User Manual

TDX Headend System Main Unit Black Edition

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Black Edition

New features in Black edition

New features have been implemented in the Black edition:

- From S/W edition 4.0.1 the user interface (GUI) has been updated – more clear, more understandable and more easy in use; entirely based on HTML5
- A Service level agreement (SLA) is introduced for dedicated service and customer/end user satisfaction. The SLA comes in 3 levels.
- New fixed PID feature that can be filtered and remapped.
- Fan noise has been reduced by 3dB

New user interface (GUI) – what has changed

In the new GUI there has been following changes

- New updated GUI – more clear, more understandable and more easy in use; and its written in HTML 5
- Port forwarding, for remote control – prior to this new S/W release, you had to use
  - Port 80, 943, 4530, 4531
  In the new GUI **only port 80** Is required – much more simple and secure to setup remote access.
  Due to this, remote access is useable both on PC, tablet and smartphone.
  The new GUI applies to the following browsers/versions::
  - ✓ Mozilla firefox ver. 46.0.1 or newer
  - ✓ Google Chrome ver. 50.0.2661 or newer
  - ✓ MS internet explorer 11 ver. 11.0.9600.18314 or newer
- The new GUI reports if the software is registered or not
- The ADMIN button has slightly changed position
- Navigation information has replaced the BACK button
- Highlighted information and more clear warnings, etc.
- New failsafe image – never lose your setup.

Service Agreement

TRIAX Service Agreement, the safe & sound deal, comes in 3 levels – Pay-As-You-Go, BASIC and PLUS.
The TRIAX Service Agreement ensures your solutions are always up and running, always up to date and always backed up by the best service and support; helping you operate a professional and profitable business.

Your Service Agreement benefits:
- Supported Setup, including free of charge 30 day installation period with unlimited access to features.
- Supported installations and solutions.
- Easy online access to the Trouble Ticket System, Product Registration Tool, new SW versions, release notes, new License Keys, how-to guides and much more.

Fixed PID, filter + remap

The PID (Packet identifier) handling has been changed significantly

- Fixed PID – the PID value is now fixed at the output after a reset of the TDX system
- PID filter – the elementary streams can now be removed from output of the TDX system
- PID remap – the PID value can now be changed at the output of the TDX system

Remote access – security measures

When connecting to the TDX system remotely it is strongly advised to:

- Have the TDX system behind a firewall w/ port forwarding and/or use a VPN to access the TDX system

This in order to defer cyber attacks

Introduction

The TDX cabinet is designed to accommodate up to 16 input modules and 6 quad output modules. Up to three TDX headends can be combined as one system of up to 48 input muxes and 72 output channels.

The TDX headend system accommodates up to 490 services.
All incoming signals from input modules initially arrive in the TDX service-pool, where conversion to defined output signals occurs, after which the converted signals are fed to output modules.

Box contents

- TDX headend unit,
- 1 x TDX Key 775310
- 2 x Mounting brackets 775285
- 4 screws (M4 x 8 hexagon ISO 7380) 840200)
- 1 x Torx® key (2.5 mm) 848603
- 1 x Power cord
- User guide.

Exterior

- A   Input module area
- B   Output module area
- C   Mounting brackets
- D   Lock
- E   Headend status LEDs

Interior

(A)	input slots (16 in total)		(H)	AUX 1 & 2	Distributes services from IP output modules
(B)	Extractor fans		(J)	Link 1 & 2	Connects the main unit with subunits 1 and 2. Can also be used in conjunction with IP input and output
(C)	Earth terminal		(K)	ID switch	Switch for setting the ID of the main unit and the two subunits
(D)			(L)	Output slots (6 in total)	
(E)	RF output	Distributes the RF channels form the output modules using an F-connector	(M)	Slot 1 & 2 for auxiliary boards	Auxiliary boards are used in connection with IP output modules
(F)	Test point -20dB	RF test point of output (-20dB)	(N)	Secure Digital (SD card)	Memory card for storage of the system configuration (behind panel)
(G)	Configuration port	Ehternet configuration port for setting up the headend unit			

Power / Grounding / ID switch

BEFORE powering up the main unit(s); it is very important to ground properly.
1. Connect an earth cable to Earth terminal of main unit(s)
2. Attach the other end of the earth cable to an approved earth connection point

3. Confirm that the ID switch is set to "0"

Single headend installation
Mounting

The headend can be mounted either on a system rack or directly onto a wall.

Rack installation   Wall installation

1. Attach the mounting brackets to the headend with the supplied screws.
   Rack: At the front of a headend
   Wall: At the rear of a headend
2. Attach the headend to the wall or onto a system rack

Ventilation requirements

10 cm   10 cm

1. Ensure that min. 10cm ventilation space is available on both sides and the front of the headend
2. Insert the key into the headend
3. Open the door
4. Lift the door off its hinges (optional)
5. Remove the top cover (optional)

Multi Headend installation

Up to three headends can be combined to further increase the number of services provided.
The headends are physically installed as per installation of single headend, i.e. by using the supplied brackets described above.
The headends can be combined in either "direct connection" or "switch connection"

RF output

Connect each headend unit to a combiner using RF cables from the RF output socket to the combiner.

Ventilation requirements

Ensure that the following ventilation requirements are met:

1. Horizontal
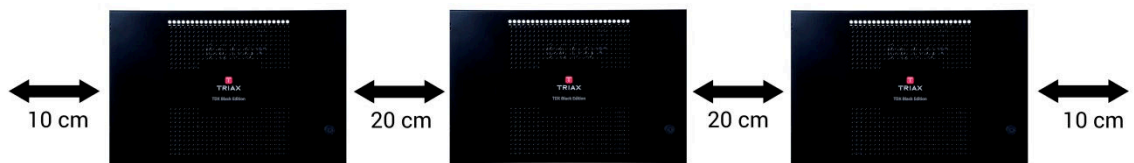
- Min. 20cm ventilation space must be available between headends.
- Min. 10cm ventilation space must be available outside the end headends.
- Min. 10cm ventilation space must be available from the front of each headend.

2. Vertical
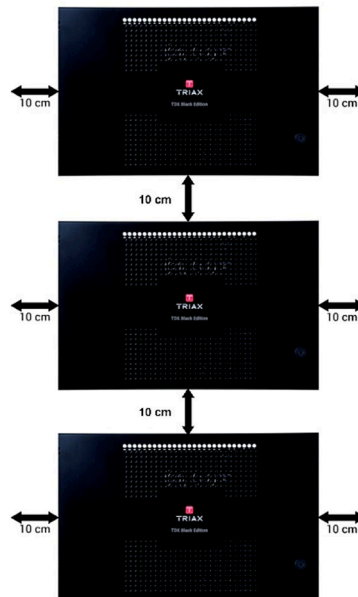
- 10cm ventilation space must be available on both sides of each headend.
- 10cm ventilation space must be available from the front of each headend.

Connection units – direct connection

Note that direct connection hardware configurations require the **Connection type** field in the service tool's Admin/IP Settings/Setup window to be set to 'Direct'

1. *1x Main – 1x sub*

1. Insert SFP copper transceivers into the "Link 1"sockets on the main headend and subunit headend.
2. Route a RJ45 Cat5e or better cable from the "Link 1" socket on the main unit to the "Link 1" socket on subunit 1.
3. Set the "ID switch" on the main headend and subunit headend to the following:
   - Main unit = "3"
   - Subunit = "1"

a.
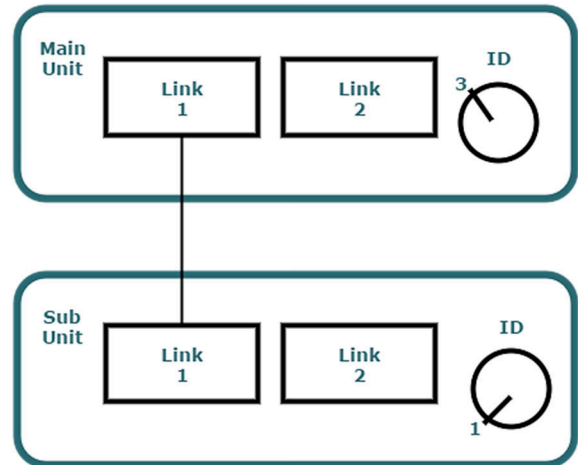
2. *1x Main – 2x sub*

1. Insert SFP copper transceivers into the "Link 1" and "Link 2" sockets on the main headend and subunit headends.
2. Route a RJ45 Cat5e or better cable from the "Link 1" socket on the main unit to the "Link 1" socket on subunit 1.
3. Route a RJ45 Cat5e or better cable from the "Link 2" socket on the main unit to the "Link 1" socket on subunit 2.
4. Route a RJ45 Cat5e or better cable between the "Link 2" sockets on both subunits.
5. Set the "ID switch" on the main headend and subunit headends to the following:
   - Main unit = "3"
   - Subunit 1 = "1"
   - Subunit 2 = "2"
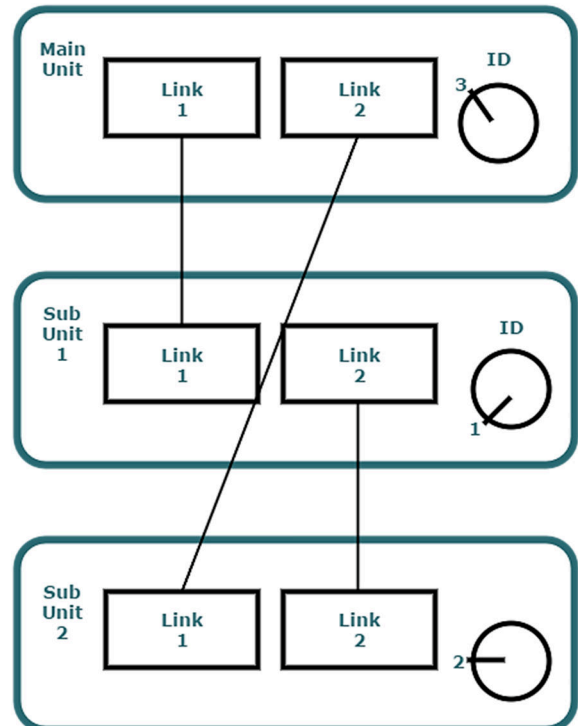
Connecting units – switch connection

Note that headend units connected using a network switch require the **Connection type** field in the service tool's **Admin** /**IP Settings** /Setup window to be set to **Switch**.
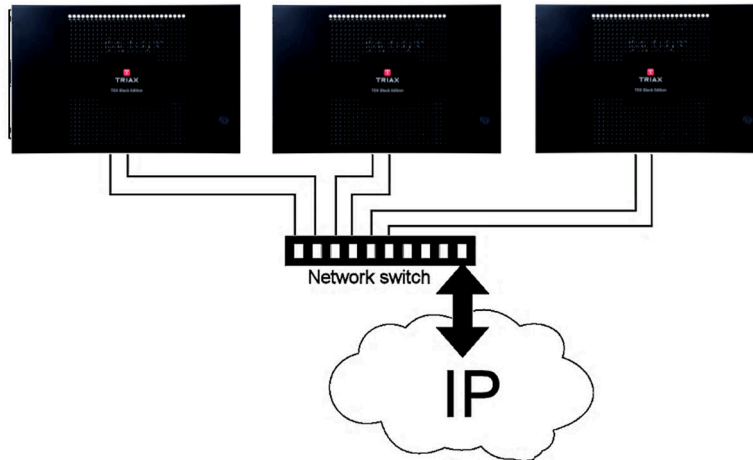
Triax recommends that a network switch is used for connecting the main and subunits even if IP services are not currently supported. The network switch used must support IGMP ver. 2 and contain a sufficient number of ports to connect to the Link sockets on the main and subunits.

1. Insert SFP copper transceivers into the "Link 1" and "Link 2" sockets on the main headend and subunit headend(s).
2. Route a RJ45 Cat5e or better cable from the "Link 1" socket on the main unit and subunit(s) to the network switch.
3. Route a RJ45 Cat5e or better cable from the "Link 2" socket on the main unit and subunit(s) to the network switch.
4. Set the "ID switch" on the main headend and subunit headends to the following:
   a. Main unit = "3"
   b. Subunit 1 to "1"
   c. Subunit 2 (if present) to "2"
5. Connect the network switch to the IP network.

Multi headend installation – Fiber optic

Fiber-optic cables must be used to connect the main headend unit to one or two subunits over distances greater than 100m.
The following SFP fibre-optic transceivers must be used in the Link sockets:

492087	Fiber (850nm) (LC)	1000Mbps	550m	Gigabit Ethernet
492088	Fiber (1310nm) (LC	1000Mbps	2km	Gigabit Ethernet

Resetting IP adress

The IP address of a headend unit can be returned to the factory default address by using the ID switch.
1. Turn off the power to the main unit.
2. Set the ID switch on the main unit to "7".
3. Turn on the power.
The four LEDs flash red and yellow until the process of resetting the IP address has been completed.
The LEDs show green-constant if the reset process was successful.
1. Turn off the power to the main unit.
2. Set the ID switch on the main unit back to the initial setting.
3. Turn on the power to the main unit.
The IP address has been reset to the factory default (192.168.0.100)

Input modules

16 input modules can be installed per headend unit. Hot swap technology is used in the headend, meaning that modules can be inserted/removed/moved when the headend is in operation.

Input module types

Each input module is identified through the use of a specifically coloured label. The label also indicates the module type's name and associated item number. The remainder of the label is used for noting post-installation module information.
Another label containing a barcode and serial number is located on the underside of the input module.

Name	DVB-C input module
Item number(s)	492024
Label colour	Crimson
Name	HDMI input module
Item number(s)	492030
Label colour	Orange
Name	A/V input module
Item number(s)	492080
Label colour	Yellow
Name	DVB-S/DVB-S2 input module
Item number(s)	492020
Label colour	Light blue
Name	DVB-T/DVB-T2 input modules
Item number(s)	492022, 492023
Label colour	Purple

Inserting input modules

- Take the protective cover away from an available input slot.
- Retain the protective cover.

Note: Any available input slot can be used

- Push the input module into the input slot until the input module is locked in position.
- Note details for the input module on the label (optional).
- Note details for the input module on the label located inside of the door (optional).
- Continue inserting all additional input modules.

Attaching cables

Signal cables can be attached when all input modules have been installed.
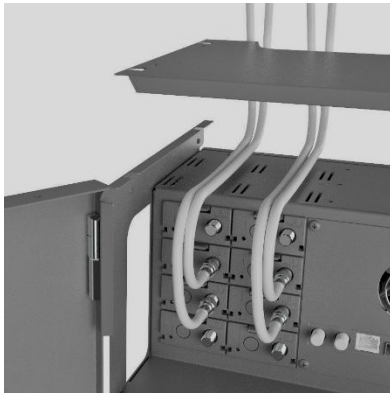
1. Route the cables either through the cable openings on the top or on the sides of the headend.
2. Attach the signal cables to the 'IN' connector on the input module.

Note: Ensure that enough cable is available for relocating input modules to alternate input slots at a later date.

Removing input modules

Input modules are removed from the headend by:
1. Remove the signal cable from the module.
2. Prize the module out of the headend with a flathead screwdriver.
3. Pull the module out of the headend.

Note:
Modules can be removed while the headend is in operation.

Moving input modules

1. Prize the module out of the headend with a flathead screwdriver.
2. Pull the module out of the headend.
3. Insert the module in a new input slot.

Note:
Modules can be moved while the headend is in operation.

Output modules

Six output modules, each consisting of four RF channels can be installed in a headend unit. Hot Flash technology is used in the headend, meaning that output modules can be inserted/removed/moved while the headend is running.

