



Website: craftandtheoryllc.com  
 Email: info@craftandtheoryllc.com  
 Phone: +1 (202) 670-4552



FlightDeck



FlightDeck<sup>Q</sup>

```

1.[Info] APM:Copter U3.5.0 (1301b979) QUAD
2.[Info] Calibrating barometer
3.[Critical] PreArm: Need 3D Fix
4.[Critical] Arm: Safety Switch
5.[Critical] Bad AHRS (x2)
6.[Warning] Reached command v3
7.[Critical] Error compass variance
8.[Warning] Reached command v4
  
```

```

RTL Flight:04:36 ul Tx: 8.5u
1 45 19.6 3.26 615
(BATT FAILSAFE) 22.0 3.66 11.2
9% 12.00/8.00Ah
3.7 38 4.73/5.20Ah
2 E 30 38m No
ONE 91 SE 30 438m Fix
8.[Critical] Geofence Breach
  
```



Taranis Apps for

ARDUPILOT

## Prerequisites

Equipment needed		Comments	
ArduPilot compatible flight controller (e.g., Pixhawk, Pixhawk 2).		<p>Must</p> <ol style="list-style-type: none"> <li>(1) have ArduPilot firmware installed</li> <li>(2) enable FrSky telemetry in ArduPilot</li> </ol> <p><i>FrSky telemetry may not work reliably on Linux based flight controllers.</i></p>	
FrSky Taranis (e.g., X9D+, X9E, X7, X-Lite)		<p>Must</p> <ol style="list-style-type: none"> <li>(1) have OpenTX 2.2 or later on the Taranis</li> <li>(2) install FlightDeck on the Taranis</li> <li>(3) enable FlightDeck in OpenTX</li> </ol>	
FrSky Smart Port receiver		All FrSky Smart Port receivers are compatible (e.g., X8R, R-XSR, S8R, R9)	
Craft & Theory telemetry cable		Connects the flight controller to the FrSky Smart Port equipment. Telemetry cables available from <a href="http://craftandtheoryllc.com">craftandtheoryllc.com</a>	
USB A to micro-B USB cable		Connects the flight controller to the computer (for flashing and configuration of ArduPilot via Mission Planner)	
USB A to mini-B USB cable		Connects the Taranis to the computer (for flashing and configuration of OpenTX via OpenTX Companion)	
<b>RECOMMENDED</b>	One power module per battery		Supplies power and provides voltage/current measurements to the flight controller. Two power modules can be used for dual parallel battery monitoring
	One FLVSS/MLVSS LiPo Cell Voltage Sensor per battery		Provides the voltage level of individual battery cells to the Taranis. Two cell sensors can be used for dual parallel battery monitoring

## 1. Hardware installation

Connect the telemetry cable to the serial port chosen for FrSky telemetry on the flight controller and the other end to the Smart Port of the FrSky receiver.



**DO NOT PLUG THE TELEMETRY CABLE TO THE FLIGHT CONTROLLER WHILE IT IS ON!**  
**THE CABLE MAY OVERHEAT WHICH COULD RESULT IN DAMAGE AND BURNS!**

Once connected, the setup should look like this:  
(other connections between the flight controller and the receiver are not shown – e.g., SBUS)



### ➤ Installation of FrSky FLVSS or MLVSS LiPo Cell Voltage sensors:

FlightDeck can use the information from one or two cell sensors (for two batteries in parallel), which provide the voltage level of individual battery cells. To install a cell sensor, connect the telemetry cable between the flight controller and the sensor, then use the cable supplied with the sensor or the receiver to connect the sensor to the Smart Port connector of the receiver.

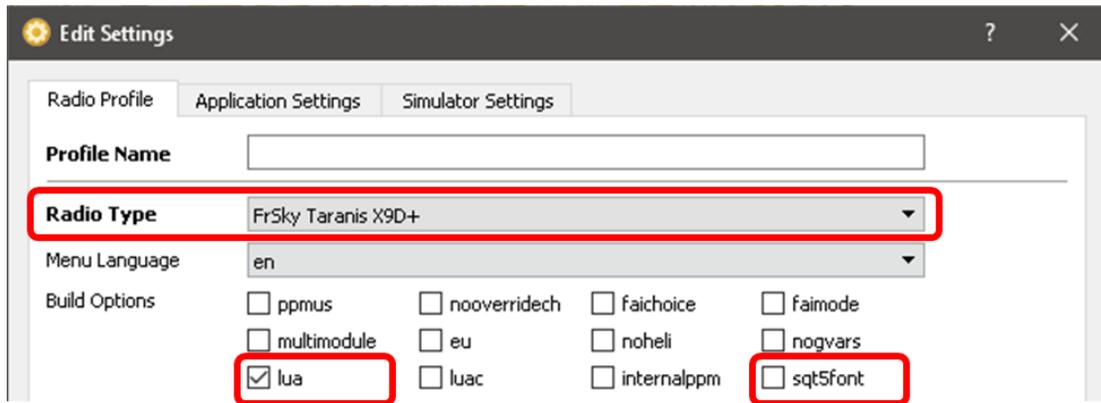
Dual cell sensor setup is beyond the scope of this manual and requires additional equipment (look for tutorials online). The general steps are as follows:

- Change the “SensorID” (a.k.a. “PhysicalID”) of one of the two cell sensors to something other than the default value of 2 using either a FrSky [Servo Channel Changer](#) or the FrSky [S.Port Tool](#) program for PCs.
- Daisy chain both cell sensors on the Smart Port bus.
- Discover both cell sensors in OpenTX, and rename the second cell sensor from “Cels” to “Cel2” so FlightDeck can recognize it.

## 2. OpenTX installation

### ➤ Update OpenTX firmware (if currently on OpenTX 2.1 or earlier):

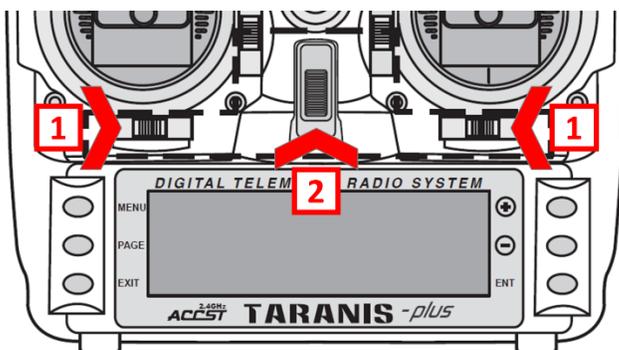
1. Download and install OpenTX Companion from the OpenTX website ([open-tx.org](http://open-tx.org)). Open OpenTX Companion, go to Settings >> Settings..., select the Radio Type. Under "Build Options," check "lua," make sure "sql5font" is unchecked, then click OK.



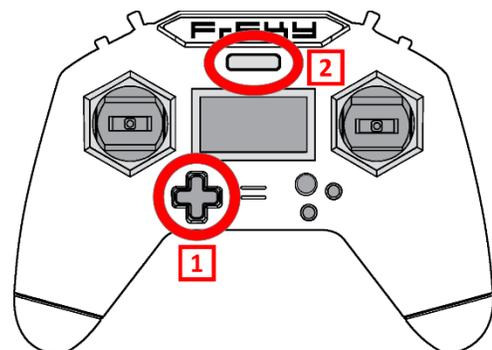
2. Click on File >> Download..., click on the Download FW button and save the resulting .bin file. Once the firmware is downloaded, click OK.



3. Enter bootloader mode:



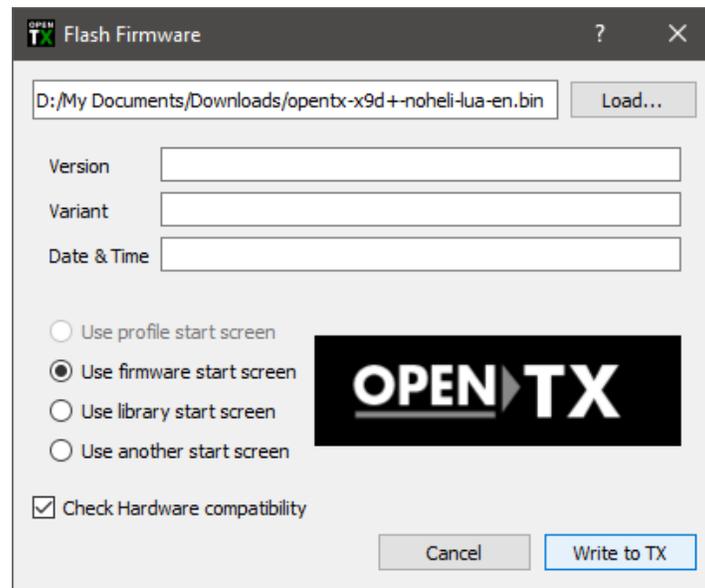
On the Taranis X9D+, X9E, and X7, hold both horizontal trims, each under the main sticks, towards the center, then turn on the Taranis.



