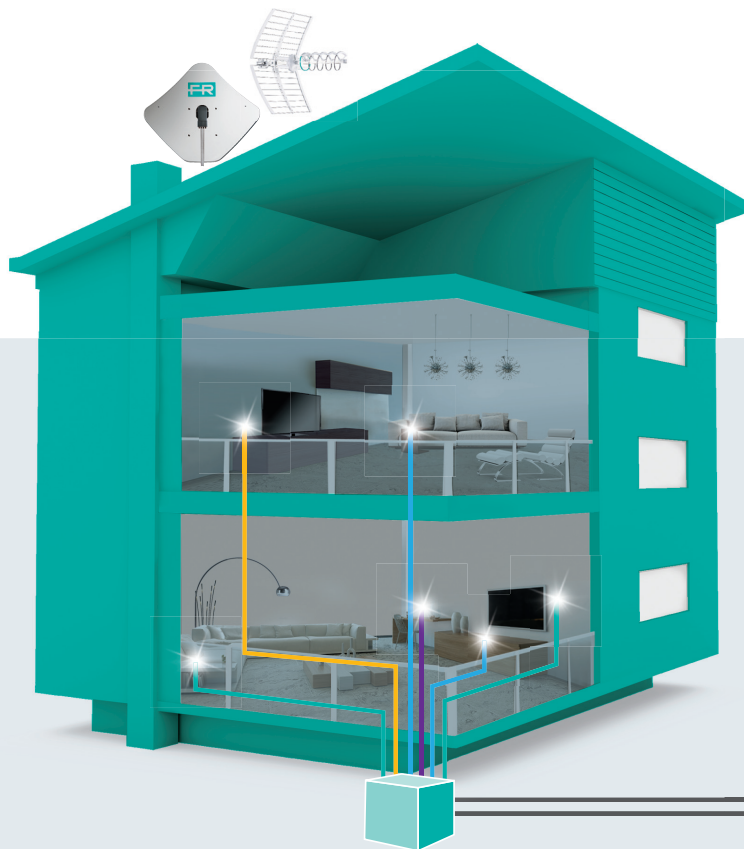


Optical fiber solutions

FTTH fiber optical distribution for
multi-satellite, digital terrestrial TV and data



Multi-Service Solutions

From the Fracarro experience the best FTTH distribution

The advantages of Optical Fiber Solutions

The use of a system with **FTTH technology** has many advantages, for example to guarantee sustainable costs and to ensure that the system is "ready for future technological developments", while ensuring equal opportunities to the users in terms of enjoying the digital contents. These values represent a wide series of interesting advantages:

- One single network for distribute many new services.
- Reduction costs for maintenance activities and for technological implementation.
- Open and neutral platform to support every type of application.
- The simplification of the optical network means aesthetically more pleasing buildings.
- The technological structure improvement increase the building's value.

Solutions and Services by Fracarro.

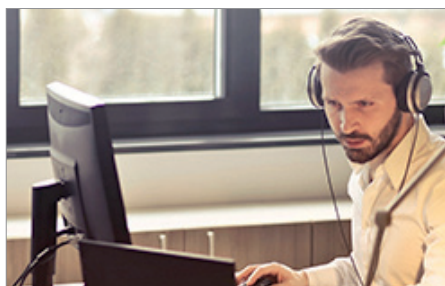
Creating a fiber optic system with **Fracarro solutions** means having **the most advanced technologies**, with a complete range of equipment suitable for any type of system. **Fracarro also offers** a wide series of important **services to support the installers**:



FREE SYSTEM DESIGN

Fracarro Technical engineers are available to design the system layout suitable for your installation, complete with a list of materials.

supportotecnico@fracarro.com



CUSTOMER SUPPORT

From Monday to Friday, from 9:00am to 5:30pm (GMT+1) for any technical request, general products information, or remote help for headend startup.

supportotecnico@fracarro.com
Whatsapp +39 335 776 2667

- Building cabinet, apartment box, organizers, accessories and optical fiber cables

Head Terminal Box

For organize the optical splicing and the connections on the technical room located under the roof.

