



U 158

IP to QAM Converter



Operating manual

Contents

General information.....	page 03
Important!	page 04
Guarantee conditions	page 04
Disposal.....	page 04
Performance description	page 04
Device description	page 05
Connecting and installing the module	page 07
Quick start – starting operation of the U 158.....	page 09
“Status” menu.....	page 16
“Main” menu	page 22
“Test generator” menu.....	page 24
“IP channel” menu	page 26
“IP RX” menu.....	page 27
“RF” menu	page 29
“RF 1.X” and “RF 2.X” menu	page 32
“TS processing” menu	page 34
“NIT 1” and “NIT 2” menu	page 37
“LCN” menu.....	page 39
“SSL settings” menu	page 40
“User settings” menu	page 42
“TS analyzer” menu.....	page 44
“Licensing” menu.....	page 45
“Update/config” menu.....	page 46
“System log” menu	page 49
“Active alarms” menu	page 51
“Statistics” menu.....	page 52
“Network” menu	page 54
“Devices” menu	page 55
Troubleshooting.....	page 56
Maintenance and repair.....	page 56
Servicing.....	page 56
Technical data	page 57

General information

NOTE: This operating manual was created to provide the most important instructions for operating the U 158 module. We expressly recommend reading this manual before installing or operating the devices.

The ASTRO company confirms the information in this manual to be correct at the time of printing, but it reserves the right to make changes, without prior notice, to the specifications, the operation of the device and the operating manual.

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.



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 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.

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

Important!



Before using the device, read the operating manual carefully and store it for future reference.

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

General safety

ATTENTION: *Disconnect both power plugs before opening the device!*

To avoid any potential risks to the greatest extent possible, it is very important that you observe the safety instructions in the operating manual for the U100-230 / U-100-48 base unit.

Assembly instructions

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

The module U 158 may only be operated in the base units U 100-230 and U 100-48 made by ASTRO.

Observe the assembly instructions in the operating manual for the U 100-230 / U 100-48 base unit.



Warranty conditions

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

Disposal



All of our packaging material (cardboard boxes, inserts, plastic film and bags) is completely recyclable. Electronic devices must not be disposed of with household waste, but rather – according to DIRECTIVE 2002/96/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL from January 27, 2003, on waste electrical and electronic equipment – must be properly disposed of. When it is no longer in use, please bring the device for disposal to one of the public collection points for this purpose.

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

Performance description

The U 158 is a plug-in module, which is only intended for use in the base units U 100-230 and U 100-48. It can receive up to 8 MPEG data streams and channels encapsulated in accordance with Internet Protocol (IP). These are converted in up to 2 x 4 QAM adjacent channels and are output using the two HF outputs in the U 158.

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

The U 158 plug-in module features the following performance characteristics:

- Conversion of up to 8 IP gigabit Ethernet multicast groups
- QAM channels are output in 2 x 4 adjacent channels
- Outstanding output parameters provided by Direct Digital Technology



The delivery is comprised of the following parts:

- U 158 Edge QAM module and backplane
- Operating manual

The U 158 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, top:
U 158, installed in the U 100 base unit
(fitted with three plug-in modules)

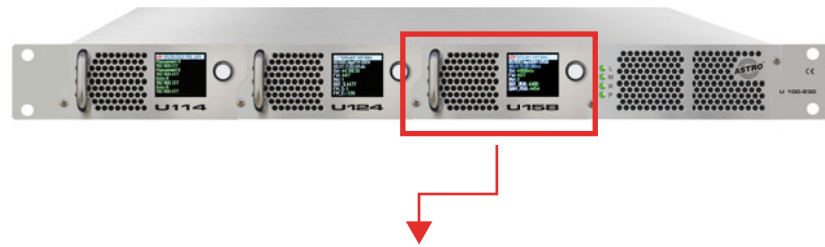
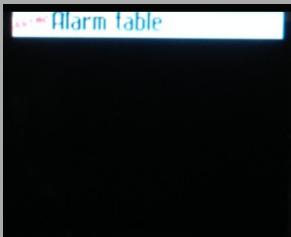
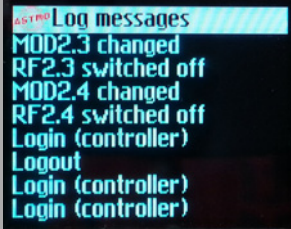


Figure 1, middle:
U 158, front panel
[1] Display for management IP addresses,
data IP addresses, status messages, etc.
[2] Status display
[3] Control and data knob, menu switch



Figure 1: U 158



NOTE: Turning the data knob [3] (fig. 2, above) allows you to navigate through the individual menu items in the U 158 display. Press the data knob to activate 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.

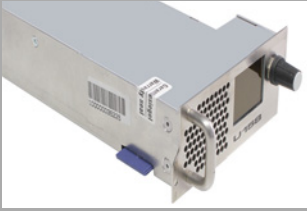
- Alarm table: The current error messages are displayed.

- RF output: The programs currently selected are 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")

Connecting and installing the module



NOTE: 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.

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

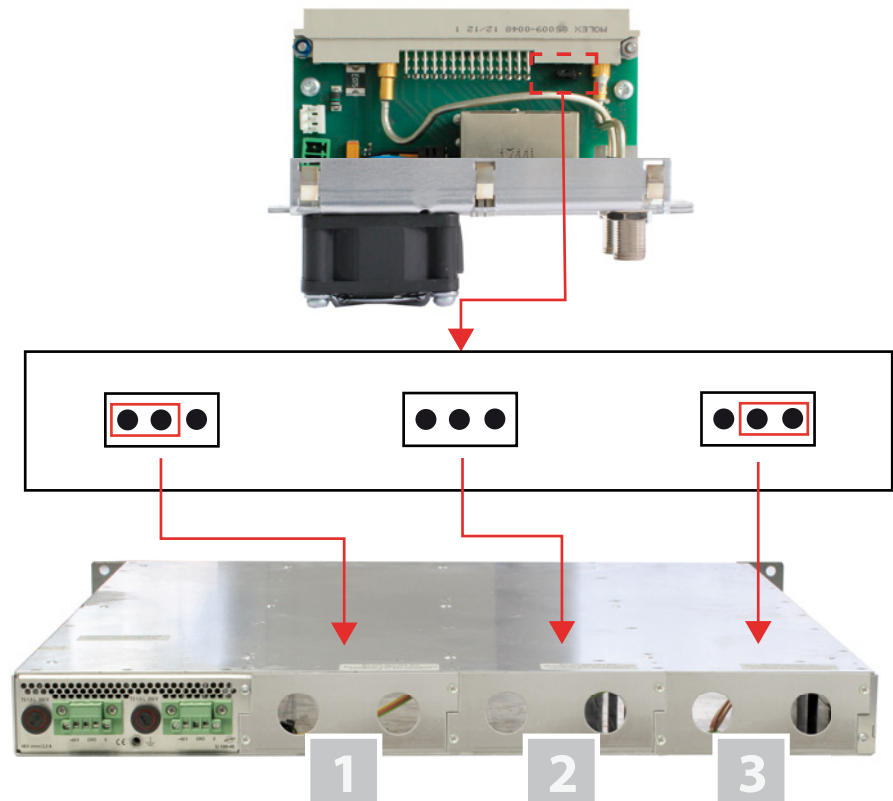


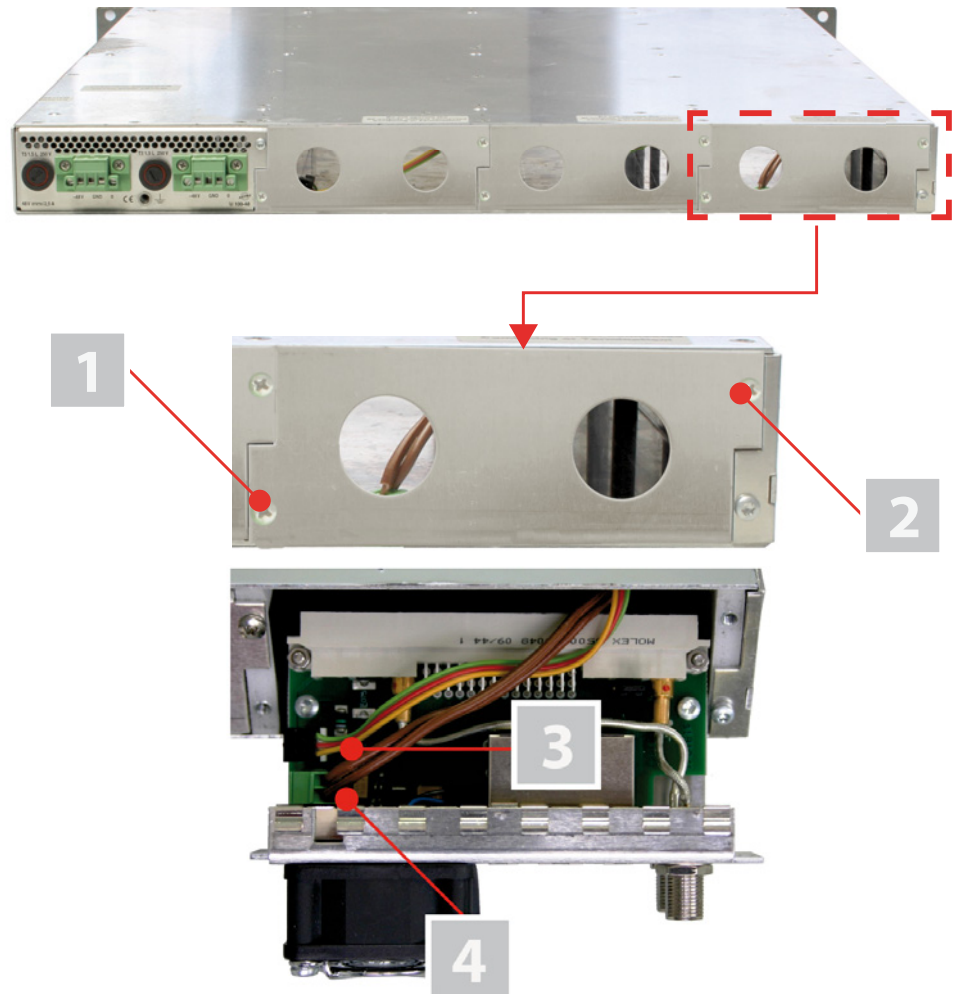
Figure 2: Coding the backplane by plugging in the jumper

To prepare the backplane for installation, proceed as follows:

Plug the jumper into the installation position provided in accordance with figure 2 (page 7).

NOTE: 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

F3E=

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.
-

D7EG>F:

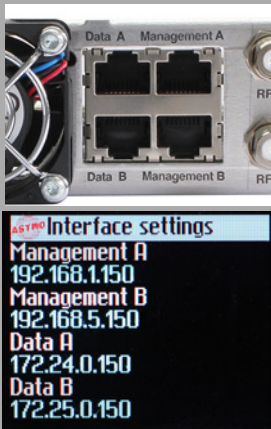
The backplane is now connected and installed. Once installed, it should correspond to the figure at the left.



Quick start - starting operation of the U 158

Connecting the U 158 to a PC or laptop

To be able to configure the U 158, 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 U 158 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.

***NOTE:** Please note that your PC or laptop must be in the same sub-network as the U 158! The sub-network mask of the U 158 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:

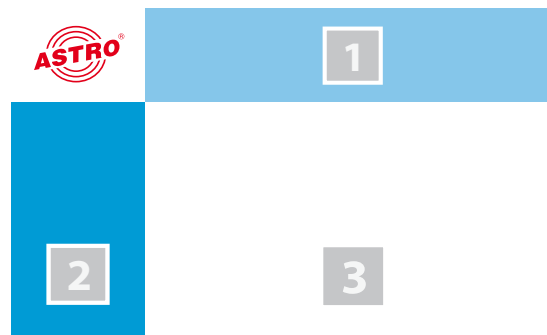


Figure 4: Structure of the web browser interface

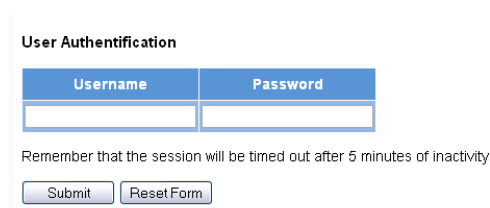
- Status line (header) [1]:** displays general information on the module.
SW: Software status
FW: Current version of the software installed
HW: Hardware version
Up: Runtime since the system was booted
Time: Date and time
Name, location, contact: corresponds to the settings which were made in the “User 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.

NOTE: *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 U 158, which appears in the device display, into 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



User Authentication

Username	Password
<input type="text"/>	<input type="password"/>

Remember that the session will be timed out after 5 minutes of inactivity.

