User Guide

ASTRO®

U 261 IP / ASI Gateway

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Parts of the software of this product is third-party software, which was developed under several different licensing conditions. Detailed information concerning the licenses is provided using the webinterface of the device.

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

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Pictograms and safety instructions

Pictograms are graphical symbols with a defined meaning. You will find the following pictograms in these instructions for installation and use:

These symbols alert you to situations in which there is mortal danger as a result of dangerous voltage or noncompliance with these instructions.

This symbol alerts you to various health, environmental and material risks.

Recycling: all of our packaging (cardboard, paper inserts, plastic films and bags) is fully recyclable.

Used batteries should be disposed of at approved recycling stations. This requires the batteries to be completely discharged when handed in.

Electronic equipment should not be placed in household garbage but rather - pursuant to guideline 2002/96/EC FROM THE EUROPEAN PARLIAMENT AND THE COUNCIL dated January 27, 2003 relating to old electrical and electronic appliances - should be disposed of in a competent manner. Please hand in such equipment for disposal at the relevant public collection stations when you have finished using it.

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2.1   Safety instructions

Remove both mains plugs before opening the device!

Exercise caution when servicing the power supply unit. There is the risk of making contact with parts which are live even when disconnected from the mains!
Operating indicators - where present - merely indicate the presence of DC voltages isolated from the mains which supply power to the components of the device. However, operating indicators which are not lit do not under any circumstances mean that the device is completely disconnected from the mains or non-live.
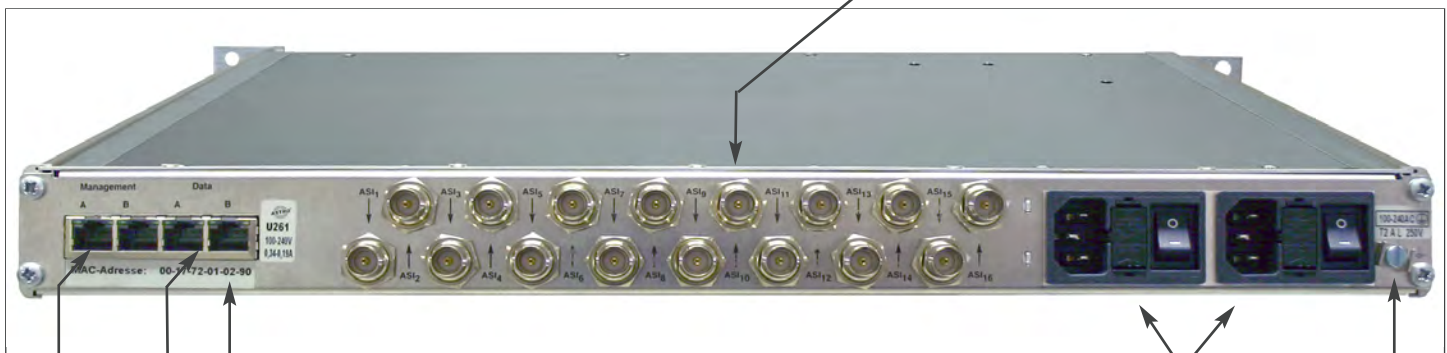
Both mains switches or mains plugs are used as a mains isolator and must therefore be accessible and able to be used at any time. When just one power supply unit is connected to the operating voltage and the mains switch is set to "on", the device is in operation. If the second power supply unit is also put into operation, one operates in idle mode for as long as the other power supply unit is supplying power to the device.

The device must be opened only by authorized specialist personnel inspected by the Chamber of Industry and Commerce. The device must be repaired only by authorized specialist personnel inspected by the Chamber of Industry and Commerce, or by sending it to ASTRO with the precise description of the fault.

The mains cable(s) must be replaced only with original mains cables. Fuses must be replaced only with fuses of the same type, value and melting characteristic.

Always observe:
DIN VDE 0701 - Parts 1 and 200, maintenance
EN 50 083 - Part 1, safety requirements

Do not carry out servicing work during thunderstorms

2.2   Assembly instructions

Protection from environmental influences:
The device must be connected and operated in dry rooms only. It must not be exposed to spray, water droplets or similar influences. If condensation has formed, wait until the device has completely dried out. Objects filled with liquid must not be put down on the device.

The permitted ambient temperature is 0 ... 45°C.

Assembly environment:
The device is intended for operation in 19" racks, which are preferably metallically conductive and which have sufficient air convection. It should be operated away from radiant heat and other heat sources. The device must be installed only in rooms in which the permitted ambient temperature can be maintained even if the climatic conditions change. To avoid trapped heat, it must be ensured that air can circulate freely on all sides. Assembly in niches and unintentional covering of the ventilation holes must be avoided at all times.

2.3   Equipotential bonding / grounding

The subscriber network must be and remain grounded as per the regulations in EN 60728 Part 11, even if the device is removed.

The equipotential bonding on the U 953 is provided by means of the fixing straps on the device or by means of the grounding clamp on its back. Appliances within arm's reach must be mutually integrated into the equipotential bonding.

Operation without connection to a protective conductor, device grounding or device equipotential bonding is not permitted!

2.4   Servicing and repair

Caution:

The device must not be opened by the user, since the device does not contain any user-serviceable parts!

If all instructions are observed and the device is used as stipulated, no servicing is required. Repairs must be carried out exclusively in the factory.

2.5   Technical data on the power supply (U 261)

Mains voltage:	100 – 240 V~
Mains frequency:	50 / 60 Hz
Power consumption:	0,19 – 0,34 A per power supply unit
Degree of protection according to EN 60529:	IP 20
Max. device ambient temperature:	45°C
Mains fuses:	T2A L 250V

The U 261 must be operated only with the original power supply unit!

3   General introduction

3.1   Connecting the U 261 to a PC / Laptop

Applying the operating voltage turns on the U 261 automatically. Following the boot phase (approx. 30 seconds), the display shows the two Management IP addresses (lines 2 & 3), and any error messages (line 4).
If the device is connected to a PC / laptop by means of one of the network ports and once the PC/laptop has been appropriately configured by means of the network settings, configuration of the U 261 can be started following input of the IP address in the address line of the Web browser.

3.2   The web browser user interface

The web browser user interface is split into a topframe, leftframe and mainframe.

