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## TDX Headend

| Quite simply a revolution



your ultimate connection

## | TDX headend - quite simply a revolution

Forget everything you know about headends. With the TRIAX TDX you move into a completely new world. TRIAX's revolutionary IP pool technology simplifies the configuration and handling of headends, making the input and output modules mutually independent. All input signals, regardless of whether they are received via satellite, terrestrial, cable, audio/video or via the Internet, can be flexibly and independently distributed from a 'pool' to each and every output module. Each of these input signals can be converted to any output signal: PAL, QAM, COFDM or IP, and because the input signals are not fixed to any particular outputs, an input signal can be assigned to several output modules.

It's that simple.

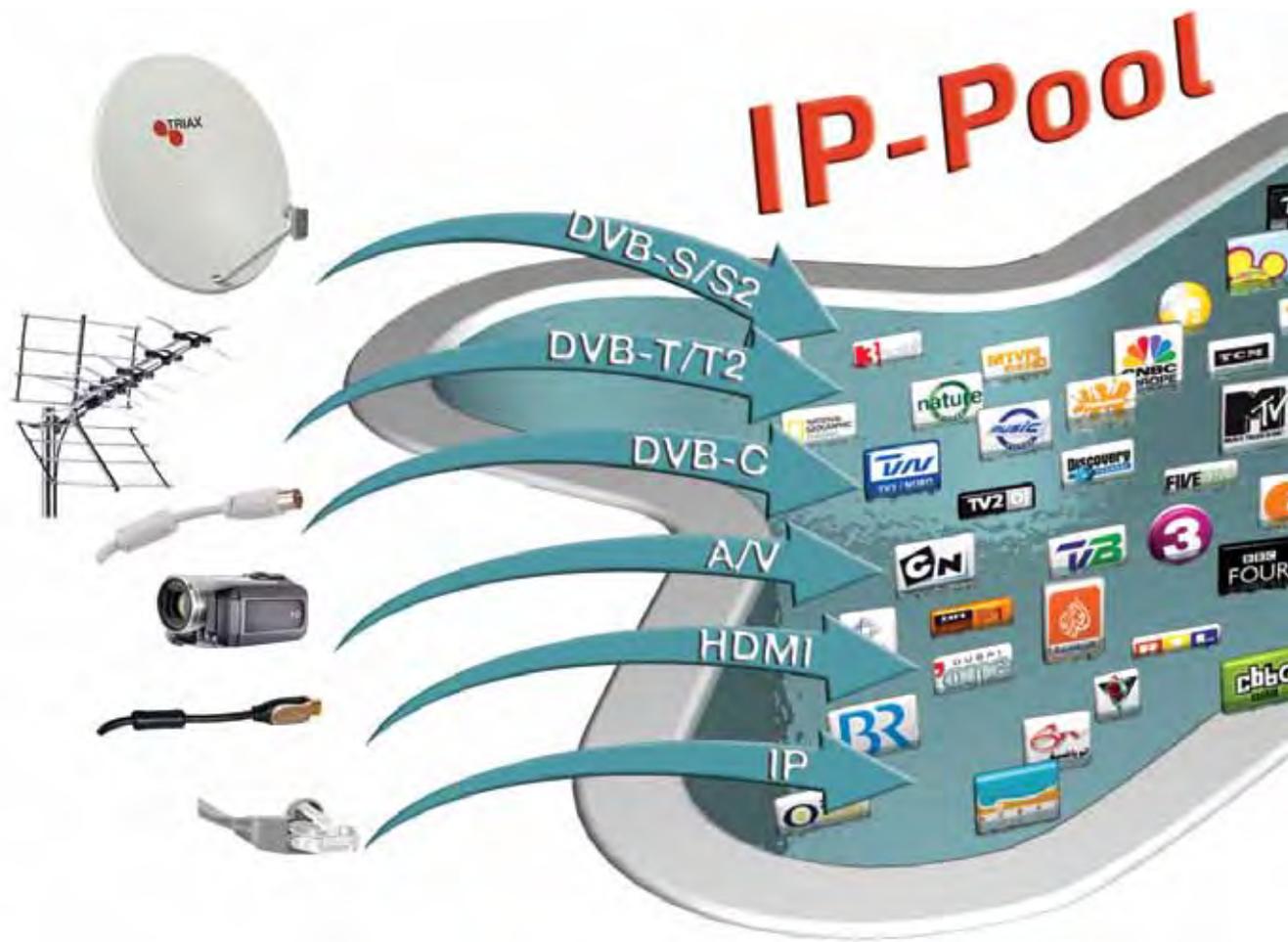


The IP pool Revolutionary technology	04 - 05
Reasons to Buy Overview	06 - 07
Solutions One product, many applications	08 - 11
Modules Specifications	12 - 15
IP & Software	15

