



# TRIAX

connecting the future



## TRIAX Optical Fibre (TOF)

Flexible installation with easy  
satellite dish alignment



[triax.co.nz](http://triax.co.nz)

# 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 Single or QUATRO 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 up to 5 coaxial cables per satellite position and includes terrestrial reception

# Satellite Fibre Optic System

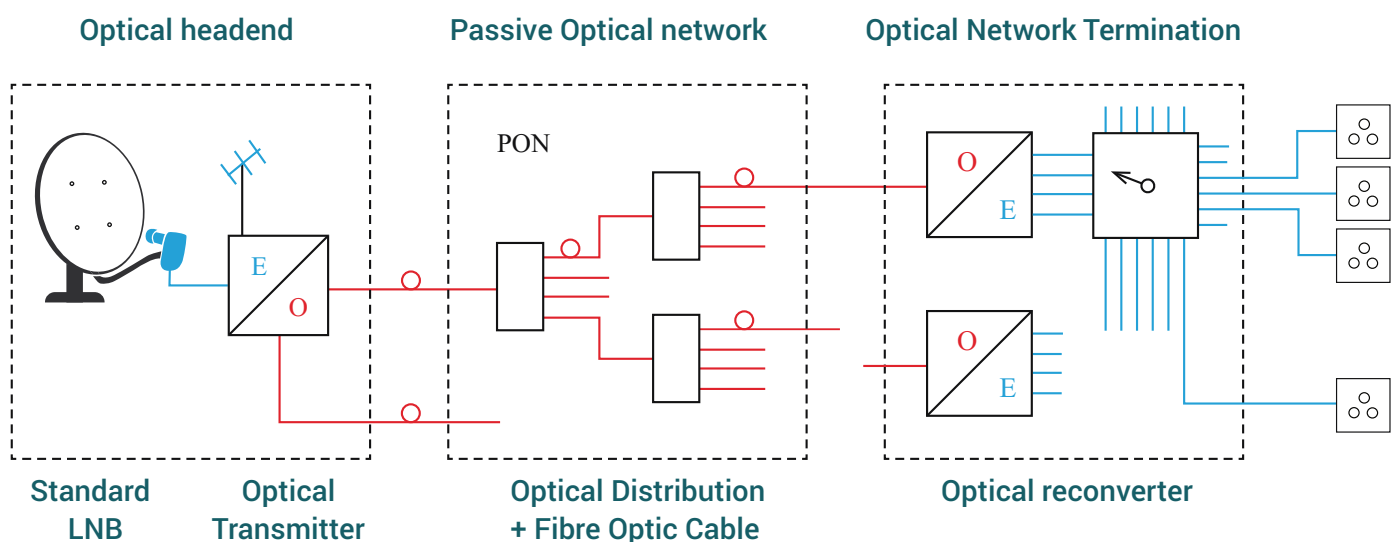
Flexible installation with easy satellite dish alignment



## 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 FM signals. Attenuation per 1000 m only about 0.3 dB
- Future-proof and widest possible variety of channels
- Multiple IF signals are transmitted over one optical fibre using Standard LNB's
- 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				1 SAT position/4 polarities FM, DTT, DAB
SAT				
Terrestrial				
Technical concept				Full band stacking-LNB with external optical transmitter 1310 nm
System components				
Single LNB	TWB204	Single LNB	304855	Single LNB 950-2000 MHz Vertical and Horizontal
Wideband Amplifier	TSWA-1	Satellite 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 input Terrestrial Optical Tx with WDM
Optical transmitter	TTOT	Terrestrial Optical TX with WDM	307771	
Optical re-converter	TWOC	Wideband optical converter	307773	Optical converter with Wideband output V and H
Optical re-converter	TWCT	Wideband optical converter w/ terr	307774	Optical converter with Wideband output V and H and separate Terrestrial
Optical re-converter	TDC4	Quad/Quattro Optical converter	307776	Optical converter with Quad/Quattro and Terrestrial Output
Optical re-converter	TDC3	Optical converter with terr	307775	Optical converter with Quad output and separate terrestrial output
Optical budget (max.)			21 dB (TBC)	
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 dBm. Thus the level of the optical signal on the input of the optical re-converter should not be less than 9dBm - 19dBm = -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.