The topframe
contains general information about the gateway.
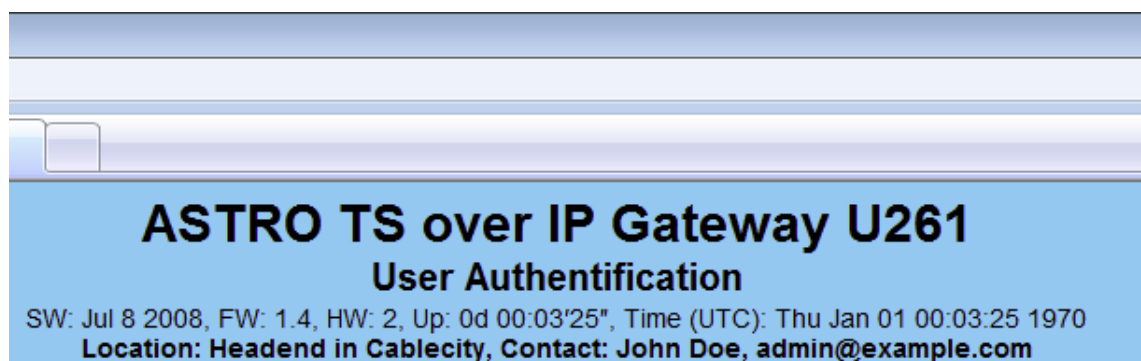
Figure 1: General information in the topframe of the Web browser user interface

This information can be read as follows:

"SW: Jul 8 2008" is the description of the software level on the U 261 Gateway,
"FW 1.4" is the level of the firmware in the U 261 Gateway,
"HW: 2" is the Gateway's hardware version,
"Up: 0d 00:03'25''" is the connection time measured from the instant of logging in,
"Time (UTC):" indicates the time on the U 261.

In the above figure, alignment with the SNTP server has not yet taken place, and the U 261 therefore indicates the year 1970. The bold line for "Location" and "Contact" is obtained from the settings in the chapter "User Administration".

The right-hand part of the topframe reflects the display and the status LEDs of the U 261, i.e. the Web browser user interface reproduces the exact view of the U 261.
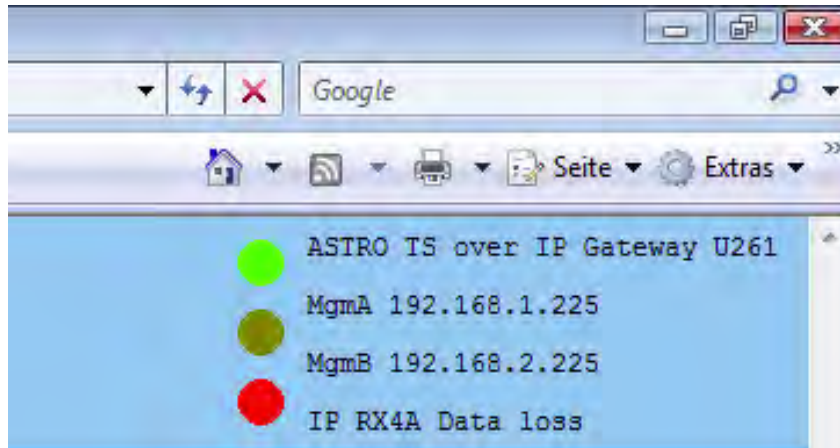
Figure 2: View of U 261 display and LEDs in the Web browser user interface

In the example for figure 2, the device is reporting the error "IP RX4A Data Loss", and precisely this error message can also be seen in the display of the U 261.

The leftframe
contains the navigation bar through the various submenus, which are described in detail in the chapters which follow.

The mainframe
displays - in line with the selection in the navigation bar in the leftframe - the submenu.

4   Login

Before the Gateway can be configured, it is necessary to log in. This is done using the "Login" submenu.

Figure 3: Input mask for login

Clicking on the "Login" submenu opens the input mask for login (see figure 3). The standard factory setting is:

"Username: admin and password: astro"

When the access data have been input correctly, it is possible to continue configuration. For security reasons, the usernames and passwords as set by the factory should be changed. This allows unauthorized access to be prevented. Only one user/BC 4 can ever be logged in on the U 261 Gateway. The very bottom of the leftframe of the Web browser user interface shows which user is currently logged in.
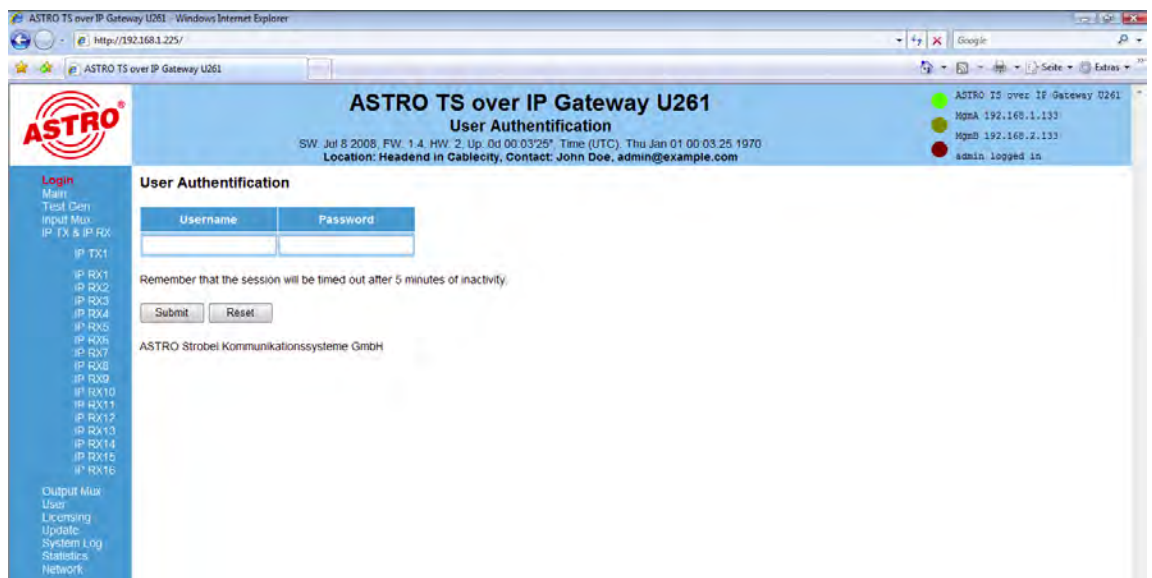
5   Settings

Clicking on the "Main" submenu takes you to the basic settings of the U 261.

NOTE:
All settings made must be transferred to the Gateway, and therefore activated, using the "Submit" button. To save the data, make sure that you click on the "Save" button after all parameters have been configured, otherwise the settings which have been changed will be lost following a reboot.

5.1   Setting the IP interfaces

The "IP Interface Settings" area is used to make the settings for the four IP interfaces (Management A & B, and Data A & B).
The "MAC" line displays the Mac address of the respective IP interface. The lowest Mac address is required for licensing further features of the U 261 (see the chapter "Licensing").
The "Active" line can be used to activate and deactivate the individual IP interfaces, and the "Mode" line displays the bandwidth of the IP interface connected to the U 261. This bandwidth is recognized by the U 261 automatically.