Technology that turns  
everything on its head

# TDX IP pool

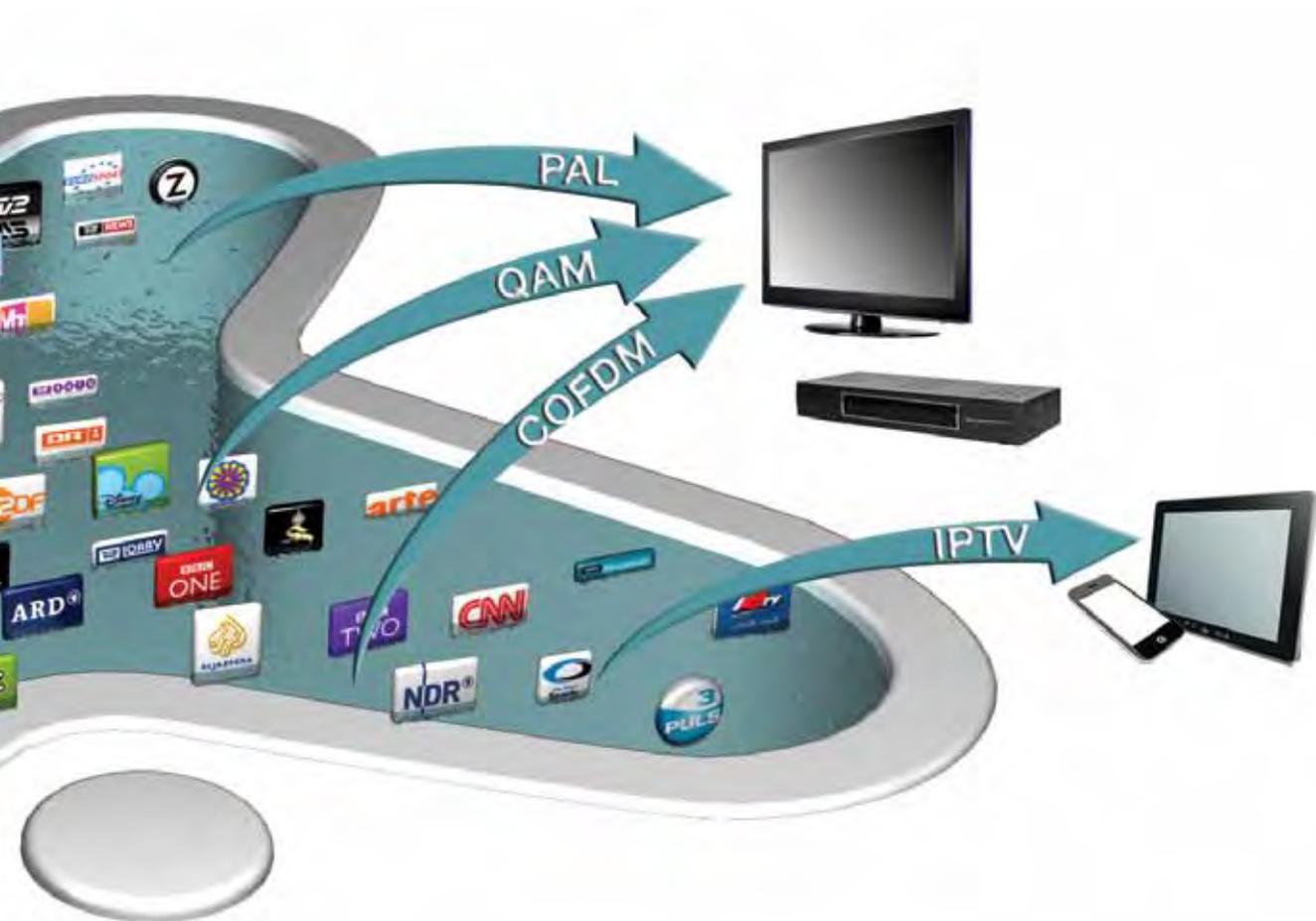
| revolutionary technology



## TDX

The IP-based headend solution made for the future.

Invest in technology that meets the requirements of tomorrow, and still makes it possible to take any type of input signals received from satellite, terrestrial, cable, AV, HDMI or via the internet and convert them to any type of output signal – so put your investment into a system that merges the highest level of efficiency with reliability and benefit from the advantages provided by one of Europe's largest manufacturers of headends.



### TRIAX TDX IP-POOL TECHNOLOGY:

Immerse yourself in tomorrow's technology.

In close collaboration with planners, installers and operators, TRIAX has developed a new headend technology designed to provide the best possible way of dealing with television distribution requirements of today and into the future. This pool technology enables you to assign input and output signals freely. Meaning traditional module arrangements featuring input demodulator and output modulator are no longer necessary.

All incoming signals initially enter the 'pool', providing unlimited opportunities to multiplex services for each output modulation. One service can be used for different modulation types simultaneously. Furthermore, it is easy to change all assignments between input to output signals at any time, making this a uniquely flexible, efficient and economical solution.