Apartment Optical Termination Box

For organize the splicing and the connections inside every single flat

Single-mode optical fiber cable

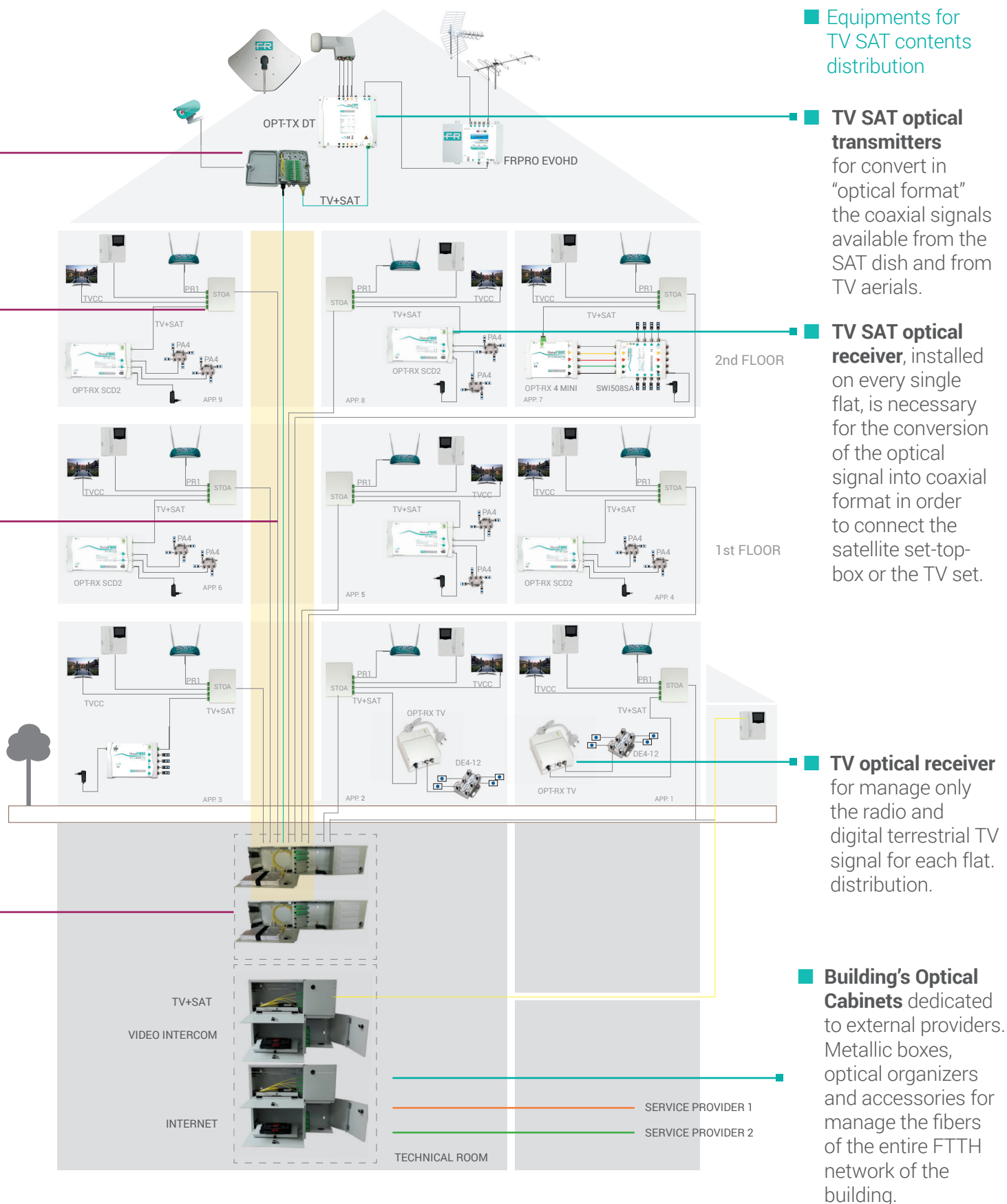
normally one cable consider many optical fibers covered by the same outer sheath.

Building Optical Cabinets

The boxes allow to collect and organize all the fibers of the entire building and for distributing the services to the every single unit of the building.

FTTH typical schematic diagram

Passive and active optical products used for typical TV SAT distributions



OPTICAL FIBRE DISTRIBUTION

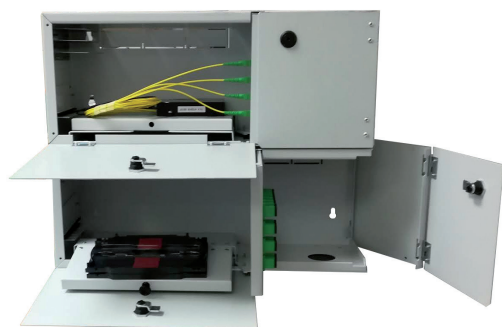
Main cabinets, distributors and accessories for distribute the optical services inside the building

The access point to all the services

The services of each external service provider and the TV SAT signals arrive at the **Optical Cabinets of the building** to be sorted, splitted and distribute on every apartments. For distribute one single service on each apartment it is possible to use PLC optical dividers (see next pages for further details).

Fracarro can provide:

- Pre-terminated solution
- Solution for splice the optical fibers on the field



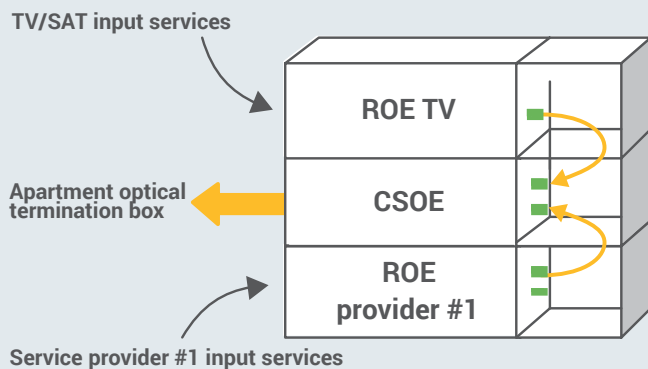
CSOE ..



PMI ..

Code	Item	Description
287418	CSOE 2U	Metallic cabinet with 48pcs of SC/APC adapters included suitable for FTTH cabling
287444	PMI 24	Metallic cabinet for distribute the services from Optical Cabinet of the Building to every single apartment. 24pcs of pigtail SC/APC and 2pcs of optical organizer included.
287445	PMI 48	Metallic cabinet for distribute the services from Optical Cabinet of the Building to every single apartment. 48pcs of pigtail SC/APC and 4pcs of optical organizer included.

Typical layout



Regarding the arrangement of the FTTH system it's typically necessary to install one or more Optical Building Cabinets that will provide the interconnections from the main technical room to each apartment.

The cabinets are available in two different versions:

CSOE 2U: this solution is suitable for use with pre-cabled STOA's with SC/APC connectors on both sides (STOA 10-20-30-40-50). In this case whole optical interconnections are already available and ready-for-use. The CSOE 2U can also be considered for create the splitting sections for the external service providers by inserting the PLC dividers inside the cabinet.

PMI 48 or PMI 24: the solutions are suitable for insert STOA 4 or STOA 4 100 m; on this case it's necessary to consider the optical splicing and connectorization of the optical cables. Both PMI models are complete with SC/APC pigtails and optical trays.

