

**Optical transmitter OTF302**

**DTT processing units MCA101L, MCA101T  
and wideband LNB LWB201L, LWB202L**

**System description**

The optical transmitter OTF302 is intended to distribute SAT IF and DTT, FM, DAB signals through a fibre optic. Transmitted SAT IF signal 290-2350 MHz is collected from wideband LNB LWB201L / LWB202L. DTT, FM, DAB signals are collected from DTT processing units MCA101L / MCA101T.

**Application diagram**

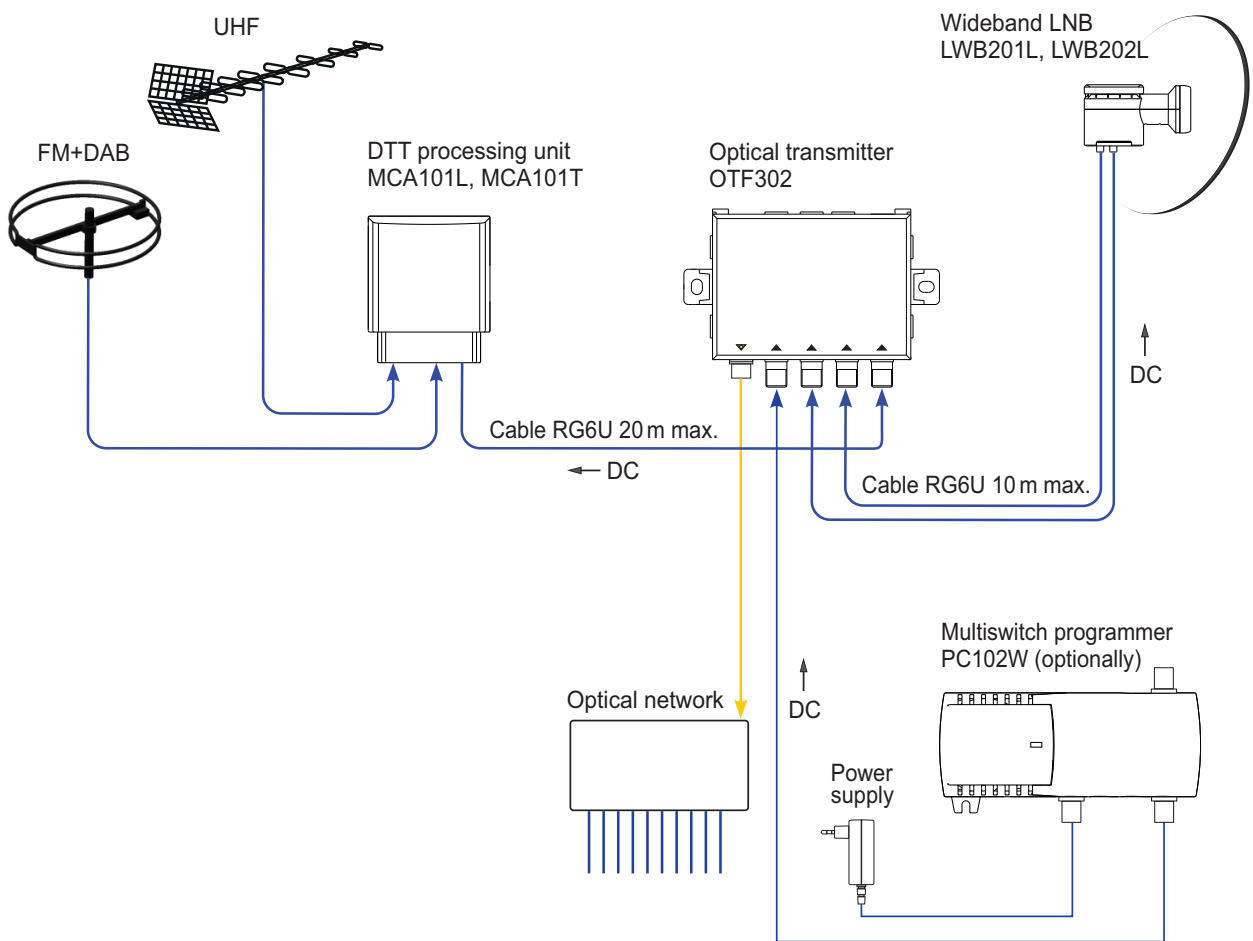


Figure 1. Transmitting system

The system is not flexible to use components of other manufacturers with similar functionality. The transmitting system is compatible with ORF302, ORD301F, ORQ302 and etc. optical receivers. See [www.terraelectronics.com](http://www.terraelectronics.com).

Manual in .pdf



## Safety instructions

Installation of the products must be done according IEC60728-11 and national safety standards.  
The products are powered from 10 - 20 V DC. This voltage is not dangerous to life.  
Any repairs must be done by a skilled personnel.  
To ensure safe operation of the products follow these instructions:  
Do not supply power until all cables have been connected correctly.  
The products should be mounted with connectors underneath to avoid the water ingress inside.

### Safety of laser product



Optical transmitter module contains laser diode sources. These devices are rated under IEC60825-1: "Safety of Laser Products", Part 1: Equipment classification and requirements as CLASS 1M laser product. When operating the equipment note the following:  
Most fiber optic laser wavelengths are totally invisible to the eye and will cause permanent eye damage. Never look into the end of a fiber on a powered device through a magnifying device (microscope, eye loupe, magnifying glass, etc.). Before using such devices always double check that power is disconnected or, if possible, completely disconnect the unit from any power source.  
To verify the light output always use an instrument, such as an optical power meter.  
Operate only with the proper optical fiber installed in the device optical connector.  
Whenever the optical connector is empty the laser transmitter should be turned off.  
Before applying power always connect a fiber to the output of the device.  
Never leave equipment with radiating bare fibers accessible - always cap the connectors.



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.



This product is in accordance to following norms of EU: EMC norm EN50083-2, safety norm EN IEC62368-1 and RoHS norm EN50581.



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.



The product has integrated LTE filter.



This product is in accordance with safety standard AS/NZS 60065: 2012 and EMC standards of Australia.

# Optical transmitter OTF302

## Product description

The optical transmitter OTF302 is intended to convert wideband SAT IF and DTT, FM, DAB to optical signals for future distribution through a fibre optic.

The transmitter is compatible with ORF302, ORD301F, ORQ302 and etc. optical receivers.