## | reasons to buy

### ENERGY FRIENDLY - LONG-TERM RELIABILITY

- 16 tuners full loaded 280 W total power consumption
- Intelligent cooling system with integrated fans – increases the life of the equipment – and allows installation in 19" cabinets.

### EASIER SERVICE HANDLING

- Fewer modules – allows easy spare part handling.
- Log file on all TDX activity
- Remote access to the TDX for installer and or TRIAX support.

### EASY SETUP AND CONFIGURATION

- HTML based user interface means there is no need for special software to manage the system.
- Mux bandwidth monitor to ensure that the mux is not overloaded.
- The respective four adjacent output channels can be freely selected across the full frequency range.
- LED to indicate operation and errors on each module
- Intuitive and easy configuration where you are led through the configuration step by step.





### A TRUE IP HEADEND

- Muxing technology
- IP in to any output
- IP out from any input
- Future proof with full compatibility with CAS systems, middleware, PMS, VOD services, EPG server, etc.

### BETTER AND STRONGER PERFORMANCE

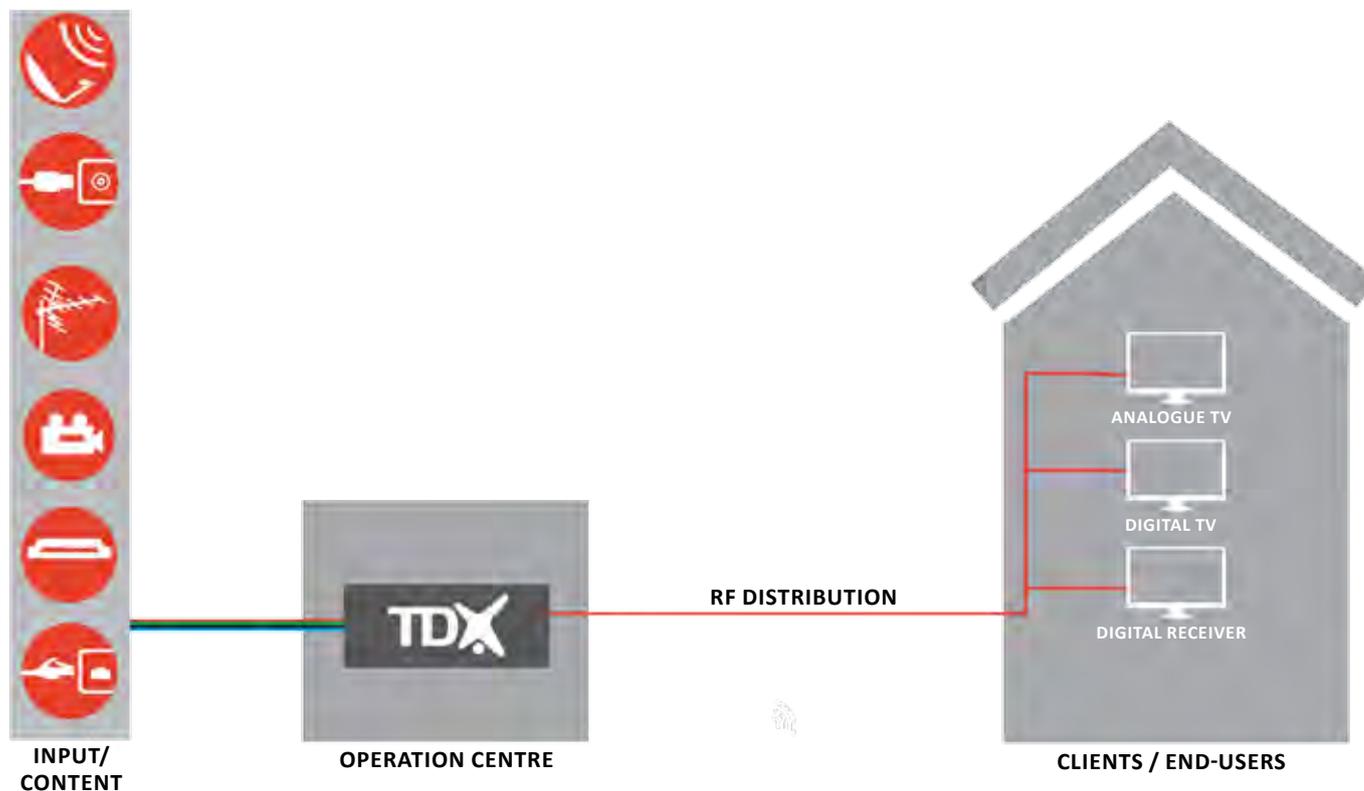
- Up to three headends can be combined in a multi unit system.
- Up to 24 PAL, QAM or COFDM channels per headend.

### EASY INSTALLATION

- Input modules are independent of output modules which gives fewer modules in total.
- Faster installation
- DiSEqC 1.1 functionality
- The housing is designed to accommodate up to 16 input and 6 quad output modules, the output modules provides the possibility to support 12 CAM modules.
- Can easily be installed on a wall or a 19" cabinet.
- All inputs and outputs as well as all modules and cables can be accessed and operated easily from the front.
- The 22 modules are numbered so their respective allocations are always immediately clear.
- Cabinet lock system
- Cable management on top, left and right.

