

# TDX Cabinet - main unit for TDX range of modules

The TDX housing is designed to accommodate up to 16 frontend and 6 quad backend modules. Up to three TDX headends can be combined as one system of up to 48 input muxes and 72 output channels, either 72 PAL programs or 72 QAM/COFDM muxes or a mixture of these. The heart of the TDX is the TDX pool where services are available from all front end modules, whether terrestrial, satellite or AV encoder. From the pool, the services can be cherry-picked and distributed via the COFDM, QAM, PAL or IP backend

modules. Any input can be connected to any output. Configuration of the TDX can either take place by using the TDX service tool or the web based configurator. Both the TDX service tool and the web configurator ensure that the COFDM or QAM muxes are created in a way where the maximum bandwidth is respected. The TDX unit can be mounted in a 19" rack or mounted on the wall horizontally or vertically by using the wall brackets. Use the key to open the front lid and get access to the modules systems).



TDX Main unit (closed)

## Technical data

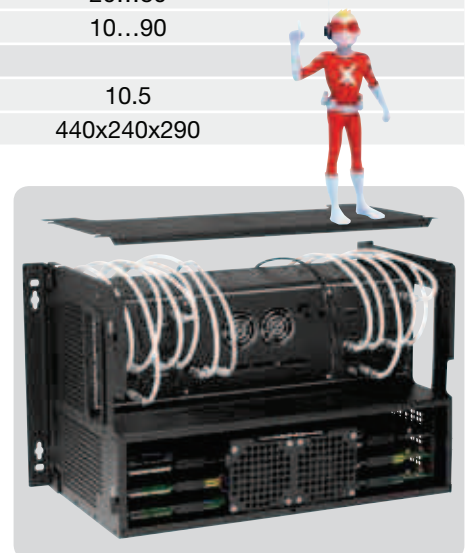
Product	TDX Main unit cabinet	
Art. No.	492090	
<b>General</b>		
Frequency range (RF OUT)	MHz	47-862
Impedance (RF OUT)	Ohm	75
Return loss (RF OUT)	dB	> 14 at 47MHz (-1.5dB/octave; Min. 10dB)
Testpoint	dB	-20
Output level max @ 60 dB IMD 24 combined channels	dBμV	103
<b>Power Supply</b>		
Operating voltage	VAC	190-260 50/60 Hz
Min. power consumption	W	20
Max. power consumption	W	280
Max. LNB control	mA	4 x 305
<b>Connectors</b>		
AC Power in (1,8m)		IEC320 (cable)
Ext. TV-OUT		F-con
Ext. testpoint		F-con
PC		RJ 45
SFP cage		4 x expansion
<b>Environment</b>		
Temperature, operating	°C	-10...+50
Temperature, storage	°C	-20...+70
Humidity, operating	%	20...80
Humidity, storage	%	10...90
<b>Mechanical data</b>		
Weight - net	kg	10.5
Dimensions product ( L x W x H )	mm	440x240x290

After opening the lid, the top metal cover can be removed. The compartment under the cover serves as a cable guide, ensuring the connected cables are protected, orderly and easy to access at the headend. Both frontend and backend modules are replaceable from the front side of the TDX without powering down the headend. The main PSU is also replaceable from the front side by disconnecting the mains power and using a Torx screw driver. A fully loaded headend consumes only

0,2 kW. Coupled with intelligent cooling with four integral fans, this increases the life time of the equipment and makes the TDX a choice that takes care of the environment.

