

DVB for ALL!

TROPHY



DATA-SHEET

CABLE TV

HD&UltraHD TROPHY HEAD-END

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INTRODUCTION

TROPHY CABLE TV HEAD-END is a high-tech, based on know-how, cost-effective business solution. In particular, it helps customers take full advantage of digital TV.

Design of HEAD-END is very simple due to using of IP connection between modules.

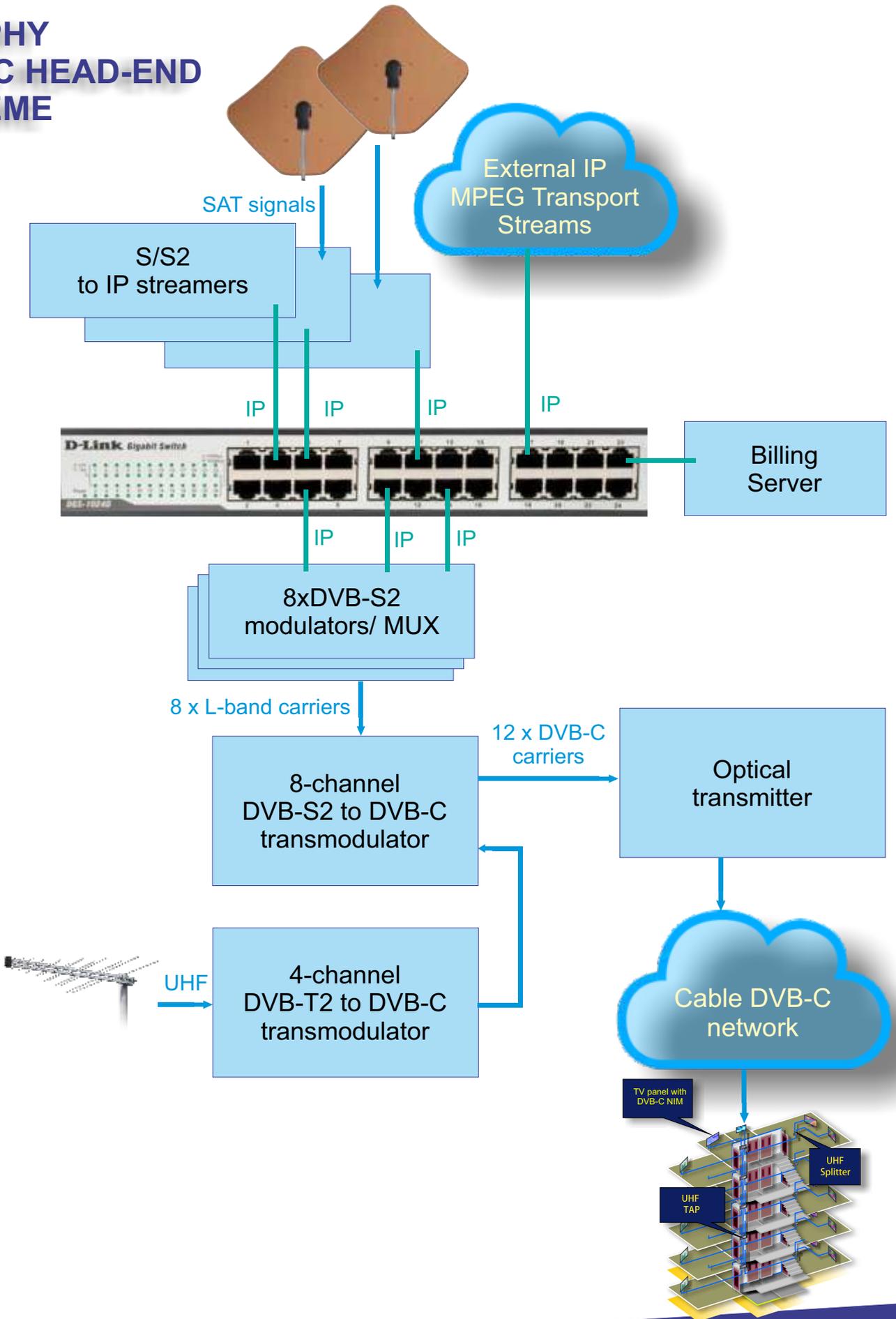
Heart of system is low-cost and high-efficient DVB-S2 Modulator / 120ch Multiplexer.

Almost all the major HEAD-END components are based on the Linux software. For example, the streamers, the demultiplexers, the modulators/multiplexers - all this, in the long run, are Linux computers. From this fact derives the main advantage of the HEAD-END, namely the fact that due to the constant improvement of the software we allow all our customers to respond quickly to the demands of time.

The HEAD-END is the part of a complete system of commercial broadcasting, which the TROPHY company offers its customers. The Billing System, the Conditional Access System and the Set-Top-Boxes allow our customers to get out "turnkey" broadcasting business.

Trough the use of modern electronic FPGA components and original software solutions the cost of the equipment is one of the lowest in the market.

TROPHY DVB-C HEAD-END SCHEME



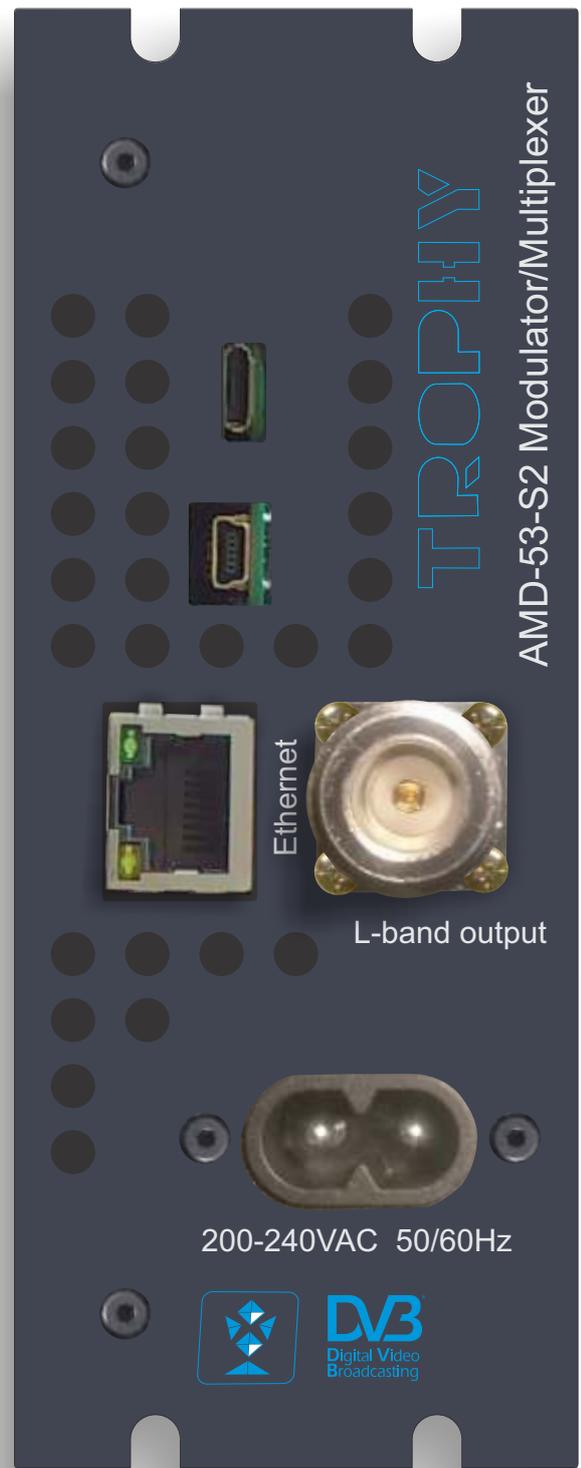
HEAD-END SCHEME

AMD-53-S2

DVB-S2 MODULATOR / 120-CHANNEL MULTIPLEXER

Part No. 1001-1016

AMD-53-S2 MODULATOR/ MUX



GENERAL INFORMATION

- AMD-53-S2 DVB-S2 MODULATOR / MULTIPLEXER is a brand new modulator/multiplexer designed for applications in full compliance with DVB-S2 standard.
- AMD-53 is using as IP multiplexer for Cable Head-end. TROPHY-ACCESS CAS is embedded into AMD-53 module.
- The AMD-53-S2 DVB-S2 MODULATOR / MULTIPLEXER converts transponders included IP or ASI (optional) transport stream into QPSK/8PSK signal to transmit them in satellite transmitter or MVDS Block UP Converter (BUC).
- DVB-S2 carrier from available up to 120 transport streams are multiplexed and generated. The internal processing allows the output of DVB signals in full HD resolution.
- The device receives a data stream via Gigabit Ethernet or ASI (optional). It can receive up to 120 transport streams from the TROPHY HeadEnd or from another IP sources included MPEG transport streams.
- A high-performance FPGA does the analogue TV modulation and the freely adjustable up-conversion into L-band range (950 ... 2150MHz). A high-speed digital→analogue converter (DAC) is responsible for the excellent output signal.

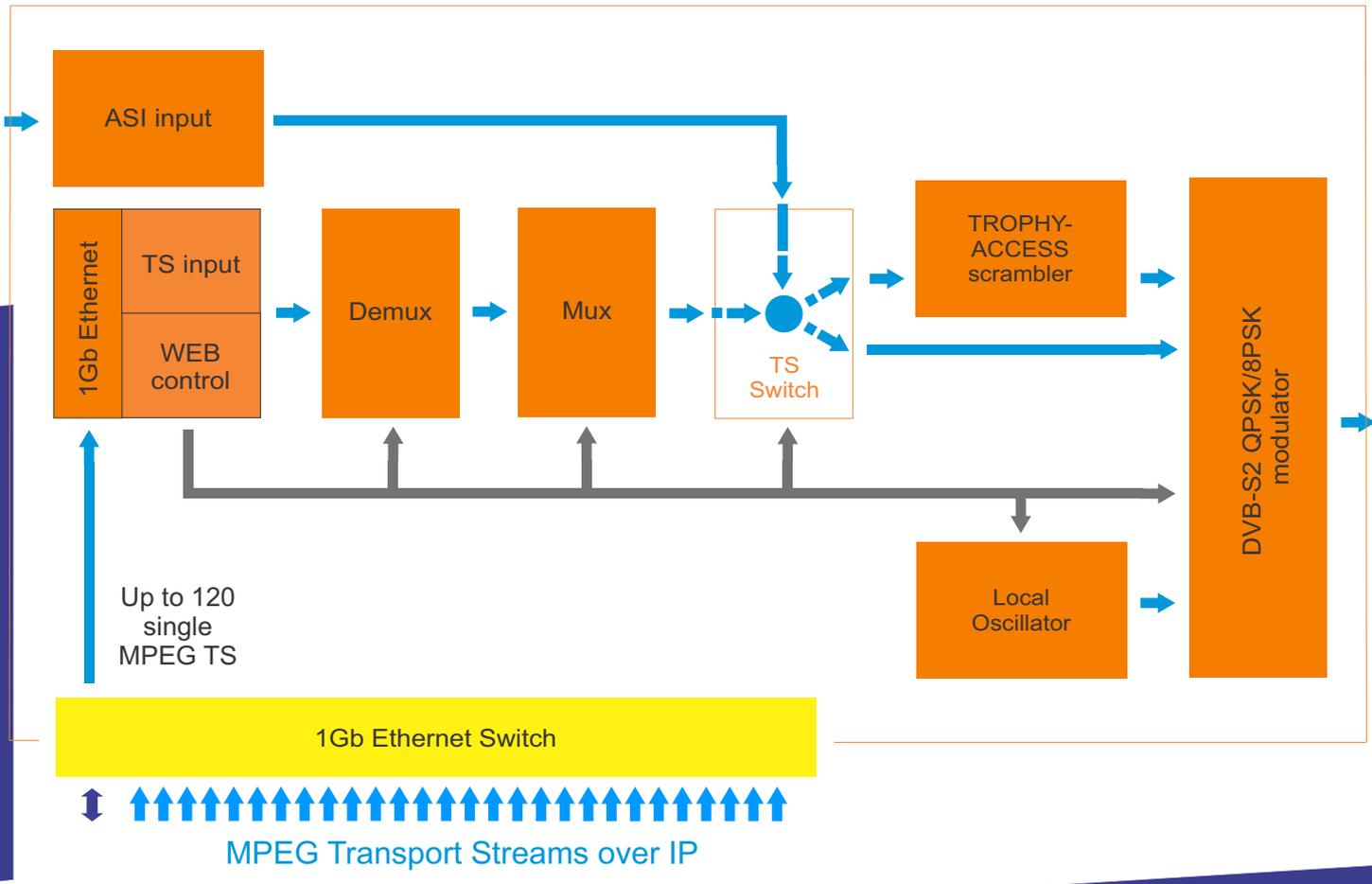


MAIN FUNCTIONS OF AMD-53-S2 MODULATOR / MULTIPLEXER:

- covers the full L-Band range (950...2150 MHz) and offers bit rate from 2 Mbps up to 100 Mbps;
- provides up to 120 independent multiplexed MPEG transport streams to a single carrier, with built-in support for TROPHY-ACCESS Conditional Access System for content protection. Software license to enable TROPHY-ACCESS scrambler solution;
- takes full advantages of the IP technology to provide a cost effective, highly reliable and flexible solution;
- has highly efficient multiplexing algorithms with PCR correction;
- provides transport Stream rates up to 100 Mbit/s;
- supports all PIDs of input services, including EIT;
- supports Full PID remapping;
- provides effective compensation of network jitter;
- supports Control and Set-Up via WEB-interface;
- has high performance and reliability.

AMD-53-S2 MODULATOR/MULTIPLEXER integrates the CycloneV core technology required to perform high quality modulation based on TROPHY expertise. It provides customers with a best in class performance, providing a high SNR value, excellent shoulder levels and lowest phase noise.

AMD-53-S2 MODULATOR / MULTIPLEXER provides a high performance channel spectrum. This results gives an efficient transmission in QPSK and 8PSK modes. The user-friendly Embedded Web Browser ensures ease of use and enables full configuration of the modulator and multiplexer, including signal input management, selection of modulation type, control of the mute/unmute conditions for the RF output signal, PIDs filtering&remapping and PCR correction. WEB-interface also offers monitoring of all input streams.



AMD-53-S2 MODULATOR/ MUX

INSTALLING AND OPERATING INSTRUCTIONS

SAFETY INSTRUCTIONS

When assembling and commissioning the AMD-53-S2 MOD/MUX and executing the settings, always follow the accompanying instructions exactly.

The devices are not to be assembled and brought into use by anybody who is not an authorised technician.

When components are being installed in areas where reception is important, ensure that EMC regulations are observed.

All assembly, installation and cable connection must take place when no electricity has been connected.

The provisions of DIN EN 50083 must be observed at all times when working with the equipment. In particular, DIN EN 60728-11 regarding safety may on no account be ignored.

GENERAL DESCRIPTION OF FUNCTIONS

The device is transport stream multiplexer and DVB-S2 modulator. With them the user's own digital program "bouquets" in the DVB-S2 carrier can be produced. The output signal are provided via RF-output and configurable by IP interface. The signal can be broadcast or fed into the MVDS or satellite TV network. Depending on the application, the device are pre-configured by hardware. Using the integrated user interface, the operating parameters can be varied within wide limits. Deliveries are made with the following configurations/ device versions:

Features	Part No.																
	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	
IP input only	+	+	+	+				+	+	+	+						
IP+ASI inputs					+	+	+	+					+	+	+	+	
TROPHY-ACCESS CAS	+	+	+	+	+	+	+	+									
EPG (EIT) supporting	+		+		+		+		+		+		+		+		
950-2150MHz output	+	+			+	+			+	+			+	+			
IF 70MHz output			+	+			+	+			+	+			+	+	

Up to 120 input elementary transport streams are multiplexed at device and inserted into the output DVB-S2 carrier with maximum bit rate of 100 Mbps and is transmitted via the N-type connector.

The output signal contains all the tables necessary to the program and associated services (PAT, PMT, SDT, NIT and TDT). Part No.1001,1003,1005...1015 supports EPG (EIT tables) too.

MULTIPLEXER/REMULTIPLEXER/PID FILTER

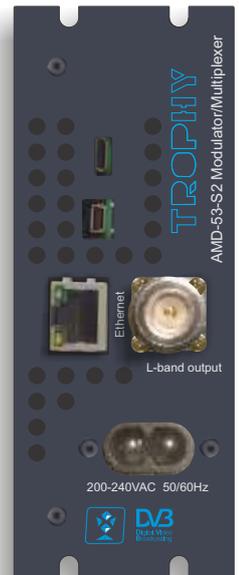
A multiplexer has been integrated into the AMD-53-S2 device for processing the incoming transport streams. On condition that in these transport streams an adequate transmission rate is available, or additional transport volume is achievable by raising the transport streams bit rate, new services and/ or program components can be added.

PID filtering is enable in case of IP-input mode only. A raw MPEG Transport Stream consists data of all the services transmitted on a particular transponders. The task on the remux/mux side is to filter out the interesting packets and schedule them to their target DVB-S2 carrier.

MPEG TS packets are identified by the Packet ID, the PID. This is a 13-bit number located in the 2nd and 3rd byte of a TS packet.

INSTALLING FUNCTIONAL ELEMENTS AND FACTORY SETTINGS

Explanation of the functional elements:	
Power (green LEDs scale)	Switched ON, 30 sec after power restart
Input stream + WEB interface	Ethernet RJ-45, 10/100/1000, UDP
L-band output	N-type connector
200-240 VAC 50/60Hz	SCZ-20 connector



Factory settings:	
IP address:	10.10.10.20
User/password	admin / admin
IP netmask:	255.255.255.0
IP gateway:	0.0.0.0
SNMP trap (IP):	0.0.0.0
System section	
Input mode:	IP-MUX
Scrambler:	Enabled (Part No. 1001-1008)
EPG support	Enabled (Part No.1001,1003,1005 etc up to 1015)
Billing Server:	
PSR Restamping:	Enabled
Inputs section	
Protocol/Port:	UNICAST UDP:1234
SI generator section	
Provider name:	no name
Transport Stream ID:	2
Original Network ID:	4
TDT generator:	ON
Auxiliary SI Port:	901
Modulator section	
Output Frequency (MHZ)	1000
Symbol Rate (kSpS)	14400
Modulation – FEC	8PSK 3/4
Roll-off	0,25
FEC Frame length	Normal
Pilot tone	off
Spectrum inversion	off
Output attenuation (dB)	-3.5

AMD-53-S2 MODULATOR/ MUX

SETTINGS FOR THE ETHERNET NETWORK INTERFACE

Allocation of IP address, default : 10.10.10.20

One-time at the start an IP address via a DHCP server is requested. If the probe fails, will use the default IP address. The default IP address is used.

IP-Address: [0.0.0.0 ... 10.10.10.20 ... 255.255.255.255]

A default IP address for the case that "use DHCP" is set to "OFF", or no DHCP server could be reached.

IP-Subnetmask: [0.0.0.0 ... 255.255.255.0 ... 255.255.255.255]

The mask corresponding to the IP address.

IP-Gateway: [0.0.0.0 .. 255.255.255.255]

A default IP address for the device to a possibly active exploitation of a gateway in the network.

SNMP Trap IP-Addr: [0.0.0.0 .. 255.255.255.255] IP address to a possible used SNMP trap manager.

The screenshot shows a configuration menu with tabs for System, Network, Inputs, Programs, SI Generator, NIT Generator, and Output. The 'System' tab is active, displaying the following settings:

- Serial No: 0x12345678
- Hardware ID: 0x0102
- SW / FW version: 2.03 / 2.03 build 880
- Input mode: IP->MUX
- Billing server: Server address
- PCR Restamping: Enabled

At the bottom, there are buttons for 'Backup', 'Restore', 'Add key', 'Change password', and 'Accept'.

Default Username: **admin**

Default password: **admin**

It is recommended to change the password for confidential.

SSH access.

The MODULATOR/MUX uses the Linux Debian 8 OS. In order to be able to access the Linux configuration on the SSH connection install the PuTTY program on your computer. Indicate follow options into PuTTY menu:

Host Name: 10.10.10.20

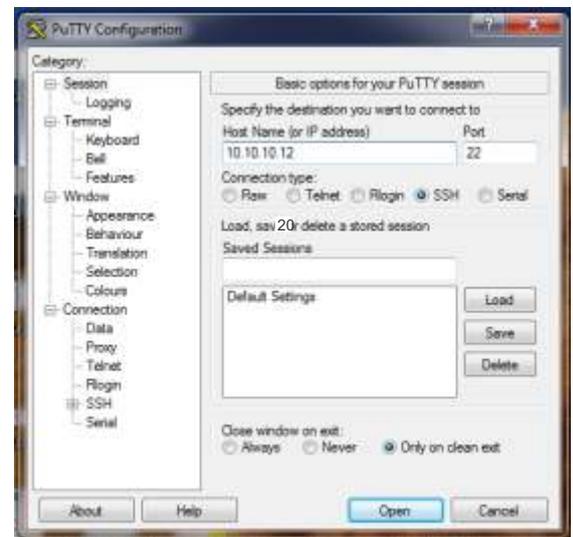
Port: 22

Connection type: SSH

Login: root

Password: trophy

It is recommended to change the password for confidential.



passwd [ENTER]

Enter new UNIX password:***** [ENTER]

Retype new UNIX password:***** [ENTE

wwwpasswd commands is using for add, delete and change of Users and Passwords of WEB-interface.

wwwpasswd -h help menu

wwwpasswd -a add user

wwwpasswd -d delete user

For more details reads LINUX OS manual.

