



TRIAX

connecting the future

TRIAX Optical Fibre (TOF)

Flexible installation with easy
satellite dish alignment



triax.uk

The Fibre Advantage

Advantages for the installer, tenant and landlord in residential complexes

TRIAX offer a complete range of solutions for your fibre installation.

TRIAX fibre is your preferred choice when you want:

- One discreet headend - distribute satellite, digital terrestrial and radio signals from a single location
- Design a system over a large area without jeopardising signal and quality
- Install a single fibre cable only rather than multiple coaxial cables

Advantages for installers

- Easy dish alignment using a Wideband LNB
- Satellite and Terrestrial bands separated optically for improved signal quality
- High reliability
- Significant infrastructure savings
- Future-proof
- Noise distortion and interference-free transmission

The fibre possibilities

- Very long distances with minimal attenuation
- Lighter and thinner than coaxial cable
- No potential and transient currents due to natural/galvanic isolation
- No influence by external electric or magnetic fields

Advantages for tenant and landlord

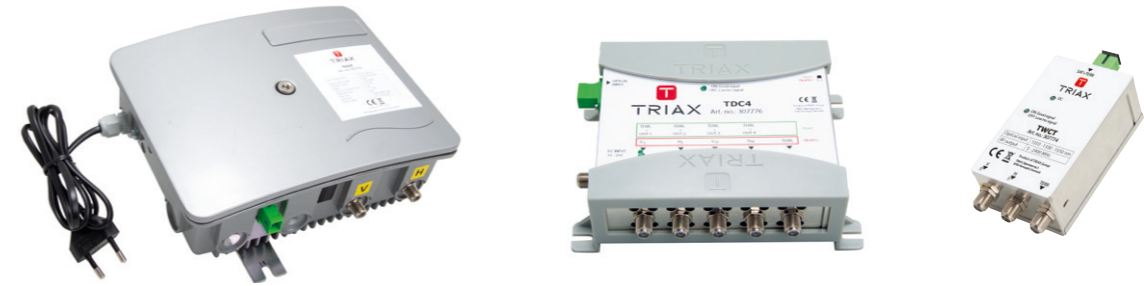
- Reduced installation times
- Best possible quality
- Maximum flexibility
- Simple upgrade to add a 2nd Satellite position
- Future-proof

New Installations

- Receive all broadcasts via Satellite and Terrestrial
- Supply several hundred apartments with only one Satellite dish station
- Improved Building aesthetics
- A fibre optic cable replaces 4 coaxial cables per satellite position plus one for terrestrial reception

Wideband Fibre Optic System

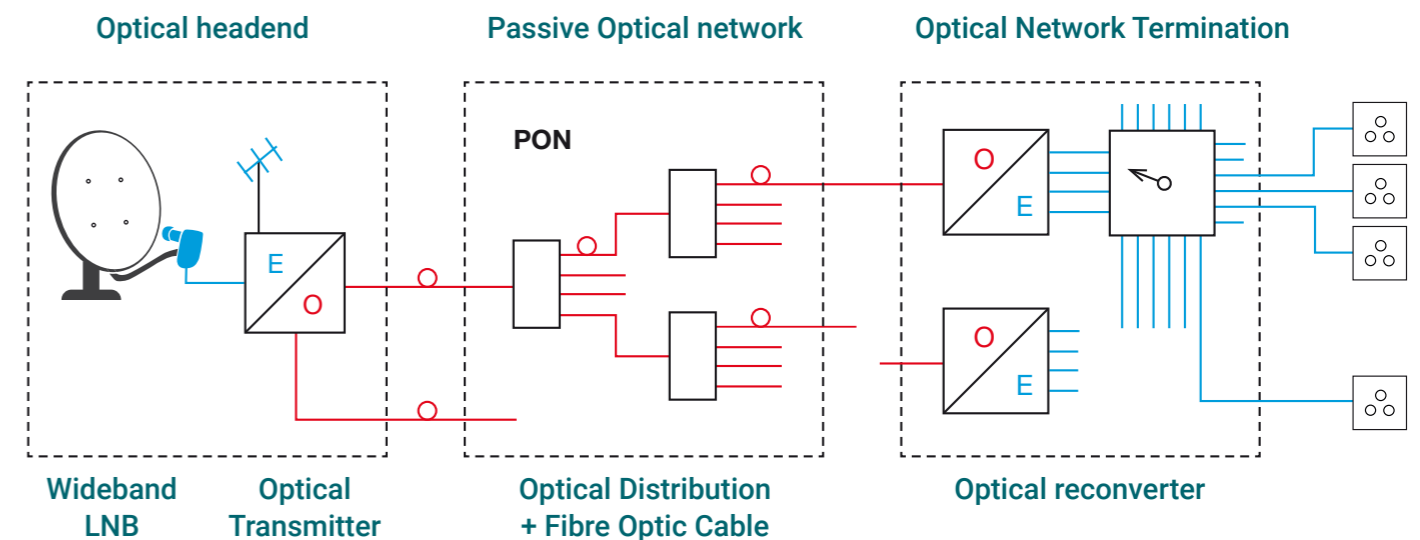
Flexible installation with easy satellite dish alignment



