

## Product description

Programmable multiband amplifiers with digital filtering are designed to amplify DTT signals in the VHF and UHF bands and FM radio signals. These amplifiers have up to 20 programmable high selectivity digital filters for DTT with a wide individual AGC range and can be programmed to filter any VHF (170 ... 230 MHz), UHF (470 ... 694 MHz) channel.

The amplifiers are also characterized by easy installation, a wide input level range, high selectivity, low power consumption, high output level, output test point and LED indication (see Installation section). Each of the 20 filters allows to balance adjacent channels due to high selectivity. Channels are automatically aligned according to the programmed UHF output level and equalizer value. VHF channels will be adjusted according to the programmed UHF output level, the FM input has a programmable gain control. DC power is provided through certain DTT inputs (switchable), see Specification.

The series consist of:

PA420T has 3 DTT inputs (2xVHF/UHF and 1xUHF) with 5G LTE filtering and 1 FM input. It has its own power supply.

PA321T has 2 DTT inputs (VHF/UHF) with 5G LTE filtering and 1 FM input. It has two powering modes:

- via DC IN (DC jack) from external 12 V DC power supply;
- via RF output from suitable receiver or 12 V DC power supply using power inserter.

The housing of amplifiers meets more stringent screening requirements according to EN50083-2, class A.

The amplifiers are intended for indoor use only.

## Safety instructions

Installation of the amplifiers must be done according to IEC60728-11 and national safety standards.

The amplifier PA420T is powered from mains 230 V~. This voltage is dangerous to life.

The amplifier PA420T is double isolated from the mains 230 V~.

The amplifier PA321TP is powered from the external stabilized power supply +12 V DC. This voltage is not dangerous to life.

Any repairs must be done by skilled personnel.

Do not remove the cover of the power supply section, without disconnecting the unit from the mains supply.

Do not plug the amplifier into the mains supply if the power cord or plug is damaged.

Do not plug the amplifier into the mains supply until all cables have been connected correctly.

The mains socket must be easily accessible.

The amplifier shall not be exposed to dripping or splashing water.

Avoid placing amplifier next to central heating components, near highly combustible materials and in areas of high humidity.

If the amplifier has been kept in cold conditions for a long time, keep it in a warm room no less than 2 hours before plugging it into the mains.

Do not insert any objects into ventilation openings.

The ventilation should not be impeded by covering the amplifier with items, such as newspapers, table-cloths, curtains.

Mount the amplifier on not flammable wall or in not flammable installation box in vertical position with power supply unit on the right side. Mount in locations where children not likely to be present.

From top, front and bottom of installed amplifier must be at least 10 cm free space.

## MONTAGE VIEW

Mount the amplifier on the vertical position with power supply unit on the right side. The amplifier must be fixed with steel screws Ø 4-5 mm. The screws are not included in a package.

## IMPORTANT WARNINGS!

Before connecting any products to a system, it is essential to make sure the **system power supply is switched off**. Avoid short-circuit or overload of any power supply. Never "HOT-SWAP" any system components as this may result in damage to the newly introduced or existing components.

Scan for downloading TERRnet App  
from Google Play:



Manual in .pdf



## External view of amplifier PA420T

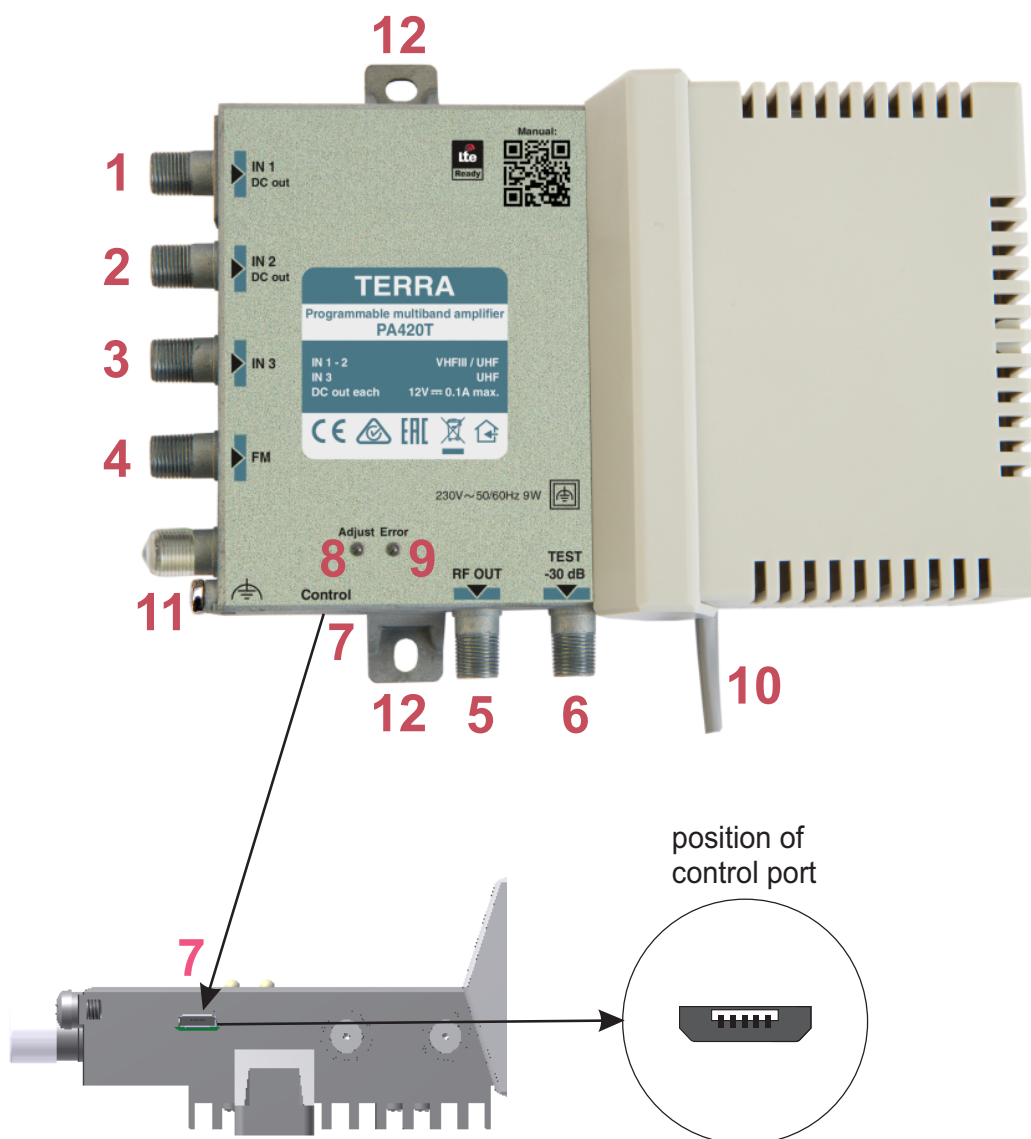


Figure 1. External view of the amplifier PA420T

- 1 - IN 1 / DC out - VHF / UHF input 1, DC output. F type.
- 2 - IN 2 / DC out - VHF / UHF input 2, DC output. F type.
- 3 - IN 3 - UHF input. F type.
- 4 - FM - FM input. F type.
- 5 - RF OUT - RF signal output connector (combined DTT and FM inputs). F type.
- 6 - TEST -30 dB - RF output signal test point. F type.
- 7 - Control - programming port.
- 8 - Adjust - adjust LED (green)
- 9 - Error - error LED (red)
- 10 - power cord
- 11 - functional ground clamp
- 12 - mounting supports

## External view of amplifier PA321TP

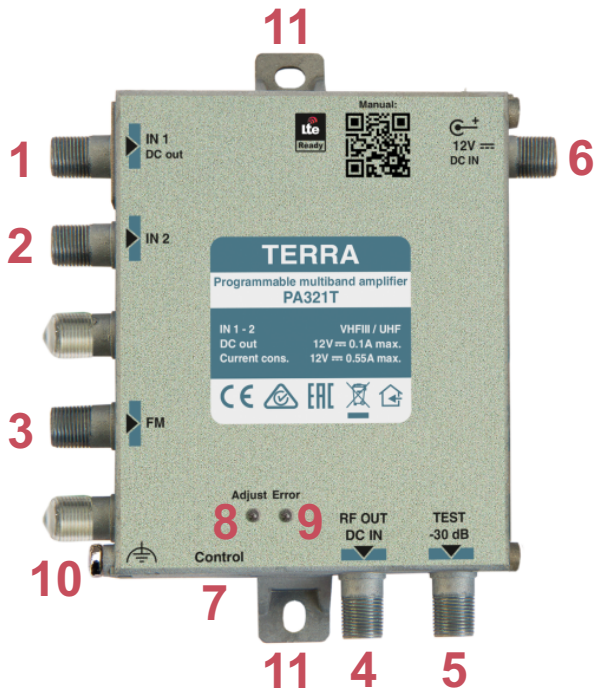


Figure 2. External view of the amplifier PA321TP


### The power supply unit 12 V DC SYS1381N-1212-W2E:

3.5 mm/1.3 mm DC jack;

The power supply is supplied with the amplifier.



### Requirements for external power supply unit (PSU)

- Output voltage 12 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

- 1 - IN 1 / DC out - VHF / UHF input 1, DC output. F type.
- 2 - IN 2 - VHF / UHF input 2. F type.
- 3 - FM - FM input. F type.
- 4 - RF OUT / DC IN - RF signal output connector (combined DTT and FM inputs) / DC IN. F type.
- 5 - TEST -30 dB - RF output signal test point. F type.
- 6 - DC IN 12V - DC entry 3.5/1.3 mm. DC jack.
- 7 - Control - programming input.
- 8 - Adjust - adjust LED (green)
- 9 - Error - error LED (red)
- 10 - functional ground clamp
- 11 - mounting supports

## Installation and configuration instructions

Read the safety instruction first.

