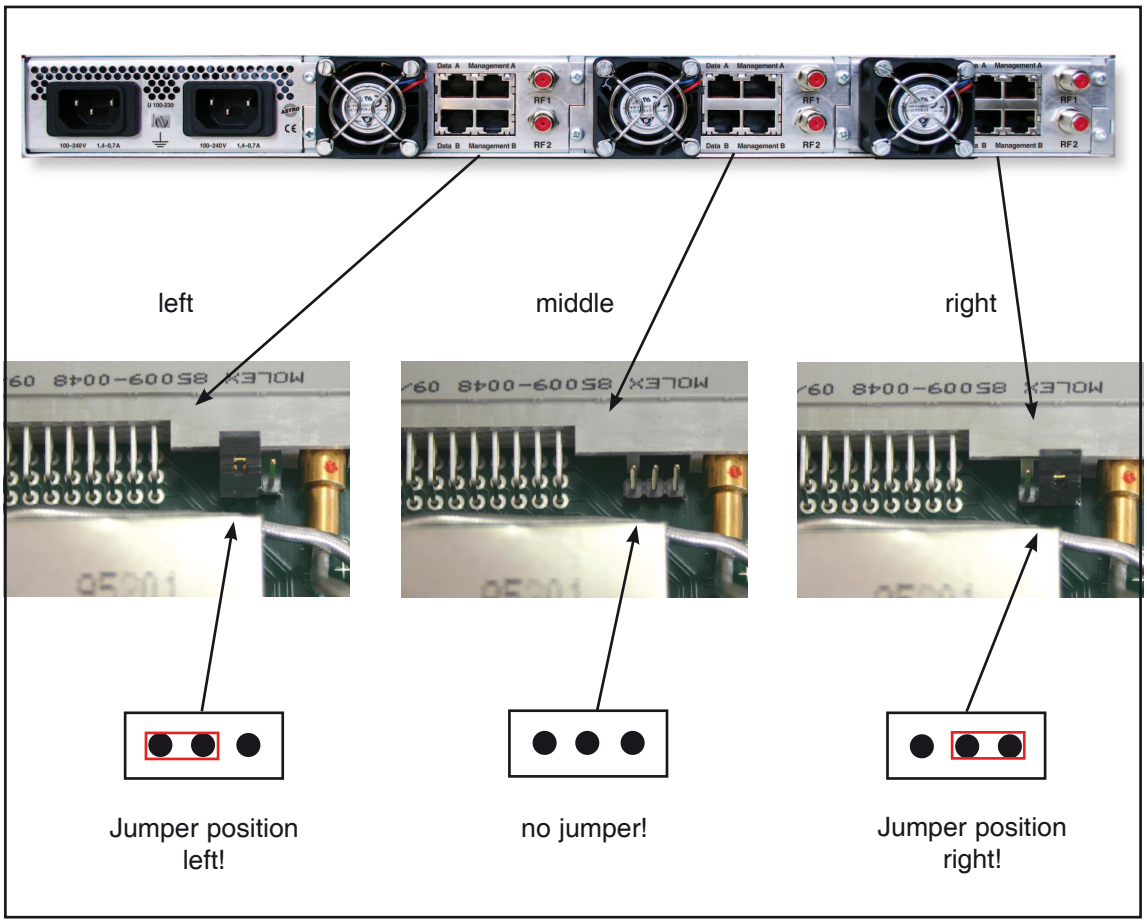


Figure 1: Coding the backplane using the jumper

Note:
An incorrectly configured jumper leads to incorrect displays in the front LEDs.
In addition, the Web user interface cannot display a correct position!

2.8.2 Installing the backplane

In its state on delivery, the back of the U 100 base device is covered with blind panels:

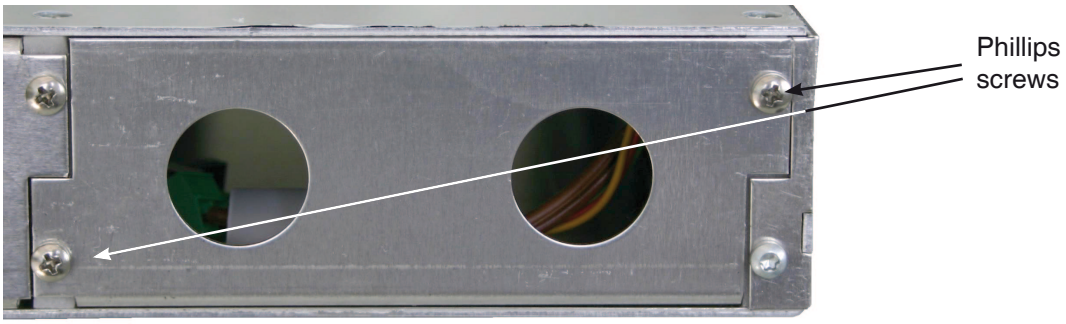


Figure 2: Position of the blind panel on delivery of U 100

To remove the blind panel, unscrew the two Phillips screws shown in the figure above and remove the blind panel. The cables which are now visible must be connected to the backplane, already coded as described in chapter 2.8.1, as shown in the following figure:

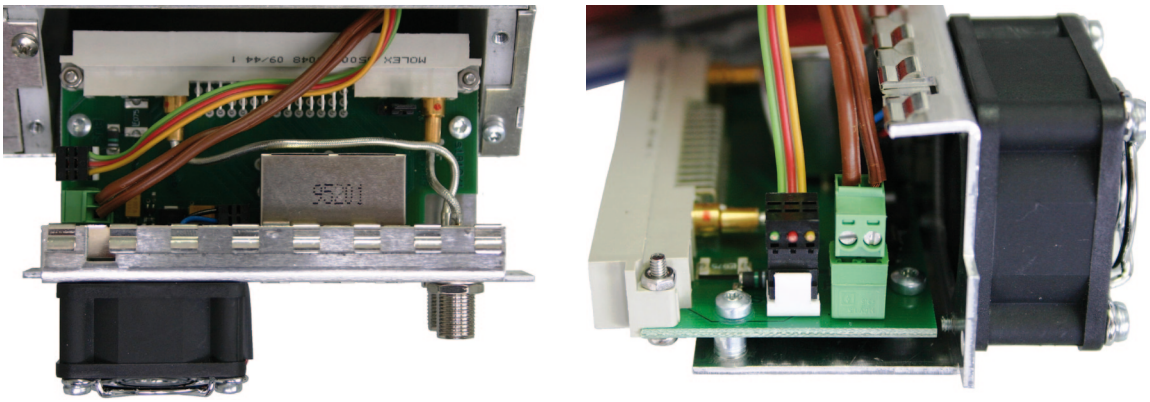


Figure 3: Connecting the voltage supply and signal lines

The backplane is now carefully inserted into the free slot of the U 100 base device and screwed in using the Phillips screws for the backplane. Here you must ensure that the cables are not clamped and that the backplane can be installed in the housing with only a small amount of pressure.

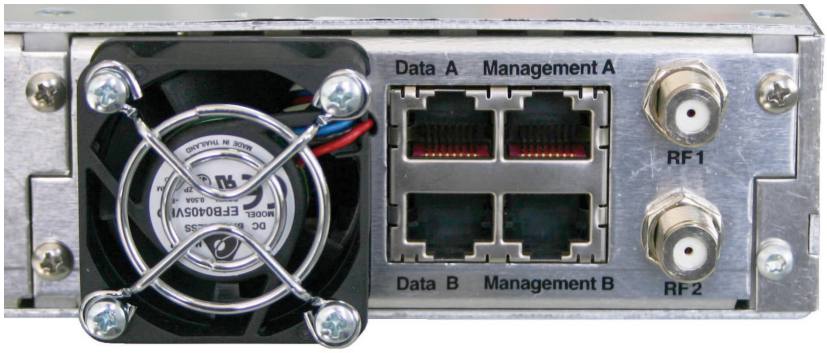


Figure 4: Correctly installed backplane

3 General introduction

3.1 Connecting the U 174 to a PC / laptop

The U 174 switches on automatically when the operating voltage is connected, or once it has been inserted into the slot of the base device. Status messages appear in the display after the boot phase (approx. 90 seconds).
If the device is connected to a PC / laptop via one of the network ports, and once the PC / laptop is appropriately configured via the network settings, you can start configuring the U 174 after you enter the IP address in the address line of the Web browser.

3.2 The Web browser user interface

The Web browser user interface is divided into the top frame, the left frame and the main frame.

The top frame shows general information about the U 174.

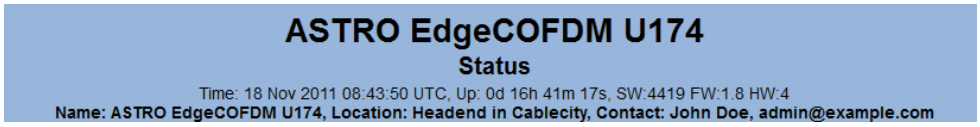


Figure 1: General information in the top frame of the Web browser user interface

This information is as follows:

“SW: 4491” indicates the software version of the U 174 EdgeCOFDM
“FW: 1.6” is the version of the firmware in the U 154 EdgeCOFDM
“HW: 4” is the hardware version of the U 174 EdgeCOFDM
“Up: 0d 16h 41m 1s” is the duration of the connection, measured from the moment of the login
“Time (UTC):” displays the date and time of the U 174.

The line in bold type for “name”, “location” and “contact” shows the settings described in the “User” chapter.

In the right section of the top frame, status information for the U 174 is displayed, i.e. the latest error message is visible in the Web browser user interface.

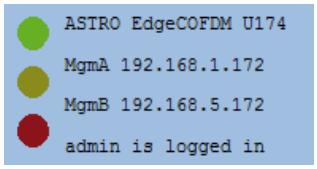


Figure 2: View of U 154 Display of the Web browser user interface

The left frame shows the navigation bar for the various submenus, which are described in detail in the following chapters.
In the main frame, the submenu is displayed according to the selection made in the navigation bar in the left frame.

4 Login

Logging in is required before configuring the U 174. This is done in the “Login” submenu.

In the state on delivery, the login data is as follows:

User: admin or user
Password: astro

After correctly entering the login data, you can proceed with the configuration.

Note:

For security reasons, the user names and passwords used in the delivery state should be changed. This prevents unauthorized access.

Only one user / BC 4 can be logged into the U 174 at a time. The user currently logged in is displayed at the very bottom of the left frame of the Web browser user interface.

