1. Product description

The transmodulators are designed for digital transmodulation with Transport Stream Processing. Modules processor enables services filtering, remultiplexing, modifying SI (Service Information), generating NIT (Network Information table), LCN (Local Channel Number), restamping PCR (Program Clock Reference). All of the configurations can be changed using the Web Interface.

tdx4168 – transmodulator with 16 DVB-S/S2 input channels and 8 DVB-T output channels (outputs are grouped into 2 groups that consists of four neighbouring channels).

tdq4168 – transmodulator with 16 DVB-S/S2 input channels and 8 DVB-C/J.83B output channels (outputs are grouped into 2 groups that consists of four neighbouring channels).

Transmodulator can be used as stand alone device or as part of the headend station.

The product is intended for indoor usage only.

2. Safety instructions

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

Any repairs must be made by skilled personnel.

Avoid placing the transmodulator next to heat sources such as central heating components or in areas of high humidity.

Keep the transmodulator away from naked flames.

If the transmodulator has been kept in cold conditions for a long time, bringing it into a warm environment may cause condensation, so allow it to warm up for no less than 2 hours before powering.

Ventilation should not be impeded by covering the transmodulator, such as newspapers, table-cloths, curtains etc.

Mount the transmodulator in a vertical position only. If installing in a 19" rack system additional forced air cooling fans may be required (see table "Technical specifications" - operating temperature range).

Always allow 10 cm of free space from the top, front and bottom of the unit to enable any heat to be dissipated.

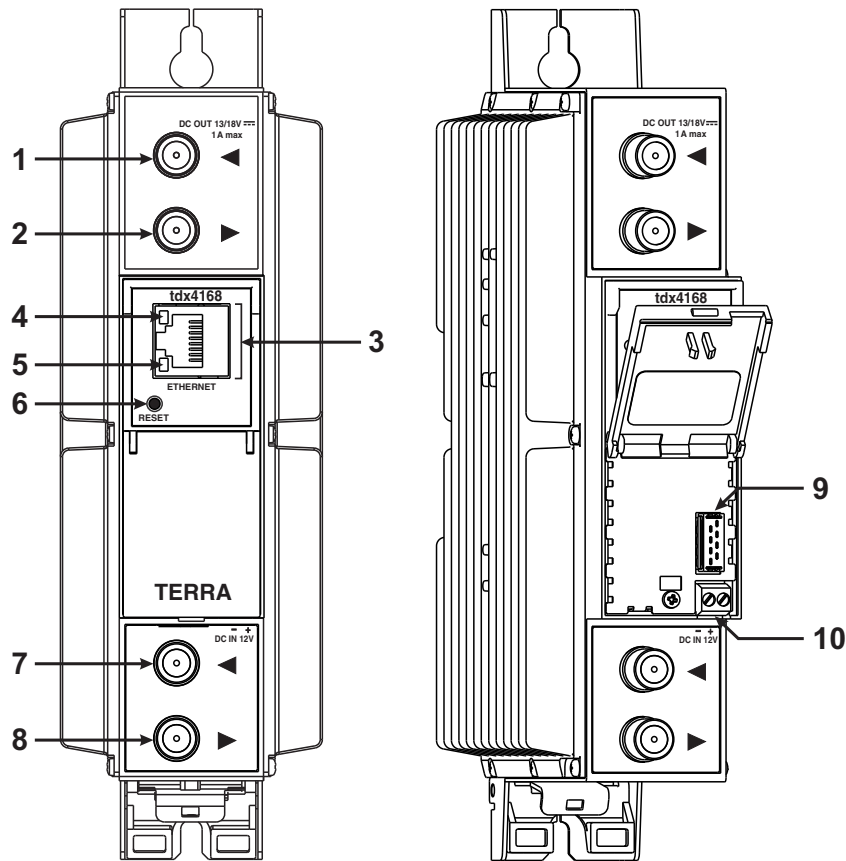**Vers. 1.03**

3. External view

Figure 1. External view of the transmodulator

1 - ◄ - RF input of SAT IF signal, DC output for LNB.

2 - ► - RF output (input signal loop-through). F socket.

3 - **ETHERNET** - control Ethernet interface. RJ45 socket.

4 - ACTIVITY (yellow) indicator of the control Ethernet interface.

5 - LINK (green) indicator of the control Ethernet interface.