Figure 5: Log in

After logging in, the start page of the U 158 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 158 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”.

NOTE: *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

NOTE: If you wish to change the IP address, then the settings on the PC must be changed accordingly. IP addresses can only be changed by the administrator!

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:d0	00:17:72:04:00:d0	00:17:72:05:00:d0
Active	<input checked="" type="radio"/> on <input type="radio"/> off	<input checked="" type="radio"/> on <input type="radio"/> off	<input checked="" type="radio"/> on <input type="radio"/> off	<input checked="" type="radio"/> on <input type="radio"/> 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 6: 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 158

The overview on page 10 shows the possible signal paths for the U 158. The specific signal flow can be divided into the following sub-areas:

- The IP receivers (1 to 8) receive a signal via data port A or B (each can be switched).
- There are two QAM modulators, each of which features a transport stream selector for selecting a transport stream for each QAM channel.
- The level of the output signals from the two QAM modulators (each with 4 QAM channels) are each adapted, filtered and amplified, and are conveyed to an HF output on the backplane.

U158

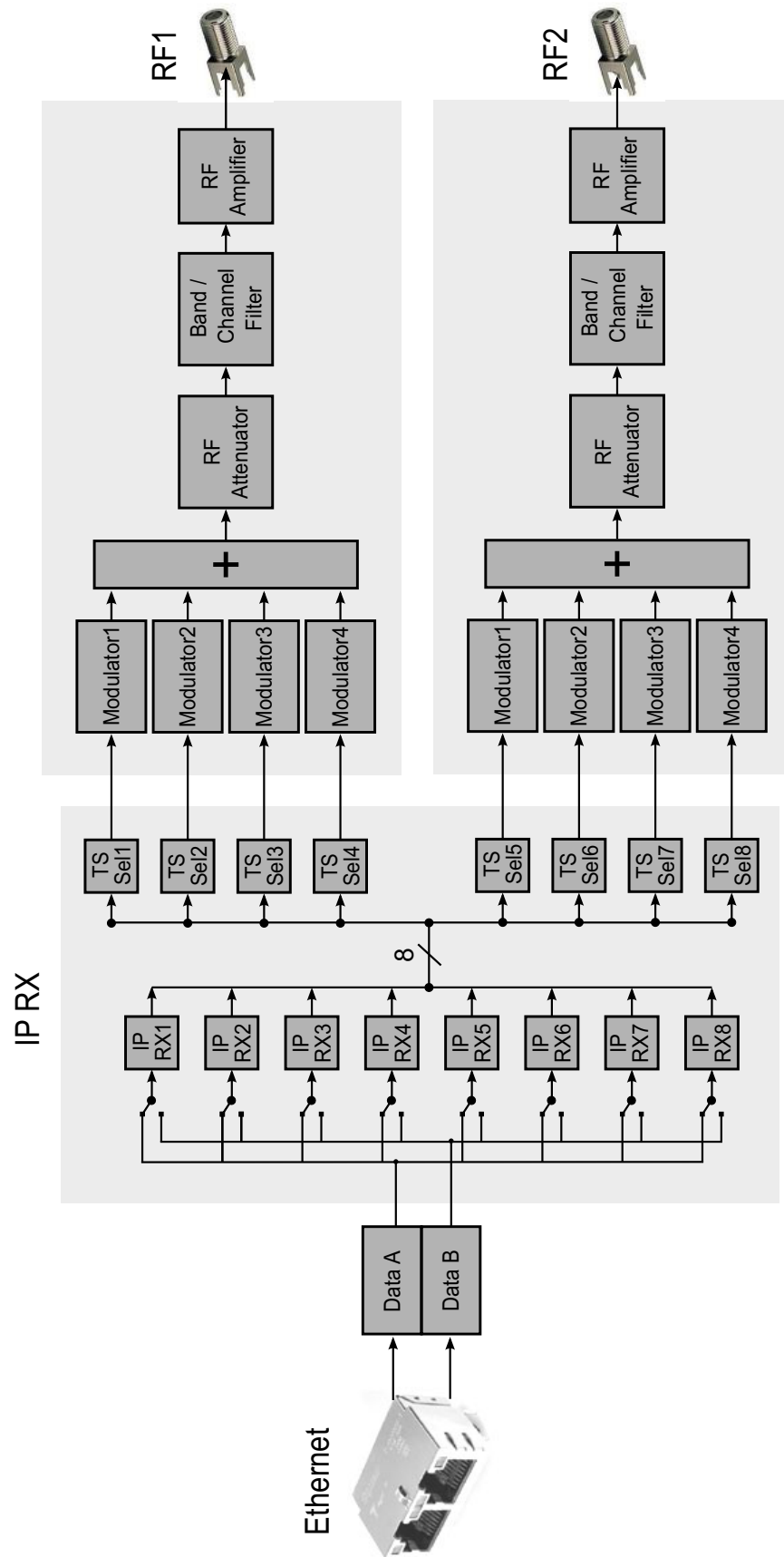


Figure 7: The signal flow in the U 158

Configuring the IP receiver

Now start configuring a signal path in the U 158. Start by clicking on the item "IP RX 1" in the web browser interface menu. You will now see the following table:

IP RX1 Channel Settings

Property	Data A (eth2) 1 G					
Primary Receive IP:Port	232	19	100	136	10000	Priority
Primary Source Select	0	0	0	0		12 Highest/Hot

Figure 8: Setting the source for the data stream

Enter the IP address and port for the data source in the first line. Optionally, you can also enter a source select address in the second line.

Further information about configuring the receiver can be found in the section "Configuring IP inputs". There is another table below the "IP RX 1 Channel Settings" table. Activate the radio button "on" to enable the receiver.

Property	Data A (eth2) + Data B (eth3)	
Enable	<input checked="" type="radio"/> on <input type="radio"/> off	
Port	Data B	Primary automatic
Timeouts	in case of failure switch after 0 seconds, switch back to higher priority after 300 seconds.	
Encapsulation	<input checked="" type="radio"/> RTP/UDP/IP <input type="radio"/> UDP/IP <input type="radio"/> automatic <input type="radio"/> manual	
Bitrate	<input checked="" type="radio"/> Single PCR (SPTS) <input type="radio"/> Mult. PCR (MPTS) <input type="radio"/> No PCR (SI-Stream) <input type="radio"/> automatic <input type="radio"/> manual	
FEC	<input checked="" type="radio"/> on <input type="radio"/> off	
TSID / ONID	1093	1
Alias manual / automatic		Bayern 1, ARD BR

Figure 9: Activating the connection to the data port

Checking the data reception rate

Now click on the menu item "Status" in the menu at the left. You will now see the following overview:

Ethernet

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
Address	192.168.1.150	192.168.5.150	172.24.0.150	172.25.0.150
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	1 Gbit/s, full duplex	1 Gbit/s, full duplex	1 Gbit/s, full duplex
Transmit	0.0 Mbit/s	0.0 Mbit/s	76.6 Mbit/s	76.6 Mbit/s
Receive	0.0 Mbit/s	0.0 Mbit/s	70.9 Mbit/s	70.9 Mbit/s

Figure 10: Displaying reception statistics

A data reception rate > 0 at data ports A or B should now appear in the line "Receive" in the "Ethernet" table.

Now click on the menu item “Statistics” in the menu at the left. Details about the transport stream received are provided in the “Ethernet RX” table. A TS rate of > 0 should be displayed. If this is not the case, check the receiver settings.

Ethernet RX

Channel	Encap	TS Rate	Buffer depth	FEC	Valid	Missing	Fixed	Duplicate	Reordered	Out of range
IP RX1	1328 bytes 7 packets RTP/UDP/IP	33.8 Mbit/s Mult. PCR	255 Frames 49.8 % 79.5 ms	none	4410949	0	0	0	0	0

Figure 11: IP receiver statistics

Configuring HF output channels

To complete the process, you should configure and activate the HF output channels. To do so, click on the menu item “RF” in the web browser interface menu. You will now see the following table:

Modulator	Enable	Stream	Symbol Rate	Standard Bandwidth Constellation TS Rate	Channel Frequency	Level	Channel Filter	Reference	Status
RF1.1	<input type="radio"/> on <input type="radio"/> standby <input type="radio"/> off	IP_RX1 TSID:1093 ONID:1 Alias: Bayern 1, ARD BR	6.90000 MBaud	J.83 Annex A/C 7.93 MHz 256 QAM 50.871 Mbit/s	D370 370.0 MHz 0.000 kHz	0.0 dB	<input type="radio"/> on <input type="radio"/> off not fitted	Δ 0.1 dB	ok
RF1.2	<input type="radio"/> on <input type="radio"/> standby <input type="radio"/> off	IP_RX2 TSID:1051 ONID:1 Alias: tagesschau24, ARD		J.83 Annex A/C 7.93 MHz 64 QAM 38.153 Mbit/s	D378 378.0 MHz 0.000 kHz	0.0 dB			ok
RF1.3	<input type="radio"/> on <input type="radio"/> standby <input type="radio"/> off	IP_RX3 TSID:1078 ONID:1 Alias: DATA SYSTEM TR 78, MTV Networks Europe		J.83 Annex A/C 7.93 MHz 64 QAM 38.153 Mbit/s	D386 386.0 MHz 0.000 kHz	0.0 dB			ok
RF1.4	<input type="radio"/> on <input type="radio"/> standby <input type="radio"/> off	IP_RX4 TSID:1024 ONID:1 Alias: TELE MELODY, CSAT		J.83 Annex A/C 7.93 MHz 64 QAM 38.153 Mbit/s	D394 394.0 MHz 0.000 kHz	0.0 dB			ok
RF2.1	<input type="radio"/> on <input type="radio"/> standby <input type="radio"/> off	IP_RX1 TSID:1093 ONID:1 Alias: Bayern 1, ARD BR	6.90000 MBaud	J.83 Annex A/C 7.93 MHz 64 QAM 38.153 Mbit/s	D706 706.0 MHz 0.000 kHz	0.0 dB	<input type="radio"/> on <input type="radio"/> off not fitted	Δ 0.1 dB	ok
RF2.2	<input type="radio"/> on <input type="radio"/> standby <input type="radio"/> off	IP_RX2 TSID:1051 ONID:1 Alias: tagesschau24, ARD		J.83 Annex A/C 7.93 MHz 64 QAM 38.153 Mbit/s	D714 714.0 MHz 0.000 kHz	0.0 dB			ok (standby)
RF2.3	<input type="radio"/> on <input type="radio"/> standby <input type="radio"/> off	IP_RX3 TSID:1078 ONID:1 Alias: DATA SYSTEM TR 78, MTV Networks Europe		J.83 Annex A/C 7.93 MHz 64 QAM 38.153 Mbit/s	D722 722.0 MHz 0.000 kHz	0.0 dB			ok
RF2.4	<input type="radio"/> on <input type="radio"/> standby <input type="radio"/> off	IP_RX5 TSID:1079 ONID:1 Alias: ZDF, ZDFvision		J.83 Annex A/C 7.93 MHz 64 QAM 38.153 Mbit/s	D730 730.0 MHz 0.000 kHz	0.0 dB			ok

Channel list selection

	Localisation	Available on SD Card
Channel list	<input type="text"/>	de ru

RF Detector

	Mode	Level
warnings	<input type="radio"/> on <input type="radio"/> off	±2.5 dB
security switch off	<input type="radio"/> on <input type="radio"/> off	+3.0 dB
Lock RF relevant settings	<input type="radio"/> on <input type="radio"/> off	

Figure 12: Configuring HF output channels

For an example of this, select one of the modulators by clicking on the “On” radio button in the “Enable” column.

Select the incoming data stream for conversion from the drop-down menu. The drop-down menu shows all data available streams with reception using the eight IP receivers. Enter the preferred values for the frequency and the level in the corresponding input field in the “Channel Frequency” and “Level” columns respectively.

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

More information on setting the HF modulators can be found in the section “RF menu”.

