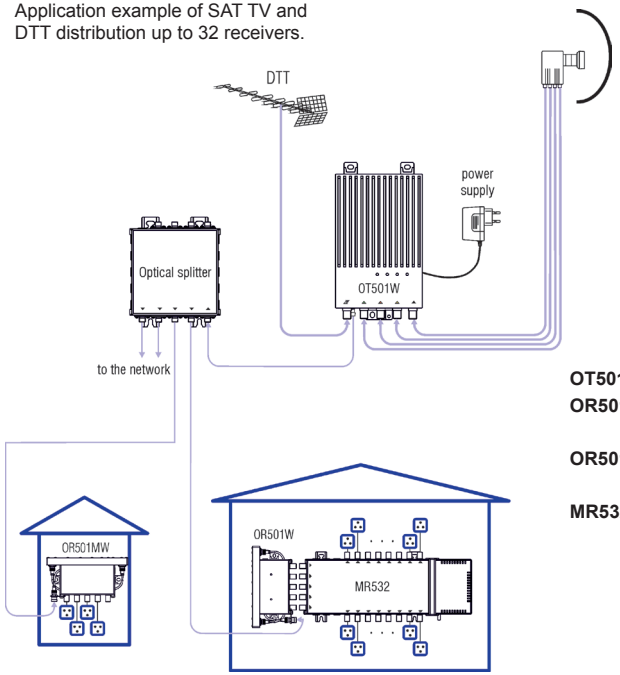
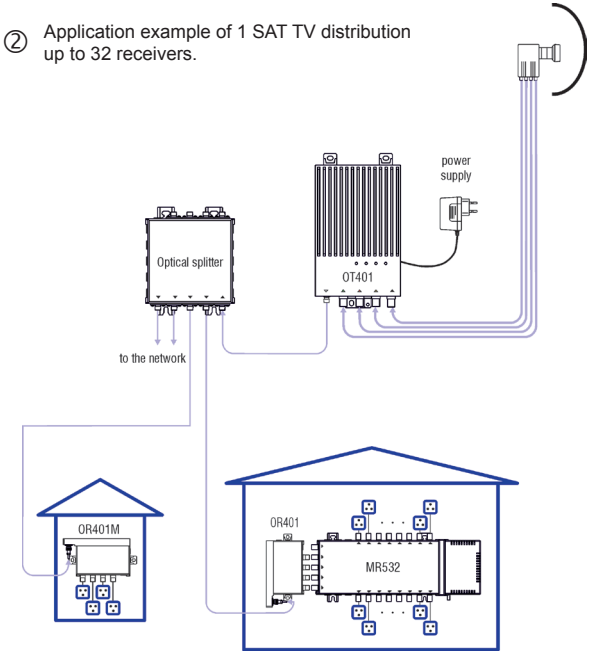
Application diagrams

① Application example of SAT TV and DTT distribution up to 32 receivers.



OT501W - optical transmitter
OR501W - optical receiver, virtual quatro, with WDM diplexer
OR501MW - optical receiver with 4x4 multiswitch and WDM diplexer
MR532 - 5x32 multiswitch

② Application example of 1 SAT TV distribution up to 32 receivers.



coaxial cable
fiber cable

OT401 - optical transmitter
OR401M - optical receiver with 4x4 multiswitch
OR401 - optical receiver, virtual quatro
MR532 - 5x32 multiswitch

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Optical receivers

OR401, OR401M, OR501, OR501M, OR501W, OR501WS, OR501MW, OR501MWS

Product description

Optical receivers (in the text - receiver) are designed to convert signals from optical transmitters OT401(W, S), OT501(W, S) to SAT IF and DTT (Digital Terrestrial TV) RF signals (see table 5). These receivers allow to build small and medium size SAT IF and terrestrial TV distribution systems. Receivers have an Optical Level Control (OLC), which allows to have fixed level of RF output signal at different level of input optical signal. Optical level of input signal is indicated by LED.

SAT IF and DTT signals are extracted from separate optical fibers. Models OR501W, OR501WS, OR501MW, OR501MWS have an integrated optical diplexer. This enables to transfer SAT IF and DTT signals to receiver by the same fiber.