6 - **RESET** and default IP button.
   Press button for more than three seconds to set default IP address of the control Ethernet interface. Ethernet led indicators "activity" [4] and "link" [5] will start to toggle to inform, that the reset IP address request has been accepted. Device will be restarted with default IP address.
   To restore all parameters to default values (including password), keep pressing the button for additional 4 seconds. The green (link) indicator will start blinking after that time indicating, that a "restore defaults" command has been accepted. Now the button can be released. Yellow (activity) indicator will light on while resetting parameters. After that device will restart with all default values.

7 - RF input (output signal loop-through). F socket.

8 - RF output. F socket.

9 - Power distribution bus connector.

10 - +12 V DC powering input. Screw terminal.

4. 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.

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

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

Connect power supply in to the mains.

Within 5-40 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;
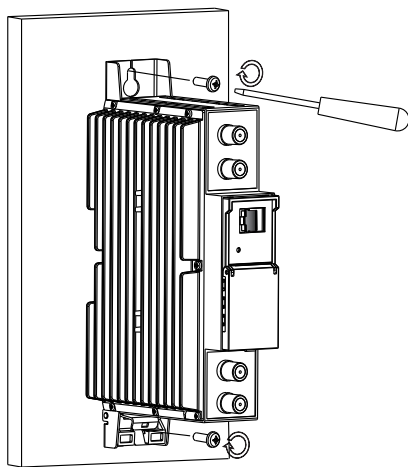
the ACTIVITY [5] indicator blinks, if communication via the control Ethernet interface is active.

5. MOUNTING

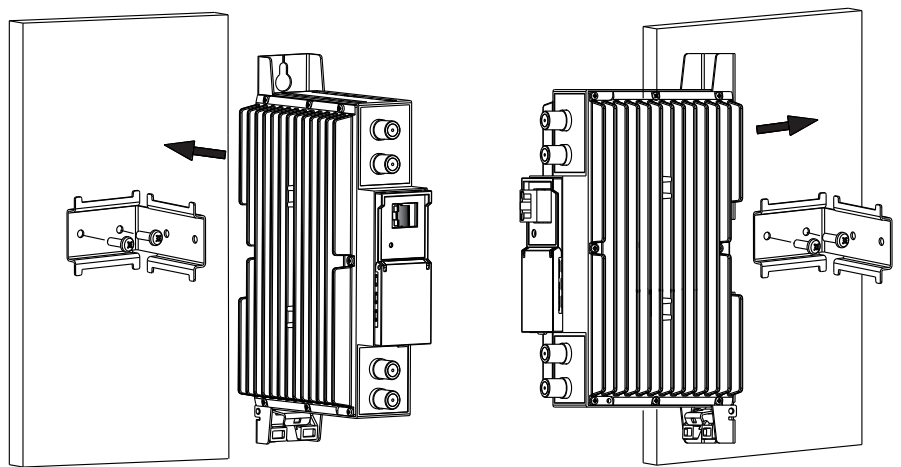The module or mounting bracket must be fixed with steel screws Ø 3.5-4 mm. The screws are not included in a package.

Mounting bracket on DIN rail should be connected to main potential equalization bus.

Mounting on a wall by screws   **Mounting on a bracket (supplied)**

Perpendicular to the wall   Parallel to the wall

Figure 2. Mounting of the transmodulator

Requirements for external power supply unit

• Output voltage   +12 V ± 0.5 V
• Ripple at single and/or double mains frequency   < 10 mV p-p
• Ripple & noise   < 100 mV p-p
• Short circuit protection
• Double insulated (marked ▣)
• Meet EN 55022 class B conducted emisions requirements, measuring with grounded load

Package contents

1. Transmodulator.. 1 pcs.
2. Holder .... 1 pcs.
3. Spacer .... 1 pcs.
4. 75 Ω terminator .... 1 pcs.
5. Bridge F quick to F quick .... 1 pcs.
6. User manual .... 1 pcs.

Mounting on DIN rail

Figure 3. Mounting to DIN rail

1. 2.