IP Interface Settings

Property	Management A (eth0)	Management B (eth1)	Data A (eth2)	Data B (eth3)
MAC	00:17:72:01:02:0c	00:17:72:01:02:0d	00:17:72:00:02:0c	00:17:72:00:02:0d
Active	⊙ on ○ off	⊙ on ○ off	⊙ on ○ off	⊙ on ○ off
Mode	10 Mbit/s, full duplex	10 Mbit/s, full duplex	1 Gbit/s, full duplex	1 Gbit/s, full duplex
Address	192 168 1 133	192 168 2 133	192 168 3 133	192 168 4 133
Subnet	255 255 255 0	255 255 255 0	255 255 255 0	255 255 255 0
Broadcast	192.168.1.255	192.168.2.255	192.168.3.255	192.168.4.255
Gateway	192 168 1 100	192 168 2 100	192 168 3 100	192 168 4 100

Note: Please use different IP address settings for each interface.
Use 0.0.0.0 for unused or unknown gateway, DNS, SNMP or SNTP addresses.

Figure 4: Detail from basic settings of the U 261: IP Interface Settings

The IP addresses ("Address" line), subnetwork masks ("Subnet" line) and standard Gateways "Gateway" line) are input using the keypad. Normally, it is only necessary to input a Gateway under Management A.

NOTE:
Please use different IP addresses for every interface and different address ranges if the interfaces are connected to different network segments. Input 0.0.0.0 for unused or unknown Gateways.

5.2 Setting the IP Management interfaces

The "IP Management Settings" area is used to stipulate the DNS server, to configure up to four SNMP Trap recipients and to input two SNTP servers for obtaining the time reference. The time source used may then be "SNTP Server" or "IP Rx 1" to "IP Rx 16" or "ASI TP". Only the licensed "IP Rx" can be used.

IP Management Settings

Property	Address 1	Address 2	Address 3	Address 4
DNS	192 168 1 100			
SNMP trap sinks	192.168.1.40	0.0.0.0	0.0.0.0	0.0.0.0
SNTP server	192.168.1.100	0.0.0.0		
Time Source	SNTP Server			

Submit   Reset

Note: Settings will become effective immediately but will be lost after reboot unless you press Save on Mai

Figure 5: Detail from the basic settings of the U 261 "IP Management Settings"

☞ **NOTE:**
Please use different IP addresses. Input 0.0.0.0 for unused or unknown DNS, SNMP or SNTP addresses.

5.3 Storing and loading settings / reboot

The "Save" button is used to save all settings made in the flash memory and to restore them even after mains failure or a reboot. The "Load" button is used to restore the last operating parameters saved in the flash memory and to reject changes which were made previously and were not stored.

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

Save   Load   Default   Reboot

Save: All settings are saved to flash memory.
Load: All settings are loaded from flash memory.
Default: Load factory default settings.
Reboot: Force reboot with settings stored in flash.

Figure 6: Detail from the basic settings of the U 261 "Save, Load, Default & Reboot"

"Default" is used to restore the factory settings, and "Reboot" prompts the advice to restart with the operating parameters saved in the flash memory.

6 Test generator

Clicking on the "Test Gen" submenu takes you to the test generator settings. This internal test generator is able to produce a test signal in order to perform a connection test, for example, and to test this connection using a data stream.

Figure 7: Configuring the test generator

The generated data stream comprises zero packets with a length of 188 and can be configured in a range from 1 - 197 Mbps. If the system contains several U 261 Gateways, a packet ID can be allocated to distinguish the test signals.

7 Configuring the input multiplexer

Clicking on the "Input Mux" submenu takes you to the input multiplexer settings. The input or output multiplexer is always seen from the ASI signal when the multiplexers are named. The U 261 has an ASI input which can be used to convert an ASI signal into IP signals.

Figure 8: Configuring the input multiplexer

This ASI signal is supplied via the BNC socket on the front and can be inverted prior to conversion into IP (inversion on/off). In addition, there is the option of using the signal from the test generator (see chapter 6) and of converting it into an IP signal. The configuration of this IP transmitted signal is explained in chapter 9.

8 IP setting for transmission and reception mode

Clicking on the "IP TX & IP RX" submenu takes you to the settings for the transmission and reception modes of the U 261. This page provides an overview of the transmission port (IP TX) of the U 261, the general settings of the reception ports (IP RX Common Settings) and the detailed settings of the reception ports (IP RX Channel Settings).

IP TX Channel Settings

Port	Enable		Length	Packets	Mode	Destination IP socket	UDP src	TOS	TTL	VLAN	Link
IP TX1	Data A: ○ on ◉ off	Data B: ○ on ◉ off	188	7	RTP/UDP/IP	232.19.100.16:1234 232.20.100.16:1234	1024 1024	34 34	1 1	0 0	

Figure 9: Activating / deactivating the transmission port (IP TX Channel Settings)

The transmission port can be activated and deactivated in this input mask, specifically differentiated according to Data A and Data B interface. If the user has a redundant network infrastructure (e.g. bidirectional backbone), it may make sense for the data to be transmitted via both data interfaces.

For the general settings of the reception port, it is possible to choose between "Data A" and "Data B" as the active reception interface.

IP RX Common Settings

Interface	Change on signal loss
◉ Data A (eth2) ○ Data B (eth3)	◉ Automatic ○ Static

Figure 10: General settings for the reception ports (IP TX Common Settings)

If the network infrastructure is of redundant design and if "Data A" and "Data B" have the same signal applied to them via a different supply line, the U 261 Gateway can be configured such that in the event of a signal loss the active data port is automatically switched over ("Automatic" selection). If this redundant supply line does not exist, the "Static" option should be selected.

In the overview of the reception ports (IP RX Channel Settings), there is merely the option of activating or deactivating reception ports which have finished being configured. The actual configuration of the reception ports is explained in chapter 10.

IP RX Channel Settings

Port	Enable	Encapsulation	Receive IP socket	TSID / ONID	Alias	Packet rate	Link
IP RX1	⦿ on ○ off	RTP/UDP/IP	232.19.100.1:1234	0 / 0	RTL	40.007882 Mbps	Play
IP RX2	⦿ on ○ off	RTP/UDP/IP	232.19.100.2:1234	0 / 0	SAT.1	38.022472 Mbps	Play
IP RX3	⦿ on ○ off	RTP/UDP/IP	232.19.100.3:1234	0 / 0	3sat	38.022472 Mbps	Play
IP RX4	⦿ on ○ off	RTP/UDP/IP	232.19.100.4:1234	0 / 0	ARD	38.022472 Mbps	Play
IP RX5	No License	RTP/UDP/IP	232.19.100.5:1234	0 / 0		38.022472 Mbps	
IP RX6	No License	RTP/UDP/IP	232.19.100.6:1234	0 / 0		38.022472 Mbps	
IP RX7	No License	RTP/UDP/IP	232.19.100.7:1234	0 / 0		38.022472 Mbps	
IP RX8	No License	RTP/UDP/IP	232.19.100.8:1234	0 / 0		38.022472 Mbps	
IP RX9	No License	RTP/UDP/IP	232.19.100.9:1234	0 / 0		38.022472 Mbps	
IP RX10	No License	RTP/UDP/IP	232.19.100.10:1234	0 / 0		38.022472 Mbps	
IP RX11	No License	RTP/UDP/IP	232.19.100.11:1234	0 / 0		38.022472 Mbps	
IP RX12	No License	RTP/UDP/IP	232.19.100.12:1234	0 / 0		38.022472 Mbps	
IP RX13	No License	RTP/UDP/IP	232.19.100.13:1234	0 / 0		38.022472 Mbps	
IP RX14	No License	RTP/UDP/IP	232.19.100.14:1234	0 / 0		38.022472 Mbps	
IP RX15	No License	RTP/UDP/IP	232.19.100.15:1234	0 / 0		38.022472 Mbps	
IP RX16	No License	RTP/UDP/IP	232.19.100.16:1234	0 / 0		38.022472 Mbps	

[Submit]   [Reset]

Note: Settings will become effective immediately but will be lost after reboot unless you press Save on Main page.