# Solutions

| one product, many applications

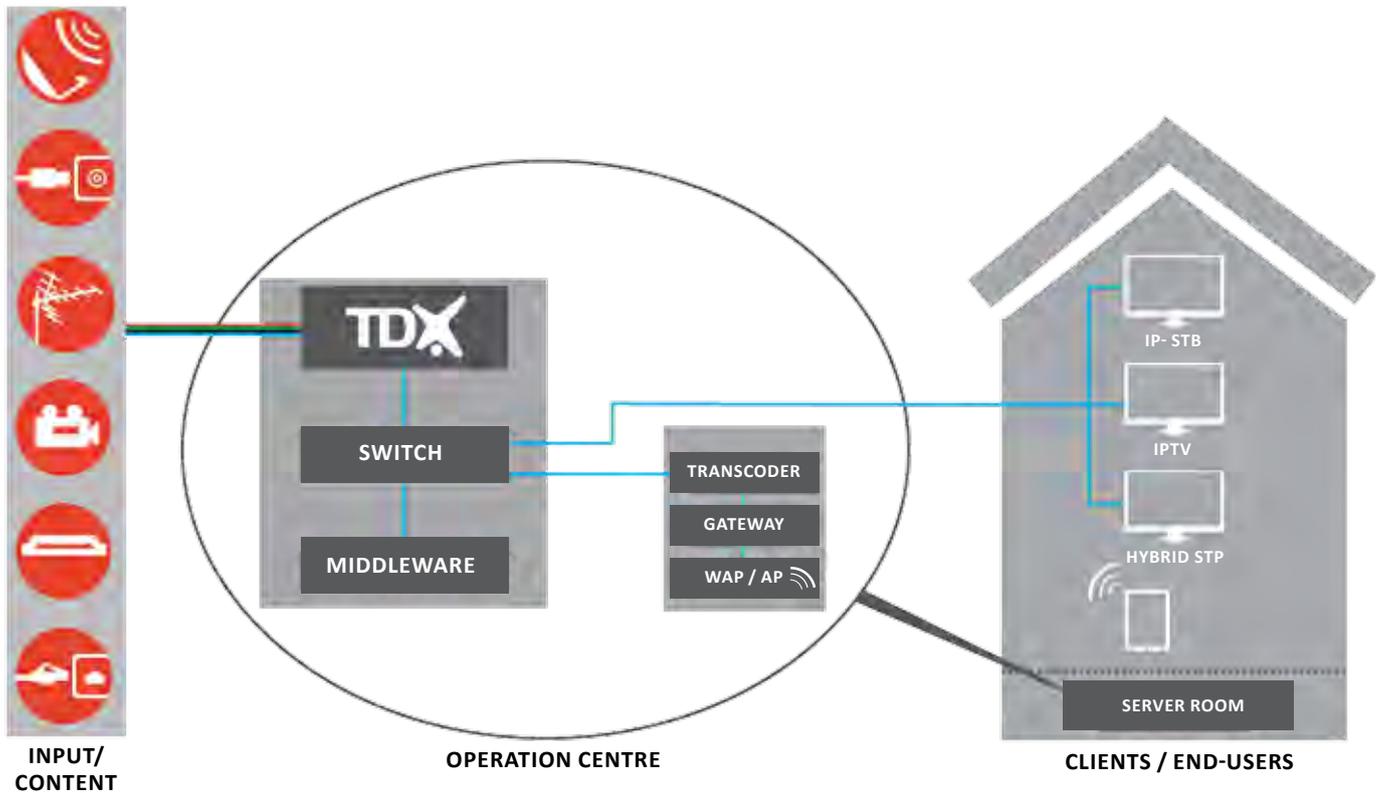


## ANALOGUE / DIGITAL MIRROR

The TDX IP pool technology enables output of the existing services in the pool with different output modulation forms. As a result, the hardware can be minimized because each transponder is received only once. This provides the TDX as an optimal solution for the simultaneous transmission of analogue and digital services in a CATV network. The high signal-to-noise ratio allows support of large networks with multiple amplifiers in cascade.

## YOUR BENEFITS

- Only one receiver (tuner) per transponder
- All services of a transponder can be fed into the IP pool
- Encrypted services must be decrypted only once and can be used for simultaneous digital (QAM/COFDM) and analog (PAL) transmission.
- The headend can be easily changed from analog to digital by changing the output module.