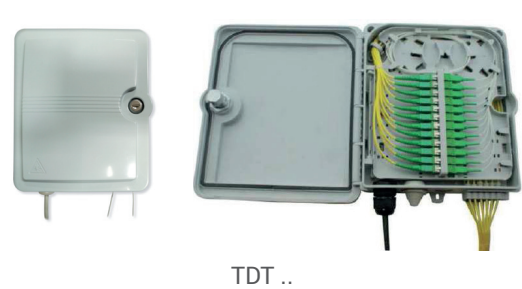
OPTICAL FIBRE DISTRIBUTION

Head and Apartment Optical Termination boxes

Head Termination Box

The **Head Terminal Box** is normally used to organize the optical services received from the aerials and converted from the dedicated optical equipments. The box container is IP66 plastic made for wall and mast installation. One optical tray able to manage up to 20 fibers and 12pcs of SC/APC adapters are included in the package.

- For indoor and outdoor installation
- IP66 protection (for TDT)
- Complete with optical tray and adapters.



TDT ..

Code	Item	Description
287419	TDT 12	Key-locked and IP66 plastic-made head terminal box with SC/APC adapters and optical organizer tray included in the package.
287441	TDT 32	Head terminal box for internal use complete with optical organizer for manage up to 32 fibers.
287442	JTDT 32	Cable protection cover for TDT32.

Apartment Optical Termination Box

It is the **Optical Apartment termination** point and must be installed very close to every premises units entrance. The **Apartment Termination Boxes** are available in two versions: the pre-cabled version that consider many models with different cable lengths, and another version to be cabled on the field.

- Pre-wired and unwired solution
- Dustproof connectors with shooter.



STOA 4

STOA 4 ..

Code	Item	Description
287420	STOA 4	Apartment Optical Termination Box and 4pcs of SC/APC adapters with shooter included.
287511	STOA 4 10m	Apartment Optical Termination Box and 4pcs of SC/APC adapters with shooter included. 10mt of 4xFO cable included. Preterminated with SC/APC connectors in both side.
287512	STOA 4 20m	Apartment Optical Termination Box and 4pcs of SC/APC adapters with shooter included. 20mt of 4xFO cable included. Preterminated with SC/APC connectors in both side.
287513	STOA 4 30m	Apartment Optical Termination Box and 4pcs of SC/APC adapters with shooter included. 30mt of 4xFO cable included. Preterminated with SC/APC connectors in both side.
287514	STOA 4 40m	Apartment Optical Termination Box and 4pcs of SC/APC adapters with shooter included. 40mt of 4xFO cable included. Preterminated with SC/APC connectors in both side.
287515	STOA 4 50m	Apartment Optical Termination Box and 4pcs of SC/APC adapters with shooter included. 50mt of 4xFO cable included. Preterminated with SC/APC connectors in both side.
287516	STOA 4 100m	Apartment Optical Termination Box and 4pcs of SC/APC adapters with shooter included. 100mt of 4xFO cable included. Preterminated with SC/APC connectors only in one side.

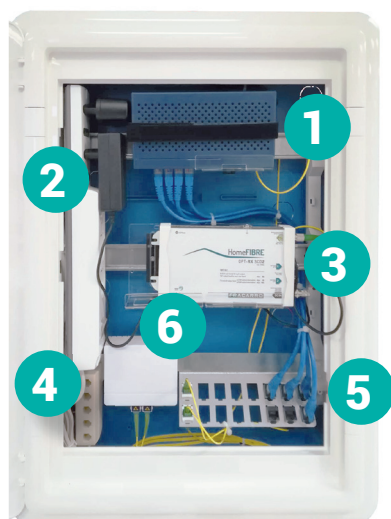
APARTMENT BOX FOR SIGNAL DISTRIBUTION

Apartment cabinets for optical signal distribution

Wall mount boxes for distribute the services inside the apartment

The **Apartment Box for Signal Distribution** is a technical box, suitable for contain the passive devices such Apartment Optical Termination Box as well as the active equipments (Home Network Interface for Broadband and/or Broadcast signals) in order to organize the distribution of all the services within the housing unit.

- Ready for install the passive and active devices
- Sized for the organization of distribution of apartment signals.



QDSA

- 1 xDSL data
- 2 CCTV
- 3 TV/SAT
- 4 VoIP
- 5 Access control
- 6 Apartment optical termination box

Code	Item	Description
287472	QDSA	Wall box for Signal Distribution inside the apartment (capacity 54 modules), equipped with 2pcs of DIN bars and accessories suitable for install the active devices, RJ45 patch-cords for data connections and SC/APC patch cords for interconnections to the apartment optical plastic box.
287517	QDSA MINI	Miniaturized wall-mounting Apartment box suitable to install the opticals and active devices. Equipped with metallic accessories.



QDSA

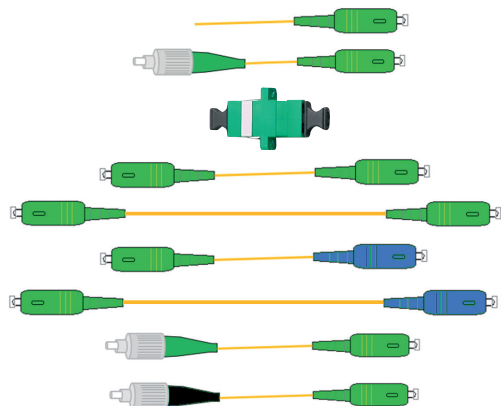


QDSA MINI

Optical patch-cords

Patch cords with SC/APC, SC/PC, FC/APC, FC/PC and MINI connectors suitable for the optical connections to the equipments.