System	Network	Inputs	Programs	SI Generator	NIT Generator	Output
		IP address	<input type="text" value="10.10.10.20"/>			
		Subnet mask	<input type="text" value="255.255.255.0"/>			
		Default gateway	<input type="text" value="10.10.10.1"/>			
		DNS Server1	<input type="text" value="8.8.8.8"/>			
		DNS Server2	<input type="text" value="8.8.4.4"/>			
		NTP Server	<input type="text" value="0.debian.pool.ntp.org"/>			
		<input type="button" value="Save and reboot"/>				

Network Time Protocol (NTP) is a networking protocol for clock synchronization between computer systems over IP. NTP is intended to synchronize all participating computers to Coordinated Universal Time (UTC). You must specify the URL of NTP Server that will synchronize the current time, which will be indicated in the **Time and Date Table (TDT)** and on the subscribers set-top-boxes.

TDT provide a time reference for the stream. The TDT contains the current UTC time. The Modulator/MUX does not have its own real-time clock. Therefore, if you turned "ON" the function of forming TDT (in SI GENERATOR menu, see page No.13), then you need to provide a connection to the Internet.

CONFIGURATIONS VIA THE ETHERNET INTERFACE

If it is necessary to change the basic configuration, the particular HTML user interface must be called up on a computer connected to the device(s). All the settings can be made via Internet Browser. How the user interface works is almost self-explanatory. Any special features of use will be explained in the following chapters.

To use all functions of the device by WEB-interface activate Java Script in your browser settings. Network connection to the computer System requirements: - PC/ laptop with 10/100/1000 Mbit Ethernet interface - any Internet browser, capable JAVA script (Google Chrome is recommended). The device has to be connected to PC network using an Ethernet cable. The default IP address of the device is 10.10.10.20. In order to access the WEB interface of the device from a PC, the PC has to be in the 255.255.255.0 subnet. If multiple devices are connected to the same network each device must be set to its own unique IP address to avoid address conflicts. After these settings, the IP address of the PC has to be adjusted to match the network.

CONNECTION SETUP

When the IP address for the device has been entered into the address field of the browser, a connection will be made to the relevant device and the appropriate SYSTEM window will be displayed.

There are two options for the menu, depending on the choice of the INPUT MODE line:
IP MODE or **IP->MUX MODE**.

The multiplexer function is not used when the **IP INPUT MODE** is selected. The transport stream is fed to the modulator output unchanged.

The screenshot shows a web interface with a navigation bar at the top containing 'System', 'Network', 'Inputs', and 'Output'. The 'Network' tab is active. Below the navigation bar, there are several configuration fields:

- Serial No:** 0x12345678
- Hardware ID:** 0x0102
- Input mode:** IP (highlighted with an orange circle)
- Billing server:** Server address
- PCR Restamping:** Enabled

At the bottom, there is a 'System configuration' section with four buttons: 'Backup', 'Restore', 'Add key', and 'Change password'. Below these buttons is a green 'Accept' button.

SERIAL No. is unique for each device. This number must be specified when ordering an additional SW licenses.

BACKUP. You can save all settings of the device as a backup.json file.

RESTORE. You can upload a backup.json file to change the device configuration.

ADD KEY. You have the opportunity to make an additional order for the TROPHY-ACCESS license. The received key must be entered after pressing the ADD KEY button.

The multiplexer function is available when the **IP->MUX INPUT MODE** is selected. The transport stream is fed to the modulator output through 120-channel multiplexer.

The screenshot shows a configuration window with the following elements:

- System configuration** section with fields:
 - Serial No: 0x12345678
 - Hardware ID: 0x0102
 - Input mode: IP->MUX (highlighted with an orange circle)
 - Billing server: Server address
 - PCR Restamping: Enabled
- System configuration** buttons: Backup, Restore, Add key, Change password
- Accept** button

SERIAL No. is unique for each device. This number must be specified when ordering an additional TROPHY-ACCESS license.

SCRAMBLER function is working if TROPHY-ACCESS license added.

The license can be included in the factory in case of prior order. Otherwise, the license can be installed by entering the text key received from the manufacturer after confirming the license order.

BILLING SERVER address can be specified if a TROPHY-ACCESS scrambled signal is at the modulator/multiplexer output. In this case, the subscription information (list of included decoders and rights to view of program packages) should be present in the stream.

PCR RESTAMPING (PCR - Program Clock Reference)

Synchronization of the receiver System Time Clock (STC) with the transmitter STC depends on transmitting PCRs through a constant-delay portion of the system. Thus, PCRs are inserted following the encoder buffer and extracted before the receiver buffer. PCRs are inserted with a maximum interval of 100ms.

Synchronization can be adversely affected by transmission over links having a variable delay or time jitter (IP transport, for example), and the accuracy of clock recovery must be studied if such an application is contemplated.

PCRs are also affected by the multiplexing of multiple program streams. In this case, there is additional buffering in the multiplexer, and it may become necessary to re-stamp the PCR values of data that is transmitted earlier or later than expected. Although the MPEG standards provide the means to maintain synchronization in this case, they do not specify the jitter limits, suggesting only that it is "intended" to be +/-4 ms maximum in a well-designed system.

INPUTS

The 120 possible logical stream channels can be defined as a multi-program stream or single program stream and can be operated according to the IP address space specified in multicast mode or unicast.

In the first step, the IP address, netmask and gateway address of stream sources are assigned to the ETHERNET interface for using in the local network. And Port number of streams are individualized! The SOURCE settings can be made separately for each stream channel. The port number must be unique and can not be repeated! After the source of the transport stream has been connected to the ETHERNET switch of the local network, you must press the “+” button and enter the port number of source. The information about the number of programs found on a specific port is displayed in the “Programs” column. In the event that there is no correct transport stream on any port, the icon with a rotating scale is displayed in the “Programs” column. Check the correspondence between the port number and the network parameters of the source and modulator input!

IP-INPUT mode (without DEMUX/MUX processing). The data enters the modulator without any preliminary processing. In this mode, data is received from only one port, except for specific cases.

System Network **Inputs** Programs SI Generator NIT Generator Output Unicast packets receiving

Protocol	[Address:]Port	Programs	
UDP	1234	26	

Add source

Protocol:

Port:

Multicast:

System Network **Inputs** Programs SI Generator NIT Generator Output Multicast packets receiving

Protocol	[Address:]Port	Programs	
UDP	1234	26	
UDP	239.0.0.1:12345		

Add source

Protocol:

Port:

Multicast:

Multicast addr:

AMD-53-S2 MODULATOR/ MUX

IP->MUX mode (with DEMUX/MUX processing). The data enters the modulator via preliminary processing. In this mode, data is received from one or several ports.

Unicast packets receiving

Protocol	[Address:]Port	Programs
UDP	1234	26
UDP	12345	1

Multicast packets receiving

Protocol	[Address:]Port	Programs
UDP	1234	26
UDP	239.0.0.1:12345	1

AMD-53-S2 MODULATOR/ MUX

PROGRAMS

Program name: The program name is the service designation. By default, for each program, the program name will be automatically generated, which coincides with the name specified in the incoming thread. You can change the name to another one.

These names will be displayed in the table of the receiving devices. They must be unambiguous.

SID	Program name	Type	Port:SID	Rate Mbit/S	
8150	BBC World	1 (TV)	1234:1	2.201	
8180	CNN	1 (TV)	1234:2	2.203	
8170	Euronews	1 (TV)	1235:1	2.403	
8180	1+1	1 (TV)	1235:18	4.991	
8190	Eurosport	1 (TV)	1235:8	2.403	

The position information that was specified in the configuration will form the basis for the allocation of PID Service IDs in ascending order. You can change program names, A PID, VPID, SID and TYPE OF PROGRAM (1-TV, 2-Radio, 3-Teletext, 4-Unknown).

VPID and PCR-PID has a same value.

You can change TROPHY ACCESS mode also (FTA, Type1, Type2, Type3).

The multiplex contains a number of different services, where each service contains at least one audio stream, at least one video stream and usually several data streams. You must to indicate the type of the stream (some can't be identified by the software in this case) and the SID number that is the number of the service (or program).

Secondly, you must indicate the PID value for each elementary stream. It's normally good practice to give elementary streams belonging to the same service similar PID values. That way, it's easy to identify which service a given stream belongs to.

The SID/ PID for the slots configured (the programs and channels) is automatically allocated according to a fixed pattern.

If you purchased an additional EPG software license, you can select the source of the EIT (EPG):

- the original EIT from the satellite;
- not present;
- the information from an external EIT server.

AMD-53-S2 MODULATOR/ MUX

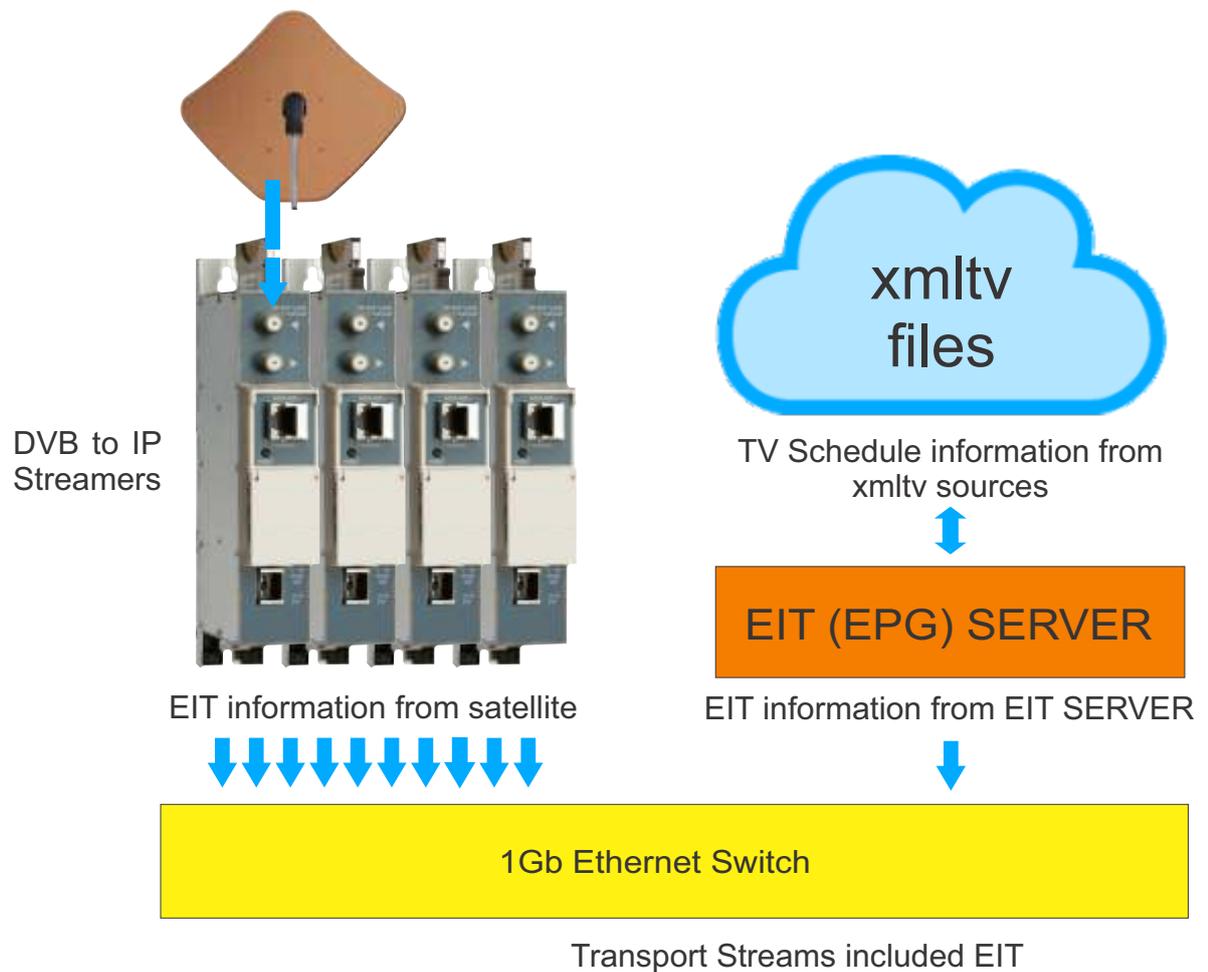
EIT (EPG) Server

Basically, the EIT tables are present in satellite broadcasting. The AMD-53 modulator/multiplexer processes this information and transmits it to the output stream. In order to use the satellite program tables, it is necessary to specify the ORIGINAL (FROM PROGRAM SOURCE) mode.

If there is no EIT information from the satellite and you do not accept this information from external resources, it is necessary to specify NOT PRESENT mode.

In case of using the TROPHY EIT (EPG) SERVER you must select the PRESENT + SCHEDULE mode.

In the case of using other EIT servers, you must specify the mode corresponding to this server.



AMD-53-S2 MODULATOR/ MUX

TROPHY EIT (EPG) SERVER free software is provided to customers upon request.

Software is provided for Windows and Linux Operating Systems.



Configuring the server settings is done using the configuration file.
The configuration file structure is indicated below:

- `<config>`
`<xml-dir>Work</xml-dir>` ← Pass to directory contained xmltv file(s) (mandatory)
- `<syslog>LOCAL0@10.10.10.1</syslog>` ← Address of syslog server (optional)
- `<stub-prefix>Program of</stub-prefix>` ← "Program of XXXXX" is EIT text in case of absent information from source
- `<mux ip="10.10.10.20">` ← IP Address of AMD-53 modulator/multiplexer

Name of program
into xmltv file



SID of program
into output MUX



Name of program
into output MUX



```
<channel id="prog00"><sid>10</sid><display-name>MUSIC BOX Ukraine</display-name></channel>
<channel id="prog01"><sid>20</sid><display-name>MTV</display-name></channel>
<channel id="prog02"><sid>30</sid><display-name>BBC</display-name></channel>
<channel id="prog03"><sid>40</sid><display-name>CNN</display-name></channel>
</mux>
```

```
<mux ip="10.10.10.21">
<channel id="prog10"><sid>10</sid><display-name>ITV</display-name></channel>
<channel id="prog11"><sid>20</sid><display-name>HBO</display-name></channel>
<channel id="prog12"><sid>30</sid><display-name>TV1000</display-name></channel>
<channel id="prog13"><sid>40</sid><display-name>Hustler</display-name></channel>
</mux>

</config>
```

XMLTV File Format

The format used differs from most other XML-based TV listings formats in that it is written from the user's point of view, rather than the broadcaster's. It doesn't divide listings into channels, instead all the channels are mixed together into a single unified listing. Each programme has details such as name, description, and credits stored as supplements, but metadata like broadcast details are stored as attributes. There is support for listings in multiple languages and each programme can have 'language' and 'original language' details.

The XMLTV File Format was originally created by Ed Avis, and is currently maintained by the XMLTVProject.

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<!DOCTYPE tv SYSTEM "xmltv.dtd">