# Single LNB

| Single LNB 950-2000 MHz Vertical and Horizontal



## Single LNB

Art. No. 304855

The Single LNB converts the Vertical and Horizontal satellite signals (11.7 – 12.75GHz) off the dish to an intermediate frequency of 290 – 2000 MHz.

- Receives 1 x Ku band satellite orbital slot
- 1 x Vertical and 1 x Horizontal output
- Low noise
- Output frequency range 290-2000 MHz

## Technical specification

Type	TSB 204 Single LNB	
Art. No.	304858	
Input	-	1Ku
Input frequency	MHz	11700 – 12750
Outputs	-	1 (V & H)
Output frequency	MHz	290 – 2000
LO frequency	MHz	10750
Conversion gain	dB	55 – 65
Noise figure	dB	1 (max)@25°C
Image rejection	dB	40 (min)
Output power	dBm	-30*
DC supply voltage	VDC	10.5 – 21.0
Power consumption	W	< 1
Operating temperature	°C	-40 to +60
LNB mount fitting	mm	40
Dimensions	mm	85 x 57 x 59
Weight	kg	0.109



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

# AGC Satellite Input Amplifier

| with 2 output level options



## Satellite Input Amplifier

Art. No. 307772

A two input Satellite 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
- 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
Outputs	-	2 SAT
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 dB $\mu$ V (-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

| 2 SAT-Position + DTT/DAB/FM

TSOT Satellite Transmitter



**Satellite Transmitter for two inputs from a 1-2 Satellites, Terrestrial Transmitter + WDM for the Satellite.**

The Satellite Transmitter takes 2 LNB feeds from a Wideband or two Single LNB's, Vertical and/or 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

| 2 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	+9
Laser type		DFB	DFB
Ripple	dB	+/- 2.5	+/- 2.5
<b>RF output</b>			
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	-10
Switch		QUAD / Quattro	QUAD / Quattro
<b>Mechanical</b>			
Power consumption	W	9	6
Voltage	VAC	200 - 240	200 - 240
LNB Power supply		12.8V / max 240mA	12.8V / max 240mA
Optical connector		SC/APC	SC/APC
RF Connectors		F female	F female
Operating temperature range	°C	-20 to +55	-20 to +55
Protection class		IP50	IP50
Dimensions	mm	225 x 190 x 86	225 x 190 x 86
Weight	Kg	1.8	1.8

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

\*\* Terrestrial input will be from a profiler type amplifier with AGC - TMB 2000

# Optical receiver

| TWOC and TWCT

The TWOC has 2 Satellite outputs

The TWCT has 2 Satellite outputs and a separate Terrestrial output

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

The outputs from the converter can be used with Triax Multi-switches to give the option of a 3-9 cable system (carrying all the services from a single satellite position and terrestrial).



## Technical specification

Type		TWOC	TWCT
Art. No.		307773	307774
Optical inputs			1
RF outp		2	3
Optical wavelengths	nm	1310 - 1330	1310 - 1330 - 1550
Optical input Power	dBm	-15 to +4	-15 to +6
RF output			
Satellite	dBuV	80	80
Terrestrial	dBuV		80
Frequency range	MHz	5 - 2400	5 - 1008 & 5 - 2400
Return Loss	dB	10	10
Indicator LED		Green LED	Green LED
Powering		Via output connectors	Via output connectors
Power consumption	W	2	3
Optical connector		SC/APC	SC/APC
Voltage	VDC	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



**The TDC4 can be switched for use as either a standard Quattro converter, or as a switch with 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 multiswitch or Quad output, combining the terrestrial signals on all 4 outputs IE for TV points in a home or apartment.