On the Taranis X-Lite, press and hold the center of the D-pad, then turn on the Taranis.

## 2. OpenTX installation (continued)

4. Connect a USB cable between the Taranis and the computer. “USB Connected” should appear in the center of the Taranis LCD screen. Click on Read/Write >> Write Firmware to Radio. Locate and load the firmware (.bin) which was downloaded earlier, then click on the Write to TX button. A popup window should display a progress bar which will eventually reach 100%. Once flashing is done, click on the Close button to close the popup window.



### ➤ Update Taranis SD card contents to match the version of OpenTX:



**If an “SD Card Warning” appears when the Taranis is turned on, follow these steps:**

1. Locate the computer drive corresponding to the Taranis SD card: When the Taranis is in bootloader mode and connected to the computer, two drives can be accessed. One drive is the Taranis memory which contains the EEPROM.bin and the FIRMWARE.bin files (DO NOT TOUCH!). The other drive is the Taranis SD card which contains folders such as LOGS, MODELS, and SOUNDS, and this needs to be updated.
2. Empty the Taranis SD card by either formatting the drive (be careful to format the correct drive!) or deleting all the files and folders at the root of the drive. Download the zip file corresponding to the Taranis and OpenTX version from: [downloads.open-tx.org/2.2/sdcard/](https://downloads.open-tx.org/2.2/sdcard/)
3. Extract the contents of the zip file to the now empty root directory of the Taranis SD card.



### 3. FlightDeck installation

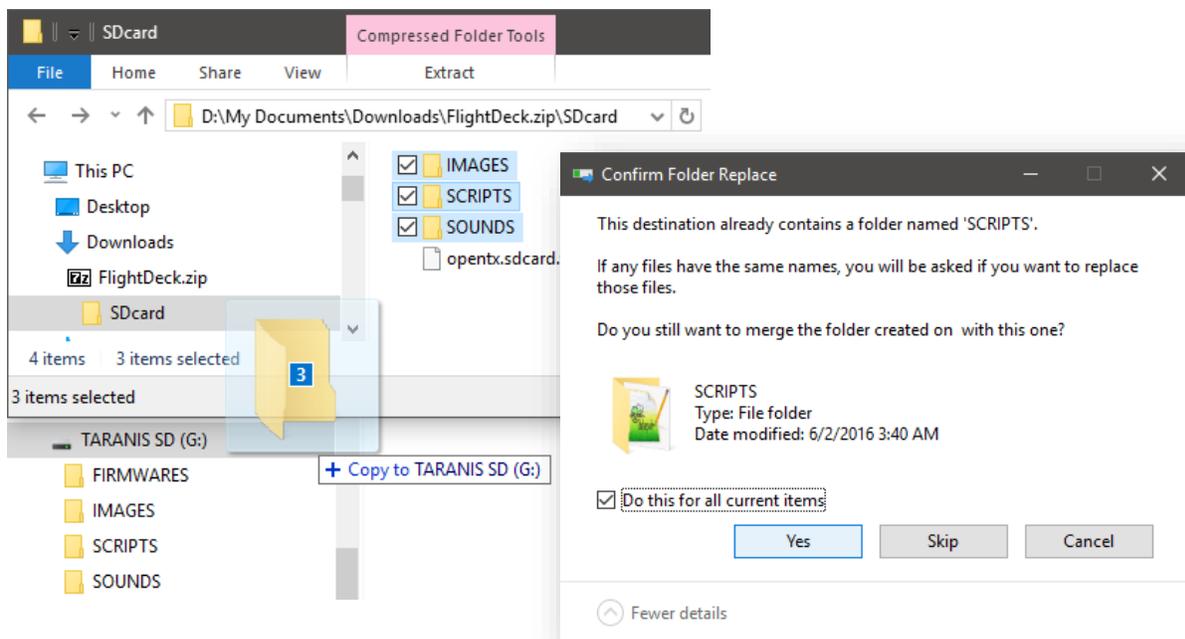
➤ **Copy FlightDeck onto Taranis SD card:**

1. Download the FlightDeck zip file using the link provided in your email receipt or by logging onto your Craft and Theory account.



**FlightDeck.zip is for the Taranis X9D+ and X9E. FlightDeckQ.zip is for the Taranis X7, X7S, and X-Lite. Make sure to get the version for your RC transmitter!**

2. With the Taranis still in bootloader mode and connected to the computer via USB, extract the contents of the "SDcard" folder found in the FlightDeck zip file to the root directory of Taranis SD card (the SD card should appear as a computer drive and contains multiple folders, including one named SCRIPTS). When extracting, make sure to "merge" the contents and replace/overwrite any file already on the SD card when prompted. Do not delete the folders already on the SD card before copying the folders to the SD card.