Fit amplifier on mounting place and connect all necessary RF cables, connect 75  $\Omega$  loads to the unused F sockets, power on amplifier. Adjust (green) and Error (red) LED's blinking simultaneously briefly. Adjust LED light up after that.

All configurations will be made with TERRnet App (see TERRnet App).

Connect Windows PC or Android smartphone to the amplifier.

Select the necessary country (channels chart).

Select the necessary channels, output level, equalizer, FM gain and send it to the device.

Input channels numbers can't be the same in different inputs.

Don't select empty channels.

Reduce output level if use more than 6 MUX (see Technical characteristics).

Keep FM max output level 10 dB less than DTT signals.

During the parameters sending Adjust LED blinking (green). Error LED blinking (red) if the input level is too low or too high for at least one selected channel.






## Software update

Download the new software version to Windows PC. Connect the amplifier to the PC (see TERRnet App). Remove the plastic cap from the “F” connector nearest to the “Control” connector. Connect 75 Ω load to it. Power amplifier. Copy the new software file to the appeared disk in the file browser. Remove 75 Ω load and reconnect power.

## Recommended accessories:

1. Power supply [SYS1381N-1212-W2E](#) (12 V 1 A) (for PA321T).
2. Power inserter [PI018](#) (for PA321T).
3. OTG cable.

## Technical characteristics





Type		PA420T
<b>RF inputs</b>		
Frequency range	FM	87-108 MHz
	2xVHFIII/UHF1	174-240 MHz / 470-694 MHz
	UHF	470-694 MHz
RF input level	FM	69-89 dBμV
	VHF/UHF	50-100 dBμV
Gain	FM	29 dB
	VHF/UHF	63 dB max.
Noise figure		7 dB
AGC	VHF/UHF	46 dB in each filter
Slope adjustment	FM	-
	VHFIII/DAB/UHF 	5 dB
Selectivity	VHF/UHF ±1 MHz	> 30 dB
	FM ±20 MHz	> 20 dB
LTE		5G
Number of channels		20 max.
Number of filters		20 max.
<b>RF output</b>		
Output level	FM	106 dBμV max.
	UHF	113 dBμV max. (1 - 6 MUX)
		110 dBμV max. (7 - 12 MUX)
		109 dBμV max. (13 - 16 MUX)
RF output adjustment 	VHF/UHF each channel	108 dBμV max. (17 - 20 MUX)
		3 dB less than UHF
	FM	0 ÷ -20 dB
RF test	VHF/UHF common	0 ÷ -20 dB
	VHF/UHF each channel	± 3 dB
Powering		30 dB
DC feeding for external	VHFIII/UHF1 	12 V 100 mA per input, OFF/ON
	VHFIII/UHF2 	
Power consumption		230 V~ 50/60 Hz 6 W**
<b>General</b>		
Return loss		> 10 dB
Operating temperature		-20° C ÷ +50° C
Dimensions/Weight (packed)		192x147x55 mm/0.66 kg

\* programming from Android device via OTG cable, this cable is sold separately

\*\* without external DC load, with maximal external DC load - 9 W

 software control

## Technical characteristics

Type		PA321TP
<b>RF inputs</b>		
Frequency range	FM	87-108 MHz
	2xVHFIII/UHF1	174-240 MHz / 470-694 MHz
RF input level	FM	69-89 dBμV
	VHF/UHF	50-100 dBμV
Gain	FM	29 dB
	VHF/UHF	63 dB max.
Noise figure		7 dB
AGC	VHF/UHF	46 dB in each filter
Slope adjustment	FM	-
	VHFIII/UHF 	5 dB
Selectivity	VHF/UHF ±1 MHz	> 30 dB
	FM ±20 MHz	> 20 dB
LTE		5G
Number of UHF channels		20 max.
Number of filters		20 max.
<b>RF output</b>		
Output level	FM	106 dBμV max.
	UHF	113 dBμV max. (1 - 6 MUX)
		110 dBμV max. (7 - 12 MUX)
		109 dBμV max. (13 - 16 MUX)
		108 dBμV max. (17 - 20 MUX)
RF output adjustment 	VHF	3 dB less than UHF
	FM	0 ÷ -20 dB
	VHF/UHF common	0 ÷ -20 dB
	VHF/UHF each channel	± 3 dB
RF test		30 dB
<b>Powering***</b>		
DC feeding for external	VHFIII/UHF1 	12 V 100 mA per input, OFF/ON
Supply voltage	via 3.5/1.3 mm DC jack	12 ± 1 V
	via RF output	12 ± 1 V
Current consumption		12 V 450 mA****
<b>General</b>		
Return loss		> 10 dB
Operating temperature		-20° C ÷ +50° C
Dimensions/Weight (packed)		100x147x55 mm/0.54 kg

\* power inserter is sold separately

\*\* programming from Android device via OTG cable, this cable is sold separately

\*\*\* PA321TP is packed with external power supply SYS1381N-1212-W2E

\*\*\*\* without external DC load, with maximal external DC load - 0.55 A max.

 software control



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.



Equipment is double insulated from the mains, with functional earthing.



Functional earthing. Connect to the main potential equalization.



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



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