Integrated Services on a Single Fibre:

- SAT IF distribution over fibre optics (FO) can supply many households over larger distances, with feed from a central satellite dish location
- Almost lossless transmission of satellite, DVB-T and DAB signals. Attenuation per 1000 m only about 0.3 dB
- Future-proof and widest possible variety of channels
- Vertical and Horizontal Wideband IF signals are transmitted over one optical fibre using a Wideband LNB
- Space-saving installation - a 3 mm optical fibre replaces five 7 mm coaxial cables
- Optical fibre with galvanic isolation
- Quick and easy installation

Typical structure of optic fibre distribution system



Overview of TRIAX products for optical satellite IF transmission technology

System	Type	Description	Art. No.	Opto-IRS
Transmission capabilities				
SAT				1 SAT position/4 polarities
Terrestrial				FM, DTT, DAB
Technical concept				
				Full band stacking-LNB with external optical transmitter 1310 nm
System components				
Wideband LNB	TWB204	Wideband LNB	304858	Wideband LNB 290-2340MHz Vertical and Horizontal
Wideband Amplifier	TSWA-1	Satellite Wideband Amplifier with AGC	307772	290MHz - 2340MHz amplifier with Automatic Gain control and option for 2 output levels.
Optical Splitters	TOS	SC/AFC Optical Splitters	3077xx	2 - 32 way
Optical transmitter	TSOT	Satellite Optical Tx	307770	Satellite transmitter with V and H wideband
	TTOT	Terrestrial Optical Tx with WDM	307771	input Terrestrial Optical Tx with WDM
	TWOC	Wideband optical converter	307773	Optical converter with Wideband output V and H
Optical re-converter	TWCT	Wideband optical converter with terr	307774	Optical converter with Wideband output V and H and separate Terrestrial
	TDC4	dSCR/Quad/Quattro Optical converter	307776	Optical converter with Quad/Quattro or dSCR and Terrestrial Output
Optical budget (max.)	TDC3	dSCR Optical converter with terr	307775	Optical converter with dSCR/Quad output + separate terrestrial output
Max. optical splitting	64 (128 with additional Satellite signal processing)			

What we mean by...

PON

The Passive Optical Network (PON) is the distribution part of the network between optical headend and optical network termination with the Opto-Re-converters. The PON consist of passive fibre optic components like fibre cables and optical splitters.

Optical Split

The max. optical split defines how many fibre lines with an optical termination unit on the optical reception side can be driven from the output of the optical transmitter. The max. optical split of 64 means that the optical signal can be split up to 64 times. With that symmetrical split the input signal on the optical re-converters is still at a level to provide an electrical output signal with sufficient quality.

Optical Budget

The max. optical budget defines the min. input level of the optical re-converter. The min. input level is the optical output power in dBm minus the max optical budget. Example: the optical output power of the Transmitter is (+9 dB) and the max. optical budgets is 19 dB. Thus the level of the optical signal on the input of the optical re-converter should not be less than 9dBm - 19dB = -10dBm..

The optical budget in this brochure is the specified max. optical link attenuation for all network design. The output power of the transmitters and the min. input level of the re-converters are for rough information only.

Wideband LNB

| Wideband LNB 290-2340MHz Vertical and Horizontal



Wideband LNB

Art. No. 304858

The Wideband LNB converts the Vertical and Horizontal satellite signals (10.7 – 12.75GHz) off the dish to an intermediate frequency of 290 – 2340MHz.