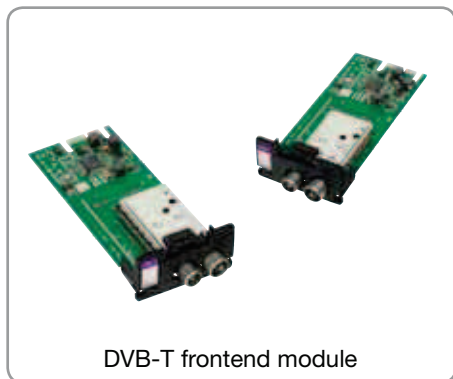
### Features

- Better and stronger performance
- Energy-friendly and long-term reliability
- Compact housing, quick installation
- Cable management
- HOT SWAP Service
- Easy set-up with few modules



TDX Main unit (open)

# TDX - DVB-T frontend module



DVB-T frontend module

The DVB-T frontend module is an input module for the reception of digital terrestrial signals. The module can receive a complete terrestrial MUX and send all services in the MUX to the TDX pool. The DVB-T frontend module includes a tuner, IF amplifier with channel filtering and a COFDM demodulator with serial transport stream input to the TDX system. The DVB-T modules can be placed in any of the slots in the input section. It is possible to remove an input module from a module slot without using any

tools. Using your fingers, simply press the fastener downwards and then pull the module out of the module slot.

## Features

- Antenna loop through.
- Software downloading through TDX system controller module.
- Preconfiguration from/to file through system controller module.
- Log to file/flash.
- Hot swap service in TDX system.
- All services will be transferred to the TDX pool.

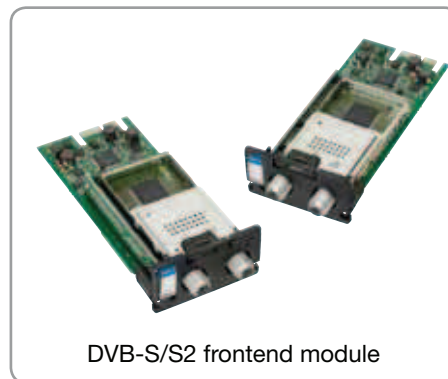
## Technical data DVB-T frontend module

Product		DVB-T - COFDM	
Art. No.		492022	
RF			
Frequency range - VHF III (channel center)	MHz	177.5 - 226.5	
Frequency range - UHF (channel center)	MHz	474.0 - 858.0	
Input sensitivity			
QPSK, FEC 2/3, guard interval 1/4	dBm	- 90.3... - 18	
QAM16, FEC 2/3, guard interval 1/4	dBm	- 84.1... - 18	
QAM64, FEC 2/3, guard interval 1/4	dBm	- 78.5... - 18	
Input impedance	Ohm	75	
Input return loss	dB	> 6.0	
Loop through gain	dB	1...+ 3	
Noise figure	dB	< 9.0	
Bandwidth	MHz	7/8	
Demodulator			
Type		COFDM	
FFT mode		2K, 8K	
Constellations		QPSK, 16QAM, 64QAM	
Guard interval		L, 1/8, 1/16, 1/32	
Power supply			
Voltage/current	V/mA	12 / 120	
Environment			
Temperature, operating	°C	-10...+50	
Temperature, storage	°C	-20...+70	
Humidity, operating	%	20...80	
Humidity, storage	%	10...90	
Mechanical data			
Input connector		IEC - female	
Output connector		IEC - male	
Power supply/control connector	mm	Edge connector 2X18P	
Weight	kg	0.060	
Dimension (HxDxW)	mm	29 x 132 x 50	

# TDX - DVB-S/S2 frontend module

The DVB-S/S2 frontend module is an input module for the reception of digital satellite signals in a TDX headend system. The module can receive a complete transponder and all services on the chosen frequency can be transferred to the TDX pool. The DVB-S/S2 frontend module includes an IF tuner with antenna loop through and a QPSK/8PSK demodulator with serial transport stream input to the TDX headend system.

The DVB-S/S2 modules can be placed in any of the slots in the input section. For ease of use, each slot has been given a number and an overview of the slot numbers is placed on a sticker mounted on the inside of the door on the TDX frame. It is possible to remove an input module from a module slot without using any tools. Using your fingers, simply press the fastener downwards and then pull the module out of the module slot.