- Different types of optical connections
- Singlemode optical patch cords 9/125 G657A2



Code	Item	Patch cords
287426	PIG TAIL	Pig Tail 900um F.O. 9/125 lenght 1mt SC/APC
280011	FC-SC/APC	FC/APC -SC/APC lenght 1mt
289349	BFO-SC-APC	SC/APC-SC/APC optical adapter
289360	BR2-AA	SC/APC -SC/APC lenght 2mt
289362	BR4-AA	SC/APC -SC/APC lenght 4mt
289359	BR2-PA	SC/APC -SC/PC lenght 2mt
289361	BR4-PA	SC/APC -SC/PC lenght 4mt
287427	BR2SCAPC-FCAPC	SC/APC -FC/APC lenght 2mt
287521	BR2FC/PC-SC/AP	SC/APC -FC/PC lenght 2mt

OPTICAL FIBRE CABLES AND SPLITTERS

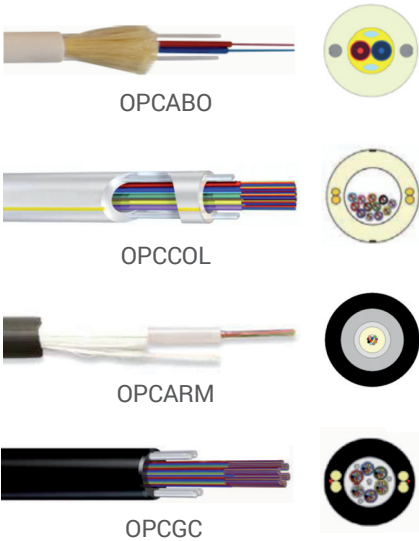
Splitters and multifibers optical cables for indoor and outdoor use. From 1 up to 96 optical fibers.

“Loose Tube” multi-fiber cable for indoor/outdoor use

The multi-fiber optical cables for indoor use are extra flexible.



- LSZH sheath for indoor use
- Loose Tube type
- Single-mode 9/125 G652 fiber.

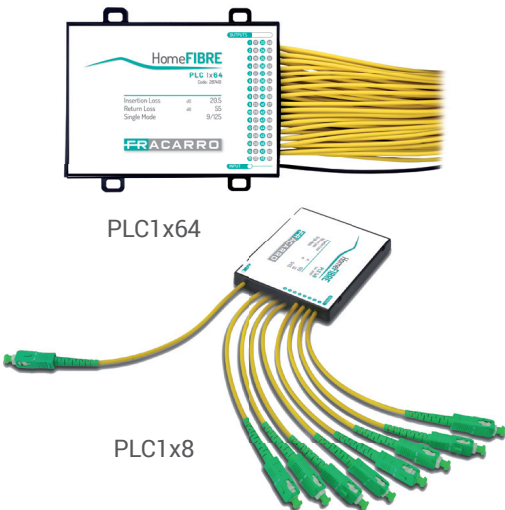


Code	Item	Loose tube cables
287446	OPCABO2	G657A2 indoor fiber (2 fibers) - reel 250mt
287447	OPCABO4	G657A2 indoor fiber (4 fibers) - reel 250mt
287425	OPC 8 Indoor	G657A2 indoor fiber (8 fibers) - reel 500mt
287452	OPCCOL12	G657A2 indoor fiber (12 fibers) - on request
287453	OPCCOL48	G657A2 indoor fiber (48 fibers) - on request
287454	OPCCOL96	G657A2 indoor fiber (96 fibers) - on request
287344	OPC4ARM	Armored outdoor cable with 4 singlemode fibers - on request
287345	4SCAPC CONN	SC/APC splicing service for the OPC4ARM fiber
287346	OPC8ARM	Armored outdoor cable with 8 singlemode fibers - on request
287347	8SCAPC CONN	SC/APC splicing service for the OPC8ARM fiber
287448	OPCGC12	12 opt fibers outdoor cable, armored with glass fibers
287449	OPCGC24	24 opt fibers outdoor cable, armored with glass fibers
287450	OPCGC48	48 opt fibers outdoor cable, armored with glass fibers
287451	OPCGC96	96 opt fibers outdoor cable, armored with glass fibers

PLC (Planar Lightwave Circuit) compact optical splitters

The PLCs are optical dividers suitable for realize the splitting of the services and send them to the entire building's flats. **High performances and very low insertion loss.** The range consider models from 4 to 64 ways splitters.

- 4, 8, 16, 32, 64 ways splitters
- Very low optical insertion loss
- SC/APC input/output patch cords included (1mt lenght).



Code	Item	Optical splitters
287455	PLC 1x4	4-ways splitter with 1mt of SC/APC patchcord 7.6dB loss
287407	PLC 1x8	8-ways splitter with 1mt of SC/APC patchcord 10.9dB loss
287408	PLC 1x16	16-ways splitter with 1mt of SC/APC patchcord 14dB loss
287409	PLC 1x32	32-ways splitter with 1mt of SC/APC patchcord 17.2dB loss
287410	PLC 1x64	64-ways splitter with 1mt of SC/APC patchcord 20.5dB loss

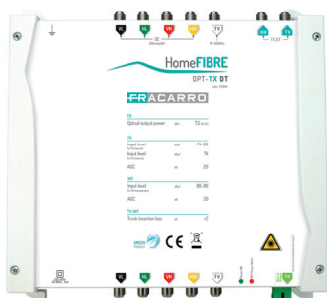
HOME FIBRE TV SAT SOLUTION

Distribution of Satellite and Digital Terrestrial signals

Home Fibre TV SAT optical transmitters range

The optical transmitters are made for satellite, digital terrestrial and radio signals distribution on residential buildings. The **Home Fibre series transmitters** allow the distribution of up to four different satellite orbital position on a single optical fiber with CWDM (Coarse Wavelength Division Multiplexing) technology.

- CWDM multi-wavelength technology
- Cascadable solution
- Full-band Digital Terrestrial TV+FM+DAB+Four satellite distribution.



OPT-TX DT

Code	Item	Optical transmitters
270694	OPT-TX DT	7dBm with FP laser SAT+TV+FM 1310nm wavelength
270667	OPT-TX 1510	7dBm with DFB laser SAT+TV+FM 1510nm wavelength
270668	OPT-TX 1530	7dBm with DFB laser SAT+TV+FM 1530nm wavelength
270669	OPT-TX 1550	7dBm with DFB laser SAT+TV+FM 1550nm wavelength
270670	OPT-TX 1570	7dBm with DFB laser SAT+TV+FM 1570nm wavelength

Home Fibre TV SAT optical receivers range

The **Home Fibre optical receivers** are designed to comply all the customer's needs in terms of digital terrestrial and satellite signals distribution with **QUAD** solutions (4 universal outputs), **QUATTRO** solutions (4 HVHV + TV outputs) and **Single Cable/Unicable** solutions (dSCR); an optical receiver is also available for digital terrestrial signals only.

