GOING FUTURE TODAY.

U 164
U 164-X

DVB-C/T/T2 to IP Streamer

Operating Manual

Version 10-2018A

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).

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.

Copyright information

Parts of the software used with this product originate from third-party vendors and were developed under a variety of licensing conditions. Detailed information on the licences can be found on the device's web user interface. If you select the menu item “Licensing” on the web browser interface of the device, you will find a link to a page with detailed information.
You can obtain the source code for licence-free parts of the software upon request and against payment of a processing fee.
Please contact us at:

kontakt@astro-strobel.de
ASTRO Bit
Olefant 1-3
D-51427 Bergisch Gladbach (Germany)
Tel.: (+49) 2204 405-0

All other parts of the software used with this product are subject to the copyright owned by
.

Proper use

The devices of the U 1xx- and U 2xx series are only used for converting signals of different modulation to / from IP data streams in multimedia cable networks. The power supply unit U 100 SNT eco / U 100 SNT eco+ may only be used for the power supply of the U 1xx- and U 2xx units within the base unit U 100-230. 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 headend technology are qualified experts who have training enabling them to perform the work required in accordance with EN 60728-11 and EN 60065. Unqualified person are not allowed to install and start operation of the device.

Device configuration

Target group for the configuration of the ASTRO headend are persons who have received instructions and have training enabling them to perform a configuration. Knowledge of EN 60728-11 and EN 60065 is not necessary for configuration.

Device description

The delivery is comprised of the following parts:

- ☐ U 164 resp. U 164-X DVB-C/DVB-T/DVB-T2 in IP streamer, including a display module and backplane
- ☐ Operating manual

The U 164 resp. U 164-X plug-in module and the U 100 base unit feature a CE marking. This confirms that the products conform to the relevant EC directives and adhere to the requirements specified therein.

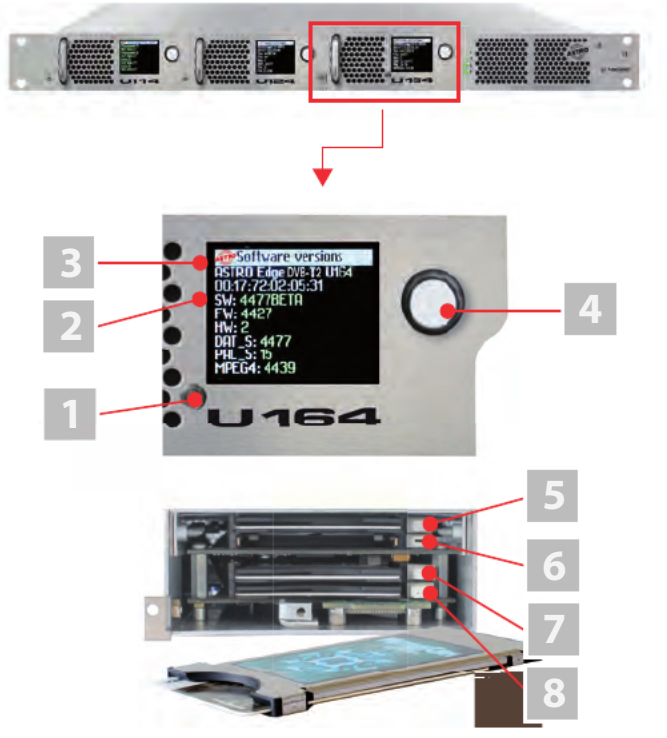
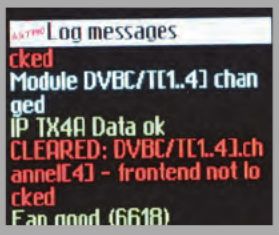
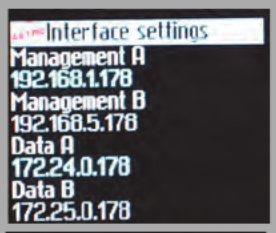
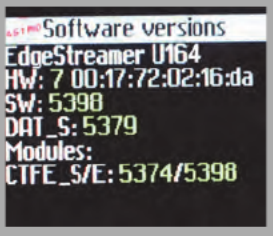


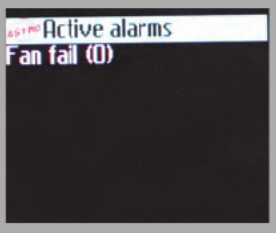
Figure 1: U 164

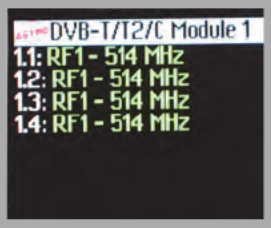
Figure 1, top:
U 164, installed in the U 100 base unit (fitted with three plug-in modules)
Figure 1, middle:
U 144, front panel
[1] Screw for the front panel
[2] Display for management IP addresses, data IP addresses, status messages, etc.
[3] Status display
[4] Control and data knob, menu switch
Figure 1, bottom:
U 194, front panel after removal
[5] Release button, CI-slot 1
[6] Release button, CI-slot 2
[7] Release button, CI-slot 3
[8] Release button, CI-slot 4

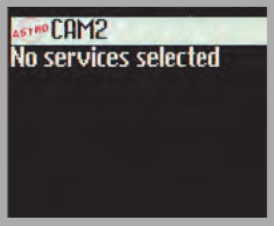












HINWEIS: Turning the data knob [4] (fig. 2, above) allows you to navigate through the individual menu items in the device display. Press the data knob to switch on the display.

The ASTRO logo will be the first display to appear following activation.

Turning the data knob clockwise allows to you access the individual displays:

- Log messages: The last messages entered in the log book are displayed.
- Interface settings: IP addresses of the network interface.
- Software versions: The version of the plug-in module software currently installed is displayed.
- Active alarms: The current error messages are displayed.
- DVB-T/T2/C module 1: The status of the four channels set is displayed.
- CAM modules 1 - 4 The respective reception channel forwarded to the CAM module is displayed.

.

The different text colours refer to:

- Red: Error (the corresponding display in the web interface log book is: “error”)
- Yellow: Warning (the corresponding display in the web interface log book is: “warning”)
- Purple: Critical error (the corresponding display in the web interface log book is: “critical / alert / emergency”)
- Light blue: Info (the corresponding display in the web interface log book is: “info”)
- Light green: Notice (the corresponding display in the web interface log book is: “notice”)

Important safety information

To avoid any potential risks to the greatest 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.

Installation and operation

- ☐ 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 module can only be installed in U 100-230 and U 100-48 base units. The safety information in the operating manuals of the base units must be obeyed in addition to the safety information described in this manual.
- ☐ The installation site must be planned in a way that prevents children from playing with the device and its connections.
- ☐ In order to prevent inadmissible operating statuses from occurring, only the components described in this manual, or components approved by the manufacturer for the base unit, may be used.
- ☐ 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 (minimum interval of 20 cm to other objects). Installing the device in a niche or covering the ventilation openings 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 splash water or drip water, condensation or similar effects of water, as this may impair the isolation from the mains voltage.
- ☐ Do not install the unit in locations with excessive dust formation, as this may impair the isolation from the mains voltage.

Electromagnetic compatibility (EMC)
In order to avoid malfunctions from occurring when operating radio and telecommunications equipment, as well as other operating units or broadcasting services, the following points must be observed:

- ☐ Before installation, the device must be checked for mechanical damage. Damaged or bent covers or housings may not be used.
- ☐ During operation, the device must always be covered by the components provided for this purpose. Operation with an opened cover is not permitted.
- ☐ The braided line or the contact springs may not be damaged or removed.

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. There may still be voltages in the device that are dangerous to touch. You may therefore not open the device.
- Read carefully: EN 60728-11 – Part 1, Safety requirements / No service tasks during electrical storms!

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.

General information

- Store or use the device in a safe location, well out of reach of small children. It may contain small parts that can be swallowed or inhaled. Dispose of any small parts that are not needed.
- Plastic bags may have been used for packaging the device. Keep these plastic bags away from babies and children in order to avoid any danger of suffocation. Plastic bags are not toys.
- Do not store the device near chemicals or in places in which a leakage of chemicals may occur. Organic solvents or fluids in particular may cause the housing and/or cables to melt or disintegrate, presenting a danger of fire or electric shock. They may also cause device malfunctions.

Warranty conditions

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

Disposal

All our packaging materials (cardboard boxes, insert sheets, plastic films and bags) are fully recyclable. After use, this device must be disposed of as electronic waste in an orderly manner according to the current disposal regulations of your district / country / state.

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

Performance description

The U 164 resp. U 164-X uses an input socket for reception of up to four DVB-C, DVB-T or DVB-T2 streams. The output signals from the four DVB-C, DVB-T or DVB-T2 receivers can each be routed to one of four CAM modules in total for decryption. The output signals from the four CAM modules can each be routed via a multiplexer to one of the eight IP transmitters, or be fed back to one of the other CAM modules.
Optionally, the output signals from the DVB-C/T/T2 receiver can also be routed directly to one of the IP transmitters.
The two Ethernet data ports in the U 164 resp. U 164-X can then be used to output up to 8 IP video data streams.

To use the devices properly, read the following safety and operating instructions attentively.

The U 164 resp. U 164-X plug-in module features the following performance characteristics:

- Conversion of up to 4 DVB-C, DVB-T or DVB-T2 input signals into 8 IP gigabit multicast groups
- 24 streams per height unit possible
- Easy configuration using web browser interface

The U 164-X module additionally features scrambling of L1 post signalling for DVB-T2.

Connecting and installing the module

HINWEIS: The instructions for the base unit U 100 include a description of how to prepare the base unit for installation.
Observe that you need to insert an SD memory card into the module prior to installation in the base unit (see figure at left).

Coding and installing the backplane

A backplane is included with every U 1xx signal converter. This is used to establish a mechanical connection between the signal converter and the base unit. Both the mains HF connections and the network connections are connected to this
backplane. There is usually a temperature-controlled fan for cooling the signal converter on the backplane. This can be replaced while the device is operating.
To ensure the position of the backplane, and therefore the position of the respective signal converter in the U 100 base unit, is correct, you must plug a corresponding jumper into the circuit board on the backplane. Proceed as described in the following.

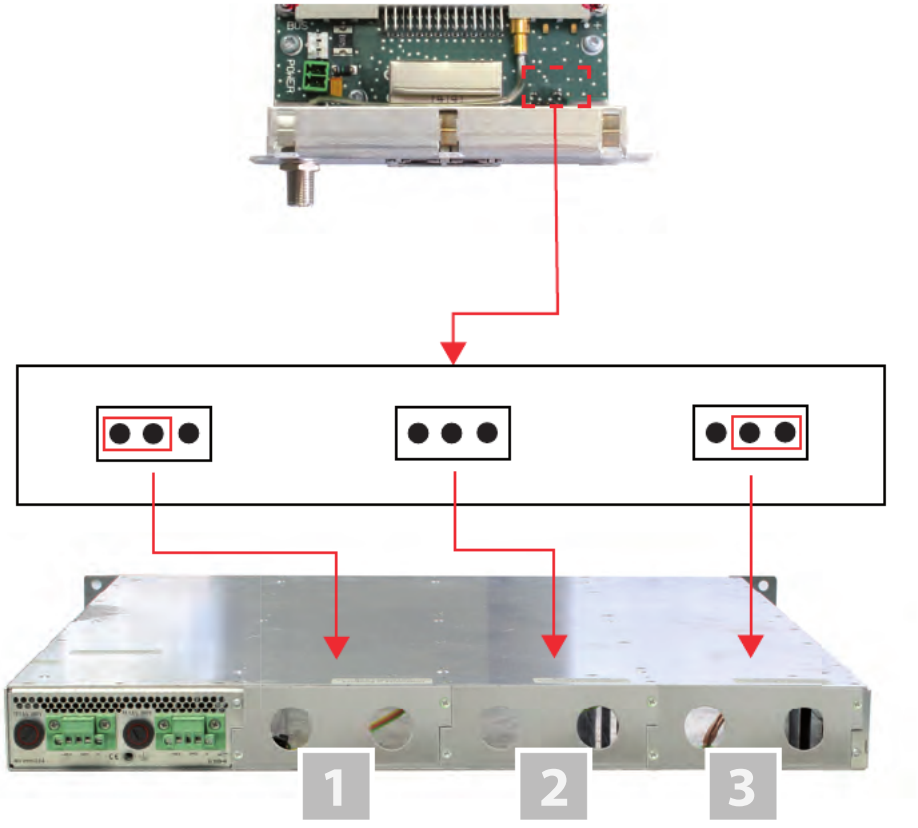


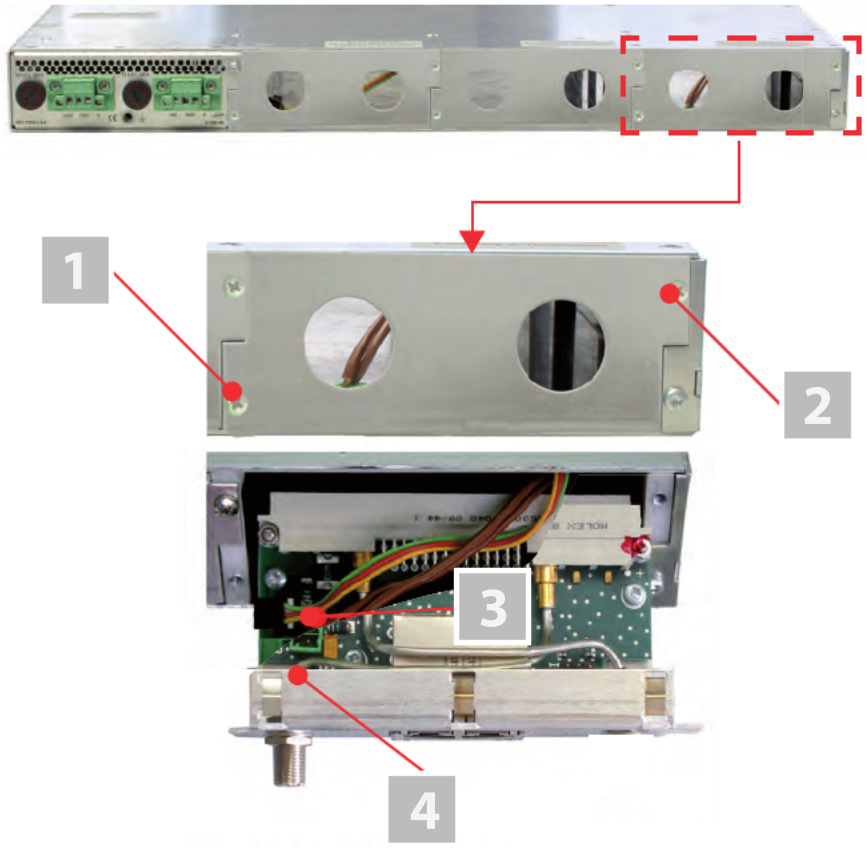
Figure 2: Coding the backplane by plugging in the jumper

[1] Left slot
[2] Middle slot
[3] Right slot

To prepare the backplane for installation, proceed as follows:
Plug the jumper into the installation position provided in accordance with figure 3.

HINWEIS: A jumper which has not been correctly plugged into the corresponding installation position will result in incorrect LED displays on the front of the U 100 base unit (see section "Device description"). Furthermore, the correct position cannot be displayed on the web browser user interface.