## Technical specification

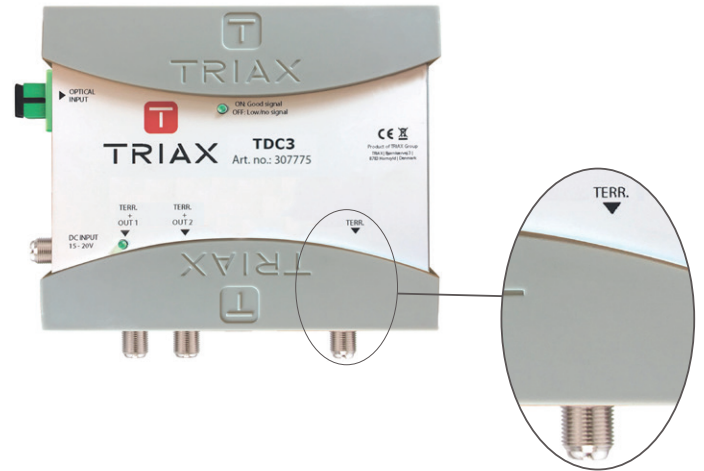
Type	TDC4	
Art. No.	307776	
	TDC4 Quattro mode	TDC4 Quad mode
Optical inputs	1	
RF outputs	5 (VL, HL, VH, HH, T)	4 (dSCR/legacy/TERR.)
Optical wavelengths	nm	1310 / 1330 / 1550
Terrestrial output frequency range	MHz	40 - 790
Satellite output frequency range	MHz	950 - 2150
Optical input level	dBm	-14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

# Optical Converter

| Optical receiver – 2 Quad/Quad + terrestrial

**The TDC3 has 2 Quad/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. Both of the satellite outputs carry the terrestrial services and there is also a **separate terrestrial output** on the converter.



## Technical specification

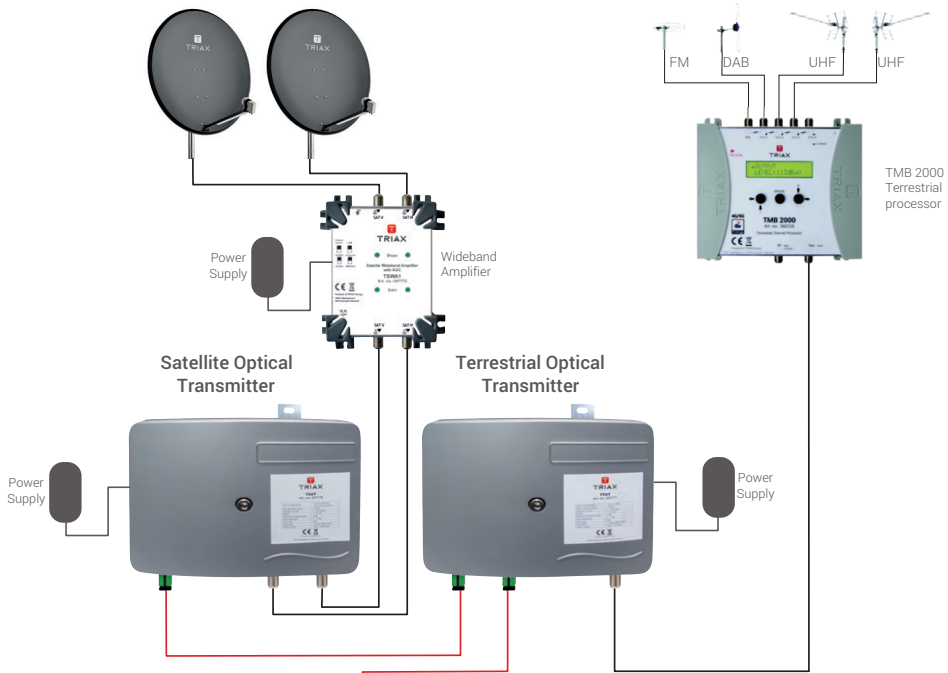
Type	TDC3	
Art. No.	307775	
Optical inputs	1	
Optical wavelengths	nm	1310 - 1330 - 1550
Optical input Power	dBm	-14 to +4
<b>RF output</b>		
No of outputs	3 (2 SAT/TERR. + 1 TERR.)	
Satellite (legacy/dSCR)	dBuV	82 - 85
Terrestrial	dBuV	80
Terrestrial Frequency output	MHz	40 - 790
Satellite Frequency output	MHz	950 - 2150
Output level dSCR/Legacy (AGC)	dBμV	80
Output level TERR (AGC)	dBμV	70
Return loss	dB	10
Band selection	DiSEqC 1.0, DiSEqC 2.0 Standard EN50494/EN50607, 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