“Status” menu

To have the current settings for the U 158 displayed, click on the `Status` item in the menu at the left. You can now see the overview shown in figure 13:

Ethernet

Property	Management A (eth0)	Management B (eth1)	Data A (eth2)	Data B (eth3)
MAC	00:17:72:02:0d:18	00:17:72:03:0d:18	00:17:72:04:0d:18	00:17:72:05:0d:18
Address	192.168.1.144	192.168.5.144	172.24.0.144	172.25.0.144
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	1 Gbit/s, full duplex	1 Gbit/s, full duplex	1 Gbit/s, full duplex
Transmit	0.4 Mbit/s	0.0 Mbit/s	0.0 Mbit/s	0.0 Mbit/s
Receive	0.1 Mbit/s	0.0 Mbit/s	368.2 Mbit/s	368.3 Mbit/s

IP RX Channels

Channel	Interface	Prim. RX IP socket source	Sec. RX IP socket source	Ter. RX IP socket source	Encapsulation	FEC	TS Rate	TSID ONID	Alias
IP_RX1	Data A	232.20.100.128:10000 0.0.0.0	0.0.0.0	0.0.0.0	1328 bytes 7 packets RTP/UDP/IP	L(Cols) 20 D(Rows) 5 Col only	37.8 Mbit/s Mult. PCR	1093 1	Bayern 1, ARD BR
	Data B	232.19.100.128:10000 0.0.0.0	0.0.0.0	0.0.0.0					
IP_RX2	Data A	232.20.100.129:10000 0.0.0.0	0.0.0.0	0.0.0.0	1328 bytes 7 packets RTP/UDP/IP	none	33.6 Mbit/s Mult. PCR	1051 1	tagesschau24, ARD
	Data B	232.19.100.129:10000 0.0.0.0	0.0.0.0	0.0.0.0					
IP_RX3	Data A	232.20.100.130:10000 0.0.0.0	0.0.0.0	0.0.0.0	1328 bytes 7 packets RTP/UDP/IP	L(Cols) 20 D(Rows) 5 Single PCR Col only	37.8 Mbit/s Single PCR	1078 1	DATA SYSTEM TR 78, MTV Networks Europe
	Data B	232.19.100.130:10000 0.0.0.0	0.0.0.0	0.0.0.0					
IP_RX4	Data A	232.20.100.131:10000 0.0.0.0	0.0.0.0	0.0.0.0	1328 bytes 7 packets RTP/UDP/IP	L(Cols) 20 D(Rows) 5 Col only	33.6 Mbit/s Mult. PCR	1024 1	TELE MELODY, CSAT
	Data B	232.19.100.131:10000 0.0.0.0	0.0.0.0	0.0.0.0					
IP_RX5	Data A	232.20.100.132:10000 0.0.0.0	0.0.0.0	0.0.0.0	1328 bytes 7 packets RTP/UDP/IP	L(Cols) 20 D(Rows) 5 Col only	37.9 Mbit/s Mult. PCR	1079 1	ZDF, ZDFvision
	Data B	232.19.100.132:10000 0.0.0.0	0.0.0.0	0.0.0.0					
IP_RX6	Data A	232.20.100.133:10000 0.0.0.0	0.0.0.0	0.0.0.0	1328 bytes 7 packets RTP/UDP/IP	L(Cols) 20 D(Rows) 5 Col only	37.9 Mbit/s Mult. PCR	1101 1	Das Erste, ARD
	Data B	232.19.100.133:10000 0.0.0.0	0.0.0.0	0.0.0.0					
IP_RX7	Data A	232.20.100.134:10000 0.0.0.0	0.0.0.0	0.0.0.0	1328 bytes 7 packets RTP/UDP/IP	none	37.8 Mbit/s Mult. PCR	1201 1	WDR Bielefeld, ARD
	Data B	232.19.100.134:10000 0.0.0.0	0.0.0.0	0.0.0.0					
IP_RX8	Data A	232.20.100.135:10000 0.0.0.0	0.0.0.0	0.0.0.0	1328 bytes 7 packets RTP/UDP/IP	L(Cols) 20 D(Rows) 5 Col only	33.6 Mbit/s Mult. PCR	1107 1	SAT.1, ProSiebenSat. 1
	Data B	232.19.100.135:10000 0.0.0.0	0.0.0.0	0.0.0.0					

Figure 13: 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	00:17:72:02:00:d0	00:17:72:03:00:d0	00:17:72:04:00:d0	00:17:72:05:00:d0
Address	192.168.1.150	192.168.5.150	172.24.0.150	172.25.0.150
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	1 Gbit/s, full duplex	1 Gbit/s, full duplex	1 Gbit/s, full duplex
Transmit	0.0 Mbit/s	0.0 Mbit/s	76.6 Mbit/s	76.6 Mbit/s
Receive	0.0 Mbit/s	0.0 Mbit/s	70.9 Mbit/s	70.9 Mbit/s

Figure 14: 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 U 158 (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 IP receiver:

P RX Channels

Channel	Interface	Prim. RX IP socket source	Sec. RX IP socket source	Ter. RX IP socket source	Encapsulation	FEC	TS Rate	TSID ONID	Alias
P_RX1	Data A	232.20.100.128:10000 0.0.0.0	0.0.0.0 0.0.0.0	0.0.0.0 0.0.0.0	1328 bytes 7 packets RTP/UDP/IP	L(Cols) 20 D(Rows) 5 Col only	37.8 Mbit/s Mult. PCR	1093 1	Bayern 1, ARD BR
	Data B	232.19.100.128:10000 0.0.0.0	0.0.0.0 0.0.0.0	0.0.0.0 0.0.0.0					
P_RX2	Data A	232.20.100.129:10000 0.0.0.0	0.0.0.0 0.0.0.0	0.0.0.0 0.0.0.0	1328 bytes 7 packets RTP/UDP/IP	none	33.6 Mbit/s Mult. PCR	1051 1	tagesschau24, ARD
	Data B	232.19.100.129:10000 0.0.0.0	0.0.0.0 0.0.0.0	0.0.0.0 0.0.0.0					
P_RX3	Data A	232.20.100.130:10000 0.0.0.0	0.0.0.0 0.0.0.0	0.0.0.0 0.0.0.0	1328 bytes 7 packets RTP/UDP/IP	L(Cols) 20 D(Rows) 5 Col only	37.8 Mbit/s Single PCR PCR-PID 8190	1078 1	DATA SYSTEM TR 78, MTV Networks Europe
	Data B	232.19.100.130:10000 0.0.0.0	0.0.0.0 0.0.0.0	0.0.0.0 0.0.0.0					
P_RX4	Data A	232.20.100.131:10000 0.0.0.0	0.0.0.0 0.0.0.0	0.0.0.0 0.0.0.0	1328 bytes 7 packets RTP/UDP/IP	L(Cols) 20 D(Rows) 5 Col only	33.6 Mbit/s Mult. PCR	1024 1	TELE MELODY, CSAT
	Data B	232.19.100.131:10000 0.0.0.0	0.0.0.0 0.0.0.0	0.0.0.0 0.0.0.0					
P_RX5	Data A	232.20.100.132:10000 0.0.0.0	0.0.0.0 0.0.0.0	0.0.0.0 0.0.0.0	1328 bytes 7 packets RTP/UDP/IP	L(Cols) 20 D(Rows) 5 Col only	37.9 Mbit/s Mult. PCR	1079 1	ZDF, ZDFvision
	Data B	232.19.100.132:10000 0.0.0.0	0.0.0.0 0.0.0.0	0.0.0.0 0.0.0.0					
P_RX6	Data A	232.20.100.133:10000 0.0.0.0	0.0.0.0 0.0.0.0	0.0.0.0 0.0.0.0	1328 bytes 7 packets RTP/UDP/IP	L(Cols) 20 D(Rows) 5 Col only	37.9 Mbit/s Mult. PCR	1101 1	Das Erste, ARD
	Data B	232.19.100.133:10000 0.0.0.0	0.0.0.0 0.0.0.0	0.0.0.0 0.0.0.0					
P_RX7	Data A	232.20.100.134:10000 0.0.0.0	0.0.0.0 0.0.0.0	0.0.0.0 0.0.0.0	1328 bytes 7 packets RTP/UDP/IP	none	37.8 Mbit/s Mult. PCR	1201 1	WDR Bielefeld, ARD
	Data B	232.19.100.134:10000 0.0.0.0	0.0.0.0 0.0.0.0	0.0.0.0 0.0.0.0					
P_RX8	Data A	232.20.100.135:10000 0.0.0.0	0.0.0.0 0.0.0.0	0.0.0.0 0.0.0.0	1328 bytes 7 packets RTP/UDP/IP	L(Cols) 20 D(Rows) 5 Col only	33.6 Mbit/s Mult. PCR	1107 1	SAT.1, ProSiebenSat.1
	Data B	232.19.100.135:10000 0.0.0.0	0.0.0.0 0.0.0.0	0.0.0.0 0.0.0.0					

Figure 15: Status display - IP RX channels

The different text formats refer to:

- Green: active
- Grey: inactive (“off”)
- Black (bold): priority “hot”, no errors
- Red (bold): priority “hot”, errors
- Black (standard): priority “cold”, no errors
- Red (standard): priority “cold”, errors

The values set for the following parameters are displayed in the table “IP RX channels” for the 8 IP receivers – for outputs Data A and B respectively:

- Prim. RX IP socket source: Primary source
- Sec. RX IP socket source: Secondary source
- Ter. RX IP socket source: Tertiary source
- Encapsulation: Data encapsulation
- FEC: Forward error correction
- TS Rate: Data rate
- TSID ONID: Transport stream ID / original network ID
- Alias: Alias name

For details on the parameters: see the section “IP RX menu”

Status display of the QAM output programs:

Modulator	Enable	Stream	Symbol Rate	Standard Bandwidth Constellation TS Rate	Channel Frequency	Level	Channel Filter	Reference	Status
RF1.1	<input checked="" type="radio"/> on <input type="radio"/> standby <input type="radio"/> off	IP_RX1 TSID:1093 ONID:1 Alias: Bayern 1, ARD BR	6.90000 MBaud	J.83 Annex A/C 7.93 MHz 256 QAM 50.871 Mbit/s	D370 370.0 MHz 0.000 kHz	0.0 dB	<input checked="" type="radio"/> on <input type="radio"/> off not fitted Set	Δ 0.1 dB	ok
RF1.2	<input checked="" type="radio"/> on <input type="radio"/> standby <input type="radio"/> off	IP_RX2 TSID:1051 ONID:1 Alias: tagesschau24, ARD			D378 378.0 MHz 0.000 kHz	0.0 dB			ok
RF1.3	<input checked="" type="radio"/> on <input type="radio"/> standby <input type="radio"/> off	IP_RX3 TSID:1078 ONID:1 Alias: DATA SYSTEM TR 78, MTV Networks Europe			D386 386.0 MHz 0.000 kHz	0.0 dB			ok
RF1.4	<input checked="" type="radio"/> on <input type="radio"/> standby <input type="radio"/> off	IP_RX4 TSID:1024 ONID:1 Alias: TELE MELODY, CSAT			D394 394.0 MHz 0.000 kHz	0.0 dB			ok
RF2.1	<input checked="" type="radio"/> on <input type="radio"/> standby <input type="radio"/> off	IP_RX1 TSID:1093 ONID:1 Alias: Bayern 1, ARD BR	6.90000 MBaud	J.83 Annex A/C 7.93 MHz 64 QAM 38.153 Mbit/s	D706 706.0 MHz 0.000 kHz	0.0 dB	<input checked="" type="radio"/> on <input type="radio"/> off not fitted Set	Δ 0.1 dB	ok
RF2.2	<input type="radio"/> on <input checked="" type="radio"/> standby <input type="radio"/> off	IP_RX2 TSID:1051 ONID:1 Alias: tagesschau24, ARD			D714 714.0 MHz 0.000 kHz	0.0 dB			ok (standby)
RF2.3	<input checked="" type="radio"/> on <input type="radio"/> standby <input type="radio"/> off	IP_RX3 TSID:1078 ONID:1 Alias: DATA SYSTEM TR 78, MTV Networks Europe			D722 722.0 MHz 0.000 kHz	0.0 dB			ok
RF2.4	<input type="radio"/> on <input type="radio"/> standby <input checked="" type="radio"/> off	IP_RX5 TSID:1079 ONID:1 Alias: ZDF, ZDFvision			D730 730.0 MHz 0.000 kHz	0.0 dB			ok

Figure 16: Status display - RF channels

The values set for the following parameters are displayed in the table “RF channels” for the 2 x 4 QAM output channels:

- Modulator: Output program
- Stream: Transport stream received
- Symbol Rate: Symbol rate for the QAM modulators 1 and 2
- Standard Bandwidth Constellation TS Rate: Modulation standard, required channel bandwidth, BAM constellation, output bit rate
- Channel Frequency: Selected frequency
- Level: Selected level
- Reference: Deviation from the calibrated value

Details on the parameters can be found in the section “Menu RF”.