### IPTV AS A DISTRIBUTION TECHNOLOGY

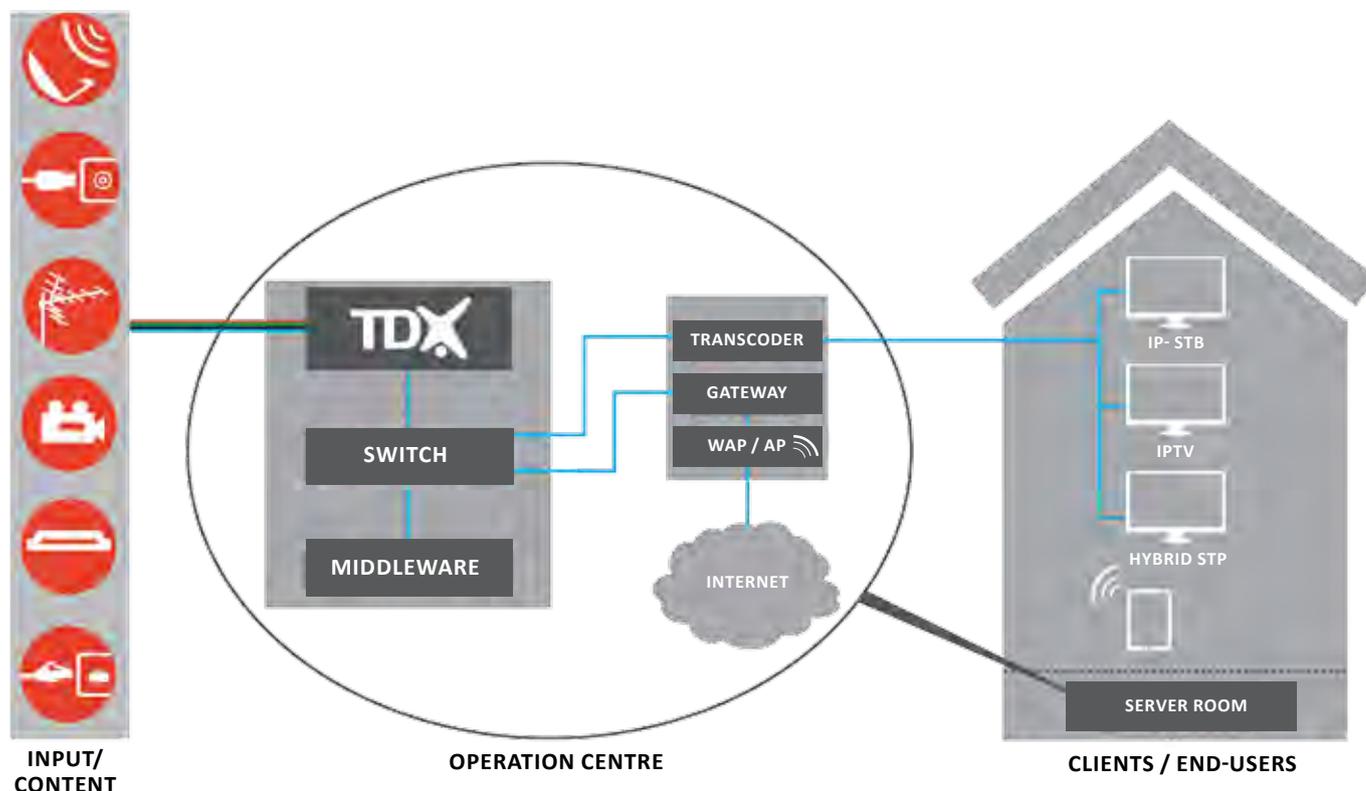
In closed buildings, there is a growing requirement for distribution of TV signals over CAT 5 cables. This requires a headend to receive the signals and transform them into IP services and also a middleware to administrate the IP receivers. In addition the used network structure must be designed to the requirements for IPTV transmission. This relates specifically to the routers and switches used which must support layer 3 and IGMP standard.

### YOUR BENEFITS

- Only one type of cabling in the building necessary
- WIFI transfer to the end-user device
- With the use of transcoder server it is possible to support different end-user devices.