You can now install the backplane in the base unit. To do so, proceed as follows:



[1, 2] Phillips-head screws
[3] Cable for signal supply
[4] Cable for power supply

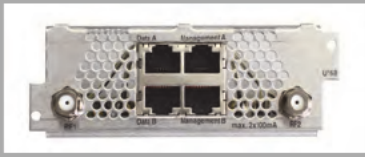
Figure 3: Installing the backplane in the base unit

AUFGABE

1. When the U 100 base unit is in its delivery state, the three installation slots for the backplanes are covered by dummy plates (see figure 3, above). Start by removing the Phillips-head screws [1] and [2] from the dummy plate at the required installation position (left, middle or right) and remove the dummy plate.
2. You can now see the two connection cables for the selected slot (power supply and signal cable). Connect the cables to the backplane as shown in figure 3 (above).
3. Now carefully insert the backplane into the slot of the U 100. Make sure the cables are not jammed. You can push the backplane into the housing by applying light pressure.

ERGEBNIS:

The backplane is now connected and installed. Once installed, it should correspond to the figure at the left.



Inserting CI cards

HINWEIS: CI cards can also be inserted and removed while the module is operating.

Before you can insert the CI cards, you must undo the screw connection [1] on the front panel of the device (see fig. 5, below) and remove the front panel together with the display. The four CI slots and the release buttons for ejecting the CI modules are visible.
Start by pushing each CI card into a CI module, and then push each module into one of the four CI slots in the device.
To remove a CI module, press the corresponding eject button and remove the module.

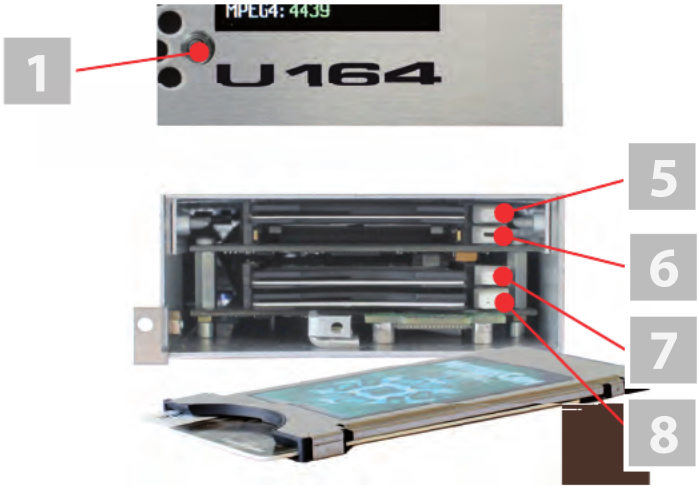
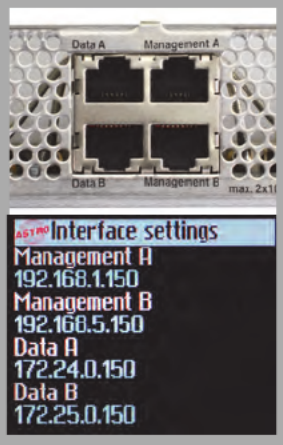


Figure 4: CI slots

[1] Screw for the front panel
[5] Release button, CI-slot 3
[6] Release button, CI-slot 4
[7] Release button, CI-slot 3
[8] Release button, CI-slot 4

Quick start - starting operation of the device



Connecting the U 164 or U 164-X to a PC or laptop

To be able to configure the U 164, you now need to connect the network sockets (Management A or Management B) on the backplane of the device (see figure at left) to your PC or laptop using a network cable.

Once you have connected the base unit to the power supply, the device will switch on automatically. Once it has booted (approx. 90 seconds), the ASTRO logo initially appears in the display.
Turn the knob to the right of the display clockwise until the menu item “Interface settings” is displayed. The two management IP addresses (Management A and Management B) for the device now appear in the upper lines.
Make a note of the address of the management connection which you are using for your PC or laptop to ensure you can enter this in the address line of your web browser later on.

HINWEIS: Please note that your PC or laptop must be in the same sub-network as the U 164! The sub-network mask of the device is set to 255.255.255.0 upon delivery. The PC or laptop which is connected must therefore be assigned an IP address 192.168.1.x.

You can now start the configuration using the web browser user interface.

General information on the structure of the web browser interface

The configuration interface is divided into the following sub-areas:

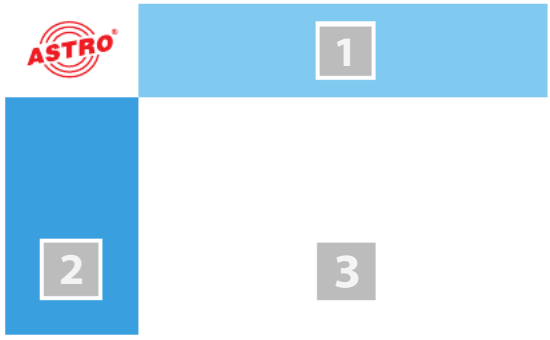


Figure 5: Structure of the web browser interface

- **Status line (header) [1]:** displays general information on the module.
  SW: Software status
  HW: Hardware version
  Up: Runtime since the system was booted
  Time: Date and time
  Name, location, contact: corresponds to the settings which were made in the “User settings” configuration area
- **Navigation menu [2]:** displays the individual configuration areas which can be selected by clicking the mouse. A detailed description of these areas can be found on the following pages of this chapter.
- **Content area [3]:** The respective configuration form – depending on the menu item selected – is displayed here.

HINWEIS: The browser display is not updated automatically. Use the corresponding button in the menu of your browser to update the display.

Logging in

To log in, enter the IP address of the device, which appears in the device display, in the address line of the browser. The menu page “Status” will then appear. Select the item “Log in” from the navigation menu at the left. The input mask for the log in should then appear (see figure 6, below). In delivery state, you must use the following log-in data:

- **User name:** “user” or “admin” (input without inverted commas)
- **Password:** astro

Figure 6: Log in

After logging in, the start page of the device with all relevant system information will appear. The navigation menu and the log-in status display will appear at the left.

Only one user can be logged into the user interface of the U 164 at a time. The current user is displayed in the column at the left, below the menu.

The device status is indicated by a green or red circle. If a green circle is displayed, the device is operational. If the circle is red, then a fault has occurred.

A list of current errors is available under the menu item “Active alarms”.

HINWEIS: For reasons of security, you should change the access data valid upon delivery (user name and password) to prevent unauthorised access!
The procedure is described in the section “Changing user data”.

Changing the IP address

HINWEIS: If you wish to change the IP address, then the settings on the PC must be changed accordingly.

Start by changing the IP addresses for the management and the data port. To do so, click on the item “Main” in the menu at the left. You will now see the following table in the content area:

IP Interface Settings

Property	Management A (eth0)	Management B (eth1)	Data A (eth2)	Data B (eth3)
MAC	00:17:72:02:00:d0	00:17:72:03:00:c0	00:17:72:04:00:d0	00:17:72:05:00:d0
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 . 150	192 . 168 . 5 . 150	172 . 24 . 0 . 150	172 . 25 . 0 . 150
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

Figure 7: Changing the IP address

You can enter the IP addresses for management ports A and B as well as for data ports A and B in the “Address” line. Make sure that you activate the ports being used by activating the corresponding radio button in the line “Active”.

To save your changes, click on the “Submit” button below the last table.

More information on configuring the IP address can be found in the section “Configuring IP interfaces, IP management and base unit”.

The signal flow in the U 164 and U 164-X

The overview on page 11 shows the possible signal paths for the device. The specific signal flow can be divided into the following sub-areas:

- A DVB-C/T/T2 signal can be fed in using the F socket. The input signal to the socket (RF) is transmitted to the front end.
- Four reception channels (Ch 1.1 - 1.4 and Ch 2.1 - 2.4) can be configured for the frontends.
- The signals from the four reception channels are forwarded via a multiplexer (CAM Mux) to CAM modules 1 to 4 (the overview shows, as an example, the signal from reception channel 1 to CAM 1 and the signal from reception channel 3 to CAM 2; see the red line connecting them).
- The output signals from the four CAM modules can also be transmitted via another multiplexer (TX Mux) to IP transmitters 1 to 8 respectively (the overview shows, as an example, the signal from CAM 2 to transmitter 1, the signal from CAM 3 to transmitter 3; see the red line connecting them). The output signals from the four reception channels can also be transmitted directly via the multiplexer (TX Mux) – bypassing the CAM decryption – to one of the 8 IP transmitters.
- Each of the output signals from the 8 IP transmitters can be forwarded to data port A and/or data port B respectively.

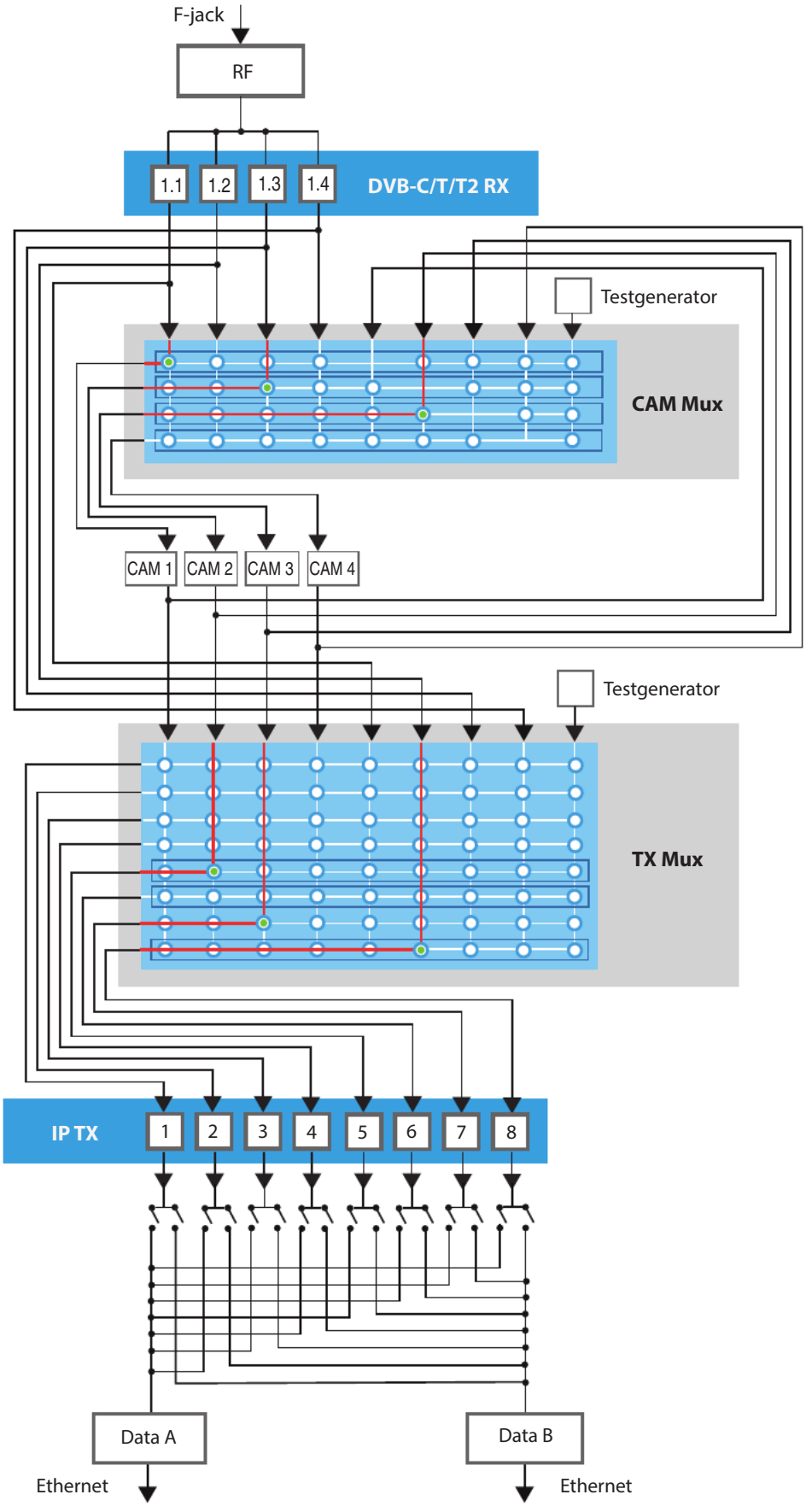


Figure 8: The signal flow in the U 164 and U 164-X

Configuring DVB-C/T/T2 receivers

Now start configuring a signal path in the device. Start by clicking on the item “Ch.1.1” in the menu in the web browser interface to have the parameters for the first reception channel displayed. You will now see the following table:

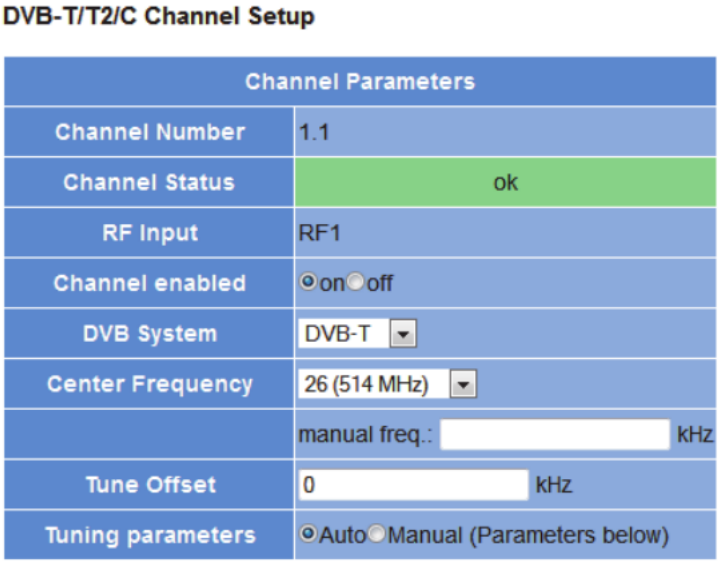


Figure 9: Selecting a reception system

Activate the radio button “on” – if this has not already been activated – in the “Channel enabled” line. This switches on the reception channel. Now select the preferred reception system (DVB-C, DVB-T or DVB-T2) from the drop-down menu in the “DVB System” line.
You can enter general reception parameters first in the lines which follow.

Depending on the selection made for the reception system, you can now set specific parameters relating to the reception system in one of the following tables.

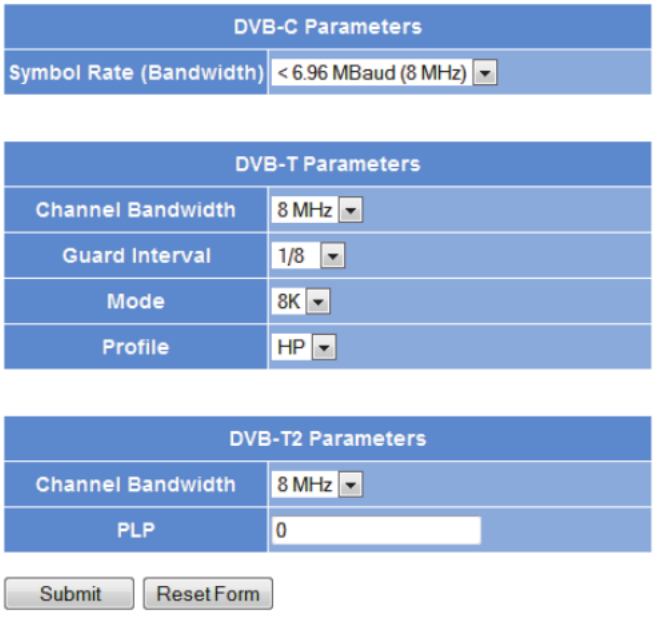


Figure 10: Setting specific reception parameters

To save your changes, click on the “Submit” button below the table.

