

T-20 GEMINI



ExpressLRS
Gemini

Quick start manual



JUMPER
TECHNOLOGY
LIMITED

The most compact, full featured ELRS GEMINI radio
Customization beyond your imagination

T-20 GEMINI

Introduction

Thank you for purchasing the Jumper. T-20 Radio system. Please read this instruction manual carefully before use to ensure correct and safe use. Due to version upgrades, there have been changes. The information contained in this manual is subject to change without notice.

Many radio control models are equipped with powerful motors and sharp spinning propellers. Please exercise caution when working on models. Ensure power is disconnected from your models and remove propellers when performing maintenance.

Do not operate the T-20 radio system under the following conditions .

- During bad weather or high wind conditions such as rain, hail, snow, storms, or electromagnetic events.
- During any conditions of limited visibility.
- In areas where people, property, powerlines, roads, vehicles or animals may be present.
- If you are feeling tired or unwell or under the influence of drugs or alcohol.
- If the radio or model appears to be damaged or not functioning correctly.
- In areas of high 2.4ghz interference or in locations where the use of 2.4ghz radios is prohibited.
- When the battery in the T-20 or the model is too low to function.



OpenTX / EdgeTX is an experimental firmware. No warranty or implied warranty is given as to the quality and reliability of this firmware.

The RC model can cause serious injury or even death if not handled properly. If you decide to use OpenTX / EdgeTX firmware, you will be solely responsible for your model.

Any injury or damage caused by the use of OpenTX / EdgeTX firmware. The author of OpenTX / EdgeTX is not responsible for it. Please use it with caution.

OpenTX firmware can be found here: <https://github.com/opentx>

EdgeTX firmware can be found here: <https://edge-tx.org>

Multi-protocol firmware can be found here: <https://downloads.multi-module.org>

ExpressLRS: <https://www.expresslrs.org>

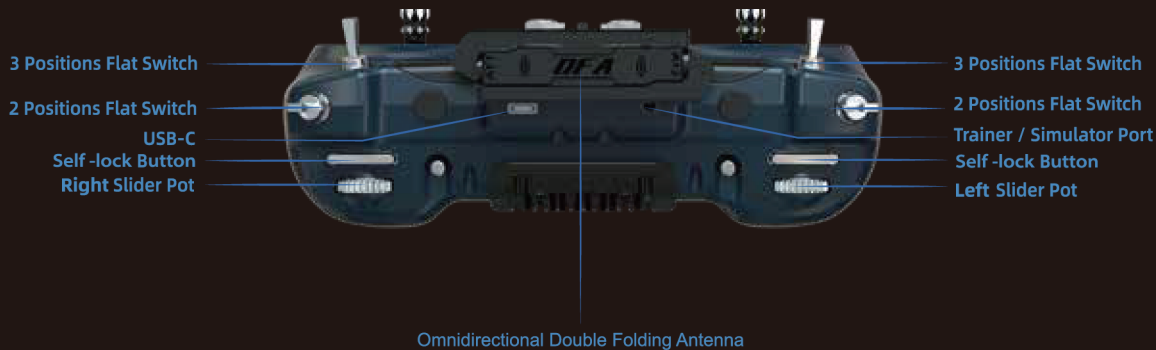


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Brief introduction



Note: In order to prevent T-20 from entering DFU mode during charging, to reduce the probability of losing firmware during charging, T-20 is the first radio that has a separate BOOT0 button. When the radio is shut down, press and hold the BOOT0 button, connect the USB cable, the system will enter DFU mode.

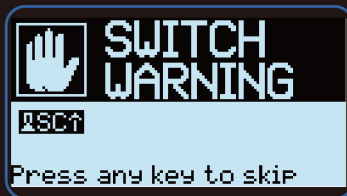
First Boot:

Long press the power button. Before entering the main interface, the system will check the position of the throttle stick and switch and other startup conditions. If the startup conditions are not met, there will be a corresponding error prompt. The user needs to clear or press any key to skip.



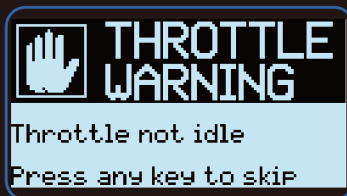
EEProm Warning:

Bad EEPROM data. Press any key to let the radio automatically format and storage to create new remote control data files.



Switch Warning:

This is a warning that a switch on the radio -control is not in the default position. (The default setting is that all switch directions are up)



Throttle Warning:

This is a warning that the throttle is not at the lowest position when the radio is turned on. You can set the throttle stick to the lowest position or press any key to skip. You can also turn off the throttle state option in the MODEL SETUP menu.