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

Miscellaneous

Property	Mainboard
Temperature 1 (center)	39.5 °C
Temperature 2 (front)	46.0 °C
Temperature 3 (rear)	53.5 °C
Temperature 4 (PA)	31.5 °C
Supply 1.2 V	1.19 V
Supply 1.5 V	1.50 V
Supply 1.8 V	1.79 V
Supply 2.5 V	2.49 V
Supply 3.3 V	3.31 V
Supply 5.5 V	5.43 V
Supply 9 V	8.89 V
Fan	9926 RPM
Power Module	OK

Figure 17: Status display - Miscellaneous

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

- Temperature 1 (center) : Temperature displayed in °C for the mainboard
- Temperature 2 (front) : Temperature displayed in °C for the mainboard
- Temperature 3 (rear) : Temperature displayed in °C for the mainboard
- Temperature 4 (PA) : Temperature displayed in °C for the HF output stage
- Supply 1.2 V: 1.2 V supply voltage
- Supply 1.5 V: 1.5 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 5.5 V: 5.5 V supply voltage
- Supply 9 V: 9 V supply voltage
- Fan: Fan rotation speed
- Power Module: Functional status (OK or error message)

Memory status:

System resources

Property	Value
Total size of memory arena	58450240
Number of ordinary memory blocks	839
Space used by ordinary memory blocks	2360944
Space free for ordinary blocks	56089276
Size of largest free block	52035236
Number of left files FOPEN_MAX	37
Number of left files NFILE	19
Number of free file descriptors NFD	19
CPU load 0.1s	100 %
CPU load 1s	91 %
CPU load 10s	30 %

Figure 18: 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.

File resources:

- Number of left files FOPEN_MAX
- Number of left files NFILE
- Number of free descriptors NFD

CPU load, averaged over XXs:

- CPU load 0.1 s
- CPU load 1 s
- CPU load 10 s

This section explains how to make general settings for the interfaces and the management of the U 158, as well as for the U 100 base unit. Click on the item "Main" in the menu at the left.

Setting IP interfaces (administrator only)

You can configure IP interfaces and activate or deactivate them using the table shown above ("IP interface settings"). The connection type is automatically identified and displayed by the U 158 (in this case: 1 Gbit/s, full duplex).

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	<input type="radio"/> on <input type="radio"/> off	<input type="radio"/> on <input type="radio"/> off	<input type="radio"/> on <input type="radio"/> off	<input type="radio"/> on <input type="radio"/> 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 19: 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
- Gateway: Gateway IP (if required)

NOTE: 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.)

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 <input type="button" value="v"/>

Figure 20: Configuring management settings

Submit Reset Form

- 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: Select the preferred time reference from the drop-down menu. The following options are available for selection: “SNTP server” and “IP RX 1 - 16”.

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”).

U100 Rack Settings

Property	Value
Base Address	0
Slot Address	2
Power Modules	0

Submit Reset Form

Figure 21: 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 U 158 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 U 158 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 used from the drop-down menu (“0” for 48 V operation, “1” or “2” for 230 V power modules).

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

Submit Reset Form

Saving and loading configurations / default and reboot

Save settings to flash / Load settings from flash / Default settings / Reboot system

Force Save Save 2nd Load 2nd Default Reboot

Force Save: All settings are stored directly (Automatic save condition ignored).
 Save 2nd: All settings are saved to an alternative config.
 Load 2nd: All settings are loaded from an alternative config.
 Default: Load factory default settings.
 Reboot: Force reboot.

Figure 22: Saving and loading configurations

Changes to the configuration of the U 158 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 U 158. (Please note that prior to installing the module, an SD memory card must be plugged in; see figure at left.)



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

You can retrieve this status again by clicking on the "Load 2nd" button. How to save the configuration onto the local computer or FTP server is explained in the section "Software update and configuration files".

Clicking the "Force Save" button saves the configuration with immediate effect. The configuration will otherwise only be saved after 10 seconds if no further change is made; and after 30 seconds at the latest.

ATTENTION: *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.

“Test generator” menu

The U 158 features an integrated test generator for a functional test when an input signal is not yet available. Null packets are generated with a preset packet ID. The maximum data rate that can be set totals 67 MBit/s.

Test Generator Settings

Property	Value
Date rate	1.000000 Mbit/s (40420)
Packet ID	0
Packet length	188

Figure 23: Test generator

The following settings are displayed, and can be configured:

- Data rate: Enter the preferred data rate in MBit/s in the input field.
- Packet ID: Enter the packet ID here.
- Packet length: Packet length is displayed.

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

"IP Channel" menu

To have the input masks for configuring the input and output channels displayed, click on the item "IP Channels" in the menu at the left.

You can check the settings for the input channels in the table at the bottom, "IP RX channel settings".

IP RX Channel Settings

Channel	Enable	Interface	Prim. RX IP socket source	Sec. RX IP socket source	Ter. RX IP socket source	Encapsulation	TSID ONID	Alias
IP RX1	<input checked="" type="radio"/> on <input type="radio"/> off	Data A	232.19.100.136:10000 0.0.0.0	232.20.100.136:10000 0.0.0.0	0.0.0.0:10000 0.0.0.0	RTP/UDP/IP Mult. PCR	1117 1	ORF1, ORF
		Data B	232.19.100.136:10000 0.0.0.0	232.20.100.136:10000 0.0.0.0	0.0.0.0:10000 0.0.0.0			
IP RX2	<input type="radio"/> on <input checked="" type="radio"/> off	Data A	232.19.100.129:10000 0.0.0.0	0.0.0.0:0 0.0.0.0	0.0.0.0:0 0.0.0.0	UDP/IP Mult. PCR		
		Data B	232.19.100.129:10000 0.0.0.0	0.0.0.0:0 0.0.0.0	0.0.0.0:0 0.0.0.0			
IP RX3	<input type="radio"/> on <input checked="" type="radio"/> off	Data A	232.19.100.130:10000 0.0.0.0	0.0.0.0:0 0.0.0.0	0.0.0.0:0 0.0.0.0	RTP/UDP/IP Single PCR		
		Data B	232.19.100.130:10000 0.0.0.0	0.0.0.0:0 0.0.0.0	0.0.0.0:0 0.0.0.0			
IP RX4	<input type="radio"/> on <input checked="" type="radio"/> off	Data A	232.19.100.132:10000 0.0.0.0	0.0.0.0:0 0.0.0.0	0.0.0.0:0 0.0.0.0	RTP/UDP/IP Mult. PCR		
		Data B	232.19.100.132:10000 0.0.0.0	0.0.0.0:0 0.0.0.0	0.0.0.0:0 0.0.0.0			

Figure 24: IP RX channel settings table

You can activate or deactivate the respective IP inputs here by clicking on the corresponding radio button. The following parameters are displayed for ports A and B respectively for the four IP input channels:

- Prim. RX IP socket source
- Sec. RX IP socket source
- Ter. RX IP socket source
- Encapsulation TSID / ONID
- Alias

NOTE: These parameters are explained in more detail in the section "IP RX menu".

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.

To configure the 8 IP inputs, start by clicking on the item “IP RX 1”, “IP RX2”, “IP RX3”, “IP RX4”, “IP RX5”, “IP RX6”, “IP RX7” or “IP RX8” in the menu at the left. The following table will then appear in the content area at the top:

IP RX1 Channel Settings

Property	Data A (eth2) 1 G					
Primary Receive IP:Port	232	19	100	136	10000	Priority
Primary Source Select	0	0	0	0		12 Highest/Hot
Secondary Receive IP:Port	232	20	100	136	10000	Priority
Secondary Source Select	0	0	0	0		11 Higher/Hot
Tertiary Receive IP:Port	0	0	0	0	10000	Priority
Tertiary Source Select	0	0	0	0		0 Off

Figure 25: Table 1 “IP RX1 channel settings”

“Receive IP” and “Port” (see lines 1, 3 and 5 in the table) form a socket on which the incoming data stream is received. This also allows the Receive IP address to be a multicast address or a unicast address of its own.

The IGMP protocol is used to request an IP multicast. If version 3 of this protocol is used, then you can select a specific source using the Source Select IP address (see lines 2, 4 and 6 in the table). If this function is to remain unused, please enter four zeroes in the input field. (This is, for example, the case when IGMP version 2 or IGMP version 3 from any source is being used as the protocol).

You can make a priority setting for the primary, secondary and tertiary IP address / port respectively using a drop-down menu. There are 13 options (from “off” to “highest/hot”) available for selection. The priorities are divided into three groups:

- Hot standby (higher priorities) Levels 7 - 12: data streams are requested permanently
- Cold standby (medium priorities): Levels 1 - 6
- “Off”

As a rule – providing there are no network provider problems – the data stream with the highest priority is received and used for processing. In the event of a fault – failure of the incoming signal – a switch-over is made to the data stream with the next-highest priority.

If a priority level from the “Hot standby” group is allocated to a data stream, then this will continue to be requested even during network provider problems. As soon as the problem has been rectified, it switches back to this data stream.

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

Property	Data A (eth2) + Data B (eth3)	
Enable	<input type="radio"/> on <input type="radio"/> off	
Port	Data B <input type="button" value="v"/>	Primary <input type="button" value="v"/> automatic <input type="button" value="v"/>
Timeouts	in case of failure switch after <input type="text" value="0"/> seconds, switch back to higher priority after <input type="text" value="300"/> seconds.	
Encapsulation	<input type="radio"/> RTP/UDP/IP <input type="radio"/> UDP/IP	<input type="radio"/> automatic <input type="radio"/> manual
Bitrate	<input type="radio"/> Single PCR (SPTS) <input type="radio"/> Mult. PCR (MPTS) <input type="radio"/> No PCR (SI-Stream)	<input type="radio"/> automatic <input type="radio"/> manual
FEC	<input type="radio"/> on <input type="radio"/> off	
TSID / ONID	1093	1
Alias manual / automatic	<input type="text"/>	Bayern 1, ARD BR

Figure 26: Table 2 "IP RX1 channel settings"

- Enable**: Activate or deactivate the IP input by clicking on the corresponding radio button.
- Port**: Configure the reception source for the IP channel here.
Select either Data A or Data B as the port from the first drop-down menu.
Select either the "Primary", "Secondary" or "Tertiary" option from the second drop-down menu.
Select the "static" option from the third drop-down menu if you do not wish to use an automatic replacement circuit for the data streams. Select the "automatic" option when the replacement circuit should be used as described above.
- Timeouts**: Enter a time frame, in seconds, in the first input field after which a switch-over to the data stream with the next-lowest priority should occur in the event of a fault.
Enter a time frame, in seconds, in the second input field after which it should switch back to the data stream with the higher priority after the problem has been rectified. (This is only the case when a priority level from the "Hot standby" group was allocated to the data stream - see explanation above).
- Error condition**: If the data rate should be the only factor considered in the event of a fault, activate the radio button "data rate only". Otherwise, select the radio button "data rate, continuity count, service".
- Encapsulation**: When the radio button "RTP / UDP / IP" has been activated, the corresponding RTP / UDP / IP data streams are received. If you activate the radio button "on" in the line "FEC", then the additional receive IP ports +2 and +4 will be received (example: apart from 10000, also 10002 and 10004). This also includes additional redundancy information for fault correction.
When the radio button "UDP / IP" has been activated, either UDP / IP data streams or RTP / UDP / IP data streams without an evaluation from RTP are received.
Select either "automatic" or "manual" for the data encapsulation by clicking the corresponding radio button.
- Bitrate**: Select either "automatic" or "manual" by clicking the corresponding radio button. If "manual" is selected and the radio button "Single PCR" has been selected at the same time, then the receive data stream is regulated using a single PCR. This is not suitable for transport streams with several PCRs.
If you activate the radio button "Multi PCR", then the data rate is used for regulation. This is not possible for data streams with a variable bit rate.
When the "SI Stream" button has been activated, the U 158 expects "Service Information Stream"-only reception, without PCR, on this receiver and adapts the minimum bit rate.
- FEC**: Activate or deactivate FEC by clicking the radio button "on" or "off". (See "Encapsulation" above.)
- TSID / ONID**: The respective value is displayed but cannot be changed.
- Alias manual / automatic**: You can enter an alias name for the data stream in the input field at the left. The automatically generated alias name is displayed at the bottom right. This is the name of the first transmitter in the data stream. This is used if no name is entered manually.

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

To configure the QAM outputs, start by clicking on the “RF” item in the menu at the left. The following table will then appear in the content area at the top, in which the most important settings for all output channels can be entered.