## External view of OTF302

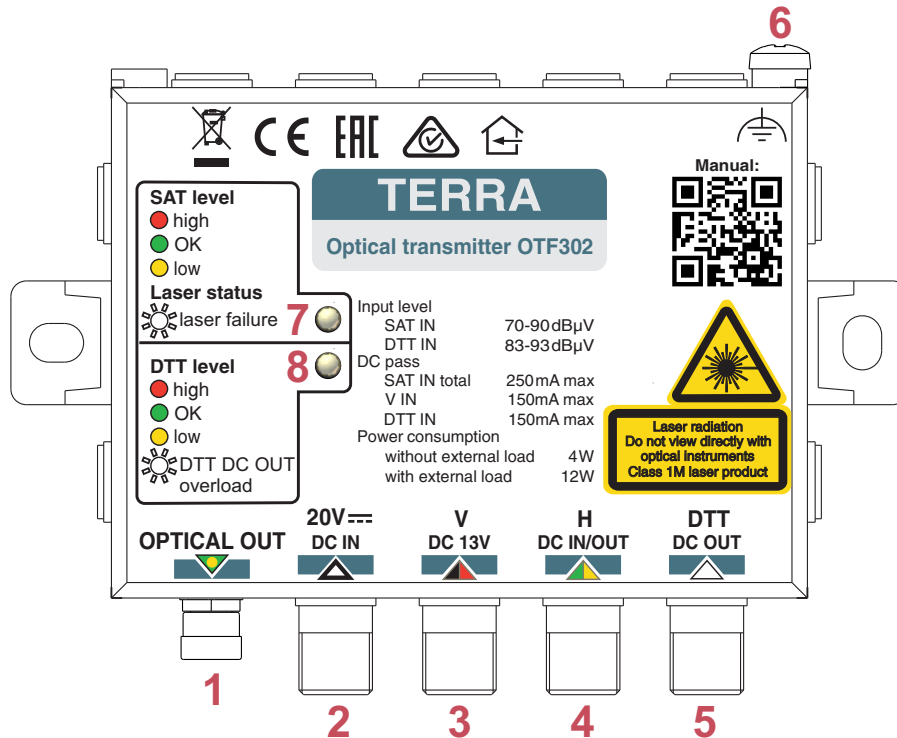



Figure 2. External view of the transmitter

1. **OPTICAL OUT** - optical output connector.
2. **DC IN** - +20 V DC powering input and communication port with PC102W. F socket.
3. **V, DC 13V** - SAT IF vertical polarization input, 13 V 150 mA DC output. F socket.
4. **H, DC IN/OUT**- SAT IF horizontal polarization input, DC input/output. F socket.
5. **DTT, DC OUT** - DTT input from MCA101x, DC output. F socket.
6. Functional grounding clamp
7. SAT input level and laser status indicator:
  - red – to high
  - green – correct (AGC range)
  - yellow – to low
  - Blinking any color - laser aging or failure.
8. DTT input level and DTT DC output status indicator:
  - red – to high
  - green – correct (AGC range)
  - yellow – to low
  - Blinking any color - DTT DC output overload.

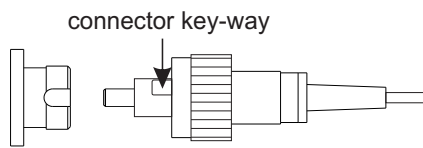
## REQUIREMENTS FOR EXTERNAL POWER SUPPLY UNIT (PSU)

- Output voltage 20 V
- Output current recommended to use PSU with 50% extra power reserve
- Ripple at single and/or double mains frequency < 10 mV p-p
- Ripple & noise < 200 mV p-p
- Short circuit protection
- Double insulated (marked )
- Meet EN 55022 class B conducted emissions requirements, measuring with grounded load

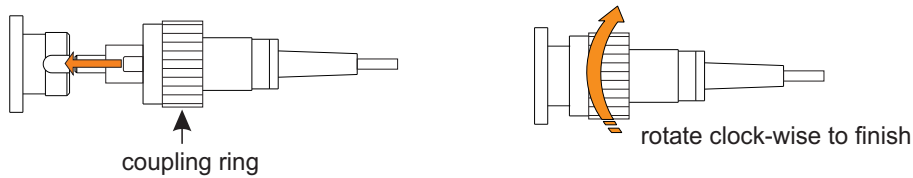
## Optical connections

**Note:** All optical connectors and adaptors should be cleaned before connecting them.  
If optical reception power of the receiver decrease, fiber connection should be cleaned and maintained.  
Fiber connectors should never be left uncovered.

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



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



3. Do not exceed the minimum bending radius of fibers: must be not less 30 mm when connecting optic cable to the system.

## Installation instructions

Read the safety instruction first.

The unit is dedicated for indoor installation and shall not be exposed to dripping or splashing water.

For outdoor installation use appropriate box. We recommend to put this box in shadow of the SAT dish to protect from direct sun radiation.

The laser is highly sensitive to overheating.