Failsafe Not Set Warning:

This is a warning that the radio- control is not set for fail-safe.



Alarms Warning:

A similar warning will appear if the sound mode of the remote control settings page is set to mute.



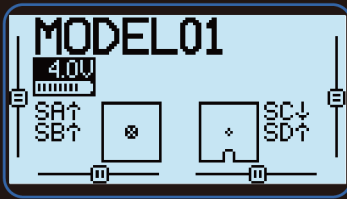
SD card Warning:

This warning will appear if the version of the SD card file used does not match the firmware version. (SD card contents also need to be updated at the same time as upgrading firmware)



RSSI Warning:

This is a warning that the Disable alarms are set.



Main Screen Display:

The default screen is as below, and the user can press the (PAGE) key to display different interfaces.

Model Setup and Selection:

In the main interface, press the SYS button to get into the model select menu



The Model Select menu allows the user to select the active model and allows the user to create, copy, move or delete a model. By selecting the "Create model" option, the new model guide (the script required by the guide is in the SD card) will be launched. The user will be leading through the basic control setup, if you choose not to use it, just press RTN Keys to manually set the model.



To create a model, press and hold the ENT key to show the menu, select create model, press ENT



With the plane, delta, and multiaxial options, the guide will check with you questions about model configuration. And make basic settings for users. The final step of the guide confirms the channel assignment for the model



If the user prefers manual setup, press RTN to exit the guide. Use the menu wheel to select the one you want to make with the model, long-press the ENT key to select the Select model to switch it.

Binding and Frequency Tuning:

Short press the SYS button, then use the scroll wheel to select 2/13



Internal RF:

Mode: The transmission mode of the internal RF. It must be compatible with the receiver. Otherwise, it will not be able to bind.

OFF: Turn off the internal RF module

Type: Select the type of protocol

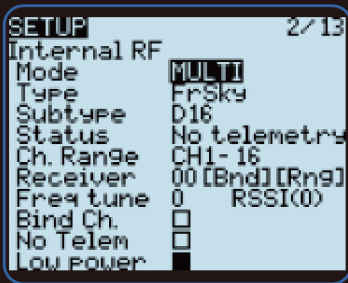
Subtype: Select the subtype of the protocol

```
SETUP 2/13
Internal RF
Mode MULTI
Type FrSky
Subtype D16
Status No telemetry
Ch. Range CH1- 16
Receiver 00 [Bnd][Rng]
Freq tune 0 RSSI(0)
Bind Ch. 
No Telem 
Low Power 
```

Status: Display the status of the multi-protocol module.
(Normally it shows the firmware version of the multi-protocol module)

Ch.Range: Set up the channel range. (D16 mode transmits data at every 9ms, 8 channels at a time, 16 channels will take 18ms, so removing unnecessary channels can reduce the latency)

Receiver: Normally it is the receiver model. It can be changed manually. If the model is moved or copied, it will not be changed. If the manual setting or copy/move steps cause the receiver with the same number to have 2 or more models, a warning window will pop up. It is up to the user to decide whether it needs to be modified



Freqtune: Frequency tuning. Certain protocols require tuning for optimal performance. In some cases, tuning is required in order for the protocol to bind. Frequency Tuning is specific to each MULTI-Module, and is due to very small variations in the RF components.

Frequency Tuning is always recommended, but especially when:

1. It is difficult to bind to the receiver, or the connection is weak or intermittent
2. The control range is very short
3. Telemetry data is not received or (for telemetry-enabled receivers only)

Completing the Frequency Tuning Procedure ensures that the radio and receiver will have the strongest possible connection. If you change the frequency tuning value it is best to re-bind the receiver(s)

```
SETUP 2/13
Internal RF
Mode MULTI
Type FrSky
Subtype D16
Status No telemetry
Ch. Range CH1-16
Receiver 00 [Bnd][Rng]
Freq tune 0 RSSI(0)
Bind Ch. 
No Telem 
Low Power 
```

The default value of Freqtune is "0". If the receiver does not bind, we can change the value to either +30 or -30 and try to bind again. If binding is still unsuccessful, continue to try higher and lower values in steps of plus or minus 30 until the bind succeeds.

Once the receiver is bound you can proceed with Fine Tuning. After the binding succeeds, kkeep the receiver 2 meters away from the radio and don't move any of them.

Return to the RF Freq. fine-tune option. Lower the value until the radio loses the connection with the receiver. Record the value (TUNE_MIN). Raise the value so that the connection is restored, then continue to raise it until the radio loses the connection with the receiver again.