## Technical data - DVB-S/S2 frontend module

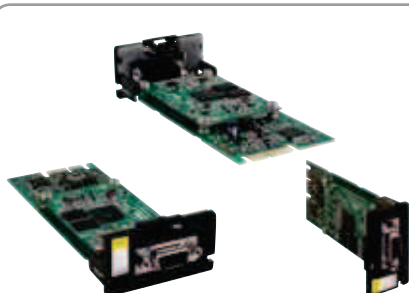
Product		DVB-S/S2
Art. No.		492020
RF		
Frequency range	MHz	950-2150
Input level	dBm	-65...-25
Input impedance	Ohm	75
Input return loss	dB	>10.0
Loop through frequency range	MHz	950-2150
Loop through output return loss	dB	> 8.0
Loop through gain	dB	0...+6
Loop through RF input isolation	dB	> 24.0
LNB control		
V/H programmable	V/mA	< 2.4
LO/HI programmable	kHz	10 ±1
DiSEqC level		1.1
Power supply		
Voltage/current @ LNB supply OFF	V/mA	12 / 250 (typ)
Voltage/current @ LNB supply ON max	V/mA	12 / 550 (typ)
Environment		
Temperature, operating	°C	-10...+50
Temperature, storage	°C	-20...+70
Humidity, operating	%	20...80
Humidity, storage	%	10...90
Mechanical data		
Input connector		F-connector
Output connector		F-connector
Power supply/control connector	mm	Edge connector 2X18P
Weight	kg	0.080
Dimension (HxDxW)	mm	29 x 132 x 50
Remarks		
Configuration	Frequency, Polarity, Symbol rate, Update (search)	

### Features

- Antenna loop through
- Software downloading through TDX system controller module
- Preconfiguration from/to file through system controller module
- Log to file/flash
- DVB-S compliant, up to 45 MS/s
- DVB-S2 compliant, up to 37 MS/s
- Programmable LNB control: 0/14/18V - 0/22kHz
- Hot swap service in TDX system
- All services will be transferred to the TDX pool
- DiSEqC compliant (1.1)



# TDX - AV frontend encoder module



AV encoder module  
(Video/Audio stereo modulator)

The AV encoder module converts analogue video (CVBS) and audio signals from a set top box, a DVD player, a camera or other sources, into a MPEG2 or MPEG4 data stream. This data stream is then available in the TDX pool and can be sent out on all TDX output modules. Teletext and WSS in the analogue signal are also converted into the MPEG2/4 stream. When configuring your system,

it is optional in which slots you place the AV input modules in the input section. When servicing your system, it is possible to remove an input module from a module slot (HOTSWAP).

Just use your fingers to press the fastener downwards and then pull the module outwards to remove it. A 15 pol Sub-D/3 x RCA cable used to connect the source to the AV module is also available.

## Technical data - AV frontend encoder module

Product		AV Encoder module
Art. No.		492080
Video input		1 x AV-signal
Audio/Video input connector		15 pol high density sub-D
Video level	Vpp	1.0
Video impedance	Ohm	75
Video S/N ratio	dB	> 53
Video input colour standards		PAL, Secam, NTSC
Return loss	dB	> 26
Physical interface		CVBS
Scan resolution	p	525, 625
VBI data slicer		Teletext
Accepted input aspect ratio		4:3, 16:9
Audio input		
Audio input level	Vpp	< 2.4
Audio impedance	kOhm	10 ±1
S/N ratio	dB	> 53
Input frequency range (- 3 dB)	Hz	50-20.000
Max. harmonic distortion	%	< 1.0
Audio bitrate, fixed	kB	192
Output		
Output format		Serial MPEG transport stream (LVDS)
Video codec		MPEG-2, MPEG-4
Video codec settings (CBR)	Mbps	1, 2.5, 5.0, 10.0
Embedded audio - AAC, 48 kHz/MPEG2 (L1)		Stereo
Mechanical data		
Audio/Video input connector		D-Sub type 15p HD (DE15)
Working temperature	°C	-10 to +50
Weight (kg)	kg	0.5
Dimension (HxDxW)	mm	29 x 126 x 53
Remarks		15pol Sub-D/3xRCA cable - art. no. 300745 - length: 1.5 meter