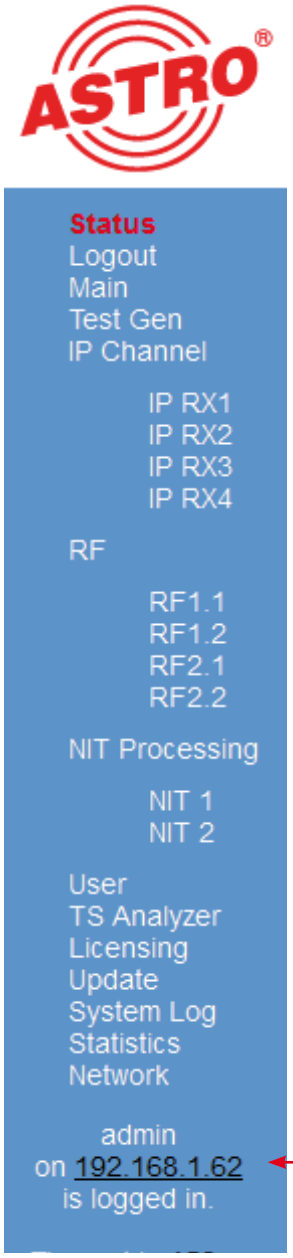
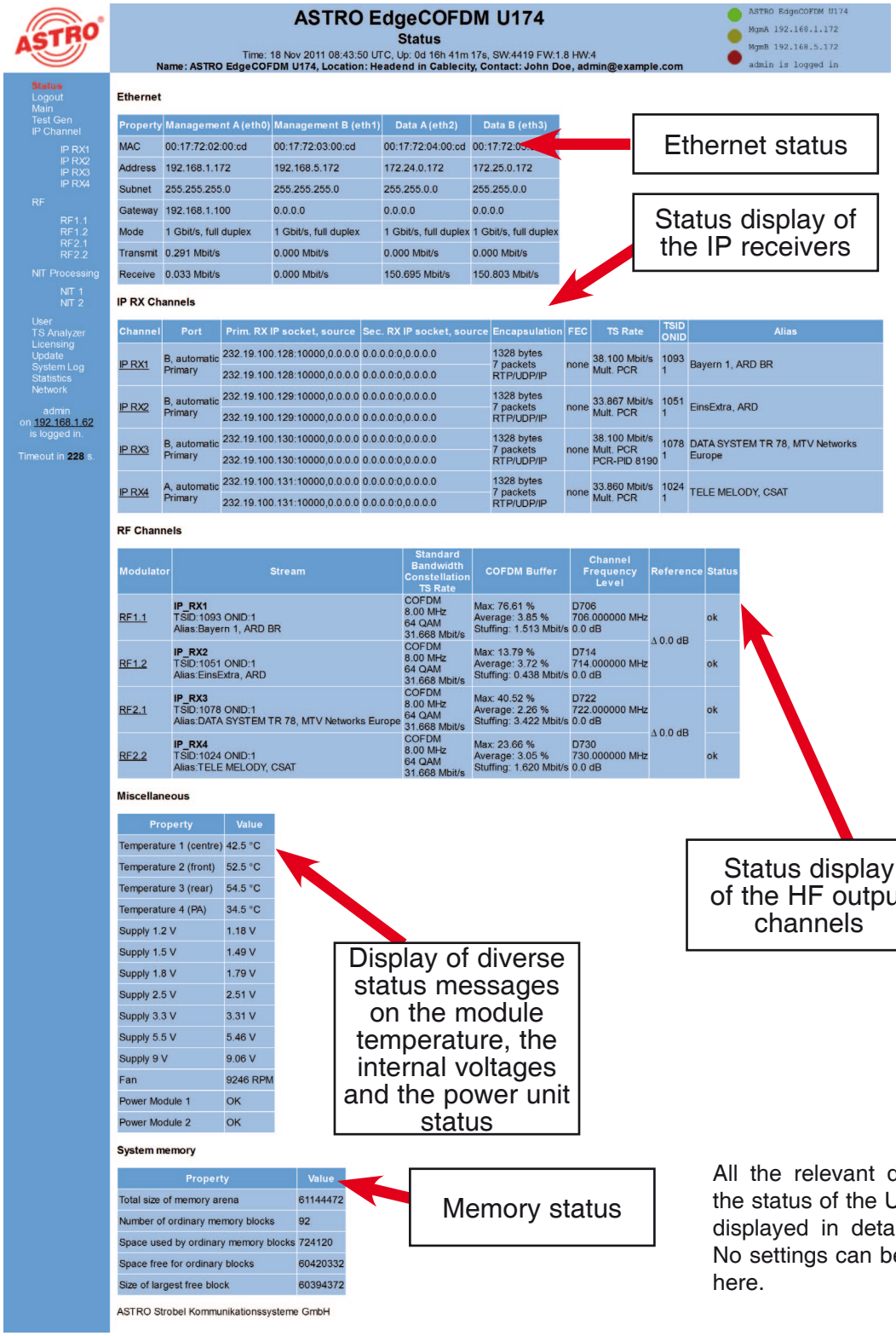


Figure 3: Display of users / controller

5 Status

When you click on the “Status” submenu in the left frame, the following window appears (example):



All the relevant data for the status of the U 174 is displayed in detail here. No settings can be made here.

Figure 4: Status display in the “Status” submenu

6 Settings for the IP interfaces, IP management and base device

When you click on the “Main” submenu in the left frame, the following window appears (example):

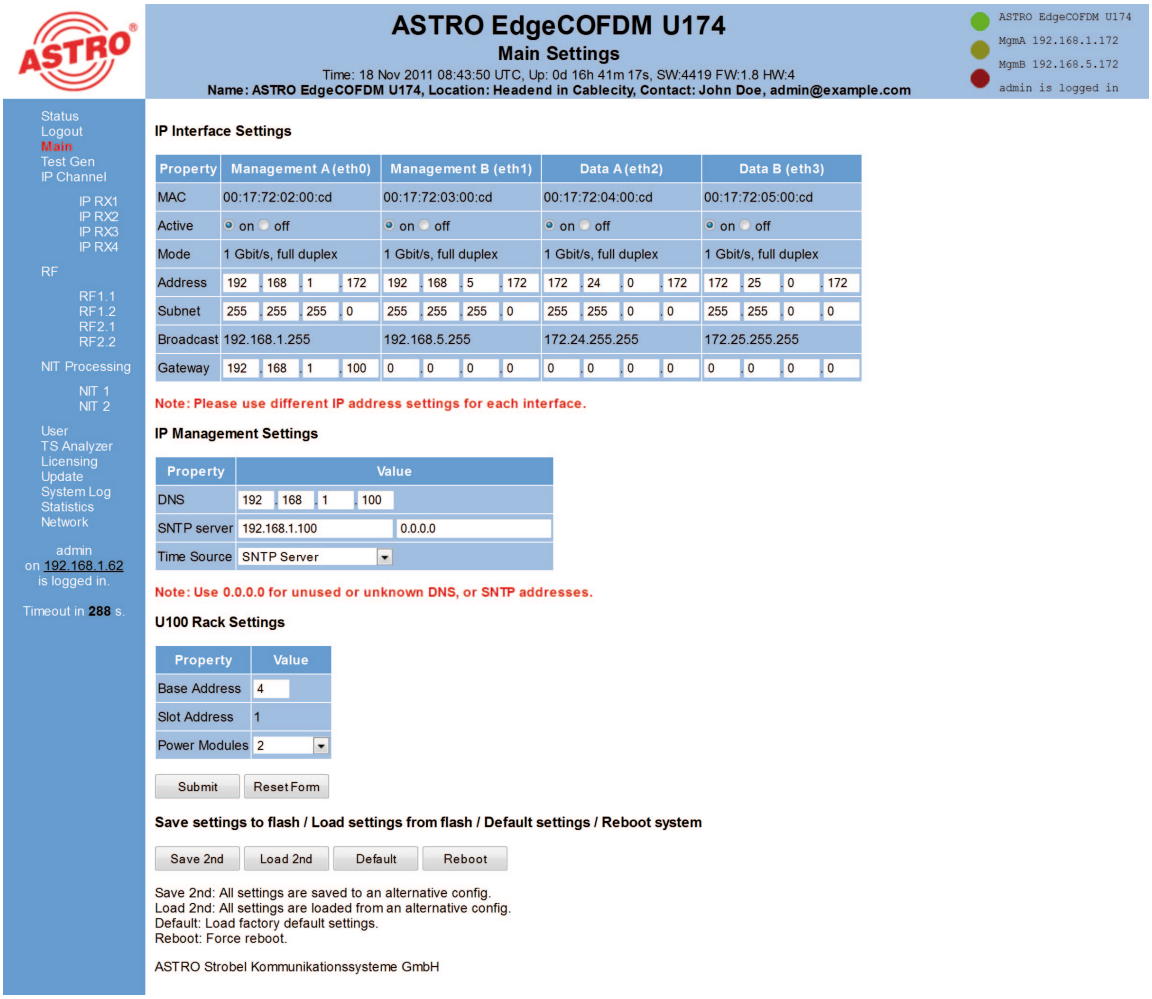


Figure 5: Overall view

The settings available are described in detail in the following sections.

6.1 Configuration of the IP interfaces

You can activate and deactivate the IP interfaces in the area of the user interface displayed below. The connection type is automatically detected and displayed by the U 174.
(In this case: 1 GBit/s, full duplex for Data A and 1 GBit/s, full duplex for Management A and B).

IP Interface Settings

Property	Management A (eth0)	Management B (eth1)	Data A (eth2)	Data B (eth3)
MAC	00:17:72:02:00:cd	00:17:72:03:00:cd	00:17:72:04:00:cd	00:17:72:05:00:cd
Active	on off	on off	on off	on off
Mode	1 Gbit/s, full duplex	1 Gbit/s, full duplex	1 Gbit/s, full duplex	1 Gbit/s, full duplex
Address	192 . 168 . 1 . 172	192 . 168 . 5 . 172	172 . 24 . 0 . 172	172 . 25 . 0 . 172
Subnet	255 . 255 . 255 . 0	255 . 255 . 255 . 0	255 . 255 . 0 . 0	255 . 255 . 0 . 0
Broadcast	192.168.1.255	192.168.5.255	172.24.255.255	172.25.255.255
Gateway	192 . 168 . 1 . 100	0 . 0 . 0 . 0	0 . 0 . 0 . 0	0 . 0 . 0 . 0

Note: Please use different IP address settings for each interface.

Figure 6: IP interface configuration

Changes to the IP addresses can only be made by the admin (first user in the user administration, see chapter 10) and are applied to the U 154 using the “Submit” button. Once the IP settings have been changed, you must log in again.

Note:

When programming the IP addresses, make sure the addresses have not already been allocated in your network. Address conflicts lead to malfunctions in the network. Any network interfaces which remain unused must be deactivated. When selecting the IP addresses, make sure that interfaces in separate network segments are not within the same sub-network.

6.2 IP management configuration

The DNS server and the SNTP server are entered in the IP management configuration. When a valid entry is made under “SNTP server”, this can be used as a time reference. The MPEG flows (TDT) are additional time references.
If the U 174 signal converter is to be configured via the U 100-C controller, then the U 100-C can also be used as a SNTP server.

IP Management Settings

Property	Value
DNS	192 . 168 . 1 . 100
SNTP server	labor2.local 0.0.0.0
Time Source	SNTP Server

Note: Use 0.0.0.0 for unused or unknown DNS, or SNTP addresses.

Figure 7: IP management configuration

6.3 U 100 settings

An address can be allocated to the relevant base device under “U 100 Rack Settings”. This setting is applied to all slots in the base unit. The number of the slot currently selected is displayed below it:

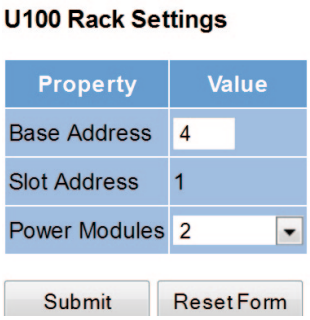


Figure 8: Rack settings

6.4 Saving and loading a configuration / Default and reboot

Any changes to the configuration of the U 174 are written into the device using the “Submit” buttons, which activates and saves them immediately. To save the current configuration separately, save it to the device using the “Save 2nd” button to allow it to be used as a recovery option should settings made after “Save 2nd” be discarded. This recovery option is re-activated by pressing the “Load Second” button. How to save the configuration to a local computer or FTP server is explained in the “Update” chapter.

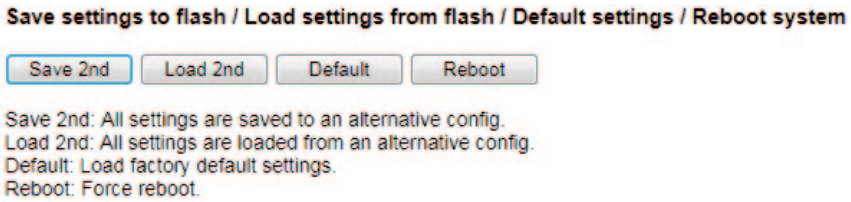


Figure 9: Saving and loading / default and reboot

The “Default” button is used to restore the factory settings.

Note:

Restoring factory settings results in all the settings, apart from the user and network settings for the data and management ports, being reset to the state on delivery!

The “Reboot” button restarts the U 174 with the last settings activated.

7 Test generator

The U 174 features an integrated test generator for checking that the COFDM modulators function when there is no input signal available. The max. data rate that can be set is 67 MBit/s.

