



Unify Pro32 Nano

TBS · Analog 5.8 GHz video transmitter (VTX)
version V1.1 · 25-600 mW · user manual



Read the entire manual before installation. Never power the transmitter without an antenna connected. Set the frequency and power according to the regulations of the country of use - in the Czech Republic max. 25 mW in the 5725-5875 MHz band without a licence.

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1. Safety instructions and warnings

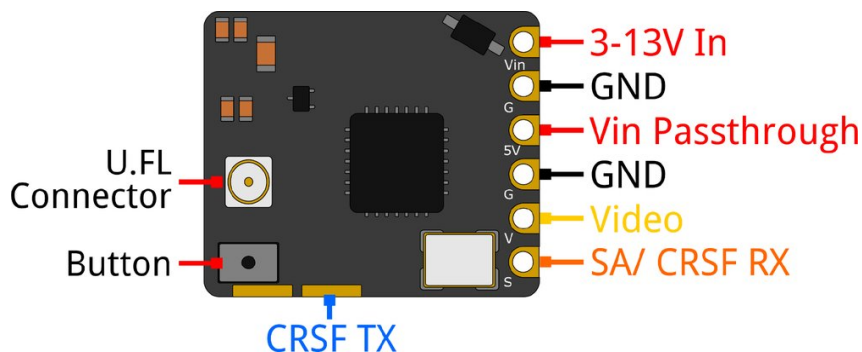
This video transmitter can transmit radio frequencies and output power that may not be allowed in your country. Always set the frequency and output power according to your local RF legislation (for the Czech Republic see Chapter 5.2).

- A general rule for RC aircraft is that they must always be controlled within line of sight. Check the current RC and drone regulations in your country to stay up to date.
- Never power the video transmitter (VTX) without an antenna connected – this may damage the transmitter's output stage.
- The transmitter heats up during operation. Ensure adequate heat dissipation (Chapter 3.1) and do not touch it immediately after use.
- Isolate the contacts of the transmitter against the carbon frame – carbon is electrically conductive and may cause a short circuit.
- Observe the supply voltage range of 3–13 V (1S–3S LiPo). When operating close to 13 V, use proper filtering – any voltage spike will damage the transmitter.
- The button on the transmitter is very fragile. Do not operate it with hard and pointy objects (e.g. needles) – this may cause permanent damage. We suggest using the SmartAudio or CRSF interface to change settings.
- Solder and connect wires only with the power disconnected. Do not solder with temperatures higher than 350 °C for more than 3–5 s.
- This product is not a toy. Keep out of the reach of children.

If you have any questions after reading this manual, visit the manufacturer's **TBS FAQ** section.

2. Product description

The **TBS Unify Pro32 Nano V1.1** is an ultra-tiny analog 5.8 GHz video transmitter (VTX) by Team BlackSheep (TBS). It is a successor to the most popular line of video transmitters (TBS Unify Pro) – the robustness has been improved, the size and power consumption decreased, new features added and the way it is installed in your multirotor perfected.



TBS Unify Pro32 Nano – pinout (see the table in Chapter 3.3)

2.1 Key features

- Power to Channel calibration for each channel – extremely consistent output power.
- 25 mW unrestricted; more power is available but requires a HAM license and unlocking (Chapter 4.4).
- One button frequency and power setup.
- OSD configuration using TBS SmartAudio 2.1 (via flight controller (FC) or TBS Crossfire / Tracer receiver).
- LUA support for CRSF users.
- U.FL antenna connector.
- 1S–3S LiPo input, improved noise filtering, optimized heat dissipation.
- Control by PWM channel and by barcodes.

2.2 Specifications

Parameter	Value
Input voltage	1S-3S LiPo / 3–13 V
Power output	pass-through: input voltage via LC filter (output voltage follows input voltage)
Output power	14 dBm (25 mW) 20 dBm (100 mW) * 26 dBm (400 mW) * 28 dBm (600 mW) * (Rev 1.1)
Frequency range	5645–5945 MHz (depending on the selected channel, see Chapter 5.1)
Channels	bands A, B, E, Airwave, Race Band, 8 channels each
Control protocols	SmartAudio V2.1, CRSF, PWM
Extra features	CleanSwitch, PITMode (incl. support for team racing), full CRSF capability (serial commands for external control), barcode reading
Power consumption	25 mW: 210 mA 400 mW: 390 mA
Range (manufacturer's data)	2 km (omni)
Audio	no
Antenna connector	u.FL high strength
Port connector	through-holes, 2 mm pitch
Dimensions	14.5 × 13 × 3 mm (L × W × H)
Weight	1 g
Firmware upgrade	no

* Requires a HAM license and a special unlocking procedure (Chapter 4.4).