Figure 4. Mounting from DIN rail

Figure 5. Mounting or removing to/from
DIN rail of plastic spacers (supplied).
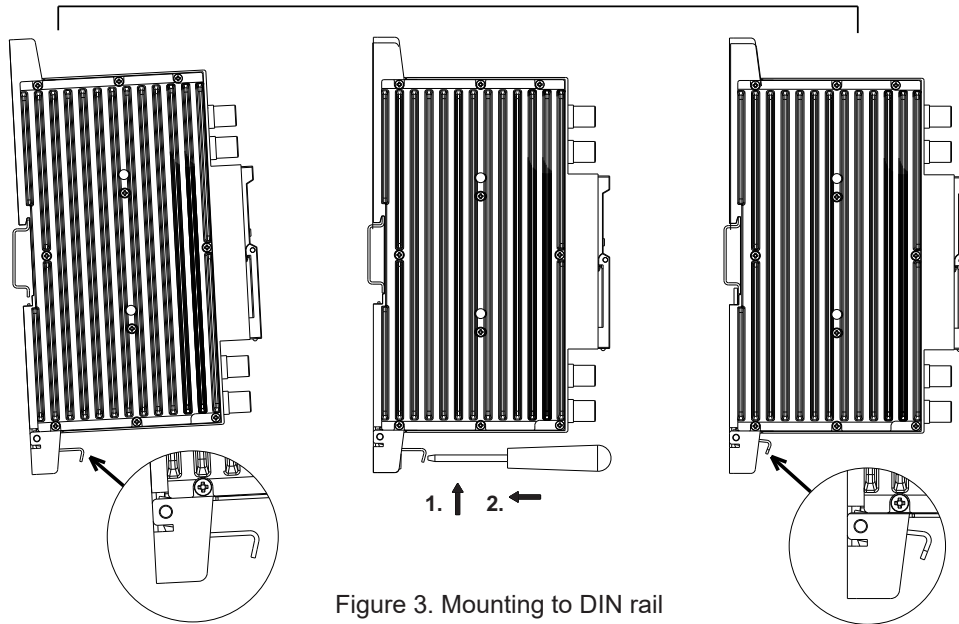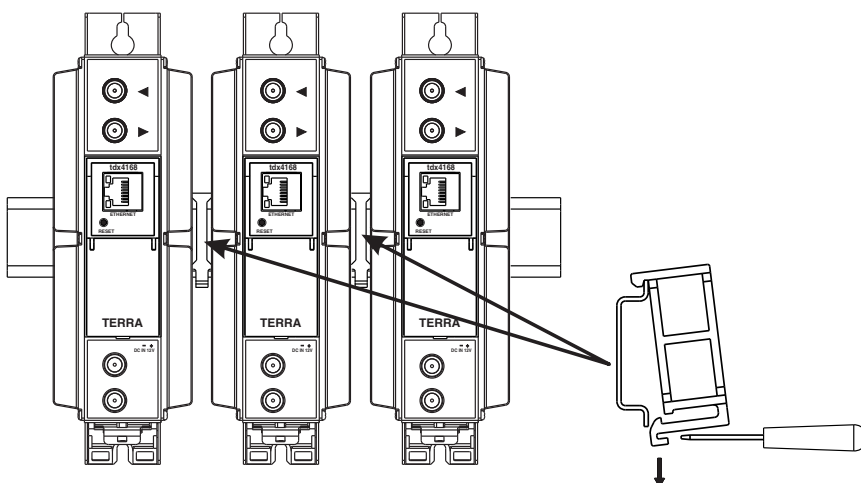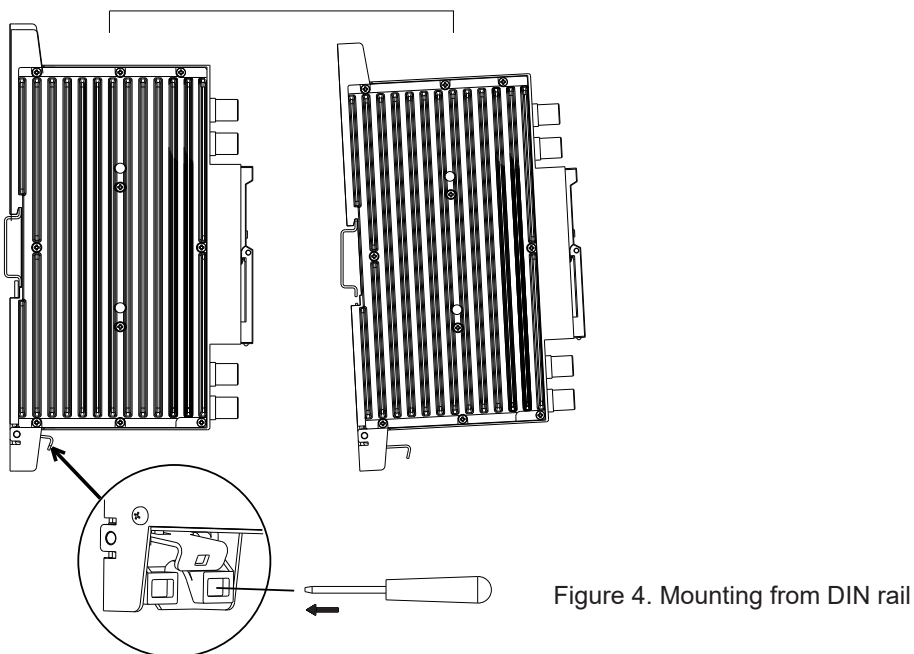
6. Operating