### Features

- Composite video input
- Stereo Audio input
- Teletext supported
- Colour standards: PAL, SECAM, (NTSC)
- Constant bit rate up to 10 Mb
- Hot swap service in TDX system
- Selectable encoder output bandwidth (TDX-GUI)
- Remote update via TDX system interface

# TDX - Quad PAL backend modules - FTA or with 2 x CI slot

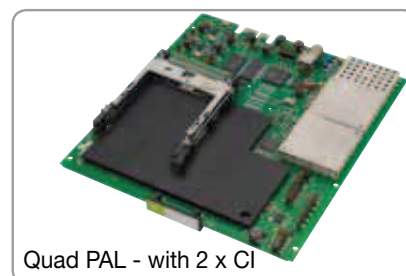
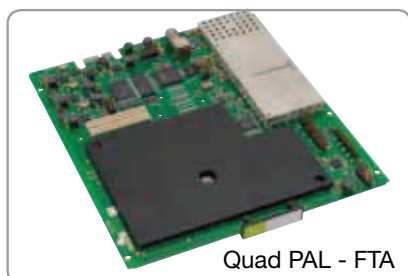
The TDX quad PAL backend is an output module that enables you to distribute up to 4 services/TV programs available in the TDX pool. The TV programs are chosen from the TDX pool either by the web configurator or the TDX service tool. The PAL output modules can be delivered in a free-to-air-version or with 2 CI slots for decryption.

## Features:

- Quad PAL backend module for FTA or for decrypting content/ services
- VBI-insert (VPS, WSS, Teletext)
- Teletext subtitles
- DVB-subtitling
- Video decoding: MPEG-2, main profile, main level - Video decoding: MPEG-4/ H.264 MP @ level 2.2
- Hot swap service in TDX system.
- Audio decoding: AAC, HE-AAC, MPEG 1 layer 1 and 2, MPEG2 part 3
- Analogue video encoding: PAL (B/G, L, D/K, I) and SECAM
- Audio encoding: NICAM, and A2 stereo, FM mono (PAL) and AM mono (SECAM).
- Supports decrypting via CI (492051)
- Decrypted outputs from the CA modules are transferred back to the TDX-pool.

## Technical data - Quad PAL backend modules

Product	Quad PAL backend FTA		Quad PAL backend CI
	Art. No.	492050	492051
<b>Modulator</b>			
TV-norm	PAL (B/G, L, D/K, I), SECAM	PAL (B/G, L, D/K, I), SECAM	
System		VSB VHF/UHF mono. A2, Nicam	
Output frequency range	MHz	47-862	47-862
Channel raster	MHz	7 / 8	7 / 8
Channel raster step	kHz	250	250
Picture carrier stability:	kHz	< ±30	< ±30
Spurious signals ref. picture carrier (24 ch.)	dB	< - 60	< - 60
Output level adjustment	dB	+ 3...- 17	+ 3...- 17
Output level in TDX system	dBμV	103.0	103.0
Output impedance	Ohm	75	75
Return loss output	dB	> 10	> 10
Differential gain	%	< 8	< 8
Differential phase	Deg.	< 8	< 8
Group delay	ns	< 80	< 80
Video carrier to noise ratio	dB	57	57
Sound sub carrier stability (NICAM)	kHz	± 1	± 1
Audio S/N ratio	dB	50	50
Sound sub carrier	MHz	5,5 / 5,74 / 5,85 / 6,0 / 6,5	5,5 / 5,74 / 5,85 / 6,0 / 6,5
Sound sub carrier stability (mono)	kHz	< ± 5	< ± 5
Sound sub carrier stability (A2)	kHz	< ± 1	< ± 1
CI slot	pcs	0	2
<b>General</b>			
Supply voltage	V	12.0 ±1	12.0 ±1
Max. supply current (FTA / CI)	A	1.6	1.8
<b>Mechanical data</b>			
RF connector		IEC - female	IEC - female
Power supply/control connector	mm	PCI Express Edge connector 36P	PCI Express Edge connector 36P
Weight	kg	0.430	0.460
Dimension (HxDxW)	mm	12 x 266 x 180	21 x 266 x 180