Figure 11: Overview of the configured reception ports

The overview shows the configurations of the individual reception ports. The U 261 Gateway in the above example is equipped with four reception licenses, i.e. four IP Multicast groups can receive and be distributed over the ASI ports. The links "RX1" to "RX16" take you to the detailed configuration of the respective port.

9   IP setting for transmission port

NOTE:
The transmission port should be configured in agreement with the network administrator in order to ensure that the network works!

Clicking on the "IP TX1" submenu takes you to the IP settings for the transmission port.

9.1   Transmit port

The "Transmit Port" line can be used to select the port which is used to send the multicast group. A value ≥ 1024 should be set for this in order to avoid conflict with services (Port 21: FTP, Port 80: http, Port 110: POP3 etc.).

9.2   Destination IP

The "Destination IP:Port" line is used to assign an IP address and a UDP port to the ASI transport stream converted according to IP. Usually, a multicast address is input here, since this allows the data stream to be received by several U 261 Gateways. By contrast, a unicast address can be received only by one U 261 Gateway.

Multicast addresses are in the IP address space 224.0.0.0 to 239.255.255.255, the range 224.0.0.0 to 224.0.0.255 being reserved for administrative purposes.

IP TX1 Channel Settings

Property	Data A (eth2) 1G	Data B (eth3) 1G
Transmit Port	1024	1024
Destination IP:Port	232 19 100 16 : 1234	232 20 100 16 : 1234
Destination MAC	01:00:5e:13:64:10	01:00:5e:14:64:10
TOS / TTL	34 1	34 1
VLAN (Set 0 to disable)	0	0

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

Enter the IP address and UDP port that the traffic is to be sent to. For an IP multicast, use an address in the range 225.0.0.0 to 239.255.255.255. The TOS and TTL entries are the values used for the IP "Type of Service" and "Time To Live" fields

[Submit] [Reset]

Note: Settings will become effective immediately but will be lost after reboot unless you press Save on Main page.

Figure 12: Configuring the transmission port (IP TX1 Channel Settings)

9.3 Destination MAC

The "Destination MAC" is obtained automatically from the input "Destination IP:Port" and is displayed here as additional information.

9.4 Type Of Service / Time To Live

The "TOS/TTL" line provides the option of inputting the "Type Of Service" and the "Time To Live". Should the various services not be distinguished in the given network, it is not necessary to alter the settings ex factory. The TTL indicates the permitted number of hops via a router and should be defined such that the data packets cannot leave the network.

9.5 VLAN Tags

If the U 261 Gateway is intended to cover various VLANs, it is possible for the data packets to be assigned different VLAN tags. This ensures that data packets are routed only to the desired VLANs, or each VLAN receives only the data packets which are intended for it.

9.6 TS Packets Per Frame / RTP / FEC

The format of the IP data stream can be determined in the bottom part of the table shown in figure 12. The number of transport stream packets per Ethernet frame can be stipulated between 1 and 7. In networks in which secure data transmission is ensured (e.g. proprietary backbone), the number of packets can be set to 7, since the loss of an Ethernet frame is improbable. In networks with nonsecure data transmission, a small value needs to be chosen in order to minimize the loss of useful data in the event of an Ethernet frame being lost.

The "Protocol Encapsulation" line can be used to append an additional RTP header (Real Time Transport Protocol) to the connectionless UDP/IP Ethernet frame. This header allows the individual transmitted Ethernet frames to be numbered in order to detect Ethernet frames which have been lost or have arrived in the wrong order on a receiver. Error correction is not included by the RTP header.

The U 261 Gateway is equipped with an optionally engageable FEC. This FEC forms checksums from a matrix and transmits these checksums to the UDP ports + 2 and + 4 in the same multicast group. When the data are recovered, these checksums are aligned and errors can be corrected. Two different modes of FEC are possible: one-dimensional FEC, in which sums are formed only over the columns, and two-dimensional FEC, in which the sums are formed over columns and rows.
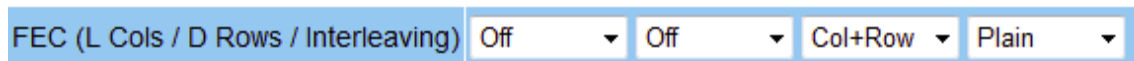

Abbildung 13: Configuring the FEC

The first drop-down selection field is used to stipulate the number of columns in the checking matrix. There are 1 to 20 columns or the selection "Off" available here. The second drop-down selection field is used to stipulate the number of rows in the checking matrix. There are 4 to 20 rows or the selection "Off" available here. The third selection field is used to select one-dimensional or two-dimensional FEC (Col+Row = two-dimensional/Col only = one-dimensional over columns).
The mode of the FEC can be selected to be "Plain", "Annex A" or "Annex B" in line with ProMpeg COP3 (SMPTE 2022-1). Please note that plain FEC results in a burst behavior for the data rate, and hence Annex A and Annex B are preferable. It should be noted that the product of the number of columns (L) and the number of rows (D) is ≤ 100 (L x D ≤ 100).

10 IP setting for reception ports

Clicking on the "IP RX1-1 - IP RX16" submenu takes you to the IP settings for the desired reception port.

Figure 14: Setting details for the reception port

The "Receive IP:Port" line is used to input the IP address and the UDP port at which the U 261 Gateway needs to receive the data stream.

The "Encapsulation" is selected according to the stipulation of how the input data stream has been encapsulated by the transmission equipment. In RTP mode, every data packet must be provided with an RTP header. This header contains numbering for the individual transmitted Ethernet frames in order to detect and possibly re-sought Ethernet frames which have been lost or have arrived in the wrong order on the receiver. Error correction is not included in the RTP header (RTP: can only receive RTP frames/UDP can receive both but cannot use the RTP header).

The "Datarate" line is used to input the data rate of the data stream which is to be received. This input may never be smaller than the value which is actually to be received, since otherwise picture interference/failure would occur.

A data stream can arrive with a CBR (Constant Bit Ratio) in the U 261 Gateway, or with a VBR (Variable Bit Ratio). In any case, CBR is used for MPTSs (Multiple Program Transport Stream) but also for SPTSs (Single Program Transport Stream). However, SPTSs can also be sent with a VBR.