- Receives 1 x Ku band satellite orbital slot
- 1 x Vertical and 1 x Horizontal output
- Low noise
- Output frequency range 290-2340 MHz

Technical specification

Type	TWB 204 Wideband LNB	
Art. No.	304858	
Input	-	1Ku
Input frequency	MHz	10700 – 12750
Outputs	-	2 (V & H)
Output frequency	MHz	290 – 2340
LO frequency	MHz	10410
Conversion gain	dB	55 – 65
Noise figure	dB	1 (max)@25°C
Image rejection	dB	35 (min)
Output power	dBm	-30*
DC supply voltage	VDC	9 – 20
Power consumption	W	< 1
Operating temperature	°C	-40 to +60
LNB mount fitting	mm	40
Dimensions	mm	130 x 75 x 60
Weight	kg	0.24



For the perfect installation use in conjunction with TRIAX TDS Dish Range

AGC Wideband Input Amplifier

| with 2 output level options



Wideband Input Amplifier

Art. No. 307772

A two input Wideband amplifier with Automatic Gain Control to maintain a constant output level. The amplifier is designed to be used with the Satellite Optical Transmitter TSOT, and has 2 fixed output levels available, (depending on the size of the optical system it is connected to). For an optical system with a large number of optical splits select a high output (17-64). For an optical system with a small number of splits select the low output (4-16).

- Automatic Gain Control and Automatic Slope Control on both satellite lines (V/H)
- DC input for powering amplifier and LNB
- Selectable between Wideband LNB (290 - 2400 MHz) and Universal LNB (950 - 2150 MHz)
- Output level selectable for up to 32 splits (-40 dB) or 64 splits (-30 dB)

Technical specification

Type	TSWA-1 Wideband Input Amplifier	
Art. No.	307772	
System	Fibre	
Inputs	-	2 SAT (V/H)
Outputs	-	2 SAT (V/H)
Frequency range	MHz	290 - 2400 (Wideband) or 950 - 2150 (Universal)
Gain	dB	20
Noise figure	dB	5
Gain adjustment	dB	20 (Automatic Gain Control) selectable
Slope adjustment	dB	15 (Automatic Slope Control) preset selectable
Max. output level	-	110 dBµV (-35 dB/IM3) selectable
Consumption	-	150 mA from 20 VDC external power supply or input/output
Dimensions	mm	129 x 114 x 51
Weight	kg	0.300

Optical Splitters

| TOS 2 - 4 - 8 - 16 - 32 splitters



The fibre system can be connected to either an optical converter in the home (to supply all the required TV services), or connected to an optical receiver to deliver services over an integrated reception system. Planar light wave circuit (PLC) splitter is a type of optical power management device that is fabricated using silica optical waveguide technology. It features a small size, high reliability, wide operating wavelength range and good channel-to-channel uniformity. It is widely used in PON networks to realize optical signal power splitting.

- Low Insertion loss and Low PDL
- Compact Design
- Good channel-to-channel uniformity
- Wide Operating Wavelength 1260nm to 1650nm
- High Reliability and Stability

Technical specification

Type:	TOS 02SC	TOS 03SC	TOS 04SC	TOS 08SC	TOS 16SC	TOS 32SC	
Art. No.	307902	307903	307904	307905	307906	307907	
Parameters	1x2	1x3	1x4	1x8	1x16	1x32	
Operating Wavelength	(nm) ~1260-1650						
Insertion Loss (typ.)	dB	3.7	5.6	6.6	9.6	13.0	17.6
Polarisation Dependent	0.3 Max						
Return Loss	dB	>55dB					
Connector Type	SC/APC	SC/APC	SC/APC	SC/APC	SC/APC	SC/APC	
Weight	g	95	95	95	100	185	360
Dimensions	mm	130x113x25	130x113x25	130x113x25	130x113x25	130x113x52	130x113x102

Optical Transmitters

| IRS 1 for 1 SAT-Position + DTT/DAB/FM

TSOT Satellite Transmitter



Satellite Transmitter for Wideband V & H input from a single Satellite Terrestrial Transmitter + WDM for the Satellite.

The Satellite Transmitter takes 2 Wideband feeds from a Wideband LNB, 290MHz – 2340MHz, Vertical and Horizontal.

The optical output from the transmitter can be combined with the optical output from the Terrestrial transmitter.

The Terrestrial transmitter has an input from 5 – 790MHz so can receive FM, DAB and Terrestrial TV signals. It also has a built in Wave Division Multiplexer (WDM) to combine the Satellite on a single optical output.