<tv source-info-url="http://www.schedulesdirect.org/" source-info-name="Schedules Direct" generator-info-name="XMLTV/$id: tv
  <channel id="I10436.labs.zap2it.com">
    <display-name>13 KERA</display-name>
    <display-name>13 KERA TX42822:-</display-name>
    <display-name>13</display-name>
    <display-name>13 KERA fcc</display-name>
    <display-name>KERA</display-name>
    <display-name>KERA</display-name>
    <display-name>PBS Affiliate</display-name>
    <icon src="file:///C:/Perl/site/share/xmltv/icons/KERA.gif" />
  </channel>
  <channel id="I10759.labs.zap2it.com">
    <display-name>11 KTVT</display-name>
    <display-name>11 KTVT TX42822:-</display-name>
    <display-name>11</display-name>
    <display-name>11 KTVT fcc</display-name>
    <display-name>KTVT</display-name>
    <display-name>KTVT</display-name>
    <display-name>CBS Affiliate</display-name>
    <icon src="file:///C:/Perl/site/share/xmltv/icons/KTVT.gif" />
  </channel>
  <programme start="20080715003000 -0600" stop="20080715010000 -0600" channel="I10436.labs.zap2it.com">
    <title lang="en">NOW on PBS</title>
    <desc lang="en">Jordan's Queen Rania has made job creation a priority to help curb the staggering unemployment rates amo
    <date>20080711</date>
    <category lang="en">Newsmagazine</category>
    <category lang="en">Interview</category>
    <category lang="en">Public affairs</category>
    <category lang="en">Series</category>
    <episode-num system="dd_progid">EP01006886.0028</episode-num>
    <episode-num system="onscreen">427</episode-num>
    <audio>
      <stereo>stereo</stereo>
    </audio>
    <previously-shown start="20080711000000" />
    <subtitles type="teletext" />
  </programme>
  <programme start="20080715010000 -0600" stop="20080715023000 -0600" channel="I10436.labs.zap2it.com">
    <title lang="en">Mystery!</title>
    <sub-title lang="en">Foyle's War, Series IV: Bleak Midwinter</sub-title>
    <desc lang="en">Foyle investigates an explosion at a munitions factory, which he comes to believe may have been premedit
    <date>20070701</date>
    <category lang="en">Anthology</category>
    <category lang="en">Mystery</category>
    <category lang="en">Series</category>
    <episode-num system="dd_progid">EP00003026.0665</episode-num>
    <episode-num system="onscreen">2705</episode-num>
    <audio>
      <stereo>stereo</stereo>
    </audio>
    <previously-shown start="20070701000000" />
    <subtitles type="teletext" />
  </programme>
```

SI GENERATOR

Service information is a special set of elementary streams that contain a set of database tables describing the structure of transport stream, the services within it and some useful information that digital TV receivers can show the user, such as the name of the service and schedule information for the services. These tables are collectively known as Service Information (SI). Every DVB transport stream has some service information that the MPEG standard declares mandatory.

System	Network	Inputs	Programs	SI Generator	Modulator
				Transport Stream ID	<input type="text" value="2"/>
				Original Network ID	<input type="text" value="4"/>
				Provider Name	<input type="text" value="Trophy"/>
				TDT generation	<input type="text" value="On"/>
				Auxiliary SI Port	<input type="text" value="901"/>
				<input type="button" value="Accept"/>	

Every service in a DVB network can be uniquely identified by three values. These values are the Original Network ID (the ID of the network that originally broadcast the service), the Transport Stream ID (to identify a particular transport stream from that network) and a Service ID to identify a service within that transport stream.

Transport stream identification (TS-ID): Unique identification of the transport stream is generated. The TS ID can be any number between 1 and 65 535.

Original Network ID [1..65535]. Information to identify the origin.

Time and Date Table (TDT) provide a time reference for the stream. The TDT contains the current UTC (Universal / GMT) time. The device does not have its own real-time clock. Therefore, if you turned "ON" the function of forming TDT, then you need to provide a connection to the Internet or to a real-time server. You must specify a server name that will synchronize the current time in the NETWORK menu (see page No.6). If this option is not available, you must set "OFF" value in the TDT GENERATION line.

In multiplexer mode, the device automatically generates the following service tables:

Program Association table (PAT) - defined by the MPEG standard. The Program Association Table is the fundamental table for service information. It describes which PID contains the Program Map Table for each service (see below) as well as the Network Information Table for the transport stream in those networks that use it.

Program Map Table (PMT) - defined by the MPEG standard. The Program Map Table is the table that actually describes how a service is put together. This table describes all the streams in a service, and tells the receiver which stream contains the MPEG Program Clock Reference for the service. The PMT is not broadcast on a fixed PID, and a transport stream will contain one PMT for each service it contains.

Together, the PAT and PMT are known as Program Specific Information (PSI) and are defined by MPEG. All other tables are specific to DVB systems.

Service Description Table (SDT)

The Service Description Table gives more user-oriented information about services in a transport stream. Unlike the PMTs, there is only one SDT in a transport stream, and that contains the information for every service. The SDT typically contains information such as the name of the service, the service ID, the status of the service (e.g. running/not running/starting in a few seconds) and whether the service is scrambled or not.

NIT GENERATOR

Network Information Table (NIT) conveys information relating to the physical organization of the multiplexes carried via a given network, and the characteristics of the network itself. The combination of `original_network_id` and `transport_stream_id` allow each TS to be uniquely identified throughout the ETS application area. Networks are assigned individual `network_id` values, which serve as unique identification codes for networks. In the case that the NIT is transmitted on the network on which the TS was originated, the `network_id` and the `original_network_id` shall take the same value.

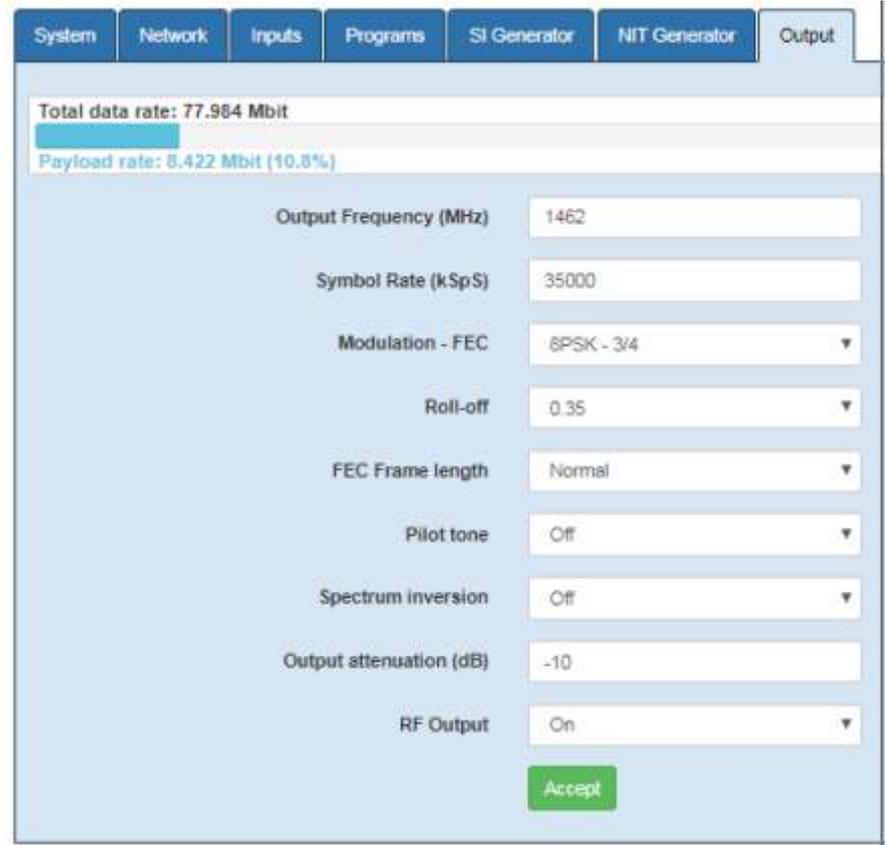
NIT generator supports the NIT transitions between delivery media boundaries, e.g. from satellite to cable or terrestrial systems. IRDs may be able to store the NIT information in non-volatile memory in order to minimize the access time when switching between channels ("channel hopping"). It is also possible to transmit a NIT for other networks in addition to the actual network.

Type	TS Id	Net Id	Frequency	S.Rate/BW	Modulation/ Constellation	FEC/Coderate	Other params	
sat	2	1	11300	30000	8PSK	3/4	RollOff:0.25 Position:E4.9 V	
cab	2	2	474	6900	128QAM			
ter	2	3	474	8MHz	64QAM	HP:2/3 LP:5/8	TxMode:8K Guard:1/32 Prio:Low, Native:leave	

MODULATOR PARAMETERS

In this menu you need to specify the parameters of the output carrier:

- Output frequency up 900 to 2150MHz;
- Symbol Rate up 1000 to 30000 kSymb per Second
- Modulation/FEC QPSK: 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
8PSK: 3/5, 2/3, 3/4, 5/6, 8/9, 9/10
- Roll-off 0,2 ; 0,25 ; 0,35
- FEC Frame length Normal/short
- Pilot tone On/off
- Spectrum Inversion On/off
- Output attenuation up to -31.5
- RF output On/Off



The actual bitrate at the output of the modulator is displayed as a blue scale at the top of the menu. Free capacity of the transponder is filled with zero packets if the subscription data does not come to the modulator from the billing server. The capacity occupied by zero packets is indicated in the form of a gray scale.



Free capacity is filled with subscription packages if the billing server sends TROPHY-ACCESS CAS data to the modulator. The efficiency of data transmission is maximum. The capacity that the subscription data occupies is indicated in the form of a yellow scale. Thanks to this technology, the CAS data transmission efficiency is maximum.



AMD-53-S2 MODULATOR/ MUX

SPECIFICATIONS	
Standards	
Carrier ID	ETSI 103 129
DVB-S2	EN 302 307
MPEG-TS	EN 301 210
DVB MPEG-TS over ASI	EN50083-9; ETSI TR 101 891
DVB MPEG-TS over IP	ETSI TS 102 034
MPEG-2 PSI Tables (PAT,PMT,NIT etc)	EN 300 468 (additional license for EPG table)
IP input	
Stream port + WEB interface	Ethernet, 10/100/1000 Base-T
Connector	RJ-45
Streaming protocol	UDP, Unicast/Multicast
Streaming mode	CBR/VBR
Encryption 0,25 to 120Mbps	TROPHY-ACCESS (additional license)
RF Output	
L-Band	900MHz to 2150MHz, 10kHz step
SNR	> 40dB @ 0dBm – 16APSK – 30Mbaud
Shoulders rejection	< -50dB @ 0dBm & f/fN=1,5 for 20% roll-off
Main RF output	N Type, 50Ohm
Attenuation range	0dBm to -31.5dBm, 0,1dB step

Multiplexer	
Quantity of multiplexed channels	up to 120
PID quantity supported	All PIDs of input services
Modulation	
DVB-S2	QPSK: 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
	8PSK: 3/5, 2/3, 3/4, 5/6, 8/9, 9/10
Supported DVB modes	CCM: Constant Coding and Modulation
	VCM: Variable Coding and Modulation
	SeamlessACM: Adaptive Coding and Modulation
DVB-S2 frames	Short (16200), Normal (64800)
Pilots	On or Off
Variable symbol rate	From 1 to 30Mbaud, step 1Baud
Control & Monitoring	
	Web Browser Control & Monitoring
	10/100/1000 Base-T Ethernet ports
	90 to 240VAC/50Hz/15W
Physical	
	2kg Weight
	0°C to 50°C temperature range
TROPHY-ACCESS Options	
Type of CAS	FPGA based, doesn't match CSA algorithm
Size of the decoder address field	32 bits
Quantity of addressable decoder	4,294,967,295
The number of serviced channels	without any restrictions
The number of packets serviced	without any restrictions
Automatic decoder disconnection	with zero balances in the subscriber account
Individual addressable message	up to 120 characters

SUBS_SEND_V.2

subscription
management
software

SUBS_SEND SOFTWARE

GENERAL INFORMATION

The subs_send program is developed for subscription management. The subs_send program sends the necessary information to each modulator in the system. This program is ideal for small networks, for example, for pay-TV in the hotel. To manage subscription rights in these small networks, there is no need to install a professional billing system. It is enough for the administrator to make adjustments to the simplest text file named decoders.txt.

Sending of subscription information should be done after the modulator is turned on or restarted, and if the subscription is changed.

The program can be easily used for communication between a third-party billing software and the TROPHY-ACCESS CAS system.

You can get the subs_send program for free by going to the site:

http://dvb4all.com/?product=subs_send-subscription-management-program

and filling out a short questionnaire.

On the site you can download the source code of the subs_send program in the GO language.

Conditional access system (CAS) built into the modulator/multiplexer

In order for the TROPHY-ACCESS scrambling function to be available in the TROPHY modulator/multiplexer, you must purchase a special license:

<http://dvb4all.com/?product=software-license-to-enable-trophy-access-scrambler-solution>

After confirming the payment, a unique key, which is formed on the basis of the serial number of the your modulator/multiplexer, will send to the client. The serial number is indicated in the first line of the SYSTEM menu of WEB interface.

The screenshot shows the 'SYSTEM' menu configuration page. The 'Serial No' field is highlighted with an orange circle and contains the value '0x1C00000A'. The 'Add key' button is also highlighted with an orange circle. Other fields include Hardware ID (0x0102), Input mode (IP), Scrambler (Enabled), and Billing server (Server address). Buttons for Backup, Restore, Add key, and Accept are visible at the bottom.

After receiving the key you can input to the SYSTEM menu, click the "Add key" button and enter the key in the appeared window.

Modulators (streams) and groups

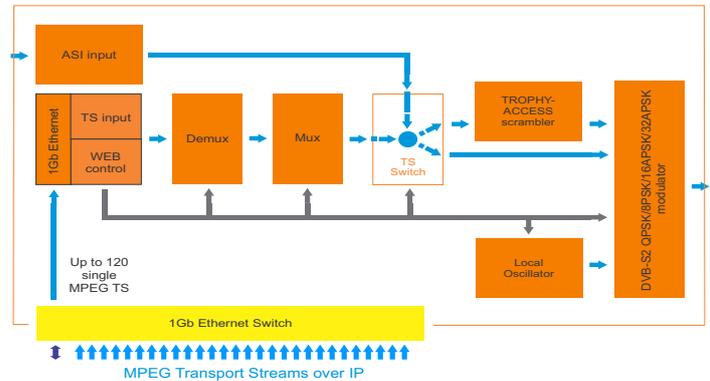
Modulators/multiplexers are grouped together. A group can have any number of modulators. Modulators belonging to the same group broadcast the same subscription. The system can have up to 10 groups with numbers 0 ... 9.



The belonging of modulators to groups is defined in the modulators.lst text file.

Each line describes one modulator in the form: modulator-ip-address: group-number.

The string to the right of the # character is a comment. Spaces are ignored.



Example

```

-----
# Example of the modulators.lst file.
# This is a comment
10.10.10.21: 0 # the modulator 10.10.10.21 (IP-address of modulator) belongs to the group 0

10.10.10.22: 0 # the modulator 10.10.10.22 belongs to the group 0

10.10.10.23: 1 # the modulator 10.10.10.23 belongs to the group 1

10.10.10.24: 2 # the modulator 10.10.10.24 belongs to the group 2
    
```

You determine to which group the modulator/multiplexer belongs based on the scheme of tariff plans and program viewing rights. When you install a Head-End with several modulators, you will need to plan which programs in which packages will be included, then distribute them over streams (modulators), subscription groups, etc. In the first step, simply assign group 0 to all modulators/multiplexers.

TROPHY-ACCESS CAS

The TROPHY-ACCESS CAS (Conditional Access System) developed without CSA algorithm, which ensures high reliability and lack of pirate viewing (named Cardsharing). Scrambler is performed within the hardware of the TROPHY MODULATOR/MUX.

The Billing server or SUBS_SEND subscription management software provides office. The decoder automatically switches off at a zero balance in the subscriber account number. Subscription data are fed to the AMD-53-S2 MODULATOR/MUX over Ethernet or ASI.

Options	
Type of CAS	Cardless, doesn't match CSA algorithm
Polynomial length	2048 bits
The size of the decoder address field	32 bits
Quantity of addressable decoders	4,294,967,295
The number of serviced channels	without any restrictions
The number of packets serviced	without any restrictions
Automatic disconnection of the decoder	with zero balances in the account
Individual addressable message	up to 120 characters

Enabling the scrambling mode

The modulator/multiplexer can transmit a programs in an FTA or scrambled form. In order for the program to become scrambled, you must:

- enable the scrambling function in the modulator. In the SYSTEM menu, in the SCRAMBLER line, specify the ENABLED mode;

The screenshot shows the 'Modulator' configuration page. The 'Scrambler' dropdown menu is set to 'Enabled'. An orange arrow points from the text in the list above to this dropdown menu. Other fields include Serial No (0x1C00000A), Hardware ID (0x0102), Input mode (IP), and Billing server (Server address). There are buttons for Backup, Restore, Add key, and Accept.

In the setting of program that you want to scramble, you need to specify that this program should be closed and select the encoding type in the CONDITIONALACCESS field (Type 1, Type 2 or Type 3). To do this, in the PRORGAMS menu, click the PROGRAM PROPERTIES icon in the line of the corresponding program.

SID	Program name	Type	In Address:Port:SID		
10	GEOSAT radio	1 (TV)	0.0.0.0:1234:8509		
20	ITV	1 (TV)	0.0.0.0:1234:8507		
30	BBC One	1 (TV)	0.0.0.0:1234:8508		
40	DW	1 (TV)	0.0.0.0:1234:8505		
50	KAVKASIA	1 (TV)	0.0.0.0:1234:8504		
60	RUSTAVI2	1 (TV)	0.0.0.0:1234:8501		
70	COMEDY	1 (TV)	0.0.0.0:1234:8502		
80	MARAO	1 (TV)	0.0.0.0:1234:8503		
90	Nat Geo Wild Europe	1 (TV)	0.0.0.0:12345:101		
100	BNT World	1 (TV)	0.0.0.0:12345:102		
110	Lucky Balls	1 (TV)	0.0.0.0:12345:201		
120	Dog Racing	1 (TV)	0.0.0.0:12345:202		
130	Virtual Football	1 (TV)	0.0.0.0:12345:203		

The modulator sends to the decoders the information about subscription that allows or prohibits the viewing of scrambled programs.

Program properties

SID: 30

Name: RUSTAVI2

Type: 1 (TV)

Conditional Access: FTA

Type	PID	Enabled
MP4 Video (PCR)	121	<input type="checkbox"/>
MP1 Audio (geo)	122	<input type="checkbox"/>

FTA
Type 1
Type 2
Type 3

Accept Cancel

Working with the subs_send program

The subs_send program is a console application, so you need to run it from the Windows console. You can create a command file and run it from the explorer:

Create a file called subs_send.cmd in any text editor, Notepad for example, with one line:

```
-----  
Subs_send_v2.exe -z 42 *  
* The version of the program compiled for the 42nd Geographical Zone.
```

Save this file in the directory where is subs_send_v2.exe. Run now subs_send.cmd

You can also create a shortcut to the subs_send_v2.exe program, then in the properties of this shortcut, in the "Target" field add -z 42 key.

subs_send_v2.exe should be run after you create the modulators.lst and decoders.txt files. This program sends over the network subscription data from the above files to modulators. If the modulator is restarted, the subs_send_v2.exe should be repeated, since subscription data is not stored on modulators. You should also sending (run the program) after making changes to the modulators.lst or decoders.txt files.

The subs_send_v2.src file that you want to download for free from the site should be created with the number of your geographic zone. In order for you to become acquainted with the program, an example program for Zone 42 is posted on the site.

In the archive there are two files collected with the zone No.42 by default, for Windows x32 and x64.

DVB_BILLING_V.5

subscriber accounting software

DVB_BILLING SOFTWARE

MAIN INFORMATION

DVB-BILLING Software and Statistics Billing

The DVB-BILLING program is designed to manage the subscriber base and manage subscriber decoders in large commercial broadcasting DVB networks.

The DVB-BILLING software comes with a Statistics Server. Depending on the sales order, the Statistics Server can be either the simplest (demo version) or the most complex, up to a group of servers assembled by cluster technology.

The main functions of the statistics server are:

- management of subscriber decoders;
- keeping records of subscribers' payments;
- feed to the EPG data stream;
- input of service information PAT, PMT, CAT, TSDDT, NIT, SDT, EIT, TDT (formed in full compliance with the specification EN 300 468) into the transport stream;
- creation of various reports on payments.

Additional functions of the Statistics Server are:

- As part of the TROPHY base station, the Server takes full control of the DB100, DB800 and DB800CI streamers. The data generated by the Statistics Server is sent to the streamers using the dvbserver program.

The program is launched as follows:

```
cd / dvbserver / bin
killall camserver
./camserver dvbX, where X is the stream number.
Repeat the sequence of commands on all threads.
```

- Displaying real-time monitoring data of the streamers;
- Integration of the Statistics Server with the system of bank payment terminals.

How is everything arranged inside?

The system is installed on the Linux OS Debian 4.0.

The main components of the system are located in the /opt directory. Firebird is database. The database is located /var/db. Some components of the system are located in the /home/palich/bin/ directory, namely:

- net_cam_server - the subscription server with its configuration camserver.conf file;
- the generator of service tables si_gen with its configuration file si_gen.conf;
- parser xmlTV files with TV program xmlreadEPG;
- scripts for updating programs and auxiliary files.

Main parameters of DVB-BILLING Subscribers Accounting Program

Interface Language	English, Russian
Number of channels served	No restrictions
Number of serviced packets	No restrictions
Number at a time served customers	No restrictions
Information about subscribers	Contract number, Date of Contract, name, phone, city, street, house, apartment, e-mail, notes
The ability to quickly add client decoder number and installation the required application for a certain period	Yes
Automatic addition of the Contract Date and Registration data after assigning the decoder number	Yes
Automatic decoder shutdown when zero balance on subscriber's account	Yes
When you make a payment, the program instantly makes money to the client on the account and shows on what number is paid.	In VIEW mode
Ability to perform a quick search of customers by any criterion specified in the search list	Yes
Ability to print reports	Yes
Ability to enter different tariffs	Yes
The possibility of temporary disconnection and automatic activation at a specified time	Yes
Types of reports:	For payments for the period, for services, for tariffs, for balance, for viewing channels, for disabled subscribers for a certain date
Sending address messages	Up to 120 characters
Automatic sending of address messages about the need to deposit money into the account	Yes
Interface type	WEB
Architecture type	Open

The Main Menu Review

Users	User List	View a list of subscribers with details, a list of decoders, a schedule for decoders, the current balance of the account, etc.
	Search	Search for a subscriber by one or more criteria of menu
	New	New subscriber registration.
	Change	Change the subscriber's credentials, assign it decoders, schedules for decoders, a price package for the decoder, send messages to the receiver.
	Delete	Removing a subscriber from the system. Completely and forever
Payments	Courses	System Accounting Rate
	Payments	Enter and edit payments for the current subscriber.
	Report	Report on the receipt of payments for the period.
Channels /Packets	Streams	Managing broadcasting streams list
	Channels	Managing the list of broadcast channels
	Streams<-Channels	Assignment of channels to broadcast streams
	Channels<-PIDs	Assignment of PIDs for broadcast channels
	Broad-casting	View the complete broadcast table for all streams
	Decoders	Managing the list of decoders
	Viewing	View the status of the decoder on the threads (debugging)
	Stat-Packet	View statistics of signed decoders by streams

The Main Menu review (continue)

Prices	Prices	Management of price policy. Management of the list of price packages.
	Prices<- Streams	Assignment to price packets of broadcast streams
	Viewing	Reserve
Installation	Users	Manage users, rights, regions, messages, EPG. Manage the list of users of the system, the assignment of filters for the division of the subscriber base, and the list of price packages. Change passwords.
	Groups	Manage the list of user groups.
	Rights	Assigning rights to users of the system.
	Regions	Manage the list of regions.
	Logs	Viewing and clearing the system log.
	Messages	View and delete messages sent to subscriber receivers.
	Broad- casting	List of broadcast channels with EPG, the number of EPG, events in the database and the date of the last EPG event.
	EPG	The EPG editor.
	Now in the Air	Displays the list of programs that are now on the air, broadcast channels with EPG events on these channels.

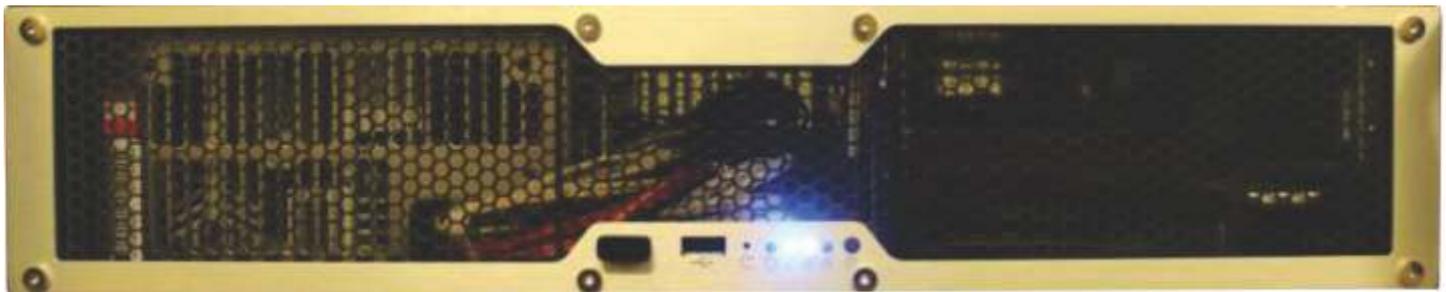
Main Menu Review (ending)

Reports	Who will be disabled	This report displays subscribers who will be disconnected by the system after 3 days (by default). The number of days before disconnection can be changed.
	Channels viewing	The report on viewing by subscribers of broadcast channels, for any period, by default - for today.
	Balance	Balance for current subscribers, account balance and credit.
	Balance 2	Extended balance for subscribers per month. If in the "Period" field is any date of the current month, the balance is issued as of now. If the "Period" field indicates a date for another month, a balance is displayed as of the last day of this month.
	Users	Report on the number of subscribers, switched off and registered decoders (by region).
	Services	Services for the current subscriber, for all decoders registered by him, per day, per period.
	Prices	Report on subscribers with their price packages and decoder numbers with the possibility of filtering by the price package and the region.
Quit		Sign Out

BILLING SERVER

The BILLING SERVER provides the data flow of EPG, PAT, PMT, CAT, TSDT, NIT, SDT, EIT, TDT service information (formed in full accordance with EN 300 468 specification) to the DSC-01 servers.

BILLING SERVER manages the 8PSK to IP STREAMERs and monitors the work of the 8PSK to IP STREAMERs. The BILLING SERVER data enter to the DSC-01 servers using *dvbserver* software.



Running of the program is as follows:

```
cd / dvbserver / bin
killall camserver
. / Camserver dvbX, where X - number of the flow.
```

Repeat the sequence of commands on all transponders.

Address of the BILLING SERVER is 10.10.10.254.

Name: root

Password: 12345678

We recommend to replace the name and password confidential.

Billing program options	
Number of serviced channels.	no restriction
Number of serviced packages.	no restriction
Number of concurrent clients.	no restriction
Customer information.	Contract number, name, street name, house number, apartment number, № phone, notes.
Automatically add dates of the contract.	there is
Automatically add Registration Date after assigning number of decoder.	there is
Automatically closing of the decoder at zero balance on the subscriber account.	there is
Program brings money instantly to the account of the customer and shows by how many paid when making a payment.	in VIEW mode
The ability to quickly search customer by any criteria specified in the search list.	there is
The ability to report output to print.	there is
Ability to enter different tariffs.	there is
The ability to temporarily disable the automatic inclusion and at a specified time.	there is
Types of reports.	Payments for the period of service, at the rates on the balance sheet, on viewing channels for disabled customers on a certain date.
Interface Type	WEB
Type of architecture	Open

TDX-480
TDQ-480
8 DVB-S/S2 to
8 DVB-T/C
transmodulators



8-ch S2 to T/C TRANSMODULATOR

Product description

The devices are transmodulators with 8 DVB-S/S2 input channels and 8 DVB-T (tdx480) or 8 DVB-C (tdq480) output channels. The devices are designed for digital transmodulation with Transport Stream Processing of TV or Radio programmes issued from FTA (Free to air) or encrypted digital reception. Devices filter services, modify SI (Service Information), generate NIT (Network Information table), LCN (Local Channel Number), can remultiplex services from any input to any output. All of the configurations can be changed by using the Web Interface.

tdx480 – octal transmodulator - with eight DVB-S/S2 input channels and eight DVB-T output channels.

tdq480 – octal transmodulator - with eight DVB-S/S2 input channels and eight DVB-C output channels.

Transmodulators can be used as stand alone devices. The product is intended for indoor usage only.

Characteristics:

- Integrated 2x8 multiswitch
- TS processing: any service to any output
- PCR restamping
- service filtering
- PSI/SI regeneration
- NIT generation
- PMT version monitoring
- BISS descrambling
- Web control and SNMP monitoring
- loop through RF distributing at input and output
- DIN rail or wall mounting
- robust die-cast housing
- connectors:
RF input/output - type F
Ethernet control interface - RJ-45
screw terminal block for DC entry power distribution bus

VHF band I		
1	-	-
2	58..66	62
VHF band II		
3	76..84	80
4	84..92	88
5	92..100	96
Cable special band I		
S1	110..118	114
S2	118..126	122
S3	126..134	130
S4	134..142	138
S5	142..150	146
S6	150..158	154
S7	158..166	162
VHF band III		
6	174..182	178
7	182..190	186
8	190..198	194
9	198..206	202
10	206..214	210
11	214..222	218
12	222..230	226
Cable special band II		
S11	230..238	234
S12	238..246	242
S13	246..254	250
S14	254..262	258
S15	262..270	266
S16	270..278	274
S17	278..286	282
S18	286..294	290
S19	294..302	298
UHF Hyperband special band III		
S20	302..310	306
S21	310..318	314
S22	318..326	322
S23	326..334	330
S24	334..342	338
S25	342..350	346
S26	350..358	354
S27	358..366	362
S28	366..374	370
S29	374..382	378
S30	382..390	386
S31	390..398	394
S32	398..406	402
S33	406..414	410
S34	414..422	418
S35	422..430	426
S36	430..438	434
S37	438..446	442
S38	446..454	450
S39	454..462	458
S40	462..470	466

IV UHF band		
21	470..478	474
22	478..486	482
23	486..494	490
24	494..502	498
25	502..510	506
26	510..518	514
27	518..526	522
28	526..534	530
29	534..542	538
30	542..550	546
31	550..558	554
32	558..566	562
33	566..574	570
34	574..582	578
V UHF band		
35	582..590	586
36	590..598	594
37	598..606	602
38	606..614	610
39	614..622	618
40	622..630	626
41	630..638	634
42	638..646	642
43	646..654	650
44	654..662	658
45	662..670	666
46	670..678	674
47	678..686	682
48	686..694	690
49	694..702	698
50	702..710	706
51	710..718	714
52	718..726	722
53	726..734	730
54	734..742	738
55	742..750	746
56	750..758	754
57	758..766	762
58	766..774	770
59	774..782	778
60	782..790	786
Additional UHF band		
61	790..798	794
62	798..806	802
63	806..814	810
64	814..822	818
65	822..830	826
66	830..838	834
67	838..846	842
68	846..854	850
69	854..862	858

DEVICE OPERATION

Safety Requirements

Installation of the transmodulator must be done according IEC60728-11 and national safety standards.

Any repairs must be made by qualified personnel.

Supply Voltage

Power supply DC 12V is safety.

Overload

Avoid overloading the supply network by extension cords or adapters. It may cause fire or give you an electric shock.

Liquid Substances

Store liquid substances away from the device and make sure no such substances get inside the device.

Foreign Objects

Please keep coins and other small objects away from the device to prevent their getting through the vent slots, which may cause serious damage to device. Getting of insects into the device may also damage the device and, consequently, cause fire.

Cleaning

Disconnect the device from power supply before cleaning. Use soft, slightly damp cloth to clean the surface of the casing. Never use any solvents!

Ventilation

Make sure the vent slots are open and the location where the device is installed allows free air circulation. Never put the device on a soft surface or cloth. Do not operate and never store the device on the heat or under direct sunlight. Never put any other appliances on top of the device.

Connected Devices

Do not connect any unauthorized appliances to the device as it is dangerous and may damage the appliance and this device.

Location

Install the device indoors on hard surface. Make sure the device is well protected from direct sunlight or moisture.

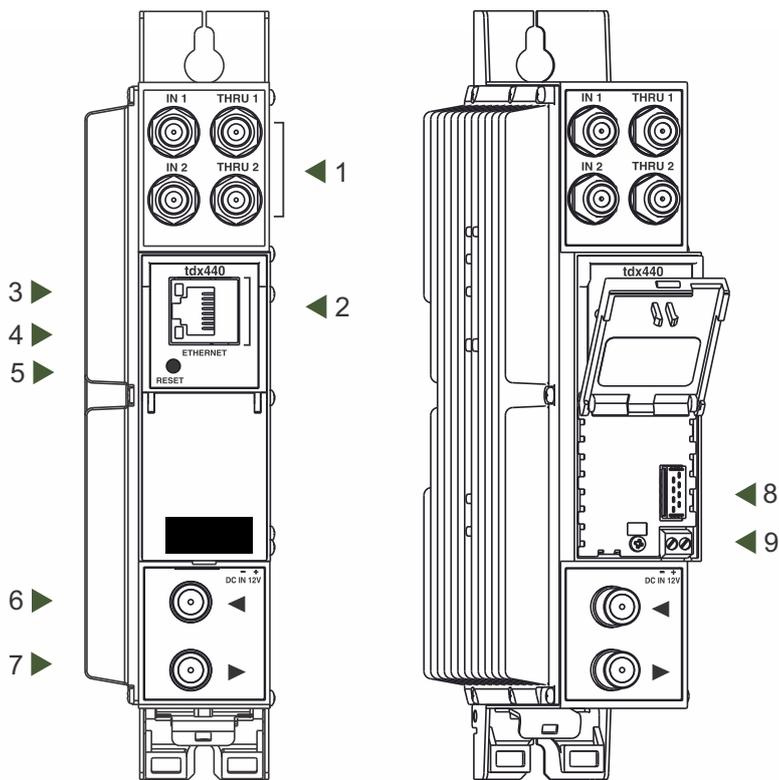
WARNING: Subject to compliance with the instructions, the device life is 5 (Five) years following the manufacture date. Terms and conditions of further operation must be agreed upon by the owner of device and the service company.

Specifications

RF input		
Demodulation	QPSK, 8PSK	
Input level	55...95 dBuV	
Input resistance	75 Ohm	
Symbol rate	2...45 Msymb/s (QPSK) 2... 37 Msymb/s (8PSK)	
FEC	1/2_2/3_3/4_5/6_6/7_7/8 (QPSK) 1/2_3/5_2/3_3/4_4/5_5/6_8/9_9/10 (8PSK)	
Input frequency range	950...2150 MHz	
Tuning step	1 MHz	
LNB control	0/14/18 V, 300 mA max, DiSEqC 1.0 EN50494, EN50607	
RF output		
	TDX480	TDQ480
DVB standard	OFDM (DVB-T)	QAM (DVB-C)
Frequency range	170-230 MHz / 470-862 MHz	96-862 MHz
Channel allocation	4 + 4	
Level / impedance	90 dBuV (0 ÷ -15.0 dB by 1 dB step) / 75 Ohm	
TS bit rate	< 31 Mbit/s	< 53 Mbit/s
MER	35dB	40dB
Modulation	QPSK, QAM16, QAM64	QAM16, 32, 64, 128, 256
Channel bandwidth	7MHz / 8MHz	4...8,3MHz
Guard Interval	1/32, 1/16, 1/8, 1/4	
FEC	1/2, 2/3, 3/4, 5/6, 7/8	
Symbol Rate		3.5...7.2 Msymb/s
Transmission mode	2K	
Management port	standard IEE802.3 10/100 Base T	
Current consumption	12V / 1A	12V / 1.1A
Temperature range	0° ÷ +45°C	
Dimensions / Weight	48.5x198x112 mm/0.9 kg	

MODULATION	Supported bandwidth of DVB-C channel	
	Frequency bandwidth (MHz)	
	6 MHz	8MHz
16QAM	19,23 Mbit	25,64 Mbit
32QAM	24,04 Mbit	32,05 Mbit
64QAM	28,85 Mbit	38,47 Mbit
128QAM	33,66 Mbit	44,88 Mbit
256QAM	38,47 Mbit	51,29 Mbit

Front Panel



- 1 - IN 1, IN 2 - RF input of SAT IF signal, DC output for LNB. F sockets.
- THRU 1, THRU 2 - RF output (input signal loop-through). F sockets.
- 2 - ETHERNET - control Ethernet interface. RJ45 socket.
- 3 - ACTIVITY (yellow) indicator of the control Ethernet interface.
- 4 - LINK (green) indicator of the control Ethernet interface
- 5 - RESET button. Press this button shortly to restart the module.
- Press this button for more than three seconds to set default IP address of the control Ethernet interface.
- 6 - RF input (output signal loop-through). F socket.
- 7 - RF output. F socket.
- 8 - Power distribution bus connector.
- 9 - +12 V DC powering input. Screw terminal.

Installation instructions:

Read the safety instruction first.

All settings can be changed using the web browser via control Ethernet interface. Disconnect power supply unit from the mains before making any changes in the connections of the module. Fasten the module on DIN RAIL or individual holder. The module or mounting bracket must be fixed with steel screws Ø 3.5-4 mm. The screws are not included in a package.

Connect all necessary RF, powering and control cables. Shielded Ethernet cable is recommended.

Connect the 75 W load to the unused RF output F sockets.

Connect power supply in to the mains.

Within 30-40 seconds of powering the module will run in normal operation mode.

Comments of the front panel indicators:

the LINK [4] green indicator is on when the link with the control Ethernet interface is established. Indicator is off when there is no link.

the ACTIVITY [3] indicator blinks, if communication via the control Ethernet interface is active.

8-ch S2 to T/C TRANSMODULATOR



OPERATING

Initial configuration

All modules leave the factory with this control Ethernet interface IP address: 192.168.1.10. In order to avoid conflicts with other IP addresses, it is necessary to perform an initial configuration in local mode. Subsequently, it will be possible to access the modules via the local area network (LAN), either to re-programme it or to check its operating status.

The modules leave the factory with the following Control Ethernet

IP address of the control interface: **192.168.1.10**
 Subnet mask: **255.255.255.0**
 Default Gateway: **192.168.1.1**
 Username: **admin**
 Password: **admin**

To access each module, use a PC or MAC personal computer equipped with an Ethernet card and RJ-45 cable (CAT-5E or CAT-6). The IP address of the PC/MAC must be configured within the following range: 192.168.1.2 - 192.168.1.254 (do not use 192.168.1.10, since this is the IP address of the module to be configured). To start the configuration of the module, open your web browser and type in the following direction: <http://192.168.1.10>. The login prompt will appear on the screen.

Access to the site is protected by user name and password. The default user name and password is admin. Enter the user name and password and click on "Login" button.

Note: the default password - admin - can (and must) be changed as explained on section 12.

During initial configuration you need to change the default control and streaming Ethernet interfaces TCP/IP configuration as explained on section 6.12.

NOTE: If you are using Internet Explorer Web browser, supported versions are version 10 or higher. Control interface IP address reset to default procedure: press the "RESET" [5] button for more than 3 seconds. When the LINK [4] indicator will start blinking, release it. After this operation the control interface IP address will be set to 192.168.1.10, user name and password set to admin.

General configuration

Initial Web interface screen

The first screen that appears when the module accessed is the "Main" window, which gives general information on the device.

The screenshot displays the initial web interface with the following elements:

- Navigation Tabs [1]:** Main (highlighted in yellow), RF inputs, Transport Streams, NIT, RF outputs, IP parameters, and System menu.
- Device information:**

Device model:	tdq440	
Serial number:	tdq4400170605025	
Title:	DVB-S to DVB-T	Change
Region:	LT	Change
Software version:	1.09	
FPGA version:	1.01	
IP:	192.168.1.20	
System time:	2017-03-16, 14:21:30	
Up time:	0:02:27	
- Output bitrates:**

#1	0%	0.0/31.0Mbps
#2		0.0/0.0Mbps
- Diagnostic information:** Demodulator 1 unlocked
- System status:**
 - Internal temperature: 46 C
 - Processor load: 1%
 - Main supply voltage: 12.1 V
- Other devices in the network:**
 - 52C16P: Demodulator 1 unlocked, Demodulator 2 unlocked
 - tdq440 (TIT2, C -> C): No errors

In the top of each configuration screen you will see a main menu tabs [1]. Using it, you can switch between the different configuration menu. The tab highlighted in yellow shows which menu is active at a given moment. The "System menu" tab contains several submenu items. Common elements for all screens are module title [2] and login information strings [3]. Pressing on the "Logout" string you can logout from module control.

Device information table

This shows the following data of module:

"Device model": model of the module.

"Serial number": serial number of the module.

"Software version": module software version number.

"Title": user may assign a title to the device for easier management. Press the button "Change" to modify it. This title will be written at [2] place. Also it will be visible in other devices, and by computers in network devices (if PC supports SSDP).

"Regions": Device supports several preinstalled regions. The RF channel list depends on which region is selected. Region can be changed without restarting the device. Just select needed region by pressing "Change" button in "Device information" table. Additional regions can be installed under request. Contact our distributors for such possibility.

"Software version": module software version number.

"System time": current time, synchronized from the TDT table of the input stream or NTP server. Local time offset can be selected in the System menu/Date, Time.

"Up time": time passed from last power-up or restart of the module.

Output bitrates table

It displays the output bitrate status of each channel in real time, Horizontal bar shows the percentage of used available bandwidth in the channel. The 1st number right to the bar shows actual bitrate in Mbps. Next number shows maximum allowed bitrate in the channel and it depends on modulation parameters. Ensure that actual bitrate would not reach more than 95% of available bandwidth. Otherwise bitrate overflow may occur.

System status table

It represents the following parameters at real time: Processor load in percents, internal temperature in degrees of Celsius, power voltage in Volts.

Other device in the network

If there are any modules in the network their status and diagnostic information will be displayed as it is in Figure 7 "General information screen". If modules status is red press the down arrow and diagnostic errors will be displayed. Make sure, that Ethernet router is configured properly to pass SSDP packets (239.255.255.250:1900 and 239.255.255.246:7900). Also make sure that all modules are connected to the same Ethernet network.

Diagnostic information table

It displays all module errors and comments (if possible) how to eliminate them.

Diagnostic Information	
Demodulator 2 unlocked	
Demodulator 1 unlocked	

Input status table

	Lock status	RF level	Modulation	FEC	SNR	VBER	PER	Input bitrate
Input 1 status	Locked	76 dBuV	QPSK	5/6	13.9 dB	<1.8E-9		33791 kbps
Input 2 status	Locked	69 dBuV	QPSK	5/6	14.0 dB	<1.8E-9		33791 kbps
Input 3 status	Locked	73 dBuV	QPSK	5/6	12.4 dB	<1.8E-9		33790 kbps
Input 4 status	Locked	70 dBuV	QPSK	5/6	14.5 dB	<1.8E-9		33791 kbps
Input 5 status	Locked	71 dBuV	8PSK	2/3	14.7 dB		1.4E-9	42573 kbps
Input 6 status	Locked	74 dBuV	8PSK	2/3	15.1 dB		1.4E-9	42573 kbps
Input 7 status	Locked	75 dBuV	8PSK	2/3	14.0 dB		1.4E-9	42591 kbps
Input 8 status	Locked	75 dBuV	QPSK	5/6	14.9 dB	<1.8E-9		33791 kbps

Transport Streams

One input channel at a time can be configured in this page. Select proper channel from the list at „Choose input channel" combobox. A list of services in the selected channel will appear ("List of services").

List of services

Service title	Bitrate	LCN	Service ID	Descramble	Enable
TLC HD	7.5 Mbps	<input type="text" value="0"/>	10100		Output 1 <input type="text"/>
Zee One HD	8.1 Mbps	<input type="text" value="0"/>	10101		Output 1 <input type="text"/>
mediaspar HD	6.6 Mbps	<input type="text" value="0"/>	10102		Output 2 <input type="text"/>
MTV HD	4.1 Mbps	<input type="text" value="0"/>	10103		Output 2 <input type="text"/>
Channel21 HD	5.3 Mbps	<input type="text" value="0"/>	10104		Output 3 <input type="text"/>
QVC BEAUTY & STYLE HD	7.7 Mbps	<input type="text" value="0"/>	10105		Output 4 <input type="text"/>
TLC HD Austria	7.5 Mbps	<input type="text" value="0"/>	10110		Off <input type="text"/>
MTV HD Austria	4.1 Mbps	<input type="text" value="0"/>	10113		Off <input type="text"/>
SES Demo	0.0 Mbps	<input type="text" value="0"/>	10121		Off <input type="text"/>

Update

Select all to channel 1
 Select all to channel 2
 Select all to channel 3
 Select all to channel 4

„List of services" table shows a list of available services. Icon before the service name indicates service type. Bitrate of each service is measured in real time. Services that currently are not running will be displayed as grayed. They can be selected and will be outputted normally when the services starts running. „LCN" field is a Logical Channel Number. Every service can have a „channel number" and TV will sort channels according to it. Just ensure, that all services in all channels have different numbers. Value "0" means, that LCN for that service is not used at all and TV will sort these channels according to it's own rules.

Services can be passed to any output number, independing on the input demodulator number. BISS scrambled services have a checkbox for descrambling.

Press “+” icon onto sign and service information will be extended (see Figure "Service details" below).

1+1 International 2.0 Mbps 6125 Enable

Service title:	1+1 International	New service title:	<input type="text" value="1+1 International"/>
Service provider:	1plus1 Media	New service provider:	<input type="text" value="1plus1 Media"/>
Service ID:	6125	Scrambled flag:	<input checked="" type="checkbox"/> Other ID <input type="text" value="6125"/>