## Technical specifications

Type	OTF302
Wideband inputs	
Frequency range	2 x (290-2350) MHz
RF input level (AGC range) for 60 transponders	70-90 dB $\mu$ V (per carrier)
LNB remote feeding	13 V via V input - 150 mA max, 20 V via H input, 250 mA max. total
DTT input	
System frequency range**	87.5-240 / 470-790 MHz
RF input level***	83 dB $\mu$ V / 83-93 dB $\mu$ V (per carrier)
Remote feeding	19 V 150 mA max.
Optical output****	
General	
Input return loss / impedance	> 12 dB / 75 $\Omega$
Supply voltage	20 V
Power consumption*	4 W max.
Operating temperature range	-20° C ÷ + 40° C
Dimensions/Weight (packed)	116x84x25.5 mm/0.28 kg

\* without remote feeding

\*\* the set with MCA101x

\*\*\* FM level the same like DTT, DAB level 12 dB below

****	Type	Power	Laser	Wavelength	Connector IN
	<b>OTF302 3C55 E</b>	3 dBm min	DFB	1550 nm $\pm$ 3 nm	FC/UPC
	<b>OTF302 6F31 E</b>	6 dBm	FP	1310 nm	FC/UPC
	<b>OTF302 6F55 E</b>	6 dBm	FP	1550 nm	FC/UPC

Remotely monitored parameters by PC102W:

- DC voltages on V,H and DTT inputs
- internal temperature
- laser status
- V polarity input RF power per channel (average)
- DTT input UHF RF power per channel (average)

Parameters of connected MCA101x:

- supply voltage
- internal temperature
- UHF input RF power per channel (average)
- number of UHF channels


When the MCA101x rotary switch is set to position "0", the number of DTT channels in the UHF band can be set remotely.

See [www.terraelectronics.com](http://www.terraelectronics.com).

## DTT processing units MCA101T, MCA101L

### Product description

Masthead DTT processing units MCA101L, MCA101T are intended for operation with optical transmitter OTF302. The units are converting UHF DTT channels and through pass FM and DAB signals.

Built-in LTE 700/800 suppression filter .

The units can be used in outdoor conditions as well.

### External view of MCA101L, MCA101T

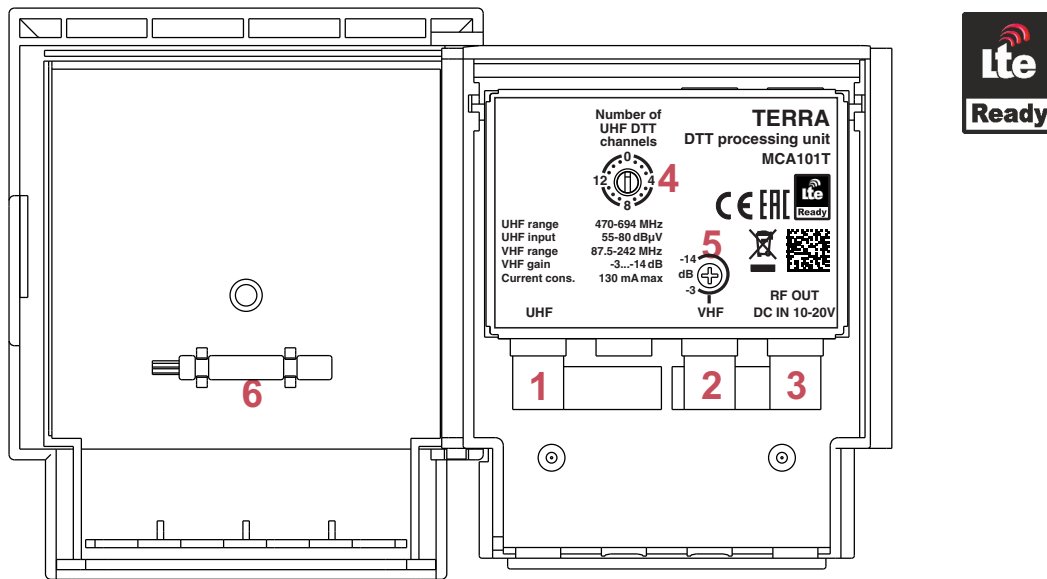


Figure 3. External view of the units

## INSTALLATION INSTRUCTIONS

Read the safety instruction first.



For outdoor installation.

The length of the cable between MCA101x and OTF302 must be less than 20 m of RG6U type.