Output module types

Each output module is identified through use of a specifically coloured label. The label also indicates the module type's name and associated item number. The remainder of the label is used for noting post-installation module information.
Another label containing a barcode and serial number is located on the underside of the output module.

Name	QAM FTA/CI output module	
Item number(s)	492055/492056	
Label colour	Crimson	
Name	PAL FTA/CI output module	
Item number(s)	492050/492051 / 492052/492053	
Label colour	Green	
Name	COFDM FTA/CI output module	
Item number(s)	492060/492061	
Label colour	Orange	
Name	2xCI Slots output module	
Item number(s)	492070	
Label colour	Black	
Name	IP 2xCI output module	
Item number(s)	492072	
Label colour	Black	

Note: Some output modules also contain slots for two CAM modules

Inserting output module

Depending on where you want to insert the output module push the extractor fan to the opposite side.

CA module
Smart card
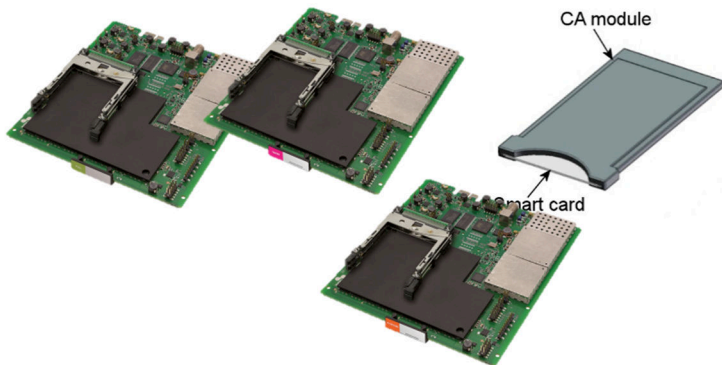
1. Insert smart cards (if relevant).
   - Insert the service provider's smartcard into the CA module.
   - Insert the CA module into either of the available slots in the output module.
2. Push the output module into an available output slot.
3. Press until the output module is locked into position.
4. Continue inserting all additional output modules.
5. Note details about the output module on the label (optional).
6. Note details about the output module on the label located on the inside of the door (optional).
7. Return the extractor fan to the centre of the output area.

Removing output module

1. Release the lock mechanism on the module to be removed.
2. Extract the module from the headend.
3. Return the extractor fan to the center of the output area.

Auxiliary modules

Two slots are present in the middle of the output section for installation of auxiliary modules. For details refer to products that use auxiliary boards.

System monitoring

Input modules – LED status

Each input module has an LED on the front to indicate its current status when the headend is powered:

Green - flashing	The module is yet to be configured yet.
Green	No errors, and the tuner is locked to the frequency.
Red	Error, and the tuner is not locked to the frequency.
No colour	Module is not powered.

Input module software updates are also displayed on the LED when the modules are updating:

Orange	Booting.
Temporary off	Initiation of the software update.
Temporary green	Every time the module receives a valid data package. Repeated until the update is completed without errors.
Red	Software update failed.

Output modules – LED status

Four LEDs are placed at the top of the output section of each headend unit, and provide information on the state of the headend and subunits (if present).
The four LEDs are named (from left to right):

System Status	Tuner Status	Unit Link 1	Unit Link 2

The LEDs can be green - constant, green – flashing, red, or no colour is displayed. The message being indicated are different for each LED.

Headend type/usage	LED Name	Colour	Message
Standalone	System Status	Green – constant	Power is on and the headend is operational.
		Green – flashing	The headend is booting up.
		Red	An error has been detected in the headend, which must be investigated.
	Tuner Status	Green – constant	The input module tuners are locked.
		Red	One or more Input module tuners are not locked.
	Unit Link 1	Not used	
	Unit Link 2	Not used	
Main Unit in multi-unit installation	System Status	Green - constant	Power is on and the headend is operational.
		Green – flashing	The headend is booting up.
		Red	An error has been detected in the headend, which must be investigated.
	Tuner Status	Green – constant	The input module tuners are locked.
		Red	One or more Input module tuners are not locked.
	Unit Link 1	Green – constant	The subunit is connected to the main unit.
		Red	There is a problem with the connection to the subunit.
		No colour	No subunit is connected to the main unit.
	Unit Link 2	Green – constant	The subunit is connected to the main unit.
		Red	There is a problem with the connection to the subunit.
		No colour	No subunit is connected to the main unit.
Sub Unit 1 in multi-unit installation	System Status	Green – constant	Power is on and the headend is operational.
		Green – flashing	The headend is booting up.
		Red	An error has been detected in the headend, which must be investigated.
	Tuner Status	Green – constant	The input module tuners are locked.
		Red	One or more Input module tuners are not locked.
	Unit Link 1	Green – constant	The subunit is connected to the main unit.
		Red	There is a problem with the connection to the subunit.
		No colour	No subunit is connected to the main unit.
	Unit Link 2	Green – constant	The subunit is connected to the main unit.
		Red	There is a problem with the connection to the subunit.
		No colour	No subunit is connected to the main unit.

Headend type/usage	LED Name	Colour	Message
Sub Unit 2 in multi-unit installation	System Status	Green – constant	Power is on and the headend is operational.
		Green – flashing	The headend is booting up.
		Red	An error has been detected in the headend, which must be investigated.
	Tuner Status	Green – constant	The input module tuners are locked.
		Red	One or more Input module tuners are not locked.
	Unit Link 1	Green – constant	The subunit is connected to the main unit.
		Red	There is a problem with the connection to the subunit.
		No colour	No subunit is connected to the main unit.
	Unit Link 2	Green – constant	The subunit is connected to the main unit.
		Red	There is a problem with the connection to the subunit.
		No colour	No subunit is connected to the main unit.

Service tool - System requirements

The headend needs to be configured before it can be used.

Computer minimum requirements

A computer meeting the following minimum requirements is required for configuring the headend.

Operating system:	Windows XP or later
Browser:	Mozilla firefox ver. 46.0.1 or newer
	Google Chrome ver. 50.0.2661 or newer
	MS internet explorer 11 ver. 11.0.9600.18314 or newer

Static IP address

A static address must be used on the computer you use to configure the headend.
Refer to the computer's operating software documentation for assistance on using static IP addresses.

Physical connection to headend
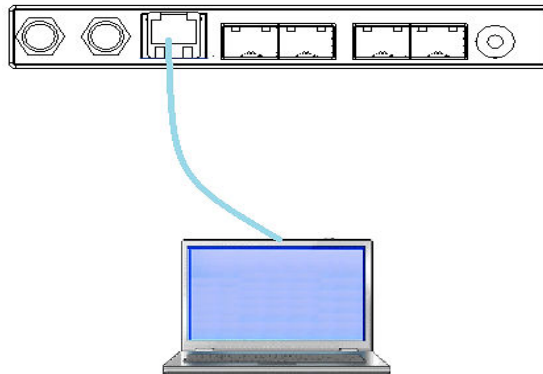
Connect a Cat5e shielded cable or better between the computer's network port and the configuration port on the headend.

Starting service tool

1. Open a web browser window.
2. Enter '**http://192.168.0.**100' in the web address field.
3. Press **Enter**.
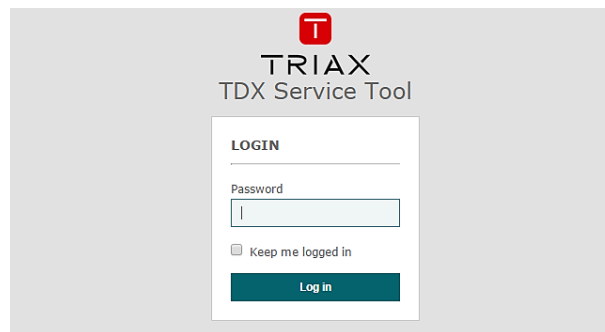
4. Enter the password.
5. Press the **Log in** button.
   Note:
   Password = '**triax1234**' when the service tool is opened on each headend for the first time.
   The **Keep me logged in** checkbox overrides the system's automatic time out function, which is activated after 20 minute's inactivity.

Overview

Tabs (A)

Accesses the various tabs used to configure the headend's input and output modules.

System	The service tool's 'home' window. Provides system overview information and configuration activation/control.
Input	Tab for configuring input modules and services.
CA Modules	Tab for configuring CI modules and CA cards. Refer to output module manuals for information.
Output Network	Tab for configuring output modules and services.
Channel List	Tab for viewing available channels, refer to input module manuals for information.
Services	Tab for service overview with filter options

Communication circle (B)

Indicates whether the service tool is communicating with the headend unit.

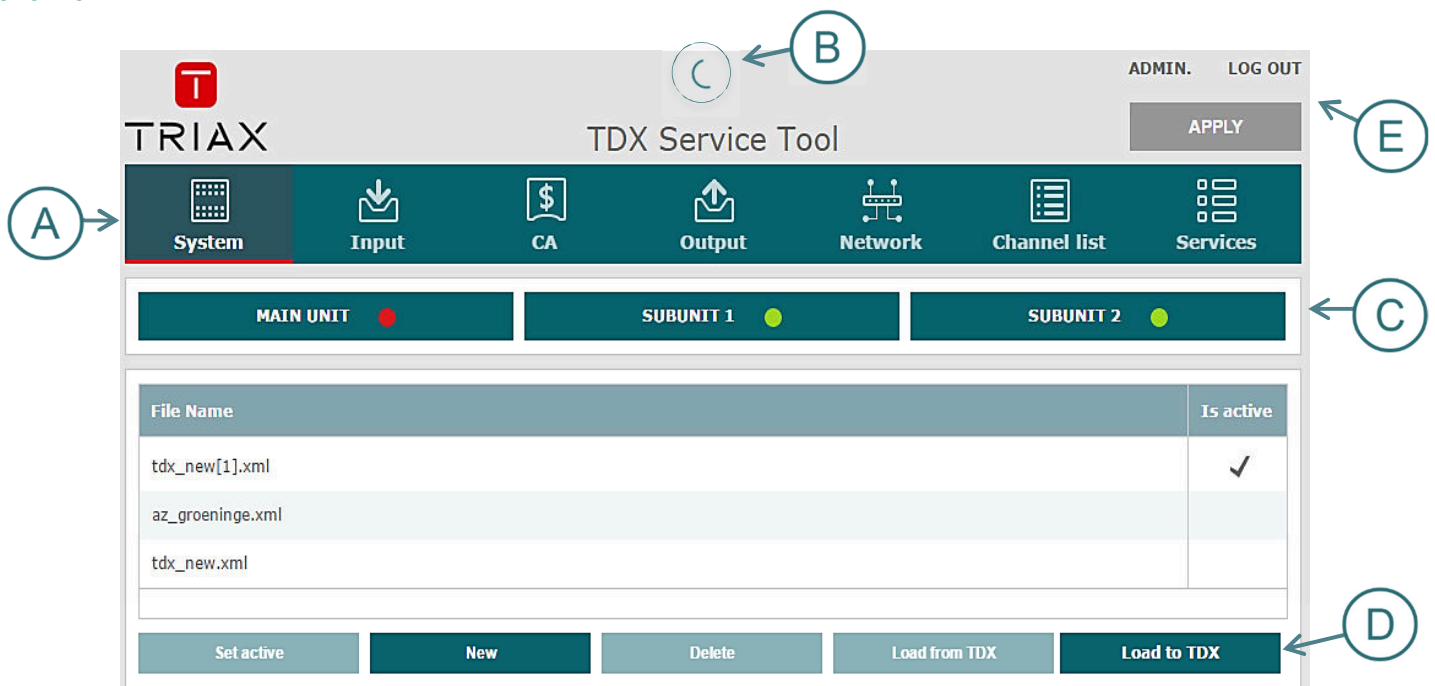|	
Circle is spinning	The service tool and headend are communicating.

System icons (C)

Indicates whether the headend unit is functioning correctly.

Green	The headend unit is functioning correctly.
Red	The headend unit is NOT functioning correctly. To get further information: press relevant button : • Main unit • Subunit 1 • Subunit 2

Misc. buttons (E)

Apply	Stores and applies the configuration settings.
Log In/Out	Service tool access control.
Admin	Opens the settings for service tool window, where language, location, time zone, and initial IP addresses are specified.

Configuration buttons (D)

Set active	Set the selected configuration active
New	Create a new default configuration
Delete	Delete the selected configuration
Load from TDX	Load new configuration from computer
Load to TDX	Load selected configuration to computer

> **NOTE**
> Press checkmark to select configuration.

Administration

The system language, locale, and time zone need to be specified on each headend unit.
It is also necessary to specify IP addresses for headends which are located on a distribution network.

Language

1. Press the **Admin** button at the top right-hand corner of the System window.
2. Open the **Current language** drop-down list.
3. Select the desired language.
4. Press the **UPDATE** button, down below.

SETTINGS FOR TDX SERVICE TOOL

⌄ **Language settings**

Change language for TDX Service Tool

Current language

| English ▾ |
| English |
| Greek |
| Swedish |
| Spanish |
| German |
| Danish |
| Hungarian |
| French |
| Dutch |
| Russian |
| Finnish |
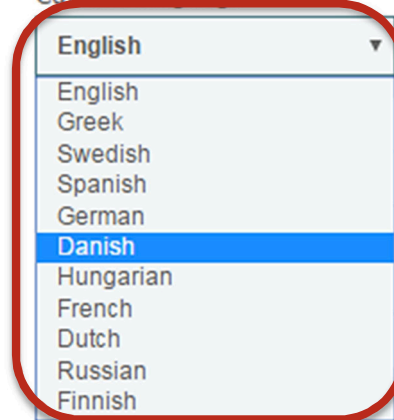
Location

1. Press the **Admin** button at the top right-hand corner of the System window.
2. Expand the **Country settings** area.
3. Open the **Current location** drop-down list.
4. Select the country where the headend is located.
5. Press the **UPDATE** button, down below.

SETTINGS FOR TDX SERVICE TOOL

› **Language settings**

⌄ **Country settings**

Change location for the TDX installation

Current location

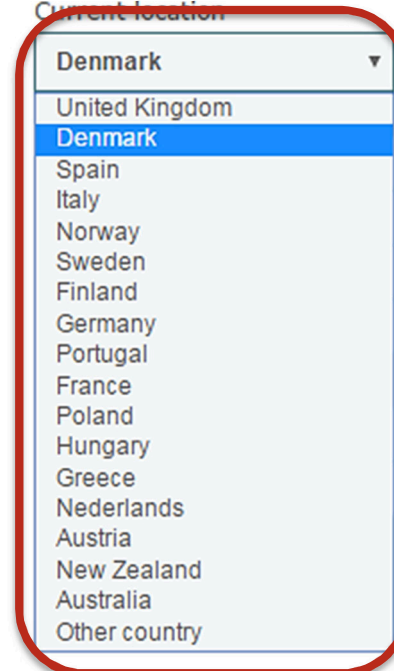| Denmark ▾ |
| United Kingdom |
| Denmark |
| Spain |
| Italy |
| Norway |
| Sweden |
| Finland |
| Germany |
| Portugal |
| France |
| Poland |
| Hungary |
| Greece |
| Nederlands |
| Austria |
| New Zealand |
| Australia |
| Other country |

Time zone

1. Press the **Admin** button at the top right-hand corner of the **System** window.
2. Expand the **Time zone settings** area.
3. Open the **Input module (Main unit)** drop-down list.
4. Select the input module that is to be used for setting the headend's system date/time/time zone.
5. Press the **UPDATE** button, down below.