Receivers are intended for indoor use only.

Coding explanation of receiver

OR 5 01 M W S

S - receiver with integrated optical filters, only for 5 cable system with optical Terr TV.

W - receiver with integrated WDM diplexer. For 5 cable system with optical Terr TV only.

SAT IF signal output type:
without letter M - VLo, HLo, VHi and HHi signals at receiver output (virtual quattro);
with letter **M** - multiswitch type output. Receiver with integrated multiswitch (virtual quad).

01 – series of optical receivers

Number of cables in the system:
4 - 4 cable system. SAT IF signals VLo, HLo, VHi and HHi will be extracted from one SAT optical input.
5 - 5 cable system. Four SAT IF signals VLo, HLo, VHi and HHi will be extracted from one SAT optical input and DTT signal will be enclosed from additional Terr. TV optical input.

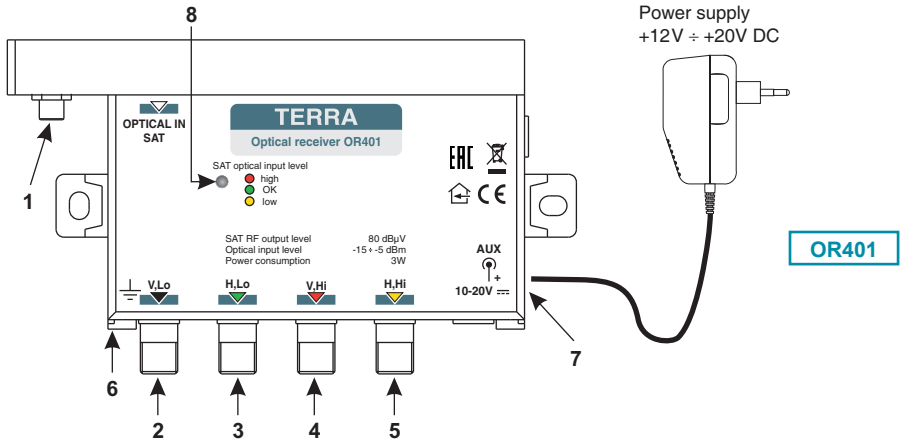
OR - optical receiver

Vers. 1.01

Safety instructions

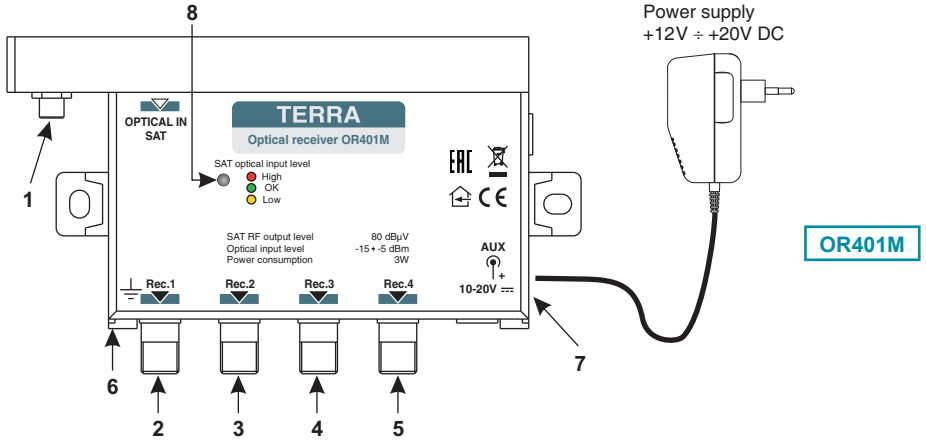
Installation of the receivers must be done according IEC60728-11 and national safety standards.
The receivers are powered from power supply unit (PSU) up to 20V or from set-top box 10...20 V. This voltage is not dangerous to life.
PSU must have a short circuit protection.
Any repairs must be done by a qualified personnel.
Do not plug the PSU into the mains socket until all cables have been connected correctly.
The mains socket of PSU must be easily accessible.
To disconnect the receivers power completely, disconnect the PSU from the mains and disconnect all RF cables.
The receivers shall not be exposed to dripping or splashing water and no objects filled with liquids, such as vases, shall be placed on it.
Avoid placing receivers next to central heating components and in areas of high humidity.
No naked flame sources, such as lighted candles, should be placed on receivers.
If the receivers have been kept in cold conditions for a long time, keep it in a warm room no less than 2 hours before plugging into the mains.
The ventilation should not be impeded by covering the receiver with items, such as newspapers, table-cloths, curtains.
Mount the receivers in vertical position (see external view).
From top, front and bottom of installed receivers must be at least 10 cm free space.An optical connector after disconnection emits optical radiation.
Avoid looking directly into beam, laser light can cause eye injuries and result in permanent loss of vision.
Before connecting to the receiver, check the optical level of the signal on the optical fibre using an optical power meter. The optical input signal higher than 0 dBm may damage the device.