# Satellite Fibre System

| Example for 1-2 SAT-Position + DTT/DAB/FM

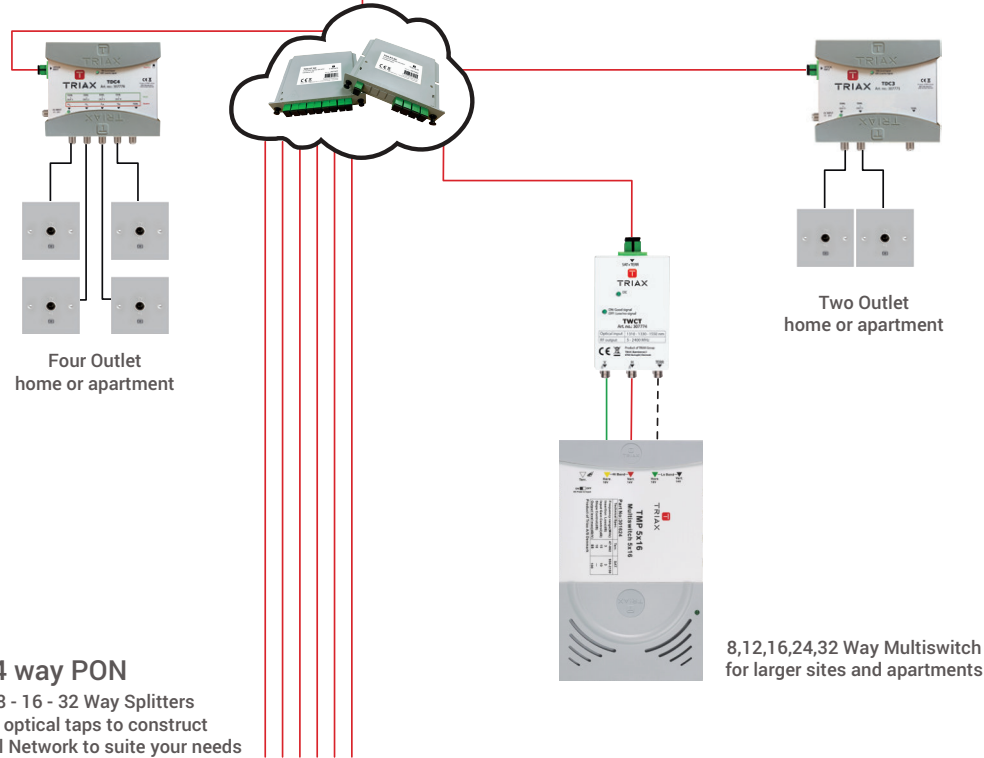
## Description

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 - TMB 2000.