SETTINGS FOR TDX SERVICE TOOL

> Language settings
> Country settings
> Time settings

Select input module from main unit to use as source for system time. If r

Input module (Main unit)

1 DVB-T ▾

☐ **Enable NTP timeserver**

Enter IP address or host name for time servers

Primary time server   Secondary time server

Time set by NTP server

It is possible to have the time in the TDX set by a NTP server.

The *Primary* and *Secondary time server* can be setup using either a. IP address like "192.168.30.31" or a URL like "the.best.ntpserver.org". If a URL is used then a DNS must be setup in the *IP settings* sub menu. See below.

SETTINGS FOR TDX SERVICE TOOL

> Language settings
> Country settings
> Time settings
> Password settings
> License handling
> IP settings

Configuration port

IP address | Subnet mask | Default gateway
192.168.0.100 | 255.255.255.0 | 192.168.0.1

DNS Server 1 | DNS Server 2
8.8.8.8 |

Edit link IP settings for system
ENTER SETUP

The TDX uses 512 IP addresses for internal use, specify first address

Start | End
239.192.0.0 | 239.192.1.255

SETTINGS FOR TDX SERVICE TOOL

> Language settings
> Country settings
> Time settings

Select input module from main unit to use as source for system time. If r

Input module (Main unit)

1 DVB-T ▾

☐ **Enable NTP timeserver**

Enter IP address or host name for time servers

Primary time server   Secondary time server

Security

1. Press the **Admin** button at the top right-hand corner of the System window.
2. Expand the **Password settings** area.
3. Specify the current password in the **Old password** field. ('**triax1234**') if the service tool is being used for the first time.
4. Specify a new password in the **New password** field.
5. Re-specify the new password in the **Confirm password** field.
6. Press the **UPDATE** button, down below.

SETTINGS FOR TDX SERVICE TOOL

> Language settings
> Country settings
> Time settings
> Password settings

Change password for TDX system

Old password | New password | Confirm password

Features and License Keys

Licenses handle the Features (e.g. IP input and/or IP output or SNMP functionality) available for the Headend. To activate a specific Feature, you need to type in the License Key for the specific Feature.
The License Key and matching Unique ID is created for the individual Headend, and can therefore not be re-used in other Headend installations.
When you have purchased and retrieved the necessary License Keys and Unique IDs they need to be entered into the Headend system to activate the Feature:

1. Press the Admin button at the top right-hand corner of the system window.
2. Expand the "License handling" area.
3. Enter the retrieved License Keys to the matching Unique IDs in the order given from TRIAX.
4. Press the ACTIVATE button, and the installed license is listed.
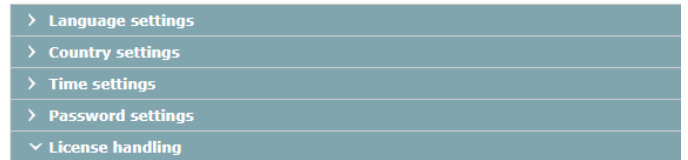
How-To get License Keys

To retrieve a License Key, you need to access the TRIAX Product Registration Tool on our online My TRIAX

> **NOTE**
> Access to TRIAX My TRIAX require personal login credentials! If not already acquired, please apply online.

To register a Headend system and retrieve new License Keys, you will need to upload the Equipment-File for the specific Headend. The Equipment-File is automatically generated by the service tool:
1. Press the Admin button at the top right-hand corner of the system window.
2. Expand the "System maintenance" handling area.
3. Press SAVE EQUIP. and the Equipment-File is generated and saved on your PC.
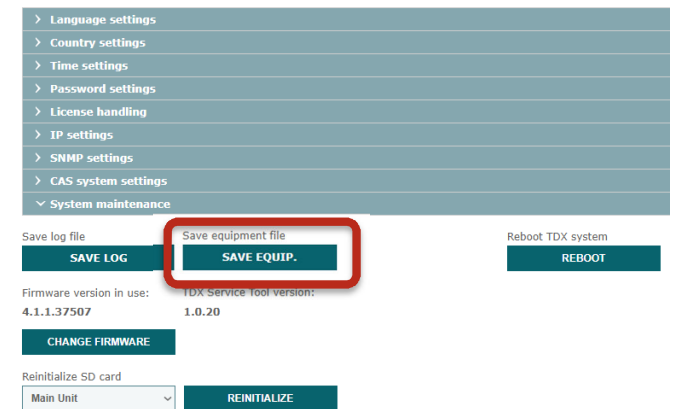
30-day Trial Period, Free of charge access to all Features

The TDX Black Edition is delivered with a free of charge 30-day installation period with unlimited access to all available Features.
When TDX Black Edition is initialized for the first time, you have to start the 30-day Trial Period. The START TRIAL box is automatically displayed, and you start the trial by pressing START.
Above the menu bar you will now see the remaining days of your trial period.

> **ATTENTION**
> When trial period reaches 0 days, the Headend will automatically restart and no Features will be available..

To activate Features permanently, please follow procedure described in "Features and License Keys"
To end 30-day Trial Period actively you have 2 choices:
1. Retrieve "Installation Key" license from PRT. At the same time please retrieve License Keys for any other Features to be permanently installed in the Headend.
2. Expand "License handling" area and press END TRIAL.
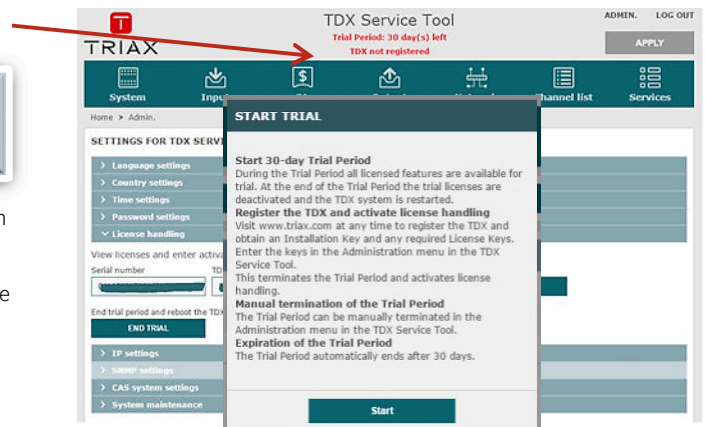
IP settings

It may be necessary to specify specific IP addresses for the headend to avoid network IP address conflicts.
Note: Headend IP addresses can be reset to factory default settings if required. This is done via the ID switch located on the headend unit(s).

1. Press the **Admin** button at the top right-hand corner of the System window.
2. Expand the **IP settings** area.
3. Specify the headend's IP address, subnet mask and default gateway in the corresponding fields.
4. Press the **UPDATE** button, down below.

SETTINGS FOR TDX SERVICE TOOL

> **Language settings**
> **Country settings**
> **Time settings**
> **Password settings**
> **License handling**
⌄ **IP settings**

Configuration port

IP address	Subnet mask	Default gateway
192.168.0.100	255.255.255.0	192.168.0.1

DNS Server 1	DNS Server 2
8.8.8.8	

Edit link IP settings for system

ENTER SETUP

The TDX uses 512 IP addresses for internal use, specify first address

Start	End
239.192.0.0	239.192.1.255

IP settings - continued

This step is only relevant where Main and sub units are connected to the network via a Gigabit network switch.

1. Press the **ENTER SETUP** button

The **IP Settings** window is used to specify unique IP addresses and subnet masks used by the Link 1 and Link 2 sockets on the main and sub units. This provides additional functionality to avoid IP address conflicts.

1. Select the **Switch** radio button.
2. Specify unique IP addresses and subnet mask details for the main and subunits in the corresponding fields.
3. Press the **UPDATE** button, down below.

IP SETTINGS   ✕

Connection type: ◉ Switch ◯ Direct

Main unit	IP address	Subnet mask
Link 1	192.168.1.3	255.255.255.0
Link 2	192.168.2.3	255.255.255.0
AUX 1	192.168.5.5	255.255.255.0
AUX 2	192.168.6.6	255.255.255.0

Sub unit 1	IP address	Subnet mask
Link 1	192.168.1.1	255.255.255.0
Link 2	192.168.3.1	255.255.255.0
AUX 1	192.168.4.4	255.255.255.0
AUX 2	192.168.5.5	255.255.255.0

Sub unit 2	IP address	Subnet mask
Link 1	192.168.2.2	255.255.255.0
Link 2	192.168.3.2	255.255.255.0
AUX 1		
AUX 2		

SWITCH

> **NOTE**
> The **AUX 1**, **AUX 2** and associated **IP Address** and **Subnet mask** fields are used in connection with the IP output module.
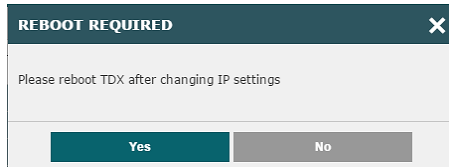
Cancel   OK

IP settings - continued

Remaining steps are valid for all multi-unit installations.

The 512 IP addresses used by the headend(s) must not conflict with any of the IP addresses used either within the network or for services.

1. Enter the first of the 512 IP addresses used for internal purposes in the **Start** field.
2. Press the **UPDATE** button, down below.

A message is displayed if the headend needs to be rebooted due to IP address changes having been made.

REBOOT REQUIRED   ✕

Please reboot TDX after changing IP settings

| Yes | No |

SETTINGS FOR TDX SERVICE TOOL

> Language settings
> Country settings
> Time settings
> Password settings
> License handling
⌄ IP settings

Configuration port

IP address	Subnet mask	Default gateway
192.168.0.100	255.255.255.0	192.168.0.1

DNS Server 1	DNS Server 2
8.8.8.8	

Edit link IP settings for system

ENTER SETUP

The TDX uses 512 IP addresses for internal use, specify first address

Start	End
239.192.0.0	239.192.1.255

SNMP settings

SNMP stands for "Simple Network Management Protocol".

SNMP is an Internet standard protocol that you use for exchanging management information between the equipment in a CATV network. You can use SNMP to monitor sub-headends, fibre notes and amplifiers or to check the status of the equipment.

1. Press the **Admin** button at the top right-hand corner of the System window.
2. Expand the **SNMP settings** area.
3. Specify the IP address of the computer that monitors the network, i.e. the SNMP manager.
4. Specify new SNMP port numbers if you want to change the default values in the two SNMP port fields.
5. Enter a password to access the SNMP manager in the **Community string** field.
6. Press the **UPDATE** button, down below.

For an overview of SNMP traps, see "SNMP Traps".

SETTINGS FOR TDX SERVICE TOOL

> Language settings
> Country settings
> Time settings
> Password settings
> License handling
> IP settings
⌄ SNMP settings

Connection settings for SNMP server

Manager IP	SNMP port	SNMP port (Traps)	Community string
0.0.0.0	161	162	TDX

CAS system settings

- Enter relevant information – as example shown here.
- Press the **UPDATE** button, down below.

> **NOTE**
> CAS system should be connected to the TDX system.
> TDX should have quality input signal and user should have a license.

SETTINGS FOR TDX SERVICE TOOL

> Language settings
> Country settings
> Time settings
> Password settings
> License handling
> IP settings
> SNMP settings
> CAS system settings

CAS system 1
CAS system name
Panaccess CAS 1

CAS system ID (hex value)	EMM server port	ECM server IP address	ECM server IP port
0x4afc	5000	10.50.3.216	12500

Rebooting

1. Press the **Admin** button at the top of the right-hand corner of the System window.
2. Expand the System maintenance area.
3. Press the **Reboot** button.
4. You will be prompted before reboot takes place.

> **NOTE**
> Changes to IP addresses only take effect when the headend has been rebooted.

SETTINGS FOR TDX SERVICE TOOL

> Language settings
> Country settings
> Time settings
> Password settings
> License handling
> IP settings
> SNMP settings
> CAS system settings
> System maintenance

Save log file
SAVE LOG

Save equipment file
SAVE EQUIP.

Reboot TDX system
REBOOT

Firmware version in use:
4.0.1.35819

TDX Service Tool version:
1.0.4

CHANGE FIRMWARE

Reinitialize SD card
Main Unit ▼

REINITIALIZE

View system log

It is possible to save log files for viewing headend actions.

1. In the System maintenance – press **SAVE LOG**
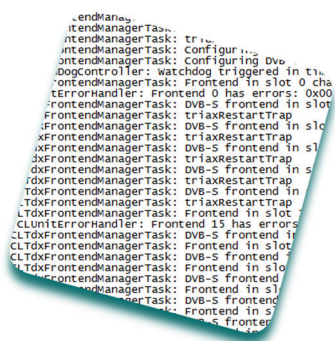
2. A txt file is saved to the Downloads folder in Windows – see snippet above.
3. Open the TDXLOG.txt file in ie. Notepad or the like.
4. Rename the file if needed

SETTINGS FOR TDX SERVICE TOOL

> Language settings
> Country settings
> Time settings
> Password settings
> License handling
> IP settings
> SNMP settings
> CAS system settings
> System maintenance

Save log file
SAVE LOG

Save equipment file
SAVE EQUIP.

Reboot TDX system
REBOOT

Firmware version in use:
4.0.1.35819

TDX Service Tool version:
1.0.4

CHANGE FIRMWARE

Reinitialize SD card
Main Unit ▼

REINITIALIZE

Firmware updating

Firmware updates are available from the support section at TRIAX
Always read the release notes to determine whether the headend would benefit from available firmware updates or not.