Checking the channel status

Now click on the item “Ch. 1.1” in the menu at the left. You will now see the following overview:

DVB-T/T2/C Channel Setup

Channel Parameters	
Channel Number	1.1
Channel Status	ok
RF Input	RF1
Channel enabled	◉on ○off
DVB System	DVB-T
Center Frequency	26 (514 MHz)
	manual freq.: kHz
Tune Offset	0 kHz
Tuning parameters	◉Auto ○Manual (Parameters below)

Figure 11: Displaying channel parameters

The message “OK” should now appear in the “Channel status” line in the “DVB/T/T2/C Channel Setup” table.
Now check the most important parameters in the table which follows, “Channel Status”.

Channel Status

System	DVB-T
Tuned Frequency	514000 kHz
Bandwidth	8 MHz
Carrier Offset	6 kHz
Tuner Level	68.50 dBµV
TS Locked	yes
SNR	26.87 dB
Quality	100
C/N Value	35.70
RS Error	0
Constellation	16QAM
Guard Interval	1/4
Mode	8K
MER	31.02 dB
Pre-RS BER	0.00e+00
Pre-Viterbi BER	0.00e+00

Figure 12: Reception channel status

Ensure that you check the values in the “Quality”, “Tuner Level” and “C/N” lines here.

Setting the signal routing to the CAM modules

Now insert the required CI module into the first slot of the device if you have not already done so. Proceed as described in the section “Connecting and installing the module”.

Click on the item “CAM Mux” in the web browser interface menu. You will now see the following table:

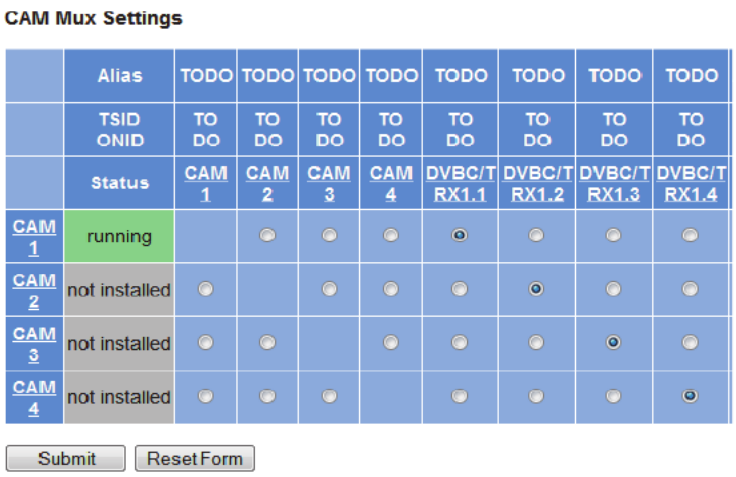


Figure 13: Signal routing to the CAM modules

In the switch matrix, click on the radio button which connects the receiver IP DVB-C/T RX 1 to CAM module 1.

To save your changes, click on the “Submit” button below the table.

More information on signal routing can be found in the section “Configuring signal paths using the switch matrix”.

Now click on the item “CAM 1” in the menu at the left. (You may have to press the refresh button in your browser several times to update the page.) You will now see the following table:

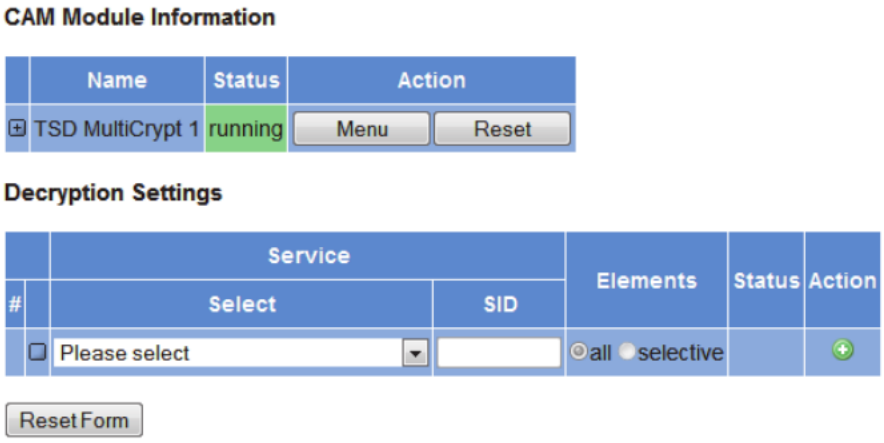
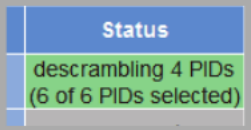


Figure 14: CAM settings

A list of the individual services which the module CAM 1 is receiving appears in the “Status” table. You can select the service for decryption in the “Decryption Settings” table. To add a service, click on the plus symbol in the right-hand column.

More information on decryption settings can be found in the section “Setting the decryption”.

When decryption is successful, a text which is highlighted in green appears in the status column (example: see figure at left).



Configuring signal routing to IP transmitters

You can now route the received signal to an IP transmitter.Click on the item „TX 1..8 (MPTS)“ in the main menu on the left to configue one of the 8 available MPTS channels. You will now see the following table:

IP TX Channel Settings (MPTS)

Channel	Source	Data A						Data B					
		Enable	Destination IP:Port					Enable	Destination IP:Port				
IP TX1	CAM 1: ARD Digital1 (TP071)	on off	232	144	1	1	10000	on off	232	144	2	1	10000
IP TX2	CAM 2: ARD Digital2 (TP085)	on off	232	144	1	2	10000	on off	232	144	2	2	10000
IP TX3	CAM 3: ARD Digital3 (TP101)	on off	232	144	1	3	10000	on off	232	144	2	3	10000
IP TX4	CAM 4: ARD HD1 (TP019)	on off	232	144	1	4	10000	on off	232	144	2	4	10000
IP TX5	DVBS RX1.1: ARD Digital1 (TP071)	on off	232	144	1	5	10000	on off	232	144	2	5	10000
IP TX6	DVBS RX1.2: ARD Digital2 (TP085)	on off	232	144	1	6	10000	on off	232	144	2	6	10000
IP TX7	DVBS RX1.3: ARD Digital3 (TP101)	on off	232	144	1	7	10000	on off	232	144	2	7	10000
IP TX8	DVBS RX1.4: ARD HD1 (TP019)	on off	232	144	1	8	10000	on off	232	144	2	8	10000

Figure 15: Signal routing to IP transmitters

Select a source in column „Source“ from the dropdown list.

To store your changes, click on the „Submit“ button below the table.

Submit Reset Form

Configuring the IP transmitter

To complete the process, you should now configure and activate the IP transmitter. To do so, click on the item “IP TX 1” in the web browser interface menu. You will now see the following table:

IP TX1 Channel Settings

Property	Data A (eth2) 1G	Data B (eth3) 1G
Enable	on off	on off
Transmit IP Port	172 . 24 . 0 . 150 : 0	172 . 25 . 0 . 150 : 0
Destination IP Port	232 . 22 . 100 . 128 : 10000	232 . 21 . 100 . 128 : 10000
Destination MAC	01:00:5e:16:64:80	01:00:5e:15:64:80
TOS / TTL	184 1	184 1
VLAN (Set 0 to disable)	0	0

Enter the IP address and UDP port that the traffic is to be sent to.
For an IP multicast, use an address in the range 224.0.0.0 to 239.255.255.255.
The TOS and TTL entries are the values used for the IP "Type of Service" and "Time To Live" fields

Property	Data A (eth2) + Data B (eth3)
TS Packets per Frame	7
Protocol Encapsulation	RTP/UDP/IP UDP/IP
FEC (L Cols / D Rows / Interleaving)	Off Off Col only Plain

Figure 16: Configuring the IP transmitter

Enter the IP address and port of a reception device (e.g. for one of the signal converters from the U 1xx series) in the line “Destination IP Port”.

In the table at the top, click on the radio button “on” to activate signal transmission to one of the data ports A or B.

To save your changes, click on the “Submit” button below the table.

More information on setting the IP transmitters can be found in the section “IP TX menu”.

Submit Reset Form

Checking the data transmission rate

Now click on the item “Statistics” in the menu at the left. You will now see the following overview:

Ethernet bandwidth

Property	Management A (eth0) 1G full	Management B (eth1) 1G full	Data A (eth2) 1G full	Data B (eth3) 1G full
Transmit	0.0 Mbit/s	0.0 Mbit/s	57.5 Mbit/s	0.0 Mbit/s
Receive	0.0 Mbit/s	0.0 Mbit/s	0.0 Mbit/s	0.0 Mbit/s

Ethernet frames

Property	Data A (eth2) 1G	Data B (eth3) 1G
Total frames sent by host	2	0
Total frames sent to host	3	54
Total exception frames sent to host	19	2
Total errored frames received	0	0
Total frames discarded by deencapsulator	0	0
Total frames discarded because of lack of buffers	0	0
Total transmit frames generated from IP TX 1 / per sec.	107441 / 1260	0 / 0
Total transmit frames generated from IP TX 2 / per sec.	120496 / 1417	0 / 0
Total transmit frames generated from IP TX 3 / per sec.	106750 / 1260	0 / 0
Total transmit frames generated from IP TX 4 / per sec.	106461 / 1260	0 / 0

Figure 17: IP transmitter statistics

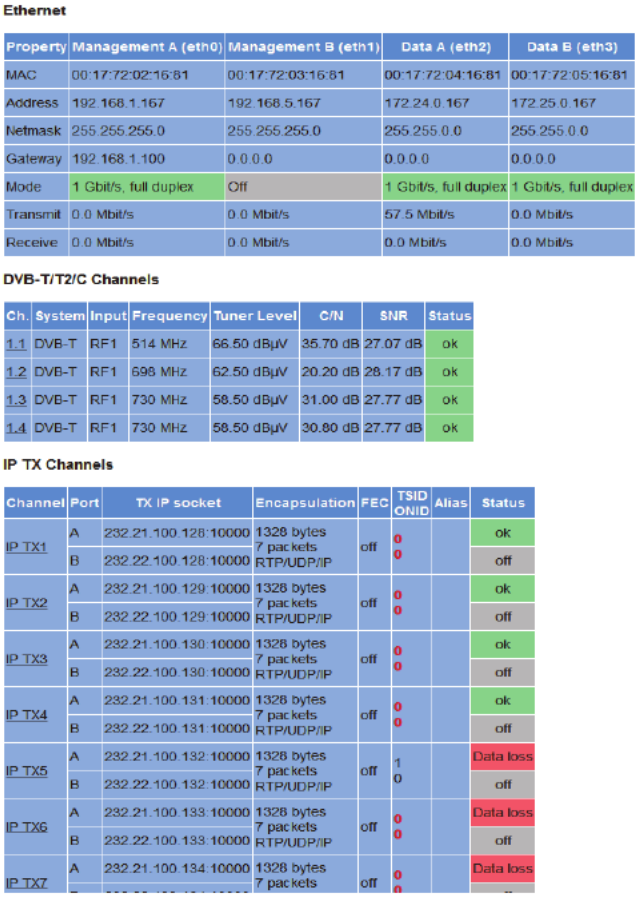
A value > 0 should now appear for the data transmission rate in the line “Transmit” in the “Ethernet bandwidth” table.
A corresponding value should appear in the line “Total transmit frames generated from IP TX 1” in the “Ethernet frames” table.

More information about the values in the “Statistics” overview can be found in the section “Statistics menu”.

Once you have successfully completed all the steps described, then the most important settings required to decrypt a data stream have been entered in the device.
To ensure error statuses entered in the log book are easy to follow, you should configure a time source. This can be done under the menu item “Main” in the
“IP Management Settings” table (also see the section “Main Menu”).

"Status" menu

To have the current settings for the device displayed, click on the `Status` item in the menu at the left. You can now see the overview shown in figure 18:



Ethernet

Property	Management A (eth0)	Management B (eth1)	Data A (eth2)	Data B (eth3)
MAC	00:17:72:02:16:81	00:17:72:03:16:81	00:17:72:04:16:81	00:17:72:05:16:81
Address	192.168.1.167	192.168.5.167	172.24.0.167	172.25.0.167
Netmask	255.255.255.0	255.255.255.0	255.255.0.0	255.255.0.0
Gateway	192.168.1.100	0.0.0.0	0.0.0.0	0.0.0.0
Mode	1 Gbit/s, full duplex	Off	1 Gbit/s, full duplex	1 Gbit/s, full duplex
Transmit	0.0 Mbit/s	0.0 Mbit/s	57.5 Mbit/s	0.0 Mbit/s
Receive	0.0 Mbit/s	0.0 Mbit/s	0.0 Mbit/s	0.0 Mbit/s

DVB-T/T2/C Channels

Ch.	System	Input	Frequency	Tuner Level	C/N	SNR	Status
1.1	DVB-T	RF1	514 MHz	66.50 dBµV	35.70 dB	27.07 dB	ok
1.2	DVB-T	RF1	698 MHz	62.50 dBµV	20.20 dB	28.17 dB	ok
1.3	DVB-T	RF1	730 MHz	58.50 dBµV	31.00 dB	27.77 dB	ok
1.4	DVB-T	RF1	730 MHz	58.50 dBµV	30.80 dB	27.77 dB	ok

IP TX Channels

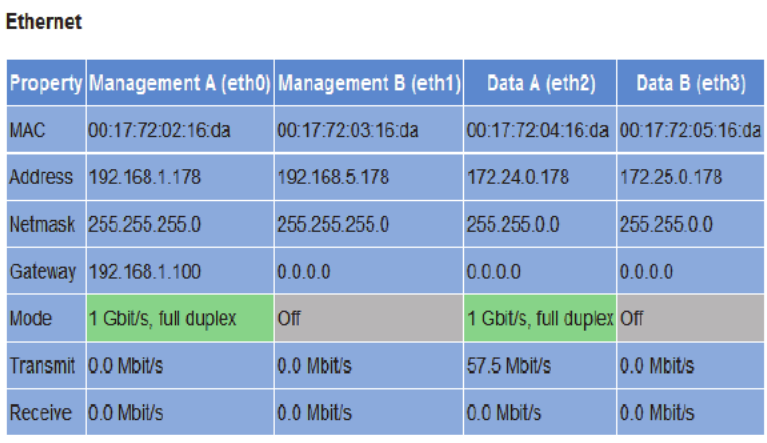
Channel	Port	TX IP socket	Encapsulation	FEC	TSID ONID	Alias	Status
IP TX1	A	232.21.100.128:10000	1328 bytes 7 packets RTP/UDP/IP	off	0 0		ok
	B	232.22.100.128:10000					off
IP TX2	A	232.21.100.129:10000	1328 bytes 7 packets RTP/UDP/IP	off	0 0		ok
	B	232.22.100.129:10000					off
IP TX3	A	232.21.100.130:10000	1328 bytes 7 packets RTP/UDP/IP	off	0 0		ok
	B	232.22.100.130:10000					off
IP TX4	A	232.21.100.131:10000	1328 bytes 7 packets RTP/UDP/IP	off	0 0		ok
	B	232.22.100.131:10000					off
IP TX5	A	232.21.100.132:10000	1328 bytes 7 packets RTP/UDP/IP	off	1 0		Data loss
	B	232.22.100.132:10000					off
IP TX6	A	232.21.100.133:10000	1328 bytes 7 packets RTP/UDP/IP	off	0 0		Data loss
	B	232.22.100.133:10000					off
IP TX7	A	232.21.100.134:10000	1328 bytes 7 packets	off	0 0		Data loss

Figure 18: Status display

The following tables are displayed:

Ethernet status

Configuration data and status of the Ethernet port



Ethernet

Property	Management A (eth0)	Management B (eth1)	Data A (eth2)	Data B (eth3)
MAC	00:17:72:02:16:da	00:17:72:03:16:da	00:17:72:04:16:da	00:17:72:05:16:da
Address	192.168.1.178	192.168.5.178	172.24.0.178	172.25.0.178
Netmask	255.255.255.0	255.255.255.0	255.255.0.0	255.255.0.0
Gateway	192.168.1.100	0.0.0.0	0.0.0.0	0.0.0.0
Mode	1 Gbit/s, full duplex	Off	1 Gbit/s, full duplex	Off
Transmit	0.0 Mbit/s	0.0 Mbit/s	57.5 Mbit/s	0.0 Mbit/s
Receive	0.0 Mbit/s	0.0 Mbit/s	0.0 Mbit/s	0.0 Mbit/s

Figure 19: Status display - Ethernet

The values for the following parameters are displayed and configured here respectively in accordance with the four connections on the backplane of the device (Data A, Data B, Management A and Management B, see section "Device description").

