

FrSky

FrSky TANDEM X20/X20 HD/X20 Pro Manual

Version 1.0

Introduction

TANDEM X20 - A groundbreaking dual-band radio transmitter. Comes with a color-display touch screen, using the light-weight and robust case but quality material. And the rear 2 momentary buttons provide DLG pilots a fit position for the launch finger no matter you are left or right-handed.

Internal 900MHz/2.4GHz Dual-Band & External Module Bay

The TD dual-band RF system does not simply reiterate the features of combining FrSky 900MHz and 2.4GHz RF systems. The TD features its real simultaneous dual-band long-range control with telemetry that can achieve incredible and incomparable end-to-end 3ms latency while connecting the TD receivers.

ETHOS - A Powerful, Intuitive and Flexible OS!

The ETHOS, as a thorough upgrade base on the former system FrOS.

Layout

SF

SE

SB

SA

Slider

Stick

SYS, MOL, TELE, RTN

Speaker

Display Screen

Power Switch

Switch

SA: 3 positions; Short Lever

SB: 3 positions; Long Lever

SC: 3 positions; Long Lever

SD: 3 positions; Short Lever

SE: 3 positions; Short Lever

SF: 2 positions; Long Lever

SG: 3 positions; Short Lever

SH: 2 positions; Momentary, Long lever

Stick

Hook

1. Micro SD card is not provided with shipment.

2. USB port is for upgrading, reading/writing Micro SD cards and internal memory of radio contents and charging.

3. Smart Port is for firmware upgrade for all FrSky S.Port devices.

TANDEM

Carrying Bar/Antenna 900 MHz

Module Bay

Battery Cover

FrSky Electronic Co., Ltd.

www.frsky-rc.com

Contact us: frsky@frsky-rc.com

Add: F-4,Building C, Zhongxiu Technology Park, No.3 Yuanxi Road, Wuxi, 214125, Jiangsu, China

Technical Support: sales4tech@gmail.com

FrSky

FrSky TANDEM X20/X20 HD/X20 Pro Manual

Version 1.0

Specifications

- Dimension: 212*200*95 mm (L*W*H)
- Weight: 809g (without battery)
- Operating system: ETHOS
- Internal RF module: TANDEM
- Operating Voltage Range: 6.5 ~ 8.4V (2S Li-battery)
- Operating Temperature: -10℃~60℃ (14°F~140°F)
- Operating Current: 240mA@7.4V (typ.)
- Charging Current: ≤1A ±200mA
- USB Adaptor Voltage: 5V+0.2V
- USB Adaptor Current: >2.0A
- Backlit touchable LCD resolution: 800*480
- Compatibility: ACCST D16 & ACCESS receivers

Features

	Stand.
• Built-in TD 900M/2.4G Dual-Band Internal RF Module - Supports Multiple Working Modes - 2.4G ACCST D16 Mode (Compatible with ACCST Receivers with D16 V2 or later FW) - 2.4G ACCESS Mode (Compatible with ACCESS Receivers) - 900M ACCESS Mode (Compatible with ACCESS R9 915MHz Receivers) - *Capable of simultaneous working under ACCESS mode - 2.4G&900M TD Mode^{NEW} (Compatible with TD Receivers) - Super-low latency and long-range control with telemetry - *Up to 50 to 100KM range and down to 3ms end-to-end latency	•
• 800*480 Color Touch-Screen Displays	•
• 6 Quick-Mode Custom Buttons (Front) and 2 Momentary Buttons (Rear)	•
• Lite Type External Module Bay	•
• Built-in 6-axis Gryoscope Sensor	•
• All CNC Metal Trims, Knobs	•
• Haptic Vibration Alerts and Voice Speech Outputs	•
• Supports Recharge System for 2S Li-ion Battery (USB Type-C Interface)	•
• High-speed PARA Wireless Training System (Compatible with FreeLink App3.0)	•
• High-Precision Hall-Sensor Gimbals with All-CNC Metal Panel	•
• ETHOS: The more powerful, Flexible and Intuitive OS for your radio. - Clear and Intuitive UI Design - Supports Dual Operation Modes of Radio Display (Touch and Non-Touch) - Supports Multi-Language Switching - Hardware/Software Version and Factory Version Detection - Supports running LUA Scripts	•