External view



OR401

1. **OPTICAL IN SAT** - 4 SAT IF optical inputs (FC/APC)
2. **V, Lo** - SAT IF V,Lo RF signal output connector (F socket)
3. **H, Lo** - SAT IF H,Lo RF signal output connector (F socket)
4. **V, Hi** - SAT IF V,Hi RF signal output connector (F socket)
5. **H, Hi** - SAT IF H,Hi RF signal output connector (F socket)
6. Functional grounding clamp
7. **AUX** - auxiliary input for external power suppy (3.5/1.3 mm DC jack)
8. LED indicator of optical input power



OR401M

1. **OPTICAL IN SAT** - 4 SAT IF optical inputs (FC/APC)
2-5. **Rec.1, Rec.2, Rec.3, Rec.4** - SAT IF output connectors for set-top box (F socket)
6. Functional grounding clamp
7. **AUX** - auxiliary input for external power suppy (3.5/1.3 mm DC jack)
8. LED indicator of optical input power

OR401M, OR501M, OR501MW, OR501MWS* technical characteristics

OR401M, OR501M, OR501MW, OR501MWS* are OR401, OR501, OR501W, OR501WS with built-in multiswitch

Table 3

Type	OR401M	OR501M / ORH501M / OR501MW / OR501MWS
SAT IF channels		
Optical input		
Optical wave lenght	1100 - 1650 nm	
Optical input level (OLC range)	-15...- 5 dBm	
Optical return loss	> 40 dB	
Noise current density	≤ 7.5 pA/√Hz	
RF output		
Rec.1, Rec.2, Rec.3, Rec.4 outputs bandwidth	950..2150 MHz	
Impedance	75 Om	
Return loss	≥ 10 dB	
Band pass flatness	± 2 dB	
Output level (OLC controlled)	75 ± 2 dBµV	
Output level IMD3, IMD2 ≤ -40 dBc (30 transponders, AGC controlled)	75 dBµV	
Terrestrial TV channel		
Optical input		
Optical wave lenght		1100 - 1650 nm
Optical input level (OLC range)		-15...- 5 dBm
Optical return loss		> 40 dB
Noise current density		≤ 6 .5 pA/√Hz
RF output		
Terr.TV output bandwidth (Rec.1, Rec.2, Rec.3, Rec.4 outputs)		47..790 MHz
Impedance		75 Om
Return loss		≥ 10 dB
Band pass flatness		± 1 dB
Output level (OLC controlled)		75 ± 1 dBµV
Output level IMD3, IMD2 ≤ -60 dBc (8 transponders, optical level -5 dBm)		75 dBµV
Optical level control (OLC) SAT IF, Terrestrial TV		
Indication	Optical input level	
- red (OLC off) - green (OLC on) - yellow (OLC off)	> -5 dBm - 15 .. - 5 dBm < - 15 dBm	