Under "Packet Mode", it is possible to select between "continuous" or "burst" for configuring the respective ASI outputs connected downstream of the IP RX.
The TSIDs and ONIDs are displayed for information purposes in line with the selected transport stream and, to provide a better overview of the transport streams (see also figure 11), it is possible for an alias to be input. If no alias is input, the name of the first service of the transport stream is entered.

11 Configuring the output multiplexer

Clicking on the "Output Mux" submenu takes you to the output multiplexer settings. The input or output multiplexer is always seen from the ASI signal when the multiplexers are named. The U 261 Gateway has 16 ASI outputs which can be used - depending on licensing - to convert a maximum of 16 IP data streams.

Output Mux Settings

	Enable	Pack. Len.	Inversion	IP RX1 (RTL)	IP RX2 (SAT.1)	IP RX3 (3sat)	IP RX4 (ARD)	IP RX5	IP RX6	IP RX7	IP RX8	IP RX9	IP RX10	IP RX11	IP RX12	IP RX13	IP RX14	IP RX15	IP RX16	ASI TP	Test Gen. (Null Pack)
TSID/ONID				0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0		
ASI 1	on	188	off	●			●														
ASI 2	on	188	off		●		●														
ASI 3	on	188	off			●	●														
ASI 4	on	188	off				●														
ASI 5	on	188	off	●			●														
ASI 6	on	204	on	●	●	●	●														
ASI 7	on	188	off	●																	
ASI 8	on	188	off	●																	
ASI 9	on	188	off	●																	
ASI 10	on	188	off	●																	
ASI 11	on	188	off	●																	
ASI 12	on	188	off	●																	
ASI 13	on	188	off	●																	
ASI 14	on	188	off	●																	
ASI 15	on	188	off	●																	
ASI 16	on	188	off	●																	

[Submit] [Reset]

Note: Settings will become effective immediately but will be lost after reboot unless you press Save on Main page.

Figure 15: Example view of the output multiplexer

The "Output Mux Settings" are used to assign an IP RX port to each ASI output of the U 261 Gateway. An IP RX port can also be routed to several ASI outputs, so that the U 261 can also be used as an ASI distributor. To provide a better overview, the respective row and column of the output matrix above which the mouse pointer is situated have a red background. The ASI signal can also be inverted and can be configured for the packet lengths 188 and 204. It is also possible to turn off the ASI outputs.

12 User Administration

Clicking on the "User" submenu takes you to User administration.
When delivered, the U 261 Gateway can be configured using three different items of access data.

Username: admin, password: astro
Username: user, password: astro
Username: bc4, password: astro

Figure 16: View of User Administration upon delivery

NOTE:
ASTRO does not have a master password! Should you forget your password, you will no longer be able to log in and the device will need to be sent in.

No service levels are distinguished for the different users. Each user has the same rights. To remove user accounts 2 to 4, it is merely necessary to input a blank username and click on the "Submit" button. New passwords which are input must not be shorter than 5 characters.

NOTE:
All settings made need to be transferred to the Gateway and activated using the "Submit" button. To save the data, make sure that you click on the "Save" button in the "Main" submenu, otherwise the settings which have been changed will be lost following a reboot.

The data which have been input under "Location" and "Contact" are displayed in the topframe. This makes it possible to avoid confusing appliances and locations when configuring remotely.

13 Transport Stream Analysis

By purchasing a license, the U 261 can be equipped with a transport stream analyzer. This analyzer shows the structure of the MPEG2 TS from the tables to the individual PID and its service. Clicking on the "TS Analyzer" submenu takes you to selection of the transport stream to be analyzed. When a TS is selected and the "Submit" button hit, the following example window opens:

Alias	RTL	SAT.1	3sat	ARD													
TSID ONID	1089 1	1107 1	1079 1	1101 1	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
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	ASI TP
Analyze	○	◉	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

[Submit] [Reset]

Analyzing SI Tables...

⊟ PAT (PID:0), TSID:1107, version:11, valid:current, SDT actual (PID:17), TSID:1107, ONID:1, version:1, valid:current
    ❑ SID:0, NID_PID:16
    ⊟ SID:17500, PMT_PID:96
      ⊞ PMT (PID:96), SID:17500, PCR_PID:255, version:25, valid:current
      ⊟ SDT Status:running, Free, EIT_present_following, EIT_schedule
        ❑ Service, name:**SAT.1**, provider:**ProSiebenSat.1**, type:**Digital television**
    ⊟ SID:17501, PMT_PID:97
      ⊞ PMT (PID:97), SID:17501, PCR_PID:511, version:23, valid:current
      ⊟ SDT Status:running, Free, EIT_present_following, EIT_schedule
        ❑ Service, name:**ProSieben**, provider:**ProSiebenSat.1**, type:**Digital television**
    ⊟ SID:17502, PMT_PID:98
      ⊞ PMT (PID:98), SID:17502, PCR_PID:767, version:6, valid:current
      ⊟ SDT Status:running, Free, EIT_present_following, EIT_schedule
        ❑ Service, name:**kabel eins**, provider:**ProSiebenSat.1**, type:**Digital television**
    ⊟ SID:17503, PMT_PID:99
      ⊞ PMT (PID:99), SID:17503, PCR_PID:1023, version:18, valid:current
      ⊟ SDT Status:running, Free, EIT_present_following, EIT_schedule
        ❑ Service, name:**N24**, provider:**ProSiebenSat.1**, type:**Digital television**
    ⊟ SID:17504, PMT_PID:100
      ⊞ PMT (PID:100), SID:17504, PCR_PID:1279, version:18, valid:current
      ⊟ SDT Status:running, Free, EIT_present_following, EIT_schedule
        ❑ Service, name:**9Live**, provider:**ProSiebenSat.1**, type:**Digital television**
    ⊟ SID:17505, PMT_PID:101
      ⊞ PMT (PID:101), SID:17505, PCR_PID:1535, version:28, valid:current
      ⊟ SDT Status:running, Crypt, EIT_present_following, EIT_schedule
        ❑ Service, name:**Sat.1 Comedy**, provider:**ProSiebenSat.1**, type:**Digital television**
        ❑ CA_identifier, **Betacrypt** (0x1702), **Nagravision** (0x1801), **Nagravision** (0x1830)
    ⊟ SID:17506, PMT_PID:102
      ⊞ PMT (PID:102), SID:17506, PCR_PID:1791, version:18, valid:current
      ⊟ SDT Status:running, Crypt, EIT_present_following, EIT_schedule
        ❑ Service, name:**kabel eins classics**, provider:**ProSiebenSat.1**, type:**Digital television**
        ❑ CA_identifier, **Betacrypt** (0x1702), **Nagravision** (0x1801), **Nagravision** (0x1830)
    ⊟ SID:17507, PMT_PID:103
      ⊞ PMT (PID:103), SID:17507, PCR_PID:255, version:0, valid:current
      ⊟ SDT Status:running, Free, EIT_present_following, EIT_schedule
        ❑ Service, name:**SAT.1 Bayern**, provider:**ProSiebenSat.1**, type:**Digital television**

⊞ CAT (PID:1), version:10, valid:current

❑ TSDT (PID:2) missing

⊞ NIT actual (PID:16), NID:1, version:6, valid:current

⊞ NIT other (PID:16), NID:3, version:7, valid:current

❑ SDT other (PID:17) missing

❑ BAT (PID:17) missing

❑ RST (PID:19) missing

❑ TDT (PID:20), UTC:Tue Jan 27 15:21:18 2009

⊟ TOT (PID:20), UTC:Tue Jan 27 15:21:18 2009
    ❑ Local_time_offset
    DEU, zone:0, now:+01:00, next:+02:00 at Sun Mar 29 01:00:00 2009

...done!