PMT PID:	6125	BISS Code:	<input type="text" value="-----"/> Other PID <input type="text" value="6125"/>
H.264 Video PID:	6126	Enable	<input checked="" type="checkbox"/>
MPEG1 Audio (ukr)	6127	Enable	<input checked="" type="checkbox"/>
PID:			
PCR PID:	6126		

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RF inputs

Input type selection

Input source type = dSCR

Input source type = SCR

“Input type selection” table consists of the following parameters:

“LNB LO frequency” - the LNB local oscillator lower frequency in megahertz. Use 9750 MHz for the universal converter.

“LNB HI frequency” - the LNB local oscillator upper frequency in megahertz. Use 10600 MHz for the universal converter.

“LNB Power” - power supply of the converter – can be set to “0”, “13V”, “18V”, “13V/22kHz”, “18V/22kHz”.

“Polarization” - the polarization of converter. Can be “Horizontal” or “Vertical”.

“Source type” - the LNB types, there are several: Universal, Quadro, DiSEqC, dSCR EN50607, SCR EN50494 - see **Input source type = dSCR**.

dSCR and SCR options are available in “Input 1” only.

“Universal LNB” - power supply voltage of the converter is chosen according to the selected polarization – 18 V Horizontal, 13 V Vertical; the 22 kHz is set depending on given “LNB HI frequency” “LNB LO frequency” and “Input frequency” parameters.

“DiSEqC” - then DiSEqC commands are used to select the satellite. Possible commands: “Satellite A”, “Satellite B”, “Satellite C”, “Satellite D”, Vertical or Horizontal polarization.

“dSCR” – first select source type as shown in Figure, then select “dSCR/SCR mode” Master or Slave (Master for module which has direct connection to Unicable multiswitch or LNB and Slave for modules connected by loop through). If Slave was selected, additionally type the IP address of Master module. All the modules in the dSCR/SCR group must be in the same Ethernet network. Next select “SAT input” and “User band”, type in frequencies, symbol rate press “Update” button and observe “dSCR” status.

“SCR” - same as “dSCR”, just the user band frequencies must be typed in manually.

„SAT input” - a parameter that can switch demodulator off or connect to any available RF input.

“User band” - parameter used in dSCR/SCR switches.

“Modulation standard” - a selection between DVB-S and DVB-S2 standards;

„Input frequency” - parameter is a frequency of transponder in MHz.

„Symbol rate” - parameter is a symbol rate of transponder in kSymb/s.

Demodulator settings table

	SAT input	User band	Modulation standard	Input frequency, MHz	Symbol rate, Ks/s
Demod. 1	Input 1	Off	DVB-S2	10773	22000
Demod. 2	Input 2	Off	DVB-S2	10773	22000
Demod. 3	Input 1	Off	DVB-S	10744	22000
Demod. 4	Input 2	Off	DVB-S	10744	22000
Demod. 5	Input 1	Off	DVB-S	10744	22000
Demod. 6	Input 2	Off	DVB-S	10744	22000
Demod. 7	Input 1	Off	DVB-S2	10773	22000
Demod. 8	Input 2	Off	DVB-S2	10773	22000

Service title and provider can be edited (multilanguage character support). „Scrambled flag" will be inserted into SDT (Service Description Table). Unchecking this checkbox will not descramble the content. It only carries information about the scrambling status of the service.

BISS scrambled services have a BISS key input field "BISS Code". Enter the BISS code (12 or 16 characters) in hex format.

Individual streams can be disabled as well. PID number can be remapped manually by selecting checkbox "Other PID". Keep in mind that PID must be unique, otherwise PID remapping is done automatically.

Press onto „Update" button to save changes and execute.

NOTE: If transparent mode is selected, all services of transponder will be passed to the output, including original PAT, SDT, PMT, EIT, CAT, NIT tables. All changes that were made to these tables (new titles, LCN) will be disregarded. No more than 95% of output bandwidth usage is recommended, otherwise bitrate overflow might occur.

NIT

Several tables related to NIT generation exist in this section. Figure 16 "Global TS parameters" describes following TS parameters:

"Network ID": is unique number within the geographical region defined by the "country code". For a cable network usually this is a single country code plus 0x2000 (8192). If there are more connected modulators in the network, they must have the same Network ID.

Proper value depending on your country and operator can be found here:

http://www.dvbservices.com/identifiers/network_id?page=1

"Private data specifier (in hex format)": can be inserted in the NIT table for proper LCN description. This value is described in TS 101162 specification. NorDig standard requires 00 00 00 29 value, UK should use 00 00 23 3A value.

Other options can be found here:

http://www.dvbservices.com/identifiers/private_data_spec_id?page=1

The parameter will not be inserted into NIT if value is set to zero.

„Network name" is the name of the network.

The 2nd table in the page describes Transport stream ID and Original network ID of each channel (see Figure below).

	RF output parameters	Original network ID	Transport stream ID
Output 1	C21, 8MHz, QAM-64	1	1
Output 2	C22, 8MHz, QAM-64	1	2
Output 3	C23, 8MHz, QAM-64	1	3
Output 4	C24, 8MHz, QAM-64	1	4
Output 5	C66, 8MHz, QAM-64	1	5
Output 6	C67, 8MHz, QAM-64	1	6
Output 7	C68, 8MHz, QAM-64	1	7
Output 8	C69, 8MHz, QAM-64	1	8

Each stream in a network must have unique ID, called „Transport stream ID". An Original_Network_ID is defined as the "unique identifier of a network". It can be linked to NetworkID or used value from this location:

http://www.dvbservices.com/identifiers/original_network_id?page=1

Every channel in the network must be described in NIT. Otherwise TV automatic channel tuning function will not find all channels. All other modules in the network will be monitored via standard SSDP protocol. NIT tables will be regenerated if any change is detected in other modulators with the same Network ID. Make sure, that Ethernet router is configured properly to pass SSDP packets (239.255.255.250:1900 and 239.255.255.246:7900). Also make sure that control ports of all modules are connected to the same Ethernet network.

RF outputs

Transmodulator has two independent groups of four adjacent channels.

	Constellation	Bandwidth	Guard interval	Code Rate	Cell ID	Output frequency, MHz (Channel)		Attenuator, dB	Enable
Output 1	QAM-64	8 MHz	1/32	7/8	0	474.0	C21	0	<input checked="" type="checkbox"/>
Output 2	QAM-64	8 MHz	1/32	7/8	0	482.0	C22	0	<input checked="" type="checkbox"/>
Output 3	QAM-64	8 MHz	1/32	7/8	0	490.0	C23	0	<input checked="" type="checkbox"/>
Output 4	QAM-64	8 MHz	1/32	7/8	0	498.0	C24	0	<input checked="" type="checkbox"/>
Output 5	QAM-64	8 MHz	1/32	7/8	0	506.0	C25	0	<input checked="" type="checkbox"/>
Output 6	QAM-64	8 MHz	1/32	7/8	0	514.0	C26	0	<input checked="" type="checkbox"/>
Output 7	QAM-64	8 MHz	1/32	7/8	0	522.0	C27	0	<input checked="" type="checkbox"/>
Output 8	QAM-64	8 MHz	1/32	7/8	0	530.0	C28	0	<input checked="" type="checkbox"/>

Update Select all

"Output frequency" parameter can be entered manually or selected as a channel from combobox. Channels that can be selected from the list depend on which region is selected. If you need any other frequency – select "Manual" and type the needed frequency. Frequency step is 0.1 MHz. „Enable" checkbox will enable channel to the output. Global attenuator can be entered up to 15 dB. Also there is individual precise attenuator up to 2.5 dB in step of 0.5 dB.

Press „Update" to change settings. In case, if any modulation parameter was changed, both channels will be restarted with new settings. Exception is „Attenuator", changes in this parameter will not restart the modulator.

	Constellation	Symbol rate	Output frequency, MHz (Channel)		Attenuator, dB	Enable
Output 1	QAM-64	6875	474.0	C21	0	<input type="checkbox"/>
Output 2	QAM-64	6875	482.0	C22	0	<input type="checkbox"/>
Output 3	QAM-64	6875	490.0	C23	0	<input type="checkbox"/>
Output 4	QAM-64	6875	498.0	C24	0	<input type="checkbox"/>
Step			8.0 MHz			

Update Select all

Figure above shows DVB-C output settings. The step of RF channels can be selected to one of these values: 7.0, 7.5, 8.0, 8.3, 8.5 MHz. Actual bandwidth of each channel depends on the symbol rate, and can be calculated as SR x 1.15 (1.15 here is roll off factor of 15%). Symbol rates of all channels must be the same, from the range of 3500..7200 kSym/s.

Output channel enumeration depends on the region selected from the main page. However, it's allowed to enter any frequency you want in a range of 100..858 MHz in all devices.

Only the first output frequency/channel of the group can be entered by the user. Other frequencies will be calculated automatically according to the selected step/bandwidth.

IP settings

All device IP settings can be configured here – IP address, subnet mask, gateway, DNS (Domain Name System), see Figure. IP parameters will be updated immediately after pressing „Update“ button and redirect to new location.

NOTE: IP address can be reset to default (192.168.1.10) by pressing RESET button for at least 3 seconds. Ethernet "link" led will start to blink quickly to inform, that the reset IP address request has been accepted. Device will be restarted with default IP address.

IP parameters	
MAC address	00:1C:A3:00:00:00
IP address	192.168.1.222
Subnet mask	255.255.255.0
Gateway	192.168.1.1
DNS	8.8.8.8
Update	

E-mail-settings

The device can send e-mail reports if errors were detected. SMTP protocol is used for that. Figure "E-mail settings table" shows parameters related to this feature. "Enable e-mail error report" checkbox enables error monitoring. All errors within "timeout" period will be gathered, and send to the e-mail address, provided in "Receiver e-mail address" input box. Comma separated e-mail addresses can be used to send report to multiple addresses. The timer will be started as soon, as the first error is detected, and stopped when e-mail is sent. The timer will be restarted again if a new error will appear.

"Sender e-mail address" can be used as authentication in the SMTP server side.

SSL (SMTPS) protocol is not supported.

E-mail settings	
Enable e-mail error report	<input type="checkbox"/>
SMTP server	192.168.1.1
SMTP port	25
Sender e-mail address	no_reply@domain.com
Receiver e-mail address	
Timeout for errors in minutes	5
Send last message Update	

SNMP settings

"SNMP settings table" is located in "IP parameters" tab.

The description of the SNMP configuration parameters:

"Read Community" - community name acts as a password that is shared by multiple SNMP agents and one or more SNMP managers. "Read Community" password is used for read-only access to the modules parameters.

"Write Community" - is the password used for read-write access to the modules parameters.

"Enable TRAP" - SNMP traps are alerts generated by agents on a managed device. Check this box to enable TRAP generation. The module generates traps when the diagnostic message occurs.

"TRAP Community" - is the password used for accessing of TRAPS.

"Host IP #1", "Host IP #2", "Host IP #3" - IP addresses of hosts with SNMP managers, where TRAPS will be send.

SNMP settings	
Enable TRAP	<input type="checkbox"/>
Trap community	public
Read community	public
Write community	private
Trap IP address 1	0.0.0.0
Trap IP address 2	0.0.0.0
Trap IP address 3	0.0.0.0
Update	

System menu

This menu tab contains following submenu items: "Event logs", "Export parameters", "Import parameters", "Firmware upgrade", "User management", "Restore defaults", "Reset the device", "Date,Time", "Language". Mouse over to show the list of this submenu.

Event logs

Various important events, errors, warnings will be logged into "Event logs". Each record has an event type, which can be used to filter particular messages. Just select checkboxes in the „Logs filtering" table and press „apply". Other messages will be hidden.

„Erase logs" button will erase all logs from the system.

"Export logs" button forms the file (log.html) which will be downloaded to PC.

Each record has a log time when the event appeared. Refer to 6.10.8 "Date, Time" settings for instructions how to configure time settings.

Date/Time	Event type	Event description
2016-09-07 10:30:48	Event	Bitrate overflow restored back for channel 2
2016-09-07 10:30:15	Event	PMT (Test-R) version change detected in channel 1
2016-09-07 10:30:14	Error	Channel 2 bitrate overflow
2016-09-07 10:28:39	Event	Control ETH interface link up: 100Base-TX full-duplex
2016-09-07 10:28:39	Event	System time updated
2007-01-01 00:00:05	Event	Power option restart occurred
2016-09-07 10:28:15	Event	PMT (Test-R) version change detected in channel 1
2016-09-07 10:26:14	Event	PMT (Test-R) version change detected in channel 1
2016-09-07 10:24:25	Event	Logs erased

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Export parameters

All settings of transmodulator can be exported for backup or copying to another device. Press "Export parameters" and "parameters.xml" file will be downloaded to PC. This file can be imported only to the same type of device.

Import parameters

Exported parameters can be imported back to the device. Press onto "Click to select file" button (see "Import parameters") to select exported file.

Press "Upload" button to send the file to the device. It will take several seconds to update all parameters after file upload. After that, device will function with new configuration. No restart is required.

Import parameters

Click to select file

Expected file name:

Upload

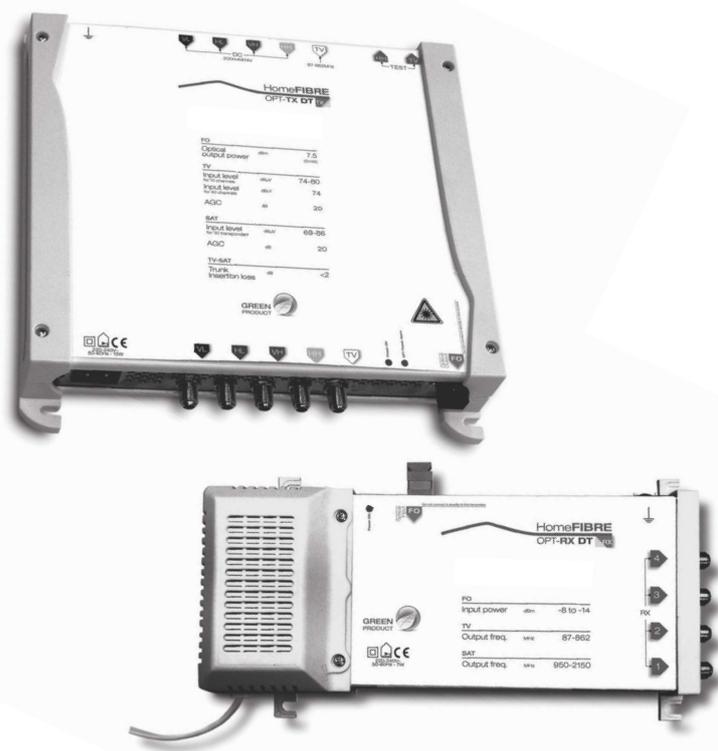
Firmware upgrade

Device firmware can be upgraded via web browser. Press the "Click to select file" button and select firmware binary file. If valid file was selected, a version number of new firmware will be displayed. Otherwise an error message will appear. Press the "Upload" button to upload new firmware to the device. Upload progress bar will appear and may take several seconds to upload, depending on the size of a file and a network connection speed. A message will be displayed asking to restart the device when the file was sent to the device. New firmware will be programmed into the device only after restart. It may take additional minute or more to flash new program. Device will start up with a new firmware and continue to operate with previous parameters. Additional new firmware features (if any) may need to setup additionally to take effect.

Avoid power supply interruption when a programming process is going on.

Device has possibility to load software revision history and check availability for new software release. Click the "Check online" link. If computer (not device!) has internet access, it will show a list of all software releases with links to binary files. Binary file can be downloaded and saved to computer (see Figure below). After that, use the firmware upgrade method as described above.

Optical transmitter (OPT-TX DT) and optical receiver (OPT-RX DT)



Optical transmitter and optical receiver

SAFETY WARNING.

The product must be installed by a qualified engineer, according to the local safety standards and regulations. The product is classified as Class II, in accordance with EN 60065, and for this reason it doesn't need to be connected to the protective earth (PE) of the mains supply.

Installation warnings

Only use the original power cable (adaptor) supplied and install the product so that the mains plug is easily accessible. The product must not be exposed to dripping or splashing liquids and so must be installed indoors in a dry place. Humidity and condensation could damage the product. In case of condensation, wait until the product is dry before using it.

Don't install the product above or close to heat sources, in dusty places or where it might come into contact with corrosive substances. Keep the product away from heat sources to prevent some parts or components of the unit to catching fire. To fix the product to the wall use suitable expansion bolts.

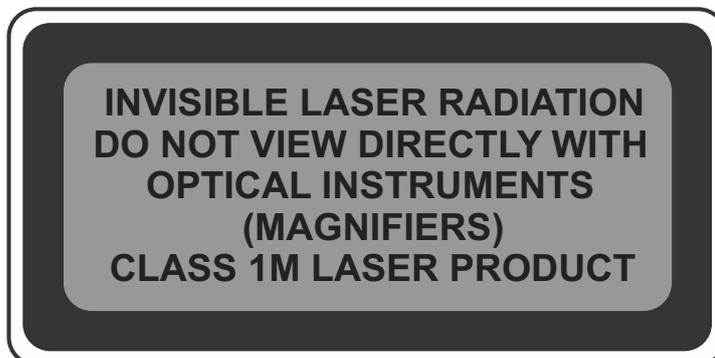
Leave enough space around the product housing to ensure sufficient ventilation. "An excessive operating temperature and/or excessive heat may affect the performance and the life span of the product."

Never look inside the product's optical connectors. The laser radiation is not visible with the naked eye and therefore it is not possible to prevent long term damage. When working with the splitter's optical connectors make sure that the lasers of any optical transmitters connected to it are switched off.

In accordance with the European Directive 2004/108/EC (EMC), the product must be installed using devices, cables and accessories that comply with this directives requirements for fixed installations.

Aerial system earth connection The unit must be connected to the ground electrode of the antenna installation according to the standard EN60728-11. We recommend following the provisions of standard EN60728-11 therefore not connecting the ground electrode to the earthing of the power supply network.

IMPORTANT: Only trained and authorised personnel can open the product. In case of failure, do not try to repair the product; otherwise the guarantee will no longer be valid.



Product description

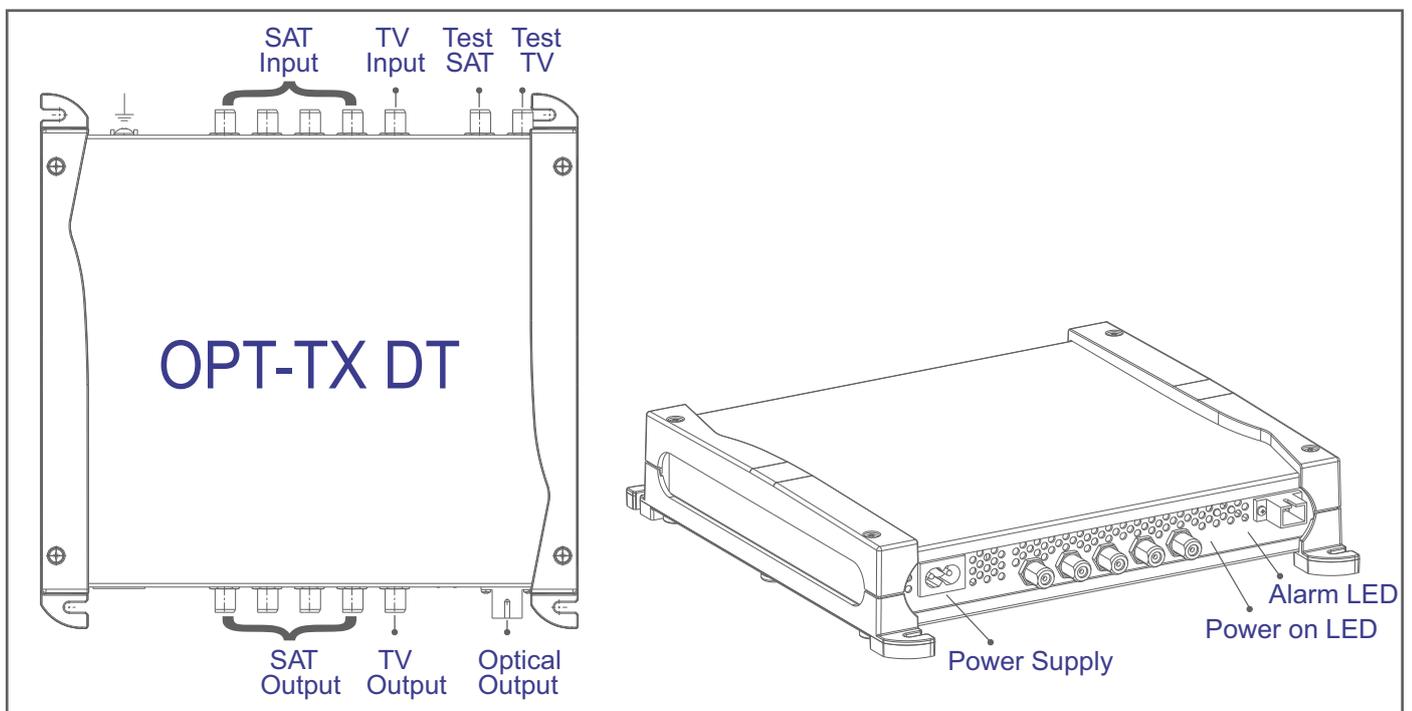
Optical transmitter (OPT-TX DT) and optical receiver (OPT-RX DT) for distributing satellite and digital terrestrial signals through a single-mode fibre optic cable.

The incoming RF signals to the OPT-TX DT transmitter are converted and distributed through a single-mode fibre optic that can be split by splitters and passive taps enabling them to be sent to multiple optical connections (PON=Passive Optical Network) using a single transmitter.

The OPT-RX DT receiver converts the incoming optical signal in to 4 universal outputs, therefore enabling the TV and SAT signal to be available for 4 different users.