Modulator	Enable	Stream	Symbol Rate	Standard Bandwidth Constellation TS Rate	Channel Frequency	Level	Channel Filter	Reference	Status
RF1.1	<input type="radio"/> on <input type="radio"/> standby <input type="radio"/> off	IP_RX1 TSID:1093 ONID:1 Alias: Bayern 1, ARD BR	6 90000 MBaud	J.83 Annex A/C 7.93 MHz 256 QAM 38.153 Mbit/s	D370 370.0 MHz 0.000 kHz	0.0 dB	not fitted	Δ 0.1 dB	ok
RF1.2	<input type="radio"/> on <input type="radio"/> standby <input type="radio"/> off	IP_RX2 TSID:1051 ONID:1 Alias: tagesschau24, ARD			D378 378.0 MHz 0.000 kHz	0.0 dB			ok
RF1.3	<input type="radio"/> on <input type="radio"/> standby <input type="radio"/> off	IP_RX3 TSID:1078 ONID:1 Alias: DATA SYSTEM TR 78, MTV Networks Europe			D386 386.0 MHz 0.000 kHz	0.0 dB			ok
RF1.4	<input type="radio"/> on <input type="radio"/> standby <input type="radio"/> off	IP_RX4 TSID:1024 ONID:1 Alias: TELE MELODY, CSAT			D394 394.0 MHz 0.000 kHz	0.0 dB			ok
RF2.1	<input type="radio"/> on <input type="radio"/> standby <input type="radio"/> off	IP_RX1 TSID:1093 ONID:1 Alias: Bayern 1, ARD BR	6 90000 MBaud	J.83 Annex A/C 7.93 MHz 64 QAM 38.153 Mbit/s	D706 706.0 MHz 0.000 kHz	0.0 dB	not fitted	Δ 0.1 dB	ok
RF2.2	<input type="radio"/> on <input type="radio"/> standby <input type="radio"/> off	IP_RX2 TSID:1051 ONID:1 Alias: tagesschau24, ARD			D714 714.0 MHz 0.000 kHz	0.0 dB			ok (standby)
RF2.3	<input type="radio"/> on <input type="radio"/> standby <input type="radio"/> off	IP_RX3 TSID:1078 ONID:1 Alias: DATA SYSTEM TR 78, MTV Networks Europe			D722 722.0 MHz 0.000 kHz	0.0 dB			ok
RF2.4	<input type="radio"/> on <input type="radio"/> standby <input type="radio"/> off	IP_RX5 TSID:1079 ONID:1 Alias: ZDF, ZDFvision			D730 730.0 MHz 0.000 kHz	0.0 dB			ok

Submit Reset Form

Channel list selection

Localisation	Available on SD Card
Channel list	de ru

RF Detector

Mode	Level
warnings	<input type="radio"/> on <input type="radio"/> off ±2.5 dB
security switch off	<input type="radio"/> on <input type="radio"/> off +3.0 dB
Lock RF relevant settings	<input type="radio"/> on <input type="radio"/> off

Figure 27: Table 2 “RF channels”

- Enable: To activate or deactivate an output channel, click the corresponding radio button. If you select the “Standby” option, the decoder will run, but the corresponding output will be switched off. This may be practical when, for example, the module is being used as a replacement module in a redundant circuit.
- Stream: Select the incoming data stream for conversion from the drop-down menu. The drop-down menu shows all available data streams received using the eight IP receivers. The last item in the drop-down menu is the ASTRO test generator, which generates a digital radio program with a 1 kHz tone in the output channel which has been set.
- Symbol Rate: This displays the symbol rate currently configured for the output channel.
- Standard Bandwidth Constellation TS Rate: The QAM standard, the bandwidth of the output channel, the modulation type and the output data rate are displayed here.



Submit Reset Form

- Channel Frequency:** Select an item from the drop-down menu for the channel. Once a value has been selected from the list, the input field for the output frequency remains inactive, and the corresponding channel centre frequency is displayed. If you select the "manual" option, you can enter the channel centre frequency manually.
There may be a 32 MHz interval between the start frequency of the RF X.1 and the end frequency of the RF X.2 within a channel pair (RF 1.1 / 1.2 / 1.3 / 1.4 or RF 2.1 / 2.2 / 2.3 / 2.4); e.g. RF 1.1 = S06 and RF 1.2 = S09 when there is a channel width of 8 MHz. If the interval set is too large, then an error message will appear. The output channel affected will then be set to "Standby" and must be reactivated when a new, and correct, configuration is set. If no adjacent channel assignment has been configured, then a channel filter cannot be used for the respective pair of channels.
- Level:** The level of the output signal is equalised here. You can set the relative level in increments of 0.1 dB by entering the corresponding value in the input field. The range which can be set depends on the type of modulation set (QAM 64 to +10 dB, QAM 256 to +4 dB). If you set a value which is excessively high, an error message appears. Once this message has been acknowledged, the maximum value is entered.
If you change the type of QAM modulation of a pair of output channels, the level will be adjusted automatically.
- Channel Filter:** If you wish to activate a channel filter, select an item from the "min." or "max." drop-down menus and activate the radio button "on".
Note that the channel filter for the corresponding output channel must be connected (see figure at left).
In order to be able to activate the channel filter, the limits configured in the "Channel Filter" column must exhibit the same values as the output channels entered under "Channel Frequency". Filter limits which deviate from the output channel can, of course, also be used, however in this case, this filter will not be able to be activated.
- Reference:** Click on the "Set" button to select the value entered within the modulation parameters as the reference. A 2.5 dB deviation from the output signal will result in a warning message being issued.

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

The table "Channel List Selection" is found below the table "RF Channels".

	Localisation	Available on SD Card
Channel list	<input type="text"/>	de ru

Figure 28: "Channel list selection" table

The language version of the channel list can be selected in the input field "Localisation". "us" (USA), "de" (German), "fr" (French), "ru" (Russian) and "be" (Belgium) are available.
If stored on the SD memory card, you can use the country code (e.g. "ru") to activate a different channel list.

The table “RF Detector” can be found further down.

RF Detector

	Mode	Level
warnings	<input checked="" type="radio"/> on <input type="radio"/> off	±2.5 dB
security switch off	<input type="radio"/> on <input checked="" type="radio"/> off	+3.0 dB
Lock RF relevant settings	on <input checked="" type="radio"/> off	

Figure 29: “RF Detector” table

The U 158 features a level detector in the output. This level detector consistently measures the output level. When you click the “Set” button in the “Reference” column in the table “RF Channels” (further up), then the value entered in the modulation parameters is saved as a reference. The deviation from this value is measured on an ongoing basis.

The consequences of any deviations which may occur can be configured in the table “RF Detector”. You can, for example, activate or deactivate the warning message for the level deviation by clicking on the corresponding radio button. When the warning message is activated and the level deviation totals +/- 2.5%, then the warning message is recorded in the log file and, depending on the configuration of the SNMP properties, a trap occurs. Furthermore, you can activate or deactivate a security switch-off in the event of a deviation of +/- 3%.

Activating or deactivating the “Lock RF relevant settings” option remains possible. If the option has been activated, only the service for conversion can be changed in the table “RF Channels”. All other settings in this table are locked. All configuration options relating to the HF output channel in the modulator settings (menus RF 1.1 to RF 2.4) are also locked.

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

“RF 1.X” and “RF 2.X” menu

To enter detailed settings for the individual output channels, start by clicking on the item “RF 1” or “RF 2” in the main menu at the left, and then clicking on one of the submenu items “RF 1.1 to RF 1.2” or “RF 2.1 to RF 2.2”. The “Input Selection” table now appears in the upper part of the content area:

Input Selection

TS ID, Transport Stream name, Provider name		QAM Buffer	
Transport Stream	IP_RX1 TSID:1093 ONID:1 Alias:Bayern 1. ARD BR	Max: 0.10 %	Average: 0.00 %
<input type="button" value="Submit"/> <input type="button" value="Reset Form"/>		Stuffing: 45.819 Mbit/s	

Figure 30: “Input selection” table

You can select the program to be converted to QAM here. This program can be converted from any of the 8 IP receivers.

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

Another table follows in which you can complete all the settings relating to the QAM output signal.

Modulation

Property	Value			Information
Standard	<input checked="" type="radio"/> DVB-C / ITU-T J.83 Annex A/C <input type="radio"/> ITU-T J.83 Annex B			Output TS Rate: 50.871 Mbit/s
Defaults	DVB-C / J.83/A (8MHz / 256 QAM) <input type="checkbox"/> Apply changes to all RF1.X channels			
Parameter	Constellation <input type="text" value="256 QAM"/>	Interleaving Mode <input type="text" value="12/17"/>	<input checked="" type="radio"/> TS-Packet Stuffing <input type="radio"/> PRBS-Packet Stuffing	Allocated Bandwidth: 7.93 MHz
Spectrum	Symbol Rate <input type="text" value="6.900000"/> MBaud	Roll-Off Factor <input type="text" value="0.15"/>	Inversion <input type="radio"/> on <input checked="" type="radio"/> off	
<input type="button" value="Submit"/> <input type="button" value="Reset Form"/>				

Figure 31: “Modulation” table

The following settings can be entered individually.

- Standard:** The U 158 is able to generate QAM channels in accordance with the DVB-C standard Annex A/C or in accordance with ITU-T J.83 Annex B. Depending on the standard selected, the selection options in the “Defaults” line, in which the modulation type and the channel bandwidth are selected, will change.
When you...
- Defaults:** The modulation type and the channel bandwidth are set here by selecting them from the drop-down menu. Activate the checkbox “Apply changes to all RF X.X channels” if the selection made should be applied to all output channels of the U 158.

- Parameter:** When you have selected the option “Manual” from the drop-down menu in the “Defaults” line, you can select the modulation type and the spectrum inversion from a drop-down menu manually, allowing it to be set manually. The settings selected here apply to both channels of the respective pair of output channels.
If the option “ITU-T J.83 Annex B” has been selected in the “Standard” line, then a selection can also be made for “Interleaving Mode”. Interleaving mode determines the degree of reference data interleaving during transmission via the QAM channel. The first number determines the number of paths used for transmission, while the second number specifies the basic delay within a path. The interleaver makes a higher level of transmission reliability possible on a transmission channel affected by burst errors.
When you have selected the option “Manual” from the drop-down menu in the “Defaults” line, then you also have the option of configuring the stuffing unit. When you select the option “TS-Packet Stuffing”, then zero packets are generated with a useful content comprised of zeroes. If, in contrast, you select the option “PRBS-Packet Stuffing”, then the useful content of the zero packets generated is comprised of a random sequence.
- Spectrum:** When you have selected the option “Manual” from the drop-down menu in the “Defaults” line, then you can enter the symbol rate in the corresponding input field manually and select a value for the roll-off factor from the drop-down menu.

Click on the “Submit” button below the last table to save the changes.
Click on “Reset form” to restore the original settings.
If you click on the “Refresh” button, all information in the table is updated.

Another table follows in which you can edit the transport stream.

Transport Stream Processing

Property	Value	
SID/PID-Filter	<input type="radio"/> on <input type="radio"/> off <input type="radio"/> Drop-Filter <input type="radio"/> Pass-Filter	Pass-SID Please select <input type="text"/> SID <input type="text"/> <input type="button" value="Add"/> SID-List: <input type="checkbox"/> SID:28487 (BR-alpha, ARD) <input type="checkbox"/> Remove all <input type="button" value="Remove"/>
		Pass-PID Please select <input type="text"/> PID <input type="text"/> <input type="button" value="Add"/> PID-List: <input type="checkbox"/> Remove all <input type="button" value="Remove"/>
PID-Remapping	<input type="radio"/> on <input type="radio"/> off	Input-PID Please select <input type="text"/> PID <input type="text"/> => Output-PID <input type="text"/> <input type="button" value="Add"/> Remapping-List:

Figure 32: “Transport stream processing” table

The following settings can be entered individually.

- SID/PID-Filter:** You can activate or deactivate the transport stream filter here by clicking on the corresponding radio button. The option of configuring drop filters or pass filters is also provided. Click on the corresponding radio button here. The drop filter removes the selected IDs from the transport stream, while the pass filter transmits the selected IDs only and discards all others.
If you select a service filter using an SID filter, all subordinate PIDs which belong to the service are also removed from the transport stream, or are transmitted. When a PID filter is used, only the PID selected is removed or transmitted respectively. The respective PIDs selected are displayed in the SID or PID list once selected. The PIDs for filtering can be activated by clicking the Add button. Clicking the “Remove” button deletes entries with a marked checkbox again.
- PID Remapping:** The U 158 provides a PID remapping function, which means that PIDs active on the input side can be renamed, and be added to the output data stream with a new PID. To set this type of filter, select a PID from the drop-down menu and then enter the new PID in the input field “Output-PID” and confirm it by clicking the “Add” button. Renamed PIDs appear in the “Remapping List”. If you wish to remove a remap filter again, then mark the checkbox for the entry in the remapping list, and then click the “Remove” button.

Click on the “Submit” button below the last table to save the changes.
Click on “Reset form” to restore the original settings.
If you click on the “Refresh” button, all information in the table is updated.