- Satellite Optical wavelength 1310 & 1330 nm
- Terrestrial Optical wavelength 1550nm
- RF input connectors – F type female
- Optical connectors – SC/APC
- High Optical output level +9dBm



TTOT Terrestrial Transmitter

Optical Transmitters

| IRS 1 for 1 SAT-Position + DTT/DAB/FM

Technical specification

Type		TSOT Satellite Transmitter	TTOT Terrestrial Transmitter
Art. No.		307770	307771
Inputs		2 RF	1 RF + 1 optical (loopthrough from TSOT)
Outputs		1 Optical	1 Optical
Optical wavelengths	nm	1310 - 1330	1550
Optical output Power	dBm	+9 (per Wavelength)	
Laser type		DFB	
Ripple	dB	+/- 2.5	+/- 2.5
RF output			
No of outputs (Sat / Terr)	-	2	1
Optimal input level	dBuV	*70-80 per Transponder	** 70 per MUX
Input attenuator	dB	0-15	0-15
Frequency range	MHz	290 - 2340	5 - 790
Return Loss	dB	-10	
Switch	-	dSCR + QUAD / Quattro	
Mechanical			
Power consumption	W	9	6
Voltage	VAC	200 - 240	
LNB Power supply		12.8V / max 240mA	
Optical connector	-	SC/APC	
RF Connectors	-	F female	
Operating temperature range	°C	-20 to +55	
Protection class	-	IP50	
Dimensions	mm	225 x 190 x 86	
Weight	Kg	1.8	

* Satellite input will be via a line amplifier with AGC - or for smaller systems directly off the Wideband LNB

** Terrestrial input will be from a profiler type amplifier with AGC

Optical receiver

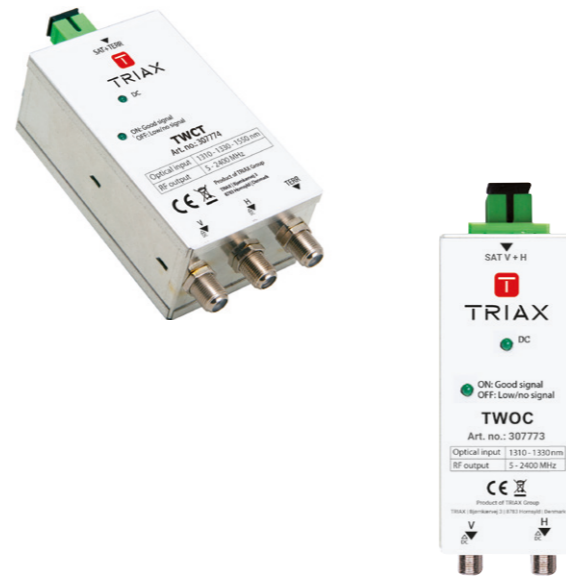
| TWOC and TWCT

The TWOC has 2 Wideband outputs, Vertical and Horizontal

The TWCT has 2 Wideband outputs, Vertical and Horizontal and a separate Terrestrial output

The TWCT has 2 Wideband outputs, Vertical and Horizontal 290MHz – 2340MHz and a separate Terrestrial output 5MHz – 790MHz.

The outputs from the converter can be used with the TdSCR switches in Wideband mode to give the option of a 3 cable system (carrying all the services from a single satellite position and terrestrial). Using the TWOC (carrying the Wideband signals from a 2nd satellite position), these can be added to the TdSCR switch to enable a 2 satellite position over a 5 cable backbone.



Technical specification

Type		TWOC	TWCT
Art. No.		307773	307774
Optical inputs	-	1	1
RF outputs	-	2	3
Optical wavelengths	nm	1310 - 1330	1310 - 1330 - 1550
Optical input Power	dBm	-15 to +4	-15 to +6
RF output			
Satellite (legacy/dSCR)	dBuV	80	80
Terrestrial	dBuV		80
Frequency range	MHz	5 - 2400	5 - 1008 & 5 - 2400
Return Loss	dB	10	10
Indicator LED		Green LED on Vertical	Green LED
Powering		Via output connectors	Via output connectors
Power consumption	W	2	3
Optical connector	-	SC/APC	SC/APC
Voltage	V	12 - 20 (via V or H port)	12 - 20 (Via V or H port)
RF Connectors	-	75 Ohm F type (Female)	75 Ohm F type (Female)
Operating temperature range	°C	-20 to +55	-20 to +55
Dimensions	mm	40 x 51 x 122	60 x 51 x 122
Weight	kg	0.110	0.165

Optical Converter

| Optical receiver – Quad/Quattro/dSCR



The TDC4 can be switched for use as either a standard Quattro converter, or as a switch with dSCR or Quad output.