Table 4 ***POWERING***

OR401M input DC voltage range	
DC jack	10 V...20 V
Rec.1-Rec.4 outputs *	13 V / 18 V
Power consumption	3 W
Output SAT control	14/18, 0/22 kHz
OR501M, OR501MW, OR501MWS input DC voltage range	
DC jack	12 V...20 V
Rec.1-Rec.4 outputs *	13 V / 18 V
Power consumption	3.6 W
Output SAT IF control	14/18, 0/22 kHz
Main characteristics	
OR401M Dimension/Weight	145x86x37 mm/0.42 kg
OR501M, OR501MW, OR501MWS Dimension/Weight	158x86x37 mm/0.42 kg

*when < 12 V DTT is OFF

Table 5

Optical receiver	Convert signal from
OR401, OR401M	OT401(W,S)
OR501, OR501M	OT501(W,S)
OR501W, OR501WS, OR501MW, OR501MWS	OT501(W,S)

OR401,OR501, OR501W, OR501WS* technical characteristics

Table 1

Type	OR401	OR501/OR501W/OR501WS
SAT IF channels		
Optical input		
Optical wave lenght	1100 – 1650 nm	
Optical input level (OLC range)	-15...- 5 dBm	
Optical return loss	> 40 dB	
Noise current density	≤ 7.5 pA/vHz	
RF output		
VLo, HLo outputs bandwidth	950..1950 MHz	
VHi, HHi outputs bandwidth	1100..2150 MHz	
Impedance	75 Ω	
Return loss	≥ 10 dB	
Band pass flatness	± 2 dB	
Output level (OLC controlled)	80 ± 2 dBuV	
Output level IMD3, IMD2 ≤ -40 dBc (30 transponders, AGC controlled)	80 dBuV	
Terrestrial TV channel		
Optical input		
Optical wave lenght		1100 – 1650 nm
Optical input level (OLC range)		-15...- 5 dBm
Optical return loss		> 40 dB
Noise current density		≤ 6.5 pA/vHz
RF output		
Terr.TV output bandwidth		47..862 MHz
Impedance		75 Om
Return loss		≥ 10 dB
Band pass flatness		± 1 dB
Output level (OLC controlled)		80 ± 1 dBuV
Output level IMD3, IMD2 ≤ -60 dBc (8 transponders, optical level -5 dBm)		80 dBuV
Optical level control (OLC) SAT IF, Terrestrial TV		
Indication	Optical input level	
- red (OLC off) - green (OLC on) - yellow (OLC off)	> - 5 dBm - 15 ... - 5 dBm < - 15 dBm	

Table 2 ***POWERING***

OR401 *input DC voltage range*	
DC jack	10 V...20 V
SAT IF RF output	10 V...20 V
Power consumption	3 W
OR501,OR501W, OR501WS *input DC voltage range*	
DC jack	12 V...20 V
SAT IF RF output *	10 V...20 V
Power consumption	3.6 W
Main characteristics	
OR401 Dimension/Weight	145x86x37 mm/0.42 kg
OR501, OR501W, OR501WS Dimension/Weight	158x86x37 mm/0.42 kg
Operating temperature range	-20⁰...+50⁰C

*when < 12 V DTT is OFF

This product complies with the relevant clauses of the European Directive 2002/96/EC. The unit must be recycled or discarded according to applicable local and national regulations.

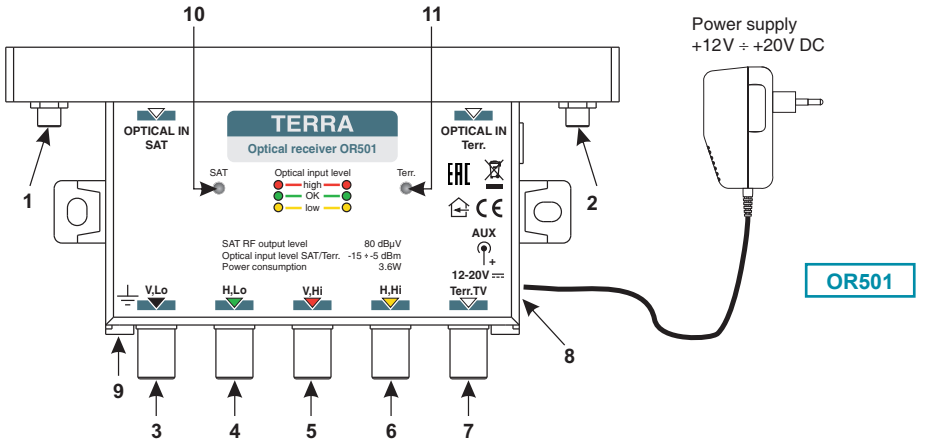
Equipment intended for indoor usage only.