1. Press the CHANGE FIRMWARE button
2. A dialog box that lists the current and previous F/W versions, will open:

SETTINGS FOR TDX SERVICE TOOL

> Language settings
> Country settings
> Time settings
> Password settings
> License handling
> IP settings
> SNMP settings
> CAS system settings
∨ System maintenance

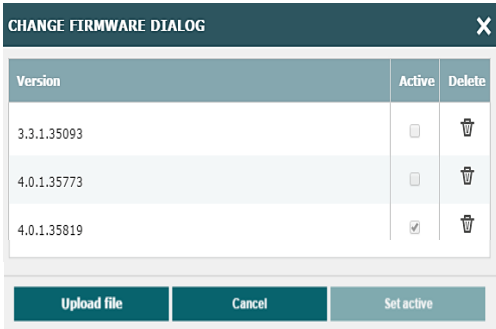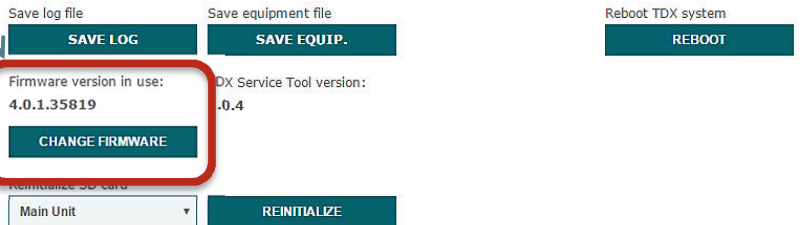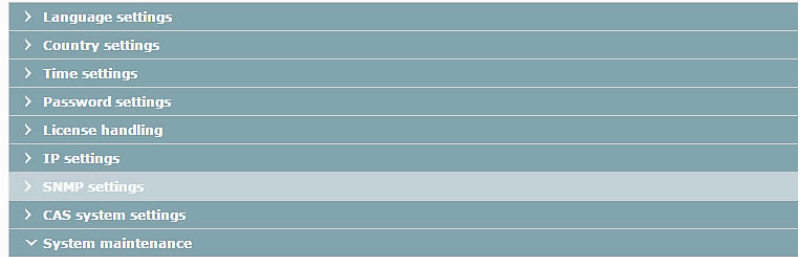Save log file — **SAVE LOG**
Save equipment file — **SAVE EQUIP.**
Reboot TDX system — **REBOOT**

Firmware version in use:
4.0.1.35819
CHANGE FIRMWARE

TDX Service Tool version:
.0.4

Reinitialize SD card
Main Unit — **REINITIALIZE**

CHANGE FIRMWARE DIALOG

Version	Active	Delete
3.3.1.35093	☐	🗑
4.0.1.35773	☐	🗑
4.0.1.35819	☑	🗑

Upload file | **Cancel** | **Set active**

3. To change the F/W, highlight the firmware you want to install, press SET ACTIVE or
Press the UPLOAD FILE button, find the desired F/W to be uploaded and installed, and then press SET ACTIVE

4. When you have pressed the the SET ACTIVE button a box opens, where you have 2 options:

   a. REPLACE ALL
   updates all of the headend's firmware, i.e. modules, system controller and user interface.
   (This is recommended)
   b. UPDATE OLD PACKAGES
   Updates only outdated modules

5. Press START UPDATE, and the update starts, during which you have can abort if needed.
6. When update is finished (could take some time) you will be noticed.
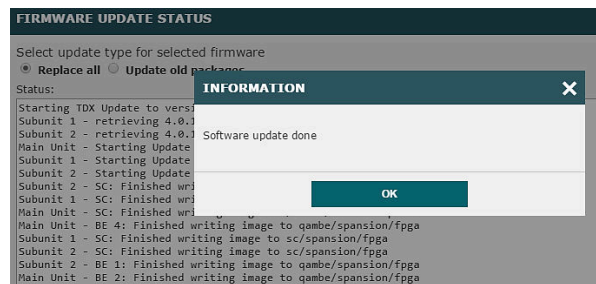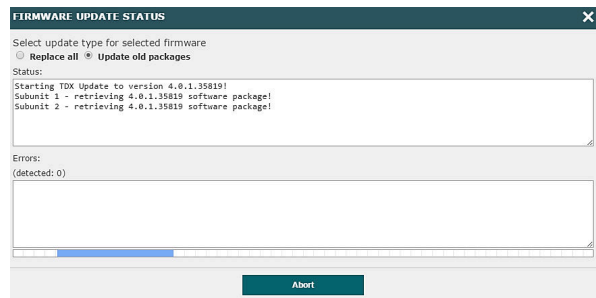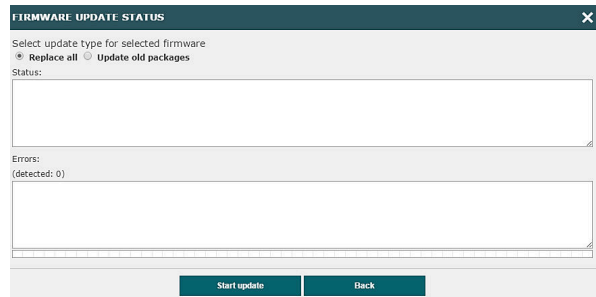
NOTE
Service distribution to end-users will be disrupted while the headend restarts.

The **Update old packages** radio button should only be used in cases where the headend consists mainly of new modules, but also contains some older modules that might benefit from an update.

NOTE
As from the F/W version 4.0.1 it is not possible to reverse to older Firmware. This is due to significantly changed and improved firmware.

Firmware clean up

Select the firmware updates to be removed from the system tool by pressing the DELETE bucket, and confirm with YES

FIRMWARE UPDATE STATUS
Select update type for selected firmware
◉ Replace all   ◯ Update old packages
Status:

Errors:
(detected: 0)

Start update   **Back**

FIRMWARE UPDATE STATUS
Select update type for selected firmware
◯ Replace all   ◉ Update old packages
Status:
Starting TDX Update to version 4.0.1.35819!
Subunit 1 - retrieving 4.0.1.35819 software package!
Subunit 2 - retrieving 4.0.1.35819 software package!

Errors:
(detected: 0)

Abort

FIRMWARE UPDATE STATUS
Select update type for selected firmware
◉ Replace all   ◯ Update old packages
Status:
Starting TDX Update to vers
Subunit 1 - retrieving 4.0.1
Subunit 2 - retrieving 4.0.1
Main Unit - Starting Update
Subunit 1 - Starting Update
Subunit 2 - Starting Update
Subunit 2 - SC: Finished wri
Subunit 1 - SC: Finished wri
Main Unit - SC: Finished wri
Main Unit - BE 4: Finished writing image to qambe/spansion/fpga
Subunit 1 - SC: Finished writing image to sc/spansion/fpga
Subunit 2 - SC: Finished writing image to sc/spansion/fpga
Subunit 2 - BE 1: Finished writing image to qambe/spansion/fpga
Main Unit - BE 2: Finished writing image to qambe/spansion/fpga

INFORMATION
Software update done
OK

CHANGE FIRMWARE DIALOG

Version	Active	Delete
3.3.1.3		🗑

WARNING
Delete FW package?
Yes   **No**

4.0.1.3		🗑
4.0.1.3		🗑

Format file system in flash

If data in the TDX needs to be deleted, then you need to format file system in flash of the TDX.
Be aware: this operation DELETES ALL data in the TDX – including License data !

1. Set rotary wheel to 6
2. Reboot TDX
3. Wait for the 4 front LED's to blink red
4. Set wheel to 2
5. The 2nd diode should slowly blink green followed by rapid blinking green after some seconds
6. Wait for diode to turn solid green
7. Set wheel back to original position
8. Reboot

Force TDX systemcontroller in failsafe mode

If there is a S/W version mismatch inside the TDX system – then the system will go into "Failsafe" mode. To get back into normal mode, a S/W update has to be performed.
The Failsafe mode can also be forced – see description below:

1. Set rotary wheel to 6
2. Reboot TDX
3. Wait for the 4 front LEDS to blink red
4. Set wheel to 1
5. The 1st diode should slowly blink followed by fast blinking green
6. Wait for diode to turn solid green
7. Set wheel back to original position
8. Reboot

Reinitialize SD card

If the TDX system reports "SD card corrupt" then the SD card needs to be reinitialized.
This can happen for the SD card in either the Main or Subunit 1 or 2. (if your TDX system got Subunits)

Be aware: This function deletes ALL information stored in the SD card.
The SD card stores NON critical data, (ie. logfiles and S/W update packages).

Choose the unit in which the SD card needs to be reinitialized.

SETTINGS FOR TDX SERVICE TOOL

> Language settings
> Country settings
> Time settings
> Password settings
> License handling
> IP settings
> SNMP settings
> CAS system settings
∨ System maintenance

Save log file
SAVE LOG

Save equipment file
SAVE EQUIP.

Reboot TDX system
REBOOT

Firmware version in use:
4.0.1.35907

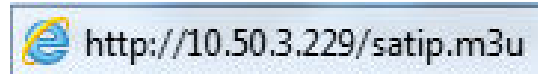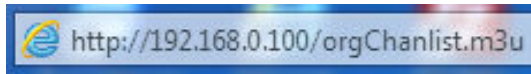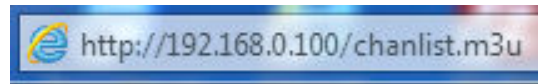TDX Service Tool version:
1.0.6

CHANGE FIRMWARE

Reinitialize SD card
Main Unit ▼   **REINITIALIZE**

IP out service list

 http://192.168.0.100/ipoutservices

 http://192.168.0.100/chanlist.m3u

 http://192.168.0.100/orgChanlist.m3u

 http://10.50.3.229/satip.m3u

It is possible to get the list of services at IP out in the following formats:
- XSPF
- M3U
- Extended M3U
- Extended++ M3U

XSPF can be accessed by enter "/ipoutservices" after the URL for the TDX configuration.
Sample:
<?xml version="1.0" encoding="UTF-8"?>
<playlist version="1" xmlns="http://xspf.org/ns/0/">
<trackList>
<track><title>DR1</title><location>udp://@239.194.0.1:50172</location>
<extension application="http://www.triax.com"><poolserviceid>4</poolserviceid></extension></track>
<track><title>Syd</title><location>udp://@239.194.0.2:50172</location>
<extension application="http://www.triax.com"><poolserviceid>6</poolserviceid></extension></track>
</trackList>
</playlist>

M3U can be accessed by enter "/orgChanlist.m3u" after the URL for the TDX configuration.
This service list contains
- IP adresses and port numbers
Sample:
udp://239.194.0.1:50172
udp://239.194.0.2:50172

Extended M3U can be accessed by enter "/chanlist.m3u" after the URL for the TDX configuration.
The service list is compliant to SAT>IP Protocol Specification
(ver. 1.2.2) and is defined as *"extended M3U channel list"*
In the standard under appendix A2.1
This service list contains
- IP adress and port number
- Service name
- LCN
Sample:
#EXTM3U
#EXTINF:0,1. DR1
udp://239.194.0.1:50172
#EXTINF:0,3. Syd
udp://239.194.0.2:50172

Extended++ M3U can be accessed by enter "/satip.m3u" after the URL for the TDX configuration.
The service list is based at the Extended M3U with further extensions.
The service list can be used for TV sets. Panasonic is one TV set vendor that supports this service list as service discovery.
The list is used for communication between the TDX system controller and the TDX EPG server.
This service list contains
- IP adress and port number
- Service name, transport stream ID, original network ID
- LCN
- Service type (1=TV, 2=Radio)
Sample:
#EXTM3U
#EXTINF:0,1. DR1
udp://239.194.0.1:50172?stype=1&onid=43962&tsid=0&svcid=4
#EXTINF:0,3. Syd
udp://239.194.0.2:50172?stype=1&onid=43962&tsid=0&svcid=6

All above lists can be downloaded

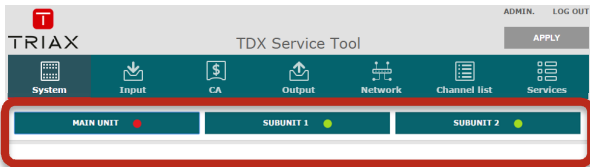 Do you want to open or save **orgChanlist.m3u** (224 bytes) from **192.168.0.100**?   Open | Save ▼ | Cancel | ✕

System information

Viewing system information

Detailed information is available on headend units:
1. Select the **System** tab.
2. Select the main unit or one of the subunits in the **System information list** area.

The **System information for unit** window is displayed. The window contains information relating to:

Any headend system errors
Name and associated software version of input and output modules
Note that the software versions installed on all headends, including each input/output module must be identical.

Update the software for the entire headend installation (including input/output modules) if this is not the case.
- MAC addresses
- Current/minimum/maximum temperatures
- Power supply

Duplicated PID's

Selecting IP services for output may result in a selection of services from an MPTS stream that uses the same PID for two or more services.
It is not possible to output services with identical PIDs.
If you have selected services with identical PIDs, the System icon of the headend unit that handles the output of the services with identical PIDs turns red.
- Click the affected unit to open the **System information for unit** window.

The **System information for unit window** lists the output module(s) and channel(s) which attempt to output services with identical PIDs.
To solve the problem you have to open the configuration window of the output module(s) listed in the **System information for unit** window, and deselect the selected IP services one by one while checking the **System information for unit** window until the message disappears from the window.

Managing configuration files

Creating

1. Select the **System** window.
2. Select the **New** button.

An empty configuration file is created and listed in the configuration list area.

Deleting

1. Select the **System** tab.
2. Highlight the configuration file to be deleted. Press the **Delete** button.

Activating

1. Select the **System** tab.
2. Select the configuration that is to be actively used on the headend.
3. Press the **Set active** button.
4. The TDX will load new configuration file and reconnect system

Saving

Headend configuration files can, if desired, be saved on the computer. This simplifies the process of configuring additional headends that contain the same modules.

A saved configuration file can also be used on headends that do not contain exactly the same modules. It will, however, be necessary to reconfigure/delete/add the modules that differ between the initial headend and that being configured.
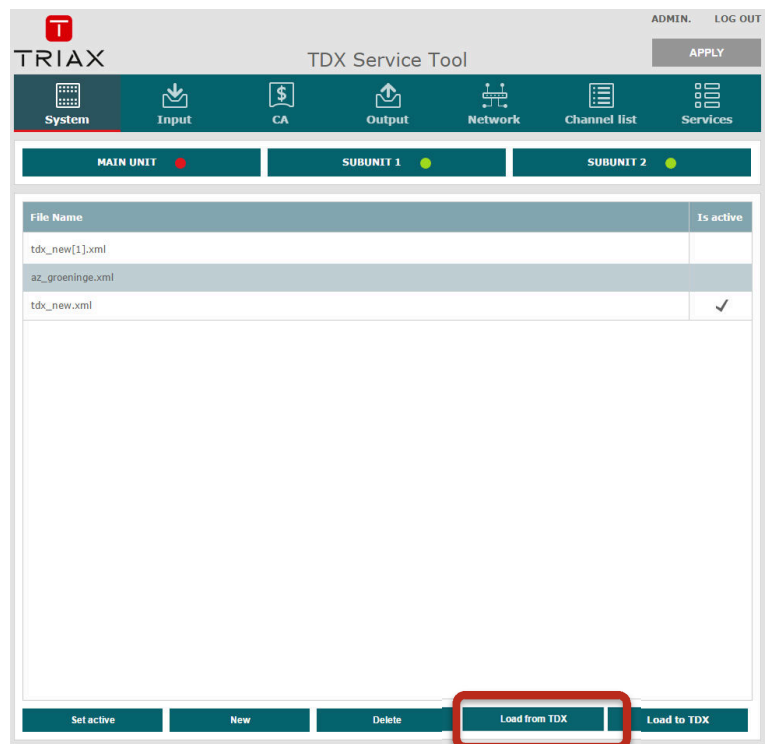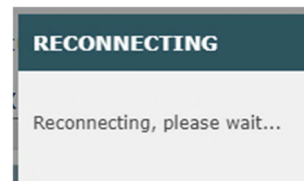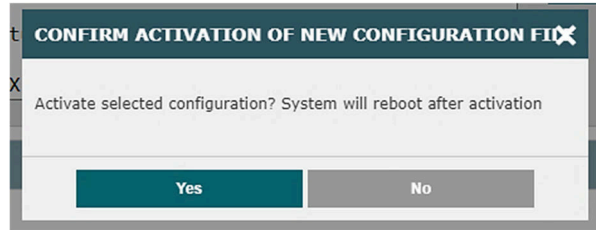
1. Select the **System** tab.
2. Press the **Load from TDX** button.
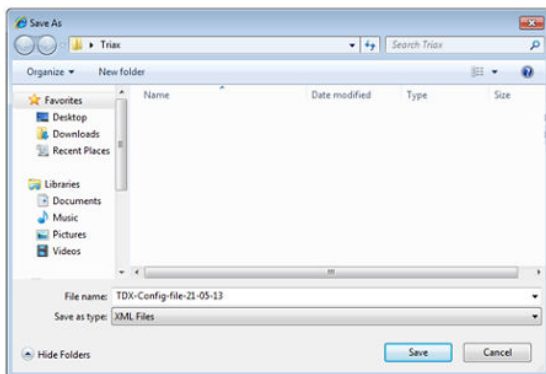
3. Navigate to where the configuration file is to be saved.
4. Enter a name for the configuration file.
5. Select 'XML' in the **File type** field.
6. Press the **Save** button to save.

Uploading

Configuration files previously saved on a computer can be transferred to the system tool to simplify the configuration process.
Any module differences will need to be manually configured.

1. Select the **System** tab.
2. Press the **Load to TDX** button.

3. Navigate to the folder where the configuration file to be uploaded is located.
4. Select the file.
5. Press the **Open** button.