The TDC4 can be used in two modes at the flick of a switch. Either as a Quattro converter to give vertical and horizontal high and low bands (+ a separate terrestrial output), or as a 4 output switch with dSCR or Quad output, combining the terrestrial signals on all 4 outputs.

Technical specification

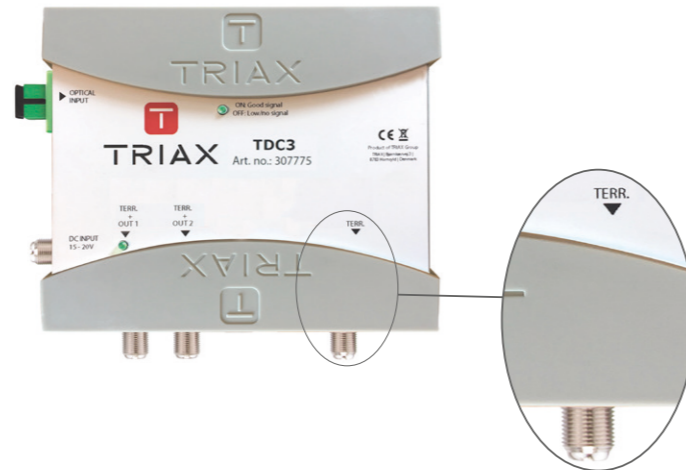
Type		TDC4	
Art. No.		307776	
		TDC4 Quattro mode	TDC4 Quad mode
Optical inputs	-	1	
RF outputs	-	5 (VL, HL, VH, HH, T)	4 (dSCR/legacy/TERR.)
Optical wavelengths	nm	1310 / 1330 / 1550	
Terrestrial output frequency range	MHz	40 - 790	
Satellite output frequency range	MHz	950 - 2150	
Optical input level	dBm	-14 to +4	
Signal presence indicator	-	Green LED on Vertical	
dCSS/dSCR UBs	-	-	4 x 16
Output level dSCR/Legacy (AGC)	dBμV	80	
Output level TERR (AGC)	dBμV	75	65
Return loss	dB	10	
Input connector type	-	SC / APC	
Output connector type	-	75 ohm F type (female)	
Band and polarity selection	-	DiSEqC 1.0 (unidirectional) / DiSEqC 2.0 (bidirectional) Standard EN50494/EN50607 / SKY UK protocol Universal LNB Voltage & Tone	
Power consumption	W	8	8
Power supply via DC IN	VDC	15 - 20	
Power supply via output (STB)	VDC	12 - 20	
Power indicator	-	Green LED	
Selection Quad or Quattro mode		with slide switch	
Operating temperature range	°C	-20 to +55	
Dimensions	mm	166 x 136 x 50	
Weight	kg	0.5	

Optical Converter

| Optical receiver – 2 dSCR/Quad + terrestrial

The TDC3 has 2 dSCR/Quad outputs and a separate Terrestrial output.

The TDC3 can be used in two modes depending on the receiver connected to the outputs. It can be connected to a standard Satellite receiver with PVR function, or a Satellite receiver in SCR mode. Both of the satellite outputs carry the terrestrial services and there is also a **separate terrestrial output** on the converter.