3. Unplug the USB cable from the Taranis, select "Exit," and confirm [ENT].

***Each purchased copy of FlightDeck (license) allows you to install FlightDeck on one compatible device (Taranis) at a time. You may not use a single license to install FlightDeck on more than one compatible device (Taranis) simultaneously.***

***You may not distribute FlightDeck or make FlightDeck available for distribution. No derivative work may be prepared based upon this work without prior approval from Craft and Theory.***



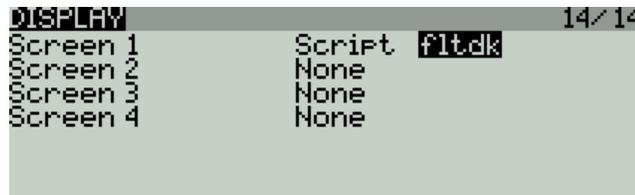
### 3. FlightDeck installation (continued)

➤ **Configure OpenTX to enable FlightDeck:**



An OpenTX model (.otx) located in the FlightDeck zip file can be used in OpenTX Companion to load onto the Taranis a model preconfigured for FlightDeck. If you use the preconfigured model, all you have left to do is bind the receiver to the Taranis. You will, however, lose all the settings previously found on the Taranis!

*If you would rather keep your current OpenTX configuration and models, repeat these steps for each model with which you want to use FlightDeck:* Press on MENU from the main screen, then change pages until the DISPLAY page is shown. Highlight the “None” entry next to “Screen 1,” confirm [ENT], select the “Script” option, and confirm [ENT] again. Move to the right (highlighting “- - -”), confirm [ENT], select “fltdk,” and confirm [ENT] again. Long press on EXIT to get back to the main screen.



#### ***Sensor configuration (optional)***

To take full advantage of the capabilities of OpenTX, some sensors can get “discovered.” To discover them, press on MENU from the main screen, then change pages until the TELEMETRY page is displayed. Scroll down and highlight “Discover new sensors.”



Once highlighted, validate[ENT]. “Stop discovery” should now be displayed. Turn on the flight controller (with the telemetry cable and FrSky receiver connected). Wait approximately 15 seconds for OpenTX to discover sensors based on the data transmitted by the flight controller. Among the list of sensors, one named “GPS” should appear, which indicates that the flight controller is successfully communicating with the Taranis. *If you use one or two FrSky FLVSS or MLVSS LiPo Cell Voltage sensors, make sure the sensors named “Cels” get discovered. If using two cell sensors, change the name of the second sensor from “Cels” to “Cel2.”*

### 3. FlightDeck installation (continued)

The latest transmitted latitude and longitude information (which can be used to locate your vehicle) can be displayed using the following configuration (the OpenTX model found in the FlightDeck zip file has this configuration):

```

DISPLAY 14/14
Screen 1      Script fltdk
Screen 2      Nums
GPS          ---
---          ---
---          ---
---          ---
Screen 3      None
  
```

Once configured, GPS latitude and longitude information is shown by long pressing on PAGE several times from the main screen:

```

FlightDeck 7.00
98°33'12.38"N
44°32'47.58"E
  
```

Discovered sensors for battery pack voltage (VFAS), altitude from home (Alt), and vertical speed (VSpd) can be used natively in OpenTX. The following configuration enables their use (the OpenTX model found in the FlightDeck zip file has this configuration):

```

VARIABLES 13/14
Variometer
Source      VSpd
Range       -10    10
Center      -0.5   0.5   Silent
DISPLAY 14/14
Top bar
Voltage source VFAS
Altitude      Alt
  
```

The “Top Bar” display of the voltage and altitude is found in the center, at the top of the main menu screen (e.g., battery pack voltage: 12.31 Volts, altitude: 125 meters):





### 3. FlightDeck installation (continued)

Variometer sounds are played if a special function is configured for the use of the Vario, as in the following example where the SF switch will enable/disable the variometer sounds (the OpenTX model found in the FlightDeck zip file has this configuration):

```
SPECIAL FUNCTIONS 11/13
SF1 SF4 Vario
SF2 ---
SF3 ---
SF4 ---
SF5 ---
SF6 ---
SF7 ---
```