# Solutions

| one product, many applications

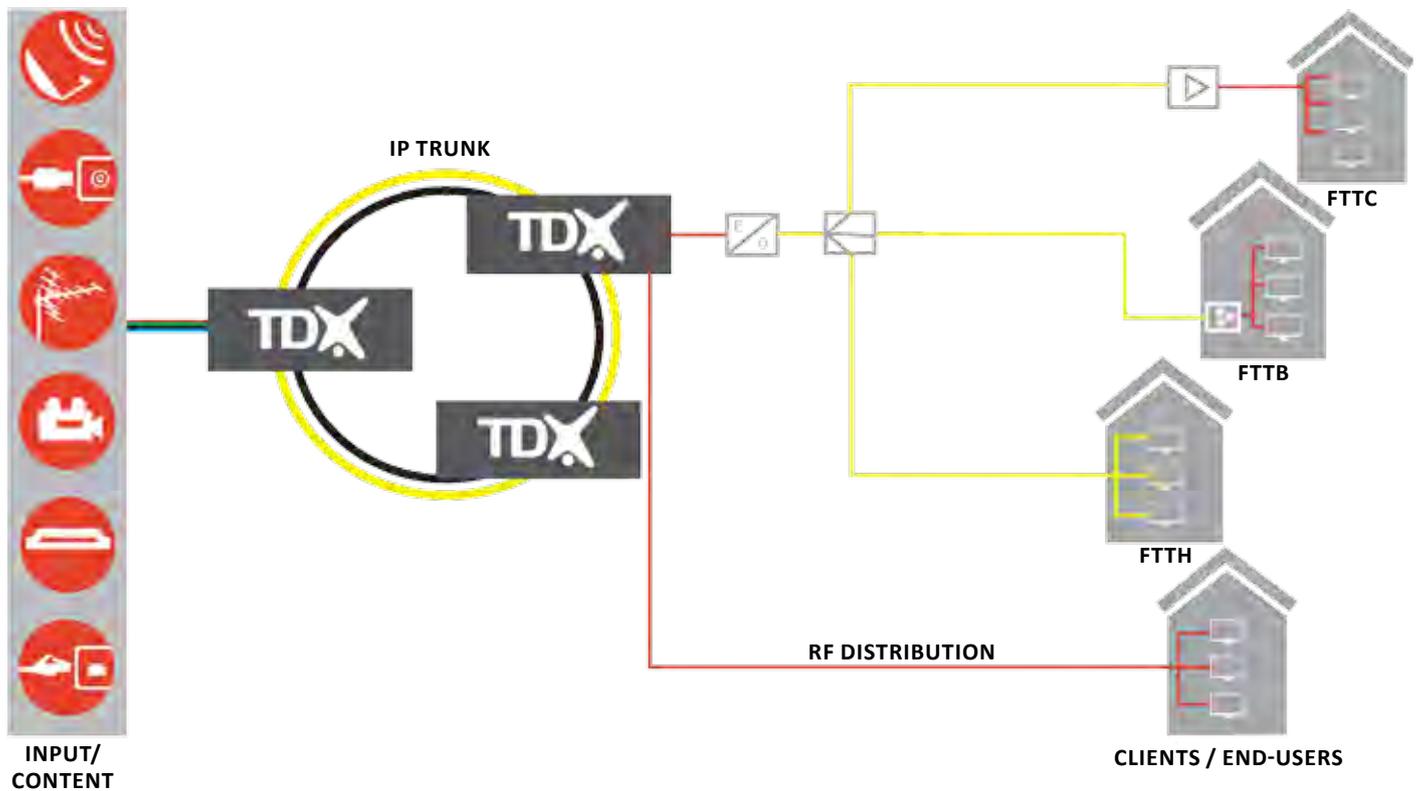


## FULL MIDDLEWARE SOLUTION

The combination of an IP headend and middleware addresses the fundamental needs of IPTV and internet access for hotels, hospitals, cruise ships etc. To increase the revenue return per guest a vast range of products and service options for multi-media are available. In cooperation with our partners we offer a wide range of IPTV solutions in this area.

## YOUR BENEFITS

- Tablet solution for remote control and live TV streaming
- Meeting / conference room solution:  
Connect, present, browse, control.
- Hotel info – channel
- Time shift
- PVR – personal video recorder
- Internet on TV



### TDX AS PART OF A FIBRE DISTRIBUTION

Increasingly, the existing optical CATV fibre networks (maybe in the past distributing analog modulated TV signals) are used more and more to transmit IP TV services between the central headend and sub headend. Also the distribution cells in new system architectures are planned to be smaller. One reason for this is the feed-in of internet services and providing bandwidth for internet services to the end customer.

These distribution cells can be built up as an RF distribution network or as an optical distribution network. There are different technologies for building up the system in terms of optical distribution. FTTC (Fibre to the curb), the optical distribution ends at the street cabinet. FTTB (Fibre to the block), the fibre reaches the boundary of the building. FTTH (Fibre to the home), the fibre reaches the living room.

### YOUR BENEFITS

- Easy signal handling and management
- Independent RF distribution per cell possible
- Smaller RF distribution cells
- Redundancy systems with lower investments possible



### TECHNICAL SPECIFICATIONS CABINET

#### CABINET

TDX basic device with IP pool technology for supporting 16 input modules and 6 Quatro output modules.

#### CABINET

TYPE PART NO.		TDX CABINET TDXCABINET
Frequency range (TV out)	MHz	47 - 862
Impedance (RF out):	Ohm	75
Return loss (RF out):	dB	> 14 at 47 MHz (-1.5 dB/octave; min. 10 dB)
Testpoint	dB	-20
Output level max @ 60 dB IMD 24 combined PAL channels:	dB $\mu$ V	103
<b>POWER SUPPLY</b>		
Operating voltage	VAC	190 - 260 50/60 Hz
Power consumption, max	W	280
Max. LNB control	mA	4 x 305
<b>CONNECTORS</b>		
AC power in (1.8 m)		IEC320 (cable)
Ext. TV-OUT		F-connector
Ext. testpoint		F-connector
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>		
Dimensions product (L x W x H)	mm	440 x 240 x 290
Dimensions cardboard packaging (L x W x H)	mm	546 x 316 x 374
Weight - net	kg	10.5
Weight - gross	kg	12.1

### TECHNICAL SPECIFICATIONS INPUT MODULES

#### FRONT-END DVB-S / S2 MODULE

SD and HD satellite receiver module. Multiplex transmission and routing of all programmes into the TDX pool.