- `MAC:` MAC address (display value)
- `Address:` IP address (configurable)
- `Netmask:` Net mask (configurable)
- `Gateway:` Gateway IP address (configurable)
- `Mode:` Ethernet mode (display value)
- `Transmit:` Data transmission rate (display value)
- `Receive:` Data reception rate (display value)

Status display of the DVB-C/T/T2 reception channels:

DVB-T/T2/C Channels

Ch.	System	Input	Frequency	Tuner Level	C/N	SNR	Status
1.1	DVB-T	RF1	514 MHz	66.00 dBµV	35.70 dB	26.97 dB	ok
1.2	DVB-T	RF1	698 MHz	64.50 dBµV	32.50 dB	28.97 dB	ok
1.3	DVB-T	RF1	706 MHz	64.50 dBµV	35.70 dB	27.27 dB	ok
1.4	DVB-T	RF1	730 MHz	57.50 dBµV	31.70 dB	27.77 dB	ok

Figure 20: Status display – DVB-T/T2/C channels

The values set for the following parameters are displayed in the table "DVB-T/T2/C Channels" for the reception channels (channel 1.1 - 1.4):

- `System:` Reception system selected
- `Input:` HF input selected
- `Frequency:` Reception frequency set
- `Tuner Level:` Input level selected
- `C/N:` Carrier-to-noise ratio
- `SNR:` Signal-to-noise ratio

Details on the parameters can be found in the section "Menu Ch. X.X".

Status display of the IP transmitters:

IP TX Channels

Channel	Port	TX IP socket	Encapsulation	FEC	TSID ONID	Alias	Status
IP TX1	A	232.16.100.128:10000	1328 bytes 7 packets RTP/UDP/IP	off	0 0		ok
	B	232.25.100.178:10000					off
IP TX2	A	232.16.100.129:10000	1328 bytes 7 packets RTP/UDP/IP	off	0 0		ok
	B	232.22.100.129:10000					off
IP TX3	A	232.16.100.130:10000	1328 bytes 7 packets RTP/UDP/IP	off	0 0		ok
	B	232.22.100.130:10000					off
IP TX4	A	232.16.100.131:10000	1328 bytes 7 packets RTP/UDP/IP	off	0 0		ok
	B	232.22.100.131:10000					off

Figure 21: Status display - IP TX channels

The values set for the following parameters are displayed in the table "IP TX Settings" for the four IP transmitters – for port A and B respectively:

- `TX IP socket`: Destination IP address/port
- `Encapsulation`: Data encapsulation
- `FEC`: Forward error correction
- `TSID/ONID`: Transport stream ID / original network ID
- `Alias`: Alias name

Details on the parameters can be found in the section "Menu IPTX".

Status display on temperature, internal voltages and the power module:

Miscellaneous

Property	Mainboard	DVBC/T[1..4]	CAM[1..2]	CAM[3..4]
Temperature	50.5 °C	46.5 °C	29.5 °C	29.5 °C
Supply 1.2 V	1.19 V	1.19 V	1.20 V	1.21 V
Supply 1.8 V	1.79 V	n/a	1.79 V	1.78 V
Supply 2.5 V	2.49 V	2.48 V	2.48 V	2.48 V
Supply 3.3 V	3.31 V	3.33 V	3.29 V	3.24 V
Supply 5.2 V	5.17 V	n/a	n/a	n/a
Supply 13 V	12.88 V	n/a	n/a	n/a
Fan	9642 RPM	n/a	n/a	n/a
Supply 5.0 V	n/a	5.17 V	5.15 V	5.20 V

Figure 22: Status display - Miscellaneous

The following, general parameters are displayed in the "Miscellaneous" table:

- `Temperature:` Temperature display in °C for the mainboard and DVB-C/T/T2 1 - 4 and 5 - 8.
- `Supply 1.2 V:` 1.2 V supply voltage
- `Supply 1.8 V:` 1.8 V supply voltage
- `Supply 2.5 V:` 2.5 V supply voltage
- `Supply 3.3 V:` 3.3 V supply voltage
- `Supply 5.2 V:` 5.2 V supply voltage
- `Supply 13 V:` 13 V supply voltage (mainboard only)
- `Fan:` Fan rotation speed
- `Supply 5.0 V:` 5.0 V supply voltage

Memory status:

System resources

Property	Value
Total size of memory arena	58358812
Number of ordinary memory blocks	23
Space used by ordinary memory blocks	1017904
Space free for ordinary blocks	57340884
Size of largest free block	57331284
Number of left files FOPEN_MAX	59
Number of left files NFILE	50
Number of free file descriptors NFD	50
CPU load 0.1s	0 %
CPU load 1s	30 %
CPU load 10s	23 %

Figure 23: Status display - System resources

Information on the internal resources of the operating system can be viewed in the "System resources" table. No settings can be made here.

"Main" menu

This section explains how to enter general settings for the interfaces and the management of the device, as well as for the U 100 base unit.
Click on the item "Main" in the menu at the left.

Setting the IP interfaces

You can configure IP interfaces and activate or deactivate them using the upper table ("IP interface settings"). The connection type is automatically identified and displayed by the device (in this case: 1 GBit/s, full duplex).

HINWEIS: In order to make changes in this table, you must be logged in as the administrator.

IP Interface Settings

Property	Management A (eth0)	Management B (eth1)	Data A (eth2)	Data B (eth3)
MAC	00:17:72:02:00:d0	00:17:72:03:00:d0	00:17:72:04:00:d0	00:17:72:05:00:d0
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 . 150	192 . 168 . 5 . 150	172 . 24 . 0 . 150	172 . 25 . 0 . 150
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

Figure 24: Configuring IP interfaces

The following parameters are displayed, and can be configured:

- `MAC`: MAC address of the respective interface
- `Active`: Activate the radio button "on" to activate the interface. Activate the radio button "off" to deactivate the interface.
- `Mode`: Connection type (identified automatically)
- `Address`: IP address
- `Subnet`: Netmask
- `Broadcast`: Broadcast address (calculated)
- `Gateway`: Gateway IP (if available; otherwise, set this to 0.0.0.0)

HINWEIS: When programming the IP addresses, make sure the addresses have not already been allocated within your network. Address conflicts result in network malfunctions. (Please set unused parameters to 0.0.0.0.)

Submit Reset Form

To save your changes, click on the "Submit" button below the last table.

Configuring management settings

You can configure the following management settings in the second table ("IP management settings"):

IP Management Settings

Property	Value
DNS	0 . 0 . 0 . 0
SNTP server	0.0.0.0 0.0.0.0
Time Source	SNTP Server

Figure 25: Configuring management settings

- DNS: Enter a DNS server, if required, in the input fields.
- SNTP server: You can enter one or two time servers here (SNTP protocol).
- Time Source: "SNTP server" is set here as the default option.

To save your changes, click on the "Submit" button below the last table.

Configuring the base unit

You can enter settings for the U 100 base unit in the third table ("U 100 Rack settings").

Figure 26: Configuring the U 100 base unit

The following parameters are displayed, and can be configured:

- Base Address: Enter an address for the base unit being used here. If the device is managed using the U 100-C controller and several U 100 base units are being used, then each base unit must be allocated an address of its own.
  This setting only has to be entered for one module per base unit.
- Slot Address: In accordance with the coding of the backplane of the device performed previously (see section "Installing and connecting"), the address corresponding to the slot in the base unit is displayed here.
- Power Modules: Select the number of power modules being monitored from the drop-down menu

To save your changes, click on the "Submit" button below the last table.

Saving and loading configurations / default and reboot

Figure 27: Saving and loading configurations

Changes to the configuration of the device are written to the device by clicking the "Submit" button, and are activated immediately. If you wish to save the current status to a separate memory, click on the "Save 2nd" button (below the tables). This current status is then saved to the SD card in the device. By clicking on the "Load 2nd" button, you can query this status again. How to save the configuration onto the local computer or FTP server is explained in the section "Software update and configuration files". When you click the "Force Save" button, all settings are saved immediately. The time settings for automatically saving changes are then overridden.

Click on the "Default" button if you wish to restore the default settings.

ACHTUNG: If you click the "Default" button, all settings except for the user and network settings for the data and management ports are reset to the delivery state.

Click on the "Reboot" button to restart the unit with the last settings saved.

"Channels" menu

To have an overview of the settings for the individual reception channels displayed, click on the item "Channels" in the menu at the left.

Checking the settings for the DVB-C/T/T2

You can check the settings for the input channels in the upper table, "DVB-T/T2/C Channel overview", and activate or deactivate the individual channels.

DVB-T/T2/C Channel overview

Ch.	Enable	System	Input	Frequency	Tuner Level	C/N	SNR	Status
1.1	on off	DVB-T	RF1	514 MHz	66.50 dBµV	35.70 dB	27.07 dB	ok
1.2	on off	DVB-T	RF1	698 MHz	62.50 dBµV	20.20 dB	28.17 dB	ok
1.3	on off	DVB-T	RF1	730 MHz	58.50 dBµV	31.00 dB	27.77 dB	ok
1.4	on off	DVB-T	RF1	730 MHz	58.50 dBµV	30.80 dB	27.77 dB	ok

RF Input Settings

	Channel 1.x
Input Attenuator	0.0 dB
RF Input	RF1
RF Supply Voltage	off on

Submit Reset Form

Figure 29: "DVB-T/T2/C Channel overview" and "RF Input Settings" tables

The signal forwarding to the multiplexer (TX Mux) can be activated or deactivated respectively in the "Enable" column by clicking the corresponding radio button.

The following parameters are displayed for the four reception channels (Ch 1.1 - 1.4) respectively:

- `System`: Display of the reception system selected
- `Input`: Display of the input signal received (for reception channels Ch 1.1 - 1.4, this is always RF 1)
- `Frequency`: Reception frequency selected
- `Tuner Level`: Output level set for the respective reception channel
- `C/N`: Carrier-to-noise ratio
- `SNR`: Signal-to-noise ratio

The "RF Input Settings" table which follows allows you to:

- Enter an input attenuation value for the two front ends respectively
- Activate or deactivate the HF supply voltage for the two frontends respectively

Submit Reset Form

If you change the activation or deactivation status of inputs or outputs in one of the two tables, then click on the "Submit" button below the last table to save your changes. Click on "Reset form" to restore the original settings.

"Ch 1.1 - Ch 1.4" menu

To configure the four reception channels, start by clicking, in the menu at the left, on the item "Ch. 1.1", "Ch. 1.2", "Ch. 1.3" or "Ch. 1.4". The following table will then appear in the content area at the top:

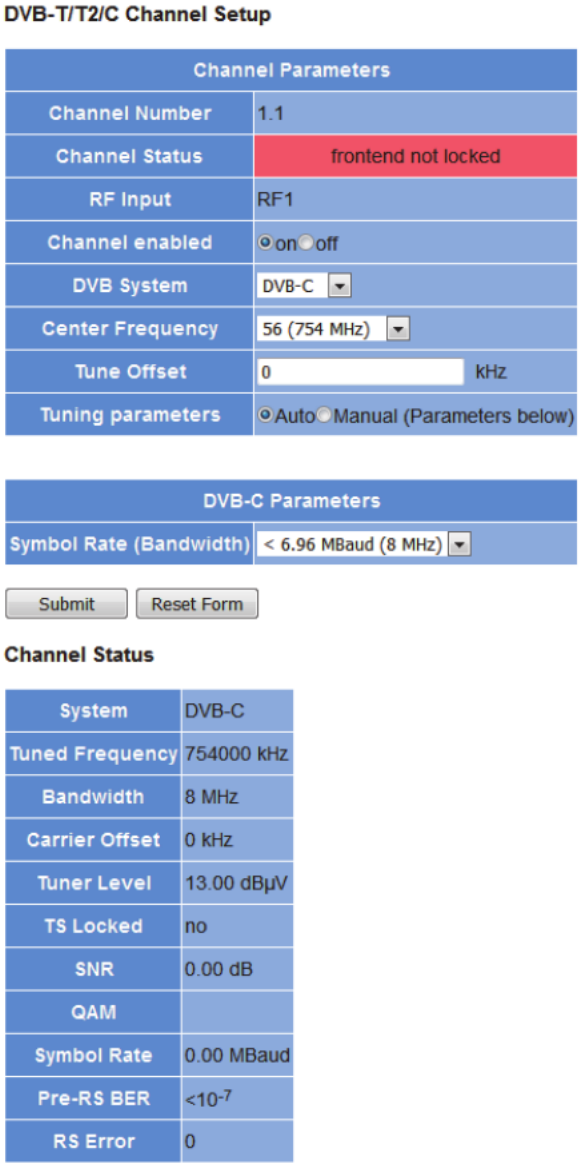


Figure 30: "DVB-T/T2/C Channel Setup" table

The following settings can also be entered individually:

- `Channel enabled`: To activate or deactivate the channel, select the corresponding radio button.
- `DVB System`: Select the preferred reception system from the drop-down menu (DVB-C, DVB-T or DVB-T2).
- `Center Frequency`: Select the preferred reception frequency from the drop-down menu. If you select the item "manual" from the list, you can enter the required value, in kHz, in the "manual freq." input field.
- `Tune Offset`: You can enter a frequency offset to the centre frequency here.
- `Tuning parameters`: Click the corresponding radio button to select whether the reception parameters for the preferred reception system should be set automatically or manually. When you activate "manual", you can configure the reception parameters in the table in the sections which follow.

Setting DVB-C parameters:

- `Symbol Rate (Bandwidth)`: Select the preferred symbol rate from the drop-down menu.

Setting DVB-T parameters:

- `Channel Bandwidth`: Select the preferred channel bandwidth from the drop-down menu (6, 7 or 8 MHz).
- `Guard Interval`: Select the preferred guard interval from the drop-down menu (1/4, 1/8, 1/16 or 1/32).
- `Mode`: Select the preferred mode from the selection list (2k or 8k).
- `Profile`: Select the preferred profile from the drop-down menu (HP or LP).

Click on the "Submit" button below the last table to save the changes.
Click on "Reset form" to restore the original settings.