Record the value (TUNE_MAX). Calculate the median between the two values $(TUNE_MIN + TUNE_MAX) / 2 = TUNE_MEDIAN$. Set RF Freq. fine-tune to the median value.

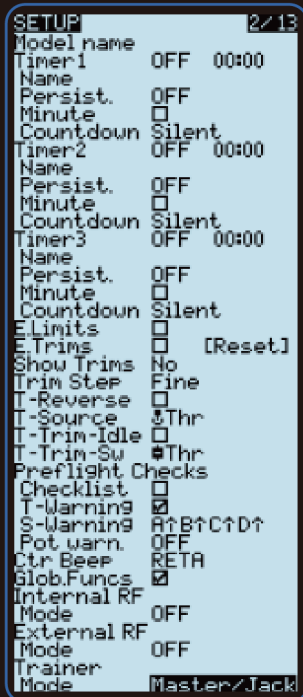
For example

Connection is lost at 60 and -60, then the Freqtune number is $(-60+60)/2=0$

Connection is lost at 20 and -80, then the Freqtune number is $(-80+20)/2=30$

Model Setup:

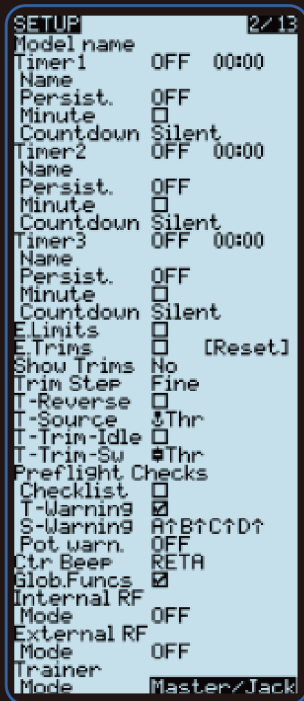
The model setup covers all the required preliminary setups. The Model Setup page contains the following features:



1. Defines the model's name
2. Up to 3 fully programmable timers that can count up or down
3. Extended limits allow setting servo movement limits up to 125%
4. Extended trims allows trims to cover the full stick range instead of +/-25%
5. Trim step sets the precision of trim clicks
6. Throttle reverse: Ensures correct operation of throttle-based timers and functions for people who like having full throttle with the stick down
7. Throttle source defines what triggers the THx functions of the timers.

Model Setup:

The model setup covers all the required preliminary setups. The Model Setup page contains the following features:



8. Throttle trim: IC engine mode, where trim only affects the idle part of the throw without touching the full-throttle point

9. Throttle Warning: Will warn you if the throttle stick is not at idle when the radio is powered up or a model is loaded

10. Preflight checks: display checklist, throttle state, switch positions, pot positions

11. Center beep: Makes a beep when the selected control(s) pass the center point

12. Internal RF module setting

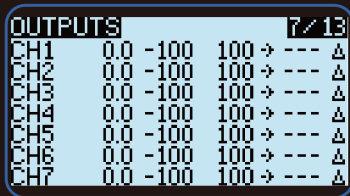
13. External RF module setting

14. Trainer mode setting

Press the SYS button and use the scroll wheel to select the model you want to set (after selecting the model name, there will be a * logo before the model name) Then press the PAGE key to enter the Model Setup page

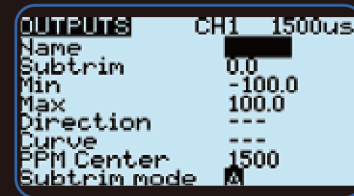
Outputs (center adjustment, servo reverse setting):

Short press the SYS button and then use the scroll wheel to select the 7/13 page



```
OUTPUTS 7/13
CH1 0.0 -100 100 → --- Δ
CH2 0.0 -100 100 → --- Δ
CH3 0.0 -100 100 → --- Δ
CH4 0.0 -100 100 → --- Δ
CH5 0.0 -100 100 → --- Δ
CH6 0.0 -100 100 → --- Δ
CH7 0.0 -100 100 → --- Δ
```

Select the channel
you want to set up

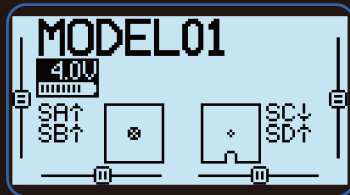


```
OUTPUTS CH1 1500us
Name
Subtrim 0.0
Min -100.0
Max 100.0
Direction ---
Curve ---
PPM Center 1500
Subtrim mode A
```