"TS processing" menu

To enter settings for TS processing, start by clicking on the item "TS Processing" in the main menu at the left. The following tables now appear in the upper part of the content area:

PAT Processing

	RF1.1	RF1.2	RF1.3	RF1.4	RF2.1	RF2.2	RF2.3	RF2.4
Enable PAT Processing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

NIT Processing

Insertion Method	RF1.1	RF1.2	RF1.3	RF1.4	RF2.1	RF2.2	RF2.3	RF2.4
Remap NIT from PID	<input type="checkbox"/> actual Input PID: 16 <input type="checkbox"/> Use global	<input type="checkbox"/> actual Input PID: 16 <input type="checkbox"/> Use global	<input type="checkbox"/> actual Input PID: 16 <input type="checkbox"/> Use global	<input type="checkbox"/> actual Input PID: 16 <input type="checkbox"/> Use global	<input type="checkbox"/> actual Input PID: 16 <input type="checkbox"/> Use global	<input type="checkbox"/> actual Input PID: 16 <input type="checkbox"/> Use global	<input type="checkbox"/> actual Input PID: 16 <input type="checkbox"/> Use global	<input type="checkbox"/> actual Input PID: 16 <input type="checkbox"/> Use global
Generate from local NIT	<input type="checkbox"/> use NIT 1				<input type="checkbox"/> use NIT 2			

Connected Modules

Use U100-C configuration to generate dynamic NIT	Type	Address MGMT A	Address MGMT B	Status
<input type="checkbox"/> On <input checked="" type="checkbox"/> Off	This Module	192.168.1.144	192.168.5.144	ok

NIT Load

Property	Value
Use (T)FTP Settings from Update page	<input type="checkbox"/>
(T)FTP Server address	192.168.1.62
Protocol	FTP → TFTP
FTP Username (e.g. anonymous)	anonymous
FTP Password (e.g. guest)	*****
Path	/
Mode	Please select

Figure 33: Settings for transport stream processing

You can make settings for the PAT processing, NIT processing and the NIT upload here.

You can activate and deactivate PAT processing for the individual output channels in the "PAT Processing" table by clicking the corresponding checkbox (see below). If a service filter has been applied, then the PAT is adapted accordingly.

PAT Processing

	RF1.1	RF1.2	RF1.3	RF1.4	RF2.1	RF2.2	RF2.3	RF2.4
Enable PAT Processing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 34: "PAT processing" table

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

You can complete the settings for the NIT processing in the table which follows.

NIT Processing

Insertion Method	RF1.1	RF1.2	RF1.3	RF1.4	RF2.1	RF2.2	RF2.3	RF2.4
Remap NIT from PID	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	actual ▾	actual ▾	actual ▾	actual ▾	actual ▾	actual ▾	actual ▾	actual ▾
	Input PID 16	Input PID 16	Input PID 16	Input PID 16	Input PID 16	Input PID 16	Input PID 16	Input PID 16
	Use global <input type="checkbox"/>	Use global <input type="checkbox"/>	Use global <input type="checkbox"/>	Use global <input type="checkbox"/>	Use global <input type="checkbox"/>	Use global <input type="checkbox"/>	Use global <input type="checkbox"/>	Use global <input type="checkbox"/>
Generate from local NIT	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	use <input type="radio"/> NIT 1 <input type="radio"/> NIT 2				use <input type="radio"/> NIT 1 <input type="radio"/> NIT 2			

Figure 35: “NIT Processing” table

The following parameters can be set individually:

- Remap NIT from PID:** If there is an NIT in the data stream under a different PID than the 0x0010, then this NIT can be used in the output data stream using the remap filter. To do so, you must enter the input PID in the input field for the output channel concerned, and then activate the corresponding “Use global” checkbox for the output channel. This distributes this NIT over all “Connected modules”.
- Generate from local NIT:** You can select whether a static NIT should be used for every output channel here. When you activate the checkbox, then you have the option of using either NIT 1 or NIT 2 for the respective pair of channels.

Click on the “Submit” button below the table to save the changes.

Click on “Reset form” to restore the original settings.

The “Connected Modules” table follows. This allows you to select whether the configuration of the U 100-C Management Controller should be used for generating a dynamic NIT.

Click on the corresponding radio button to do so. This will update the file “nit.xml”, with the “Generate from local NIT; use NIT 1” mode having to be set on all RF ports.

Connected Modules

Use U100-C configuration to generate dynamic NIT	Type	Address MGMT A	Address MGMT B	Status
<input type="radio"/> On <input type="radio"/> Off	This Module	192.168.1.144	192.168.5.144	ok

Figure 36: “Connected modules” table

Click on the “Submit” button below the table to save the changes.

Click on “Reset form” to restore the original settings.

Submit Reset Form

Submit Reset Form

The table "NIT Load" follows further down (see below). This provides the option of loading a prepared NIT to the U 158 in XML format. This NIT must appear in the upload path with the file names "nit.xml" or "nit2.xml". This allows an NIT which has been created once to be duplicated onto several devices.

NIT Load

Property	Value
Use (T)FTP Settings from Update page	<input type="checkbox"/>
(T)FTP Server address	192.168.1.62
Protocol	<input checked="" type="radio"/> FTP <input type="radio"/> TFTP
FTP Username (e.g. anonymous)	anonymous
FTP Password (e.g. guest)	•••••
Path	/
Mode	Please select <input type="button" value="v"/>

Figure 37: "NIT load" table

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

“NIT 1” and “NIT 2” menu

If you wish to create a static NIT, start by clicking on the one of the corresponding menu items, “NIT 1” or “NIT 2” in the main menu at the left. The following table now appears in the upper part of the content area:

Change Network Information

Network ID	Network Name
12345	Astro

Figure 38: “Change network information” table

You can enter the network ID and the network name in the respective input fields here.

Click on the “Submit” button below the last table to save the changes.

Click on “Reset form” to restore the original settings.

If you click on the “Refresh” button, all information in the table is updated.

The table “Add External Transport Streams” follows. You can add an external transport stream here.

Add External Transport Streams

TS-ID	ON-ID	Channel Frequency	Constellation	Symbol Rate	
		<input type="text" value="manual"/> <input type="text"/> MHz	64 QAM	<input type="text"/> MS/s	<input type="button" value="Add"/>

Figure 39: “Change network information” table

The following parameters can be configured individually:

- TS-ID: Enter the transport stream in the input field.
- ON-ID: Enter the ON ID in the input field.
- Channel Frequency: Select the preferred output frequency from the drop-down menu. If you select the “manual” option, you can enter the frequency in MHz in the input field manually.
- Constellation: Select the preferred modulation type from the drop-down menu.
- Symbol Rate: Enter the symbol rate in MS/s in the input field.

Once you have configured all the parameters, click on the Add button to add the transport stream.



Another table follows in which the NIT is listed with all entries.

NIT

Sort	Alias	TS-ID	ON-ID	Channel - Frequency	Constellation	Symbol Rate	Info	Remove (external TS)
▼	DATA SYSTEM TR 78, MTV Networks Europe	1078	1	D386 - 386.0 MHz	64 QAM	6.9000	local	<input type="checkbox"/>
▲ ▼	TELE MELODY, CSAT	1024	1	D394 - 394.0 MHz	64 QAM	6.9000	local	<input type="checkbox"/>
▲ ▼	DATA SYSTEM TR 78, MTV Networks Europe	1078	1	D722 - 722.0 MHz	64 QAM	6.9000	local	<input type="checkbox"/>
▲ ▼	ZDF, ZDFvision	1079	1	D730 - 730.0 MHz	64 QAM	6.9000	local	<input type="checkbox"/>
▲ ▼	tagesschau24, ARD	1051	1	D378 - 378.0 MHz	64 QAM	6.9000	local	<input type="checkbox"/>
▲ ▼	tagesschau24, ARD	1051	1	D714 - 714.0 MHz	64 QAM	6.9000	local	<input type="checkbox"/>
▲ ▼	Bayern 1, ARD BR	1093	1	D370 - 370.0 MHz	256 QAM	6.9000	local	<input type="checkbox"/>
▲	Bayern 1, ARD BR	1093	1	D706 - 706.0 MHz	64 QAM	6.9000	local	<input type="checkbox"/>

Note: The order of the Transport Streams in the generated NIT is equivalent the order in this HTML table. To sort this table click on the table headers or the arrow buttons in front of each row.

Figure 40: "NIT" table

Sort the entries by clicking on the corresponding arrow button in the "Sort" column. To delete an entry, activate the respective checkbox in the "Remove" column.

Click on the "Submit" button below the last table to save the changes.

Click on "Reset form" to restore the original settings.

If you click on the "Refresh" button, all information in the table is updated.

If you wish to create an LCN table, start by clicking on the menu item “LCN” in the main menu at the left. The following table now appears in the upper part of the content area:

Service selection for creation of LCN Table

LCN	Service name
311	No service selected
312	No service selected
313	No service selected
314	No service selected
315	No service selected

Add selected services to LCN Table

Figure 41: “Service selection for creation of LCN table” table

You can enter an LCN in the left column and select the preferred service from the drop-down menu in the right column respectively.

Click on the “Add selected services to LCN table” button to add your selection to the LCN table. Keep in mind that the entries added will only be saved after you have clicked the “Submit” button below the table which follows, the “LCN Table”.

The “LCN Table” table follows. A list of all the services currently selected appears here. To delete an entry from the list, activate the checkbox for the respective service in the “Remove” column.

LCN Table

LCN	Service name	Serv-ID	TS-ID	ON-ID	Remove	Sort	LCN Descriptor Type
1	3sat, ZDFvision	28007	1079	1	<input type="checkbox"/>	▼	<input checked="" type="radio"/> NorDig (V1) <input type="radio"/> IEC 62216
2	arte, ARD	28724	1051	1	<input type="checkbox"/>	▲ ▼	
3	BR-alpha, ARD	28487	1093	1	<input type="checkbox"/>	▲ ▼	
4	Einsfestival HD, ARD	28396	1201	1	<input type="checkbox"/>	▲ ▼	
5	EinsPlus, ARD	28723	1051	1	<input type="checkbox"/>	▲ ▼	
100	Hallo TV España free - Full Erotik 19:25-5:50, -	13016	1117	1	<input type="checkbox"/>	▲ ▼	
101	ZDF, ZDFvision	28006	1079	1	<input type="checkbox"/>	▲ ▼	
102	3sat, ZDFvision	28007	1079	1	<input type="checkbox"/>	▲ ▼	
103	Animal Planet, T-Home	1211	2	100	<input type="checkbox"/>	▲ ▼	
104	arte, ARD	28724	1051	1	<input type="checkbox"/>	▲ ▼	

Figure 42: “LCN table” table

You can select the type of description for the table (“NorDig (V1)” or “IEC 62216”) to the right of the LCN table. The descriptor corresponding to this standard is then generated in the NIT. Activate the radio button which corresponds to your selection.

Click on the “Submit” button below the last table to save the changes.

Click on “Reset form” to restore the original settings.

If you click on the “Refresh” button, all information in the table is updated.

A selection of print views for the LCN table, the TV program overview and the radio program overview follows further down. Click on the respective button to have the print view displayed.

Submit Reset Form

“SSL Settings” menu

NOTE: 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 rerouting of HTTP requests to the secure protocol HTTPS. After input of the licence, the checkbox is activated.

Setting	Value
Redirect HTTP requests to HTTPS	<input type="checkbox"/>

Figure 43: “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	<input type="button" value="Download CSR"/>

Figure 44: “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 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	<input type="button" value="Durchsuchen..."/> Keine Datei ausgewählt.	<input type="button" value="Upload key"/>
Clear supplied key	<input type="button" value="Clear key"/>	
Upload device certificate in PEM format	<input type="button" value="Durchsuchen..."/> Keine Datei ausgewählt.	<input type="button" value="Upload certificate"/>
Clear supplied certificate	<input type="button" value="Clear certificate"/>	
Regenerate device key and certificate	<input type="button" value="Regenerate"/>	

Figure 45: “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)

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.