The configuration file will now be listed in the configuration list area. A number in brackets, e.g. (1), is added to the name of the new file if an identically named configuration file is already present.
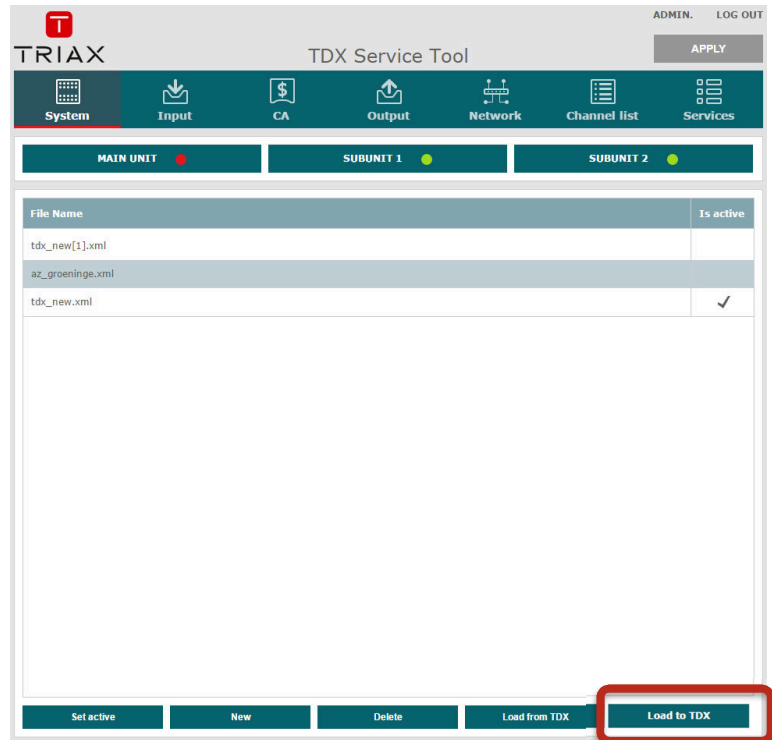
IP Input configurations

The headend system includes basic IPTV functionality which enables service delivery over a packet-switched network infrastructure. To handle IP input through the Link sockets the following requirements must be satisfied:
IP multicast streaming (UDP streaming)
Possibility of RTP
Possibility of IGMP version 2
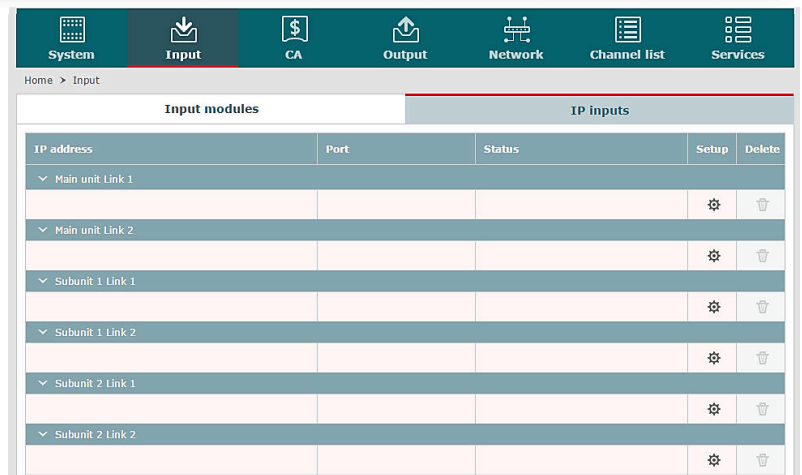SPTS or MPTS including PAT, PMT, CAT

Important:
The TDX headend system supports up to 7 TS packets per IP packet at IP inputs.
The TDX headend system does not support IP fragmentation at IP inputs, which may occur if the IP packets are transmitted over a network with a Maximum Transmission Unit (MTU) less than approximately 80 + N*188 bytes, where N is the number of packets per IP packet..
Recommended settings are 7 TS packets per IP packet and a minimum MTU of 1500 bytes in the entire network path.
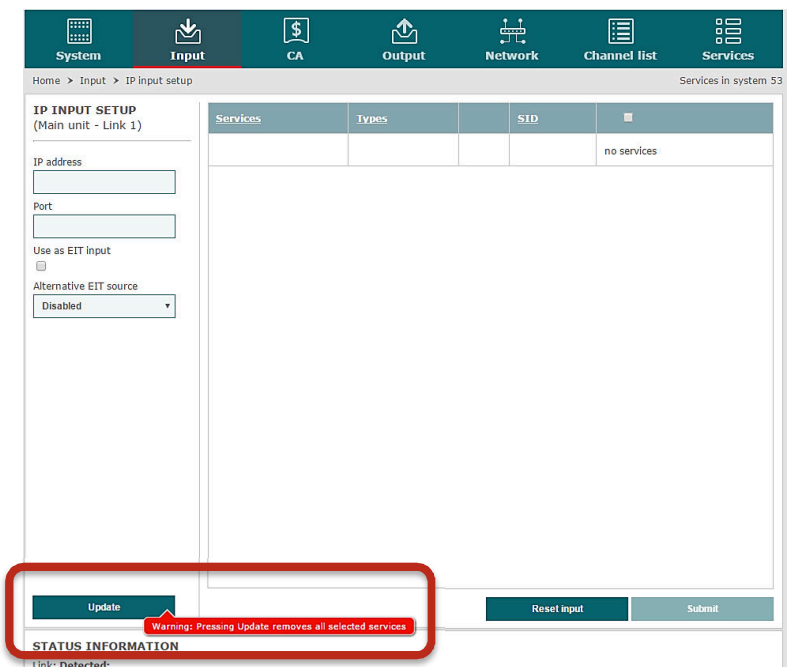
> **NOTE**
> Licenses for IP input are required to be able to use the IPTV functionality in the headend. The licenses can be purchased from Triax Sales, and need to be activated, see "Activating licenses". Get more knowledge at TRIAX

Creating

1. Select the **Input** tab.
2. Select the **IP inputs** sub-tab.
3. Press the **Setup** button for the link socket that processes IP input.
4. Specify the desired IP address and associated IP port number in the corresponding fields.
5. Press the **Update** button.
6. Previously selected services will be deleted when pressing the **Update** button
7. Check the **Selected services** checkbox for one or more services to select the service(s) you want to use.

Creating - continued

Important:
If the IP input uses MPTS streams, then each stream can contain one or more services. An MPTS stream may use the same PID (Package ID) for two or more of the services that it contains.

However, the headend system cannot output services with the same PID. To discover services with the same PID is NOT possible until you have selected the services with identical PIDs in order to output them using an output module or a Link socket.
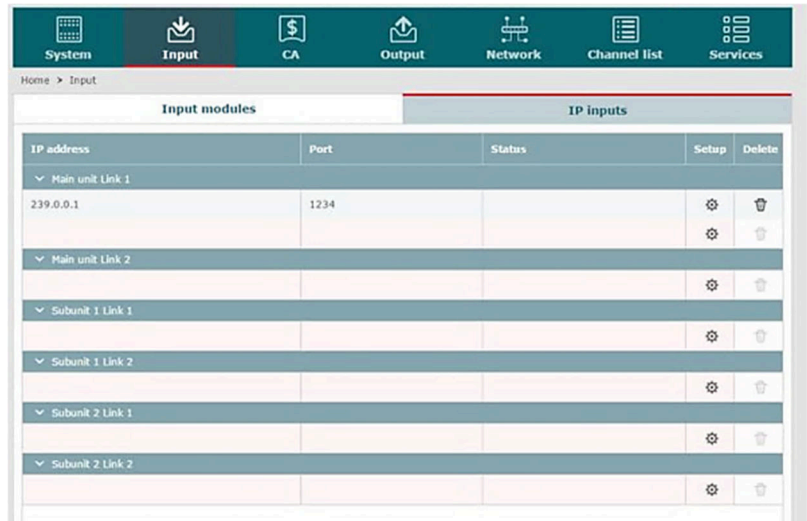
If you attempt to output services with identical PIDs:

- the System Status LED turns red on the unit that tries to output the IP services,
- the System icon of the affected headend unit turns red on the System tab in the Service Tool,
- the System Status LED and System icon turn red on the main unit in a multi-unit installation.
- See "Duplicated PIDs" for further information.

8. View the **Status information** area to ensure that IP data is being sourced through the Link socket.
9. Press the **Submit** button.

The selected service is now available in the headend service pool.

10. Press the Apply button to save the new settings in the configuration.
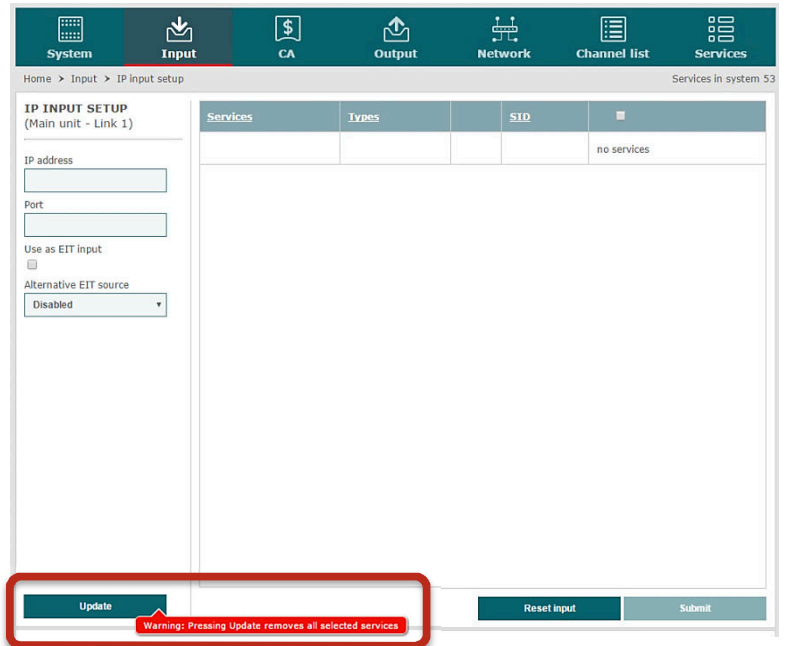
Specifying EIT/EPG source

One input on each link per headend can be configured to carry Event Information Table (EIT) data.

1. Specify the desired IP address and associated IP port number in the corresponding fields.
2. Check the **Use as EIT input** checkbox.
3. Press the **Update** button.
4. Previously selected services will be deleted when pressing the **Update** button
5. Check the **Selected services** checkbox for one or more services to select the service(s) you want to use
6. View the **Status information** area to ensure that IP data is being sourced through the Link socket.
7. Press the **Submit** button.

Specifying Alternative EIT/EPG source

1. Specify the desired **IP address** and associated **IP port number** in the corresponding fields.
2. Open the **Alternative EIT source** drop-down list.
3. Select the **EIT source** to be used.
4. Press the **Update** button.
5. Previously selected services will be deleted when pressing the **Update** button
6. Previously selected services will be deleted when pressing the **Update** button
7. Check the **Selected services** checkbox for one or more services to select the service(s) you want to use
8. View the **Status information** area to ensure that IP data is being sourced through Link 1 or 2 on the socket.
9. Press the **Submit** button.
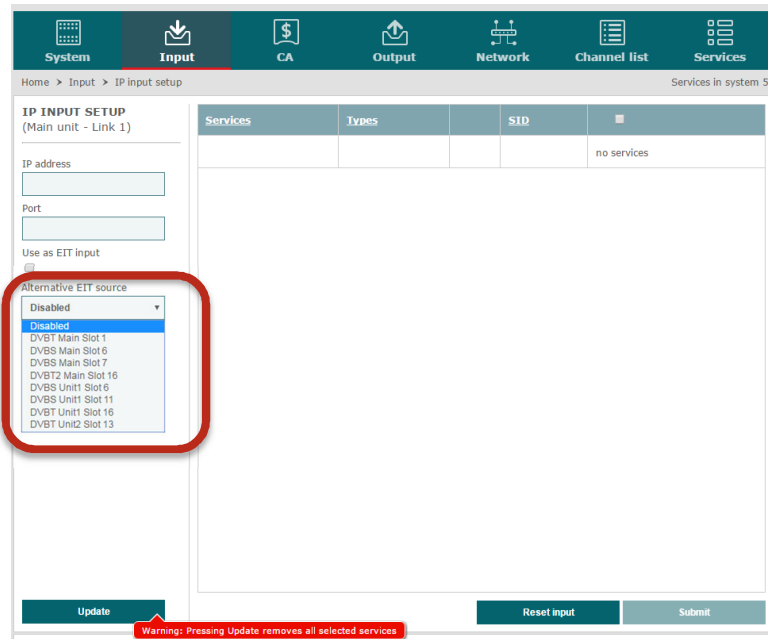
EIT for Viasat services
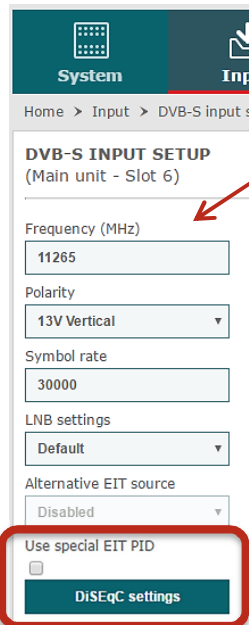
It is possible to change the EIT at PID 57 received at DVB-S input and convert the EIT to the standard PID (PID 18) for EIT. This function is for Viasat services. To activate this function select *Use special EIT PID* at the *Input* menu for DVB-S.