6.1 Initial configuration

All modules leave the factory with this control over 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 the local mode. Subsequently, it will be possible to access the module via local area network (LAN), either to change the configuration or to check the operating status.

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

IP address of the module: **192.168.1.10**
Subnet mask: **255.255.255.0**
Default Gateway: **192.168.1.1**

To access each module, use a personal computer (PC) 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 (see Figure 6).

Figure 6. Login window

Access to the module 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.

<u>NOTE</u>*: the default password - **admin** - can (and must) be changed as explained in the section **6.11**.**5 "User management"**. During initial configuration you need to change the default control interface TCP/IP configuration as explained in the section **6.9 "IP settings"**.

<u>NOTE</u>**: 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**" [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**, for more information see section **6.9**.

6.2 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.

Figure 7. General information screen

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. Also common elements for all screens are 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 following data of module:

"Device model": model of the module.

"Serial number": serial number of the module.

"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 "IP settings" tab, see section **6.9 "IP settings"**.

"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 how to eliminate them.

Diagnostic information	
Demodulator 2 unlocked	
Demodulator 1 unlocked	

Figure 8. Diagnostic information table with errors

6.3 RF inputs

Figure 9. "Input 1" table (DVB-S/S2 input only)   Figure 10. "Input 1" table "Source types = dSCR"

The Figure 9 "Input 1" table in modules with DVB-S/S2 input 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 Figures 9, 10.

Figure 11. "Input 1" table "Source types = SCR"

"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.

For example:

LNB Hi=10,600, LNB Lo=9750, then F=(950+10,600+2150+9750)/2=11,725 MHz.

"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 10, 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 as shown in Figure 11.

Figure 12. Status table

The Figure 13 "Demodulator settings table" in modules with DVB-S/S2 input consists of the following parameters:

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

"User band" - parameter used in dSCR/SCR Switches.

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

„Symbol rate" - parameter is a symbol rate of transponder in kSym/s.

	SAT in	SAT input	User band	Modulation standard	Input frequency, MHz	Symbol rate, Ks/s
Demod. 1	Input 1	SAT A H/Lo	Off	DVB-S2	12476	29900
Demod. 2	Input 1	Off	Off	DVB-S2	12539	30000
Demod. 3	Input 1	SAT A V/Lo	Off	DVB-S	12654	27500
Demod. 4	Input 1	SAT A V/Hi	Off	DVB-S2	12692	27500
Demod. 5	Input 1	SAT A H/Lo	Off	DVB-S2	12399	29700
Demod. 6	Input 1	SAT A H/Hi	Off	DVB-S2	12360	29900
Demod. 7	Off		Off	DVB-S	10744	22000
Demod. 8	Off		Off	DVB-S	10744	22000
Demod. 9	Input 1		Off	DVB-S2	12437	29900
Demod. 10	Input 1		Off	DVB-S2	11747	27500
Demod. 11	Off		Off	DVB-S2	11681	27500
Demod. 12	Off		Off	DVB-S	10744	22000
Demod. 13	Off		Off	DVB-S	10744	22000
Demod. 14	Off		Off	DVB-S	10744	22000
Demod. 15	Off		Off	DVB-S	10744	22000
Demod. 16	Off		Off	DVB-S	10949	27500