The "Channel Status" table which follows provides an overview of the parameters currently set for the selected reception channel (see below).

Channel Status

System	DVB-T
Tuned Frequency	514000 kHz
Bandwidth	8 MHz
Carrier Offset	6 kHz
Tuner Level	68.50 dBµV
TS Locked	yes
SNR	26.87 dB
Quality	100
C/N Value	35.70
RS Error	0
Constellation	16QAM
Guard Interval	1/4
Mode	8K
MER	31.02 dB
Pre-RS BER	0.00e+00
Pre-Viterbi BER	0.00e+00

Figure 31: "Channel Status" table

„Service Filter“ menu

For transport streams TS 1.1 - TS 1.4 a service filter can be configured each to delete services from the transport stream. Click on one of the items „TS 1.1 - TS 1.4“ in the Service Filter menu on the left to show up the configuration tables.

Adjusting the setup for a service filter

In the first table „Service Filter Setup“ you can activate or deactivate the service filter function for the selected service filter by clicking on radio button „on“ or „off“.

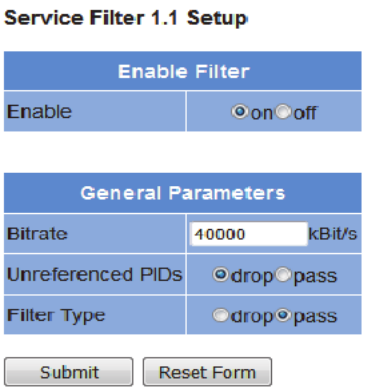


Figure 32: Table „Service Filter Setup“

When the filter is activated, you can choose an appropriate bit rate in section „General Parameters“ by typing the desired value into the input field. Please note, that the lowest possible bit rate depends on the number of services that the transport stream contains. If the chosen bit rate is too low, some of the services may not be transmitted properly.

If PIDs without referencing are desired to be deleted from the transport stream, click on the radio button „drop“ or choose „pass“, if these PIDs are desired to remain in the transport stream.

In row „Filter Type“ you can choose if the services selected in the next table „Service Selection“ are being deleted from the transport stream (radio button „drop“) or if only the selected services will remain in the transport stream.

After making changes within the table, click on the „Submit“ button below the last table to store your changes.Click on the „Reset Form“ button to restore the original settings.

Selecting services

In table „Service Selection“ you can choose services by selecting the desired service from the drop down list in column „Select“. The click on the plus symbol to add the service.

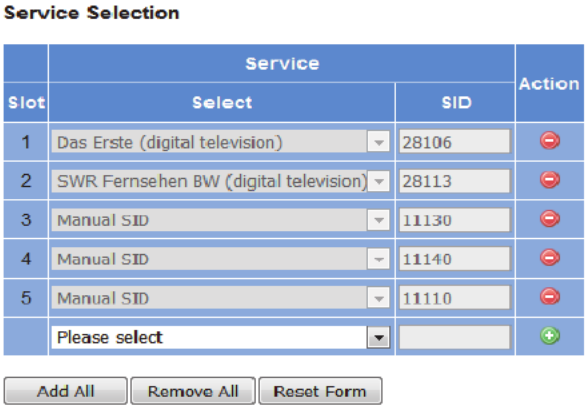


Figure 33: Table „Service Selection“

Services, that are added to the selection are marked with a minus symbol in column „Action“. To delete a previously selected service, simply click on the minus symbol of that service.

When handling longer service lists you can simply add all services to the list (click button „Add All“) or delete all selected services at once (click button „Remove All“). Click the „Reset Form“ button to restore the original settings.

In the next table „Status“ you can see an overview of all services with their curent status („drop“ or „pass“).

Status

SID	Service	Status
28106	Das Erste	pass
28107	BR Fernsehen Süd	drop
28108	hr-fernsehen	drop
28110	BR Fernsehen Nord	drop
28111	WDR Köln	drop
28113	SWR Fernsehen BW	pass

Figure 34: Table „Status“

"CAM Mux" menu

You can configure the receiver routing to the four CAM modules using this menu item.

HINWEIS: An overview of the possible signal paths can be found in the "Quick start – starting operation of the device" section.

Start by clicking on the menu item "CAM Mux" in the menu at the left. You will now see the following table:

CAM Mux Settings

	Alias	TODO	TODO	TODO	TODO	TODO	TODO	TODO	TODO
	TSID ONID	TO DO	TO DO	TO DO	TO DO	TO DO	TO DO	TO DO	TO DO
	Status	CAM 1	CAM 2	CAM 3	CAM 4	DVBC/T RX1.1	DVBC/T RX1.2	DVBC/T RX1.3	DVBC/T RX1.4
CAM 1	running		○	○	○	◉	○	○	○
CAM 2	not installed	○		○	○	○	◉	○	○
CAM 3	not installed	○	○		○	○	○	◉	○
CAM 4	not installed	○	○	○		○	○	○	◉

Submit Reset Form

Figure 35: Output switch matrix "CAM Mux Settings"

You can forward the respective output signal from a reception channel to one of the CAM modules by clicking on the corresponding radio button.
Furthermore, the output signal from each CAM module can be forwarded on to one of the other CAM modules.

If no input signal is available, you can also forward the signal from the test generator (see "Test generator" section) to the respective CAM modules.

The transport stream ID, the network ID and the alias name for each source are displayed respectively in the upper part of the table.

Submit Reset Form

Click on the "Submit" button below the table to save the changes.
Click on "Reset form" to restore the original settings.

HINWEIS: The "Quick start – starting operation of the device" section includes a configuration example.

"CAM 1 - CAM 4" menu

This section tells you how to make the decryption settings for the four CAM modules.
The procedure is described in the following.

To have the input screen for the module configuration displayed, click on one of the items "CAM1", "CAM2", "CAM3" or "CAM4" in the menu at the left.

CAM module information

The respective name of the module as well as the current status is displayed in the upper table. If the module is functioning properly, the message "running" appears. If a CAM module has not been installed, then the message reads "no CAM installed". Other error messages are "CAM error temperature too high" and "voltage error".

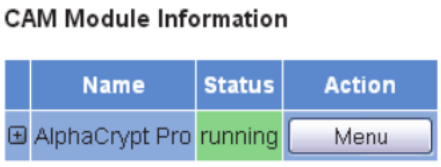


Figure 36: CAM module information

Click on the "+" symbol in the left column to have an overview of the CA systems displayed.
If you click on the "Menu" button in the right column, the MM menu for the module opens.

Entering decryption settings

The second table allows you to add the service for decryption and – if preferred – to limit the decryption to individual elements.

Figure 37: Selecting services for decryption

To add a service, start by selecting the service in the "Select" column, or enter the SIDs manually in the input fields. Click on the "+" symbol in the right column. The service will now be added.

You can set different SIDs for the redundant sources of reception.
Details on the redundancy concept can be found in the section "IP RX menu".

Depending on the active source, either Primary, Secondary or Tertiary is flagged as active.

HINWEIS: If you wish to delete a service from the list, then click on the red symbol in the column at the right.

If you wish to select individual elementary streams, click on the pencil symbol to activate the service.

You can select whether the full service ("all") or only individual elements ("selective") should be decrypted in the "Elements" column. Click on the corresponding radio button to do so. If you select the option "selective", another table is expanded in which the individual elementary streams can be selected.

Figure 38: Selecting specific service elements

You can choose between the options "PID", "Content" and "Stream Type" in the "Select by" column.

The "**PID**" options allows selection according to the elementary stream PID. Enter the preferred PID in the input field manually.

The "**Content**" option allows selection according to the content of the elementary streams. A drop-down menu with the following options appears in the "Value(s)" column:

- `Video:` All video elementary streams are decrypted.
- `Audio*:` All audio elementary streams are decrypted.
- `Teletext*:` The elementary streams for all languages are decrypted.
- `Subtitling*:` When you select this option, the elementary streams for the subtitles are decrypted.

*) Two input fields for language selection appear to the right of the selection list, in which you can enter the preferred language or an alternative language as an abbreviation.

The "**Stream Type**" options allows selection of the elementary streams according to DVB stream type.

Your changes are applied as soon as either the Plus button or the Tick button is clicked.
Click on "Reset form" to restore the original settings.

Status display

An overview of the decryption status is displayed in the third table (see figure 32, below). The respective SID appears in the left column, with the middle column showing the selected service and the current status of the decrypted PIDs appearing in the right column.
If no decryption occurs, then "no processing" appears.

Status

	SID	Service	Status
⊞	13001	**ORF1, ORF**	descrambling 4 PIDs (4 of 6 PIDs selected)
⊞	13002	**ORF2, ORF**	descrambling 3 PIDs (5 of 5 PIDs selected)
⊞	13003	**ORF2 W, ORF**	no processing
⊞	13004	**ORF2 N, ORF**	no processing
⊞	13005	**ORF2 B, ORF**	no processing
⊞	13006	**ORF2 O, ORF**	no processing
⊞	13007	**ORF2 S, ORF**	no processing
⊞	13008	**ORF2 T, ORF**	no processing
⊞	13009	**ORF2 V, ORF**	no processing
⊞	13010	**ORF2 St, ORF**	no processing
⊞	13011	**ORF2 K, ORF**	no processing
⊞	13012	**ATV, ATV+**	no processing
⊞	13013	HITRADIO OE3, ORF	no processing
⊞	13014	ORF2E, ORF	no processing
⊞	13019	RIC, -	no processing
⊞	13200	AlphaCrypt, ORF	no processing
⊞	13221	Crenova OTA Service, ORS	no processing

Figure 39: Decryption status display

Services marked in bold type include at least one encrypted service.
Click on the "+" symbol in the left column to have the detailed settings for decryption displayed.

Status

	SID	Service					Status
⊟	13001	**ORF1, ORF**					descrambling 4 PIDs (4 of 6 PIDs selected)
	PID	**Type**	**Content**	**Language**	**Input**	**Output**	**Status**
	160	0x02	ISO/IEC 13818-2 Video		**scrambled**	free	descrambling
	161	0x03	ISO/IEC 11172 Audio	ger	**scrambled**	free	descrambling
	162	0x03	ISO/IEC 11172 Audio	eng	**scrambled**	free	descrambling
	163	0x06	ISO/IEC 13818-1 Private PES data packets	ger	**scrambled**	free	descrambling
	165	0x06	ISO/IEC 13818-1 Private PES data packets (Teletext)	ger	free	free	no processing
	169	0x06	ISO/IEC 13818-1 Private PES data packets		free	free	no processing

Figure 40: Status details display

The advanced view shows all the settings made in the "Decryption Settings" table (decrypted PIDs, type, selected content, language). Furthermore, it shows whether the content is encrypted or unencrypted ("scrambled" or "free").
The "Output" column shows whether the content of the output signal is unencrypted for the respective PID. The "Status" column shows whether the PID is being decrypted ("descrambling" or "no processing") or whether errors have occurred.

"IP TX" menu

To transmit a single service as an IP transport stream (SPTS) you can activate up to 504 SPTS channels. The configuration of the SPTS channels can be done via the menues IPTX 9...

Modify IP TX Channels

Command	Selection	Action
Add SPTS Channels	Number: 1	
Remove SPTS Channels		

Figure 41: "IP TX channel settings" table

Within the table „Modify IP TX Channels" you can comfortably add or delete a desired number of channels in the SPTS list.
To add channels type in the desired number of channels into the input field „Number" in row „Add SPTS Channels" and click on the plus symbol in column „Action".
To delete a range of existing channels type in the desired channels in row „Remove SPTS Channels" in „X-Y" manner (e. g. 10-14 or the like). Then click on the minus symbol in column „Action".

HINWEIS: *Up to 504 SPTS channels can be used.*

HINWEIS: *It is also possible to add or delete channels via the individual menu of each SPTS channel (TX 9..) - however you can add or delete only one single channel in one individual procedure (see chapter „TX 9..).*

"TX 1..8 (MPTS)" menu

To configure the 8 MPTS channels, start by clicking, in the menu at the left, on the item "TX 1..8 (MPTS)". The following table will then appear in the content area at the top:

IP TX Channel Settings (MPTS)

Channel	Source	Data A									Data B								
		Enable	Destination IP:Port								Enable	Destination IP:Port							
IP TX1	CAM 1: ARD Digital1 (TP071)	on off	232	144	1	1	10000				on off	232	144	2	1	10000			
IP TX2	CAM 2: ARD Digital2 (TP085)	on off	232	144	1	2	10000				on off	232	144	2	2	10000			
IP TX3	CAM 3: ARD Digital3 (TP101)	on off	232	144	1	3	10000				on off	232	144	2	3	10000			
IP TX4	CAM 4: ARD HD1 (TP019)	on off	232	144	1	4	10000				on off	232	144	2	4	10000			
IP TX5	DVBS RX1.1: ARD Digital1 (TP071)	on off	232	144	1	5	10000				on off	232	144	2	5	10000			
IP TX6	DVBS RX1.2: ARD Digital2 (TP085)	on off	232	144	1	6	10000				on off	232	144	2	6	10000			
IP TX7	DVBS RX1.3: ARD Digital3 (TP101)	on off	232	144	1	7	10000				on off	232	144	2	7	10000			
IP TX8	DVBS RX1.4: ARD HD1 (TP019)	on off	232	144	1	8	10000				on off	232	144	2	8	10000			

Figure 42: Table 1 "IP TX settings (MPTS)"

Here you can select the desired program source for each channel in column „Source" fom a dropdown list. Each channel can be routed to one of the outputs A or B respectively to to both channels by clicking the radiobutton „On". Type in the IP port into the corresponding input fields.

Click on the „Submit" button below the last table to store changes.
Click on the „Reset Form" button to restore the original settings.

Submit Reset Form

To configure one of the 8 MPTS channels click on one of the items TX1", „TX 2", „TX 3" ... „TX 8" in the left column. You will then see the following table:

IP TX1 Channel Settings

Property	Data A (eth2) 1G	Data B (eth3) 1G
Enable	on off	on off
Transmit IP:Port	172 . 24 . 0 . 142 : 0	172 . 25 . 0 . 142 : 0
Destination IP:Port	232 . 144 . 1 . 1 : 10000	232 . 144 . 2 . 1 : 10000
Destination MAC	01:00:5e:10:01:01	01:00:5e:10:02:01

Figure 43: Table 1 „IP TX1 Channel Settings"

You can activate or deactivate forwarding of the selected IP output to ports A and B respectively by clicking on the corresponding radio button. The MAC address is displayed for ports A and B respectively ("Destination MAC").
You can enter one value for ports A and B respectively for the following parameters:

- `Transmit IP: Port`: Enter the transmit IP address here.
- `Destination IP: Port`: Enter the transmit IP address of a reception device here.
- `TOS/TTL`: You can enter a value for the "Type of service" here (which is used for prioritising the IP data packets). Enter a value for the validity period here ("Time to Live").
- `VLAN (Set 0 to disable)`: Enter the address of a virtual local network here.

Another table is shown in the following in which settings valid for data ports A and B can be entered.