#### DVB-S / S2 INPUT DEMODULATOR MODULE

TYPE PART NO.		QPSK & 8PSK DEMODULATOR TDXDVBSFE
Frequency range	MHz	950 - 2150
Input level	dB $\mu$ V	42 - 82
Input impedance	Ohm	75
Input return loss	dB	> 10
Loop through gain	dB	0 - 6
LNB control DiSEqC		1.1
LNB control V/H	V/mA	0 - 13 - 18 / 300
Input connector		F-connector
Output connector (loop through)		F-connector



### FRONT-END DVB-T, DVB-T/T2 MODULE

SD and HD terrestrial receiver module. Multiplex transmission and routing of all programmes into the TDX pool.

DVB-T / T2 (1 TUNER) INPUT DEMODULATOR MODULE		
TYPE PART NO.		DVB-T TDXDVBTFE
Frequency range	MHz	177.5 - 226.5 / 474 - 858
Input level	dB $\mu$ V	35...75
Input impedance	Ohm	75
Input return loss	dB	> 6
Loop through gain	dB	-1...+3
Demodulator mode		QPSK, 16QAM, 64QAM / 2k 8k
Bandwidth	MHz	7 / 8
Input connector		IEC - male
Output connector (loop through)		IEC - female



### FRONT-END DVB-C MODULE

SD and HD cable receiver module. Multiplex transmission and routing of all programs into the TDX pool.

DVB-C INPUT MODULE		
TYPE PART NO.		DVB-C TDXDVBCFE
<b>RF</b>		
Frequency range	MHz	114 - 858
Input sensitivity QAM256	dB $\mu$ V	45...75
QAM64	dB $\mu$ V	45...75
Input impedance	Ohm	75
Input return loss	dB	> 7
Noise figure	dB	> 7
Bandwidth	MHz	8
<b>DEMODULATOR</b>		
Type		QAM
QAM mode	DVB-C	16QAM, 64QAM, 128QAM, 256QAM
Symbol rates supported	Msym/s	1.8 to 7.2
<b>MECHANICAL DATA</b>		
Input connector		F-female



### FRONT-END AV ENCODER MODULE

Converting analogue audio / video signal in an MPEG4 stream and forwarding to the TDX pool.

AV ENCODER MODULES		
TYPE PART NO.		VIDEO / AUDIO STEREO MODULATOR TDXAVFE
Video level	Vpp	1
Video impedance	Ohm	75
Video S/N ratio	dB	> 52
Video input standards		PAL, Secam
Audio level	Vpp	< 2.4
Audio impedance	kOhm	10
Video input connector		15 pol high density sub-D
Audio input connector		15 pol high density sub-D





### FRONT-END HDMI MODULE

Converting analogue audio/video signal in an MPEG4 stream and forwarding to the TDX pool.

#### DVBT / T2 INPUT DEMODULATOR MODULE

TYPE PART NO.		HDMI TDXHDMIFE
Input		1 x HDMI
Output		MPEG transport stream
Embedded audio		2ch LPCM in, AAC or MP2 out
Video codec		MPEG2, MPEG4
BW settings	Mbps	3 - 13
Remarks		Use high speed HDMI cable

HDCP compliant, blocks content protected



### BACK-END QAM MODULE

Quad-QAM modulator, adjacent channel operation, automatic multiplexing, available as FTA or CI variant.

#### QAM OUTPUT MODULE

TYPE PART NO.		FTA MODULATOR / CI MODULATOR TDXQAMCBE / TDXQAMCIBE
Output frequency range	MHz	50.5 - 858
Spurious signals	dB	> 60
QAM modes	QAM	16, 32, 64, 128, 256
Symbol rate	Mbps	2-40 (SCPC/MCPC)
Viterbi decoder		1/2, 2/3, 3/4, 5/6, 7/8
Reed Solomon		204, 188, t=8
Deinterleaver		I = 12
Output spectrum		Normal, Inverted Random
Symbol rate	Mbaud	3.5-7200
Roll-off factor	%	15
FEC block code		RS 204, 188
MER	dB	> 38
Output level (system)	dB $\mu$ V	100
Output level adjustment	dB	+3 / -17 (0.5 dB step)
CI slots		0/2



### BACK-END COFDM MODULE

Quad-COFDM modulator, adjacent channel operation, automatic multiplexing, available as FTA or CI variant.