- Miniaturized solution
- dSCR, SCD2 receivers for Single Cable/Unicable satellite distribution (for ex. Sky Italy, BSkyB UK)
- Full band solution (Digital Terrestrial+FM+DAB+full Satellite)



OPT-RX SCD2



OPT-RX 4 MINI



OPT-RX QUAD MINI



PSU1506



OPT-RX TV



OPTATT...

Code	Item	Description
270664	OPT-RX SCD2	Single Cable, Unicable optical receiver (SCD2, dSCR) equipped with 2 outputs, SCD2 technology with 16 user bands + TV for each output, optical FC/APC connector
270658	OPT-RX DSCR UK	Single Cable, Unicable optical receiver (dSCR - UK) equipped with 2 outputs, dSCR technology with 16 user bands + TV for each output and 2 outputs LEGACY + TV, optical SC/APC connector
270665	OPT-RX QUAD Mini	TV SAT optical receiver with four SAT + TV + FM standard legacy outputs, optical FC/APC connector
270666	OPT-RX 4 Mini	TV SAT optical QUATTRO receiver with HL, VL, HH, VH, TV+FM independent outputs, optical SC/APC connector
270696	OPT-RX TV	TV+FM optical receiver, power supply built-in, optical FC/APC connector, patch cord included
287155	PSU1506	Switching power supply 600mA@15V
287237	OPTATT14dB	Line optical attenuator, 14dB loss, SC/APC connectors
287238	OPTATT7dB	Line optical attenuator, 7dB loss, SC/APC connectors
287239	OPTATT3dB	Line optical attenuator, 3dB loss, SC/APC connector

K SERIES TV SAT SOLUTION

Distribution of Satellite and Digital Terrestrial signals

K Series Solution

The **K Series** Solution was created to distribute high quality satellite and digital terrestrial signals over a large number of user outlets via a single optical fiber. The DIN bar coupling system allows the use of transmitters and receivers in professional enviroments as well as in domestic installations. The KTX transmitter can be coupled to the self-powered OPT-RX TV receivers in domestic installation, or to the KRX receivers for professional installation.

- Scalable solution based on installation needs
- Digital Terrestrial signal with a single satellite polarity distribution
- Bandwidth 47-2150MHz.



Code	Item	Description
270686	KTX	7dBm optical transmitter with DFB laser 47-2150MHz
270667	KRX	K Series optical receiver 47-2150MHz output bandwidth
270696	OPT-RX TV	TV+FM optical receiver, power supply built-in, optical FC/APC connector, patch cord included
270018	KP15	12V,1.5A K Series power supply unit
271130	SCD2-32IF	Compact IF-IF headend (32 satellite transponders) for IF distribution

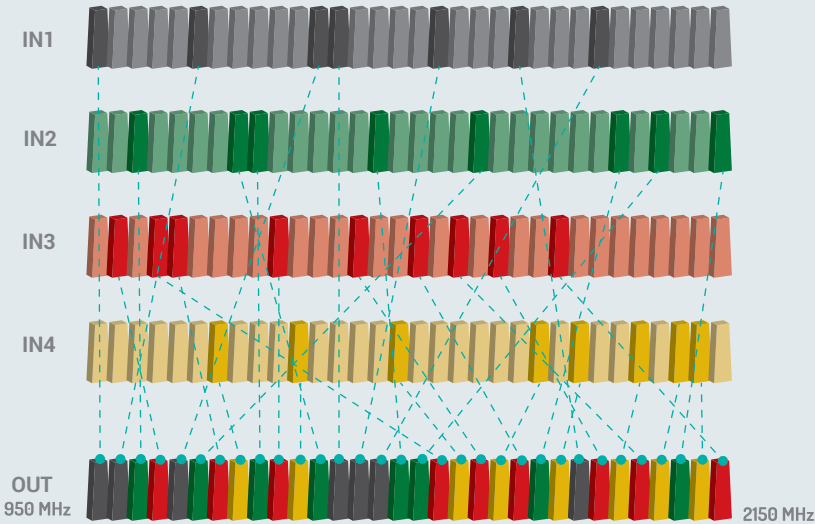
IF-IF Compact Solution

The new **SCD2 (dCSS) compact IF-IF headend** is equipped with 4 satellite inputs and 2 outputs to generate up to **32 DVB-S/S2 transponders** (configurable bandwidth 20-60MHz).

- Automatic Gain Controlled
- Maximum output flexibility
- Configuration via PC software

SCD2-32IF: working mode

The SCD2-32IF compact headend is able to filter and convert up to 32 complete satellite transponders, coming from 4 satellite polarities, and allows the distribution of the desired transponders and programs, up to a frequency of 2150 MHz through a single coaxial cable.



DATA OVER OPTICAL FIBRE DISTRIBUTION

EPON Technology for data distribution over singlemode optical fiber

EPON Network

The data distribution via single mode optical fiber is done by using **EPON technology (Ethernet Passive Optical Network)** which allows a very high bitrate distribution of broadband services. Each DATA PON TX transmitter is able to manage up to 128 DATA PON RX user receivers.

- Each OLT TX manage up to 128 ONU receivers
- Up/Downlink Gigabit distribution
- 19" Standard Rack mounting .



DATA-PON-RX-WF



DATA-PON-RX



DATA-PON-TX

Code	Item	Description
287416	DATA PON RX	EPON data receiver ONU, 1xRJ45 output
287417	DATA PON RX WF	EPON data receiver ONU, 4xRJ45 outputs + WiFi
287415	DATA PON TX	EPON data transmitter OLT, 1310-1490nm, 2xSFP modules, up to 128 ONU

CWDM Technology

By using **CWDM mux/demux** it's possible to mix several services within a single optical fiber, using different wavelengths.