The system requires the use of a conventional LNB and provides a traditional 5 core output (4 SAT + 1 TV) to enable a cascable installation to additional transmitters or to a traditional multiswitch system.

The AGC (Automatic Gain Control) in the transmitter makes the product configuration much easier by automatically adjusting the input signal level to the optical laser.



SAT INPUT: F input connectors for the four IF satellite polarities (950 - 2150MHz) with LNB remote power.

TV INPUT: F input connector for the TV signal (87 - 862MHz) .

TEST SAT: F output connector for the SAT test signal, HH polarity (RF level: 60dB μ V per transponder).

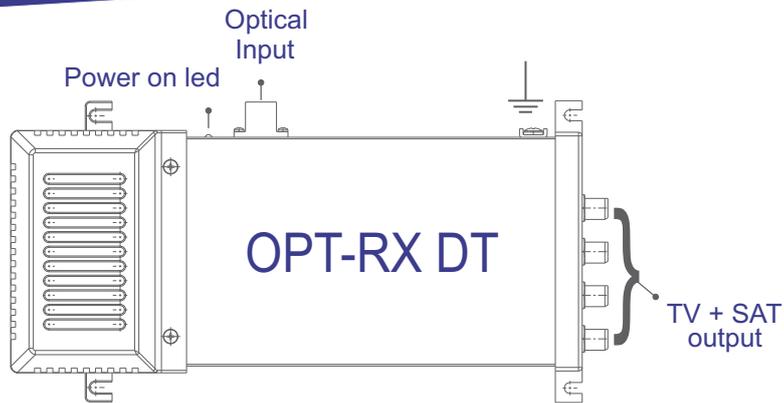
TEST TV: F output connector for the TV signal 87 - 862MHz (RF level: 74dB μ V overall power).

OPTICAL OUTPUT: SC-APC output connector for the optical transmitter for the fibre link.

SAT OUTPUT: F output connectors for the four IF satellite polarities (950 - 2150MHz) for possible cascade applications to other devices
TV OUT : F output connector for the TV signal (87 - 862MHz).

POWER ON LED: On (green) to show the product is turned on. **ALARM LED:** the alarm LED shows that the transmission laser is not working correctly.

⚡ Earthing the antenna installation (according to EN60728-11 standard).



OPTICAL INPUT: SC-APC input connector for the optical receiver. Used for the fibre link for the satellite polarisation and TV signals.

TV+SAT OUT: 4 F connectors for mixed TV+SAT outputs (87 - 862MHz, 950 - 2150MHz).

POWER ON LED: On (green) to show the product is turned on.

Aerial system earth connection (according to EN60728-11 standard).

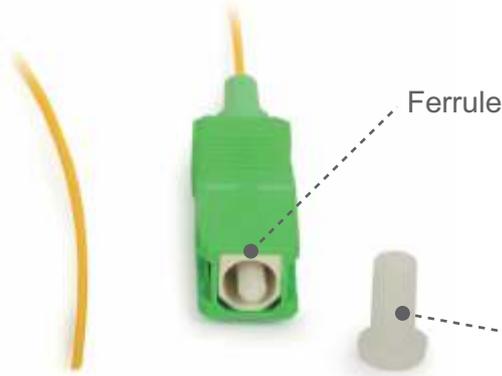
System Functions:

The headend system in a fibre optic distribution network uses traditional receptive devices, i.e. aerials, dishes and traditional LNB's and any signal equalisation and amplification units. TV and SAT signals are sent to an OPT-TX DT optical transmitter, which converts the electrical signals into luminous signals, therefore enabling the distribution via a fibre optic infrastructure over long distances. Like traditional systems, each time this signal has to be split over a number of lines, a device called an optical divider or optical splitter (VOV or VOT) is used this splits the signal into a number of optical transport lines without any fall in quality even with a calculated attenuation. Once the optical signal is in the vicinity of the unit to be served, it is reconverted into a traditional signal by the OPT-RX DT optical receiver which on output generates the RF signals provided to the end user by means of traditional components (coaxial cables and filtered outlet sockets).

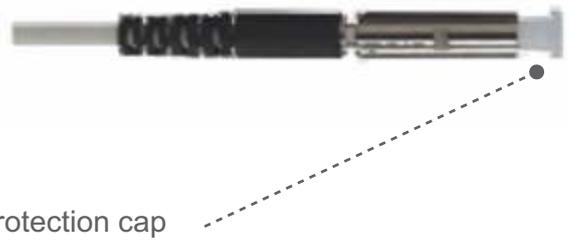
ATTENTION: A direct optical connection cannot be made between the OPT-TX DT and OPT-RX DT. The connection can only be made using optical line attenuators as the overall input power to the OPT-RX DT optical receiver must not exceed -7dBm. Check the optical level of the signal on the fibre using an optical light meter before connecting it to the OPT-RX DT receiver.

Connections The OPT-TX DT transmitter and OPT-RX DT receiver both have an SC-APC optical connector. The splitters and dividers in the VOV and VOT series have sockets for MINI connectors. Use the SC-APC -> MINI links (PR ADAPT, code 287226) to connect the OPT devices to the optical distribution (VOV and VOT devices). We provide patch cables with MINI connectors of different lengths for connecting the passive VOV and VOT devices.

SC/APC Fibre Optic Connectors



MINI Fibre Optic Connectors



Attention: To conserve and protect the contact surfaces of the optical connectors the bushing and ferrule protectors should be left in position until the connections are made or can be cleaned using the correct tools.

Installing and removing the fibre cable to the VOV and VOT devices:

1) Remove the protective cover from the connector without touching the ferrule.

2) Insert the connector following the guides until it clicks into place.

3) To remove the fibre, press the connector and pull out the cable.



Optical transmitter and optical receiver

USER INSTRUCTIONS.

Dimensioning a Fibre Optic system.

When designing a fibre optic system it is important to consider the optical input level to the OPT- RX DT receivers, suitable attenuation is required and must be calculated at each point to ensure the system falls within the required parameters. The optical output power from the OPT-TX DT transmitter is fixed (+7.5dBm typical).

The OPT-RX DT receivers can guarantee that the correct level of TV and SAT signals are available to the end users sockets. This guarantee is on the proviso that the input level of the optical signal is between -8dBm and -14dBm therefore giving an optical attenuation range of 15 to 21dB.

ATTENTION:

Direct connections are not allowed between the OPT-TX DT and OPT-RX DT, unless the correct line optical attenuators are used. An optical signal reader must be used to check the optical input level to the OPT-RX DT and to prevent damaging the receiving photodiode (damage can be caused if the optical input signal is higher than 0dBm). If the quality of the input signals are not optimised, or if a lot of signals have to be distributed to a lot of sockets, the optical budget should be reduced or professional splitters should be used with SC-APC connectors.

Requirements for the input signal to the OPT-TX DT optical transmitter

For the signals to be correctly transmitted through the fibre optic, the RF signals must respect the following requirements:

TV (DTT/CATV)

To ensure the TV signals are transmitted and received correctly, the input signals to the transmitter should be equalised, especially if a lot of channels are being transmitted.

As an indication, the input signals should respect the following requirements:

1. The transmitter signal level should be $\geq 74\text{dB}\mu\text{V}$ to guarantee correct reception by the OPT- RX DT receivers, even after an optical attenuation of 21dB.
2. Overall input power: -19dBm (90dB μV)
3. The overall power $\leq -19\text{dBm}$ (90dB μV) is guaranteed in the following cases:
 - 40 TV channels equalised at 74dB μV
 - 20 TV channels with a maximum level of 77dB μV
 - 16 TV channels with a maximum level of 78dB μV
 - 8 TV channels with a maximum level of 81dB μV

If the TV input signal quality is not optimal or not correctly equalised, then the system should be designed considering an optical attenuation lower than 21dB to guarantee correct signal reception at the socket (especially when a lot of channels are being transmitted).

FM and DAB

The FM and DAB signal levels should be at least 10dB lower than the overall input power of the TV signal.

SAT

1. Input signal level: 69-86dB μ V

The input transponder level to the OPT-TX DT must be between 69 and 86dB μ V for the ACG to function correctly.

2. Band flatness: 4dB

The transponders should be equalised within the same polarity so that the maximum difference in level between the transponders transmitting through the fibre is 4dB, to ensure the receiver is able to receive correctly.

The output levels to the OPT-RX DT optical receiver.

The output level to the OPT-RX DT optical receiver depends on the number of signals transmitted through the fibre and the optical attenuation of the section.

Remember that 1dB of optical fall equals 2dB μ V of attenuation to the electric level (RF).

Below some reference levels are given for the output signals to the receiver:

TV (DTT/CATV) The overall output power is -27dBm (82dB μ V) with 21dB of optical attenuation which means that the fewer multiplexes that are transmitted, the better the output level and quality.

RF output level per MUX		
No. of Muxes	Receiver optical Input -8dBm	Receiver optical Input -14dBm
40	73dB μ V	61dB μ V
16	77dB μ V	65dB μ V
8	80dB μ V	68dB μ V
4	83dB μ V	71dB μ V

Table 1 Indications of output levels to the OPT-RX DT – TV signal

N.B.: 1dB optical equals 2dB at electric level (RF).

SAT

The typical output SAT signal level to the OPT-RX DT is:

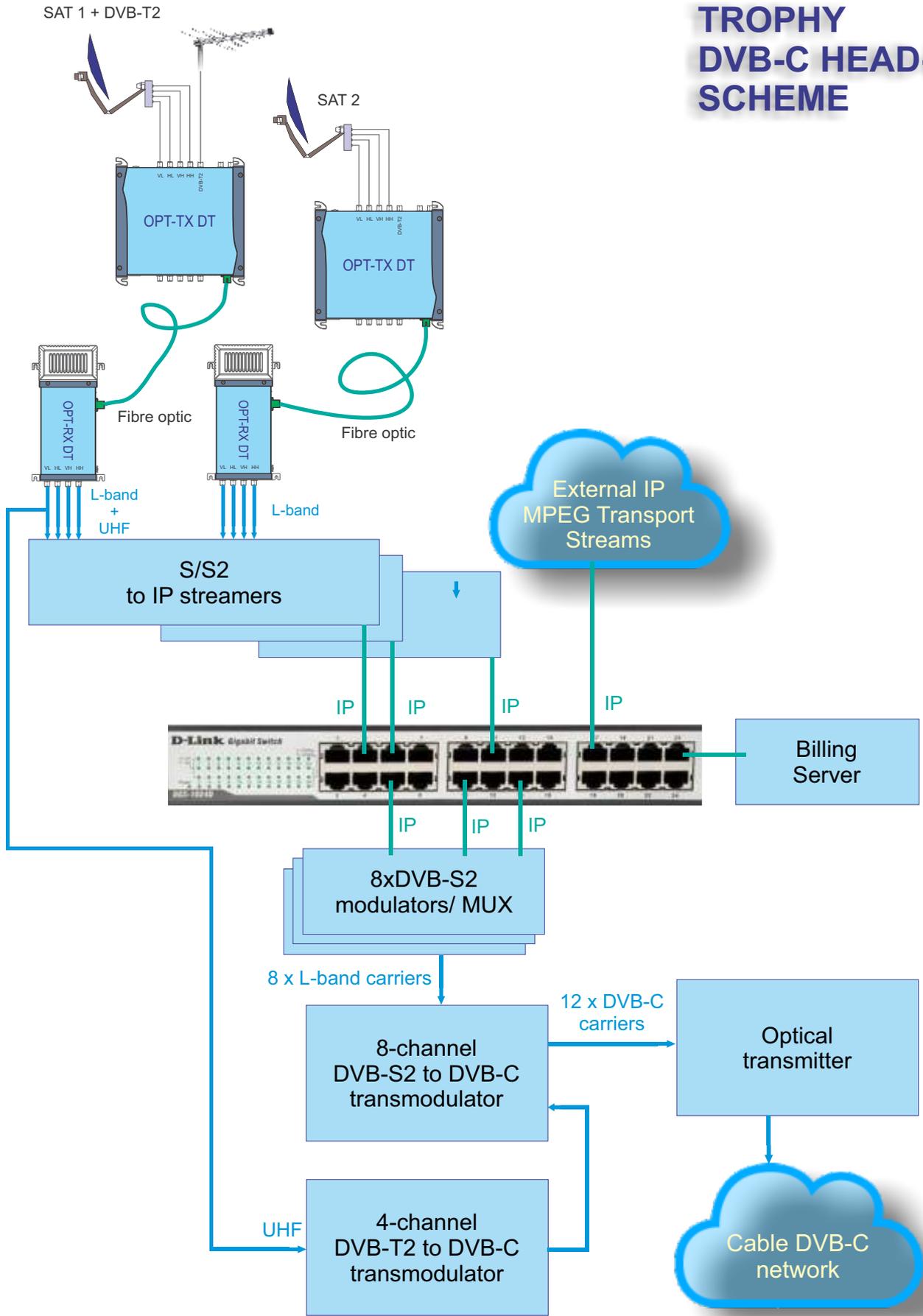
- 74dB μ V for transponders with an optical level of -14dBm input to the receiver (21dB of optical attenuation)
- 86dB μ V for transponders with an optical level of -8dBm input to the receiver (15dB of optical attenuation)
-

FM and DAB

The FM and DAB signal levels respect the difference of input level in relation to the TV signal.

N.B.: The signal levels to the user sockets must respect the set points given in the EN50083-7 standard (DTT: 45-74dB μ V – SAT: 47-77dB μ V). In certain cases the RF output signal from the receiver, or if possible the input optical signal, will have to be attenuated by means of passive components such as optical line faders.

TROPHY DVB-C HEAD-END SCHEME



Optical transmitter and optical receiver

TECHNICAL SPECIFICATIONS

Home Fibre Transmitter		OPT-TX DT
Part No.		270694
RF inputs	No.	5 (4SAT + 1TERR)
RF outputs	No.	7 (4 SAT + 1TERR + 2TEST)
Optical output	No.	1 SC/APC
SATELLITE INPUTS		
Bandwidth	MHz	950 - 2150
Connectors type		F Female
Input return losses	dB	10
Trunk line insertion losses	dB	<2
RF input level	dB μ V	69 - 86
TERRESTRIAL INPUT		
Bandwidth	MHz	87 - 862
Connector type		F Female
Input return loss	dB	10
Trunk line insertion loss	dB	2
Overall input power	dB μ V	90
TEST OUTPUTS		
Bandwidth	MHz	87 - 862/950 - 2150 (HH polarity)
Connectors type		F Female
Output return losses	dB	10
RF Output level	dB μ V	74 (TV) overall power 60 (SAT) per transponder
OPTICAL OUTPUT		
Connector type		SC/APC
Wavelength	nm	1310
Optical output power	dBm	+7.5
Optical return loss	dB	>45
Safety class		1M
MAIN FEATURES		
Mains voltage	Vac/Hz	184 - 264/50 – 60
Power consumption	W	15
LNB remote powering	mA	200@14V (4 SAT connectors)
Operating temperature	°C	-5 to +50
AGC RF level dynamics	dB	20
LED information		Power on green LED Extracurrent on laser red LED
Dimensions L x H x W	mm	230 x 230 x 50

QUAD Home Fibre Receiver		OPT-RX DT
Part No.		270693
Optical input	No.	1 SC/APC
RF outputs	No.	4 (TERR + SAT)
OPTICAL INPUT		
Optical connector		SC/APC
Wavelength	nm	1310
Optical return loss	dB	>45
Optical power (min - max)	dBm	-8 to -14
RF OUTPUTS		
Bandwidth	MHz	87 - 862/950 - 2150
Connector type		F Female
Return loss	dB	10
RF output level @ optical -14dBm	dB μ V	77 \pm 5 (TV) overall power 66 \pm 5 (SAT) per transponder
Output sat control		DiSEqC
MAIN FEATURES		
Mains voltage	Vac/Hz	184 - 264/50 - 60
Power consumption	W	7
Operating temperature	°C	-5 to +50
LED information		Power on green led
Dimensions L x H x W	mm	250 x 125 x 50

SDI-410C
STI-410C
Common Interface
DVB-S/S2 & DVB-T/T2/C
to IP STREAMERS



DVB-S2/T2/C to IP STREAMERS

PRODUCT DESCRIPTION

DVB-S/S2 (SDI-410C), DVB-T/T2/C (STI-410C) to IP streamers designed to broadcast in multicast on an IP network the services (TV or Radio programmes) issued from FTA or encrypted digital reception; in case of encrypted signal, a CAM containing the operator's smart card must fit the slot. The IP streams can be viewed using an IPTV set-top box or a software video player.

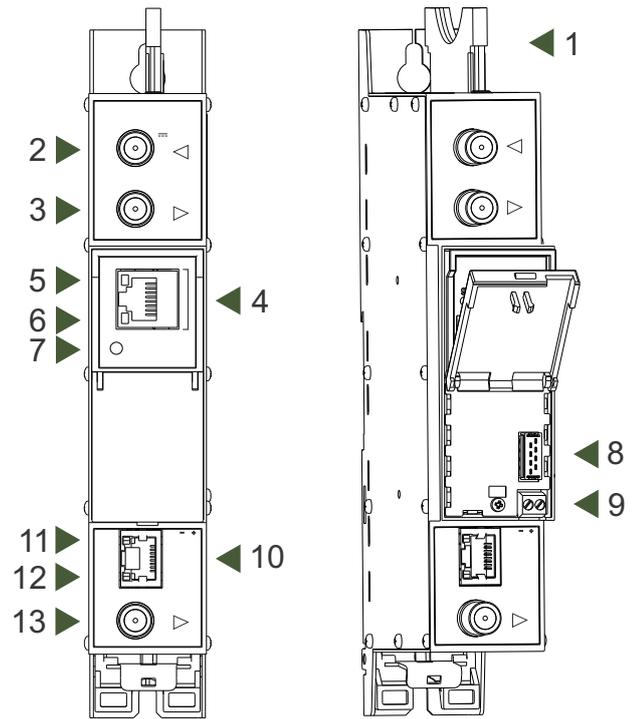
Modules are intended for indoor use only.

Characteristics:

- Input: one DVB transport stream (MPTS).
- Output: up to 24 simultaneous, IP-encapsulated services (TV or Radio programs), with individual multicast addresses and one MPTS stream.
- Information filtering of DVB tables.
- UDP & RTP transmission protocols.
- Web interface for configuration and setting.
- SNMP agent for monitoring and alarms.
- SAP & SDP protocols that facilitate automatic service selection on the user's STB and provide information to external servers.
- PID filtering.
- PSI/SI parsing.
- Transparent ECM & EMM messaging.
- PAT, PMT and SDT table regeneration.
- Routing or blocking for CAT, EIT, TDT tables.
- Configurable QoS marking.
- Configurable Time To Live.

FRONT PANEL

- 1 - CA module slot. PCMCIA socket.
- 2 - input of SAT IF signal, DC output for LNB (sdi410C); RF input of terrestrial TV, cable TV, DC output for preamplifier (sti410C);
- 3 - RF output (input signal loop-through). F socket.
- 4 - ETHERNET - control Ethernet interface. RJ45 socket.
- 5 - ACTIVITY (yellow) indicator of the control Ethernet interface.
- 6 - LINK (green) indicator of the control Ethernet interface.
- 7 - RESET button. Press this button shortly to restart the module. Press this button for more than three seconds to set default IP address of the control Ethernet interface.
- 8 - Power distribution bus connector.
- 9 - +12 V powering input (screw terminal).
- 10 - TS/IP OUT - streaming Ethernet interface. RJ45 socket.
- 11 - LINK/ACTIVITY (yellow) indicator of the streaming Ethernet interface.
- 12 - status indicator (green).
- 13 - DVB-ASI output (for another models).



Installation instructions:

- Read the safety instruction first.
- All settings can be made using the web browser via control Ethernet interface.
- Disconnect power supply unit from the mains before make all connections of modules.
- Fasten the module on DIN RAIL or individual holder.
- Connect all necessary RF, powering and control cables.
- Connect the 75 Ω load to the unused RF output F sockets.
- Connect power supply in to mains.
- Within 5-20 seconds of powering the module will run in normal operation mode.

Comments of the front panel indicators:

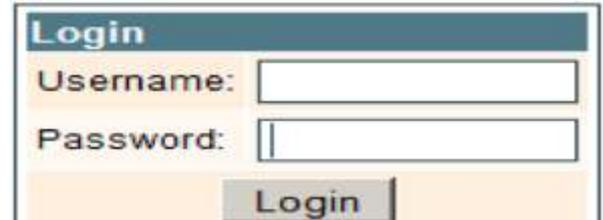
- if the link with the control Ethernet interface is established - the LINK [6] indicator glows;
- if communication via the control Ethernet interface is active - the ACTIVITY [5] indicator blinks;
- if IP streaming is active the - LINK/ACTIVITY [11] indicator blinks at frequency about six times per second, if IP streaming is inactive - indicator blinks at irregular intervals, if no link of the streaming Ethernet interface - indicator not glows;
- if the input signal is present - the status indicator [12] blinks at frequency about three times per second, if no input signal - indicator blinks at frequency about one time per second.

INITIAL CONFIGURATION

All modules leave the factory with this control Ethernet interface IP address: 192.168.1.10. In order to avoid conflicts with other IP addresses, it is necessary to perform an initial configuration in local mode. Subsequently, it will be possible to access the modules via the local area network (LAN), either to re-programme it or to check its operating status.

The modules leave the factory with the following Control Ethernet interface TCP/IP configuration:

IP address of the control interface: **192.168.1.10**
 IP address of the streaming interface: **192.168.1.11**
 Subnet mask: **255.255.255.0**
 Default Gateway: **192.168.1.1**
 Username: **admin**
 Password: **admin**



The image shows a web browser window with a title bar that says "Login". Below the title bar, there are two input fields: "Username:" followed by a text box, and "Password:" followed by a text box. At the bottom right of the form area, there is a button labeled "Login".

To access each module, use a PC or MAC personal computer equipped with an Ethernet card and RJ-45 cable (CAT-5E or CAT-6). The IP address of the PC/MAC must be configured within the following range: 192.168.1.2 - 192.168.1.254 (do not use 192.168.1.10, since this is the IP address of the module to be configured). To start the configuration of the module, open your web browser and type in the following direction: <http://192.168.1.10>. The login prompt will appear on the screen.

Access to the site is protected by user name and password. The default user name and password is admin. Enter the user name and password and click on "Login" button.

Note: the default password - admin - can (and must) be changed as explained in the "IP settings".

During initial configuration you need to change the default control and streaming Ethernet interfaces TCP/IP configuration as explained on section in the "IP settings".

Control interface IP address reset to default procedure: press the "RESET" [7] button for more than 3 seconds and release it. After this operation the control interface IP address will be set to 192.168.1.10, user name and password set to admin.

GENERAL CONFIGURATION

Initial program screen

The first screen that appears when the module accessed contains the "Main" window, which gives general information on the device.



In the top of each configuration screen you will see a main menu tabs [1]. Using it, you can switch between the different configuration menus. The tab highlighted in yellow shows which menu is active at a given moment. The "System menu" tab contains several submenu. Also common elements for all screens is module title [2] and login information strings [3]. The module title can be changed after pressing the "Change" button in the "Device information" table. Pressing on the "Logout" string you can logout from module control.

Device information table

This shows the data of module:

- "Device model": model of the module.
 - "Serial number": serial number of the module.
 - "Software version": module software version number.
 - "Hardware version": module hardware version number.
 - "IP 1": IP address of the control interface.
 - "IP 2": IP address of the streaming interface.
 - "System time": current time, synchronized from the TDT table of the input stream. Local time offset can be selected in the "IP settings" tab.
 - "Up time": time passed from last power-up or restart of the module.
- In the "Common status" table the following parameters are displayed at real time: input bit rate in kbps, output bit rate in kbps, processor load in percents, internal temperature in degrees of Celsius, power voltage in Volts.
- In the "Diagnostic information" table all module errors and comments how to eliminate these errors are displayed.

Diagnostic information	
Streaming ETH interface link down	Check Ethernet cable and switch
No input signal	Check input cable, ensure, that input settings are correct