**64 way PON**  
 Use 2 - 4 - 8 - 16 - 32 Way Splitters  
 or a range of optical taps to construct  
 a Passive Optical Network to suite your needs

8,12,16,24,32 Way Multiswitch  
 for larger sites and apartments

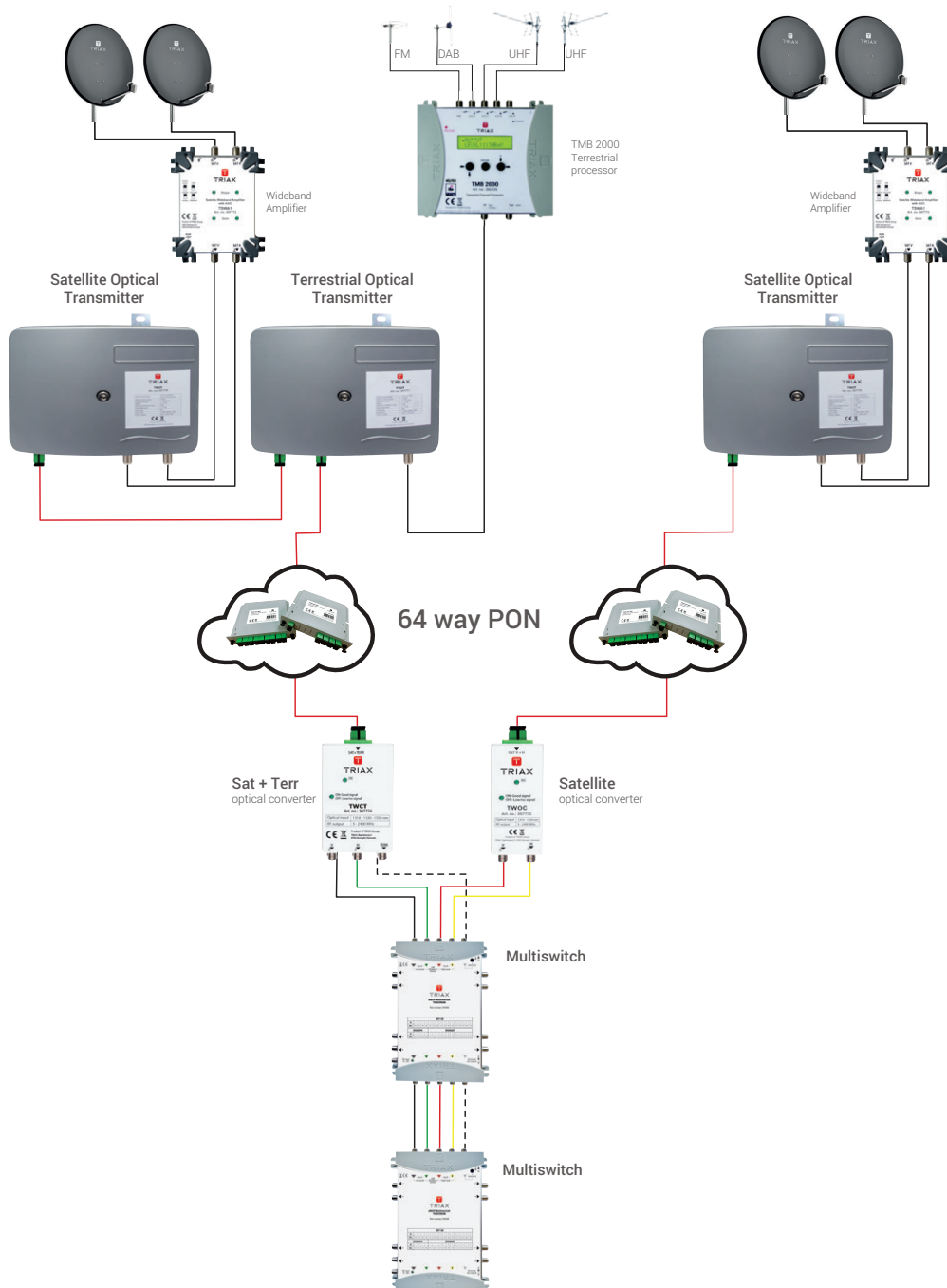
# Satellite Fibre System

| Example for 2-4 SAT positions

## Description

Every two SAT positions require 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 IF.

It can then be connected to a Multiswitch, 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.