# TDX - Quad PAL HD downscale - FTA or with 2 x CI slot

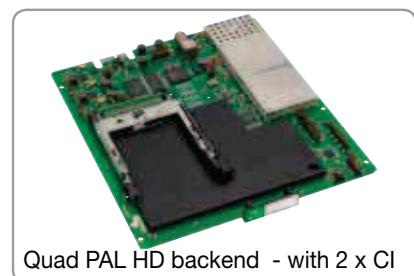
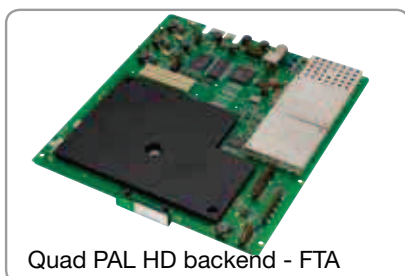
The TDX quad PAL HD downscale modules can take any HD service from the TDX pool, scale the service down to SD format, modulate it to a PAL signal and distribute it in a PAL network. You can distribute 4 PAL services / TV programs from each module, equal to 24 PAL services from one cabinet. The PAL HD downscale module comes in 2 versions, a Free-to-Air version and a CI version with 2 CI slots for decrypting of content/ services.

## Features:

- Video downscaling from HD (in MPEG4 AVC/H.264 format and VC1 decode for single HD up to 720p and 1080i to SD
- Quad PAL backend module for FTA or for decrypting content/ services
- VBI-insert (VPS, WSS, Teletext)
- Teletext subtitles
- DVB-subtitling
- Video decoding: MPEG-2, main profile, main level - Video decoding: MPEG-4/ H.264 MP @ level 2.2
- Audio decoding: AAC, HE-AAC, MPEG 1 layer 1 and 2, MPEG2 part 3
- Analogue video encoding: PAL (B/G, L, D/K, I) and SECAM
- Audio encoding: NICAM, and A2 stereo, FM mono (PAL), AM mono (SECAM) and dual sound.
- HOT SWAP Service in TDX system
- Supports decrypting via CAI(492053)
- Decrypted outputs from the CA modules are transferred back to the TDX-pool.

## Technical data - Quad PAL HD downscale backend modules

Product		PAL HD downscale backend module - FTA	PAL HD downscale backend module - CI
Art. No.		492052	492053
Modulator			
TV-norm	PAL (B/G, L, D/K, I), SECAM		PAL (B/G, L, D/K, I), SECAM
System			VSB VHF/UHF mono. A2, Nicam
Output frequency range	MHz	47-862	47-862
Channel raster	MHz	7 / 8	7 / 8
Channel raster step	kHz	250	250
Picture carrier stability:	kHz	< ±30	< ±30
Spurious signals ref. picture carrier (24 ch.)	dB	< - 60	< - 60
Output level adjustment	dB	+ 3...- 17	+ 3...- 17
Output level in TDX system	dBμV	103.0	103.0
Output impedance	Ohm	75	75
Return loss output	dB	> 10	> 10
Differential gain	%	< 8	< 8
Differential phase	Deg.	< 8	< 8
Group delay	ns	< 80	< 80
Video carrier to noise ratio	dB	57	57
Sound sub carrier stability (NICAM)	kHz	± 1	± 1
Audio S/N ratio	dB	50	50
Sound sub carrier	MHz	5,5 / 5,74 / 5,85 / 6,0 / 6,5	5,5 / 5,74 / 5,85 / 6,0 / 6,5
Sound sub carrier stability (mono)	kHz	< ± 5	< ± 5
Sound sub carrier stability (A2)	kHz	< ± 1	< ± 1
CI slot	pcs	0	2
General			
Supply voltage	V	12.0 ±1	12.0 ±1
Max. supply current (FTA / CI)	A	1.6	1.8
Mechanical data			
RF connector		IEC - female	IEC - female
Power supply/control connector	mm	PCI Express Edge connector 36P	PCI Express Edge connector 36P
Weight	kg	0.430	0.460
Dimension (HxDxW)	mm	12 x 266 x 180	21 x 266 x 180