Input settings

This screen consists of three tables: "RF input", "List of services" and "Input status". The "RF input" table is used to configure parameters corresponding to the input satellite transponder (sdi410C module), terrestrial or cable transponder (sti410C module). In the "List of services" table the list of services, available in the input transponder is displayed. In the "Input status" table you can see real time status of the input section.

The "RF input" table is different according the input signal of module.

RF input table

The "RF input" table for sdi410C, sda410C module consists of following parameters:

"LNB LO frequency" - the LNB local oscillator lower frequency in megahertz. Use 9750 MHz for the universal converter.

"LNB HI frequency" - the LNB local oscillator upper frequency in megahertz. Use 10600 MHz for the universal converter.

"LNB voltage" – power supply of the converter – can be set to "Off", "Auto", "13V", "18V", "13V/22kHz", "18V/22kHz". If "Auto" is selected, power supply voltage of the converter is chosen according to set polarisation – 18V Horizontal, 13V Vertical; if the "Frequency" of the satellite exceeds the value $F=(950+LNB\ Hi+2150+LNB\ Lo)/2$, the 22 kHz signal is switched ON and "LNB Hi freq." is selected.

For example: LNB Hi=10,600, LNB Lo=9750, then $F=(950+10,600+2150+9750)/2=11,725$ MHz. When power supply of the converter is set to value different from "Auto" - "LNB HI frequency", "Satellite", "Polarisation" rows are disabled and the "LNB LO frequency" value is used for IF frequency calculation.

"Satellite" – DISEQC command is used to select the satellite when the switch that supports DISEQC protocol is present.

Possible commands: "None", "SATA", "SAT B", "SAT C", "SAT D".

"Polarisation" - the polarisation of converter. Can be "Horizontal" or "Vertical".

"Frequency" - the frequency of the satellite transponder in megahertz.

"Symbol rate" - the symbol rate of the satellite transponder in kilo symbols per second.

RF input		
LNB LO frequency	<input type="text" value="9750"/>	MHz
LNB HI frequency	<input type="text" value="10600"/>	MHz
LNB Power	<input type="text" value="Auto"/>	
Satellite	<input type="text" value="SAT A"/>	
Polarization	<input type="text" value="Horizontal"/>	
Input frequency	<input type="text" value="11053"/>	MHz
Symbol rate	<input type="text" value="22000"/>	Ks/s
<input type="button" value="Update"/>		

The "RF input" table for sti410C module consists of following parameters:

"Modulation standard" - used to select from the "DVB-T/T2" and "DVB-C" modulation standards.

"Preamplifier power" - used to switch on/off the power for the RF preamplifier.

"Input bandwidth" - the bandwidth of DVB-T/T2 transponder. Can be selected from values 8 MHz and 7 MHz.

"Input frequency" - the frequency of the terrestrial or cable transponder in kilohertz.

When the tuner is locked to the DVB-T2 transponder

with multi PLP modulation, the additional parameter "PLP number" is displayed in the "RF input" table. When the

"Modulation standard" set to DVB-C, the "Preamplifier power" parameter is hidden and power for the RF preamplifier is switched off; instead of the "Input bandwidth" parameter the "Symbol rate" parameter is displayed. Enter the value in kilo symbols per second.

RF input		
Modulation standard	<input type="text" value="DVB-T/T2"/>	
Preamplifier power	<input type="text" value="On"/>	
Input bandwidth	<input type="text" value="8MHz"/>	
Input frequency	<input type="text" value="658000"/>	kHz
PLP number	<input type="text" value="0"/>	
<input type="button" value="Update"/>		

Input status table

The following information is displayed in the table "Input status".

"Lock status" "Locked" - the streamer module has synchronised with the input signal; "Unlocked" – the streamer module has not synchronised with the input signal.

"Input level" - RF signal level at the module input. Level indication – approximate.

The values of the following parameters are displayed only if the streamer module has synchronised with the input signal.

"Modulation standard" – detected standard of the input signal.

Possible values of the standard: DVB-S, DVB-S2 (sdi410C); DVB-T, DVB-T2, DVB-C (sti410C).

"Frequency" – intermediate frequency (sdi410C, sda410C) or RF frequency (sti410C) at the module input.

"Modulation" – modulation scheme of the input signal.

Possible values of the modulation scheme:

QPSK, 8PSK (sdi410C, sda410C);

QPSK, QAM16, QAM32, QAM64, QAM128, QAM256 (sti410C)

"Modulation mode" – OFDM modulation mode of the input signal (sti410C only). Values: 8k or 2k.

"FEC" – forward error correction.

"Guard interval" – guard interval of OFDM signal (sti410C only)

"Symbol rate" – the symbol rate of the satellite transponder in kilo symbols per second (sdi410C only).

"SNR" – RF signal/noise ration at the input of module.

"VBER" – bit error rate after Viterbi corrector. To get the signal without any errors at the output of the tuner, VBER shall not exceed 2E-4.

"PER" – ratio of the MPEG transport error packets to the whole number of packets.

If the number of error packet is equal to zero, the opposite value to whole number of packets is displayed. Packet counters are reset during RF input parameters update.

"Input bitrate" – bitrate of the input signal.

► Input status

- Lock status: **Locked**
- Modulation standard: **DVB-T**
- Input level: **66 dBµV**
- Frequency: **506000 kHz**
- Modulation: **QAM64**
- Modulation mode: **8K**
- FEC: **2/3**
- Guard interval: **1/32**
- SNR: **32.2 dB**
- VBER: **<1.0E-8**
- PER: **<2.9E-09**
- Input bitrate: **24880 kbps**

List of services table

The table shows all of the input transport stream services, including different details (type, name, identifier). Also UDP unicast streaming via the control interface can be started, services for descrambling by CA module can be selected and descrambling status observed.

Service title	Service ID	Descramble	Descrambling status
NatGeo HD (TEO) Watch	171	<input checked="" type="checkbox"/>	
Discovery HD (TEO) Watch	173	<input checked="" type="checkbox"/>	
Eurosport HD (TEO) Watch	174	<input checked="" type="checkbox"/>	

Click on the "Watch" button to see selected channel. The module will start an UDP unicast streaming via the control interface. Maximum output bitrate of the UDP unicast is 8 Mbps. VLC Media Player must be installed, downloadable from <http://www.videolan.org>

The checkboxes in the "Descramble" column are used to select services for descrambling by CA module. Several services can be selected, if the module supports simultaneous descrambling of several services. The "Descrambling status" icon meanings: - service is descrambled successfully, - service is not descrambled.

Detailed service information

Press “+” the icon at the start of the list of services line. The detailed service information table will appear:

Service title	Service ID	Descramble	Descrambling status
NatGeo HD (TEO) Watch	171	<input checked="" type="checkbox"/>	
<div style="border: 1px solid orange; padding: 5px;"> <p>Service title: NatGeo HD (TEO)</p> <p>Service provider: TEO</p> <p>Service ID: 171</p> <p>PMT PID: 706</p> <p>H.264 Video PID: 7006 Descramble <input checked="" type="checkbox"/></p> <p>MPEG1 Audio PID: 7061 eng Descramble <input checked="" type="checkbox"/></p> <p>MPEG1 Audio PID: 7062 rus Descramble <input checked="" type="checkbox"/></p> <p>PCR PID: 7006</p> </div>			
Discovery HD (TEO) Watch	173	<input checked="" type="checkbox"/>	
Eurosport HD (TEO) Watch	174	<input checked="" type="checkbox"/>	

This table is used to see detailed service information and select individual streams for descrambling. The following service information is shown in the table: service title, service provider, service ID, PMT PID, types and PID-s of service streams, PCR PID. After checking the "Descramble" checkbox of service line, all streams of this service are included in a descrambling list of the CA module. Unnecessary streams can be deselected from the descrambling list by unchecking corresponding "Descramble" checkboxes of streams. Close the “+” table by clicking on the icon.

Output settings

This screen consists of three tables: "Streaming settings", "SAP/SDP settings" and "Output streams". The "Streaming settings" table is used specify common streaming parameters to all output streams. The "SAP/SDP settings" table is used to configure the announcement and service description SAP/SDP channel. The "Output streams" table is used to individually configure the output streams.

Streaming settings table

This table is used specify common streaming parameters to all output streams. This table consists of following lines:
 "Protocol" - the drop down menu offers two options: UDP and RTP/UDP. UDP is a transport protocol which is not connection oriented and is particularly useful for streaming. RTP/UDP adds extra data fields so that the data flow is served at the correct speed for its projection in real time.
 "TS packet count" - count of the MPEG2 TS packets in the UDP packet. Can be selected from one to seven. It is recommended to select the value of seven packets.

Streaming settings	
Protocol	UDP
TS packet count	7
Time To Live	64
QoS	High priority vi
Count of output streams	4
Send IGMP query messages	<input checked="" type="checkbox"/>
Update	

"Time To Live" - a parameter used to restrict the stream multicasting range. A number between 1 and 255 is entered in this box. Each time that an IP stream passes through a router, the TTL is reduced by one unit. The stream will be rejected by any router when the TTL value is reduced to zero.

"QoS" - quality of Service. The drop down list offers five differentiated service options or Diffserv. These options relate to the priority that you wish to assign to the streaming packets on their routes through switches or routers that are QoS management capable.

QoS values:

- 1 - Top priority
- 2 - High priority video
- 3 - Low priority video
- 4 - Video and voice
- 5 - Best effort (best effort made to correctly deliver the video data and the associated audio data)

"Count of output streams" - count of output streams, displayed in the "Output streams" table bellow. Can be selected from one to twenty five. After updating of the FR input parameters this count is automatically set to input stream count value.

"Send IGMP query messages" - enable of the IGMP query messages transmitting. Enable this function when the streaming output of module is connected to the manageable Ethernet switch with IGMP snooping support. In order for IGMP snooping to function, a multicast router must exist on the network and generate IGMP queries. The tables created for snooping are associated with the querier. Without a querier the tables are not created and snooping will not work. When the IGMP query messages send enabled, the module acts as the multicast router. It is sufficient to enable the IGMP query in one module per one Ethernet switch.

Once the different data values have been entered, click on "Update" to conclude the streaming settings.

SAP/SDP settings table

This table is used to configure the announcement and service description SAP/SDP channel. SAP and SDP are two protocols for creating an EPG type program guide.

"Enable" - check the box if you wish to transmit the program guide.

"Sending period" - introduce the time interval, in seconds, at which the transmitted programmes guide will refresh.

"Username" - the name entered will be transmitted on the SAP/SDP channel.

"IP address" - multicast address of SAP/SDP messages. It is need to be changed only when your IP receiving equipment use different address.

"Group names" - the names of SAP/SDP groups whose can be assigned to the output streams. Click on "Update" to save the SAP/SDP channel configuration data.

SAP/SDP settings		
Enable	<input checked="" type="checkbox"/>	
Sending period	<input type="text" value="5"/>	sec.
Username	<input type="text" value="Test"/>	
IP address	<input type="text" value="224.2.127.254"/>	
Group names	<input type="text" value="News\nEntertainment\nMusic"/>	
<input type="button" value="Update"/>		

Output streams table

This table is used to individually configure the output streams.

	Enable	IP address	IP port	Service title	Output bitrate,kbps
<input type="button" value="Update"/>					
1	<input type="checkbox"/>	239.192.2.0	1234	All transport stream	0
2	<input checked="" type="checkbox"/>	239.192.2.1	1234	NatGeo HD (TEO) <input style="font-size: 8px; vertical-align: middle;" type="button" value="+"/>	7600
3	<input type="checkbox"/>	239.192.2.2	1234	Discovery HD (TEO) <input style="font-size: 8px; vertical-align: middle;" type="button" value="+"/>	0
4	<input type="checkbox"/>	239.192.2.3	1234	Eurosport HD (TEO) <input style="font-size: 8px; vertical-align: middle;" type="button" value="+"/>	0

The description of the table columns.

"Enable" - enable streaming of service.

"IP address" - the multicast address required for the stream to be added. The available range is from 224.0.0.0 to 239.255.255.255, but it is recommended to reduce it from 224.0.1.0 to 238.255.255.255.

"IP port" - the IP port required for the stream to be added. The default value is 1234.

"Service title" - select the service from available input services. In the second line sending of the entire transport stream can be enabled.

"Output bitrate" - current output bitrate of stream in kbps. When the streaming Ethernet interface is not connected, all output bitrates will be zero. To confirm the configuration, click on the "Update" button.

Advanced output settings

For advanced users, the possibility exists of opening an additional table with further configuration options related to the output services. To open this table, click on the icon "+" next to the service title.

Enable	IP address	IP port	Service title	Output bitrate,kbps	
<input type="button" value="Update"/>					
1	<input type="checkbox"/>	239.192.0.0	1234	All transport stream	0
2	<input checked="" type="checkbox"/>	239.192.0.1	1234	tagesschau24 HD <input style="font-size: 8px; vertical-align: middle;" type="button" value="+"/>	11800
<div style="text-align: right; margin-bottom: 5px;"><input type="checkbox"/> Include EPG information</div> <div style="text-align: right; margin-bottom: 5px;"><input type="checkbox"/> Include CA information</div> <div style="text-align: right; margin-bottom: 5px;">SAP/SDP group: <input type="text" value="News"/></div> <div style="text-align: right; margin-bottom: 5px;">SAP/SDP channel number: <input type="text" value="1"/></div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> Service title: tagesschau24 HD New service title: <input type="text"/> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> Service provider: ARD New service provider: <input type="text"/> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> H.264 Video PID: 5401 Enable <input checked="" type="checkbox"/> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> MPEG1 Audio PID: 5402 deu Enable <input checked="" type="checkbox"/> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> Teletext PID: 5404 Enable <input checked="" type="checkbox"/> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> AC-3 Audio PID: 5406 deu Enable <input checked="" type="checkbox"/> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> Private section PID: 170 Enable <input checked="" type="checkbox"/> </div> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> ISO/IEC 13818-6 type B PID: 2171 Enable <input checked="" type="checkbox"/> </div> <div style="text-align: center; margin-top: 5px;"><input type="button" value="Update"/></div>					
3	<input checked="" type="checkbox"/>	239.192.0.2	1234	Einsfestival HD <input style="font-size: 8px; vertical-align: middle;" type="button" value="+"/>	15900
4	<input checked="" type="checkbox"/>	239.192.0.3	1234	EinsPlus HD <input style="font-size: 8px; vertical-align: middle;" type="button" value="+"/>	15500

DVB-S2/T2/C to IP STREAMERS

The description of the table rows:

"Include EPG information" - check this to include EPG information from the input stream.

"Include CA information" - check this to include all conditional access information required to descramble output service at the IP receiving side. Leave this checkbox unchecked when service is descrambled by the inserted CA module.

"SAP/SDP group" - select from the drop down menu the SAP group to which you want to link the service. The group will have been previously created through the SAP/SDP settings table.

"SAP/SDP channel number" - enter the order number you want to assign to the service on the subscriber's set-top box or reproducer, if the device supports SAP.

"New service title" - the name given to the service on the subscriber's set-top box or reproducer, if the device supports SAP/SDP protocol. The name that the service has on the input transport stream is the default name. Also this name will be used as the output service name.

"New service provider" - enter the provider name of the output stream. This name will be used in the SDT table.

Within the "Enable" checkboxes next to the stream PIDs it is possible to select the streams to be broadcast for each service (the video PID cannot be disabled). By default, all the PIDs are selected and remain so until this configuration is altered. When you have made your selection, confirm it by clicking on the "Update" button and close the advanced settings table by clicking on the "-" icon.

IP settings

This screen (Figure 21) consists of four tables: "Control interface IP parameters", "Streaming interface IP parameters", "Time parameters" and "IP status". The IP parameters tables are used to configure ethernet connection parameters of both interfaces. In the time parameters table a local time offset can be set. In the IP status table current status of both Ethernet interfaces and total output bitrate is displayed.

Control interface IP parameters	