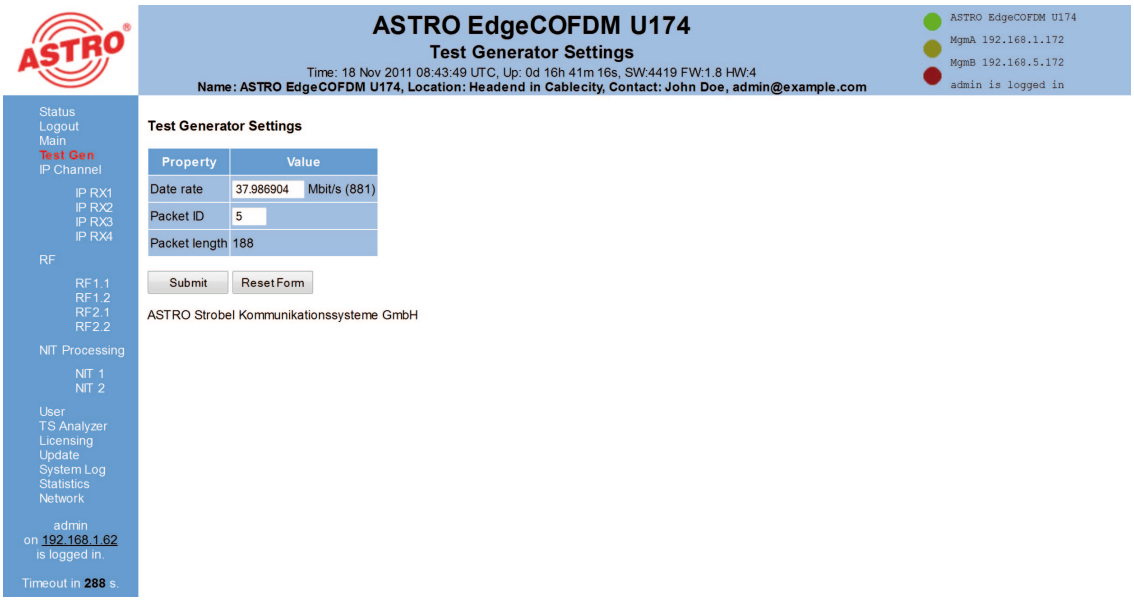


Figure 10: Test generator settings

If the test generator is selected as “Service” in the HF settings for a COFDM output channel, then the COFDM modulator emits a digital radio programme which is comprised of a 1 kHz tone.

8 Configuration of the IP inputs

When you click on the “IP RX” submenu in the left frame, the following window appears (example):

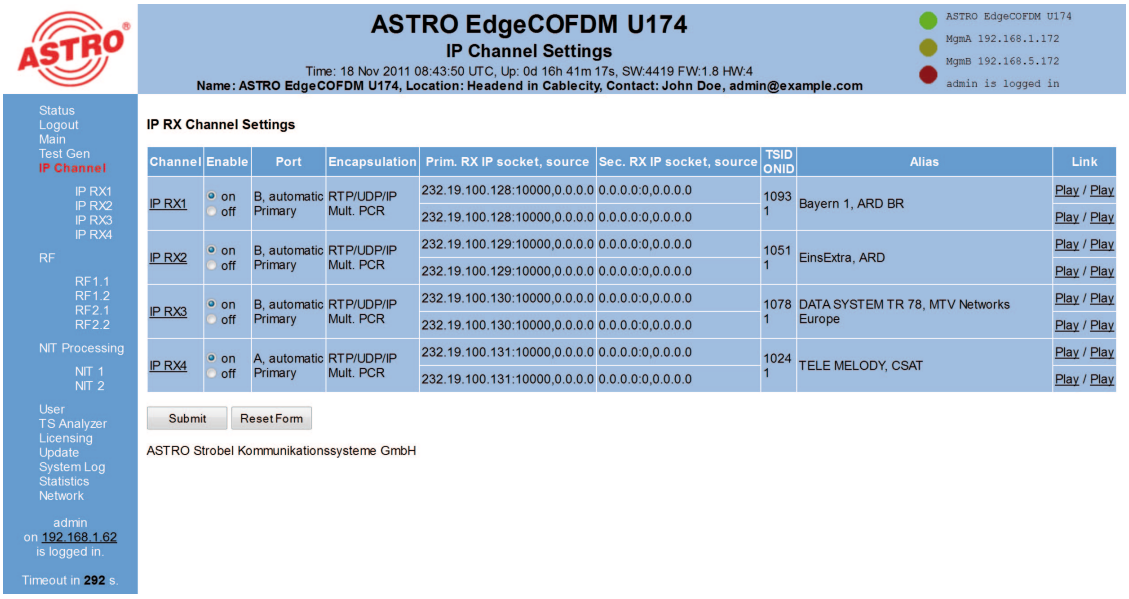


Figure 11: Overview of the IP input configuration

The four IP inputs for configuration are activated or deactivated here, and their current configuration is displayed. You can access the detailed settings either by clicking the respective channel (e.g. IP RX3) or clicking the corresponding submenu in the left frame.

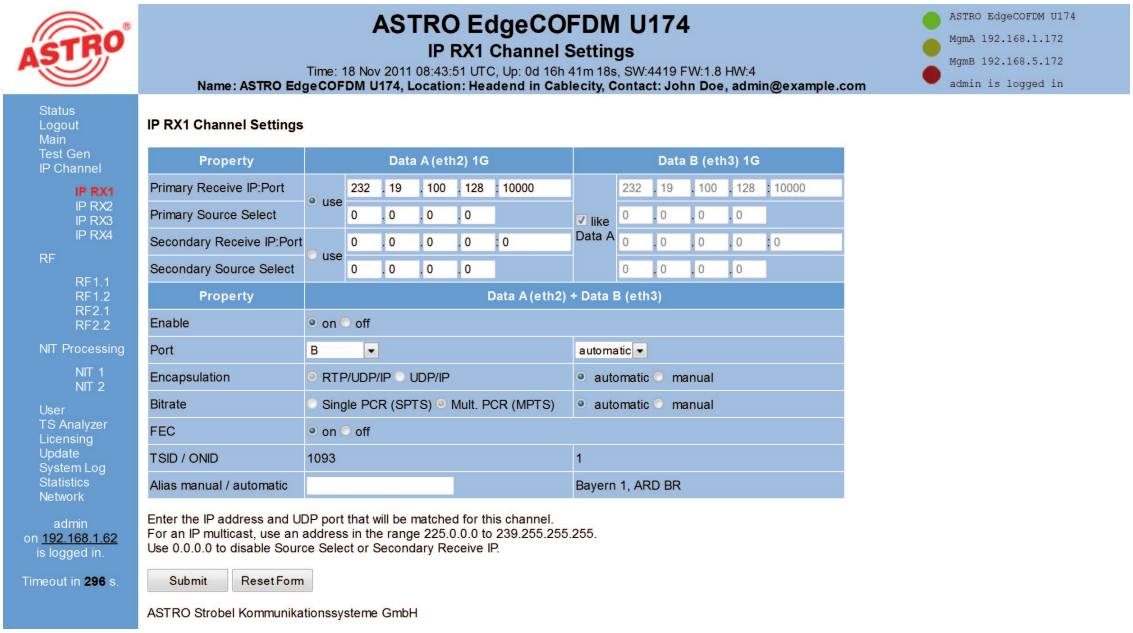


Figure 12: Detailed IP receiver settings

To enable the greatest possible path redundancy, the U 174 has a number of different configuration options for the IP receivers. The Data A and Data B ports can be configured completely independently of one another. IGMPv3 enables the so-called “Source Select”, i.e. the IP receiver can request the data from a preferred source.

IP RX1 Channel Settings

Property	Data A (eth2) 1G		Data B (eth3) 1G	
Primary Receive IP:Port	◉ use	232 . 19 . 100 . 128 : 10000	☑ like Data A	232 . 19 . 100 . 128 : 10000
Primary Source Select		0 . 0 . 0 . 0		0 . 0 . 0 . 0
Secondary Receive IP:Port	○ use	0 . 0 . 0 . 0 : 0		0 . 0 . 0 . 0 : 0
Secondary Source Select		0 . 0 . 0 . 0		0 . 0 . 0 . 0

Figure 13: Setting the Multicast addresses

The “use” selection box determines the data source used. This data source is defined via the Multicast address and can - if this Multicast address is provided by multiple senders - be given priority by the IP receiver. The IP address of the preferred source is entered under “Primary / Secondary Source Select”. If 0.0.0.0 is displayed here, the Source Select function is deactivated. If the same sending equipment feeds different signal paths, it may be practical to configure Data B exactly the same way as Data A. This is easily done by activating “like Data A”.

Property	Data A (eth2) + Data B (eth3)	
Enable	◉ on ○ off	
Port	B	automatic
Encapsulation	○ RTP/UDP/IP ○ UDP/IP	◉ automatic ○ manual
Bitrate	○ Single PCR (SPTS) ◉ Mult. PCR (MPTS)	◉ automatic ○ manual
FEC	◉ on ○ off	
TSID / ONID	1093	1
Alias manual / automatic		Bayern 1, ARD BR

Figure 14: Settings for the IP input signal format

The IP receiver is activated or deactivated in the “Enable” line.

In the “Port” line, the data interface is selected (A or B) and the preferred data interface is set. This function enables the U 174 to switch to the second interface after an input signal has failed, and to switch back when the failed signal has been re-established (prefer A or B). If you select the “auto” option, the IP receiver remains on the substitute interface until it is manually switched back, or until this interface fails.

The protocol used in the sender is set under “Encapsulation”: RTP/UDP/IP or UDP/IP. However, the U 174 is also able to detect the protocol automatically and evaluate it accordingly.

For the “Bitrate”, you can choose between “Single PCR (SPTS)” and “Multiple PCR (MPTS)”. In this case, the U 174 can also detect the status automatically and process it.

To gain a better overview during configuration of the HF parameters, you have the option of entering an alias. If this input option is not used, the first service in the transport stream is automatically used as the alias.

9 Configuration of the HF outputs

9.1 Overview of the HF outputs

You can access the overview of the HF parameters via the “RF” submenu in the left frame.

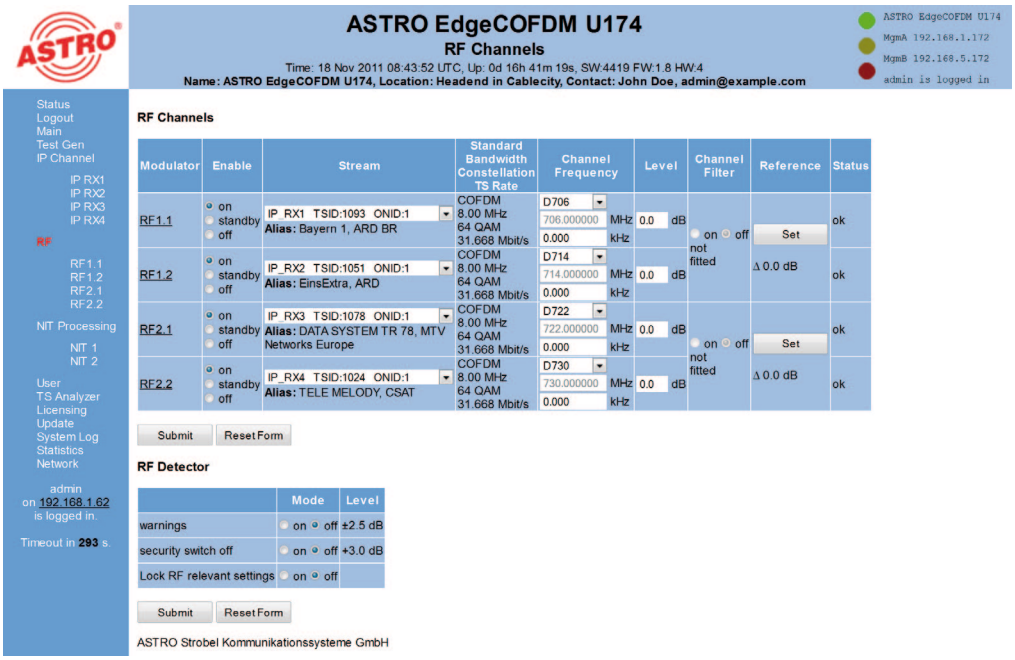


Figure 15: Overview of the HF parameters

The output channel can be activated or deactivated here. If the “Standby” option is selected in the “Enable” column, then only the HF is switched off. However, the configuration of the output signal remains active, along with the analysis of the input data stream.
The respective input data stream for conversion is selected in the “Stream” column. Opening the drop-down menu here will display all the available streams received via the IP receiver IP RX 1 to IP RX 4. The last selection option is the ASTRO test generator, which generates a digital radio channel with a 1 kHz tone in the output channel set.