Modifying

To modify an existing IP input configuration:
-Press the **Setup** button associated with the IP input configuration.
-Make the required modifications as when creating an IP input configuration.
-Press the **Submit** button.
-Press the **Apply** button when the modifications have been made.
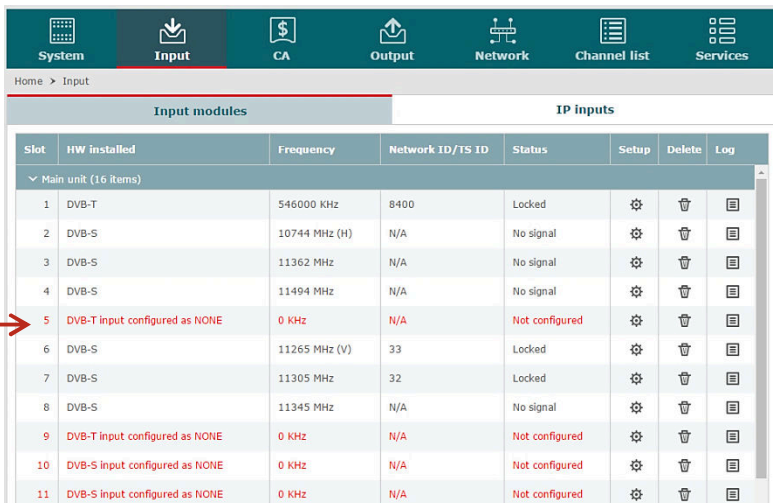
Deleting

1. Press the **Delete** button of the IP input to be removed.
2. Confirm that the selected IP input is to be removed.
3. Press the **Apply** button.
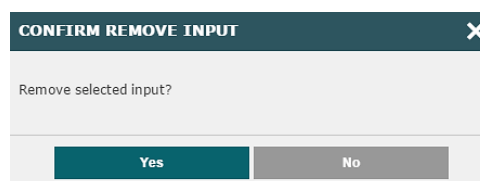
IP output configurations

Creating

The TDX headend offers **two** solutions to output IPTV services:

Through LINK sockets:
- IP multicast streaming (UDP streaming)
- No RTP option
- IGMP version 2
- SPTS or MPTS including SDT, PAT, PMT, CAT
- Packet ratio of 1 TS packet per IP packet
- Not possible to change service ID (SID)
- EIT (IP) NOT possible

Through AUX socket using an IP backend module
- IP multicast streaming (UDP & RTP streaming)
- IGMP version 2
- SPTS or MPTS including SDT, PAT, PMT, CAT
- Set packet ratio for TS packets per IP packet
- Changing service ID (SID)
- Selection of descrambled service
- Selection of scrambled service
- EIT (IP) possible

In case this option (IP backend) is used: see detailed description of the IPTV Service administration process in the **IP output module user guide**.
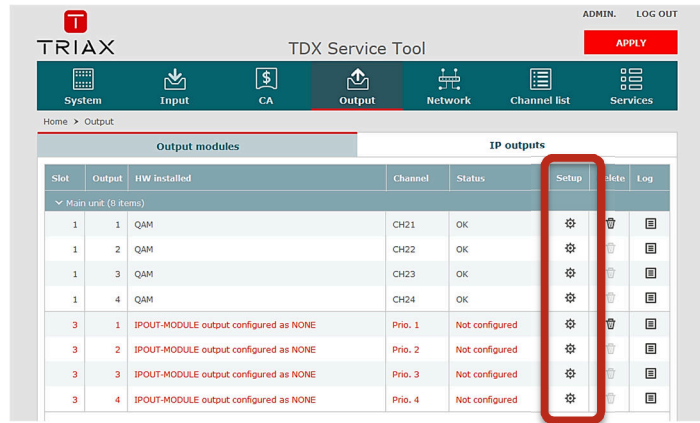
```
┌─────────────────────────────────────────────┐
│ NOTE                                          │
│ Licenses for IP output are required to be able│
│ to use the IPTV functionality in the headend. │
│ The licenses can be purchased from TRIAX       │
│ Sales, and need to be activated, see          │
│ "Activating licenses".                        │
└─────────────────────────────────────────────┘
```

Creating IP out Services using the LINK port

1. Select the **Output** tab.
2. Select the **IP outputs** sub-tab.
3. Press the **Setup** button for the link socket that will process IP output.
4. Specify the desired **IP address** and associated **IP port number** in the corresponding fields.
5. Press the **Services** button.
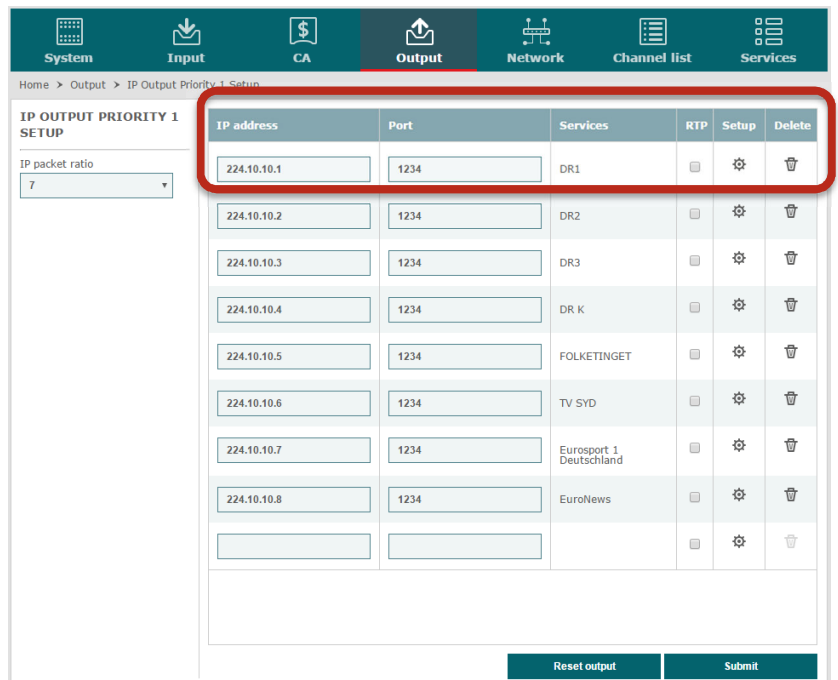   - The **Select Services** window displays services from input that has entered the headend system through the same unit which contains the Link socket(s) being used for service distribution.
6. Select the services to be distributed through the link.
7. Press the **UPDATE** button, down below.

```
┌─────────────────────────────────────────────┐
│ NOTE                                          │
│ Services selected for one output on a Link will│
│ not be selectable for other outputs on the same│
│ Link. Re-scrambled and/or descrambled          │
│ services cannot be distributed using the Link   │
│ sockets. They can, however, be distributed using│
│ an IP output module and the AUX sockets.       │
└─────────────────────────────────────────────┘
```
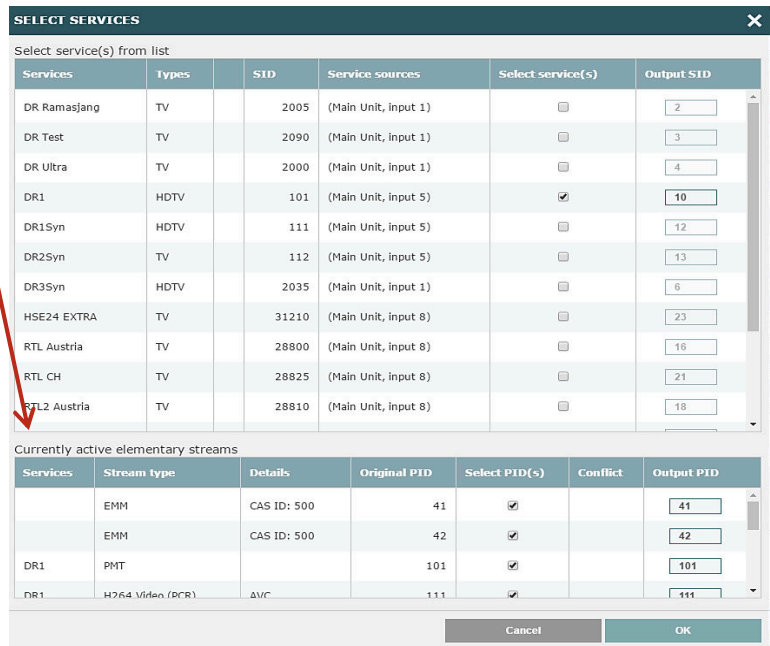
Creating - continued

8. View the **Status information** area, down below, to see the following:
   - The link's RTP status
   - The transfer bitrate
   - The number of license services used.
   - The total number of purchased service licenses

9. Press the **Submit** button.
10. Press the **Apply** button

STATUS INFORMATION
Status: **OK**; SW-Revision: **4.0.1.35773**;

The following message is displayed if the server is busy fulfilling requests from the user:

WARNING! ✕

The server is overloaded with requests (6 pending requests), please wait some time before you can continue working!

OK

The following message is displayed if more services have been selected than are permitted by the current licenses.

WARNING ✕

All activated IP output services are used, please aquire additional licences to add more

OK

Modifying

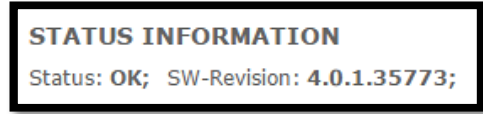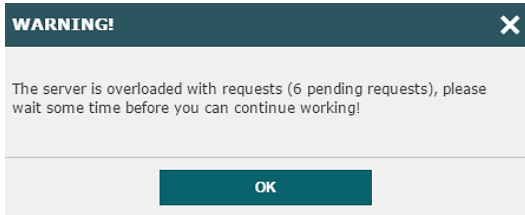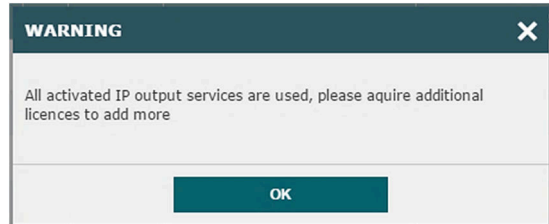To modify and existing IP output configurations:
1. Press the **Setup** button associated with the IP output configuration.
2. Make the required modifications as when creating an IP output configuration.
3. Press the **Submit** button on the IP output setup window.

Press the **Apply** button when the modifications have been made.

Deleting

1. Press the **Delete** button for the IP output to be removed.

REMOVE SELECTED OUTPUT MODULE? ✕

Confirm Remove output module

Yes | **No**
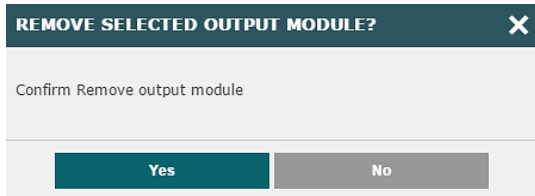
2. Confirm that the selected IP output is to be removed.
3. Press the **Apply** button

	Output modules			IP outputs			
Slot	Output	HW installed	Channel	Status	Setup	Delete	og
⌄ Main unit (20 items)							
1	1	NONE output configured as IPOUT-MODULE		N/A	⚙	🗑	📄
1	2	NONE output configured as IPOUT-MODULE		N/A	⚙	🗑	📄
1	3	NONE output configured as IPOUT-MODULE		N/A	⚙	🗑	📄
1	4	NONE output configured as IPOUT-MODULE		N/A	⚙	🗑	📄
2	1	QAM		Disabled	⚙	🗑	📄
2	2	QAM		Disabled	⚙	🗑	📄
2	3	QAM		Disabled	⚙	🗑	📄
2	4	QAM		Disabled	⚙	🗑	📄
3	1	IPOUT-MODULE output configured as NONE	Prio. 1	Not configured	⚙	🗑	📄
3	2	IPOUT-MODULE output configured as NONE	Prio. 2	Not configured	⚙	🗑	📄
3	3	IPOUT-MODULE output configured as NONE	Prio. 3	Not configured	⚙	🗑	📄
3	4	IPOUT-MODULE output configured as NONE	Prio. 4	Not configured	⚙	🗑	📄

Network switch port

ATTENTION
TRIAX recommends that the network switch port (connected to the TDX aux port), is configured so data **from network** to TDX is prevented/blocked. This is also called UDE (unidirectional ethernet) More info can be found in the TRIAX support knowledge base.
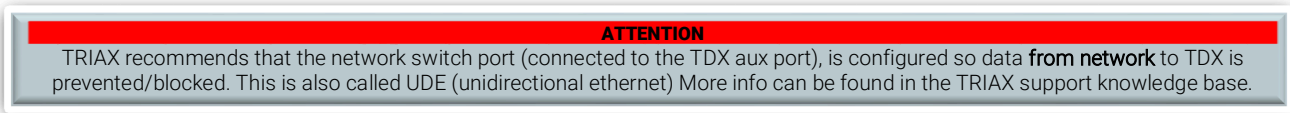
EIT/EPG output

If you want to distribute EIT information in connection with your IP output, you can choose between:
- distributing EIT information with every single IP service, or
- use a barker channel for carrying all EIT information for the IP output.

The EIT barker channel can be output in two ways depending on how you distribute your IP output:

IP output method	Barker channel distribution method
IP output is distributed through the Link sockets.	EIT barker channel is output through Link 2 on the main unit
IP output is distributed through an IP output module.	EIT barker channel is output through the AUX socket on the first IP output module in the headend system
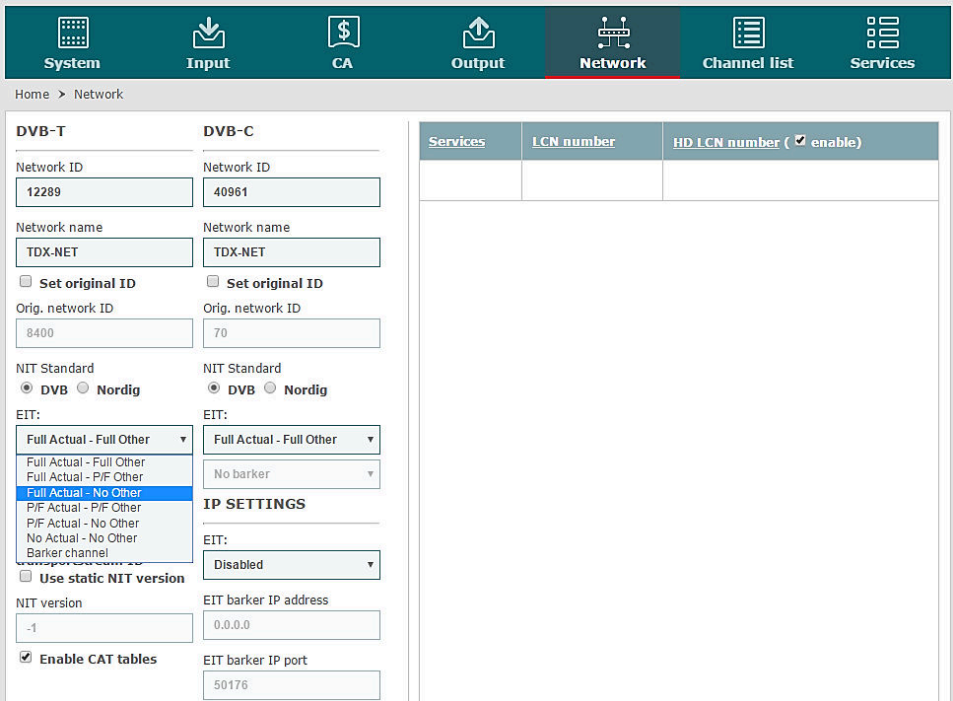
EIT – every IP service

1. Select the **Network** tab in the Service Tool.
2. Open the **EIT** drop-down list.
3. Select "Full Actual – No other".
4. Press the **Submit** button.
5. Press the **Apply** button.

System	Input	CA	Output	Network	Channel list	Services

Home > Network

DVB-T

Network ID
`12289`

Network name
`TDX-NET`

☐ Set original ID

Orig. network ID
`8400`

NIT Standard
◉ DVB ○ Nordig

EIT:
`Full Actual - Full Other` ▼

| Full Actual - Full Other |
| Full Actual - P/F Other |
| Full Actual – No Other |
| P/F Actual - P/F Other |
| P/F Actual - No Other |
| No Actual - No Other |
| Barker channel |

☐ Use static NIT version

NIT version
`-1`

☑ Enable CAT tables

DVB-C

Network ID
`40961`

Network name
`TDX-NET`

☐ Set original ID

Orig. network ID
`70`

NIT Standard
◉ DVB ○ Nordig

EIT:
`Full Actual - Full Other` ▼

`No barker` ▼

IP SETTINGS

EIT:
`Disabled` ▼

EIT barker IP address
`0.0.0.0`

EIT barker IP port
`50176`

Services	LCN number	HD LCN number (☑ enable)

EIT – barker channel

1. Select the **Network** tab in the Service Tool.
2. Open the **EIT** drop-down list.
3. Select "Barker channel".
4. Specify the IP address for the EIT barker channel in the **EIT barker IP address** field.
5. Specify the associated port number in the **EIT barker IP port** field.
6. Press the **Submit** button.
7. Press the **Apply** button.
8.

NOTE
The IP address used for the barker channel must not conflict with any of the IP addresses used for service distribution.

The **Network** window now contains a single line of information stating which unit and socket is used by the EIT barker channel.

Disable CAT tables

When the "Enable CAT tables" check-box is un-checked, the CAT tables, and only the CAT tables, of all outgoing transport streams of the TDX system will be removed.