- 2-way or 5-way optical wavelength solutions
- SC/APC input/output patch cords included (1mt lenght).



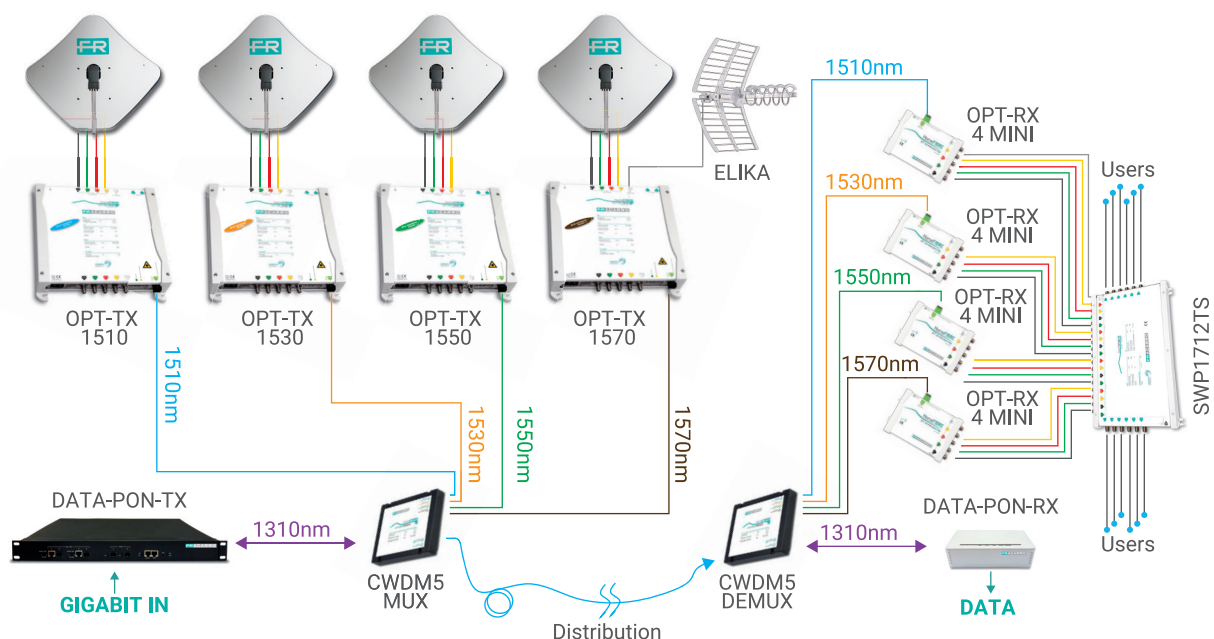
WDM2



CWDM5

Code	Item	Description
287343	WDM2	2-way optical MUX/DEMUX, 1310-1490 / 1500-1600 wavelength, 1mt of SC/APC patchcord included.
287342	CWDM5	5-way optical MUX/DEMUX, 1310-1490 / 1510 / 1530 / 1550 / 1570 wavelength, 1mt of SC/APC patchcord included.

Typical example: 4xSAT, Digital Terrestrial TV and data over a single optical fibre



OPTICAL FIBRE ACCESSORIES

Fusion splicings and accessories

EASY SPLICER portable optical fiber fusion splicer

Two-axis cladding alignment fusion splicer. Equipped with fiber cleaver, holders, stripper and carrying bag

- Cladding alignment
- Suitable for singlemode optical splicing.



EASYSPLICE

Item	Description
EASYSPLICE	Fusion splicer
Code	287534
Specifications	
Splicing mode	V.Groove
Fiber Types	MM 50/125-62/125 um, SM 9/125 um
Splicing programs	SM,MM,OM1
Typical splice loss	0.03dB (SM) – 0.01dB (MM)
Typical splicing time	7-35 Sec.
Display	LCD2.8" 320x240 pixels
Zoom	140x
Working temperature	0 ~ 40°C
Dimensions, weight	230x98x53 mm, 800 g
Power supply	6V, 1.5A power supply included

FST-83A professional optical fiber fusion splicer (core alignment).

Three-axis core alignment professional optical fiber fusion splicer.

- Core to core alignment,
- 4 motors



FST-83A

Item	Description
FST-83A	Fusion splicer
Code	287535
Specifications	
Splicing mode	Automatic, manual
Fiber Types	SM / MM / DS / NZDS
Programmi di giunzione	SM,MM,OM1
Typical splice loss	0.01dB-0.05dB
Typical splicing time	6-10Sec.
Monitor	4,3" high res LCD, touch screen
Zoom	500x
Working temperature	-10° C ~ +50° C
Dimensions, weight	140x165x148 mm (1.9KG)
Power supply	AC 100~240V – 5200mAh lithium battery incl.

OPTICAL FIBRE ACCESSORIES

Optical multimeter and cleaning tools

OPT METER optical multimeter

Optical multimeter for check different optical wavelength signal level in optical fibre distribution.



OPT METER

Item	Description
OPT METER	Optical multimeter
Code	287537
Specifications	
Wavelength	850-1300-1310-1490-1550-1625nm
Measuring range	from -70 up to +10dBm
Accuracy	0.2dB
Connector	SC/PC
Data storage	Yes, USB port
Battery	AA x 3 (not included)
Battery life	> 160H
Working temperature	-10° C ~ +50° C
Dimensions, weight	168x95x38 mm, 330g

Cleaning tools

- Optical connectors cleaning tools
- Cleaning wipes for optical connectors and adapters



Cleaning Kit

Item	Description
CLEANING KIT	Cleaning tools for optical fibers
Code	287536
Specifications	
Fiber and connector types	SM, 9/125um, SC/APC, SC/PC
Contain	unhydrated wipes, cleanstick, light, cleaning spray

EDFA OPTICAL AMPLIFIER

Erbium Doped Fiber Amplifier (EDFA)

EDFA optical amplifier

High sensitivity and high performances **EDFA (Erbium Doped Fiber Amplifier)**, designed for CATV long-distance transmission and large HFC and FTTH distribution networks. A built-in 2, 4 or 8 way optical splitter can be optionally supplied.