Figure 17: Analyzing the selected transport stream

Wait until the "...done!" message appears. Clicking on the "+" or "-" symbols displays or hides the details. Through selection of the "ASI TP" as the TS to be analyzed, the TS analyzer also provides the option of analyzing externally applied ASI signals.

14 Licensing

Clicking on the "License" submenu takes you to licensing. The features of the U 261 can be upgraded from the factory-delivered state (1 IP TX & 1 IP RX) through to the full complement of equipment (1 IP TX, 16 IP RX and TS analyzer) by purchasing software licenses.

Licensing

This device has the HWID 00:17:72:00:02:0c and you have already licensed:
1 IP TX
4 IP RX
TS Analyzer

[   ]   [Submit]   [Reset]

Figure 18: Input mask for software licenses

A prerequisite for ordering further licenses is provision of the Mac address of the device. The Mac address can be found either on the sticker on the back of the device (see illustrations on page 3) or in the Web browser interface. In this respect, the lowest Mac address is the important one. When the Mac address has been provided, ASTRO will generate the license keys and supply them by E-mail or on CD.
The format of the license keys is a text document (e.g. Lic001772000222.txt). The key or keys can be inserted into the input mask using "Copy/Paste", and clicking on the "Submit" button transfers the license to the U 261 Gateway. If the license is valid, this is confirmed by a message. An invalid license is indicated by an error message.

15 Update

15.1 Update using (T)FTP Server

Clicking on the "Update" submenu takes you to the settings for the U 261 software update. The "(T)FTP Server address" line is used to input the (T)FTP server address at which the current software for the U 261 Gateway is stored.
The "Protocol" line provides the option of selecting "FTP" (File Transfer Protocol) or "TFTP" (Trivial File Transfer Protocol). If the "TFTP" option is chosen, it is not necessary to input the username and the password.
"Path" is used to input the path on which the U 261 software update was stored. It is necessary to ensure that the software is stored in the indicated path (preceded and followed by "/"), otherwise the update will not take place. Furthermore, it must be ensured that any firewall installed permits the (T)FTP communication. In the "Update" submenu, it is also possible to store the configuration of the U 261 Gateway on an FTP server, or else to load a configuration into the U 261 Gateway. Loading a configuration into the U 261 Gateway does not affect the settings of the IP interfaces.

.

Software Update

Property	Value
(T)FTP Server address	ftp.astro-strobel.de
Protocol	⦿ FTP ○ TFTP
Username (e.g. anonymous)	anonymous
Password (e.g. guest)	guest
Path	/
File	Save config to server ▾

For a quick start you may want to use the Tftpd32 server. Please adjust your firewall to allow (T)FTP traffic.
Username and password are only used for FTP.
Please consider that the given path must exist on the server before any transfer is started.

Note: Load config excludes IP Interface Settings.

[Submit]   [Reset]

Note: Settings will become effective immediately but will be lost after reboot unless you press Save on Main page.

Figure 19: Input mask for the U 261 software update

15.2 Update using the example of a TFTP Server for Windows

Should there be no firm (T)FTP server set up for updating the U 261 Gateway, it is also possible to transfer locally stored update files to the Gateway. For this, it is recommended that a TFTP program be used. The procedure is explained below using the program "Tftpd32".
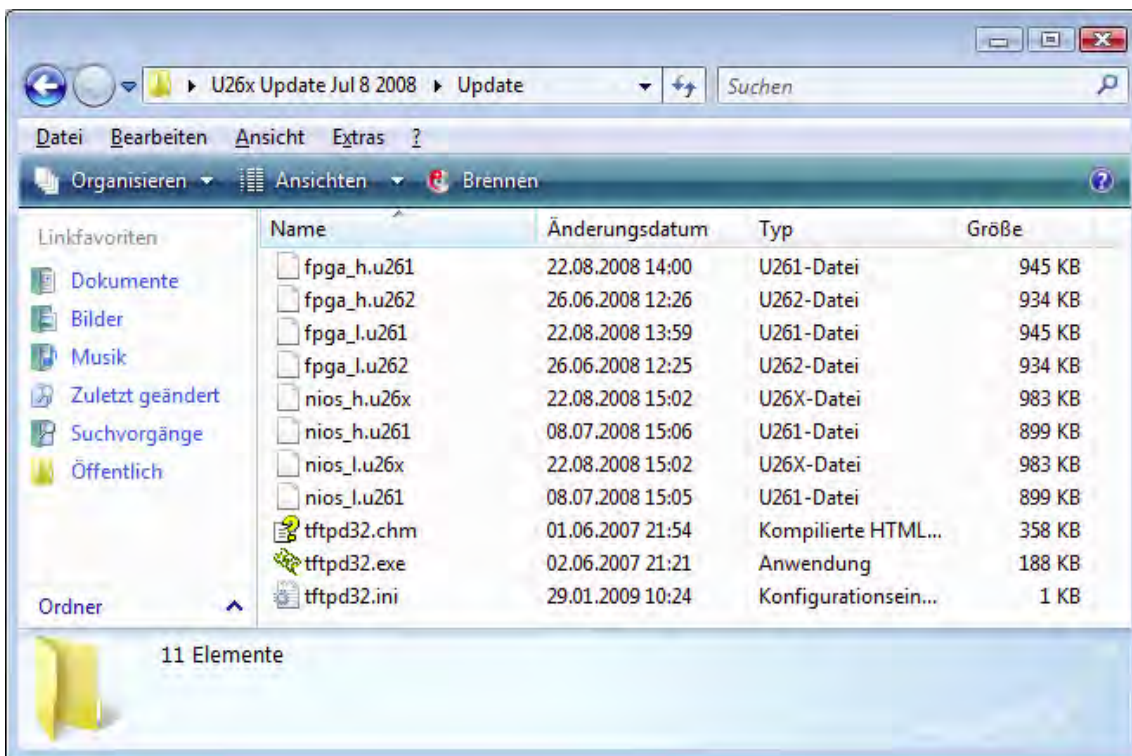
Figure 20: Example view of the U 26x Update folder with update files and the "tftpd32" TFTP program