2.3 Kit contents

- 1× TBS Unify Pro32 Nano video transmitter
- 1× u.FL antenna
- 1× set of silicone cables (pre-tinned)

※ Camera, flight controller (FC), receiver and flight battery are **not included**.

3. Installation

3.1 Mounting and cooling

When installing the transmitter, please ensure adequate airflow and – most importantly – heat transfer. Mounting it with some pressure against a flat piece of carbon will give you the best results. Make sure to isolate the contacts of the transmitter against the carbon to avoid short circuits.

Proper mounting will allow the video transmitter to run for extended periods of time while sitting on the ground and without reducing output power. The TBS Unify Pro32 automatically reduces output power before it reaches critical heat levels (the temperature limit can be set in the menu, Chapter 4.3).

3.2 Installation notes

- Please take care when soldering to the tabs; do not solder with temperatures higher than **350 °C** for more than **3-5 s**.
- For remote control of the VTX channels we suggest using the SmartAudio or CRSF interface. The tactile button is very fragile – do not use hard and pointy objects such as needles to change channels to prevent permanent damage to the button.
- If you plan to use the VTX on 13 V, make sure to use proper filtering, as any voltage spike will damage it.

3.3 Pinout

The TBS Unify Pro32 Nano comes with pre-installed silicone wires for easy installation in your build. It has a filtered 3–13 V input with a pass-through output for your camera or other devices.

Pin	Board marking	Function
3-13V In	Vin	power input 3–13 V
GND	G	ground
Vin Passthrough	5V	pass-through power output for the camera (follows input voltage)
GND	G	ground
Video	V	video input from the camera
SA / CRSF RX	S	SmartAudio / CRSF RX / PWM
CRSF TX	pad on the board edge	CRSF TX
U.FL Connector	–	u.FL antenna connector
Button	–	menu button

4. Button menu control

4.1 Menu structure

The menu consists of categories and settings. To enter the menu, hold the button for **3 s**. Pressing the button for 3 s toggles between categories, pressing it for a short time toggles between settings. LED colors signal the state of the menu.

- Order of categories: channel → band → power → temperature limit → PIT Mode → protocol.
- Hold the button for **5 s** (3 s in the Protocol category) to save the selected value and return to regular operation.
- Pressing the button during power-up toggles the PIT Mode flag and saves the settings (Chapter 7.1).
- If PIT Mode is enabled, holding the button for 5 s during operation sets the output power to the last known value.
- In the band select menu, holding the button for 30 s toggles the VTX lock (Chapter 4.4).

4.2 LED signals

The transmitter signals the selected channel, band and power level using a startup sequence of LED codes. The same sequence is also repeated in the menu. First, the **red LED** flashes to indicate the item being shown – one flash for the channel, two flashes for the band, three flashes for the power level. Subsequently, the **blue LED** indicates the value.

Red LED	indicates the item – channel, band or power setting
Blue LED	indicates the value

4.3 Menu table

Red	Category	Blue 1×	2×	3×	4×	5×	6×
1×	Channel	1	2	3	4	5	6
2×	Band	A	B	E	Airwave	Race	
3×	Power level	25 mW	100 mW	400 mW	MAX		
4×	Temperature limit	60	70	80	90	100	105
5×	PIT Mode	OFF	IN-BAND				
6×	Protocol	OFF	CRSF	SA	PWM		

The channel has 8 values (blue LED 7× = channel 7, 8× = channel 8). Factory default settings are shown in **bold**. MAX is the highest power level of the transmitter – 28 dBm (600 mW) for Rev 1.1. Power levels of 100 mW and above require unlocking (Chapter 4.4).

4.4 Unlock and power select mode (for HAM users only)

Unlocking is intended exclusively for holders of an amateur radio (HAM) license.

- ① Go to the band select menu (unlock only works inside the band selection menu).
- ② Press the button for about **30 s**. The red LED will flash 3 times to confirm – the video transmitter is unlocked for use with all frequencies (Chapter 5.1).
- ③ The power select mode is now accessible; select the power level according to the menu table.
- ④ To lock the transmitter, return to the band select menu and press the button again for 20–25 s.