- APC Automatic Power Control (for CATV network)
- AGC Automatic Gain Control
- ACC Automatic Current Control



EDFA 20

Item	Description
EDFA 20	EDFA optical amplifier
Specifications	
Wavelength	1530-1565nm
Total gain	up to +28dB
Input power	from -10dBm to +10dBm
Noise figure @ 0dBm	5+0.5dB
IN/OUT return loss	>40dB
Working mode	AGC, APC e ACC
Connectors	SC/APC with shooter
Optical fiber type	SM 9/125
AC main voltage	220Vac 50/60 Hz
Power supply	6V, 1.5A external power supply

Accessories for rack mounting and wall mounting



OPB181



OPB81



OPB24IR



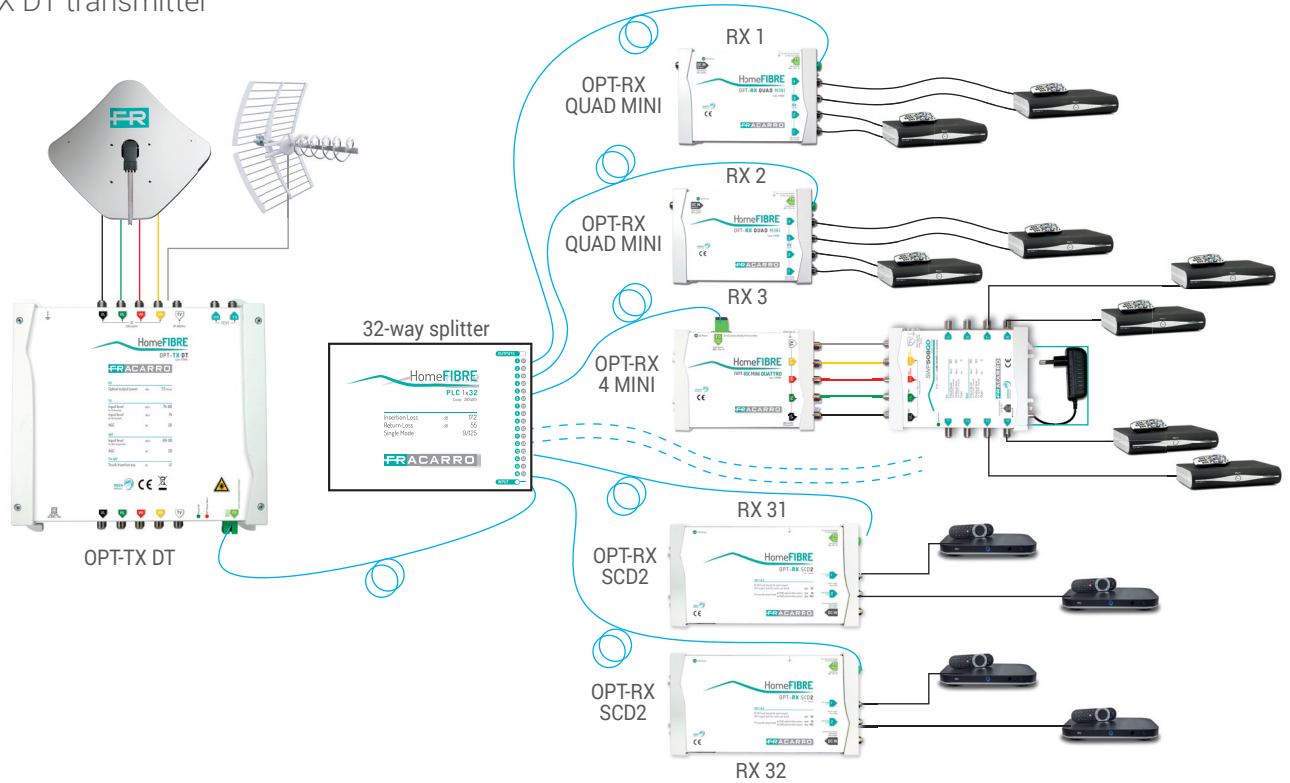
OP012P

Code	Item	Description
289403	OPB181	Wall mounting metallic cabinet for optical splice protection. Up to 18 SC/APC connectors.
289405	OPB81	Wall mounting metallic cabinet for optical splice protection. Up to 8 SC/APC connectors.
289404	OPB24IR	24 positions metallic tray for rack mounting
289402	OP012P	Compact fiber organizer (12 positions)