# TDX - Quad QAM backend module DVB-C in FTA or with 2 x CI slot

The TDX quad QAM backend modules are output modules that enable you to create up to 4 mux combinations of services/ TV programs which are available from the TDX pool. The services are distributed in a QAM data stream. The services can be combined so that the bandwidth of each output mux is used in an optimal way. Both the web configurator and the mux bandwidth monitor function in the TDX service

tool ensure that you don't overload the bandwidth and cause problems with the transmission.

The QAM output modules can be delivered in a free-to-air version or with 2 CI slots for decryption.

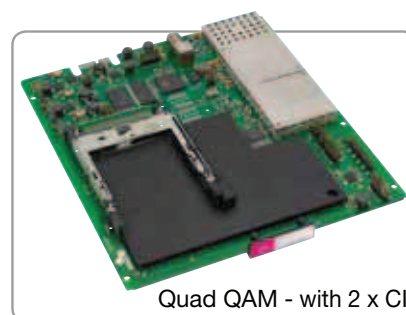
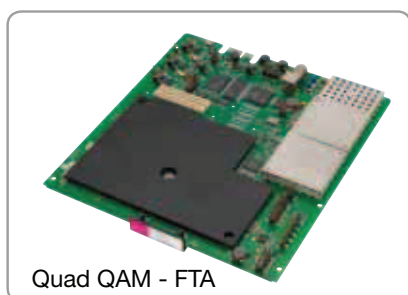
#### Features:

- Quad QAM DVB-C backend module for FTA or for decrypting content/ services
- NIT and stuffing
- Global and local NIT support

- NIT actual network & NIT other network
- SDT actual transport stream & SDT other transport stream
- Easy set-up
- Hot swap service in TDX system.
- Supports decrypting via CI (492056) - module adds stuffing bits
- Combine your QAM muxes as you want
- Decrypted outputs from the CA modules are transferred back to the TDX-pool.

## Technical data - Quad QAM backend modules

Product Art. No.	Quad QAM backend FTA		Quad QAM backend CI
	492055		492056
<b>Modulator</b>			
Output frequency range	MHz	50-858	50-858
Channel raster	MHz	7 / 8 / 8.5	7 / 8 / 8.5
Frequency step	kHz	250	250
Carrier to spurious ratio (module only)	dB	> 60	> 60
Output mode	QAM	16, 32, 64, 128, 256	16, 32, 64, 128, 256
Output spectrum		Normal	Normal
Output level adjustment	dB	+ 3...- 17	+ 3...- 17
Output level nominal in TDX system	dBμV	92.0	92.0
Output impedance	Ohm	75	75
Symbol rate	Mbaud	3.15 - 7.2	3.15 - 7.2
Roll off factor		0.15	0.15
Return loss output	dB	> 10	> 10
Modulation error ratio (MER) 16 QAM	dB	≥ 38.0	≥ 38.0
Modulation error ratio (MER) 64 QAM	dB	≥ 38.0	≥ 38.0
Modulation error ratio (MER) 256 QAM	dB	≥ 38.0	≥ 38.0
CI slots	pcs.	0	2
<b>General</b>			
Supply voltage	V	12.0 ±1	12.0 ±1
Max. supply current (FTA / CI)	A	0.7	0.9
<b>Mechanical data</b>			
RF connector		F-connector	F-connector
Power supply/control connector	mm	PCI Express Edge connector 36P	PCI Express Edge connector 36P
Weight	kg	0.410	0.440
Dimension (HxDxW)	mm	12 x 162 x 180	21 x 162 x 180