This means that I.e. no transport stream packets with PID 0x0001 are to be found in the outgoing transport streams. However – the data referenced by the CA descriptors within the CAT tables, the EMM streams, will still remain in the outgoing transport streams.

Since they are now un-referenced PIDs, most analysis tools (.e.g DVBAnalyzer, Dektec Stream Xpert etc.) will flag the presence of these streams as an error.
If the user of a TDX system wishes to remove BOTH the CAT table and the EMM streams, the EMM streams have to be filtered at each active output (see *picture 2*). Note that filtering of PIDs requires an installed license for enabling this feature.

PID handling

From S/W version 4.0.1 it is possible to filter or even remap the PID.

1. Find output and press SERVICES button.
2. A box opens – by pressing the SELECT SERVICES you can select/deselect specific services.
3. It is also possible to change the output PID – remember however that all PID's shall be different.

Example:

- Press button SERVICES
- At the shown QAM output, there is the following services: 3SAT, KIKA, ZDF, zdf-kultur, zdf-neo and zdf-info.
- Enable the "beauty TV" service
- Now you can see the elementary streams that comes with the service
- You can choose to hide the audio by uncheck the PID (3072)
  You can also choose to remap the Video PID from 3071 to 3099
- Press OK
- Remember to uncheck the field "disabled output" at the previous screen.

COFDM OUTPUT SETUP
(Unit 1 - Slot 2 - Output 1)
☑ Disabled output

- Press "SUBMIT" and then "APPLY"
-
- This way it is possible to have full control over the PID's of a specific stream

---

QAM OUTPUT SETUP
(Main unit - Slot 2 - Output 1)

☑ Disabled output

Channel plan	Channel	Frequency (KHz)	Channel spacing
B/G ▼	Frequency ▼	0	8 MHz ▼

Select input	RF level correction	Symbol rate
Services ▼	+0 dB ▼	6875
Services...		

QAM Mode	Transportstream ID
64-QAM ▼	20

Manual SDT version
☐ -1

SELECT SERVICES

Select service(s) from list

Services	Types	SID	Service sources	Select service(s	Output SI
3sat	TV	28007	(Main Unit, input 3)	☐	2
Beauty TV	TV	54	(Main Unit, input 4)	☑	8
Channel21	TV	769	(Main Unit, input 4)	☐	12
Comedy Central / VIVA AT	TV	60	(Main Unit, input 4)	☐	9
DELUXE MUSIC	TV	65	(Main Unit, input 4)	☐	10
DMAX Austria	TV	73	(Main Unit, input 4)	☐	11
KiKA	TV	28008	(Main Unit, input 3)	☐	3
N24 Austria	TV	53	(Main Unit, input 4)	☐	7
ZDF	TV	28006	(Main Unit, input 3)	☐	1
zdf.kultur	TV	28016	(Main Unit, input 3)	☐	6
zdf_neo	TV	28014	(Main Unit, input 3)	☐	5

Currently active elementary streams

Services	Stream type	Details	Original PID	Select PID(s)	Conflict	Output PID
Beauty TV	PMT		100	☑		100
Beauty TV	Video (PCR)		3071	☑		3071
Beauty TV	Audio	DEU	3072	☑		3072

Mux name [   ]   Cancel   OK

Currently active elementary streams

Services	Stream type	Details	Original PID	Select PID(s)	Conflict	Output PID
Beauty TV	PMT		100	☑		100
Beauty TV	Video (PCR)		3071	☑		3099
Beauty TV	Audio	DEU	3072	☐		3072

Mux name [   ]   Cancel   OK

SNMP traps

| PowerUp | OID: | 1.3.6.1.4.1.41359.1.1.1.1 |

Trap generated when the TDX will be power cycled.

| Login | OID: | 1.3.6.1.4.1.41359.1.1.1.2 |

Trap generated when the web configurator is logged on.

| Logout | OID: | 1.3.6.1.4.1.41359.1.1.1.3 |

Trap generated when the web configurator is logged out.

| TimeOut | OID: | 1.3.6.1.4.1.41359.1.1.1.4 |

Trap generated when the web configurator is timed out.

| FailedLogin | OID: | 1.3.6.1.4.1.41359.1.1.1.5 |

Trap generated when the web configurator login has failed.

| Restart | OID: | 1.3.6.1.4.1.41359.1.1.1.6 |

Trap generated when TDX is restarted.

| InputError | OID: | 1.3.6.1.4.1.41359.1.1.1.7 |

Trap generated when an input module has an error, e.g. module no longer locked to frequency, missing module etc,

| CIInsertion | OID: | 1.3.6.1.4.1.41359.1.1.1.8 |

Trap generated when a CI module is inserted in the TDX.

| CIRemoval | OID | 1.3.6.1.4.1.41359.1.1.1.9 |

Trap generated when a CI module is removed from the TDX.

| ModuleInsertion | OID | 1.3.6.1.4.1.41359.1.1.1.10 |

Trap generated when an input or output module is inserted.

| ModuleRemoval | OID | 1.3.6.1.4.1.41359.1.1.1.11 |

Trap generated when an input or output module is removed.

| CIDescramblingError | OID | 1.3.6.1.4.1.41359.1.1.1.12 |

Trap generated when a service descrambling has an error.

| CICommunicationDown | OID | 1.3.6.1.4.1.41359.1.1.1.13 |

Trap generated when communication with CI module fails.

| VideoDecodingError | OID | 1.3.6.1.4.1.41359.1.1.1.14 |

Trap generated when video decoding of a service in a PAL output module fails.

| InterlinkDisconnect | OID | 1.3.6.1.4.1.41359.1.1.1.15 |

Trap generated when main unit loses connection to a subunit.

| ConfigurationChangeApplied | OID | 1.3.6.1.4.1.41359.1.1.1.16 |

Trap generated when the user applies changes in the web configurator.

| InputOK | OID | 1.3.6.1.4.1.41359.1.1.1.17 |

Trap generated when an input module error disappears, e.g. errors that can disappear are input module no longer locked to frequency, missing module etc,

| CIDescramblingOK | OID | 1.3.6.1.4.1.41359.1.1.1.18 |

Trap generated when a service descrambling error disappears.

| CICommunicationUP | OID | 1.3.6.1.4.1.41359.1.1.1.19 |

Trap generated when communication with the CI module no longer fails.

| VideoDecodingOK | OID | 1.3.6.1.4.1.41359.1.1.1.20 |

Trap generated when a video decoding of a service in PAL output module no longer fails.

| InterlinkConnect | OID | 1.3.6.1.4.1.41359.1.1.1.21 |

Trap generated when a main unit is connected to a subunit

A. Simulcrypt Intro

1. Definitions

DVB Simulcrypt defines a system architecture that allows different Conditional Access Systems (CAS) to cooperate with head-end equipment from different vendors.
A Simulcrypt system provides CAS specific management and control, for use with a generic service scrambling mechanism in the head-ends

The basic Simulcrypt system consists of a single CAS server connected to a single head-end, e.g. a TDX single-unit or multi-unit system.
Multiple head-ends may be connected to the same CAS server(s), distinguished by the IP addresses of the head-ends.
This makes no difference to the scenario seen from the head-end.

2. Architecture

The Simulcrypt architecture splits the CA functionality in two major parts:

- **CAS server part** handles the CAS specific management and control flow to distribute access rights to entitled receivers. These parts are private to each CAS vendor and comprise heavy encryption of keys and control words to be distributed in public messages but decoded by entitled receivers only. CAS servers communicate with head-ends via the Simulcrypt protocol over TCP/IP connections. The message format is standardized, but much of the message content is private to the CA system

- **Head-end part** performs the actual scrambling of service content and inserts the CA message flows into transport streams in a standardized way.

3. Simulcrypt in the TDX

From a high level user perspective, the Simulcrypt feature comes with Digital Backend modules (QAM, COFDM and/or IP OUT) and is made available via the licensing system. It is managed via the Service tool and connects to CAS servers over TCP/IP through the management port.

To enable Simulcrypt scrambling, the user must:

- Install one or more output modules with Simulcrypt option
- Install proper license for Simulcrypt in the TDX
- Configure CAS ID and address information per TDX system
- Connect and configure a CAS server

To enable a Simulcrypt scrambled service, the user must:

- Select a scrambler, ie. a Simulcrypt enabled backend module
- Configure CAS parameters for scrambling the service
- Map the scrambled service to outputs via the TDX pool

The CAS server and scrambler related configuration is similar to the existing configuration of CI scrambler modules.
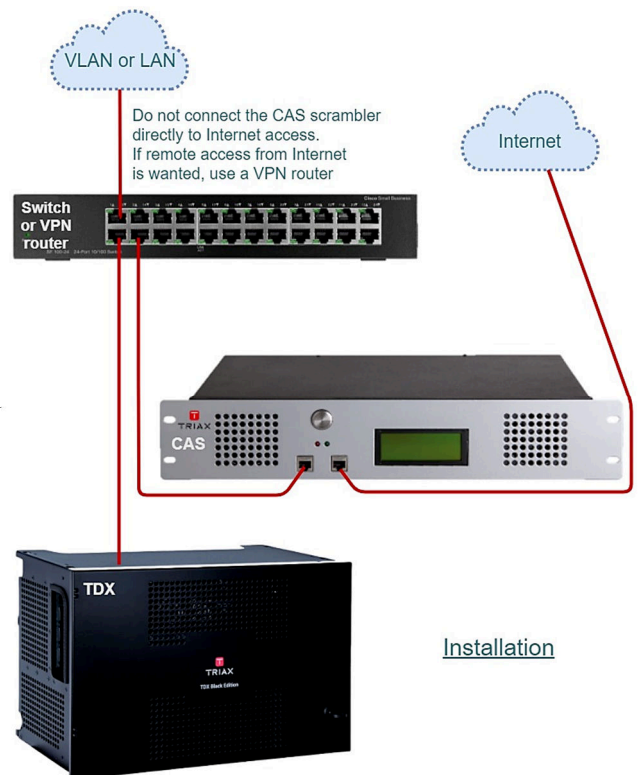
B. Panaccess setup

1. System setup description - Panaccess

- The CAS server requires internet connection for creating a VPN session to www.triax.cas.com
- The CAS scrambler port is required to be in the same network (VLAN) as the TDX
- The ECM port 12500 is forwarded to CAS scrambler port for TDX access outside VLAN
- TV & STB Connected as example above
- STB: able to Descramble service

VLAN or LAN

Do not connect the CAS scrambler directly to Internet access.
If remote access from Internet is wanted, use a VPN router

Internet

Switch or VPN router

CAS

TDX

Installation

2. Simulcrypt Configuration in CAS server – login

A thorough description of how to setup, is described in the [User manual](#) for the CAS server.
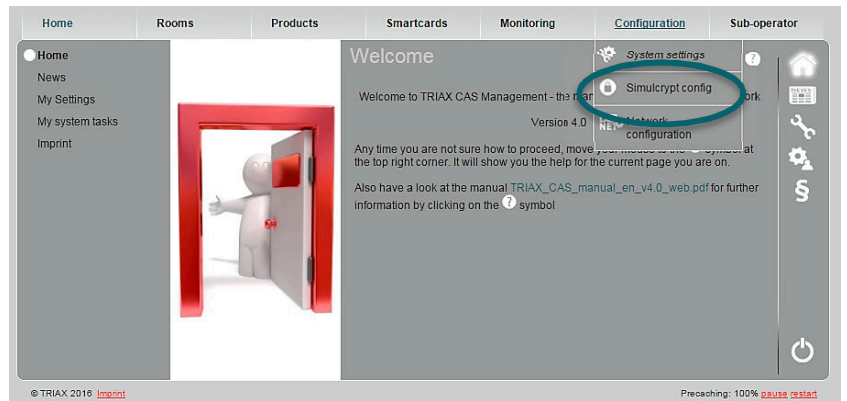
3. Add scrambler information

Press +
Enter scrambler information – click submit.
Now scrambler information is added in the CAS server.
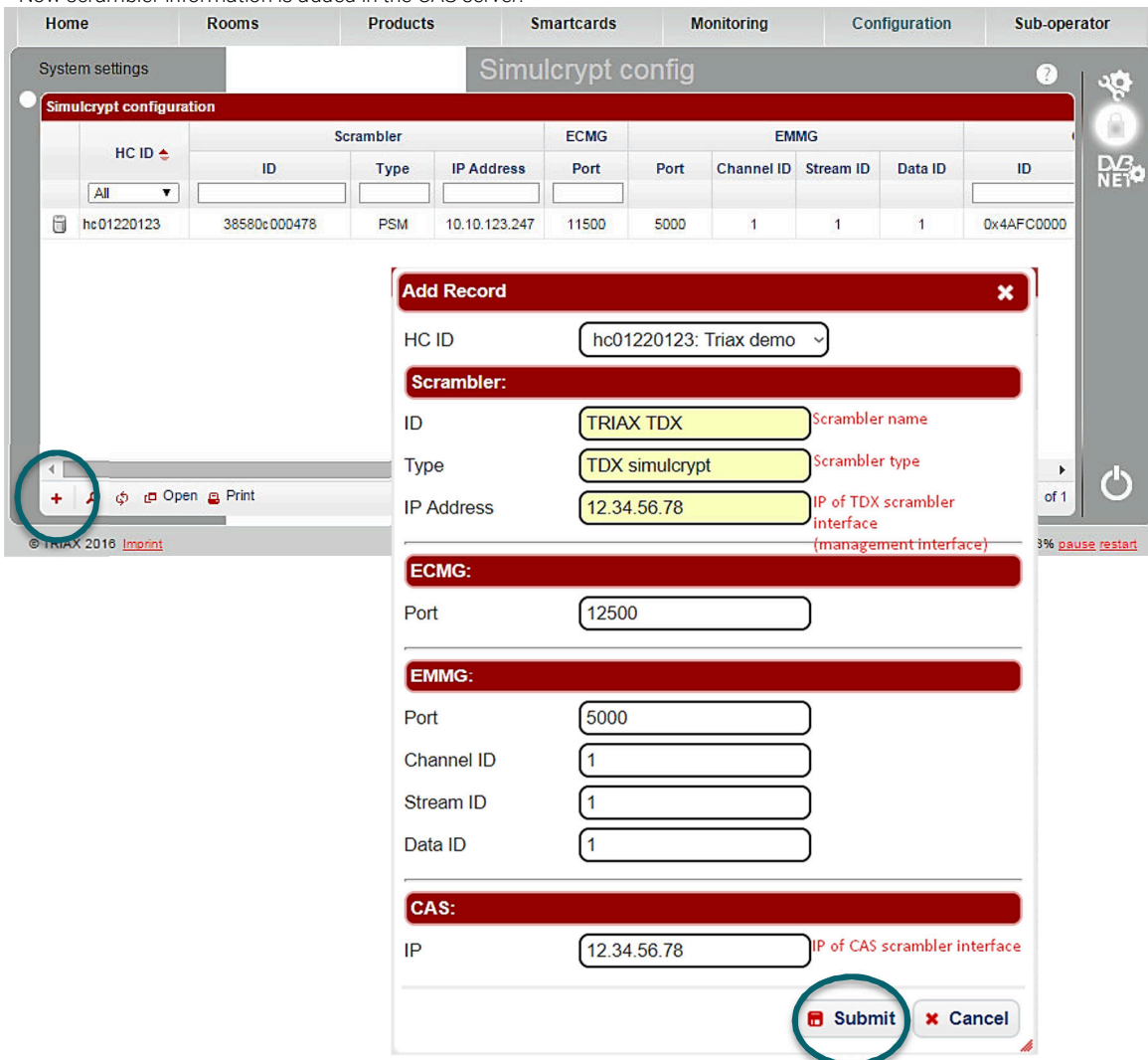
C. How to set up Simulcrypt in the TDX