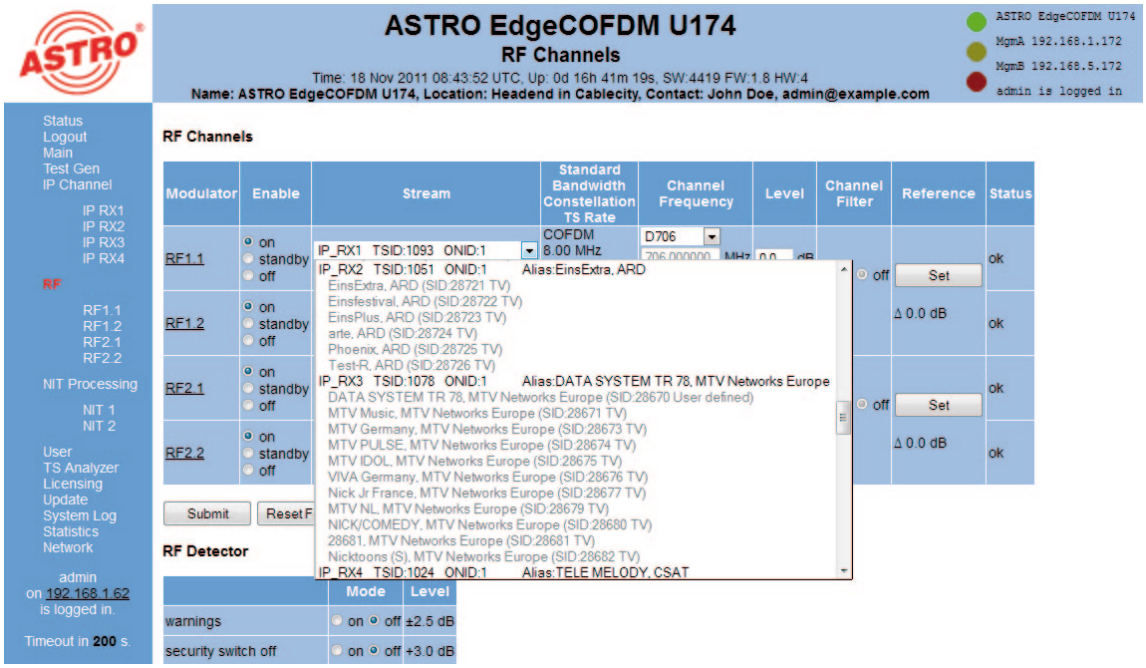


Figure 16: Drop-down menu for service selection

Further information on the output channel can be found in the “Standard Bandwidth Constellation TS Rate” column. This information covers: carrier modulation, bandwidth and maximum gross data rate.

9.1.1 Setting the output channel

The output channel is set in the “Channel Frequency” column. The channel settings can be selected from the channel list provided. If a value is selected from this list, then the input window for the channel frequency remains inactive and the corresponding channel centre frequency is displayed. If the option “manual” is selected, then you have the option of entering a channel centre frequency manually.

Note:
There may be an interval of 32 MHz between the start frequency of the RFx.1 and the end frequency of the RFx.2 within a channel pair (RF 1.1 / 1.2), e.g. RF 1.1 = S06 and RF 1.2 = S09 at a channel width of 8 MHz. If the interval set is too large, then the following error message appears:

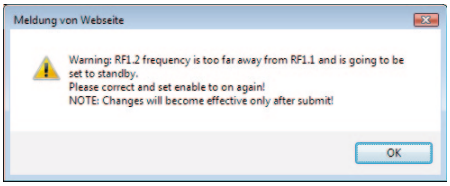


Figure 17: Error message in the event that the interval set between two channels is too large

The output channel concerned is then set to “Standby” and must be re-activated once the configuration is corrected. If an adjacent channel assignment has not been configured, then a channel filter cannot be used for the respective channel pair.

You can enter a deviation ranging between +50 and -50 kHz from the channel centre frequency in the lower input field.

9.1.2 Level equalisation for the output channel

The level of the respective output channel is equalised in the “Level” column. The relative level can be set in increments of 0.1 dB here. Changes to the level are activated by pressing the “Submit” button. If a value is entered which is inadmissibly high, the following error message appears:

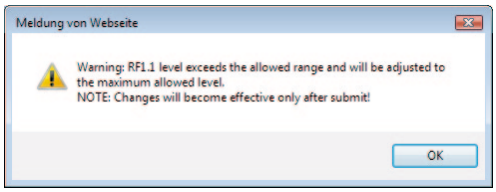


Figure 18: Warning message in the event of an inadmissible level equalisation

Once this message has been acknowledged, the maximum value is entered, which must be written into the device by pressing the “Submit” button.

.

9.1.3 Operation using an output channel filter

If an output channel filter (VHF...) has been plugged in the U 174, this channel filter will be detected. This will result in the option “Channel filter On / Off” being activated. If no filter is used, this option remains deactivated. If the channel filter is to be activated, the two limits which can be configured in the “Channel Filter” column must feature the same value as the output channels entered under “Channel Frequency”. Filter limits which are different to the output channel can, of course, also be used, however you will not be able to activate this filter.

9.1.4 Configuration of the level detector

The U 154 features a level detector in the output. This level detector permanently measures the output level. If the “Set” button is pressed in the “Reference” column, then the current level equalisation value will be set as the reference value and the deviation from the nominal level will be permanently measured. Depending on their size, any deviations may entail actions which require different configurations to be made. These actions can be set in the lower area, under “RF Detector”.

RF Detector

	Mode	Level
warnings	○ on ◉ off	±2.5 dB
security switch off	○ on ◉ off	+3.0 dB
Lock RF relevant settings	○ on ◉ off	

Figure 19: Configuration of the level detector

If the deviation is +/- 2.5 dB, a “warning” can be activated which is registered in the logfile and, depending on the configuration of the SNMP properties, can lead to a trap. The next level results in a security switch-off of the output channel subject to a deviation of + 3 dB. The “security switch off” must be activated for this. If the option “Lock RF relevant settings” is activated, only the service for conversion can be changed under “RF channels”. This setting blocks all other settings. Furthermore, all configuration options relevant to the HF output channel are blocked in the modulator settings (RF 1.1 to RF 2.2).

9.2 Detailed COFDM output channel settings

If you now click on the sub-menus RF 1.1, RF 1.2, RF 2.1 or RF 2.2, the following window (an example) will open:

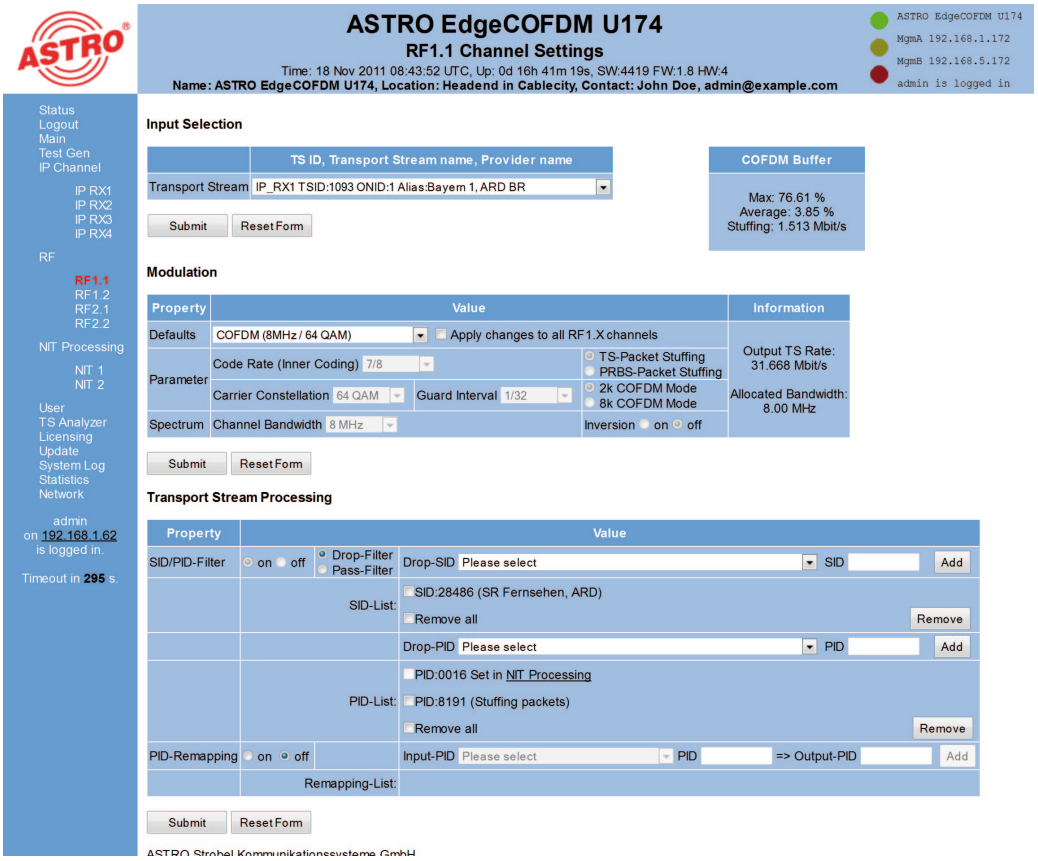


Figure 20: Detailed output channel settings

All details for the output signal can be set on this subpage.

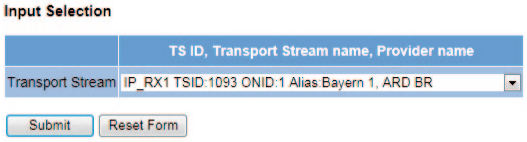


Figure 21: Service settings

The item “Input Selection” (figure 21) has the same function as the drop-down menu found in the “Stream” line of the RF main menu. The stream to be incorporated can be selected here, or the content of the respective data stream can be viewed.

9.2.1 Modulation settings

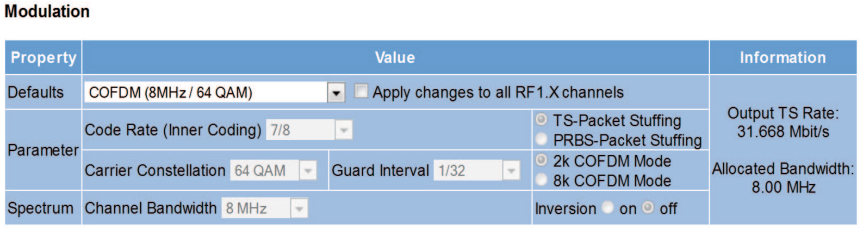


Figure 22: Modulation settings

The respective parameters in the “Parameter” and “Spectrum” lines will change according to the selection made under “Defaults”. If the changes should be applied to all output channels of the respective U 174, this can be done by ticking “Apply changes to all RF1.X channels” and then clicking the “Submit” button.

If the option “manual” is selected under “Defaults”, then the coding rate, the carrier modulation symbol rate, the guard interval and the spectrum inversion can be set manually. The settings made here apply to both channels of the respective pair of output channels. Furthermore, there is the option of configuring the stuffing unit. If the option “TS-Packet Stuffing” is selected, then null packets are generated with usable content which is comprised of zeroes. If the option “PRBS-Packet Stuffing” is selected, then the usable content of the null packets generated is comprised of a random sequence. Choose between 2k-COFDM and 8k-COFDM mode by activating the corresponding radio button.

Select the required coding rate (1/2, 2/3, 3/4, 5/6, 7/8) from the drop-down list in the “Parameter” line. Select one of the options “QPSK, 16-QAM or 64-QAM” as the carrier module from the drop-down list below it. In the “Spectrum” line, you can select 6, 7 or 8 MHz for the channel bandwidth from the drop-down list. To activate the inversion, click the corresponding radio button below “Inversion”.

9.2.2 Processing the transport stream

The U 174 allows you to process the transport stream. In the “SID/PID-Filter” line, the filtering can be activated (“On”) or deactivated (“Off”). Furthermore, there is the option of configuring either a drop filter or pass filter. Drop filtering removes the selected IDs from the transport stream, Pass filtering only transmits the selected IDs and discards all others.