# TDX - Quad backend module COFDM DVB-T in FTA or with 2 x CI

The TDX quad COFDM backend modules are output modules that enable you to create up to 4 muxes of services / TV programs which are available from the TDX pool. The services are distributed in a COFDM data stream.

The services can be combined so that the bandwidth of each output mux is used in an optimal way. Both the web configurator and

the mux bandwidth monitor function in the TDX service tool ensure that you don't overload the bandwidth and cause problems with the transmission.

The COFDM output modules can be delivered in a free-to-air version or with 2 CI slots for decryption.

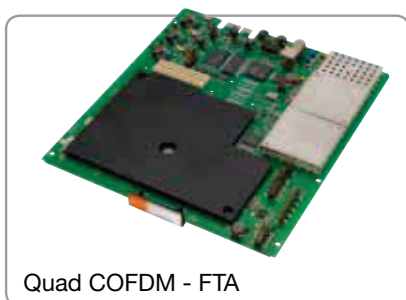


## Features:

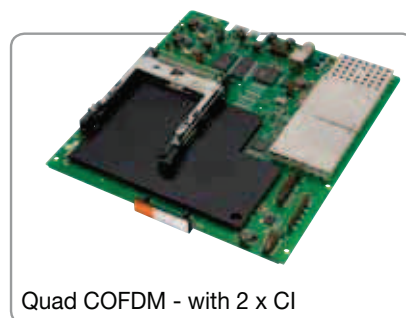
- Quad DVB-T backend module for FTA or for decrypting content/ services
- Easy set-up
- Hot swap service in TDX system.
- Supports decrypting via CI (492061)
- Combine your COFDM muxes as you want
- Decrypted outputs from the CA modules are transferred back to the TDX-pool.

## Technical data - Quad COFDM backend modules

Product		Quad COFDM backend FTA	Quad COFDM output CI
Art. No.		492060	492061
Modulator			
Output frequency range	MHz	50-858	50-858
Channel raster	MHz	7 / 8 / 8.5	7 / 8 / 8.5
Frequency step	kHz	250	250
Carrier to spurious ratio (module only)	dB	> 60	> 60
Carriers supported		2K	2K
Guard interval		1/32, 1/16, 1/8, 1/4	1/32, 1/16, 1/8, 1/4
FEC		1/2, 2/3, 3/4, 5/6, 7/8	1/2, 2/3, 3/4, 5/6, 7/8
Output mode		16QAM, 64QAM, QPSK	16QAM, 64QAM, QPSK
Output spectrum		Normal	Normal
Output level adjustment	dB	+ 3...- 17	+ 3...- 17
Output level nominal in TDX system	dBμV	92.0 (QAM 64)	92.0 (QAM 64)
Output impedance	Ohm	75	75
Return loss output	dB	> 10	> 10
Modulation error ratio (MER)	dB	≥ 36.0	≥ 36.0
CI slots	pcs.	0	2
General			
Supply voltage	V	12.0 ±1	12.0 ±1
Max. supply current (FTA / CI)	A	1.0	1.2
Mechanical data			
RF connector		F-connector	F-connector
Power supply/control connector	mm	PCI Express Edge connector 36P	PCI Express Edge connector 36P
Weight	kg	0.430	0.460
Dimension (HxDxW)	mm	12 x 162 x 180	21 x 162 x 180