1. Prerequisites

- TDX should be connected to the CAS System – see installation drawing on page I.
- TDX should have quality input signal to use
- User must have valid license(s)

The TDX configuration port has to be in the same VVLAN as the CAS server,
- ➢ if the CAS server has IP 10.10.85.1
  – then the TDX has to be set up to 10.10.85.xx

- Enter relevant information in "CAS system settings" from TDX Admin options window.
- Enter mandatory fields in the Service tool, as shown in example.
- Click OK and apply

IP settings

Configuration port

IP address	Subnet mask	Default gateway
10.50.1.222	255.255.255.0	10.50.1.254

DNS Server 1	DNS Server 2
8.8.8.8	8.8.4.4

CAS system settings

CAS system 1

CAS system name

Example CAS

CAS system ID (hex value)	EMM server port	ECM server IP address	ECM server IP port
0x4AFC	5000	12.34.56.78	12500

CAS system ID
- As shown in the CAS server Simulcrypt settings w/o zeroes/end. Ie. 0x4AFC000 is 0x4AFC
- **Panaccess: 0x4AFC** / Samsung: 0x112

EMM server port
- As defined in the CAS server. Default: 5000

ECM server IP adress
- IP adress from the CAS server

ECM server IP port
- As defined in the CAS server.
- **Panaccess: 12500** / Samsung: 9999

2. How to setup a service to be scrambled

- Route non scrambled service to scrambler
- Configure "input" in TDX as example below
- Click Update and Apply – remember when clicking Update, previously selected services will be removed

System	Input	CA	Output	Network	Channel list	Services

Home > Input > DVB-S input setup   Services in system 2

DVB-S INPUT SETUP
(Main unit - Slot 1)

Frequency (MHz)
11494

Polarity
18V Horizontal

Symbol rate
22000

LNB settings
Default

Alternative EIT source
Disabled

Use special EIT PID
☐

DiSEqC settings

Update
Warning: Pressing Update removes all selected services

Services	Types	SID	☐
arte HD	HDTV	10302	☐
Das Erste HD	HDTV	10301	☐
SWR BW HD	HDTV	10303	☐
SWR RP HD	HDTV	10304	☐

Reset input   Submit

Click on CA then on Simulcrypt scramblers. Click on Setup

System	Input	CA	Output	Network	Channel list	Services

Home > CA

CA Modules   **Simulcrypt scramblers**

Slot	Running mode	Services	Status	Setup ...	Delete	Log
∨ Main unit (4 items)						
1	Inactive		OK	⚙	🗑	📋
2	Inactive		OK	⚙	🗑	📋
4	Inactive		OK	⚙	🗑	📋
6	Inactive		OK	⚙	🗑	📋

Choose running mode options:
- Inactive – *no license*
- Full CAS (DIG) – *all licenses possible*
- Limited CAS (12 service) – *only 12 licenses*

- Access criteria: (0 is default) write as service SID of the service in HEX (SID 2 = 002 access criteria

- Click on Submit

Make sure Status is OK

Make sure service is configured correct and available in "Service List" as below
- *DK4* is the "raw" channel coming direct from the antenna/dish
- *DK4_descrambled* is the descrambled channel from ie. DVB-S, descrambled by CAM +smartcard and put back into the pool
- *DK4_scrambled* is the (re) scrambled channel coming from Simulcrypt

D. Samsung DRM / LYNK server

NOTE
Samsung LYNK and SINC server installation are NOT supported by TRIAX. If support is needed, please contact Samsung support. TRIAX will however help retrieve a server license from Samsung.

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1. Prerequisites & setup

Setup TDX Simulcrypt
- TDX should be connected to the CAS System
  - see installation
- TDX input signal should be good quality
- User must have valid license(s)
- The TDX configuration port has to be in the same VVLAN as the CAS server, - if the CAS server has IP 10.10.85.1, then the TDX has to be set up to 10.10.85.xx

- Software, version 4.2.x.xxxx or newer
- "4180xx – Samsung DRM" Licence
- Configure Simulcrypt as described in chapter A and B
- Configure services to be scrambled

- Enter relevant information in "CAS system settings" from TDX Admin options window.
- Enter mandatory fields in the Service tool, as shown in example.
- Click OK and apply

IP settings

Configuration port

IP address	Subnet mask	Default gateway
10.50.1.222	255.255.255.0	10.50.1.254

DNS Server 1	DNS Server 2
8.8.8.8	8.8.4.4

CAS system ID
- As shown in the CAS server Simulcrypt settings w/o zeroes/end. Ie. 0x4AFC000 is 0x4AFC
- Panaccess: 0x4AFC / **Samsung: 0x112**

EMM server port
- As defined in the CAS server. Default: 5000

ECM server IP adress
- IP adress from the CAS server

ECM server IP port
- As defined in the CAS server.
  Panaccess: 12500 / **Samsung: 9999**

CAS system settings

CAS system 1
CAS system name

Example CAS

CAS system ID (hex value)	EMM server port	ECM server IP address	ECM server IP port
0x0112	5000	12.34.56.78	9999

Setup LYNK (DRM) / SINC server
- Hardware – Dual core 2GHz / 4GB RAM / 100GB HD
- Software required
  - Windows 2008 server or newer / Win7 can be used for test
  - Java Runtime Environment – JRE (latest version)
  - Tomcat (ver. 6,7, or 8)
  - Samsung LYNK / SINC software

- Prepare a server running the operating system needed
- Install Samsung CAS server (LYNK)
- Configure Samsung Cas server
- Install SINC server
- Configure SINC server

---

2. Configure TDX and CAS system settings

- Purchase and enter the Samsung DRM license
- Configure CAS settings
  - CAS ID: 0x112 (Samsung DRM)
  - EMM port: default port "5000"
  - ECM server: IP address of LYNK server
  - ECM port: default port "9999"

- These CAS settings must be provided form the person installing the LYNK server

TRIAX TDX Service Tool   ADMIN. LOG OUT APPLY

System | Input | CA | Output | Network | Channel list | Services

Home > Admin.

SETTINGS FOR TDX SERVICE TOOL

> Language settings
> Country settings
> Time settings
> Password settings
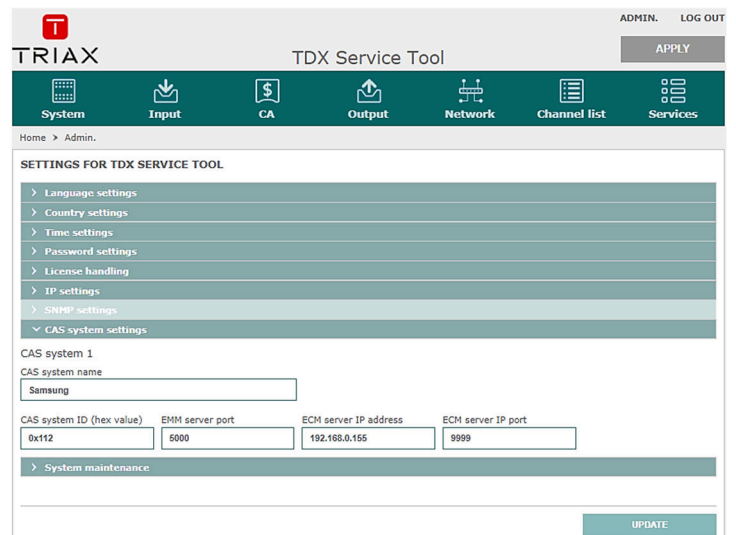> License handling
> IP settings
> SNMP settings
> CAS system settings

CAS system 1
CAS system name

Samsung

CAS system ID (hex value)	EMM server port	ECM server IP address	ECM server IP port
0x112	5000	192.168.0.155	9999

> System maintenance

UPDATE

E. Visuel guide to setup for all scrambling methods

- Configuring Simulcrypt scramblers, use only Digital output modules (QAM, CoFDM, IP) not Analog modules.
- When module is found, then press Setup

System	Input	CA	**Output**	Network	Channel list	Services

Home > Output

Output modules | **IP outputs**

Slot	Output	HW installed	Channel	Status	Setup	Delete	Log
⌄ Main unit (16 items)							
1	1	PAL	91000	OK	⚙	🗑	▤
1	2	PAL	98000	Disabled	⚙	🗑	▤
1	3	PAL	105000	Disabled	⚙	🗑	▤
1	4	PAL	112000	Disabled	⚙	🗑	▤
2	1	COFDM	0	Disabled	⚙	🗑	▤
2	2	COFDM	8000	Disabled	⚙	🗑	▤
2	3	COFDM	16000	Disabled	⚙	🗑	▤
2	4	COFDM	24000	Disabled	⚙	🗑	▤
3	1	IPOUT-MODULE	Prio. 1	OK	⚙	🗑	▤

- On the CA tab, press Setup

System	Input	**CA**	Output	Network	Channel list	Services

Home > CA

CA Modules | **Simulcrypt scramblers**

Slot	Running mode	Services	Status	Setup ..	Delete	Log
⌄ Main unit (3 items)						
2	Inactive		OK	⚙	🗑	▤
3	Inactive		OK	⚙	🗑	▤
4	Inactive		OK	⚙	🗑	▤

- Select running mode, then select service to be scrambled

| | System | Input | CA | Output | Network | Channel list | Services |

Home ➤ CA ➤ Simulcrypt scramblers   Services in system 36

SCRAMBLER SETUP
(Main unit - Slot 2)

Running mode

| Inactive | ⌄ |

Inactive
Limited CAS (24 service)
Samsung DRM (24 service)

Services	Orig. SID	SID	Service sources	Access criteria	Selected
1LIVE diGGi	28481	18	(Main Unit, input 12)	0	☐
ARD-alpha	28487	25	(Main Unit, input 12)	0	☐
COSMO	28480	17	(Main Unit, input 12)	0	☐

- On the Output tab, select Services

| | System | Input | CA | Output | Network | Channel list | Services |

Home ➤ Output ➤ COFDM output setup

COFDM OUTPUT SETUP
(Main unit - Slot 2 - Output 1)

☑ Disabled output

Channel plan	Channel	Frequency (KHz)	Channel spacing
B/G ⌄	Frequency ⌄	0	8 MHz ⌄

Select input		RF level correction	Modulation
Services ⌄	Services...	+0.0 dB ⌄	64-QAM ⌄

FEC	Guard interval	Transmission mode	Transportstream ID
7/8 ⌄	1/32 ⌄	2K ⌄	20

Manual SDT version

☐ -1

- And then select the _scrambled service

SELECT SERVICES   ✕

Select service(s) from list

| Services	Types	SID	Service sources	Select service(s)	Output SID
1LIVE diGGi	RADIO	28481	(Main Unit, input 12)	☐	18
ARD-alpha_scrambled	TV $	28487	(Main Unit, scrambler 2)	☑	37
COSMO	RADIO	28480	(Main Unit, input 12)	☐	17
DR K	HDTV	2010	(Main Unit, input 5)	☐	12
DR Ultra	TV	2000	(Main Unit, input 5)	☐	9
DR2	HDTV	2005	(Main Unit, input 5)	☐	10

F. LYNK server – purpose & principle

1. The purpose of the LYNK server

- The DRM (Digital rights management) server
- Provides the
    - ECM (entitled control message)
    - EMM (entitled management message)
- Works solely with RF output (DVB-T / -C)
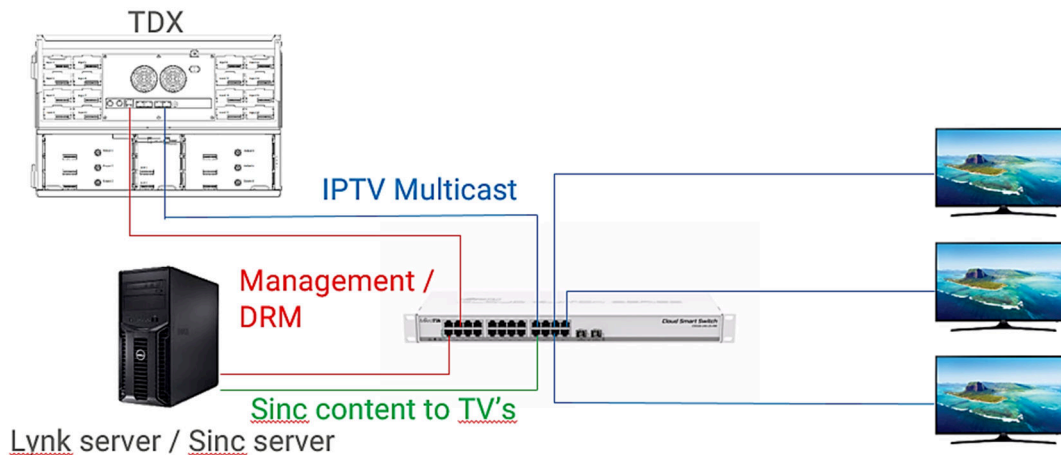   - IP out requires additional SINC server
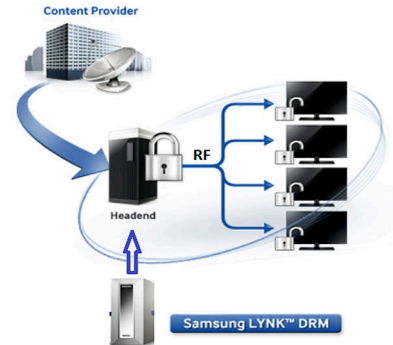
2. Principle diagram RF out
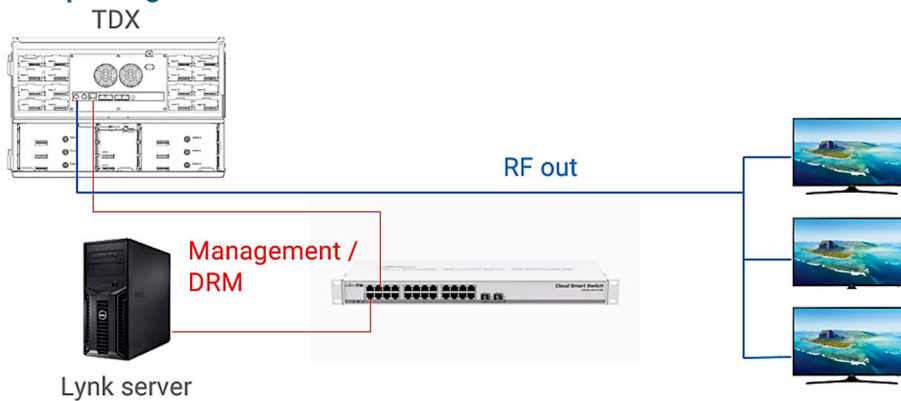
- The TDX uses the management port, and the LYNK server must be connected to the same VLAN
- They communicate and exchange data (TDX sends controlword and receives EMM / ECM)
- The TDX distributes the EMM's and ECM's in the RF output signal

3. Principle diagram IP out

- The TDX uses the management port, and the LYNK server the Ethernet interface – they must be in the same VVLAN
- IPTV and SINC server must also be on same VVLAN. IGMP is always configured on IPTV VVLAN
- The LYNK and SINC server is running on same H/W with one NIC (network interface controller)
- They communicate and exchange data (TDX sends controlword and receives EMM / ECM)
- The TV sets will communicate with the SINC server and receive their certificates; which is necessary for the TV's to run IP mode in the network.
- The TDX output is IP multicast