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

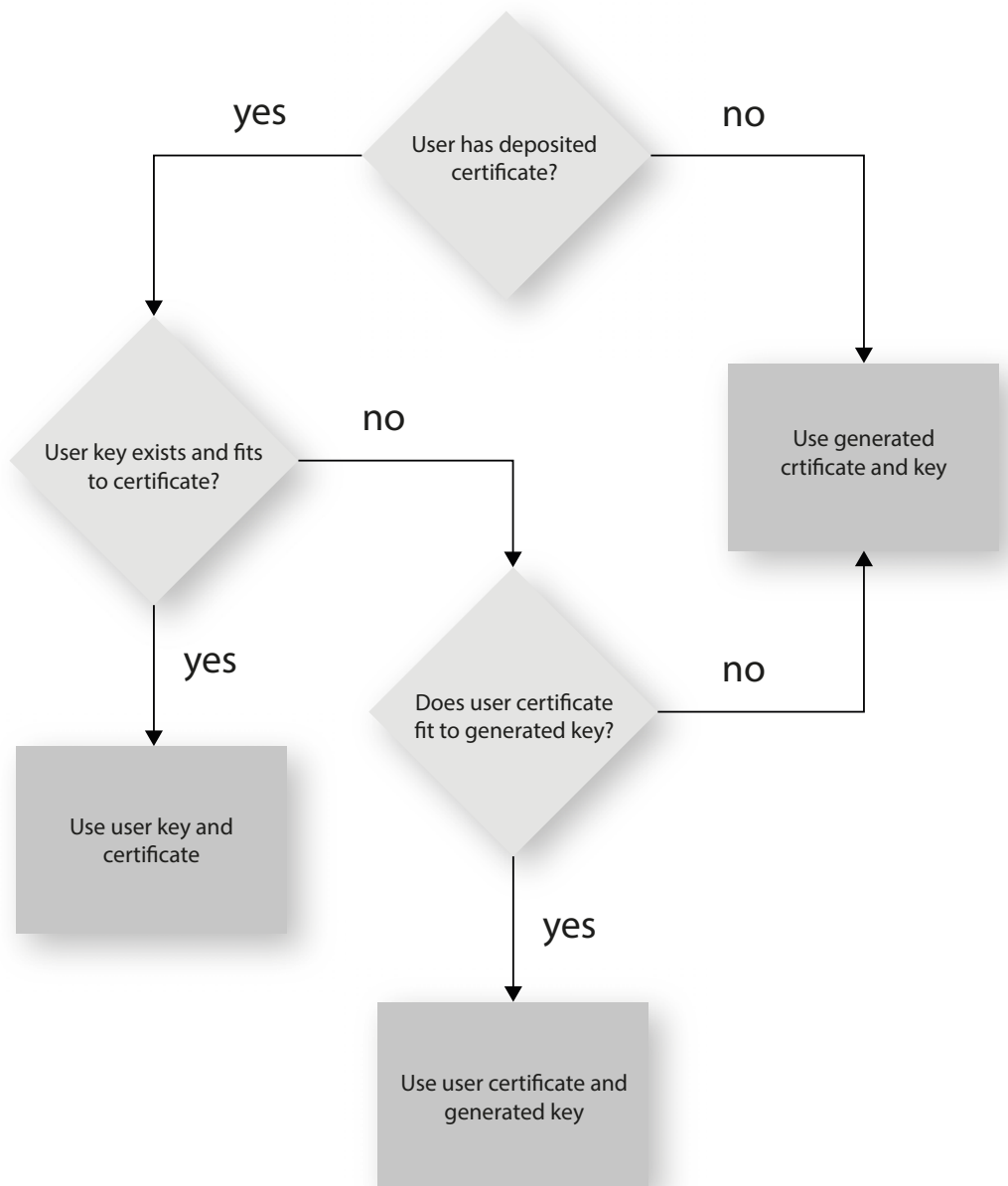


Figure 46: Using the certificates/keys

“User Settings” menu

Click on the menu item “User Administration” in the main menu at the left to have the corresponding input mask displayed. The input mask shown in figure 38 now appears.

Property	Username	New Password	Retype New Password	Delete
Admin account	admin			
User account 1	user			<input type="checkbox"/>
User account 2	controller			<input type="checkbox"/>
User account 3				<input type="checkbox"/>
Timeout	5 minutes			
Name	ASTRO EdgeDecrpt U194			
Location	Headend in Cablecity			
Contact	John Doe, admin@example.com			

Figure 47: User administration

You can create up to four users for the user interface of the U 158. The following three users have been created as the default setting:

- user
- admin
- controller

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.

NOTE: A password must contain at least 5 characters.

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.

IMPORTANT: 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.

Submit

Reset Form

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

RADIUS Server Address	0.0.0.0
RADIUS Server Port	1812
RADIUS Shared Secret	
RADIUS Retries	3
RADIUS Timeout	10

To disable RADIUS login, set address to 0.0.0.0 or retries to 0

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

NOTE: 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.

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

“TS Analyzer” menu

The U 158 can be equipped with a Transport Stream Analyzer by purchasing a licence. This Analyzer displays the structure of the MPEG2 TS, from the tables to the individual PID and its service. Click on the “TS Analyzer” submenu to access and select the transport stream for analysis. The following input mask now appears:

TS Analyzer

Alias	Bayern 1 ARD BR	tageschau24 ARD	DATA SYSTEM 78 MTV Networks Europe	TELEMELODY CSAT	ZDFv ision	Das Erste ARD	WDR Bielfeld ARD	SAT. 1 ProSiebenSat.1	DATA SYSTEM 78 MTV Networks Europe	ORF1 ORF	Bayrisches FS Süd ARD	WDR Köln ARD	CNN Int. CNN	Juwel pur MEDIA BROADCAST	ASTRO		
TSID ONID	10931	10511	10781	10241	10791	11011	12011	11071	10781	11171	31011	21011	87078468	00	11131	00	6553565535
Source	IP RX1	IP RX2	IP RX3	IP RX4	IP RX5	IP RX6	IP RX7	IP RX8	IP RX9	IP RX10	IP RX11	IP RX12	IP RX13	IP RX14	IP RX15	IP RX16	Test Gen.
Analyze	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Standard	Table			
MPEG	<input checked="" type="checkbox"/> PAT	<input checked="" type="checkbox"/> CAT	<input type="checkbox"/> TSMT	<input checked="" type="checkbox"/> PMTs
DVB	<input checked="" type="checkbox"/> NIT actual	<input type="checkbox"/> NIT other (only first found)	<input checked="" type="checkbox"/> SDT actual	<input type="checkbox"/> SDT other (only first found)
	<input type="checkbox"/> EIT actual present/following	<input type="checkbox"/> EIT actual schedule	<input type="checkbox"/> BAT (only first found)	<input type="checkbox"/> RST (only first found)
	<input checked="" type="checkbox"/> TDT	<input type="checkbox"/> TOT		

Please be patient until measurements are finished. (e.g. EIT may take a long time.)

Figure 50: Transport stream analyzer

To analyse a transport stream, click on the corresponding radio button in the “Analyze” line and then click on the “Submit” button. If you wish to reset your inputs, click on the “Reset” button.

NOTE: The two buttons “Submit” and “Reset” are only visible when this module has been licensed. If this is not the case, the link “No licence” will appear instead. Click on this, or the item “Licence” in the menu at the left, to access the “Licensing” input mask (more detailed explanation of this is found in the section “Licensing”).

“Licensing” menu

A number of functions of the U 158 (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:

Licensing

This device has the HWID 00:17:72:02:00:d0 and you have already licensed:
 4 IP TX
 4 IP RX

The software included in this product contains copyrighted software that is licensed under the GPLv3. A copy of that license is included in this device on page [gpl.txt](#) from us for a period of three years after our last shipment of this product and/or spare parts therefor, which will be no earlier than 2015-08-01, via email to [kontakt@e](#)

ASTRO Strobel Kommunikationssysteme GmbH

Figure 51: 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 (U 158) 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.

Software Update

Property	Value
File	<input type="text"/> <input type="button" value="Durchsuchen..."/> <input type="button" value="Update and reboot"/>
Software archive	u194xxxx.up

Figure 52: 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.

Uploading and downloading configuration files

Config files (read/write)

Property	Value
File	<input type="text"/> <input type="button" value="Durchsuchen..."/> <input type="button" value="Upload"/>
System settings	settings.xml

Figure 53: 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 54: 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	<input type="text" value="astro-firmware.de"/>
Protocol	<input checked="" type="radio"/> FTP <input type="radio"/> TFTP
FTP Username (e.g. anonymous)	<input type="text" value="anonymous"/>
FTP Password (e.g. guest)	<input type="password" value="•••••"/>
Path	<input type="text" value="/Headend-Firmware/u1xx/"/>
Version	<input type="text"/>
Mode	<input type="text" value="Please select"/> ▾

Figure 55: 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 158 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 U 158.
- "Save config to server"** action: The current configuration of the U 158 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). Once 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 update archive is unpacked, saved to an SD memory card 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.

NOTE: 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:

System Log Settings

Property	Value 1	Value 2	Value 3	Value 4
Log file filter	<input checked="" type="checkbox"/> Emergency, <input checked="" type="checkbox"/> Alert, <input checked="" type="checkbox"/> Critical, <input checked="" type="checkbox"/> Error, <input checked="" type="checkbox"/> Warning, <input checked="" type="checkbox"/> Notice, <input checked="" type="checkbox"/> Info, <input checked="" type="checkbox"/> Debug			
Debug log file	<input type="radio"/> on <input type="radio"/> off			
Syslog server	<input type="text" value="0.0.0.0"/>	<input type="text" value="0.0.0.0"/>	<input type="text" value="0.0.0.0"/>	<input type="text" value="0.0.0.0"/>
Syslog filter	<input checked="" type="checkbox"/> Emergency, <input checked="" type="checkbox"/> Alert, <input checked="" type="checkbox"/> Critical, <input checked="" type="checkbox"/> Error, <input checked="" type="checkbox"/> Warning, <input checked="" type="checkbox"/> Notice, <input checked="" type="checkbox"/> Info, <input type="checkbox"/> Debug			
SNMP trap receiver	<input type="text" value="0.0.0.0"/>	<input type="text" value="0.0.0.0"/>	<input type="text" value="0.0.0.0"/>	<input type="text" value="0.0.0.0"/>
SNMP trap community	<input type="text" value="public"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
SNMP trap filter	<input checked="" type="checkbox"/> Emergency, <input checked="" type="checkbox"/> Alert, <input checked="" type="checkbox"/> Critical, <input checked="" type="checkbox"/> Error, <input checked="" type="checkbox"/> Warning, <input checked="" type="checkbox"/> Notice, <input type="checkbox"/> Info, <input type="checkbox"/> Debug			
SNMP access	<input type="radio"/> on <input type="radio"/> off			
SNMP GET/SET community	<input type="text" value="public"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Access permission	<input checked="" type="checkbox"/> Read <input type="checkbox"/> Write	<input type="checkbox"/> Read <input type="checkbox"/> Write	<input type="checkbox"/> Read <input type="checkbox"/> Write	<input type="checkbox"/> Read <input type="checkbox"/> Write
SNMP authentication failure trap	<input type="radio"/> on <input type="radio"/> off			

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

SNMP MIBs
astro.mib

System Log
 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 00:14:05 UTC	0d 00h 14m 05s	user	192.168.1.26	info	Login

Figure 56: System log

You can check or configure the following parameters individually:

System log settings

System Log Settings

Property	Value 1	Value 2	Value 3	Value 4
Log file filter	<input checked="" type="checkbox"/> Emergency, <input checked="" type="checkbox"/> Alert, <input checked="" type="checkbox"/> Critical, <input checked="" type="checkbox"/> Error, <input checked="" type="checkbox"/> Warning, <input checked="" type="checkbox"/> Notice, <input checked="" type="checkbox"/> Info, <input checked="" type="checkbox"/> Debug			
Debug log file	<input type="radio"/> on <input checked="" type="radio"/> off			
Syslog server	<input type="text" value="0.0.0.0"/>	<input type="text" value="0.0.0.0"/>	<input type="text" value="0.0.0.0"/>	<input type="text" value="0.0.0.0"/>
Syslog filter	<input checked="" type="checkbox"/> Emergency, <input checked="" type="checkbox"/> Alert, <input checked="" type="checkbox"/> Critical, <input checked="" type="checkbox"/> Error, <input checked="" type="checkbox"/> Warning, <input checked="" type="checkbox"/> Notice, <input checked="" type="checkbox"/> Info, <input type="checkbox"/> Debug			
SNMP trap receiver	<input type="text" value="0.0.0.0"/>	<input type="text" value="0.0.0.0"/>	<input type="text" value="0.0.0.0"/>	<input type="text" value="0.0.0.0"/>
SNMP trap community	<input type="text" value="public"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
SNMP trap filter	<input checked="" type="checkbox"/> Emergency, <input checked="" type="checkbox"/> Alert, <input checked="" type="checkbox"/> Critical, <input checked="" type="checkbox"/> Error, <input checked="" type="checkbox"/> Warning, <input checked="" type="checkbox"/> Notice, <input type="checkbox"/> Info, <input type="checkbox"/> Debug			
SNMP access	<input type="radio"/> on <input checked="" type="radio"/> off			
SNMP GET/SET community	<input type="text" value="public"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Access permission	<input checked="" type="checkbox"/> Read <input type="checkbox"/> Write	<input type="checkbox"/> Read <input type="checkbox"/> Write	<input type="checkbox"/> Read <input type="checkbox"/> Write	<input type="checkbox"/> Read <input type="checkbox"/> Write
SNMP authentication failure trap	<input type="radio"/> on <input checked="" type="radio"/> off			

Figure 57: 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.