About USB 2S Li-battery balance charging :

The Green Power indicator LED state:
Led on: charging/Led off: charge end/Led flash: charge fault
Please use the following type of battery if you do not want to use the battery slot
LiFePO battery is not supported.
Battery compartment size: 84*41.5*20mm (L*W*H)

FrSky Electronic Co., Ltd.

www.frsky-rc.com

Contact us: frsky@frsky-rc.com

Add: F-4,Building C, Zhongxiu Technology Park, No.3 Yuanxi Road, Wuxi, 214125, Jiangsu, China

Technical Support: sales4tech@gmail.com

FrSky

FrSky TANDEM X20/X20 HD/X20 Pro Manual

Version 1.0

Note: 1. Charge the battery with the USB adapter (Voltage: 5V+0.2V Current: >2.0A) when you use the USB charging function.
2. The lower the initial charging voltage, the better the charging effect is when the voltage difference between the two cells exceed 50 mV.

Navigation Controls

The left navigation control does RTN, SYS, MDL, TELE and Page UP/Down. The right navigation control does scroll and enter. The navigation controls or touch screen can be used.

Connections and switches

There is an area behind the base of the display for the external 2.4GHz antenna, trainer jack, S.Port, SD card, USB-C connection (PC and Li battery balance charging), headphone jack and external 900mHz antenna.

There are six three position switches, one two position and one spring loaded two position.

Two front pots, one front slider and two side sliders.

There are six mode buttons on the front of the system and two push buttons on the back near the grips.

ISRM/R9M RF

The system has a newly designed ISRM/R9M RF board that has a 2.4gig section and a 900mHz section. Two internal 2.4gig antennas are located in case area at the very top and side and one external antenna mount behind the display base. The 900mHz has one internal antenna in the handle and one external antenna mount behind the display base.

Up to 24 channels for 2.4gig ACCESS, 16 channels for D16 and 16 channels for 900mHz ACCESS.

There is a connection for a FrSky external Lite version RF module.

Battery

The system has a built-in 2S Li balance charger with a USB-C connection for a user provided external USB power source. The batteries are accessible through a battery hatch in the lower back area of the system.

The battery compartment is 84.5mm by 41.5 high and 20mm deep.

Color Themes

Currently there are two color themes.

Blue case with natural color CNC aluminum gimbal rings.

Black case with the CNC black aluminum gimbal rings black.

ETHOS

Extra1

ETHOS

00:00:00

00:00:00

00:00:00

11:39:08

Model

ETHOS

Edit model

Flight modes

Misc

Outputs

RF system

Telemetry

Checklist

Timers

10:27:34

FrSky Electronic Co., Ltd.

www.frsky-rc.com

Contact us: frsky@frsky-rc.com

Add: F-4,Building C, Zhongxiu Technology Park, No.3 Yuanxi Road, Wuxi, 214125, Jiangsu, China

Technical Support: sales4tech@gmail.com

FrSky

FrSky TANDEM X20/X20 HD/X20 Pro Manual

Version 1.0

The ETHOS operating system developed for the X20 is designed for touch or navigation controls use or a mix of both.

Model Setup Procedure-Internal Module

The internal RF module of FrSky TANDEM X20 is newly developed by FrSky under the name of TANDEM-X20.