#### COFDM OUTPUT MODULE

TYPE PART NO.		FTA MODULATOR / CI MODULATOR TDXDVBTBE / TDXDVBTBIB
Output frequency range	MHz	50.5 - 858
Spurious signals	dB	> 60
QAM modes		16 QAM, 64 QAM, QPSK
Bandwidth	MHz	6, 7 or 8
Carriers supported		2k
Guard interval		1/32, 1/16, 1/8, 1/4
Error correction	Viterbi FEC Reed Solomon	1/2, 2/3, 3/4, 5/6, 7/8 204 byte mode
MER	dB	$\geq$ 35
Output level (system)	dB $\mu$ V	100
Output level adjustment	dB	+3 / -17 (0.5 dB step)
CI slots		0/2

### BACK-END 2 x CI SLOTS MODULE

The s x CI back-end 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.



#### 2 x CI SLOTS OUTPUT MODULE

TYPE PART NO.	2 x CI MODULATOR TDX2CIBE
CI slots	2

### BACK-END PAL AND PAL HD MODULES

Quad-PAL modulator, adjacent channels, available as FTA or CI variant, also available PAL with HD downscale function, for programs received only in HD, or processed as digital HD and analogue SD signal.



#### PAL OUTPUT MODULES

TYPE PART NO.		PAL FTA / PAL CI MODULATOR TDXPALBE / TDXPALCIBE	PAL HD FTA / PAL HD CI MODULATOR TDXPALHDBE / TDXPALHDCI
TV norm		Pal/Secam B/G, I, L, D/K	Pal(B/G, I, L, D/K), Secam
TV system		VSB VHF/UHF/mono/A2/Nicam	VSB VHF/UHF/mono/A2/Nicam
Output frequency range	MHz	47-862	47-862
Picture carrier stability	kHz	< ±30	< ±30
Spurious signals ref picture carrier	dB	> 60	> 60
Output level system	dBμV	103	103
Output level adjusting	dB	+3.0...-17.0 (0.5 dB step)	+3.0...-17.0 (0.5 dB step)
Output impedance	Ohm	75	75
Return loss	dB	> 10	> 10
Differential gain	%	< 8	< 8
Differential phase	Degrees	< 8	< 8
Crominance/luminance delay	na/m	> 80	> 80
Luminance non-linearity	%	< 8	< 8
Video S/N ratio (typical)	dB	58	58
CI slots	pca	0/2	0/2

### IP-IN AND OUTPUT SFP PLUGS



#### SFP MODULES (SMALL FORM FACTOR PLUGGABLE)

TYPE PART NO.		EOLT - C12 - 02 (COPPER - SFP) TDXSFPCE	EOLT - 8512 MXX (FIBRE - SFP) TDXSFPBE	EOLT - 1324 - 02XX (FIBRE - SFP) TDXSFPBE2
Type		Copper SFP (RJ45)	Fibre LC - 850 nm	Fibre LC - 1310 nm
Data rate	MBps	1000	1000	1000
Reach	m	100	up to 550 m with 50/125 μm MMF	2km
Packing size	Pca	1	1	1
Application		Gigabit Ethernet over cat 5e cable	Gigabit Ethernet over fibre	Gigabit Ethernet over fibre
Transport stream payload	max. MBps	720	–	–
Protocols		UDP with RTP optional	–	–

### ACCESSORIES

TYPE PART NO.	TDX FAN KIT TDXFK	TDX POWER SUPPLY TDXPS	SD CARD TDXSDC
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# TDX IP technology

All incoming signals initially enter the 'pool', providing unlimited opportunities to multiplex services for each output modulation. One service can be used for different modulation types simultaneously. Furthermore, it is easy to change all assignments between input to output signals at any time, making this a uniquely flexible, efficient and economical solution.

## TRIAX IP BACK-END

IP back-end is an output module for transmission of digital video, audio and miscellaneous data, encapsulated within one or more MPEG2/DVB single program transport stream. Besides the back-end module the package consists of an AUX-TS-loop module and a SFP RJ45 (small form factor pluggable) module.

### FEATURES

- IP transmission of up to 96 MPEG2 / DVB SPTS
- Configurable ratio of 3 - 7 TS packets / MTU
- Configurable output priority for each output SPTS
- RTP option
- 2 x CI slots complying to EN 50 221
- Hot swappable



TYPE	PART NO.	
TDXIPBE	TDX IP Back-end	3 -7 TS 1 UDP package

### IP IN & IP OUT SOFTWARE

Software for the TDX IP-in and IP-out in different package sizes. You can always start up with 4 or 12 IP services and later fill in with extra extension license packages for 4 or 12 IP-in and out services when you need it.

TYPE	PART NO.	
TDXIISP12	IP-in Startpack	12 IP services
TDXIPIE12	IP-in Extra	12 IP services
TDXIISP4	IP-in Startpack	4 IP services
TDXIPIE4	IP-in Extra	4 IP services
TDXIOSP12	IP-in Startpack	12 IP services
TDXIPOE12	IP-in Extra	12 IP services
TDXIOSP4	IP-in Startpack	4 IP services
TDXIPE4	IP-in Extra	4 IP services



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