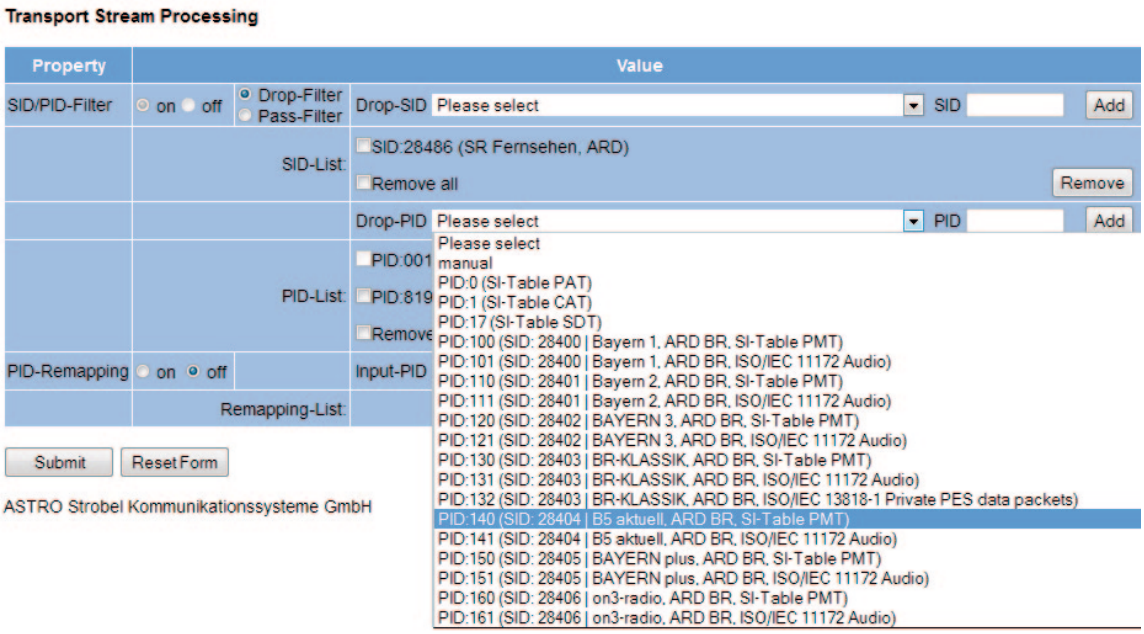


Figure 23: Processing the transport stream

If service filtering using the SID filter is selected, then all subordinate PIDs within the service will also be removed from the transport stream, or transmitted. When PID filtering is used, only the respective PID selected will be removed or transmitted. The respective PIDs appear in the SID or PID list after selection. PIDs for filtering are activated by clicking the “Add” button and removed by ticking them before clicking the “Remove” button.

The U 174 provides a PID remap function, i.e. PIDs used on the input side can be renamed and added to the output data stream with a new PID. To set a filter like this, select a PID from the drop-down menu, enter the new PID in the “Output-PID” field and then programme it using the “Add” button. Renamed PIDs then appear in the “Remapping list”. If you need to remove a remap filter, then mark the entry in the remapping list and remove it by clicking the “Remove” button.

9.3 NIT processing

The link “NIT Processing” in the left frame will reroute you to following example view:

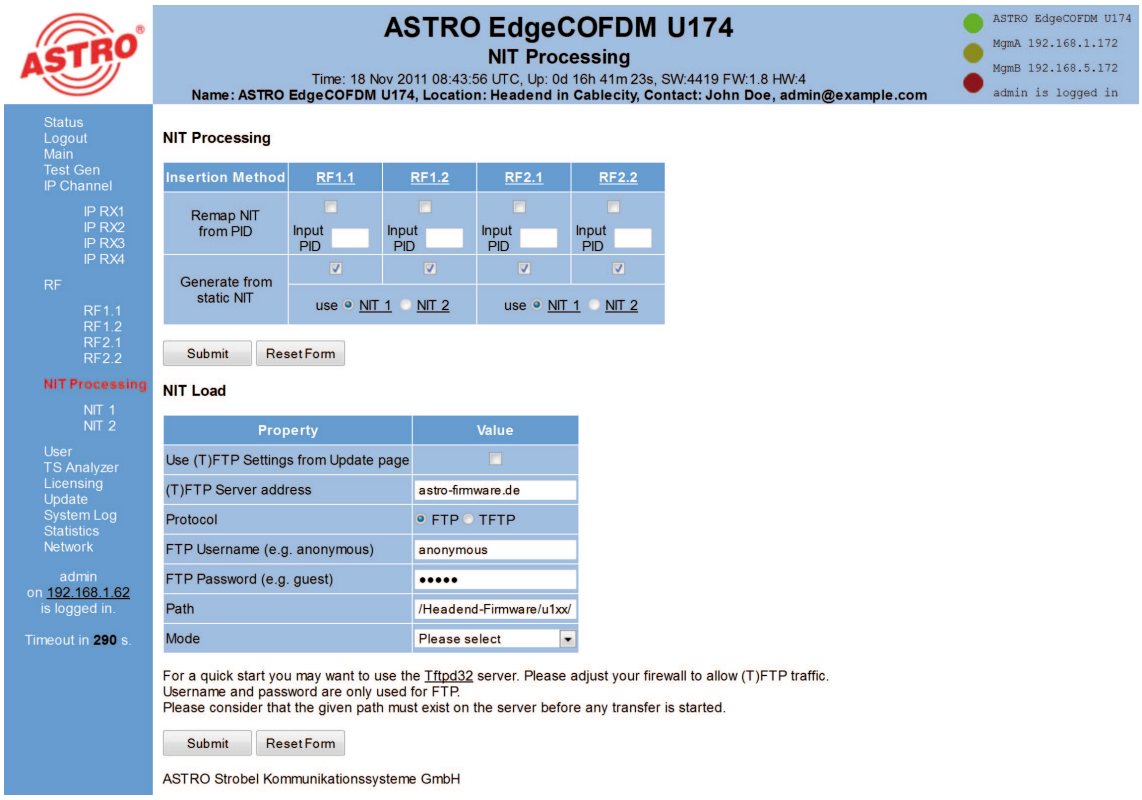


Figure 24: Activating NIT Processing / Upload NIT

9.3.1 NIT remapping

If there is an NIT in the data stream under a different PID than the 0x0010, this NIT can be used in the output data stream by means of the Remap filter. To do so, the input PID for the output channel concerned is entered in the “Remap NIT from PID” field, ticked, and the filter set using the “Submit” button. The Remap filter for the NIT set here is also displayed for the PID Remap filters under “RFx.y Channel Settings”.

9.3.2 Using a static NIT

The “Generate from static NIT” line allows you to select whether a static NIT is used for each output channel separately. If this option is activated, then there is the option of using either NIT 1 or NIT 2 for the respective pair of channels. This selection can also be activated by pressing the “Submit” button. Creating an NIT is described in chapter 9.3.4.

9.3.3 Uploading an NIT

There is an option of loading a prepared NIT in .xml format onto the U 174. This NIT must appear in the upload path with the file name “nit.xml” or “nit2.xml”. This allows the NIT to be duplicated on several devices once it has been created.

The static NIT can be generated using the input mask shown as an example below:

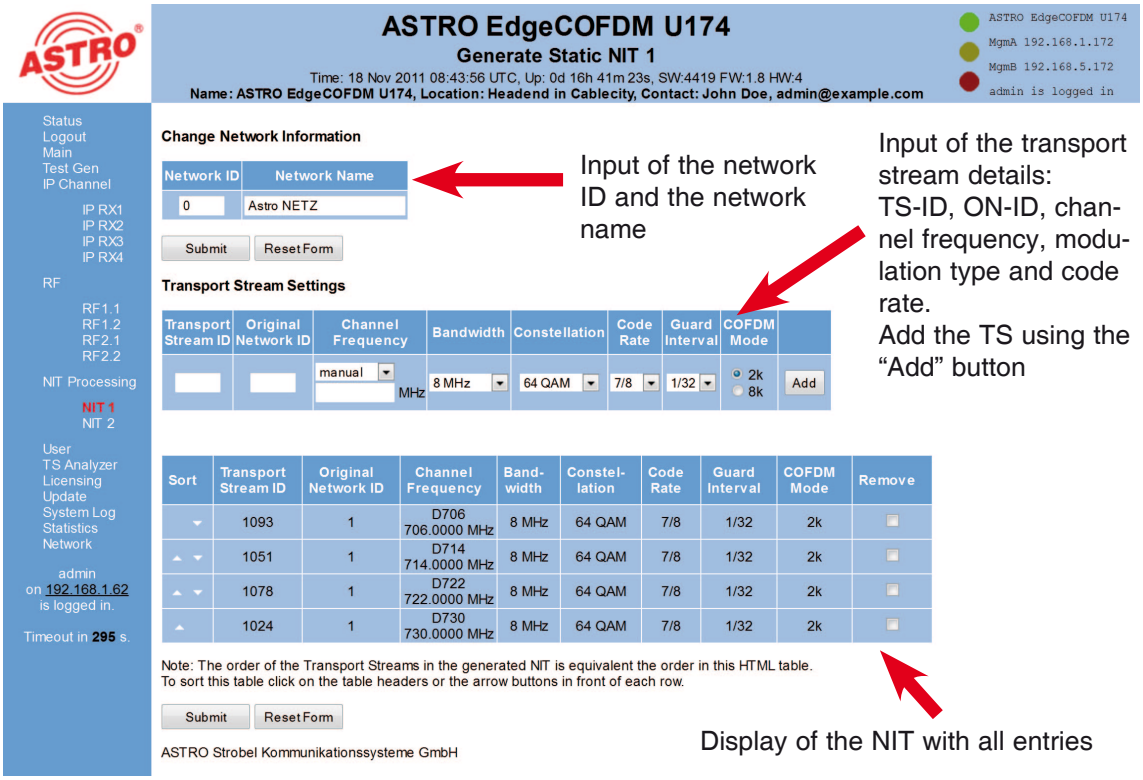


Figure 25: Input mask for NIT entry

10 User management

You can access the user management by clicking on the “User” submenu. The U 174 allows you to create four different users. In the delivery state, “admin”, “user” and “controller” have been installed, all with the password “astro”.
Only account 1 can make IP settings (chapter 6) and the set the option “Lock RF-relevant settings” (chapter 9).

Note:

For security reasons, the user names and passwords used in the delivery state should be changed. This prevents unauthorized access.

The number of minutes after which the U 174 automatically logs the user out if no configuration change has been registered during this period is entered in the “Timeout” line.

You can enter the name, location and responsible contact person in the lower area of the “User Administration” table. This information also appear in the top frame.

You can enter the name, location and responsible contact person in the lower area of the “User Administration” table. This information also appears in the top frame and can be found in the corresponding SNMP variables.

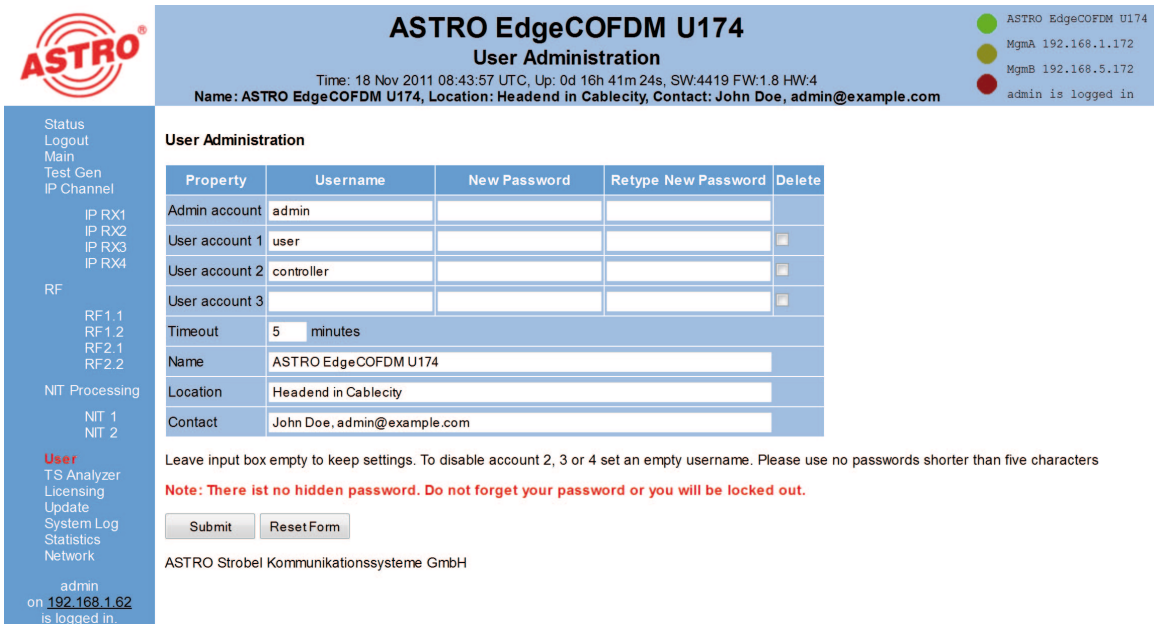


Figure 22: User management

Changes must be applied to the U 174 using “Submit”.

11 Transport Stream (TS) Analyzer

Purchase of a licence allows the U 174 to be equipped with a Transport Stream Analyzer. This Analyzer displays the structure of the MPEG2 TS, from the tables to the individual PIDs and their service. You click on the “TS Analyzer” submenu to select the transport stream for analysis. When you select a TS in the “Analyze” line and press the “Submit” button, the selected transport stream will be analysed.