Update

Figure 13. Demodulator settings table

	Lock status	RF level	Modulation	FEC	SNR	VBER	PER	Input bitrate
Demod. 1 status	Locked	86 dBμV	8PSK	3/4	12.2 dB		1.6E-8	65108 kbps
Demod. 2 status	Locked	85 dBμV	8PSK	5/6	11.7 dB		1.4E-8	72583 kbps
Demod. 3 status	Locked	85 dBμV	QPSK	5/6	11.8 dB	<2.5E-8		42247 kbps
Demod. 4 status	Locked	85 dBμV	8PSK	3/4	12.0 dB		<1.7E-8	61378 kbps
Demod. 5 status	Locked	85 dBμV	8PSK	2/3	11.8 dB		<1.8E-8	57573 kbps
Demod. 6 status	Locked	86 dBμV	8PSK	3/4	12.3 dB		<1.6E-8	65243 kbps
Demod. 7 status	Inactive	0 dBμV			0.0 dB			0 kbps
Demod. 8 status	Inactive	0 dBμV			0.0 dB			0 kbps
Demod. 9 status	Locked	86 dBμV	QPSK	3/4	11.8 dB		<2.5E-8	43330 kbps
Demod. 10 status	Locked	85 dBμV	8PSK	3/4	13.6 dB		<1.8E-8	59768 kbps
Demod. 11 status	Inactive	0 dBμV			0.0 dB			0 kbps
Demod. 12 status	Inactive	0 dBμV			0.0 dB			0 kbps
Demod. 13 status	Inactive	0 dBμV			0.0 dB			0 kbps
Demod. 14 status	Inactive	0 dBμV			0.0 dB			0 kbps
Demod. 15 status	Inactive	0 dBμV			0.0 dB			0 kbps
Demod. 16 status	Inactive	0 dBμV			0.0 dB			0 kbps

Figure 14. Demodulator status table

The following information is displayed in the table "Demodulator status":
"RF level" - RF signal level at the module input. Level indication - approximate.
The values of the following parameters are displayed only if the module has synchronized with the input signal.
"Modulation standard" - detected standard of the input signal. Possible values of the standard: DVB-S, DVB-S2.
"Frequency" - intermediate frequency (for DVB-S/S2) at the module input.
"Modulation" - modulation scheme of the input signal. Possible values of the modulation scheme: QPSK, 8PSK (for DVB-S/S2).
"FEC" - forward error correction.
"SNR" - RF signal/noise ratio 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 MPEG2 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.

6.4. Transport Streams

One channel at a time can be configured in this page. Select proper channel from the list at „Choose input channel" combobox (see Figure 15 "Transport streams page").

Choose input channel

Demod. 2 ⌄   Transparent mode ☐

List of services

Service title	Bitrate	LCN	Service ID	Descramble	Enable
⊞ 🔒TV Nat Geo Wild HD	6.8 Mbps	0	118	☐	Output 1 ⌄
⊞ 🔒TV Sky Sport 1 HD	16.5 Mbps	0	129	☐	Off ⌄
⊞ 🔒TV Discovery HD	9.8 Mbps	0	130	☐	Off ⌄
⊞ 🔒TV Sky Cinema HD	5.4 Mbps	0	131	☐	Off ⌄
⊞ 🔒TV TNT Film (TCM)	2.7 Mbps	0	405	☐	Off ⌄
⊞ 🔒TV Sky 1	2.6 Mbps	0	408	☐	Off ⌄
TV Sky Sport 3 HD	0.0 Mbps	0	268	☐	Off ⌄
TV Eurosport360HD 1	0.0 Mbps	0	270	☐	Output 1 ⌄
TV Sky Sport Bundesliga 2 HD	0.0 Mbps	0	267	☐	Off ⌄

Update

Select all to channel 1 ☐
Select all to channel 2 ☐

Figure 15. Transport streams page

A list of services in the selected channel will appear. „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 to 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. If channel numbers are added, but TV does not recognize it, check the following:

> - If TV supports LCN?
> - If Network ID and Original Network ID values are valid for the country, which is selected on TV?
> „Enable" dropbox enables the service to the selected output.
> "Descramble" checkbox enables or disables descrambling.
> Press onto „+" sign and service information will be extended (see Figure 16 "Service details").

Figure 16. Service details

"Service title" and "Service 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.

"Service type": this is an 8-bit field specifying the type of the service. The assignment of service type value for a Service is described in EN 300 468. It shall be coded according to Figure 17.

"Parental control": this selection enables ability to restrict certain content viewable by the user. For example, parental control field is set to "Less than 6 years", than all content with maturity rating above 6 years old will be filtered out.