Step 1: Enter the RF SYSTEM menu

Model

ETHOS

Edit model

Flight modes

Misc

Outputs

RF system

Telemetry

Checklist

Timers

10:27:34

Choose the INT MODULE. Then turn ON INTERNAL RF, select the OUTSIDE or INSIDE ANTENNA (Dual internal antennas and external antenna work simultaneously while selecting the OUTSIDE ANTENNA.)
Set the Mode for TANDEM X20 internal RF corresponding to your receiver (ACCESS, ACCST D16).

RF system

ETHOS

Owner Registration ID

Internal module

State

Type

2.4G

Antenna

900M

1000000000

▼

OFF ● ON

ACCESS ▼

OFF ● ON

Inside ▼

OFF ● ON

Step 2: Set the Channel Range
The internal RF module of TANDEM X20 supports 24 channels. the channel range is configurable, and it needs to be double checked before use.

RF system

ETHOS

900M

Model ID

Channels Range

Set

RX1

RX2

RX3

1000000000

CH1 CH24

Register Range

Bind Set Reset

Bind Set Reset

Bind Set Reset

Outputs

ETHOS

CH1

CH2

CH3

CH4

CH5

CH6

CH7

Channel 90

Mean 90

Min 90

Max 90

Channel 90

Mean 90

Min 90

Max 90

Channel 90

Mean 90

Min 90

Max 90

Channel 90

Mean 90

Min 90

Max 90

Step 3: Set the Receiver Number
When you create a new model, the system will assign you a receiver number automatically, but this can be easily changed. The range of the Model ID is 00-63, with the default number being 01. Once the receiver is set to the desired number and is bound to the TANDEM X20, the bind procedure will not need to be repeated unless the receiver number is changed, In this case, set the receiver number to the previous one, repeat the bind procedure.

RF system

ETHOS

Type

2.4G

Antenna

900M

Model ID

Channels Range

Set

ACCESS ▼

OFF ● ON

Inside ▼

OFF ● ON

CH1 CH24

Register Range

Step 4 : Registration
In ACCESS, select the STATE [Register] into Registration status. Then Press the F/S button and power on your receiver, and select the "RX Name XX" and [REGISTER] to complete the Registration process then power down the receiver.

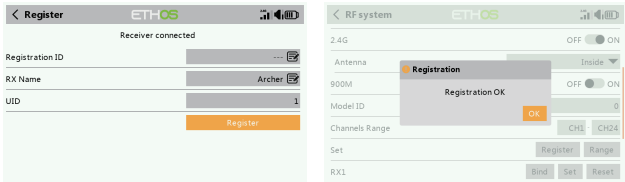
FrSky Electronic Co., Ltd.

www.frsky-rc.com

Contact us: frsky@frsky-rc.com

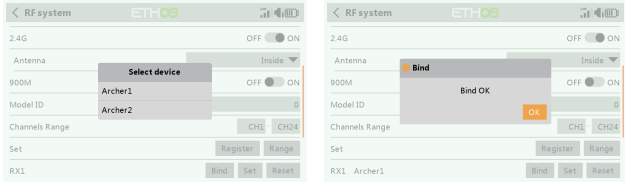
Add: F-4,Building C, Zhongxiu Technology Park, No.3 Yuanxi Road, Wuxi, 214125, Jiangsu, China

Technical Support: sales4tech@gmail.com



Step 5: Automatic binding (Smart Match)

Move the cursor to Rx1[BIND],and select it, power your receiver, select the RX, and complete the process, the system will confirm "Bind succeed". (You do not need to press the "F/S" button in ACCESS to Bind. Refer to the receivers manual for details).



Step 6: Set Failsafe mode

There are 3 failsafe modes when enable: No Pulse, Hold, Custom.



- No Pulse: on loss of signal the receiver produces no pulses on any channel. To use this type, select it in the menu and wait 9 seconds for the failsafe to take effect.
- Hold: the receiver continues to output the last positions before signal was lost. To use this type, select it in the menu and wait 9 seconds for the failsafe to take effect.
- Custom: pre-set to required positions on lost signal. Move the cursor to the failsafe mode of channel and press Encoder, then choose the Custom mode. Move the cursor to the channel you want to set failsafe on, and press Encoder.