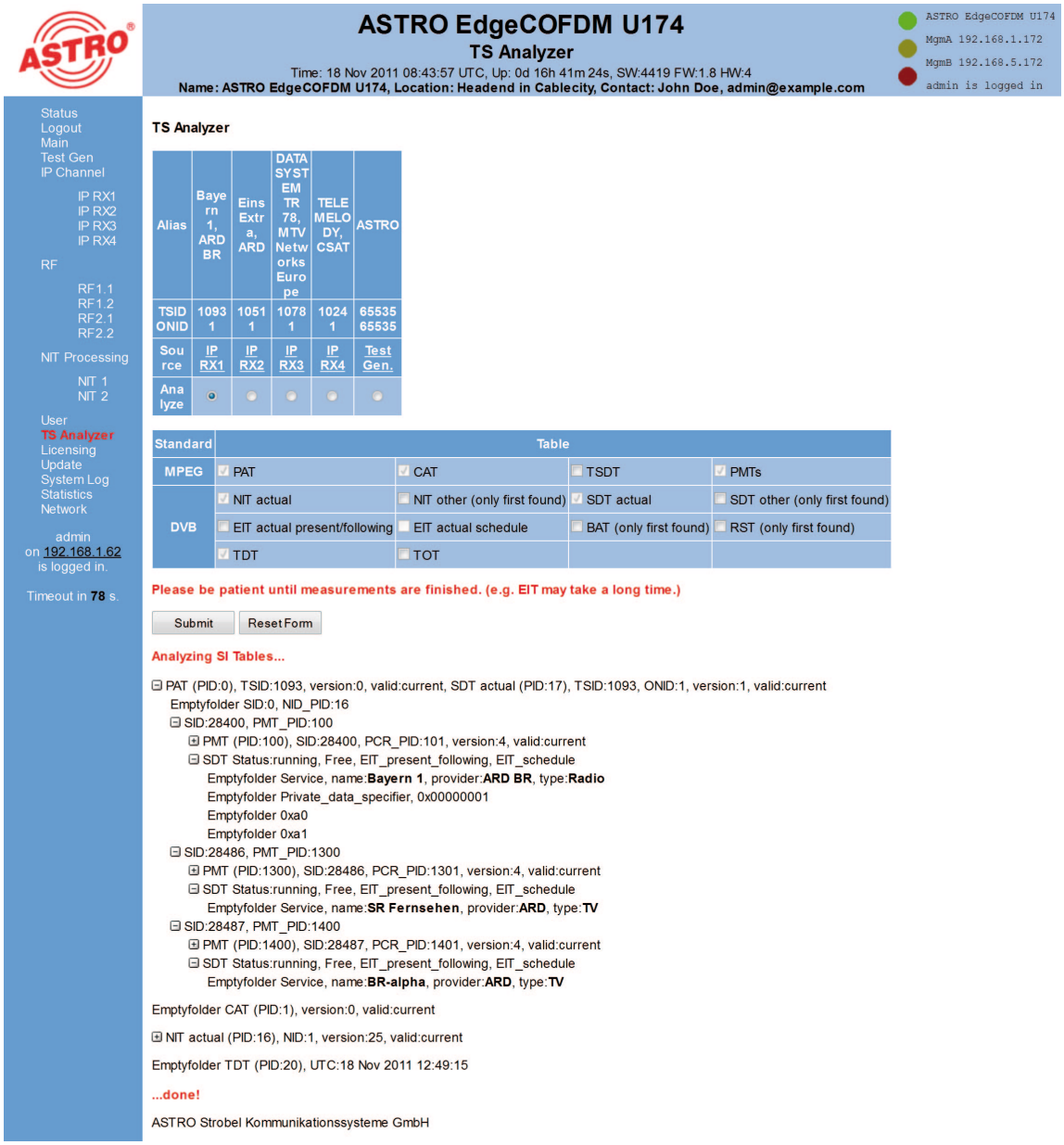


Figure 23: Transport Stream (TS) Analyzer view

The TS Analyzer, available as an option, provides an effective way of checking that the IP input signal is complete in terms of the services / tables it contains. Once an analysis has started, it can take several minutes to complete. The analysis of the EIT (Event Information Table) can, in particular, take somewhat longer.

12 Licensing

The TS Analyzer must be enabled using a licence key. You can purchase the licence key from ASTRO. The text which is sent is copied into the text input field and applied to the device using the “Submit” button.

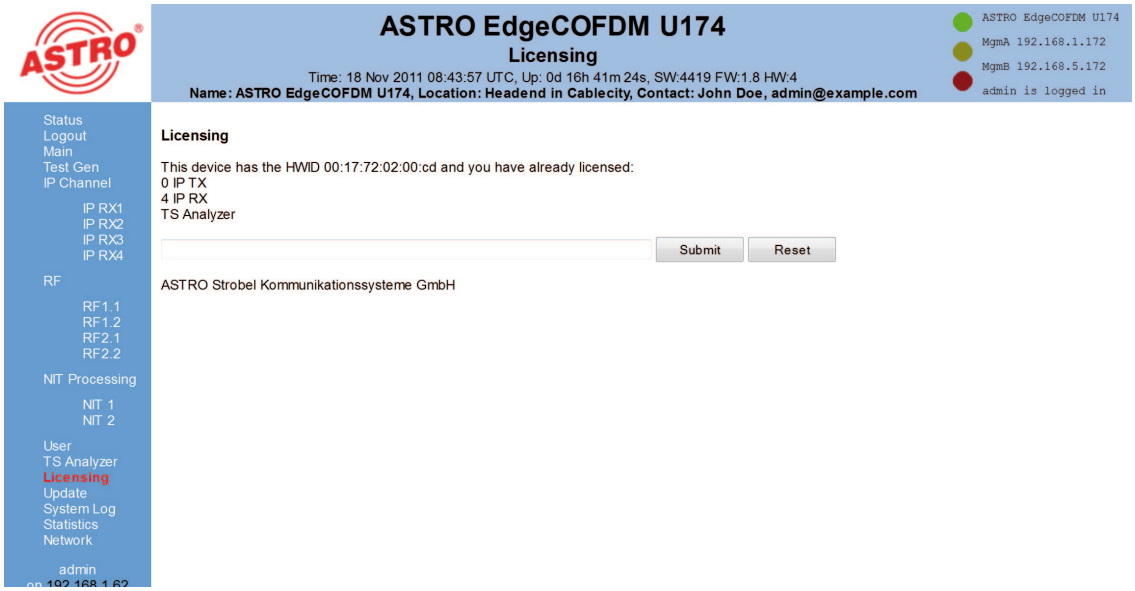


Figure 24: Input mask for licence key

To order licences, you must specify the MAC address of the device. You will find the MAC address on the Web browser interface, in the “Licensing” submenu (HWID). Once you have shared the MAC address, the licence keys are generated at the ASTRO company and issued by e-mail or on a CD.
The format of a licence key is a text document (e.g. Lic001772000222.txt). You can use copy / paste to copy the key(s) into the input mask, and press the “Submit” button to transfer the licences to the U 174. If the licence is valid, this is confirmed by the message “License is valid”. An error message is displayed for an invalid licence.

13 Software update / Saving and loading a configuration

When you click on the “Update” submenu in the left frame, the following window appears (example):

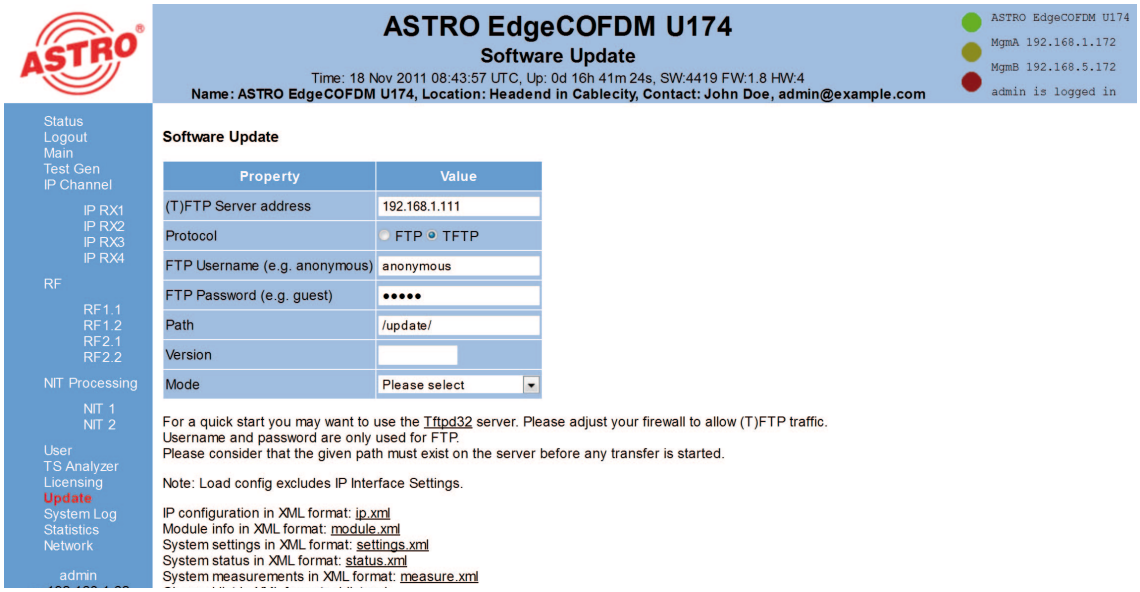


Figure 25: Selecting an action in the “Software Upgrade” submenu

You have the option of performing various actions using (T)FTP here. To configure the U 174 for these actions, the server address (“(T)FTP Server Address” line), the protocols used (“Protocol” line), user name and password (“FTP Username (e.g. anonymous)” and “FTP Password (e.g. guest)” lines) and the path should be saved in the data, or loaded from the data (“Path” line). The path is specified relative to the root directory of the FTP server, and must begin with a “/” and also end with a “/”.

The actions to be performed are selected in the “Mode” line. To ensure the required action can be performed, make sure that the path specified does exist on the server. You must also ensure that any firewall installed allows (T)FTP communication.

Load Config from server:
The configuration stored on the (T)FTP server is copied to the U 174 and activated with immediate effect. The IP settings for the data and management interfaces on the device are not changed. When “Load Config from server” is used, “settings.xml”, “NIT 1.xml” and “NIT 2.xml” are written into the U 174.

Save Config to server:
The current configuration of the U 174 is written onto the (T)FTP server. This configuration contains diverse files:

“ip.xml”:	IP settings for the data and management interfaces
“user.xml”:	User accounts created
“settings.xml”:	All other settings (e.g. IP receiver and modulator settings)
“status.xml”:	Current operating status
“module.xml”:	Description of the device for the controller U 100-C
“measure.xml”:	Reference levels
“chlist.xml”:	Allocation of the channel names to the image carrier frequencies
“NIT 1.xml”:	NIT no.1 for installation in a pair of output channels
“NIT 2.xml”:	NIT no.2 for installation in a pair of output channels

Update firmware from server:
If this action is selected, then the required software version must be specified in the “Version” line (max. 4 characters). After the update is complete, the following message appears: “Firmware update from SD card OK Ready Please Reboot to use new firmware“. After a reboot, the device will operate with the new firmware.

Load firmware from server:
A software version stored on the server is saved on the SD card of the U 174. The old software version will continue to run after a reboot. Several different software versions can be saved on the SD card.

Update firmware from SD card:
The required software version must also be specified in the “Version” line when this action is performed. If a version is selected which has not been saved to the SD card, then an error message appears.

Overwrite backup firmware:
The U 174 can also be operated from the so-called “Backup area”. This may occur when there is a fault in the standard area of the internal Flash memory of the U 174. The device does not fail, however will in this case operate from the “Backup area” of the internal Flash memory. The firmware found in this area is the so-called “Backup firmware”. To prevent unwanted operating states, this “Backup firmware” should be overwritten after completing an update.

Note:
If the U 174 is running in the backup area, then the action “Overwrite backup firmware” must not, under any circumstances, be started in this operating mode. This will result in a complete failure of this device, which will need to be returned to the manufacturer!

13.1 Update using a TFTP server for Windows as an example

If no fixed (T)FTP server has been set up for the U 174 update, you also have the option of transferring locally saved update files onto the device. In this case, using a TFTP programme is recommended. The procedure is described in the following section using the “Tftpd32” programme.