Service type	Description
0	reserved for future use
1	digital television service (see note 1)
2	digital radio sound service (see note 2)
3	Teletext service
4	NVOD reference service (see note 1)
5	NVOD time-shifted service (see note 1)
6	mosaic service
7	FM radio service
8	DVB SRM service [49]
9	reserved for future use
10	advanced codec digital radio sound service
11	H.264/AVC mosaic service
12	data broadcast service
13	reserved for Common Interface Usage (CENELEC EN 50221 [37])
14	RCS Map (see ETSI EN 301 790 [7])
15	RCS FLS (see ETSI EN 301 790 [7])
16	DVB MHP service
17	MPEG-2 HD digital television service
18 to 21	reserved for future use
22	H.264/AVC SD digital television service
23	H.264/AVC SD NVOD time-shifted service
24	H.264/AVC SD NVOD reference service
25	H.264/AVC HD digital television service
26	H.264/AVC HD NVOD time-shifted service
27	H.264/AVC HD NVOD reference service
28	H.264/AVC frame compatible plano-stereoscopic HD digital television service (see note 3)
29	H.264/AVC frame compatible plano-stereoscopic HD NVOD time-shifted service (see note 3)
30	H.264/AVC frame compatible plano-stereoscopic HD NVOD reference service (see note 3)
31	HEVC digital television service (see note 4)
32 to 127	reserved for future use
128 to 254	user defined
255	reserved for future use

NOTE 1: MPEG-2 SD material should use this type.
NOTE 2: MPEG-1 Layer 2 audio material should use this type.
NOTE 3: For information on the use of these values, see clause I.2.3 and ETSI TS 101 547-2 [54]
         (3D Guidelines of Frame Compatible 3D-TV).
NOTE 4: For information on the use of these values, see clause I.2.5 and ETSI TS 101 547-4 [62].

Figure 17. Service type coding

Individual streams can be disabled as well. Also PID number can be remapped manually by selecting checkbox "Other PID" (Keep in mind than 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 will be disregarded. No more than 95% of output bandwidth usage is recommended, otherwise overflow might occur.

6.5. NIT

Several tables related to NIT generation exist in this section. Figure 18 "Global TS parameters" describes following TS parameters:

Figure 18. Global 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 specifer (hex)": 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 18). 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 Network ID or used value from this location:

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

Figure 19. Transport stream and original network IDs

Figure 20. Description of other streams in the network

Every channel in the network must be described in NIT. Otherwise TV automatic channel tuning function will not find all channels. All 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 all modules are connected to the same Ethernet network.

NOTE: If in the RF network exists transponders that is generated by old TERRA transmodulators/modulators, the frequencies and modulation parameters must be filled manually (Figure 20).

6.6. TS info

This tab Lists all outgoing servises. You can easily filter out needed output channels by selecting needed output in table "TS Info". This lets you quickly view and setup LCN for every channel also check your Output bitrate and ensure that it is not overflowing.

Choose output channel

Output 1	✔
Output 2	✔
Output 3	✔
Output 4	✔
Output 5	✔
Output 6	✔
Output 7	✔
Output 8	✔
Select all	☐
Show services	✔

Service title	Input source	Service ID	LCN
Output 1	89%	28 / 31.6 Mbps	
RT HD	Demod. 1	2001	0
RT Doc HD	Demod. 1	2002	0
OMAN TV HD	Demod. 3	7	0
BFM TV	Demod. 4	415	0
PRESS TV HD	Demod. 9	7931	0
Output 2	83%	26.1 / 31.6 Mbps	
Dubai TV HD	Demod. 5	905	0
Dubai Sports 1 HD	Demod. 5	906	0
SAMA DUBAI HD	Demod. 5	903	0
Noor Dubai Radio	Demod. 5	904	0
Eurosport 2 HD	Demod. 6	4150	0
Output 3	83%	26.1 / 31.6 Mbps	
AL SHARJAH HD	Demod. 10	9504	0
AD SPORT1 HD	Demod. 10	9507	0
YAS Sports HD	Demod. 10	9508	0
ZAD TV	Demod. 10	9509	0
AL SHARQIYA HD	Demod. 10	9510	0
Orient News	Demod. 10	9518	0
AL SHARJAH RADIO	Demod. 10	9521	0
Output 4	0%	0 / 31.6 Mbps	
Output 5	0%	0 / 31.6 Mbps	
Output 6	0%	0 / 31.6 Mbps	
Output 7	0%	0 / 31.6 Mbps	
Output 8	0%	0 / 31.6 Mbps	