Technical specification

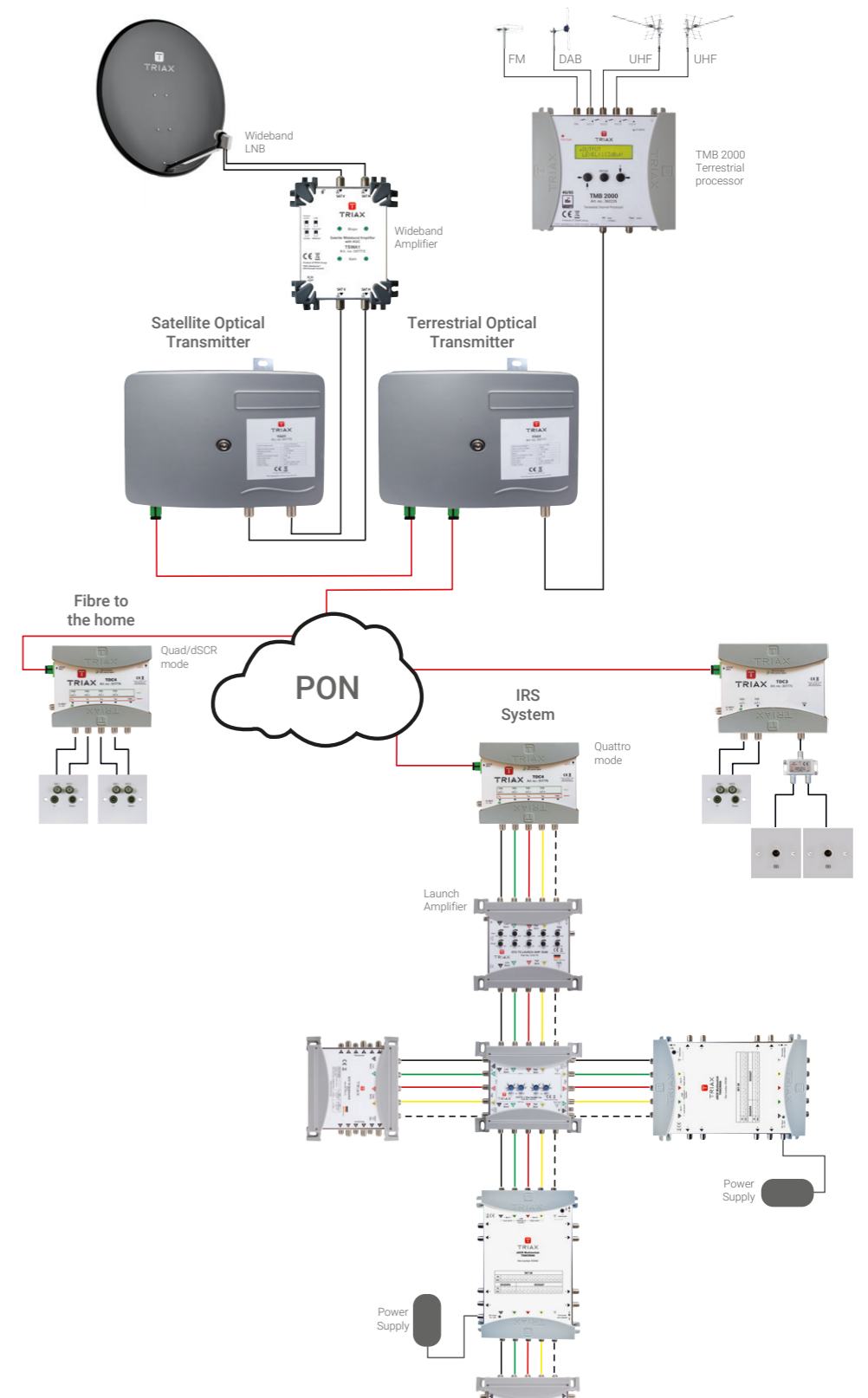
Type	TDC3	
Art. No.	307775	
Optical inputs	1	
Optical wavelengths	nm	1310 - 1330 - 1550
Optical input Power	dBm	-14 to +4
RF output		
No of outputs	3 (2 dSCR/Legacy/TERR. + 1 TERR.)	
Satellite (legacy/dSCR)	dBuV	82 - 85
Terrestrial	dBuV	80
Terrestrial Frequency output	MHz	40 - 790
Satellite Frequency output	MHz	950 - 2150
Output level dSCR/Legacy (AGC)	dBuV	80
Output level TERR (AGC)	dBuV	70
Return loss	dB	10
Band selection	DiSEqC 1.0, DiSEqC 2.0, Standard EN50494/EN50607, Sky UK Protocol, Universal LNB Voltage & Tone	
Ripple	dB	+/-1
Return Loss	dB	10
dCSS/dSCR UB's	-	2 x 16
Indicator LED's	Green LED per wavelength	
Power indicator	-	Green LED
Powering	Direct or via output connectors	
Power consumption	W	5
Optical connector	-	SC/APC
Voltage via DC in	V	15 - 20
Power supply via output (STB)	VDC	12 - 20
RF Connectors	-	75 ohm, F female
Operating temperature range	°C	-20 to +55
Protection class	-	IP20
Dimensions	mm	166 x 136 x 52
Weight	Kg	0.31

Wideband Fibre System

| Example for 1 SAT-Position + DTT/DAB/FM

Description

The fibre system can be connected to either an optical converter in the home (to supply all the required TV services) or it can be connected to an optical receiver which can deliver services over an integrated reception system.



Installation tips

It is recommended that a selective multi-band cluster leveler is used to manage the terrestrial signals.