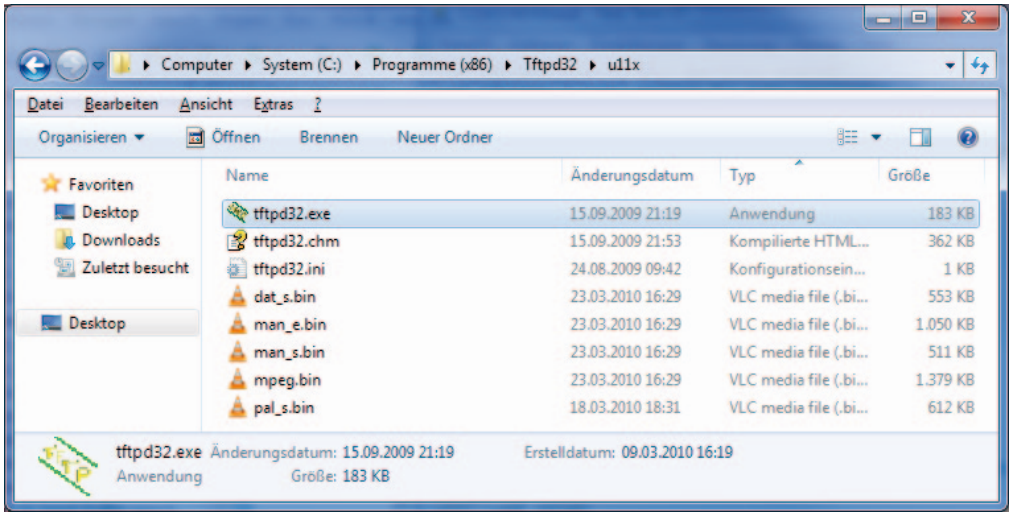


Figure 26: Example view of the U 154 update folder with update files and “tftpd32” TFTP programme.

The “tftpd32” programme is started directly from the folder with the U 174 update files. In the window that appears, you first press the “Settings” button, then enter the settings according to Figure 27:

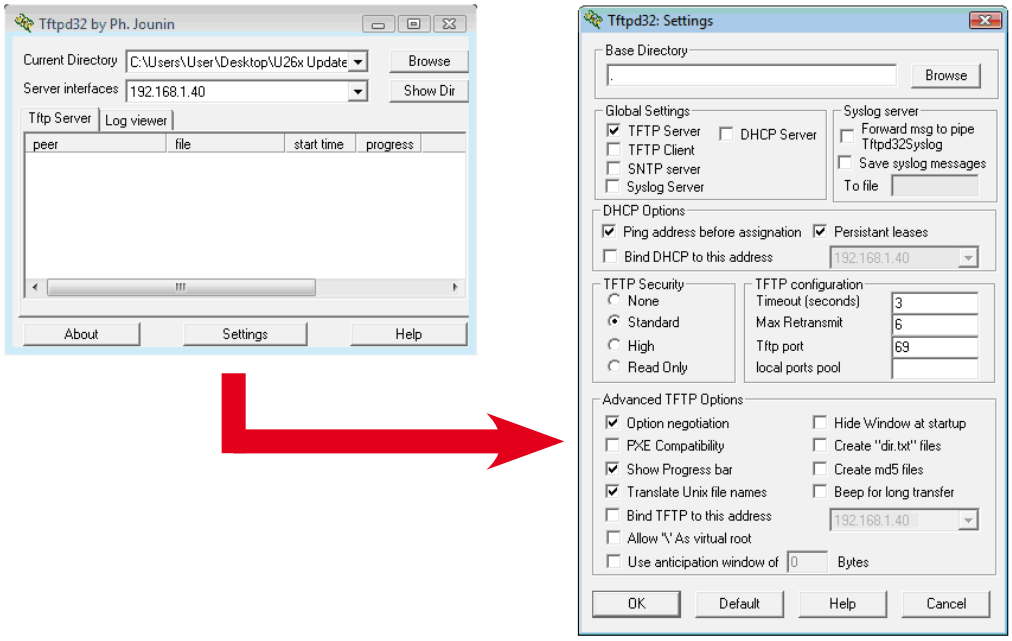


Figure 27: Settings for the tftpd32 TFTP programme

To start the update, the IP address of the local computer must be entered as the server address in the line “(T)FTP Server address” (Figure 23), and the protocol must be set to TFTP. This makes entering a user name and a password unnecessary. You now select the option “Update” in the “File” line, and press the “Submit” button to start the update.

NOTE:

A reboot or a network failure during an update process can cause an irreversible crash of the U 174 software. The device then has to be returned to ASTRO for repair.

14 System log

You can access the log of the U 174 by clicking on the “System Log” submenu. All the procedures relevant to the operation of the device are documented here. Additionally, the SNMP settings are made here (defining the trap recipients, the trap community & the trap filter). The “Log file filter” line can also be used to define which events lead to an entry in the log.

ASTRO EdgeCOFDM U174

System Log

Time: 18 Nov 2011 08:43:58 UTC, Up: 0d 16h 41m 25s, SW:4419 FW:1.8 HW:4

Name: ASTRO EdgeCOFDM U174, Location: Headend in Cablecity, Contact: John Doe, admin@example.com

ASTRO EdgeCOFDM U174
MgmA 192.168.1.172
MgmB 192.168.5.172
admin is logged in

Status
Logout
Main
Test Gen
IP Channel
IP RX1
IP RX2
IP RX3
IP RX4
RF
RF1.1
RF1.2
RF2.1
RF2.2
NIT Processing
NIT 1
NIT 2
User
TS Analyzer
Licensing
Update
System Log
Statistics
Network
admin on 192.168.1.62 is logged in.
Timeout in 291 s.

System Log Settings

Property	Value 1	Value 2	Value 3	Value 4
Log file filter	☑ Emergency, ☑ Alert, ☑ Critical, ☑ Error, ☑ Warning, ☑ Notice, ☑ Info, ☑ Debug			
Syslog server	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0
Syslog filter	☑ Emergency, ☑ Alert, ☑ Critical, ☑ Error, ☑ Warning, ☑ Notice, ☑ Info, ☑ Debug			
SNMP trap receiver	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0
SNMP trap community	public	public	public	public
SNMP trap filter	☑ Emergency, ☑ Alert, ☑ Critical, ☑ Error, ☑ Warning, ☑ Notice, ☐ Info, ☐ Debug			
SNMP access	◉ on ○ off			
SNMP GET/SET community Access permission	public ☑ Read ☐ Write	☐ Read ☐ Write	☐ Read ☐ Write	☐ Read ☐ Write
SNMP authentication failure trap	◉ on ○ off			
Debug log file	◉ on ○ off			

Note: Use empty fields for unused SNMP addresses or communities.

Submit | Reset Form

SNMP MIBs

AstroStrobel.mib
AstroStrobel-EdgeCOFDM.mib

System Log

Refresh | Check box to clear log on refresh ☐

System log in CSV format: log.csv
Debug log in CSV format: debug.csv
Use right click and "save as" to save locally.

IP configuration in XML format: ip.xml
Module info in XML format: module.xml
System settings in XML format: settings.xml
System status in XML format: status.xml
System measurements in XML format: measure.xml
Channel list in XML format: chlist.xml

English manual: u174mane.pdf
German manual: u174mang.pdf
Use right click and "save as" to save locally.

number	time	uptime	user	source	severity	message
1	18 Nov 2011 08:43:22 UTC	0d 16h 40m 49s	admin	192.168.1.62	info	Login
2	18 Nov 2011 08:16:25 UTC	0d 16h 13m 52s	system	local	info	Login timeout
3	18 Nov 2011 08:04:29 UTC	0d 16h 01m 56s	admin	192.168.1.62	info	Login
4	18 Nov 2011 07:38:20 UTC	0d 15h 35m 47s	system	local	info	Login timeout
5	17 Nov 2011 10:39:26 UTC	0d 00h 00m 33s	boot	local	info	SW:4419 FW:1.8 HW:4
6	17 Nov 2011 10:39:25 UTC	0d 00h 00m 32s	boot	local	notice	ASTRO EdgeCOFDM U174
7	17 Nov 2011 10:39:25 UTC	0d 00h 00m 32s	boot	local	debug	Start HTTP watchdog
8	17 Nov 2011 10:39:25 UTC	0d 00h 00m 32s	boot	local	debug	Start HTTPD
9	17 Nov 2011 10:39:24 UTC	0d 00h 00m 31s	boot	local	debug	Start measurements
10	17 Nov 2011 10:39:24 UTC	0d 00h 00m 31s	boot	local	debug	Start SI analyzer
11	17 Nov 2011 10:39:23 UTC	0d 00h 00m 30s	boot	local	debug	Set RF channels
12	17 Nov 2011 10:39:23 UTC	0d 00h 00m 30s	boot	local	debug	Start gratuitous ARP
13	17 Nov 2011 10:39:22 UTC	0d 00h 00m 29s	boot	local	debug	Start serial FP
14	17 Nov 2011 10:39:22 UTC	0d 00h 00m 29s	boot	local	debug	Start display
15	01 Jan 1970 00:00:26 UTC	0d 00h 00m 26s	boot	local	debug	Init ADC2
16	01 Jan 1970 00:00:26 UTC	0d 00h 00m 26s	boot	local	debug	Init ADC1
17	01 Jan 1970 00:00:26 UTC	0d 00h 00m 26s	boot	local	debug	Init MOD2
18	01 Jan 1970 00:00:26 UTC	0d 00h 00m 26s	boot	local	debug	Init MOD1
19	01 Jan 1970 00:00:25 UTC	0d 00h 00m 25s	boot	local	debug	Init DAC2
20	01 Jan 1970 00:00:25 UTC	0d 00h 00m 25s	boot	local	debug	Init DAC1
21	01 Jan 1970 00:00:24 UTC	0d 00h 00m 24s	boot	local	debug	Init PLL
22	01 Jan 1970 00:00:17 UTC	0d 00h 00m 17s	boot	local	debug	Load OFDM_S
23	01 Jan 1970 00:00:17 UTC	0d 00h 00m 17s	boot	local	debug	Set IP channels
24	01 Jan 1970 00:00:17 UTC	0d 00h 00m 17s	boot	local	debug	Start snmpd
25	01 Jan 1970 00:00:16 UTC	0d 00h 00m 16s	boot	local	debug	Init services
26	01 Jan 1970 00:00:14 UTC	0d 00h 00m 14s	boot	local	debug	Init eth interfaces
27	01 Jan 1970 00:00:11 UTC	0d 00h 00m 11s	boot	local	debug	Load settings
28	01 Jan 1970 00:00:10 UTC	0d 00h 00m 10s	boot	local	info	Coldstart
29	01 Jan 1970 00:00:10 UTC	0d 00h 00m 10s	boot	local	info	SW:4419 FW:1.8 HW:4
30	01 Jan 1970 00:00:10 UTC	0d 00h 00m 10s	boot	local	notice	ASTRO EdgeCOFDM U174

HWID 00:17:72:02:00:cd

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Figure 28: System log settings

The SNMP MIBs available are stored on the U 174 and can be downloaded from the device.