Update LCN

Figure 21. "TS Info" table

6.7. RF outputs

Transmodulators tdx4168, tdq4168 have 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 ▾	✔
Output 2	QAM-64 ▾	8 MHz ▾	1/32 ▾	7/8 ▾	0	482.0	C22 ▾	0 ▾	✔
Output 3	QAM-64 ▾	8 MHz ▾	1/32 ▾	7/8 ▾	0	490.0	C23 ▾	0 ▾	✔
Output 4	QAM-64 ▾	8 MHz ▾	1/32 ▾	7/8 ▾	0	498.0	C24 ▾	0 ▾	✔
Output 5	QAM-64 ▾	8 MHz ▾	1/32 ▾	7/8 ▾	0	506.0	C25 ▾	0 ▾	✔
Output 6	QAM-64 ▾	8 MHz ▾	1/32 ▾	7/8 ▾	0	514.0	C26 ▾	0 ▾	✔
Output 7	QAM-64 ▾	8 MHz ▾	1/32 ▾	7/8 ▾	0	522.0	C27 ▾	0 ▾	✔
Output 8	QAM-64 ▾	8 MHz ▾	1/32 ▾	7/8 ▾	0	530.0	C28 ▾	0 ▾	✔

Update

Select all ▢

Figure 22. DVB-T output parameters (tdx4168)

"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 ▾	0.00	✔
Output 2	QAM-64 ▾	6875	482.0	C22 ▾	0 ▾	0.00	✔
Output 3	QAM-64 ▾	6875	490.0	C23 ▾	0 ▾	0.00	✔
Output 4	QAM-64 ▾	6875	498.0	C24 ▾	0 ▾	0.00	✔
Output 5	QAM-64 ▾	6875	506.0	C25 ▾	0 ▾	0.00	✔
Output 6	QAM-64 ▾	6875	514.0	C26 ▾	0 ▾	0.00	✔
Output 7	QAM-64 ▾	6875	522.0	C27 ▾	0 ▾	0.00	✔
Output 8	QAM-64 ▾	6875	530.0	C28 ▾	0 ▾	0.00	✔
Step			8.0 MHz ▾				

Update

Select all ▢

Figure 23. DVB-C output parameters (tdq4168)

Figure 21 shows tdq4168 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.

6.8. SNMP settings

Figure 24 "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.

Figure 24. "SNMP settings" table

6.9 IP settings

All device IP settings can be configured here – IP address, subnet mask, gateway, DNS (Domain Name System), see Figure 25. Starting with software version 1.41, the "WEB port" number can be customized. Default is 80. You must restart the device for the port change to take effect. All other IP parameters will be updated immediately after pressing „Update" button and redirected to new location.
NOTE: Press the **RESET** and default IP button [6] for more than three seconds to set default IP address of the control Ethernet interface (see Figure 1). Ethernet led indicators "activity" [4] and "link" [5] will start to toggle to inform, that the reset IP address request has been accepted. Device will be restarted with default IP address. To restore all parameters to default values (including password), keep pressing the button for additional 4 seconds. The green (link) indicator will start blinking after that time indicating, that a "restore defaults" command has been accepted. Now the button can be released. Yellow (activity) indicator will light on while resetting parameters. After that device will restart with all default values.

Figure 25. IP settings table

6.10 E-mail-settings

The device can send e-mail reports if errors were detected. SMTP protocol is used for that. Figure 26 "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.

Figure 26. E-mail-settings table

6.11 System menu

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

6.11.1 Event logs

Various important events, errors, warnings will be logged into the system, see Figure 27 "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 **6.11.9 "Date, Time"** settings for instructions how to configure time settings.

Export logs			Erase logs
Date/Time	**Event type**	**Event description**	
2019-02-28 11:40:57	Event	Demodulator 3 locked	
2019-02-28 11:40:50	Error	Demodulator 3 unlocked	
2019-02-28 11:37:52	Event	Demodulator 3 locked	
2019-02-28 11:35:14	Error	Demodulator 3 unlocked	
2019-02-28 11:31:28	Event	Demodulator 10 locked	
2019-02-28 11:31:28	Event	Demodulator 9 locked	
2019-02-28 11:31:28	Event	Demodulator 6 locked	
2019-02-28 11:31:28	Event	Demodulator 5 locked	
2019-02-28 11:31:28	Event	Demodulator 4 locked	

Figure 27. Event logs

6.11.2 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.