Property	Data A (eth2)	Data B (eth3)
TOS / TTL	184 1	184 1
VLAN (Set 0 to disable)	0	0
TS Packets per Frame	7	
Protocol Encapsulation	RTP/UDP/IP UDP/IP	
FEC (L Cols / D Rows / Interleaving)	10 10 Col+Row Plain	
Modify multiple Channels		

Figure 44: Table 2 "IP TX1 channel settings"

- `TS Packets per Frame`: The number of transport stream packets per frame; select a value between 1 and 7 from the drop-down menu.
- `Protocol Encapsulation`: Select either "RTP/UDP/IP" or "UDP/IP" as the protocol by clicking the corresponding radio button.
- `FEC`: Forward error correction
  Select the number of columns from the first drop-down menu ("off" or a value between 1 and 20).
  Select the number of rows from the second drop-down menu ("off" or a value between 4 and 20).
  Select one of the two options, "Columns and rows" (Col + Rows) and "Column only" (Col only) from the third drop-down menu.
  Select one of the options "Plain", or "Annex A" or "Annex B" respectively, from the fourth drop-down menu.

Submit Reset Form

Click on the "Submit" button below the last table to save the changes.
Click on "Reset form" to restore the original settings.

Menü „ TX 9.. (SPTS)“

The configuration of the SPTS channels is done - depending on the number of activated channels - via one ore more menus „TX XX...YY“ with XX and YY > 8; e. g. „TX 9...24“. Click on the item „TX 9..24“. in the main menu on the left. You will now see the following table:

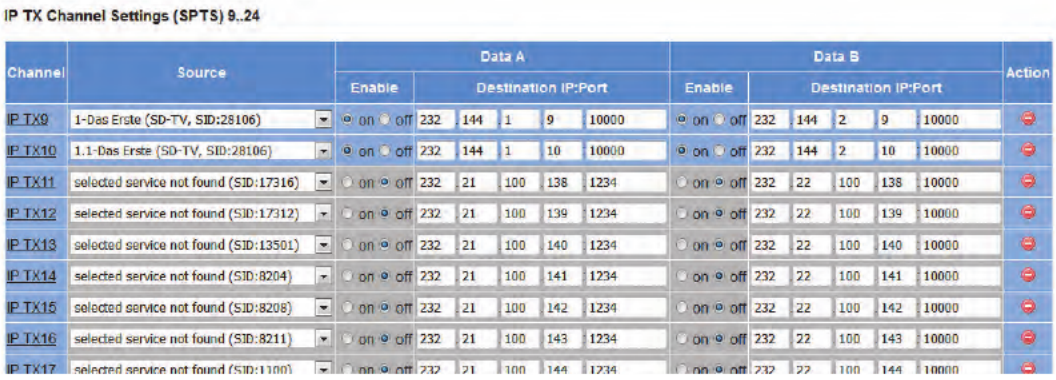


Figure 45: Table 1 „IP TX Channel Settings (SPTS) 9..24“

In column „Source“ you can select the desired program source from a dropdown list. Each channel can be routed to one of the outputs A or B respectively to to both channels by clicking the radiobutton „On“. Type in the IP port into the corresponding input fields.

If desired you can delete the channels from the list by clicking on the minus symbol in column „Action“.

Submit Reset Form

Click on the “Submit” button below the last table to save the changes.
Click on “Reset form” to restore the original settings.

To configure an SPTS channel in detail click on one of the items TX9“, „TX 10“, „TX 11“ ... „TX 24“ in the left column. You will now see the following table:

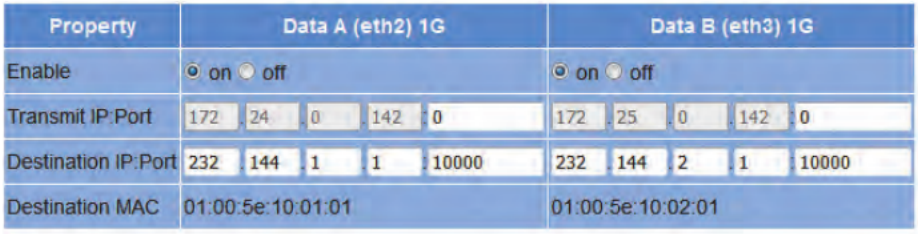


Figure 46: Table 1 „IP TX Channel Settings“

Here you can activate or deactivate the routing of the selected IP output to ports A and B by clicking on the corresponding radiobutton. For ports A and B the MAC address is displayed („Destination MAC“). For the following parameters you can type in a value for ports A and B:

- `Transmit IP: Port:` Type in the transmission IP address.
- `Destination IP: Port:` Type in the IP address of a reception unit.
- `TOS / TTL:` Here you can type in a value for the „Type of Service“ (for priority of IP data packages). / Type in a value for the desired period of validity („Time to Live“)
- `VLAN (Set 0 to disable):` Type in the address of a virtual local network.

HINWEIS: *You can edit further SPTS channels via additional menus TX XX...YY in the main menu on the left.*

"User Settings" menu

Click on the menu item "User Settings" in the main menu at the left to have the corresponding input mask displayed. The following input mask now appears:

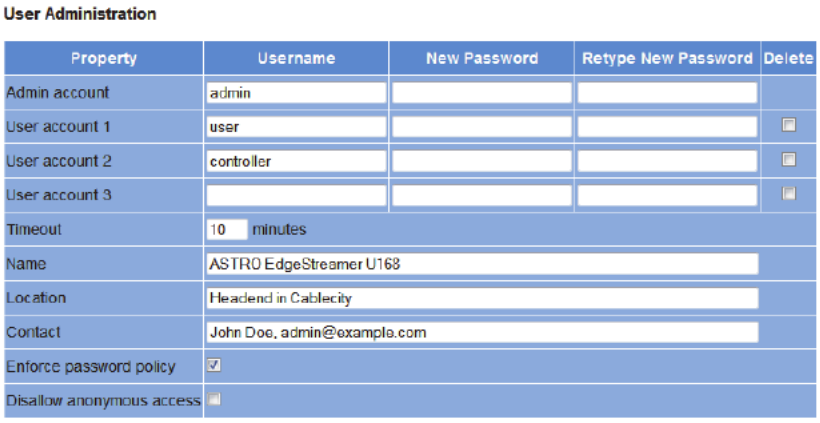


Figure 47: User administration

You can create up to four users for the user interface of the device. The following three users have been created as the default setting:

- admin
- user
- controller

Users logged in as administrator can change all of the settings in the user interface. A number of settings are not accessible for other user groups (e.g. "IP Interface Settings" table in the "Main" menu).

The password for all three users is "astro".

To change the access data for a user account, or to create a new one, enter the preferred user name in the input field `User name`. Then enter the preferred password in the input field `New Password`, and confirm it by typing it in the input field `Retype New password` again.

HINWEIS: A password must contain at least 5 characters. You can increase the minimum requirements for passwords using the "Enforced Password Policy" option (see below).

To delete a user account, activate the corresponding checkbox `Delete` for the respective account in the right column of the table.

The following settings can also be entered:

- `Timeout`: You can enter a time for the automatic logout, in minutes, in this input field. If no more inputs are made in the user interface, then automatic logout will occur once the time entered here has elapsed.
  The time remaining until automatic logout is displayed under the main menu, in the left column of the user interface.
- `Name, Location, Contact`: You can save a name for the system, the location and the contact data for a person in these input fields. They are displayed in the status line.
- `Enforced Password Policy`: Activate the checkbox when a password should have a minimum of 8 characters, and include at least one lower-case letter, one upper-case letter, one number and one special character.
- `Disallow anonymous access`: Activate the checkbox when access to the content area (tables) should only be possible after logging in.

Submit Reset Form

WICHTIG: All changes will only be applied after you have clicked on the "Submit" button below the input mask. Click on the "Reset Form" button to delete the input values again.

Another table follows in which you can enter information for a RADIUS server. A licence is also required for the RADIUS server function.

RADIUS Administration

RADIUS Server Address	123.0.0.0
RADIUS Server Port	1812
RADIUS Shared Secret	
RADIUS Retries	3
RADIUS Timeout	2
Enable RADIUS login	☐

Figure 48: RADIUS administration

The following items of information can be entered individually:

- RADIUS Server Address
- RADIUS Server Port
- RADIUS Shared Secret
- RADIUS Server Retries
- RADIUS Server Timeout
- Enable RADIUS Log-in

HINWEIS: Users who have been configured on the device will be deactivated when a RADIUS server is configured.
The RADIUS server must be configured accordingly. Users with the service type "Administrative" are the device administrators.
When you click the checkbox "Enable Radius login", the RADIUS function is activated if the RADIUS server is able to be reached. If this is not the case, the RADIUS function remains inactive, and the message "RADIUS logins have not been enabled because the connection check failed" appears.

You can create a white list for all incoming IP data in a further table. In this case, only IP data will be processed which come from a source entered in the white list.

	Address	Netmask
IP Whitelist 1	0 . 0 . 0 . 0	0 . 0 . 0 . 0
IP Whitelist 2	0 . 0 . 0 . 0	0 . 0 . 0 . 0
IP Whitelist 3	0 . 0 . 0 . 0	0 . 0 . 0 . 0
IP Whitelist 4	0 . 0 . 0 . 0	0 . 0 . 0 . 0

Figure 49: White list administration

The following parameters can be specified for four IP sources respectively:

- IP address
- Netmask

"SSL Settings" menu

HINWEIS: A licence is required to use the SSL functions.

To enter SSL settings, click on the item "SSL Settings" in the main menu at the left.

There is a checkbox in the upper table "SSL Settings" which displays the redirection of HTTP requests to the secure protocol HTTPS. After input of the licence, the checkbox is activated.

Setting	Value
Redirect HTTP requests to HTTPS	☐

Figure 50: "SSL settings" table

In the following table, "Generate a CSR for this device", individual items of information about the device can be entered ("Certificate Signing Request": address, organisation, etc.).

Generate a CSR for this device

CSR Attribute	Value
Private key in use	generated by device
Country (C)	DE
State (ST)	
Locality (L)	
Organization (O)	
Organizational Unit (OU)	
Common Name (CN)	192.168.1.153
Generate CSR with above data	Download CSR

Figure 51: "Generate a CSR for this device" table

By clicking the "Download CSR" button, you can create a "Certificate Signing Request" with which your CA can issue a certificate for the device. The input field "Private key in use" shows you whether the device's own key, or the key which was entered and saved, is being used.

There is a third table, "Key and certificate settings", below this.

Key and certificate settings

Upload device key in PEM format	Durchsuchen... Keine Datei ausgewählt.	Upload key
Clear supplied key	Clear key	
Upload device certificate in PEM format	Durchsuchen... Keine Datei ausgewählt.	Upload certificate
Clear supplied certificate	Clear certificate	
Regenerate device key and certificate	Regenerate	

Submit Reset Form

Figure 52: "Key and certificate settings" table

"

This table allows you to:

- ☐ Upload a device key (click on the "Search" button and select the preferred file; then click on the "Upload key" button)
- ☐ Delete an existing device key (click the "Clear key" button)
- ☐ Upload a device certificate (click on the "Search" button and select the preferred file; then click on the "Upload certificate" button)
- ☐ Delete an existing device certificate (click the "Clear certificate" button)
- ☐ Regenerate a device key and device certificate (click the "Regenerate" button)

The device administers two keys/pairs of certificates: "generated" and "user". The following figure shows which certificate and which key are used.

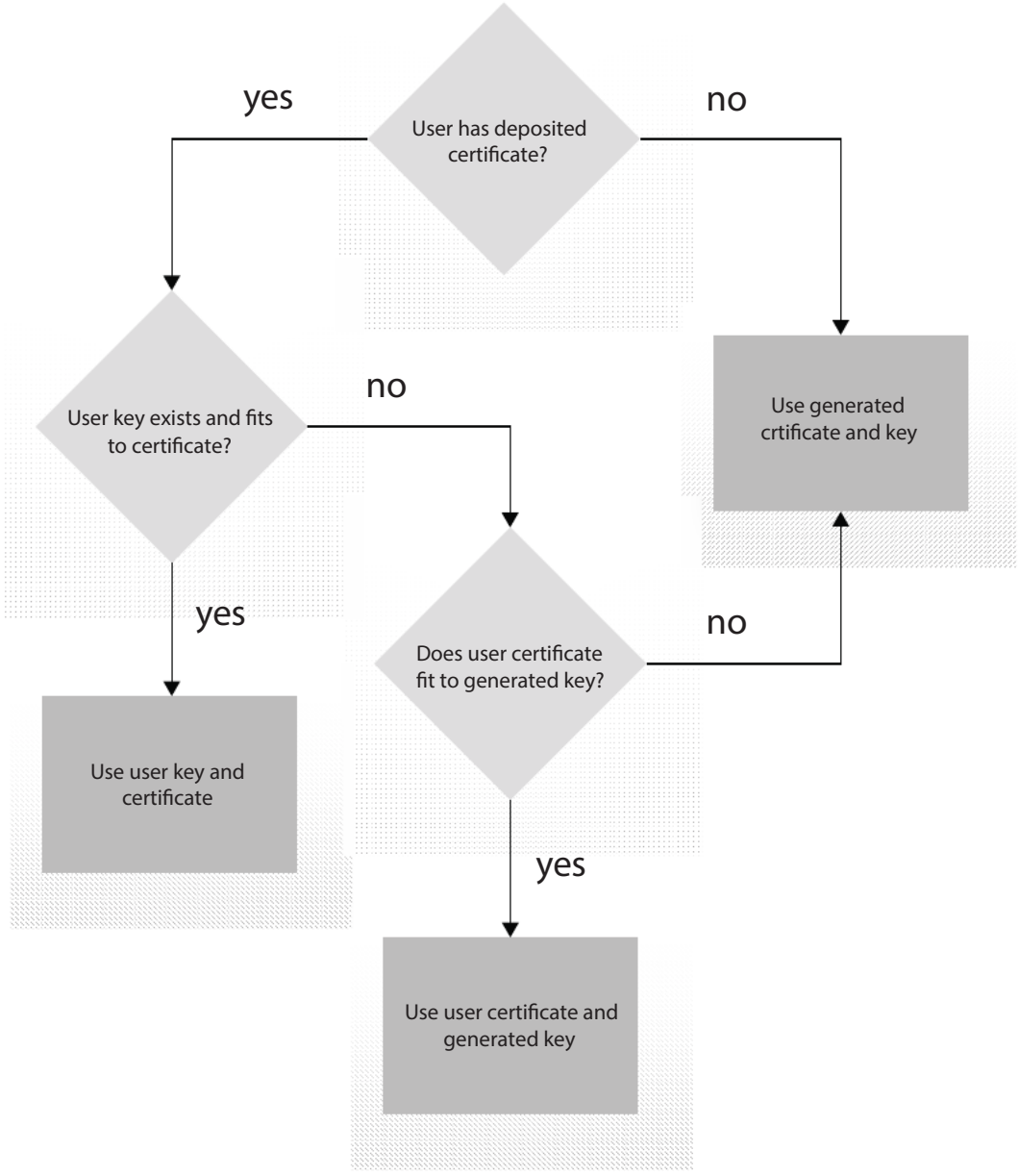


Figure 53: Using the certificates/keys

"Licensing" menu

A number of functions of the device (e.g. the TS Analyzer) can only be used after being enabled by means of a licence key.

The licence key with the respective function can be purchased from ASTRO. You will receive a licence key with which you can activate the functions using the web browser interface.
The format of the licence key is a text document (e.g. Lic001772000222.txt).
To activate the functions, start by clicking on the "Licensing" item in the menu at the left. The following input mask now appears:

Figure 54: Enabling licences using the licence key

Now enter the licence key sent to you in the input field. The key or keys can be entered in the input mask using "Copy & Paste". Then click on the "Submit" button to transmit the text to the device. If the licence is valid, this is confirmed with the message "License is valid". An error message is displayed for an invalid licence.