Functional grounding. Connect to the main potential equalization.

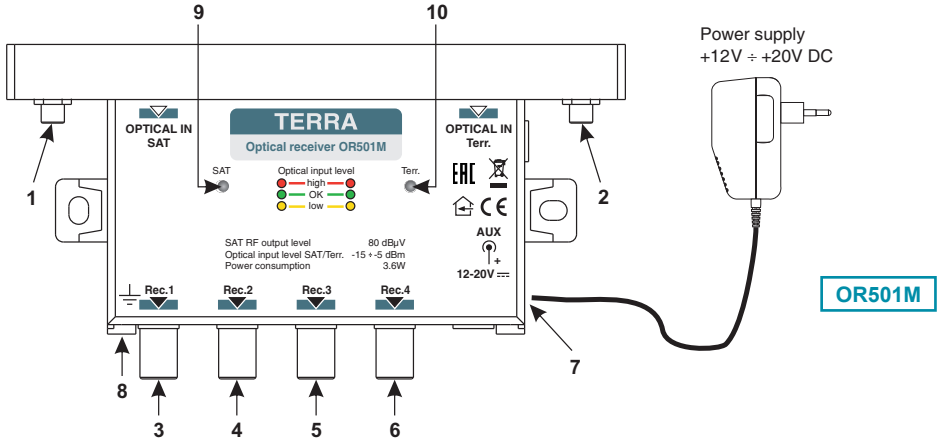
TERRA confirms, that this product is in accordance to following norms of EU: EMC norm EN50083-2, safety norm EN60065 and RoHS norm EN50581.

TERRA confirms, that this product is in accordance with Custom Union Technical Regulations: “Electromagnetic compatibility of technical equipment“ CU TR 020/2011, “On safety of low-voltage equipment“ CU TR 004/2011.

External view



1. **OPTICAL IN SAT** - 4 SAT IF optical inputs (FC/APC)
2. **OPTICAL IN Terr.** - DTT optical input (FC/APC)
3. V, Lo - SAT IF V,Lo RF signal output connector (F socket)
4. H, Lo - SAT IF H,Lo RF signal output connector (F socket)
5. V, Hi - SAT IF V,Hi RF signal output connector (F socket)
6. H, Hi - SAT IF H,Hi RF signal output connector (F socket)
7. **Terr.TV** - DTT RF signal output connector (F socket)
8. **AUX** - auxiliary input for external power suppy (3.5/1.3 mm DC jack)
9. Functional grounding clamp
10. LED indicator of optical SAT input power
11. LED indicator of optical Terrestrial TV input power



1. **OPTICAL IN SAT** - 4 SAT IF optical inputs (FC/APC)
2. **OPTICAL IN Terr.** - Terrestrial TV DTT optical input (FC/APC)
3-6. **Rec.1, Rec.2, Rec.3, Rec.4** - SAT IF and Terrestrial TV DTT output connectors for set-top box (F socket)
7. **AUX** - auxiliary input for external power suppy (3.5/1.3 mm DC jack)
8. Functional grounding clamp
9. LED indicator of optical SAT input power
10. LED indicator of optical Terrestrial TV input power

Requirements for external power supply unit (PSU)

- Output voltage range: (+12 V min ...+20 V max.)
- Output current: > 0.5 A
- Output connector: type 3.5/1.35 EP (+) plug
- Short circuit protection
- Double insulated (marked ⧈)
- Meet EN 55022 class B conducted emisions requirements, measuring with grounded load

Installation instructions

Read the product description and safety instruction first.