Then rotate the Encoder to set your failsafe for each channel and short press Encoder to finish the setting. Wait 9 seconds before the failsafe takes effect.

Notice:

- When failsafe is disabled on TANDEM X20 side, the failsafe set on receiver side will be used.
- SBUS port always outputs, does not support the No Pulse failsafe mode. Set "Hold" or "Custom" for SBUS port.

Step 7: Range

Range refers to TANDEM X20 range check mode. A pre-flight range check should be done before each flying session. Move the cursor to "STATE", scroll the Encoder to select "RANGE" mode and press Encoder. In range check mode, the effective distance will be decreased to 1/30. Press the Encoder again, turn to normal state.



FrSky Electronic Co., Ltd.

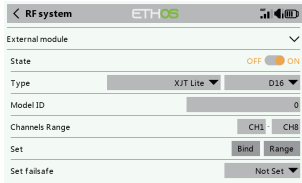
www.frsky-rc.com

Contact us: frsky@frsky-rc.com

Add: F-4,Building C, Zhongxiu Technology Park, No.3 Yuanxi Road, Wuxi, 214125, Jiangsu, China Technical Support: sales4tech@gmail.com

Model Setup for TANDEM X20 External RF Module

The external RF module can be powered on or off by software. The setup process is the same as that for the internal RF.



FCC

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules

CE

The product may be used freely in these countries: Germany, UK, Italy, Spain, Belgium, Netherlands, Portugal, Greece, Ireland, Denmark, Luxembourg, Austria, Finland, Sweden, Norway, France and Iceland.

FLYING SAFETY

⚠ Warning:

To ensure the safety of yourself and others, please observe the following precautions.

① **Have regular maintenance performed.** Although your Taranis X9D Plus 2019/Taranis X9D Plus SE 2019 protects the model memories with non-volatile EEPROM memory (which does not require periodic replacement) and of a battery, it still should have regular check-ups for wear and tear. We recommend sending your system to your FrSky Service Center annually during your non-flying-season for a complete check-up and service.

Battery

① Using a fully charged battery (DC 6.5~8.4V). A low battery will soon die, causing loss of control and a crash. When you begin your flying session, reset your transmitter's built-in timer, and during the session pay attention to the duration of usage. Also, if your model used a separate receiver battery, make sure it is fully charged before each flying session.

① **Stop flying long before your batteries become over discharged. Do not rely on your radio's low battery warning systems, intended only as a precaution, to tell you when to recharge. Always check your transmitter and receiver batteries prior to each flight.**

Where to Fly

We recommend that you fly at a recognized model airplane flying field. You can find model clubs and fields by asking your nearest hobby dealer.

① **Always pay particular attention to the flying field's rules**, as well as the presence and location of spectators, the wind direction, and any obstacles on the field. Be very careful flying in areas near power lines, tall buildings, or communication facilities as there may be radio interference in their vicinity.

FrSky Electronic Co., Ltd.

www.frsky-rc.com

Contact us: frsky@frsky-rc.com

Add: F-4,Building C, Zhongxiu Technology Park, No.3 Yuanxi Road, Wuxi, 214125, Jiangsu, China Technical Support: sales4tech@gmail.com

At the flying field

- ① To prevent possible damage to your radio gear, turn the power switches on and off in the proper sequence:
 1. Pull throttle stick to idle position, or otherwise disarm your motor/engine.
 2. Turn on the transmitter power and allow your transmitter to reach its home screen.
 3. Confirm the proper model memory has been selected.
 4. Turn on your receiver power.
 5. Test all controls. If a servo operates abnormally, don't attempt to fly until you determine the cause of the problem.
 6. Start your engine.
 7. Complete a full range check.
 8. After flying, bring the throttle stick to idle position, engage any kill switches or otherwise disarm your motor/engine.