To order additional licences, the MAC address of the device must be specified.
You will find the MAC address on the web browser interface in the "Licensing" submenu (HWID). After the MAC address has been submitted, the licence keys are generated by ASTRO are sent by e-mail or on a CD.

"Update/config." menu

The menu item "Update/config." allows you to update the firmware version of your device and upload and download a variety of configuration data.

Firmware update from a local memory location

You will require an update archive for updating the device firmware. This can be downloaded from the ASTRO firmware server (address: "http://astro-firmware.de/Headend-Firmware/u1xx"). The file name of the archive required ends in ".up". The name is comprised of the type designation of the device and a four-digit version number.
Once the update archive has been downloaded, start by selecting the item "Update/config." in the user interface menu. The "Software update" table then appears in the content area at the top.

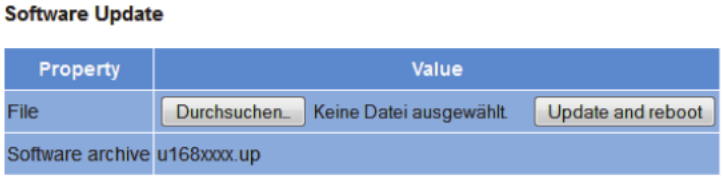


Figure 55: Firmware update

Now click on the "Search" button and select the path to the memory location of the update archive downloaded beforehand.
Then click on the "Update and Reboot" button to start the update process. Please wait for the process to be completed, and for the device to reboot.

Available Update Archives

The table table „Available Update Archives" shows an overview update-archives already stored in the module (up to ten). Users can have access to older software versions (Installation or deleting).

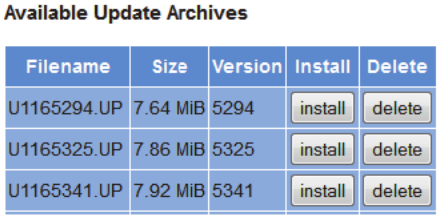


Figure 56: Firmware Update

Uploading and downloading configuration files

Figure 57: Loading/saving configuration files

Configuration files can be uploaded and downloaded.
To upload files, use the "Search" button to select the preferred file.
Then click on the "Upload" button to start the uploading process.
The following files are available for download:

- `System settings` (XML format)

Simply click on the corresponding file link to download the file.

Downloading configuration/status files

Config/status files (read only)

Property	Value
Module info	module.xml
IP configuration	ip.xml
System status	status.xml
System measurements	measure.xml

Figure 58: Loading status files

The following files are available for download:

- `Module info` (XML format)
- `IP configuration` (XML format)
- `System status` (XML format)
- `System measurements` (XML format)

Simply click on the corresponding file link to download the file.

Loading/saving firmware and configurations using (T)FTP

You can update firmware using a (T)FTP server using the table "Firmware update and configuration via server" and load or save configuration files.

Firmware update and configuration via server

Property	Value
(T)FTP Server address	astro-firmware.de
Protocol	FTP TFTP
FTP Username (e.g. anonymous)	anonymous
FTP Password (e.g. guest)	•••••
Path	/Headend-Firmware/u1xx/
Version	
Mode	Please select

Figure 59: Loading/saving firmware updates and configurations using (T)FTP

To carry out the preferred action, start by selecting an action from the drop-down menu in the "Mode" line. The action can only be carried out when the server path specified does actually exist. Furthermore, any firewalls that have been installed must be configured in a way that allows (T)FTP communication.

The following actions can be selected individually:

- "**Load config from server**" action: A configuration stored on the (T)FTP server is transmitted to the U 168 and can be activated immediately. The IP settings for the data and management interfaces on the device are not changed. The file "settings.xml" are written onto the device.
- "**Save config to server**" action: The current configuration of the device is written to the (T)FTP server. The configuration includes the following files:
  - "ip.xml" (IP settings for the data and management interfaces)
  - "settings.xml" (all other settings, e.g. IP receiver and modulator settings)
  - "user.xml" (user data)
- "**Update firmware from server**" action: If you select this action, you must specify the preferred software version under `Version` (a 4-character maximum applies). One the update is successful, the message "Firmware update OK. Please reboot to use the new firmware version" appears.
- "**Load firmware from server**" action: If you select this action, you must specify the preferred software version under `Version` (a 4-character maximum applies). The software selected is written to the SD memory card, but will not be unpacked.
- "**Unpack *.up archive**" action: If you select this action, the update archive is unpacked and saved to the SD memory card (specify the version number).
- "**Update firmware from SD card**" action: If you select this action, the specified update archive on the SD memory card is unpacked and programmed into the module (enter the version number).
- "**Overwrite backup firmware**" action: The device software is saved in two partitions. The software saved in the first partition is used for operating the module, while the second partition is used to keep a backup copy ready for the event that the update process fails. As long as both partitions are different, the information "Backup differs" will be displayed in the menu "Active Alarm Table". The current software is copied to the backup partition when this action is carried out.

Once you have selected an action, you can add any information still missing from the remaining lines of the table:

- `(T)FTP Server address:` Address of the server
- `Protocol:` Activate the radio button "FTP" if you wish to use the more comprehensive FTP protocol. Activate the radio button "TFTP" if you wish to use the more basic TFTP protocol.
- `FTP User name:` This depends on the settings for the FTP server used (for astro-firmware.de e.g. "anonymous").
- `FTP Password:` This depends on the settings for the FTP server used (for astro-firmware.de e.g. "astro").
- `Path:` Path to the location where data are saved, or from where the data can be loaded. The path must be specified in relation to the root directory of the FTP server, and must always begin with a "/" and end with a "/" as well (enter without quotation marks).
- `Version:` Enter the version number of the software which you wish to download or save here.

HINWEIS: If the update is carried out using the TFTP protocol, then filling in the input fields "FTP User name" and "FTP Password" is not necessary.

"System Log" menu

To have the system log displayed, click on "System log" in the menu at the left. The following overview will now appear:

Figure 60: System log

You can check or configure the following parameters individually:

System log settings

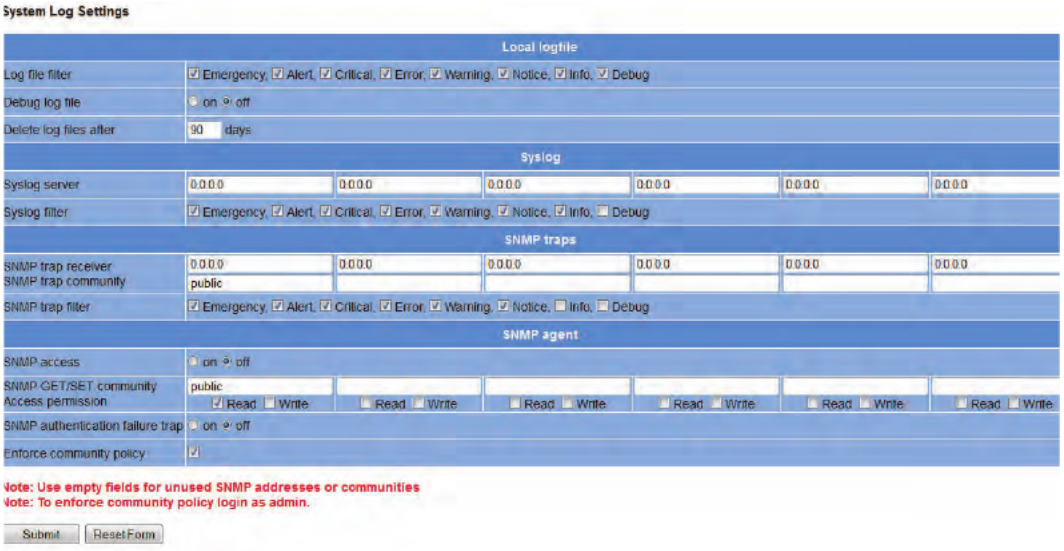


Figure 61: Filter settings for the system log display

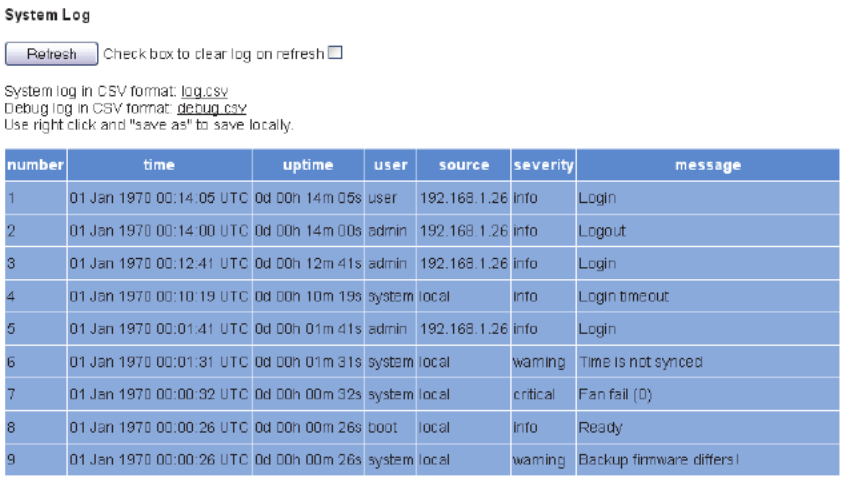
You can activate or deactivate filters for displaying the log entries here. To have messages from the corresponding category displayed, activate the checkbox allocated to the category.

HINWEIS: You can connect to higher-level management systems using the "Syslog" and "SNMP" parameters.

Management Information Base (MIB)

The SNMP MIBs available are stored on the device and can be downloaded by using the download link below the table "System Log Settings".

System log


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.

number	time	uptime	user	source	severity	message
1	01 Jan 1970 00:14:05 UTC	0d 00h 14m 05s	user	192.168.1.26	info	Login
2	01 Jan 1970 00:14:00 UTC	0d 00h 14m 00s	admin	192.168.1.26	info	Logout
3	01 Jan 1970 00:12:41 UTC	0d 00h 12m 41s	admin	192.168.1.26	info	Login
4	01 Jan 1970 00:10:19 UTC	0d 00h 10m 19s	system	local	info	Login timeout
5	01 Jan 1970 00:01:41 UTC	0d 00h 01m 41s	admin	192.168.1.26	info	Login
6	01 Jan 1970 00:01:31 UTC	0d 00h 01m 31s	system	local	warning	Time is not synced
7	01 Jan 1970 00:00:32 UTC	0d 00h 00m 32s	system	local	critical	Fan fail (0)
8	01 Jan 1970 00:00:26 UTC	0d 00h 00m 26s	boot	local	info	Ready
9	01 Jan 1970 00:00:26 UTC	0d 00h 00m 26s	system	local	warning	Backup firmware differs!

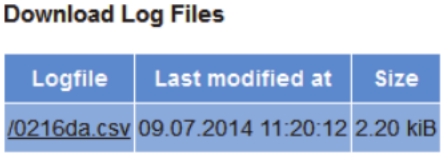
Figure 62: Logfiles

Click on the "Refresh" button to update the system log display. The entries in the system log are sorted chronologically according to the time at which the event occurred.
If you do not wish for the existing entries to be displayed after a refresh, activate the checkbox "Checkbox to clear log on refresh". Once the checkbox has been activated, after a refresh, the process of deleting the old log entries is listed as the first entry (specified the user account and the current time upon deletion).
You can also download the following logfiles:

- `System log` (CSV format)
- `Debug log` (CSV format)

HINWEIS: You can also download a complete archive of log files plus the complete device configuration by clicking on the link „To retrieve an archive of SUPPORT FILES click here:". You will need the device configuration in case of support inquiries. The name of the file is put together by the name of the device and the last four numbers of the MAC address (e. g. U1xx_0218f1_support-files.tar).

Downloading log files


Download Log Files

Logfile	Last modified at	Size
/0216da.csv	09.07.2014 11:20:12	2.20 kiB

Figure 63: Downloading log files

A maximum of 2,500 lines is displayed in the "Log files" table. The complete log file can be downloaded from the "Download Log Files" table by clicking on the file name XX.csv.

"Alarm severities" menu

You can change the alarm settings for diverse parameters or deactivate the alarm display for a parameter, when preferred. To do so, click on the item "Alarm Severities" in the menu at the left. A set of tables for different parameter groups then appears:

Status of power supply, temperature, fan

Code	Message	emergency	alert	critical	error	warning	notice	info	debug	off
0x1000002	Temp 1 fail (%.1f)	○	○	◉	○	○	○	○	○	○
0x1000002	Temp 1 good (%.1f)	○	○	○	○	○	◉	○	○	○
0x1000003	Temp 2 fail (%.1f)	○	○	◉	○	○	○	○	○	○
0x1000003	Temp 2 good (%.1f)	○	○	○	○	○	◉	○	○	○
0x1000004	Temp 3 fail (%.1f)	○	○	◉	○	○	○	○	○	○
0x1000004	Temp 3 good (%.1f)	○	○	○	○	○	◉	○	○	○
0x1000005	Temp 4 fail (%.1f)	○	○	◉	○	○	○	○	○	○
0x1000005	Temp 4 good (%.1f)	○	○	○	○	○	◉	○	○	○
0x1000006	Fan fail (0)	○	○	◉	○	○	○	○	○	○
0x1000006	Fan good (%.0f)	○	○	○	○	○	◉	○	○	○
0x1000007	Supp 1.2 fail (%.2f)	○	○	◉	○	○	○	○	○	○
0x1000007	Supp 1.2 good (%.2f)	○	○	○	○	○	◉	○	○	○
0x1000008	Supp 1.5 fail (%.2f)	○	○	◉	○	○	○	○	○	○
0x1000008	Supp 1.5 good (%.2f)	○	○	○	○	○	◉	○	○	○
0x1000009	Supp 1.8 fail (%.2f)	○	○	◉	○	○	○	○	○	○
0x1000009	Supp 1.8 good (%.2f)	○	○	○	○	○	◉	○	○	○
0x100000a	Supp 2.5 fail (%.2f)	○	○	◉	○	○	○	○	○	○
0x100000a	Supp 2.5 good (%.2f)	○	○	○	○	○	◉	○	○	○
0x100000b	Supp 3.3 fail (%.2f)	○	○	◉	○	○	○	○	○	○
0x100000b	Supp 3.3 good (%.2f)	○	○	○	○	○	◉	○	○	○
0x1000010	Supp 5.2 fail (%.2f)	○	○	◉	○	○	○	○	○	○

Figure 64: Alarm Severities

The preset options for the alarm messages are identified by a green frame. Retaining these settings is recommended.

"Active alarms" menu

To have the "Active Alarm" table displayed, click on the corresponding item in the menu at the left. The following table now appears:

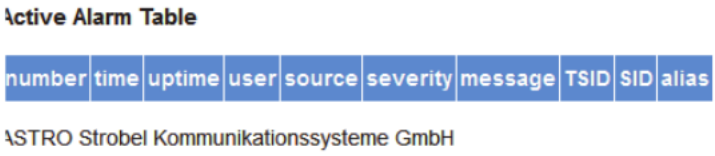


Figure 65: Active alarm table

The table provides information about error messages currently active. The "Message" column shows the error message in plain text.