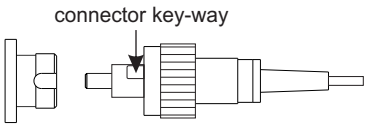
The receiver should be mounted vertically with cable RF output underneath in order to ensure good ventilation conditions.

Fiber installation should be done very carefully. Bending radius of fibers must be not less 25 mm. All optical connectors and adaptors should be cleaned before connecting them.

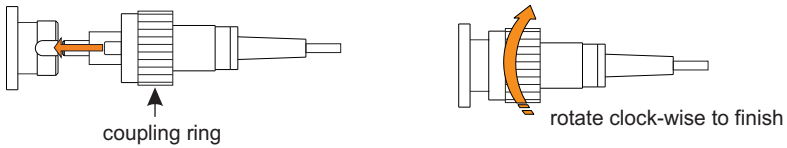
DC power should be connected to receiver after all cables have been connected correctly.

Instructions for the optical connection

1. Align the FC/PC connector key-way (type R) with the receptable key-way.



2. Push firmly to locate the key-ways and then rotate the coupling ring.



Operating and adjusting

Optical level control (OLC) is active at optical input power -15 .. -5 dBm. RF output level remains constant while optical input power fluctuates in mentioned range.

The receiver owns optical input power indicator formed from 3 colours.

Unused outputs of OR501M, OR501MW, OR501MWS should be terminated by 75 Ω loads.

The receivers **OR501M, OR501MW, OR501MWS** can be powered:
- from PSU + 12 V...+20 V
- from set-top box
- from PSU and set-top box

The receivers **OR501, OR501W, OR501WS** can be powered:
- from PSU + 12 V...+20 V
- from multiswitch

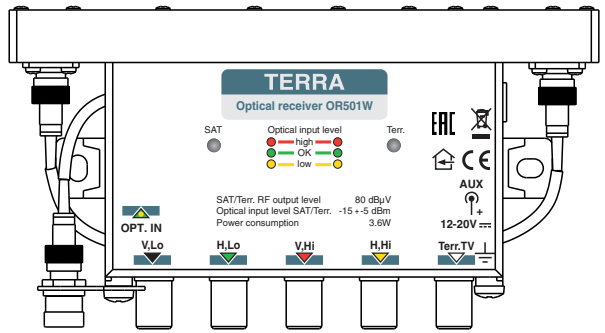
Attention! If supply voltages are < 12 V, DTT RF signal is OFF for all OR501xxx models.

The receiver **OR401** can be powered:
- from PSU + 10 V...+20 V
- from multiswitch

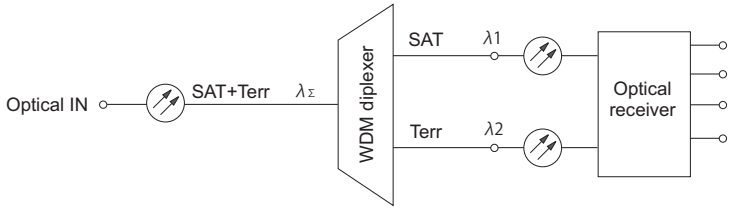
The receiver **OR401M** can be powered:
- from PSU + 10 V...+20 V
- from set-top box
- from PSU and set-top box

If supply voltages are < 10 V, SAT IF signal is OFF for all models.

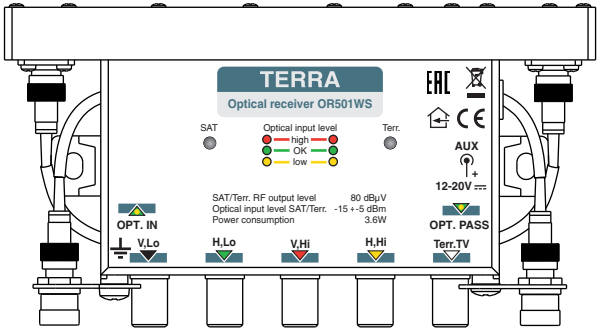
Structure diagram OR501MW, OR501W



OR501W



Structure diagram OR501MWS, OR501WS



OR501WS