MAC address	00-1C-A3-00-1E-4B
IP address	<input type="text" value="192.168.0.235"/>
Subnet mask	<input type="text" value="255.255.255.0"/>
Gateway	<input type="text" value="192.168.0.2"/>
Watching UDP port	<input type="text" value="1234"/>
Enable WEB control from streaming interface	<input type="checkbox"/>
<input type="button" value="Update"/>	

ASTRA 11053 H TP

Logged in as: **admin**
[Logout](#)

► **IP status**

- Control interface: **100 FULL**
- Streaming interface: **100 FULL**
- Output bitrate: **87100 kbps**

Streaming interface IP parameters	
MAC address	00-1C-A3-00-1E-4C
IP address	<input type="text" value="192.168.1.11"/>
Subnet mask	<input type="text" value="255.255.255.0"/>
Gateway	<input type="text" value="192.168.1.1"/>
<input type="button" value="Update"/>	

Time parameters	
Local time offset, hour	<input type="text" value="+3"/>
<input type="button" value="Update"/>	

The description of the "IP parameters" tables rows.

"MAC Address" - the physical address of the module's ethernet network card is displayed automatically.

"IP Address" - enter the IP address that you wish to assign to the module. This address must fall within the range of local network addresses.

"Subnet mask" - enter the local network mask.

"Gateway" - enter the IP address of this gateway. This information is only required if you want to access the module from the Internet.

It is possible to control the module via streaming interface. Check the enable WEB control from streaming interface checkbox to enable this function.

Note: for security reasons WEB control from streaming interface should be disabled.

CAM settings

This screen consists of three tables: "CA module monitor", "CA module information" and "CA module menu". In the "CA module monitor" table CAM restart function in case of descrambling error can be enabled. It is recommended to turn off this

option if inactivated conditional access card has been inserted.

The content of the remaining tables depends on the inserted CA module.

In the CA module information table general information about inserted CA module is displayed. When there no CA module inserted, in the "Status" line is a message: "No module inserted" and remaining lines are empty. Otherwise, the "Status" contains message "Initialised" and remaining lines are filled with information read from the CA module. As an example, above "CA module menu" table shows the menu for a particular CAM. Click on the corresponding band to access different options. Click on the "Back" button to return to previous menu, click on the "Home" button to return to start menu.

CA module monitor	
<input checked="" type="checkbox"/>	CAM restart on descrambling error

CA module information	
Status	Initialised
Manufacturer	G
Product	M
Title	
Supported CA systems	0B00 Norwegian Telekom 0B01 Norwegian Telekom 0B02 Norwegian Telekom

CA module menu	
PowerCam_HD V2.0	
Main Menu	
SmartCard & PIN	
CAS	
VP: 96448	
Download Status	
CSP - Enabled	
Select one and press 'OK' to continue	
Back	Home

SNMP settings

This menu tab contains the SNMP configuration table.

The description of the "SNMP configuration" table rows.

"Read Community" - community name acts as a password that is shared by multiple SNMP agents and one or more SNMP managers. The "Read Community" password is used for read-only access to streamer parameters.

"Write Community" - is the password used for read-write access to streamer parameters.

"Enable TRAP" - SNMP traps are alerts generated by agents on a managed device. Check this box to enable TRAP generation. The streamer generates traps when the diagnostic message occurs.

"TRAP Community" - is the password used for accessing of TRAPS.

"Host IP #1","Host IP #2" - IP addresses of hosts with SNMP managers, where TRAPS will be send.

SNMP configuration	
Read Community	<input type="text" value="public"/>
Write Community	<input type="text" value="private"/>
Enable TRAP	<input type="checkbox"/>
TRAP Community	<input type="text" value="public"/>
Host IP #1	<input type="text" value="192.168.1.1"/>
Host IP #2	<input type="text" value="192.168.1.2"/>
Download MIB file	
<input type="button" value="Update"/>	

System menu

This menu tab contains following submenu items: "Event logs", "Export parameters", "Import parameters", "Firmware upgrade", "User management", "Restore defaults", "Reset the device", "Language".

Event logs

Move the mouse on the System menu tab then click on the "Event logs" line. The event logs screen will appThis enables you to see a list of the log messages of the module. Log contents remains after the power loss of module.

Logs filtering

System error
 High priority error
 Low priority error
 Event

Critical error
 Error
 Warning
 Message

Date/Time	Event type	Event description
2014-07-04 11:05:01	Error	Service NatGeo HD (TEO) descrambling stopped
2014-07-04 11:05:00	Error	Service Eurosport HD (TEO) descrambling stopped
2014-07-04 11:04:57	Error	Service Discovery HD (TEO) descrambling stopped
2014-07-04 11:04:48	Event	CA module removed
2014-07-04 00:00:00	Event	Midnight date changed
2014-07-03 00:00:00	Event	Midnight date changed
2014-07-02 10:59:37	Event	UDP streaming finished
2014-07-02 10:57:49	Event	UDP streaming to IP 192.168.0.84 started
2014-07-02 09:08:43	Event	UDP streaming finished
2014-07-02 09:07:03	Event	UDP streaming to IP 192.168.0.84 started
2014-07-02 09:06:53	Event	UDP streaming finished
2014-07-02 09:04:52	Event	UDP streaming to IP 192.168.0.84 started
2014-07-02 09:04:21	Event	UDP streaming finished
2014-07-02 09:03:23	Event	UDP streaming to IP 192.168.0.84 started
2014-07-02 09:03:11	Event	UDP streaming finished
2014-07-02 09:01:55	Event	UDP streaming to IP 192.168.0.84 started
2014-07-02 09:01:20	Event	Service Eurosport HD (TEO) LAST requested from CAM
2014-07-02 09:01:20	Event	Service Discovery HD (TEO) MORE requested from CAM
2014-07-02 09:01:20	Event	Service NatGeo HD (TEO) FIRST requested from CAM
2014-07-02 09:01:18	Event	Service Discovery HD (TEO) LAST requested from CAM
2014-07-02 09:01:18	Event	Service NatGeo HD (TEO) FIRST requested from CAM
2014-07-02 09:01:10	Event	Service NatGeo HD (TEO) ONLY requested from CAM
2014-07-02 09:00:45	Event	UDP streaming finished
2014-07-02 08:58:55	Event	UDP streaming to IP 192.168.0.84 started
2009-03-05 14:03:02	Event	Service Nashe Lubimoiye Kino (TEO) ONLY requested from CAM
2014-07-02 08:54:43	Event	Date and time updated from TS
2014-07-02 08:54:29	Event	CA module initialised
2014-07-02 08:54:24	Event	Control ETH interface link up: 100Base-TX full-duplex
2014-07-02 08:54:22	Event	CA module inserted
2014-07-02 08:54:22	Event	Streaming ETH interface link up: 100Base-TX full-duplex

Events in the log e are sorted by time – the newest are in the beginning. Information events are shown in blue background, error messages are in red. After switching on the unit, the current date is set to 2000:01:01 and time to 00.00.00. When the MPEG stream is received, the information about date and is decoded too, and the values of these parameter are corrected.

Local time offset in the log is used from the time parameters table. You can filter required messages setting corresponding "Logs filtering" checkboxes.

Export parameters

All of the data established on the streamer module can be saved onto a backup file. Inversely, the configuration data saved on an appropriate file can be restored on streamer module. Move the mouse on the System menu tab then click on the "Export parameters" line. A window is displayed which allows you to select the action for the data file for the current streamer configuration. You need to select the "save file to disk" option.

Import parameters

Select this option in "System menu" tab. The Import parameters window is displayed.

Import parameters

Expected file name: ***.xml**

Click on "Click to select file" and select the file containing the configuration data that you wish to restore on the streamer module. Once you have selected the file, click on the "Upload" button at the bottom of the screen. The upload confirmation window will be displayed.

Firmware upgrade

If you wish to update the streamer's firmware, select this option in "System menu". The card displayed shows the firmware version that the streamer has at the present time.

Current software version: **1.10**

Firmware upgrade

Expected file name: **908XX.bin**

Version: **1.10**

Click on "Click to select file" and select the firmware update file from the hard drive. When the file name is in the box, click on "Upload". The new firmware will be installed on the streamer.

User management

Select this option in "System menu" tab. The user management window is displayed.

Change password	
Username:	<input type="text" value="admin"/>
Current password:	<input type="password" value="•••••"/>
New password:	<input type="text"/>
Repeat new password:	<input type="text"/>
<input type="button" value="Modify"/>	

User management			
Username:	Password:	Role:	<input type="button" value="Update"/> <input type="button" value="Remove"/>
<input type="text" value="Virgis"/>	<input type="text"/>	<input type="text" value="User"/> ▼	
Username:	Password:	Role:	<input type="button" value="Add"/>
<input type="text"/>	<input type="text"/>	<input type="text" value="Admin"/> ▼	

This window consists of two tables: "Change password" and "User management". The "Change password" table allows you to change the password. Enter the new password in the "New password" field and confirm the new password retyping it in the "Repeat new password" field. The change of password will not take effect until you press the "Modify" button.

In the "User management" table you can manage users, who will be able to login into the streamer. Enter the new username and password in the appropriate fields, select desired role for user and press the "Add" button to add new user or "Update" button to change settings of the user. User role "Admin" enables the password change function and user management function. User role "User" enables only password change function. Press the "Remove" button to remove user from list.

Restore defaults

Clicking on the "Restore defaults" submenu in the "System menu" tab resets the configuration of the streamer module to the factory default values. The Control and streaming interfaces IP parameters remains unchanged.

Reset the device

Clicking on the "Reset the device" submenu in the "System menu" tab causes the streamer module to restart.

Language

If you wish to change the streamer's menu language, select this option in the "System menu".

Specifications

SAT mode (SDI-410C)

Demodulation	QPSK, 8PSK
Input level	45...85 dBuV
Input resistance	75 Ohm
Symbol rate	2...45 Msymb/s (QPSK) 2... 37 Msymb/s (8PSK)
FEC	1/2_2/3_3/4_5/6_6/7_7/8 (QPSK) 1/2_3/5_2/3_3/4_4/5_5/6_8/9_9/10 (8PSK)
Input frequency range	950...2150 MHz
Tuning step	1 MHz
LNB control	0/14/18 V, 300 mA max, DiSEqC 1.0

TERRESTRIAL mode(STI-410C)

Demodulation	OFDM 2K, 4K, 8K, 16K, 32K modes
Guard Interval	1/128, 1/32, 1/16, 19/256, 1/8, 19/128, 1/4
FEC	1/2, 3/5, 2/3, 3/4, 4/5, 5/6
Pilot Signals	PP1-PP8
Input level	30 dBuV ... 80 dBuV
Input frequency range	47MHz... 862MHz
Input resistance	75 Ohm
Active antenna voltage	+12V, up to 100mA

IP TS output

Standard	IEE802.3 10/100 Base-T
Stream rate	до 100 Mbps
Output TS quantity	up to 24
Output protocols	UDP/RTP
multicast, MPTS, SPTS	Yes
Control port	Standard IEE802.3 10/100 Base-T
Supply voltage	12 V ± 1 V
Current consumption	0.2A (without external load and CAM-module); 0.4A with CAM
Temperature range	0° ÷ +50°C
Dimensions	36x198x107.5 mm
Weight	0.84 kg

ARCOTEL WT8628C Optical Transmitter



ARCOTEL OPTICAL TRANSMITTER

PRODUCT DESCRIPTION

Optical transmitter is intended to transfer cable television signals through optical fiber. It is equipped with a high-stable cooled DFB laser (made in USA). Structurally it is made in a form of unit in height 1U under installation into the 19" rack and has built-in supply unit. It is controlled by microprocessor with the possibility of installation of notification thresholds at underrating or uprating of transmitter working parameters, setting of the parameter of transmitted signals quantity, automatic or manual adjustment of the RF signal level transmitted to the laser, and possibility of remote monitoring of main parameters of the transmitter by means of SNMP network protocol.

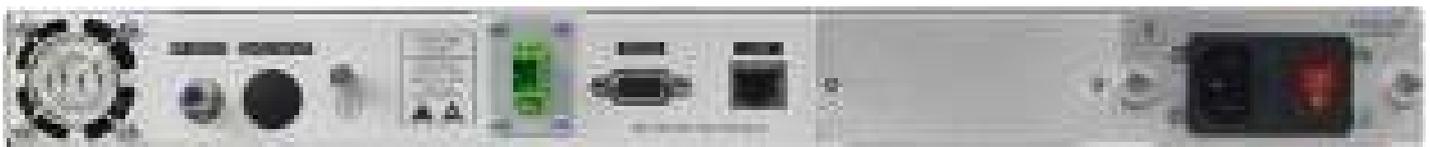
FRONT PANEL



The front panel of the transmitter consists of the following elements:

- digital indicator of working modes control. Depending on the indication mode, it can give an information about output optical power, laser temperature, laser current, or coolant current etc.
- F socket of the test point of the input RF signal;
- laser switch lock. This key must be in the "Off" position when power is applied to the device;
- control buttons;
- LED indicators of work modes.

REAR PANEL



The rear panel of the transmitter consists of the following elements:

- Input socket of a RF signal;
- LAN interface for network monitoring;
- Output optical connector;
- Socket of connection of mains supply cable;
- RS232 port.

DEVICE OPERATION

Safety Requirements

Installation of the transmodulator must be done according IEC60728-11 and national safety standards.

Any repairs must be made by qualified personnel.

Supply Voltage

Power supply AC 220V is not safety.

Overload

Avoid overloading the supply network by extension cords or adapters. It may cause fire or give you an electric shock.

Liquid Substances

Store liquid substances away from the device and make sure no such substances get inside the device.

Foreign Objects

Please keep coins and other small objects away from the device to prevent their getting through the vent slots, which may cause serious damage to device. Getting of insects into the device may also damage the device and, consequently, cause fire.

Cleaning

Disconnect the device from power supply before cleaning. Use soft, slightly damp cloth to clean the surface of the casing. Never use any solvents!

Ventilation

Make sure the vent slots are open and the location where the device is installed allows free air circulation. Never put the device on a soft surface or cloth. Do not operate and never store the device on the heat or under direct sunlight. Never put any other appliances on top of the device.

Connected Devices

Do not connect any unauthorized appliances to the device as it is dangerous and may damage the appliance and this device.

Location

Install the device indoors on hard surface. Make sure the device is well protected from direct sunlight or moisture.

Grounding

The device has a grounding terminal, which must be connected to a common grounding bus to protect the laser transmitter from static voltage.

WARNING: Subject to compliance with the instructions, the device life is 5 (Five) years following the manufacture date. Terms and conditions of further operation must be agreed upon by the owner of device and the service company.

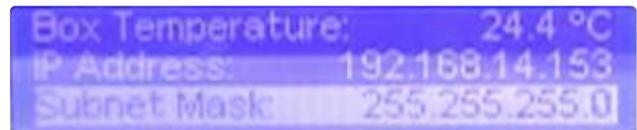
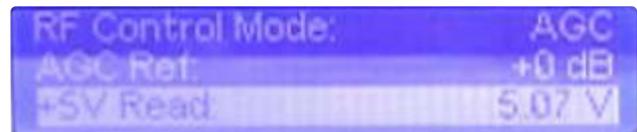
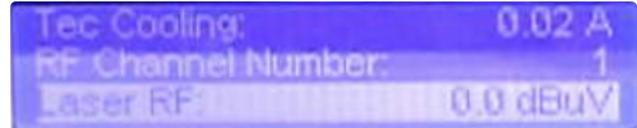
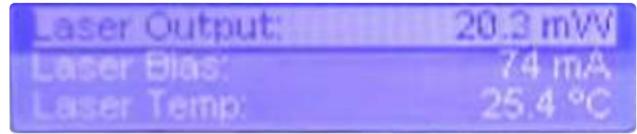
SPECIFICATIONS

Name	Value
Input frequency range	47-862 MHz
Input RF signal level	80 dBm _{kV}
CTB distortions at 84 channels, not worse	-65 dB
CSO distortions at 84 channels, not worse	-60 dB
Range of manual adjustment of the input signal	± 8 dB
Range of adjustment of AGC system	± 8 dB
C/N ratio (C/N, at -1dBm at input)	51 dB
Unevenness of amplitude-frequency characteristic	± 0.75 dB
Input resistance	75 Ohm
Output optical power	28(14.5dBm) mW
Wave working length	1310 nm
Optical connector type	SC/APC
Supply voltage, consumed power	220 V, 40 W
Dimensions, weight	482/380/44 mm, 4 kg
Working temperature range	0° ÷ +50 °C

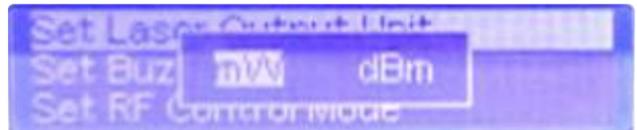
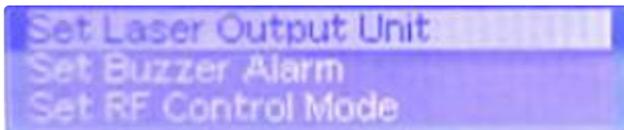
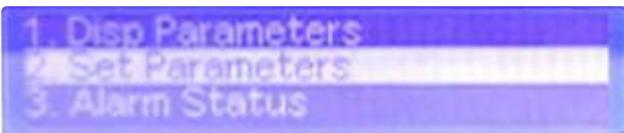
INITIAL CONFIGURATION BY FRONT PANEL BUTTONS

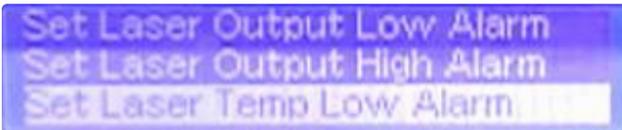
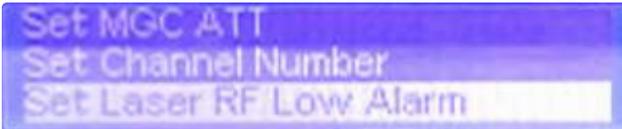
All settings of the device can be checked and changed using the buttons and the indicator of the front panel.

Menu DISP PARAMETERS shows all current parameters of the device.

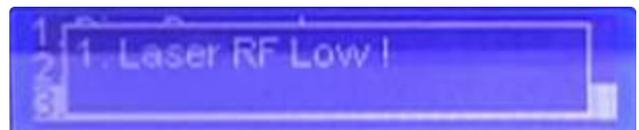
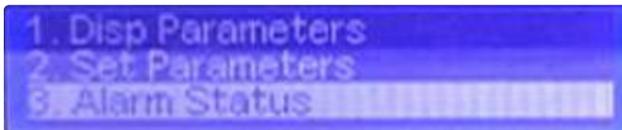


Changes to the current settings of the device can be made using the SET PARAMETERS menu.



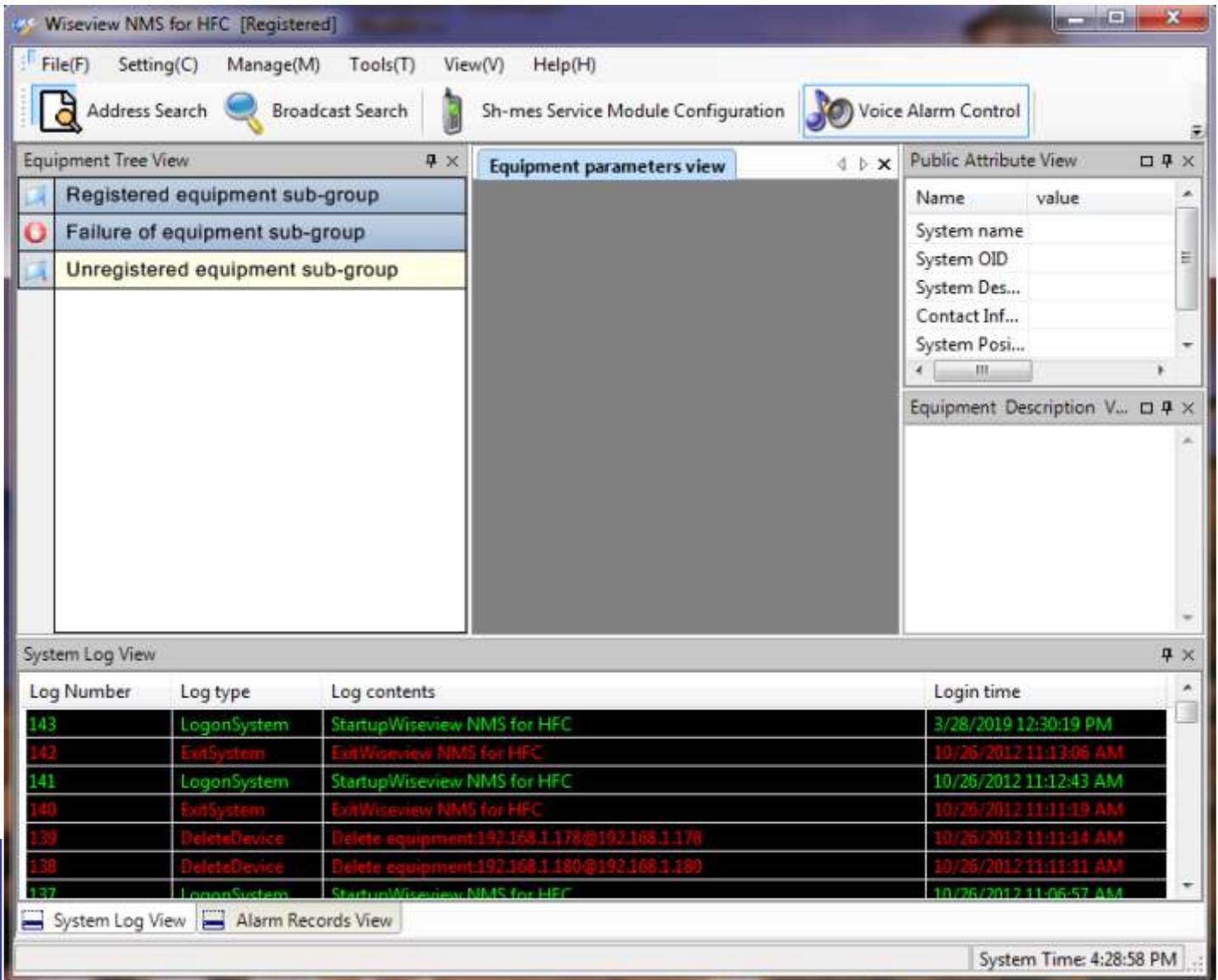


Menu ALARM STATUS shows signals of alarm indication.

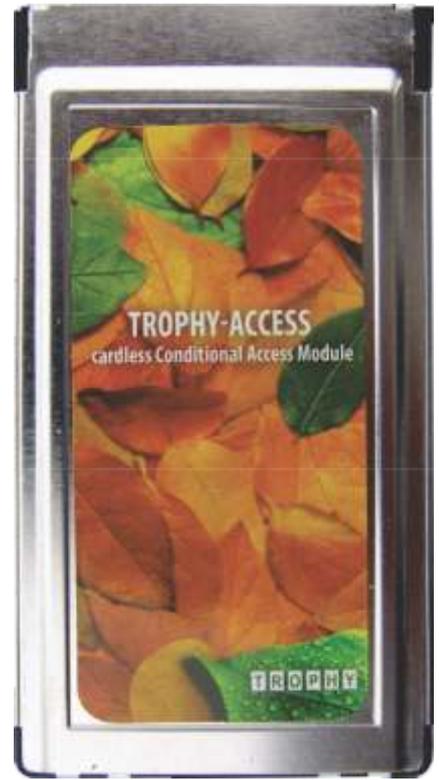


MANAGEMENT BY SNMP

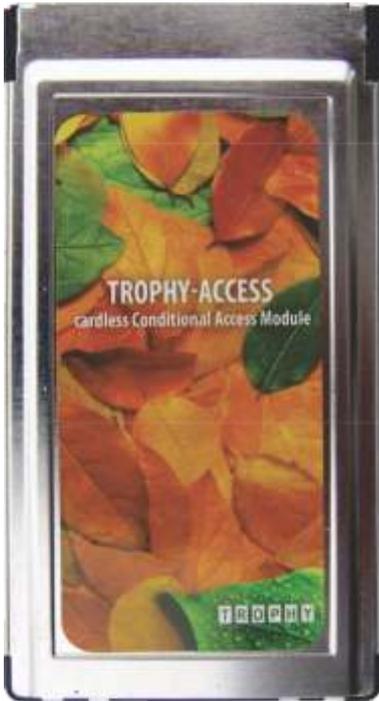
Operator has possibility of remote monitoring of main parameters of the transmitter by means of SNMP network protocol. You must to install "Wiseview NMS for HFC" program to your computer and to connect transmitter and computer by Ethernet connection.



TROPHY-ACCESS CARDLESS CONDITIONAL ACCESS MODULE



CAM-MODULE



TROPHY-ACCESS CI CAM-module is fully compatible to the equipment which support EN50221 standard (Common Interface Specification for Conditional Access and other Digital Video Broadcasting Decoder Applications).

Module installed in CI or CI+ slot of TV-panel or Common Interface of digital Set-Top-Box.

Descrambling of digital TV signal gated by TROPHY-ACCESS CAS implemented without SMART-card.

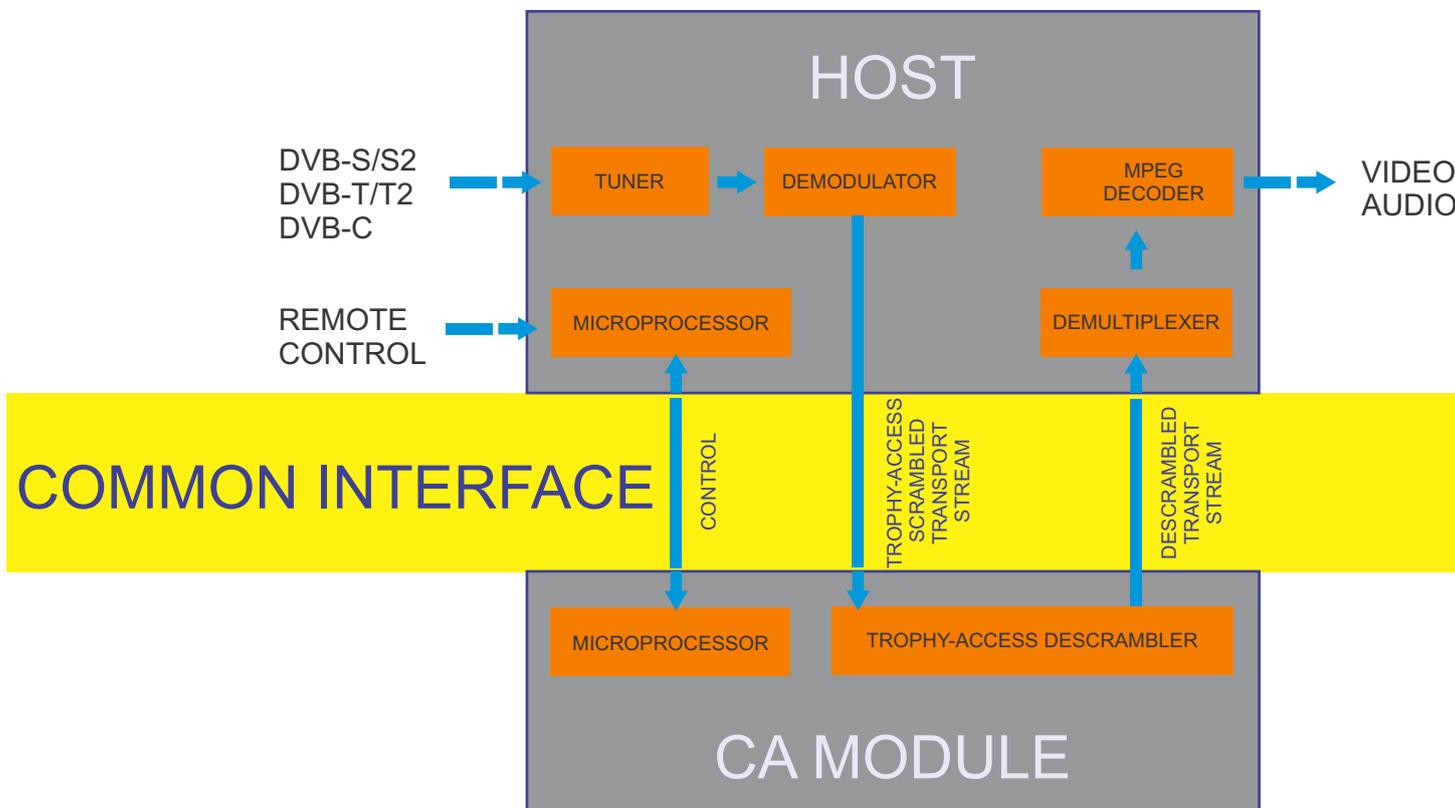
Authorized TROPHY-ACCESS service center implement programming of modules and assign a unique ID.

Module ID is indicated in QR code deposited on the rear side of the module.

ID of TROPHY-ACCESS CAM-module is displayed in the CAM menu of the TV panel or STB. The menu also displays personal messages generated by TROPHY Head-End Billing Server.

Connector type	68-pins PCMCIA
Voltage	4.5...5.5V
Current consumption	no more than 100mA
Dimensions	100 x 58 x 5mm
Working temperature	0... 50°C
Weight	45g

Common Interface CAM-module functional scheme



CAM-MODULE