NOTE: 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

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 58: 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 "Check-box 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)

“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:

Active Alarm Table

Device	Ident	Code	Type	Message	Severity	Count	Status	Username	User IP	TSID	SID	Alias
	0x0b00001c	0x0b00001c	1	Backup firmware differs!	4	1	4	system	local	-1	-1	
	0x01000006	0x01000006	1	Fan fail (0)	2	2	2	system	local	-1	-1	
	0x0b00004b	0x0b00004b	1	Time is not synced	4	3	2	system	local	-1	-1	

Figure 59: Active alarm table

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

NOTE: 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 U 158, 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	0.8 Mbit/s	0.0 Mbit/s	76.6 Mbit/s	76.6 Mbit/s
Receive	0.0 Mbit/s	0.0 Mbit/s	71.0 Mbit/s	70.9 Mbit/s

Figure 60: 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	19	19
Total frames sent to host	284	272
Total exception frames sent to host	87	0
Total errored frames received	0	0
Total frames discarded by deencapsulator	108776	130563
Total frames discarded because of lack of buffers	0	0
Total transmit frames generated from IP TX 1 / per sec.	2792023 / 3214	2792023 / 3214
Total transmit frames generated from IP TX 2 / per sec.	3071235 / 3535	3071235 / 3535
Total transmit frames generated from IP TX 3 / per sec.	91130 / 103	91130 / 103
Total transmit frames generated from IP TX 4 / per sec.	91130 / 103	91130 / 103
Total receive frames forwarded to IP RX 1 / per sec.	2814153 / 3214 2814152 / 3214 0 / 0	2814150 / 3214 2814149 / 3214 0 / 0

Figure 61: 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 lines 7 to 10 for each IP transmitter.
- The number of frames forwarded to the IP receiver (primary, secondary and tertiary respectively) are displayed in the last line.

Ethernet RX

Channel	Encap	TS Rate	Buffer depth	FEC	Valid	Missing	Fixed	Duplicate	Reordered	Out of range
IP RX1	1328 bytes 7 packets RTP/UDP/IP	33.8 Mbit/s Mult. PCR	0 Frames 0.0 % 0.0 ms	none	2744031	0	0	0	0	0

Check box to clear statistics on refresh

Figure 62: Ethernet RX

The following parameters are displayed for the individual IP receivers:

- Encap**: The number of bytes in the IP payload for each frame is specified in the upper line; below this, the number of TS packets per frame is displayed. The lower line specifies whether the transmission occurs by UDP / IP or TRP / UDP / IP. The transmission protocol is selected under the menu item “IP RX” in the table line “Encapsulation”.
- TS Rate**: The net data rate is specified in the upper line; the lower line displays whether the transport stream includes one, or a multiple, PCR. This setting can be made under the menu item “IP RX” in the table “Channel settings”, line “Bit rate”.
- Buffer depth**: The absolute buffer depth is displayed in the upper line (number of frames); below this, the relative buffer depth (in %) is displayed. The buffer depth is displayed in relation to the transport stream rate in the third line.
- FEC**: If an RTP data stream is being used, the FEC configuration detected is displayed here. Prerequisite for this is that FEC has been activated in the “IP RX” menu (radio button “ON”).
- Valid**: Total number of valid IP frames.
- Missing**: Total number of IP frames not received (this is only measured when RTP is used).
- Fixed**: When Forward Error Correction (FEC) is activated, missing or defective frames can be restored. The number of frames which were restored is displayed.
- Duplicate**: The number of IP frames received several times (this is only displayed when RTP is used).
- Reordered**: The number of IP frames arriving in the wrong order, but which were able to be switched back due to a sufficient buffer depth (is only displayed when RTP is used).
- Out of range**: The number of IP frames arriving in the wrong order and which could not be switched back due to an insufficient buffer depth.

“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: 387, Bytes: 32207, Tx - Packets: 387, 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 63: 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.

“Devices” menu

To have an overview of the local data memory in the device displayed, click on the item “Devices” in the menu at the left. Among other things, the total memory capacity, the capacity of the unused memory, and the files saved are displayed:

```
Block device: /

total size: 63024 blocks, 516292608 bytes
free size: 57138 blocks, 468074496 bytes
block size: 8192 bytes

CHLISTBE.XML [mode 00000008 ino 00000002 nlink 1 size 13955]
CHLISTDE.XML [mode 00000008 ino 00000004 nlink 1 size 13969]
CHLISTFR.XML [mode 00000008 ino 00000006 nlink 1 size 13967]
CHLISTRU.XML [mode 00000008 ino 00000008 nlink 1 size 13920]
CHLISTUK.XML [mode 00000008 ino 0000000a nlink 1 size 13963]
  FM_E.BIN [mode 00000008 ino 00000054 nlink 1 size 359948]
  FM_S.BIN [mode 00000008 ino 0000007d nlink 1 size 955870]
  MPEG4.BIN [mode 00000008 ino 000002a3 nlink 1 size 1561616]
  U1144172.UP [mode 00000008 ino 000003b4 nlink 1 size 4751364]
  U1154172.UP [mode 00000008 ino 000005fa nlink 1 size 4679684]
  U1244172.UP [mode 00000008 ino 00000837 nlink 1 size 3768324]
  MAN_E.BIN [mode 00000008 ino 00000c91 nlink 1 size 1802492]
  IP.XML [mode 00000008 ino 00000a05 nlink 1 size 758]
  USER.XML [mode 00000008 ino 00000a06 nlink 1 size 427]
SETTINGS.XML [mode 00000008 ino 0000000c nlink 1 size 26117]
MEASURE.XML [mode 00000008 ino 00000a0a nlink 1 size 2261]
CHLIST.XML [mode 00000008 ino 00000a0b nlink 1 size 13969]
  MAN_S.BIN [mode 00000008 ino 00000d4f nlink 1 size 611296]
  DAT_S.BIN [mode 00000008 ino 00000d92 nlink 1 size 655912]
  PAL_S.BIN [mode 00000008 ino 00000de1 nlink 1 size 578295]
  MPEG.BIN [mode 00000008 ino 00000e28 nlink 1 size 1595996]
  ASTRO.MIB [mode 00000008 ino 00000eeb nlink 1 size 806]
  U114.MIB [mode 00000008 ino 00000eec nlink 1 size 25676]
  UPDATE.LOG [mode 00000008 ino 00000c72 nlink 1 size 1736]
ANALYZER.LOG [mode 00000008 ino 00000ef0 nlink 1 size 121538]
U114MANE.PDF [mode 00000008 ino 0000165a nlink 1 size 2561759]
U114MANG.PDF [mode 00000008 ino 00001794 nlink 1 size 4153326]
  STILL4.JPG [mode 00000008 ino 00000a09 nlink 1 size 37970]
  020105_0.CSV [mode 00000008 ino 000014bb nlink 1 size 37762]
  U124.MIB [mode 00000008 ino 000018fa nlink 1 size 25337]
  ERROR1.JPG [mode 00000008 ino 00002bdd nlink 1 size 126919]
  ERROR2.JPG [mode 00000008 ino 00004324 nlink 1 size 72307]
  ERROR3.JPG [mode 00000008 ino 0000432d nlink 1 size 119980]
  ERROR4.JPG [mode 00000008 ino 0000433c nlink 1 size 183334]
CHLISTUS.XML [mode 00000008 ino 00000c7a nlink 1 size 14551]
U115MANE.PDF [mode 00000008 ino 0000481b nlink 1 size 5305763]
U115MANG.PDF [mode 00000008 ino 00004aa3 nlink 1 size 5276753]
U124MANE.PDF [mode 00000008 ino 00004d28 nlink 1 size 4498595]
U124MANG.PDF [mode 00000008 ino 00004f4e nlink 1 size 4050414]
```

Figure 64: List of the local data memories (part 1)

```
Block device: /conf

total size: 983040 blocks, 983040 bytes
free size: 859300 blocks, 859300 bytes
block size: 1 bytes

. [mode 016f0001 ino 00000001 nlink 1 size 0]
.. [mode 016f0001 ino 00000001 nlink 1 size 0]
  ip.xml [mode 016f0008 ino 00000002 nlink 1 size 758]
  user.xml [mode 016f0008 ino 00000003 nlink 1 size 427]
  measure.xml [mode 016f0008 ino 00000005 nlink 1 size 2261]
  chlist.xml [mode 016f0008 ino 00000006 nlink 1 size 13969]
  settings.xml [mode 016f0008 ino 0000002a nlink 1 size 26117]

Block device: /ramdisk

total size: 128 blocks, 65536 bytes
free size: 126 blocks, 64512 bytes
block size: 512 bytes

. [mode 01ff0001 ino 08564ba4 nlink 2 size 64]
.. [mode 01ff0001 ino 08564ba4 nlink 2 size 64]
```

Figure 65: List of the local data memories (part 2)

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 ASTRO Strobel GmbH.

Read carefully: EN 60728-11 Safety requirements: No service work during thunderstorms.

NOTE: *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 158) and power modules, even when the U 100 is operating.

Replacing power modules

After removing the screws from the cover of the power module chamber (ASTRO logo), the power modules can be pulled forwards by hand using the mounting tab. When installing power modules, do not touch the fan or fan grille and only use the mounting tab affixed to the power module.

When the tasks are complete, the cover of the power module chamber must be replaced. Continuous operation of the device is not permitted without this cover.

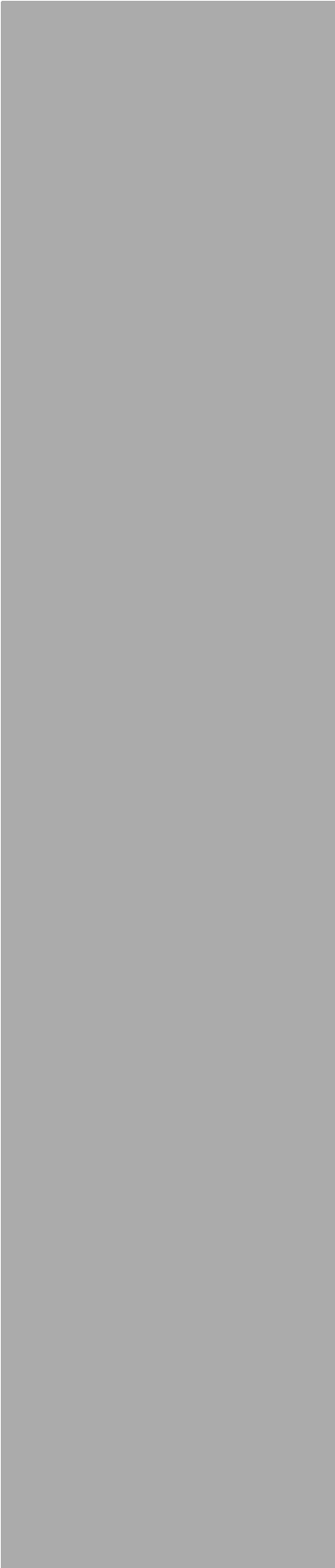
ATTENTION: *Never reach into the power module division of the U 100-230 base unit, or insert objects into it.*

NOTE: *The U 100-230 base unit must only be operated with the original power module(s)!*

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")

Type		U 158
Order number		380 158
EAN-Code		4026187131852
Network interfaces (passive routing to U 1xx)		
Management		2 x 100 Base-T Ethernet (RJ 45)
Data		2 x 1000 Base-T Ethernet (RJ 45)
Protocol		IEEE802.3 Ethernet, RTP, ARP, IPv4, TCP/UDP, HTTP, SNMP, IGMPv3
Transport stream editing		
TS capsulation		UDP, UDP / RTP, 1-7 packets, FEC
Packet length	[Bytes]	188 / 204
QAM modulator		
Modulation		16-, 32-, 64-, 128-, 256-QAM
Signal processing		according DVB standard
Spectrum shape (cos-roll-off)	[%]	15
FEC		Reed-Solomon (204, 188)
Data rate adjustment		<input checked="" type="checkbox"/>
PCR-correction		<input checked="" type="checkbox"/>
NIT-handling, PID-remapping		<input checked="" type="checkbox"/>
Output symbol rate	[Msymb/s]	3,45 - 7,5 (for 2 adjacent channels)
Bandwidth	[MHz]	4 - 8 depending on output symbol rate
Brutto data rate	[Mbit/s]	55,2
MER (Equalizer)	[dB]	≥ 44
HF modulator		
Connectors	[Ω]	75, 2 x F-jack
Frequency range	[MHz]	47 - 862, digital modulation
Output level	[dBμV]	114
Return loss	[dB]	> 14
Spurious frquency distance	[dB]	> 60
Common data		
when mounted in base unit U 100-48:		
Current consumption at 48 V	mA	680
Power consumption at 48 V	W	28 per module
Input voltage	V	- 48
when mounted in base unit U 100-230:		
Input voltage	VAC	100 - 240 (50 / 60 Hz)
Input power consumption	W / VA	1 power supply unit, 3 modules: 122,2 / 134,2; 2 power supply units, 3 modules: 140,2 / 157,5
Dimensions		1 HU, 19 inch
Ambient temperature	°C	0 ... +45







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