5. Channels and frequencies

5.1 Channel / band - frequency table

Ch. (MHz)	1	2	3	4	5	6	7	8
Band A	5865	5845	5825	5805	5785	5765	5745	5725*
Band B	5733	5752	5771	5790	5809	5828	5847	5866
Band E	5705*	5685*	5665*	5645**	5885*	5905*	5925**	5945**
Airwave	5740	5760	5780	5800	5820	5840	5860	5880*
Race Band	5658*	5695*	5732*	5769	5806	5843	5880*	5917*

* HAM license required to operate legally (manufacturer's data).

** Only on special request (custom firmware for large events with prior legal body approval).

The video transmitter ensures that you cannot select illegal channels or power levels by accident:

- When controlled by the push button, you need to confirm having a HAM license by unlocking the video transmitter as described in Chapter 4.4.
- Through the TBS CORE PRO OSD, you are required to enter your HAM license number under the *Callsign* menu before you can access the high-power transmission settings and the locked-out channels.

5.2 Permitted frequencies and power levels in the Czech Republic

Permitted bands and maximum power levels differ between countries. The information below applies to the Czech Republic; in another country, you must follow the regulations of the country of use. The user is responsible for the frequency and power setting.

Operation	Band	Conditions
without a licence (CTU general authorisation VO-R/10)	5725–5875 MHz	max. 25 mW e.i.r.p.
radio amateur with a valid licence (Decree No. 156/2005 Coll.)	5650–5850 MHz	power according to the licence class; from an aircraft: /am suffix and operator's consent

- Without a licence: only **25 mW** (e.i.r.p., i.e. including antenna gain) and channels within 5725–5875 MHz.
- 100, 400 and 600 mW only for licensed radio amateurs and only within 5650–5850 MHz; other channels are not permitted.

6. Remote control of the transmitter

6.1 Control by flight controllers (SmartAudio)

Using any SmartAudio V2.1-compatible flight controller (FC), simply connect the SmartAudio data pin (S) to a free and supported port on your FC (for the pinout see Chapter 3.3).

For Betaflight users, you can then configure the connected port in the Betaflight Configurator to the *SmartAudio* protocol. Ideally, use a Betaflight firmware that supports the new SmartAudio V2.1 rather than the older SA 2.0 – this way, you get access to the new power levels of SA 2.1. Newer Betaflight versions require you to add the VTX table. You can download the VTX tables for all TBS Unify VTXs [here](#).

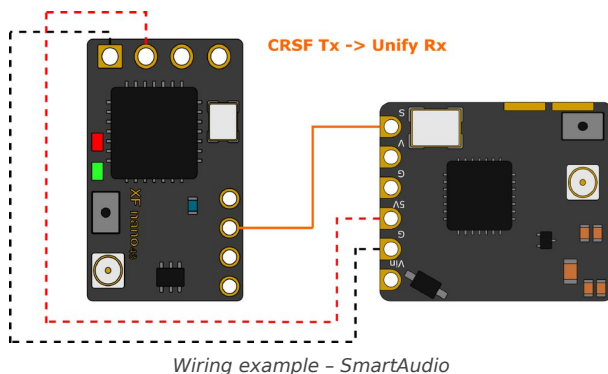
6.2 Control by Crossfire / Tracer direct connection

Your TBS Crossfire / Tracer can control the transmitter directly without needing an FC. This is helpful when you don't have an FC in your aircraft, have no free UART left, or just don't want any extra setup. Visit the Crossfire or Tracer manuals for details on how to set them up.

► 6.2.1 Crossfire / Tracer connection using SmartAudio

You can connect the transmitter to any Crossfire / Tracer receiver. The VTX will then be controlled by Agent Lite in the *Video TX* menu or in the VTX menu of the receiver:

- ① Set the transmitter to SmartAudio by the button.
- ② Select a free receiver output pin capable of SA.
- ③ Connect them (Crossfire / Tracer SA TX to the VTX RX / SmartAudio pad).

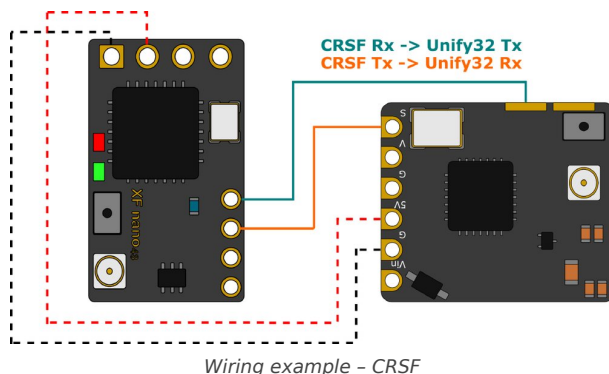


Now you can control the transmitter using the *VideoTx* menu or the VTX menu of the receiver, e.g. by Agent Lite.