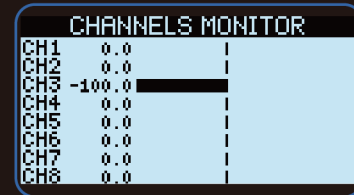
center adjustment
Low and high limits setting
Subtrim behavior

Channel Monitor:

press the “page” button in the main interface you can switch input and output monitor



Input monitor



```
CHANNELS MONITOR
CH1 0.0
CH2 0.0
CH3 -100.0
CH4 0.0
CH5 0.0
CH6 0.0
CH7 0.0
CH8 0.0
```

Output monitor

Set the default gimbal mode:

T-20 is set to MODE2 (the left-hand throttle) out of the factory. The user can change the mode by himself by reversing the gimbals, and then long-press the "SYS" key to enter the "RADIO SETUP" page, turn to the bottom to "mode", and select the corresponding mode

Calibrating Gimbals (Gimbals have been calibrated when it was out of the factory. No need to re-do the calibration unless it is necessary):

Press and hold SYS button, scroll to the HARDWARE page. Go to the "Sticks[calibration]" page to start gimbal and wheel calibration Attn: Do not put too much force during the calibration process to avoid affecting the calibration accuracy. Move slightly during the calibration process.



press ENT to start calibration



place all the gimbals, knobs,
and side sliders in the middle
position, and then press the
ENT key



move all the gimbals, knobs,
and side sliders to their respective
maximum and minimum positions,
and then press the ENT key to
complete the calibration

Battery and Charging:

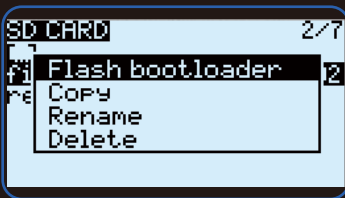
Please use two 21700 batteries under the same brand and model (with the same internal resistance) to power the T20 V2. Make sure that the anode and cathode are not reversed when inserting the battery, T20 V2 has a built-in USB charging function, You can connect the radio to a USB to charge the battery. Charging indicator: the green light flashes when the radio is not inserted with batteries; the green light is always on when the battery is charging; the green light is off when the charging is complete.

Attn: When the battery is installed in the T20 V2 for the first time, please keep the battery voltage consistent to reduce the burden on the voltage balance circuit.

Firmware Update:

There are two ways to update EdgeTX firmware.

1. Update firmware by EdgeTX companion. (For more details, please refer to T20 V2 Manual)
2. Update firmware via SD card (If passed over 1 version, please use the first method to update) if your device is not in the Windows system, please use the 2nd method. This is a BOOTLOADER function designed by the EdgeTX developer team, efficient and simple. The upgrade requires two steps. Firstly, copy the firmware downloaded from EdgeTX website to the SD card "FIRMWARE" folder. Secondly find the firmware file you just copied in the remote control SD card, long-press the ENT key to upgrade the bootloader (as shown below)



After booting, select the Write Firmware option and select the corresponding firmware to upgrade



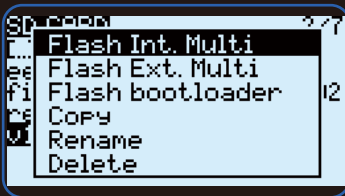
Press the trim buttons inward and turn on the radio

Update firmware of JP4IN1 module via Radio:

The firmware version of the module needs to be newer than version 1.2.1.85 to use the remote control to upgrade the module firmware. Otherwise, you need to use USB and TTL hardware to connect the module to upgrade the firmware

Firmware download link: <https://downloads.multi-module.org>

Firstly copy the firmware of the module into the radio file folder "FIRMWARE" (same folder as the one used for the radio firmware update), then disconnect the computer and radio controller, open the SD card "FIRMWARE" folder, select the firmware that just copied and long-press ENT key (as shown below)



Flash Int.Multi:

To update firmware of internal RF module

Flash Ext.Multi:

To update firmware of External RF module

ExpressLRS:

<https://www.expresslrs.org>

* For more tutorials, please refer to the manual

Adjustment instructions for gimbal stick height

- 1, Remove the gimbal stick ends locking screw.
- 2, Turning the gimbal stick ends clockwise will shorten the gimbal stick length. Turning it counterclockwise will lengthen the gimbal stick.
- 3, After adjusting the gimbal stick length, hold the gimbal stick end with your hand and tighten the locking screw.

Warning: The gimbal of the radio controller is a precision device. Excessive force when turning the gimbal stick end may cause the gimbal shaft to come off and become damaged.

Do not turn the gimbal head before removing the locking screw!



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