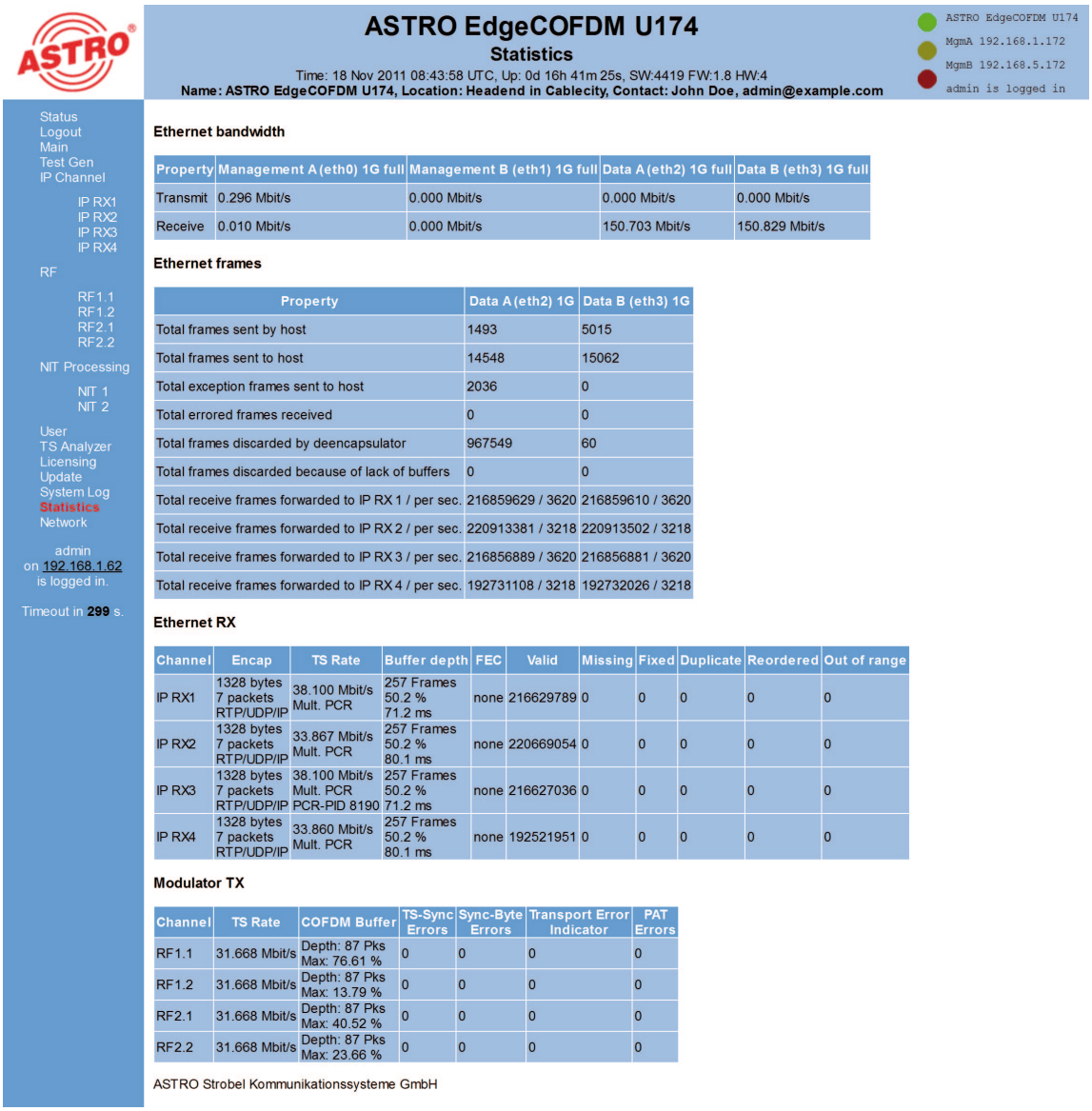
The operations listed in the system log are sorted according to the time they occurred. To delete the log file, you tick “Check box to clear log on refresh”, and click on the “Refresh” button. The first entry in the log will then be the deletion operation, together with the time and the user account, as well as the IP address of the user.

NOTE:

- Download the IP configuration using the link “ip.xml”
- Download the module information using the link “module.xml”
- System settings using the link “settings.xml”
- System entries using the link “status.xml”
- Download the measurements for the reference level using the link “measure.xml”
- Download the channel list using the link “chlist.xml”

15 Statistics

You can access the statistics on the data transfer by the U 174 by clicking on the “Statistics” sub-menu. All the statistics relevant to the operation of the device and its analysis are displayed here.



ASTRO EdgeCOFDM U174

Statistics

Time: 18 Nov 2011 08:43:58 UTC, Up: 0d 16h 41m 25s, SW:4419 FW:1.8 HW:4

Name: ASTRO EdgeCOFDM U174, Location: Headend in Cablecity, Contact: John Doe, admin@example.com

ASTRO EdgeCOFDM U174
MgmA 192.168.1.172
MgmB 192.168.5.172
admin is logged in

Status
Logout
Main
Test Gen
IP Channel
IP RX1
IP RX2
IP RX3
IP RX4
RF
RF1.1
RF1.2
RF2.1
RF2.2
NIT Processing
NIT 1
NIT 2
User
TS Analyzer
Licensing
Update
System Log
Statistics
Network

admin on 192.168.1.62 is logged in.

Timeout in **299** s.

Ethernet bandwidth

Property	Management A (eth0) 1G full	Management B (eth1) 1G full	Data A (eth2) 1G full	Data B (eth3) 1G full
Transmit	0.296 Mbit/s	0.000 Mbit/s	0.000 Mbit/s	0.000 Mbit/s
Receive	0.010 Mbit/s	0.000 Mbit/s	150.703 Mbit/s	150.829 Mbit/s

Ethernet frames

Property	Data A (eth2) 1G	Data B (eth3) 1G
Total frames sent by host	1493	5015
Total frames sent to host	14548	15062
Total exception frames sent to host	2036	0
Total errored frames received	0	0
Total frames discarded by deencapsulator	967549	60
Total frames discarded because of lack of buffers	0	0
Total receive frames forwarded to IP RX 1 / per sec.	216859629 / 3620	216859610 / 3620
Total receive frames forwarded to IP RX 2 / per sec.	220913381 / 3218	220913502 / 3218
Total receive frames forwarded to IP RX 3 / per sec.	216856889 / 3620	216856881 / 3620
Total receive frames forwarded to IP RX 4 / per sec.	192731108 / 3218	192732026 / 3218

Ethernet RX

Channel	Encap	TS Rate	Buffer depth	FEC	Valid	Missing	Fixed	Duplicate	Reordered	Out of range
IP RX1	1328 bytes 7 packets RTP/UDP/IP	38.100 Mbit/s Mult. PCR	257 Frames 50.2 % 71.2 ms	none	216629789	0	0	0	0	0
IP RX2	1328 bytes 7 packets RTP/UDP/IP	33.867 Mbit/s Mult. PCR	257 Frames 50.2 % 80.1 ms	none	220669054	0	0	0	0	0
IP RX3	1328 bytes 7 packets RTP/UDP/IP	38.100 Mbit/s Mult. PCR PCR-PID 8190	257 Frames 50.2 % 71.2 ms	none	216627036	0	0	0	0	0
IP RX4	1328 bytes 7 packets RTP/UDP/IP	33.860 Mbit/s Mult. PCR	257 Frames 50.2 % 80.1 ms	none	192521951	0	0	0	0	0

Modulator TX

Channel	TS Rate	COFDM Buffer	TS-Sync Errors	Sync-Byte Errors	Transport Error Indicator	PAT Errors
RF1.1	31.668 Mbit/s	Depth: 87 Pks Max: 76.61 %	0	0	0	0
RF1.2	31.668 Mbit/s	Depth: 87 Pks Max: 13.79 %	0	0	0	0
RF2.1	31.668 Mbit/s	Depth: 87 Pks Max: 40.52 %	0	0	0	0
RF2.2	31.668 Mbit/s	Depth: 87 Pks Max: 23.66 %	0	0	0	0

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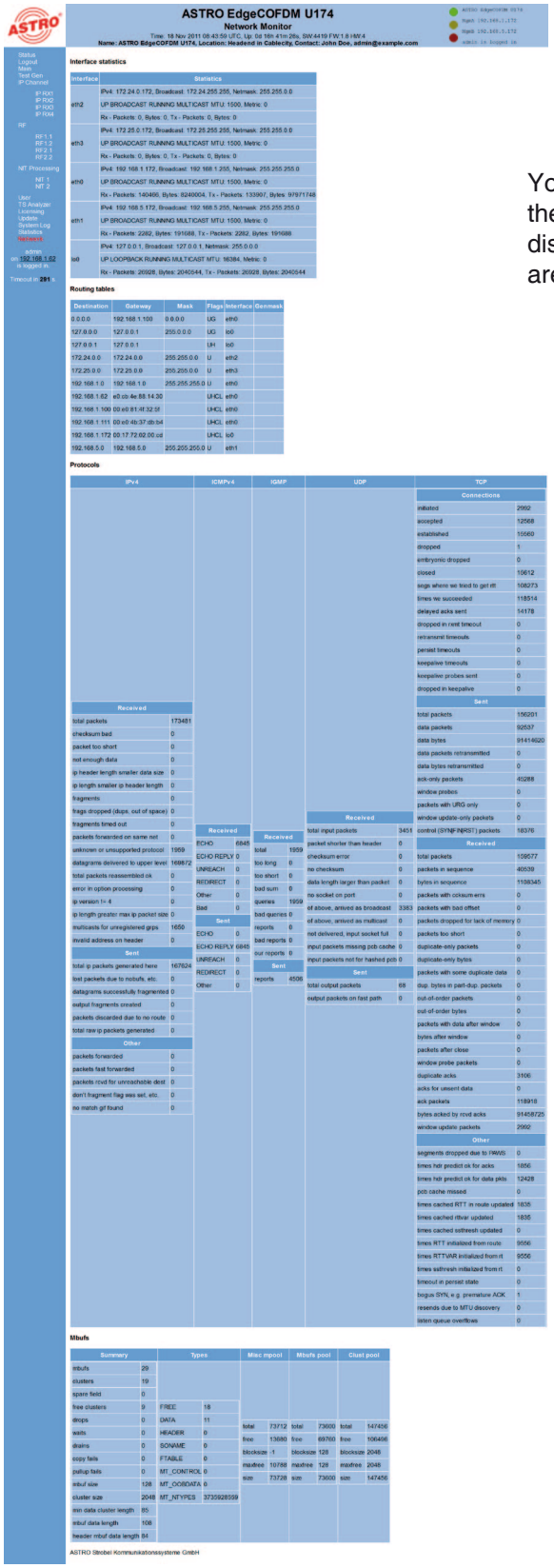
Figure 29: Statistics on the data transfer

16 Network properties



You can access the network properties by clicking the “Network Monitor” submenu. The properties displayed are purely for information purposes, and are used to describe the network.

Figure 30: Example view of the network properties in the “Network Monitor” submenu

17 Logout

Clicking on the “Logout” submenu (only available when you are logged in) will reroute you to the U 174 logout.

Figure 31: Logging out of the U 174

If you confirm the request by clicking “Yes”, you will be logged out. No further settings can be made without logging in again, but you do have the option of viewing the settings in the U 174. However, the setting elements are inactive.

18 Technical data

Type		U 100 - 48	U 100 - 230
Order number		380 100	380 101
EAN code		4026187611064	4026187611149
Network interfaces (passive routing to U 1xx)			
Management		2 x 100 Base-T Ethernet (RJ 45)	
Data		2 x 1000 Base-T Ethernet (RJ 45)	
Protocol		IEEE802.3 Ethernet, RTP, ARP, IPv4, TCP/UDP, HTTP, SNTP, IGMPv3	
Transport stream processing			
TS capsulation		UDP, UDP / RTP, 1-7 packets, FEC	
Transport stream processing		transparent (188 or 204 packets)	
Control and management			
Features		Control via HTTP / WEB	
Protocol		HTTP / SNMP (error messages)	
General data			
Voltage supply	[V]	- 48 V DC	230 V AC
Power consumption	[W]	depends on mounting	
Dimensions		19" / 1 HE	
Ambient temperature	[°C]	0...+45	

Type		U 174
Order number		380 174
EAN code		4026187611026
Network interfaces (passive routing to U 1xx)		
Management		2 x 100 Base-T Ethernet (RJ 45)
Data		2 x 1000 Base-T Ethernet (RJ 45)
Protocol		IEEE802.3 Ethernet, RTP, ARP, IPv4, TCP/UDP, HTTP, SNTP, IGMPv3
Transport stream processing		
TS capsulation		UDP, UDP / RTP, 1-7 packets, FEC
Packet length	[Bytes]	188 / 204
COFDM modulator		
COFDM Mode		2k
Carrier modulation		QPSK; 16 QAM - 64 QAM
Bandwidth	[MHz]	6, 7, 8
Maximum gross data rate	[Mbit/s]	31.668
Signal processing		accord. to DVB standard
Coding rates		1/2, 2/3, 3/4, 5/6, 7/8
Guard intervals		1/4, 1/8, 1/16, 1/32
Data rate adjustment		☑
PCR correction (< 500 ns accord. to		☑
NIT handling (static)		☑
PID remapping		☑
PID filtering		Drop or Pass PID-Filter
MER (equalizer)	[dB]	≥ 43
Shoulder attenuation	[dB]	> 56 (< 700 MHz); > 54 (≥ 700 MHz)
HF modulator		
Connectors	[Ω]	75, 2 x F-jack
Frequency range	[MHz]	47 - 862, digitally modulated
Frequency deviation	[kHz]	< 10
Output level	[dBµV]	114
Intermodulation distance	[dB]	> 60
Return loss	[dB]	> 14
Spurious frequency distance	[dB]	> 60
General data		
Power consumption	[W]	28.1

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