6.11.3 Import parameters

Exported parameters can be imported back to the device. Press onto "Click to select file" button (see Figure 28 "Import parameters") to select exported file.

Figure 28. Import parameters

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.

6.11.4 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 29 "Firmware upgrade"). After that, use the firmware upgrade method as described above.

Figure 29. Firmware upgrade

6.11.5 User management

User may change a password here. Length of the password is up to 16 symbols. Type current password and double enter new password to change it.

If logged in user has admin role, new users can be added (see Figure 30 "User management").

Figure 30. User management

Enter it's username, password, select a role and press „Add" button.

Only administrator (user with a role „admin") may manage other users.

<u>NOTE</u>: By giving your personal password or user access account for another person, you take full responsibility for all module settings modifications made by that person or anyone else they may give the password to.

6.11.6. Restore defaults

All parameters will be restored back to factory defaults after confirmation. The exception – IP address and users – these parameters will be unchanged. To restore IP address and system password to system defaults, see „**RESET**" button at section 3, pos.7.

Several seconds can take to restore all parameters, so be patient.

6.11.7. Restart the device

Device will be restarted after confirmation to do it. This is an alternative to pressing a „**RESET**" button when the device is operating.

6.11.8. Auto Restart

Enable "Auto restart" to schedule periodical restart. Fill in "Scheduled restart time" to restart device on the particular time. The restart will occure every day on speciefied time.

6.11.9. Date, Time

System time can be configured manually or taken from NTP server (only if module can access NTP server). Also there is an option to select the time source from TS as shown in the Figure 31.

Figure 31. "Date, Time" settings table

6.11.10. Language

Device control panel supports several preinstalled languages. A change of language requires system restart. Note, that all previously logged records will remain in previous language.

Additional languages can be installed under request. Contact our distributors for such possibility.

7. Regions

Device supports several preinstalled regions. Region can be changed without restarting the device, just select needed region by pressing "Change" button in "Device information" table. The RF channel list depends on which region is selected.

Additional regions can be installed under request. Contact our distributors for such possibility.

8. Technical specifications

Type			tdx4168	tdq4168
Sections input/output			16/8	
RF input	frequency range	(pr.)	950-2150 MHz	
	LNB powering/control	(pr.)	0/13/18 V & 22 kHz, 1 A total, DiSEqC 1.0, EN50607, EN50494	
	level / impedance		55-95 dBµV / 75 Ω	
	modulation		QPSK, 8PSK (DVB-S/S2)	
	symbol rate	(pr.)	2 ÷ 45 Ms/s	
	return loss		≥ 10 dB	
	RF input count		2	
	loop through frequency range		950-2150 MHz	
	loop through loss		≤ 1.5 dB	
RF output	standard	(pr.)	**DVB-T**	**DVB-C / J.83B**
	modulation	(pr.)	QPSK, QAM16, QAM64	QAM16, QAM32, QAM64, QAM128, QAM256
	frequency range	(pr.)	170-230 MHz / 470-862 MHz	96-862 MHz
	channel allocation, adjacent		4 +4	
	level / impedance		90 ± 2 dBµV / 75 Ω	
	TS bit rate		< 31 Mbit/s	< 53 Mbit/s
	MER		≥ 35 dB	≥ 40 dB
	channel bandwidth	(pr.)	7 MHz / 8 MHz	4...8.3 MHz
	guard interval	(pr.)	1/4, 1/8, 1/16, 1/32	-
	code rate	(pr.)	1/2, 2/3, 3/4, 5/6, 7/8	-
	symbol rate	(pr.)	-	3.5 ÷ 7.2 Ms/s
	return loss		≥ 10 dB	
	roll off		-	15%
	transmission mode		2K	-
	total output level adjustment	(pr.)	0 ÷ -15.0 dB by 1 dB step	
	loop through frequency range		45-862 MHz	
	loop through loss		≤ 2.5 dB	
Management port			standard IEE802.3 10/100 Base T	
Supply voltage			12 V ±1 V	
Current consumption without external DC feeding			1.2 A	
Current consumption with max. external DC feeding			3.3 A	
Operating temperature range			0º ÷ +45ºC	
Dimensions/Weight (packed)			63x198x112 mm/1.12 kg	

(pr.) software control