Set the number of DTT channels in UHF band with rotary switch (pos. 4, Figure 3) before fitting unit on mounting place. Good equalization of UHF DTT channels improve system performance. Set using regulator 5 (see Figure 3) DAB and FM signals level on OTF302 input precisely.

**NOTE:** The number of DTT channels in the UHF band can be set remotely (rotary switch position "0"). Details see in OTF302 and PC102W user manuals [www.terraelectronics.com](http://www.terraelectronics.com).

## Technical characteristics

Type	MCA101T	MCA101L
RF inputs		
VHF gain / input level	87.5-240 MHz	-3...-14 dB adjustable, passive min. 86 dB $\mu$ V, max. 97 dB $\mu$ V**
UHF input level	470-694 MHz	55-80 dB $\mu$ V* 
	470-790 MHz	- 55-80 dB $\mu$ V* 
UHF noise figure	< 5 dB	
UHF AGC range	25 dB	
RF output		
Output level UHF, AGC range, 8 DTT channels	93 dB $\mu$ V	
General		
Return loss / impedance	> 10 dB / 75 $\Omega$	
Supply voltage	10 - 20 V	
Current consumption	130 mA max.	
Operating temperature range	-20° ÷ +50° C	
Dimensions/Weight (packed)	89x107x432 mm/0.18 kg	

\* AGC range

\*\* see requirements for OTF302 DTT input

The units have communication channel with optical transmitter OTF302 for parameters monitoring by PC102W programmer.

Remotely monitored parameters are:

- supply voltage
- internal temperature
- UHF input RF power per channel (average)
- number of UHF channels set by rotary switch if it is not in position "0". If rotary switch is in position "0", it is seen value, remotely set by PC102W and it is possible to change it.

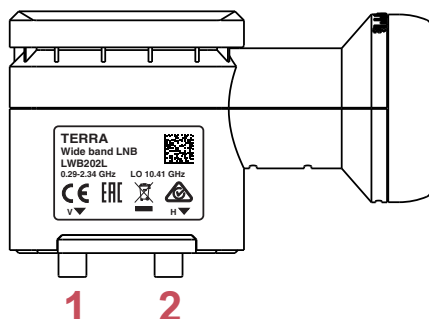
See [www.terraelectronics.com](http://www.terraelectronics.com).

# Wideband LNB LWB201L, LWB202L

## Product description

Wideband 40 mm low noise down converter units LWB201L, LWB202L are dedicated for operation with OTF302 optical transmitter.

## External view of LWB201L, LWB202L



1. V - SAT IF V polarization output, DC input
2. H - SAT IF H polarization output, DC input

Figure 4. External view of the wideband LNB

## INSTALLATION INSTRUCTIONS

Read the safety instruction first.

For outdoor installation.

The length of the cable between LWB201L, LWB202L and OTF302 must be less than 10 m of RG6U type.

We recommend to use relatively bigger dishes for ensure better MER value of the transmitted signals.

## Technical characteristics

Type	LWB201L	LWB202L
Input frequency range	10.7 - 12.75 GHz	
Noise figure	0.7 dB typical, 1.0 dB max.	
LO frequency	10.4 GHz	10.41 GHz
LO initial accuracy	± 500 kHz	
LO temperature drift	± 250 kHz	
LO phase noise	< - 75 dBc/Hz @ 10 kHz	
Conversion gain, typical	55 dB	
Gain variation full band	4 dB max.	
Gain variation over 27 MHz	± 0.5 dB	
Image rejection	40 dB min	
Cross-pol isolation, typical	22 dB	
Output impedance/return loss	75 Ω / 12 dB	
Output frequency range	300-2350 MHz	290-2340 MHz
General		
Supply voltage	10 - 20 V	
Current consumption	20 V 0.1 A	
Power consumption	2 W max.	
Operating temperature range	-30° C ÷ + 60° C	
Dimensions/Weight (packed)	141x89x63 mm / 0.35 kg	