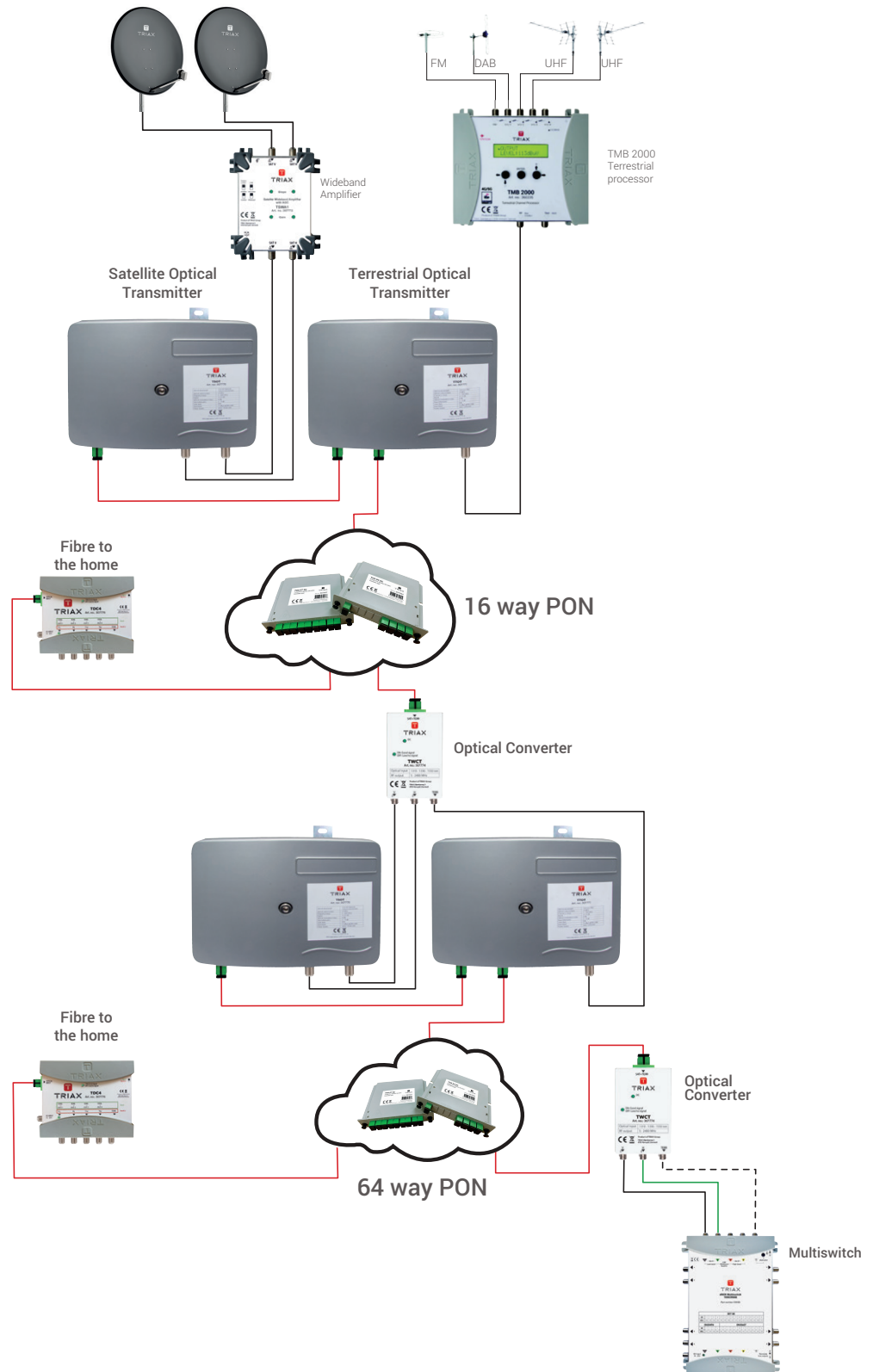


# Satellite Fibre System

| 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

*connecting the future*

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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.co.nz](http://triaux.co.nz) for further info.

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