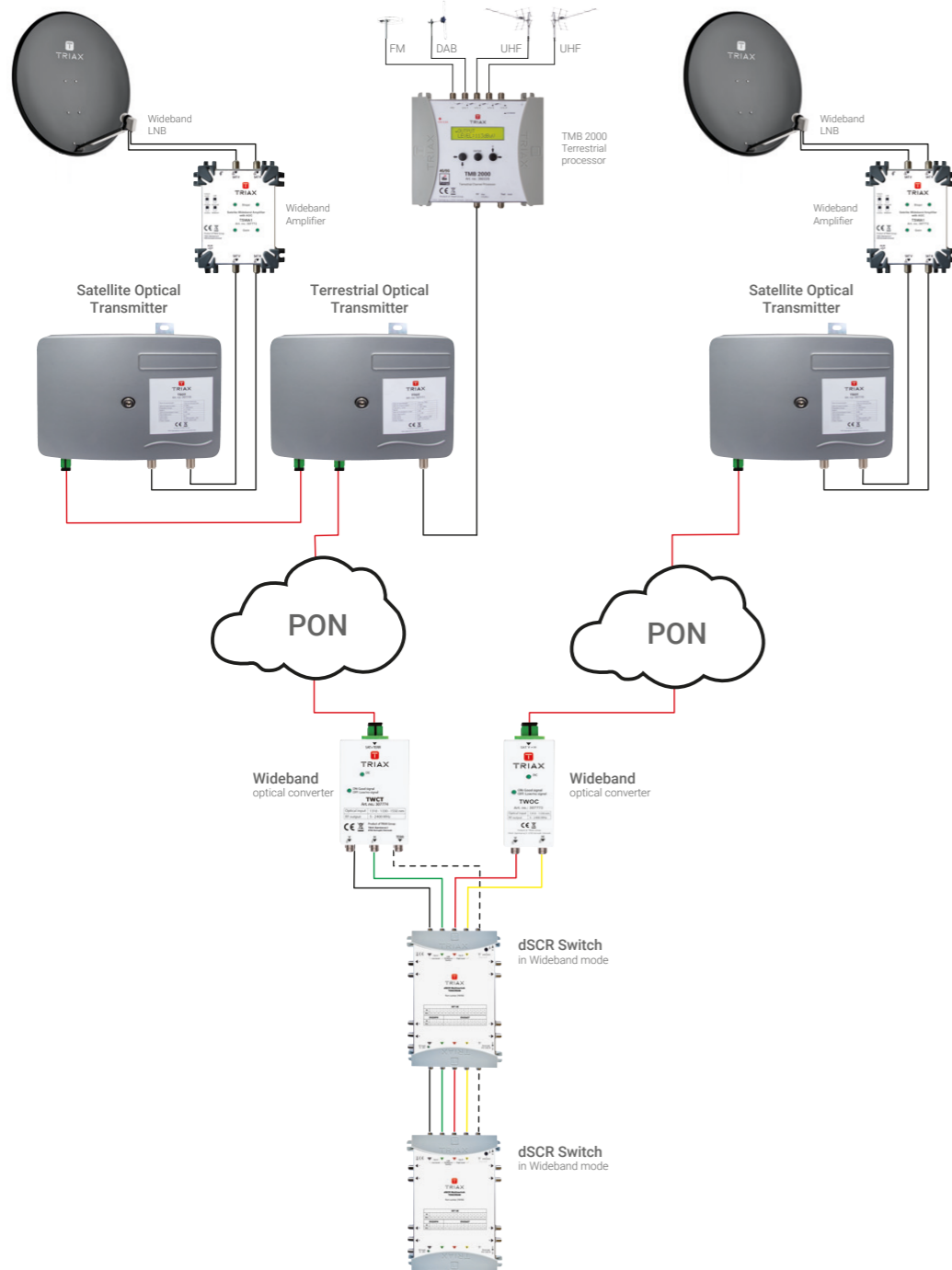
Wideband Fibre System

| Example for 2 SAT positions

Description

Each SAT position requires an optical transmitter (TSOT) + 1 optical transmitter for the terrestrial services (TTOT). The optical signal is connected to a converter, via the PON, where it is converted back to Satellite Wideband IF (290 – 2340MHz).

It can then be connected to a dSCR switch, set in Wideband mode, to give the subscriber the option to choose which satellite position they want to connect to. All the terrestrial services are also carried on the subscriber cable.