Quad COFDM - FTA



Quad COFDM - with 2 x CI



# TDX - 2 x CI output modules

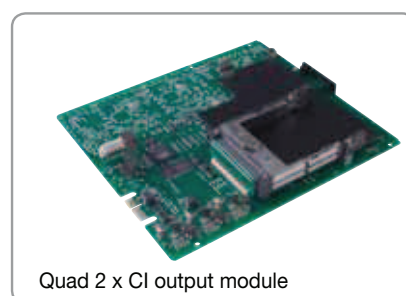
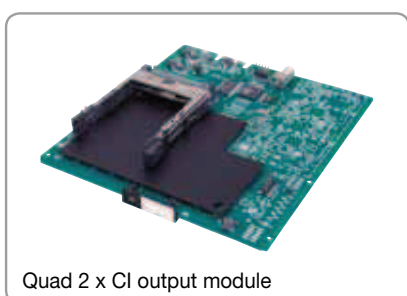
The 2x CI backend module enables you to take several services depending on CAM module from the TDX pool, decrypt them and loop them back in decrypted form to the pool. The 2x CI backend module is cost efficient solution if the TDX is distributing in IP format or if CAMs for decryption of multiple services are not available.

## Features:

- 2 conditional access (CA) slots for decoding content/ services.
- Card speed can be set up per slot to 50Mbit/s (default) or max 72Mbit/s
- Card function can be setup to either descramble transport stream services (default) or scramble services (using a PanAccess CA module).
- When descrambling, filter options per service can be set up to descramble non audio/video PIDs and/or descramble all audio PIDs.
- The number of services that can be descrambled is determined by how many PIDs the CA module can descramble.
- Decrypted outputs from the CA modules are transferred back to the TDX-poll.

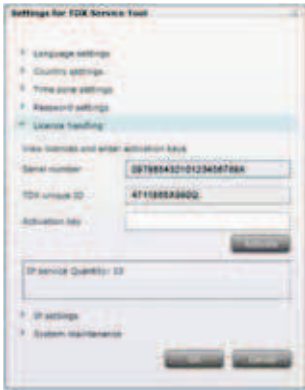
## Technical data

Product	2 x CI backend module	
Art. No.	492070	
General		
Supply voltage	V	12.0 ±1
Max. supply current (FTA / CI)	A	0.6 (typ)
Mechanical data		
Power supply/control connector	mm	PCI express edge connector 36P
Weight	kg	0.220
Dimension (HxDxW)	mm	18 x 180 x 162



# TDX - IP output module

- STP (Shielded Twisted Pair) / SFP (Small Form factor Pluggable)



## TDX – IP output functionality

You can create your own bouquets of services/TV programs from what is available in the TDX pool and distribute these on an IP data stream.

You can define your service bouquets in the TDX tool and in the TDX web configurator. No output module is needed, but you will need a license key which contains the rights to the number of services needed.

The license keys are available in packages of 12 IP services in each package.

When the services are distributed in IP format, you will also need an SFP transceiver and a corresponding fibre or RJ45 cable

## IP output SFP

Product		IP Software start package	IP Software extended package
Art. No.		418040	418041
Type		Software	Software
IP-services	pcs	12	12
Remarks		Inform Triax of the serial number of the ID-no. of the TDX main unit	Inform Triax of the serial number of the ID-no. of the TDX main unit



## Technical data

Product		EOLT - C12 - 02 Copper - STP	EOLS - 8512 MXX Fibre - SFP	EOLS - 1324-02XX Fibre - SFP
Art. No.		492086	492087	492088
Type		Copper STP (RJ45)	Fibre LC - 850 nm	Fibre LC - 1310 nm
Data rate	(Mbps)	1.000	1.000	1.000
Reach	(m)	100	550	2.000
Packing size	(Pcs)	1	1	1
Application		Gigabit Ethernet over Cat 5 cable	Gigabit Ethernet over fibre	Gigabit Ethernet over fibre
Transport stream payload	max (Mbps)	720		
Protocols		UDP with RTP optional		