The "tftpd32" program is started directly from the folder with the U 261 update files. In the window that opens, click on the "Settings" button first and make the settings as shown in Figure 21:
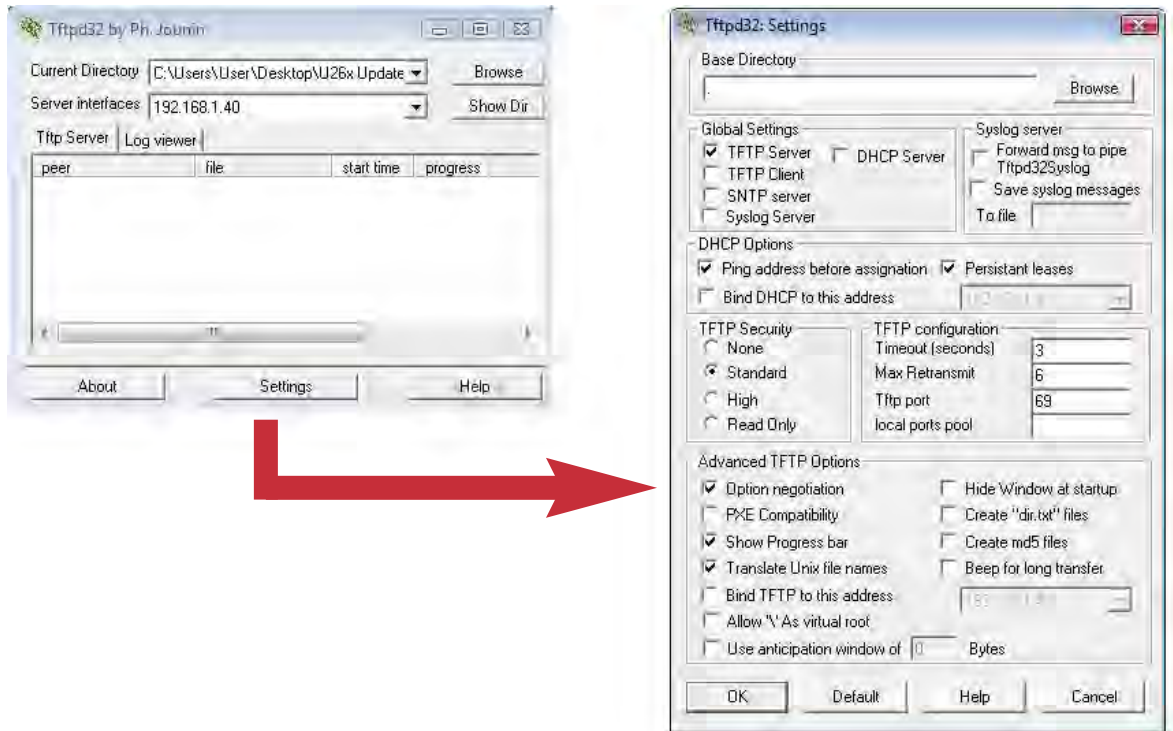
Figure 21: Settings for the tftpd32 TFTP program

To start the update, the server address which is input into the "(T)FTP Server address" line now needs to be the IP address of the local computer (Figure 19), and the protocol needs to be set to TFTP. It is therefore also no longer necessary to input a username and a password. In the "File" line, select the "Update" option, and start the update by clicking on the "Submit" button.

NOTE:
A reboot or network failure during an update procedure can result in the U 261 Gateway software crashing fatally. The device would then need to be sent to the ASTRO factory for repair.

16 Log Book

Clicking on the "System Log" submenu takes you to the U 261 Gateway's log book. This documents all processes which are relevant to operation.

System Log

[Refresh] Check box to clear log on refresh ☐

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

System configuration in XML format: status.xml (Use right click and "save as" to save locally.)

```
number,time,uptime,user,source,message
1,Thu Jan 01 00:00:53 1970 UTC,0d 00h 00m 53s,admin,192.168.1.99,Login
2,Thu Jan 01 00:00:20 1970 UTC,0d 00h 00m 21s,boot,local,ASTRO TS over IP Gateway U261
3,Thu Jan 01 00:00:01 1970 UTC,0d 00h 00m 01s,boot,local,SW:Jan 21 2009 FW:1.5 HW:2
4,Thu Jan 01 00:02:34 1970 UTC,0d 00h 02m 34s,system,local,Switching to Data B (eth3)
5,Thu Jan 01 00:02:31 1970 UTC,0d 00h 02m 32s,system,local,Switching to Data A (eth2)
6,Thu Jan 01 00:02:29 1970 UTC,0d 00h 02m 30s,system,local,Switching to Data B (eth3)
7,Thu Jan 01 00:02:27 1970 UTC,0d 00h 02m 28s,system,local,Switching to Data A (eth2)
8,Thu Jan 01 00:02:25 1970 UTC,0d 00h 02m 26s,system,local,Switching to Data B (eth3)
9,Thu Jan 01 00:02:23 1970 UTC,0d 00h 02m 23s,system,local,Switching to Data A (eth2)
10,Thu Jan 01 00:02:21 1970 UTC,0d 00h 02m 21s,system,local,Switching to Data B (eth3)
11,Thu Jan 01 00:02:19 1970 UTC,0d 00h 02m 19s,system,local,Switching to Data A (eth2)
12,Thu Jan 01 00:02:17 1970 UTC,0d 00h 02m 17s,system,local,Switching to Data B (eth3)
13,Thu Jan 01 00:02:15 1970 UTC,0d 00h 02m 15s,system,local,Switching to Data A (eth2)
14,Thu Jan 01 00:02:12 1970 UTC,0d 00h 02m 13s,system,local,Switching to Data B (eth3)
15,Thu Jan 01 00:02:10 1970 UTC,0d 00h 02m 11s,system,local,Switching to Data A (eth2)
16,Thu Jan 01 00:02:08 1970 UTC,0d 00h 02m 09s,system,local,Switching to Data B (eth3)
17,Thu Jan 01 00:02:06 1970 UTC,0d 00h 02m 06s,system,local,Switching to Data A (eth2)
18,Thu Jan 01 00:02:04 1970 UTC,0d 00h 02m 04s,system,local,Switching to Data B (eth3)
19,Thu Jan 01 00:02:02 1970 UTC,0d 00h 02m 02s,system,local,Switching to Data A (eth2)
20,Thu Jan 01 00:02:00 1970 UTC,0d 00h 02m 00s,system,local,Switching to Data B (eth3)
21,Thu Jan 01 00:01:58 1970 UTC,0d 00h 01m 58s,system,local,Switching to Data A (eth2)
22,Thu Jan 01 00:01:55 1970 UTC,0d 00h 01m 56s,system,local,Switching to Data B (eth3)
23,Thu Jan 01 00:01:53 1970 UTC,0d 00h 01m 54s,system,local,Switching to Data A (eth2)
```

Figure 22: Example view of the U 261 log book

The processes are sorted according to the time of occurrence. The logfile is erased by checking "Check box to clear log on refresh" and then clicking on the "Refresh" button. The first entry in the log book will then be the erase process with an indication of the time and the user account, and also the IP address of the user.

NOTE:
Download the system settings using the "status.xml" link; store the configuration as a table using the "log.csv" link.