HINWEIS: *You can also access the "Active Alarm Table" by clicking the red point in the status line in the upper section of the user interface.*

"Statistics" menu

To retrieve data transmission statistics for the device, click on the "Statistics" item in the menu at the left. All statistics relevant to the operation of the device and which can be used for analysis are displayed here. The following tables are displayed individually:

Ethernet bandwidth

Ethernet bandwidth

Property	Management A (eth0) 1G full	Management B (eth1) 1G full	Data A (eth2) 1G full	Data B (eth3) 1G full
Transmit	0.0 Mbit/s	0.0 Mbit/s	57.5 Mbit/s	0.0 Mbit/s
Receive	0.0 Mbit/s	0.0 Mbit/s	0.0 Mbit/s	0.0 Mbit/s

Figure 66: Ethernet bandwidth

The transmission rates for sending (transmit) and reception (receive) are specified for the respective interfaces Management A, Management B, Data A and Data B.

Ethernet frames

Property	Data A (eth2) 1G	Data B (eth3) 1G
Total frames sent by host	2	0
Total frames sent to host	3	54
Total exception frames sent to host	19	2
Total errored frames received	0	0
Total frames discarded by deencapsulator	0	0
Total frames discarded because of lack of buffers	0	0
Total transmit frames generated from IP TX 1 / per sec.	107441 / 1260	0 / 0
Total transmit frames generated from IP TX 2 / per sec.	120496 / 1417	0 / 0
Total transmit frames generated from IP TX 3 / per sec.	106750 / 1260	0 / 0
Total transmit frames generated from IP TX 4 / per sec.	106461 / 1260	0 / 0

Figure 67: Ethernet frames

The following parameters are displayed for the interfaces Data A and Data B, in this order:

- The number of IP frames transmitted to the processor is specified in the first three lines of the table.
- Number of defective frames.
- Number of frames which could not be allocated.
- Number of frames which could not be allocated due to exceeding the total buffer depth.
- The number of frames transmitted per transport stream in total or per second is displayed in the following lines for each IP transmitter.

Ethernet TX

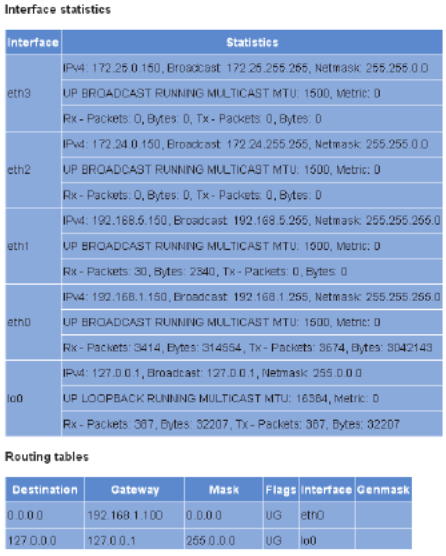
Property	Value
Minimum FEC Freelist	220
Maximum output queue depth	255

Figure 68: Ethernet TX

In reference to forward error correction, the smallest number of free FEC buffers measured at all is displayed in the first line.
The total number of FEC buffers is displayed in the second line.

"Network" menu

To have the network settings displayed, click on "Network" in the menu at the left. The following overview will now appear:



Interface statistics

Interface	Statistics
eth3	IPv4: 172.25.0.150, Broadcast: 172.25.255.255, Netmask: 255.255.0.0
	UP BROADCAST RUNNING MULTICAST MTU: 1500, Metric: 0
	Rx - Packets: 0, Bytes: 0, Tx - Packets: 0, Bytes: 0
eth2	IPv4: 172.24.0.150, Broadcast: 172.24.255.255, Netmask: 255.255.0.0
	UP BROADCAST RUNNING MULTICAST MTU: 1500, Metric: 0
	Rx - Packets: 0, Bytes: 0, Tx - Packets: 0, Bytes: 0
eth1	IPv4: 192.168.5.150, Broadcast: 192.168.5.255, Netmask: 255.255.255.0
	UP BROADCAST RUNNING MULTICAST MTU: 1500, Metric: 0
	Rx - Packets: 30, Bytes: 2340, Tx - Packets: 0, Bytes: 0
eth0	IPv4: 192.168.1.150, Broadcast: 192.168.1.255, Netmask: 255.255.255.0
	UP BROADCAST RUNNING MULTICAST MTU: 1500, Metric: 0
	Rx - Packets: 3414, Bytes: 314554, Tx - Packets: 3674, Bytes: 3042143
lo0	IPv4: 127.0.0.1, Broadcast: 127.0.0.1, Netmask: 255.0.0.0
	UP LOOPBACK RUNNING MULTICAST MTU: 16384, Metric: 0
	Rx - Packets: 367, Bytes: 32207, Tx - Packets: 367, Bytes: 32207

Routing tables

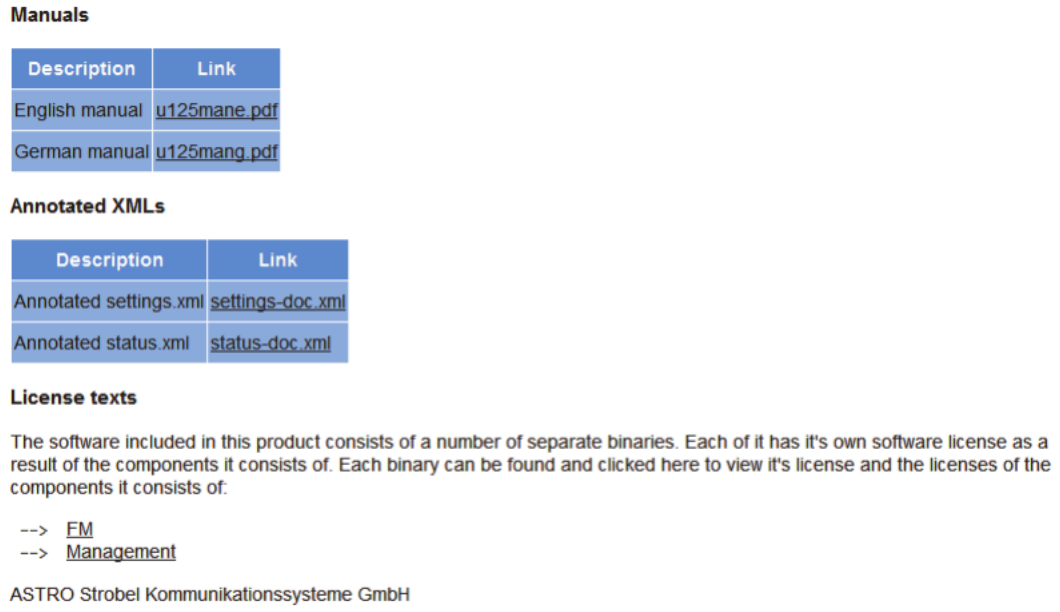
Destination	Gateway	Mask	Flags	Interface	Genmask
0.0.0.0	192.168.1.100	0.0.0.0	UG	eth0	
127.0.0.0	127.0.0.1	255.0.0.0	UG	lo0	

Figure 66: Network settings

The detailed interface statistic properties which are displayed are for information purposes only, and are used to describe the network. They could be useful for customer service in the event of a fault.

„Documentation" menu

To hsve a list of operating manuals, XML-Files and license texts displayed, click on „Documentation". in the menu at the left. The following overview will now appear:



Manuals

Description	Link
English manual	u125mane.pdf
German manual	u125mang.pdf

Annotated XMLs

Description	Link
Annotated settings.xml	settings-doc.xml
Annotated status.xml	status-doc.xml

License texts

The software included in this product consists of a number of separate binaries. Each of it has it's own software license as a result of the components it consists of. Each binary can be found and clicked here to view it's license and the licenses of the components it consists of:

--> FM
--> Management

ASTRO Strobel Kommunikationssysteme GmbH

Figure 67: Menu „Documentation"

To open a file, just click on the desired item.

Troubleshooting

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

- ☐ Check whether the device is connected to the required grid voltage (230 V~, 50 Hz for the U 100 base unit, and 48 V for the U 100-48 base unit).
- ☐ 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

The device must not be opened other than for repair purposes. Repairs may only be carried out at the factory or at workshops, or by persons, authorised by ASTROBit GmbH.
Read carefully: EN 60728-11 Safety requirements: No service work during thunderstorms.

*HINWEIS: In the event of repairs, **DIN VDE regulations 0701 - 0702**, where applicable, must be adhered to, and these are secondary to the relevant data specifications in DIN EN 60950-1. **You must disconnect the power plug before opening the base unit!***

Service tasks

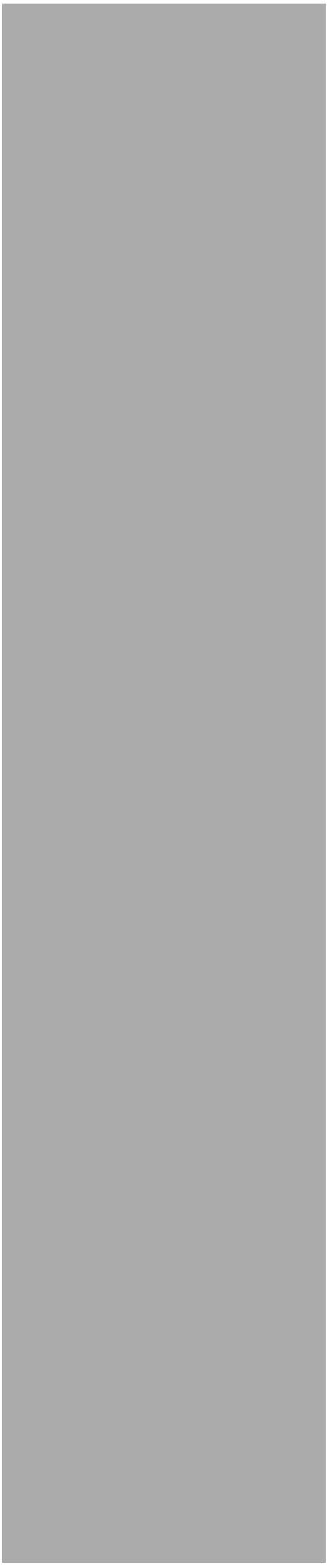
The following tasks, which involve the removal of screw connections, can be performed by appropriately instructed service personnel: Removal and installation of signal converters
(e.g. U 116) and power modules, even when the U 100 is operating.

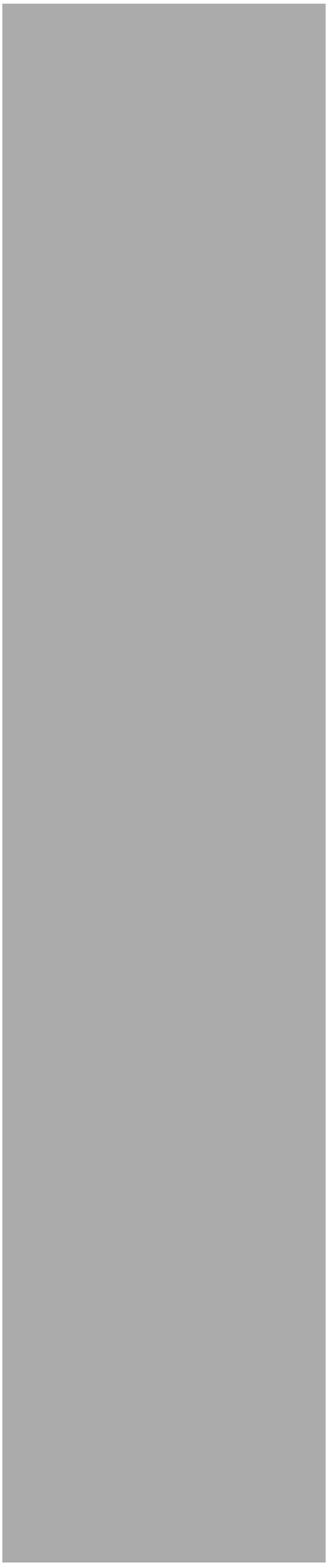
Replacing converter modules

Converter modules can be pulled out to the front after removing the safety screw in the front covers (see section “Connecting and installing the module”)

Technical data

Type		U 164	U 164-X
Order number		380 164	380 167
EAN-Code		4026187170769	4026187194499
Number of DVB-CT2 input signals		4	
Number of DVB-CT2 tuners		8	
Number of IP output streams		4 MPTS, 504 SPTS	
Interfaces			
Management		2 x 100 Base-T Ethernet (RJ 45)	
Data		2 x 1000 Base-T Ethernet (RJ 45)	
Protocols		IEEE802.3 Ethernet, RTP, ARP, IPv4, TCP/UDP, HTTP, SNTP, IGMPv3	
Transportstream Encapsulation			
Protocols		UDP, UDP / RTP, 1-7 packets, FEC	
Packet length	[Bytes]	188 / 204	
DVB-C demodulator			
Frequency range	[MHz]	47 - 862	
Input data rate	[Mbaud]	0,5 - 7	
Modulation modes (accord. DVB-standard)		QPSK, QAM16, QAM32, QAM64, QAM128, QAM256	
Input symbol rate	[MS/s]	1,8 - 7,2	
DVB-T demodulator / DVB-T2 demodulator (Scrambling of L1 post signalling; conforms to ETSI EN 302-755 v1.31)			
Frequency range	[MHz]	47 - 862	
Modulation		DVB-T: 4-, 16-, 64-QAM; DVB-T2: 4-, 16-, 64-, 256-QAM	DVB-T: 4-, 16-, 64-QAM; DVB-T2: 4-, 16-, 64-, 256-QAM DVB-T2 scrambling of L1 post signalling
Guardinterval		DVB-T: 1/4; 1/8; 1/16; 1/32; DVB-T2: 1/4; 5/32; 1/8; 5/64; 1/16; 1/32; 1/64; 1/128	
FEC		DVB-T: 1/2; 2/3; 3/4; 5/6; 7/8; DVB-T2: 1/2; 3/5; 2/3; 3/4; 4/5; 5/6	
FFT-Mode		DVB-T: 2k, 8k; DVB-T2: 1k, 2k, 4k, 8k, 16k, 32k	
Bandwidth	[MHz]	DVB-T: 6; 7; 8; DVB-T2: 5; 6; 7; 8	
Remote voltage supply		5V, typical, 100mA, switchable	
Input symbol rate	[MS/s]	DVB-T: 6, 7, 8; DVB-T2: 5, 6, 7, 8	
CI interfaces			
CI slots		4 x (front access)	
Supported modules	excerpt (others on request)	Alphacrypt, Aston Conax, Dreamcrypt, Entavio CAM, GkWare BISS CAM, Homecast CAM, ICECrypt, Ideto Access, Kid CAM, Mascom Cryptoworks, Matrix CAM, Mediaguard Canal Digitaal, Nagravision, Oasis CAM, PCMCIA CAm, Premiere, Worldcam, TechniCam Beta2, Technicrypt, TPS, Reality CAM, SMiT, Universal CAM, Viaccess, Videoguard CAM	
Connectors		4 x PCMCIA	
RF inputs			
Connectors	[Ω]	75, 4 x F-jack	
Common data			
Current consumption at 48 V	[mA]	590	
Power consumption at 36 - 60 V	[W]	28,5 per module	
Input voltage	[V]	36 - 60	
Dimensions		1 HU, 19 inch	
Ambient temperature	[°C]	0 ... +45	





ASTRO Strobel Kommunikationssysteme GmbH

These operating instructions have been written by:
ASTRO Bit GmbH
Olefant 1-3, D-51427 Bergisch Gladbach (Bensberg)
Tel.: 02204/405-0, Fax: 02204/405-10
eMail: kontakt@astro.kom.de
Internet: www.astro-kom.de