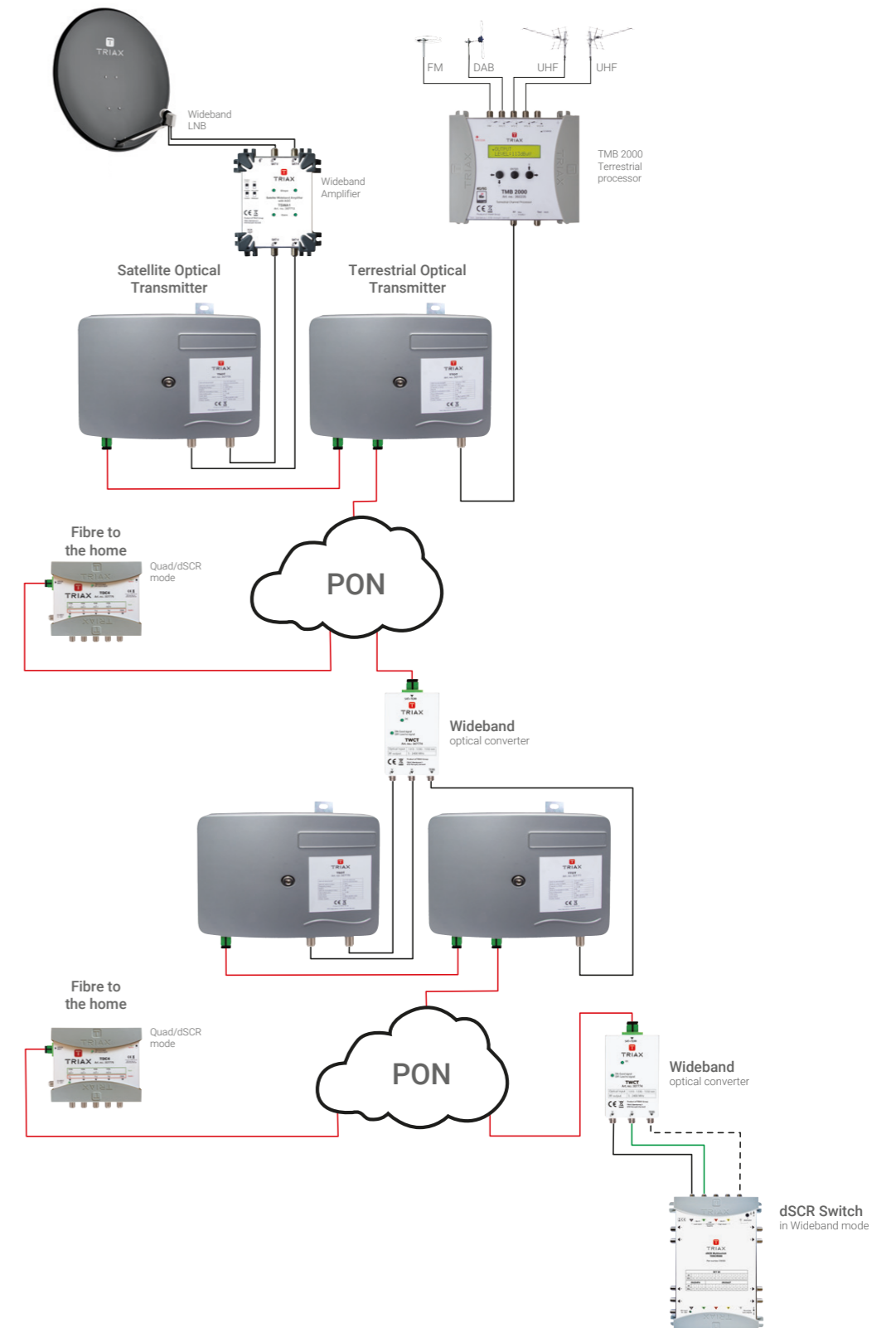


Wideband Fibre System

| Example for Extended Systems

Description

The fibre system can be extended to deliver services to more converters in large systems. Using the principle below, the optical transmitters can be connected to a splitter (ideally less than 16 outputs). Each of these outputs can be connected to a wideband converter (TWCT), which can then be connected to another set of optical transmitters, to supply services to additional PON's, for very large fibre distribution systems.





TRIAX

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Headquartered in Denmark, TRIAX is an international supplier of innovative, high-tech solutions for the reception and distribution of video, audio and data signals. The company's products and solutions are used by broadcasters, cable operators, local closed networks and domestic dwelling.

TRIAX has 9 sales subsidiaries generating a turnover of approx. €90M and operates in more than 60 distributor countries. The TRIAX team consists of 350 employees and is owned Polaris Private Equity.

See triaux.uk for further info.

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