System Log

[Refresh] Check box to clear log on refresh ☐

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

System configuration in XML format: status.xml (Use right click and "save as" to save locally.)

```
number,time,uptime,user,source,message
1,Thu Jan 01 00:07:33 1970 UTC,0d 00h 07m 33s,admin,192.168.1.99,Log file cleared
```

Figure 23: View of the log book following erasure

17 Statistics

Clicking on the "Statistics" submenu takes you to the statistics relating to the data transfer of the U 261 Gateway. This displays all statistics which are relevant to operation and which can be used for analysis.

Ethernet bandwidth

Property	Data A (eth2) 1G	Data B (eth3) 1G
Transmit	0.000 Mbps	0.000 Mbps
Receive	310.453 Mbps	310.453 Mbps

Ethernet frames

Property	Data A (eth2) 1G	Data B (eth3) 1G
Total frames sent by host	10	10
Total frames sent to host	14	14
Total exception frames sent to host	48	48
Total errored frames received	0	0
Total frames discarded by deencapsulator	6824540	6824549
Total frames discarded because of lack of buffers	0	0
Total receive frames forwarded to IP RX 1 / per sec.	1726996 / 3664	1726996 / 3664
Total receive frames forwarded to IP RX 2 / per sec.	1535104 / 3256	1535104 / 3256
Total receive frames forwarded to IP RX 3 / per sec.	1727000 / 3663	1727000 / 3663
Total receive frames forwarded to IP RX 4 / per sec.	1726950 / 3663	1726950 / 3663

Ethernet TX

Property	Value
Minimum FEC Freelist	47
Maximum output queue depth	47

Ethernet RX

Channel	Encap	TS Rate	Buffer depth	FEC	Valid	Missing	Fixed	Duplicate	Reordered	Out of range
1	1328 bytes 7 packets RTP/UDP/IP	38.005 Mbit/s	492 Frames 96.1 % 930.9 ms	none	1726505	0	0	0	0	0
2	1328 bytes 7 packets RTP/UDP/IP	33.778 Mbit/s	492 Frames 96.1 % 1047.3 ms	none	1534613	0	0	0	0	0
3	1328 bytes 7 packets RTP/UDP/IP	37.999 Mbit/s	253 Frames 49.4 % 479.6 ms	none	1726748	0	0	0	0	0
4	1328 bytes 7 packets RTP/UDP/IP	37.999 Mbit/s	253 Frames 49.4 % 477.7 ms	none	1726698	0	0	0	0	0

Figure 24: Statistics for U 261 data transfer

18   Network properties

The network properties can be displayed by clicking on the "Network" submenu. The displayed characteristics are purely informative and serve to describe the network.

Logical Interfaces

Interface	Status	
eth0	Flags	UP BROADCAST RUNNING SIMPLEX MULTICAST
	Address	192.168.1.133
	Broadcast	192.168.1.255
eth1	Flags	UP BROADCAST RUNNING SIMPLEX MULTICAST
	Address	192.168.2.133
	Broadcast	192.168.2.255
eth2	Flags	UP BROADCAST RUNNING SIMPLEX MULTICAST
	Address	192.168.3.133
	Broadcast	192.168.3.255
eth3	Flags	UP BROADCAST RUNNING SIMPLEX MULTICAST
	Address	192.168.4.133
	Broadcast	192.168.4.255
lo0	Flags	UP LOOPBACK RUNNING MULTICAST
	Address	127.0.0.1

Protocols

IPv4		ICMPv4		IGMP		UDP		TCP	
		Received		**Received**				**Connections**	
		ECHO	0	Total	0			Initiated	0
Received		ECHO REPLY	0	Too long	0			Accepted	91
Total	876	UNREACH	0	Too short	0			Established	91
Bad	0	REDIRECT	0	Bad sum	0	**Received**		Closed	90
Reassembled	0	Other	0	Queries	0	Total	99	**Received**	
Delivered	825	Bad	0	Bad queries	0	Bad	37	Packets	730
Sent		**Sent**		Reports	0	**Sent**		Data Packets	180
Total	1018	ECHO	0	Bad reports	0	Total	125	Bytes	33914
Raw	0	ECHO REPLY	0	Our reports	0			**Sent**	
Fragmented	0	UNREACH	0	**Sent**				Packets	880
		REDIRECT	0	Reports	16			Data Packets	697
		Other	0					Bytes	526525

Mbufs

Summary		Types	
Mbufs	28		
Clusters	15		
Free Clusters	12	FREE	20
Drops	0	DATA	8
Waits	0	HEADER	0
Drains	0	SONAME	0
Copy Fails	0	FTABLE	0
Pullup Fails	0		

Figure 25: Example view of the network properties in the "Network" submenu

19 Logout

Clicking on the "Logout" submenu (only available when you are logged in) allows you to log out from the U 261 Gateway.
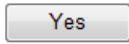
User Logout

Are you sure?

[Yes]

Figure 26: Logging out from the U 261 Gateway

If you confirm the question using the "Yes" button, you are logged out. It is not possible to make any further settings without logging in again, but it is possible to view the U 261 Gateway's settings. The setting items are inactive, however.

20 Technical Data

Typ / Type		U 261	U 261i
Bestell-Nummer / Order number:		380 261	380 262
Transportstrom Schnittstellen Transport stream interfaces			
DVB ASI		16 (plus one on front panel)	
Anschlüsse / Connectors	[Ω]	75, BNC-Buchse/ BNC-Female	
Bitrate	[Mbit/s]	213, max.	
Netzwerk-Schnittstellen Network interfaces			
Schnittstellentyp / Interface type		1000 Base-T Ethernet	
Protokoll / Protocol		IEEE 802.3 Ethernet, RTP, ARP, IPv4, TCP/UDP, HTTP, SNTP, IGMP	
Anschluss / Connector		2 x RJ 45	
Absolute Bitrate / Total bit rate	[Mbit/s]	700, max.	
Ethernet MTU-Länge MTU length	[bytes]	1500, max.	
Transportstrombearbeitung Stream processing			
TS Kapselung / TS Encapsulation		UDP, UDP+RTP, 1-7 packets per Ethernetframe	
Transportstrombearbeitung Stream processing		Transparent (188 oder/or 204 packets)	
FEC		ProMpeg FEC COP3 (SMPTE 2022-1)	
TS Analyzer		Optional	
Steuerung und Management Control and management			
Typ / Type		10/100 Base-T Ethernet	
Eigenschaften Features		Steuerung über HTTP/WEB, Element control through HTTP/WEB	
Protokoll Protocol		HTTP, SNMP (Fehlermeldungen / error messages)	
Anschlüsse / Connectors		2 x RJ 45	
Allgemeine Daten Common data			
Eingangsspannung Input voltage	[VDC]	230 V	-48 V
Abmessungen / Dimensions		1 HE / 19" / 1 RU / 19"	
zulässige Umgebungstemperatur Temperature range	[°C]	0 … + 50	

Technical improvements, changes to the design and errors excepted.