If you do not turn on your system on and off in this order, you may damage your servos or control surfaces, flood your engine, or in the case of electric-powered or gasoline-powered models, the engine may unexpectedly turn on and cause a severe injury.

① **Make sure your transmitter can't tip it over.** If it is knocked over, the throttle stick may be accidentally moved, causing the engine to speed up. Also, damage to your transmitter may occur.

① In order to maintain complete control of your aircraft it is important that it remains visible at all times. Flying behind large objects such as buildings, grain bins, etc. must be avoided. Doing so may interrupt the radio frequency link to the model, resulting in loss of control.

⚠ Do not grasp the transmitter's antenna during flight. Doing so may degrade the quality of the radio frequency transmission and could result in loss of control.

⚠ As with all radio frequency transmissions, the strongest area of signal transmission is from the sides of the transmitter's antenna. As such, the antenna should not be pointed directly at the model. If your flying style creates this situation, easily move the antenna to correct this situation.

① Before taxiing, be sure to extend the transmitter antenna to its full length.

A collapsed antenna will reduce your flying range and cause a loss of control. It is a good idea to avoid pointing the transmitter antenna directly at the model, since the signal is weakest in that direction.

① **Don't fly in the rain!** Water or moisture may enter the transmitter through the antenna or stick openings and cause erratic operation or loss of control. If you must fly in wet weather during a contest, be sure to cover your transmitter with a plastic bag or waterproof barrier. Never fly if lightning is expected.

Updates

FrSky is continuously adding features and improvements to our radio systems. Updating (via USB Port or the Micro SD card) is easy and free. To get the most from your new transmitter, please check the download section of the FrSky website for the latest update firmware and guide for adjusting your sticks. (www.frsky-rc.com)

FrSky is continuously adding features and improvements to our products. To get the most from your product, please check the download section of the FrSky website www.frsky-rc.com for the latest update firmware and manuals

FrSky Electronic Co., Ltd.

www.frsky-rc.com

Contact us: frsky@frsky-rc.com

Add: F-4,Building C, Zhongxiu Technology Park, No.3 Yuanxi Road, Wuxi, 214125, Jiangsu, China Technical Support: sales4tech@gmail.com

FCC Statement:

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

ISED RSS Warning/ISED RF Exposure Statement

ISED RSS Warning: This device complies with Innovation, Science and Economic Development Canada licence - exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device. Le présent appareil est conforme aux CNR d'ISED applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

RF Exposure Information (SAR) :

This device meets the government's requirements for exposure to radio waves. This device is designed and manufactured not to exceed the emission limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission of the U.S. Government.

The exposure standard for wireless devices employs a unit of measurement known as the Specific Absorption Rate, or SAR. The SAR limit set by the IC is 1.6 W/kg. *Tests for SAR are conducted using standard operating positions accepted by the IC with the device transmitting at its highest certified power level in all tested frequency bands.

This device has been tested and meets the IC RF exposure guidelines for use with an accessory that contains no metal and the positions the device a minimum of 0 mm from the body .

Cet appareil répond aux exigences du Gouvernement en matière d'exposition aux ondes radio. La conception et la fabrication de cet équipement ne doivent pas dépasser les limites de rayonnement énergétique des radiofréquences (RF) établies par la Federal Communications Commission des États - Unis.

La norme d'exposition pour les appareils sans fil utilise une unité de mesure appelée Absorbance spécifique (SAR). La limite SAR fixée par IC est de 1,6 W / kg.* L'essai SAR a été effectué à l'aide d'une position d'exploitation normalisée approuvée par le ci et l'équipement a été transmis dans toutes les bandes d'essai à son niveau de puissance maximal certifié.

Cet équipement a été testé conformément aux lignes directrices sur l'exposition aux RF de l'IC pour les accessoires non métalliques et doit être situé à au moins 0 mm de la carrosserie du véhicule.