INSTALLATION EXAMPLES

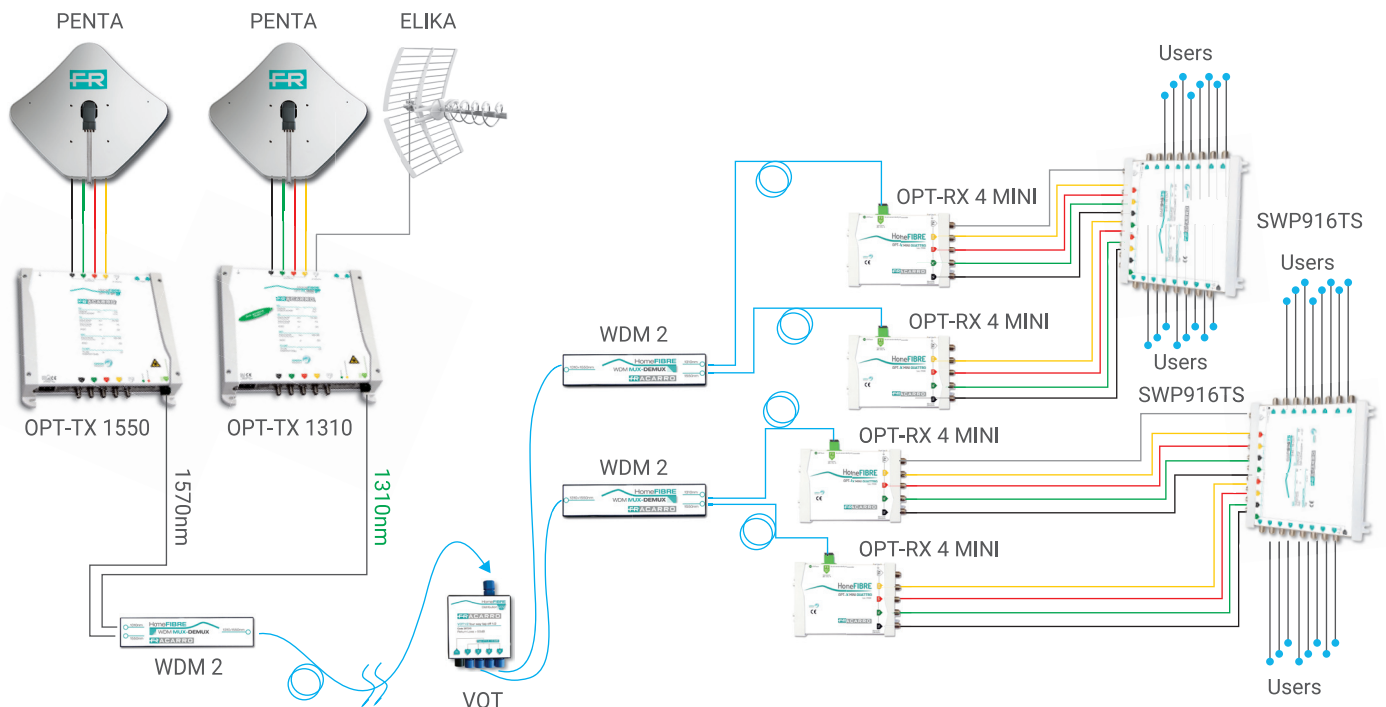
Star distribution for 32 optical receivers

Up to 32 end-point receivers for one Satellite Orbital position and for the Digital Terrestrial TV by using a single OPT-TX DT transmitter



Distribution of two SAT over a single optical fibre

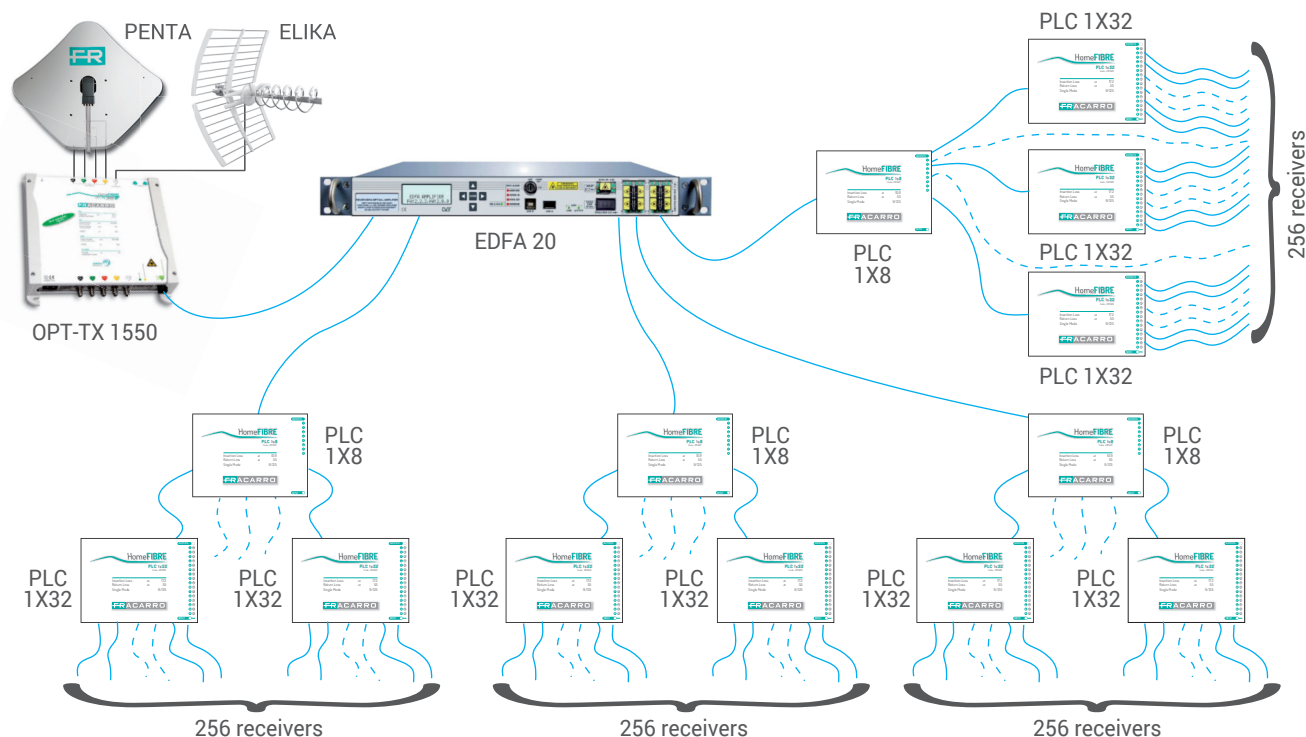
Reception and distribution of 2 Satellite Orbital position with the Digital Terrestrial TV over a single optical fiber by using WDM2 diplexer.



INSTALLATION EXAMPLES

Solution for a big installation (up to 1.024 optical receivers) and EDFA amplifier.

Up to 1.024 optical receivers connected to a single dish, a single aerial and to a single optical transmitter.



TV, SAT and Data distribution

Distribution of Digital Terrestrial TV signals, Satellite and data by using a single optical fiber with optical multiplexer.