► 6.2.2 Crossfire / Tracer connection using CRSF

All Unify Pro32 transmitters have a full serial interface with extended functionality compared to SmartAudio, which is just a one-wire protocol.

- ① Set the transmitter to CRSF by the button.
- ② Select a free receiver output pin pair capable of CRSF.
- ③ Connect them: receiver CRSF TX → VTX RX (S pad), receiver CRSF RX → VTX TX (CRSF TX pad).



Now you can control the transmitter by the *My VTX* menu or by its device menu, e.g. in Agent Lite.

► 6.2.3 SmartAudio or CRSF for the VTX?

Both protocols have their advantages and disadvantages:

- **SmartAudio** – single wire connection; saves one PWM output (useful on a wing).
- **CRSF** – fully configurable by LUA, FUSION, AGENT M Web, etc.; CRSF readout lets you use PITMode on a switch or navigate through the Unify EVO OSD without the need for an FC, link stats readout with the Unify EVO OSD.

► 6.2.4 Button not working

When the transmitter detects a signal on the RX pad, it will disable the button. To change the VTX to CRSF or SA, you can unsolder the wire or force your Crossfire / Tracer RX not to output any signal:

- ① Set the output of the Tracer RX to CH X (PWM) for the pin the VTX is connected to.
- ② Shut down the Tracer TX and RX.
- ③ Power up just the drone with the Tracer RX and the Unify Pro32.
- ④ Change the transmitter settings by the button.
- ⑤ Turn the radio transmitter back on.
- ⑥ Set the output map back to CRSF or SmartAudio.

If you have set up everything correctly, you should see the Unify32 in the LUA script, the Tango device menu or on the Crossfire OLED display (a sufficiently recent Crossfire firmware is required).

6.3 Control by PWM channel

This simplified method uses a single channel of your radio as a button to modify the VTX channel. Depending on the radio, you may need to reverse the channel output. Connect the PWM output from your receiver to the SmartAudio / CRSF RX pin (S). The operations are as follows:

- short push – increase the channel,
- long push (> 3 s) – increase the band,
- longer push (> 5 s) – reset the VTX channel to A1.

6.4 Barcode control

The video transmitter can be controlled via barcodes through your camera. Holding the barcode in front of your camera enables PITMode and sets up the video transmitter. You can simply carry your favorite channel in your pocket or backpack and revert to that channel easily and quickly. The Nano32 supports barcode reading since HW version 1.1.

- PDF barcode catalog:
<http://www.team-blacksheep.com/tbs-vtx-barcodes.pdf>
- Barcode generators:
<https://noahwaldner.ch/en/tbs-barcode-generator/>,
<https://apocalypse.github.io/UnifyEvoBarcodeGenerator/>
- Raw .json file:
<http://firmware.team-blacksheep.com/barcodes>

7. Features and technology

7.1 PITMode

PITMode is a mode where the video transmitter only runs on incredibly low output power. This prevents interference with others at events while still allowing a minimum of visibility for emergency last-minute setting changes.

Activate	press the button during power-up or use SmartAudio V2.1; the LED flashes red when enabled
Deactivate	press the button for 5 s during runtime or use SmartAudio V2.1
PIT mode → flight mode	on-board button, SmartAudio 2.1 or CRSF command

With the TBS Unify Pro32 line, PITMode has been slightly modified in behavior: the button is used to toggle the PITMode flag at power-up, and SmartAudio / CRSF can modify this flag as well. SmartAudio can also enter PITMode during runtime using the power setting 0 mW, which will not modify the flag (the VTX will never power up at the 0 mW power setting). To leave PITMode during operation, simply set your desired power setting using SmartAudio, CRSF or the button menu.

7.2 SmartAudio 2.1

SmartAudio is a protocol developed by TBS for OSD to VTX communication. It is a single-wire UART protocol running over the (audio) wire. All newer generation OSDs at TBS, all Unify Pro series VTXs and all modern flight controllers support SmartAudio.

With the Unify Pro32 line, TBS launched SmartAudio V2.1. Over the regular SmartAudio, it changed control for PITMode in operation to a switch (on / off) rather than a flag that is refreshed on reboot. Protocol specification: [SmartAudio](#), manufacturer support: team-blacksheep.freshdesk.com.

7.3 CRSF

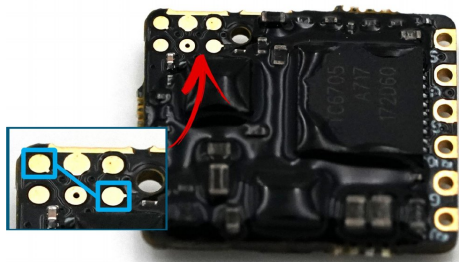
CRSF is a protocol designed by Team BlackSheep and championed through the TBS Crossfire remote control system. It is an incredibly high bandwidth (low latency), full-duplex serial data transmission protocol integrated into the most popular radios. It has native functionality such as OTA (over-the-air) firmware upgrades, localized configuration menus and a smart routing protocol. The channel, output power and PITMode settings of the transmitter can be configured via CRSF.

7.4 CleanSwitch

When video transmitters power up or change frequency, they usually send a burst across the entire band which disturbs fellow pilots. All Unify Pro32 5G8 video transmitters remain at their lowest power output (less than 0.1 mW) while changing channels and powering up. This ensures interruption-free racing, even with multiple video transmitters changing channels or powering up.

7.5 Firmware and bootloader mode

The firmware of the Unify Pro32 Nano cannot be updated (it has no USB port). In rare cases, forcing the device into bootloader mode can be required – by bridging 2 pads on the unit and then powering up. It is not required for regular operation.



Bootloader pads (marked in blue)

8. Information for the EU and Czech Market

8.1 Importer and responsible person in the EU

The product is placed on the European Union market by the importer stated below, who is at the same time the responsible person within the meaning of Article 16 of Regulation (EU) 2023/988 of the European Parliament and of the Council on general product safety (GPSR).

Importer / responsible person in the EU	Rotorama, s.r.o.
Company ID (IČO)	051 57 692
VAT ID (DIČ)	CZ05157692
Registered office	Okrajová 1351, 674 01 Třebíč, Czech Republic
E-mail	info@rotorاما.cz
Phone	+420 252 252 098
Website	www.rotorاما.com

8.2 Product conformity



- The product bears the **CE** marking and complies with the requirements of the applicable European Union harmonisation legislation.
- A copy of the **EU Declaration of Conformity** is available from the importer at the address stated above or at the e-mail address info@rotorاما.cz.
- **Product identification:** the type designation **TBS Unify Pro32 Nano V1.1** is given on the sales receipt.

8.3 Disposal of electrical equipment



- The crossed-out wheeled bin symbol on the product, its packaging or in the documentation means that at the end of its service life the product **must not be disposed of together with mixed municipal waste**.
- Hand it over at a take-back point for electrical equipment – at a collection yard, at a take-back point of a collective system, or at the retailer when purchasing a new equivalent product. Take-back is free of charge for the end user.
- The obligations under Act No. 542/2020 Coll., on end-of-life products, are fulfilled by the importer through a collective take-back system.
- Proper disposal helps prevent negative impacts on the environment and human health and contributes to the reuse of secondary raw materials.

Through its contractual partner **ASEKOL a.s.**, the company ensures the take-back of waste electrical equipment from households and the separate collection of waste electrical equipment, batteries and accumulators in accordance with the applicable legislation. The customer is entitled to hand over old electrical equipment or a battery or accumulator at any collection point of the above contractual partner. The addresses of these take-back points are listed at www.asekol.cz, www.ecobat.cz and also <https://visoh2.mzp.cz/RegistrMistZO/RegistrMistZOPublic/MapaMistZpetOdberu>.

9. Warranty and rights arising from defective performance

The rights and obligations of the contracting parties are governed by Czech law, in particular by Act No. 89/2012 Coll., the Civil Code, and Act No. 634/1992 Coll., on consumer protection.

- The seller is liable to the buyer for the product being free of defects on receipt. If the buyer is a consumer, a defect may be notified **within two years of receipt** of the product (Section 2165 of the Civil Code).
- If a defect appears within **one year** of receipt, the product is deemed to have been defective already at the time of receipt (Section 2161(5) of the Civil Code).
- When purchasing online, a consumer has the right to **withdraw from the contract within 14 days** of receiving the goods without giving a reason (Section 1829 of the Civil Code).
- Claims should be made with the retailer from whom you purchased the product. The importer's contact details are given in Chapter 8.1.
- The competent body for out-of-court settlement of consumer disputes is the **Czech Trade Inspection Authority**, Štěpánská 796/44, 110 00 Prague 1, www.coi.cz.