#### ***Units configuration (optional)***

FlightDeck can display imperial (feet and knots) units instead of metric (meters and meters per second). To switch to imperial units, long press on MENU from the main screen to get to the RADIO SETUP page and change the “Units” option to “Imperial.”

```
RADIO SETUP 1/9
Country code America
Voice language English
Units Imperial
Play delay (sw. mid pos) 150ms
Default channel order TAER
Mode ++* i* *i **
2 Rud Thr Ele Ail
```

#### ***Voice language configuration (optional)***

Voices in FlightDeck are played using the same language as OpenTX. To change the voice language in both FlightDeck and OpenTX, long press on MENU from the main screen to get to the RADIO SETUP page and change the “Voice language” option to the desired voice language. FlightDeck supports *English, French, German, Italian, and Spanish languages*. FlightDeck defaults to English if the language is not supported.

```
RADIO SETUP 1/9
Country code America
Voice language English
Units Metric
Play delay (sw. mid pos) 150ms
Default channel order TAER
Mode ++* i* *i **
2 Rud Thr Ele Ail
```



## 4. ArduPilot installation

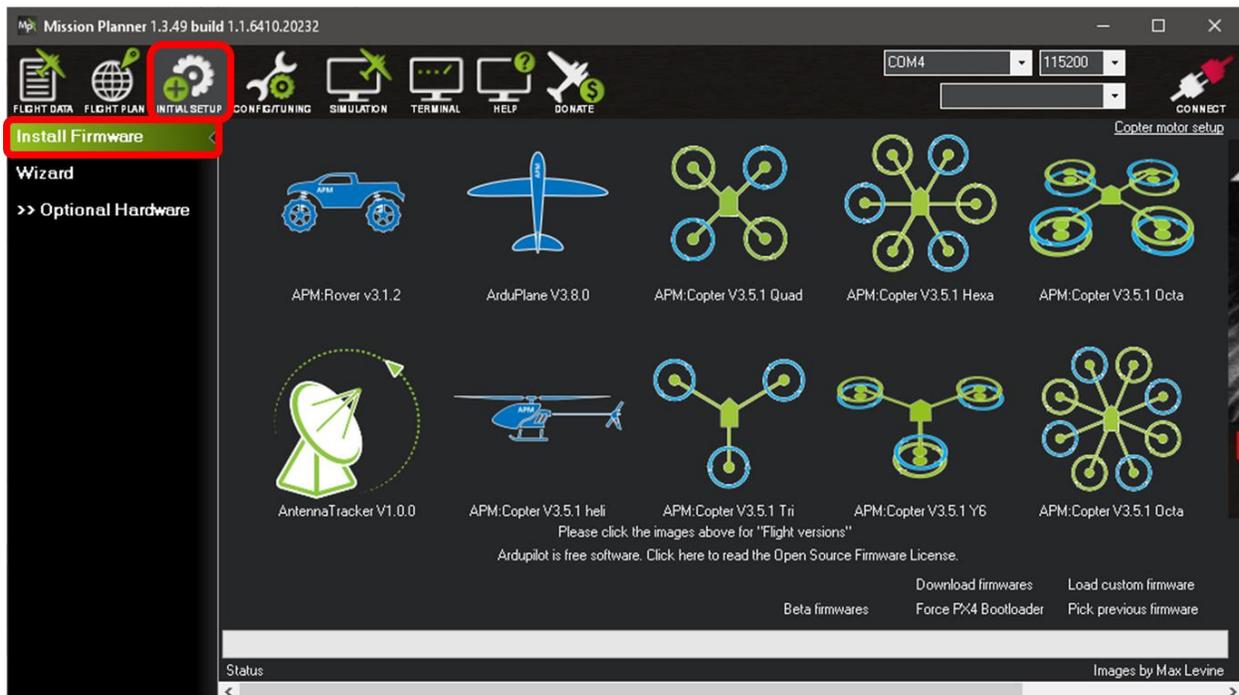
### ➤ Load ArduPilot firmware onto the flight controller:

1. Download and install the latest Mission Planner from [firmware.ardupilot.org/Tools/MissionPlanner/MissionPlanner-latest.msi](http://firmware.ardupilot.org/Tools/MissionPlanner/MissionPlanner-latest.msi)
2. Start Mission Planner, click on the “INITIAL SETUP” top menu icon then on the “Install Firmware” tab. Connect the flight controller to the computer using a USB cable.



**Backup your ArduPilot settings before flashing, as flashing may reset them to default! Once flashed, restore your settings using the .param backup file.**

3. Select your vehicle type, and follow the instructions provided by Mission Planner.



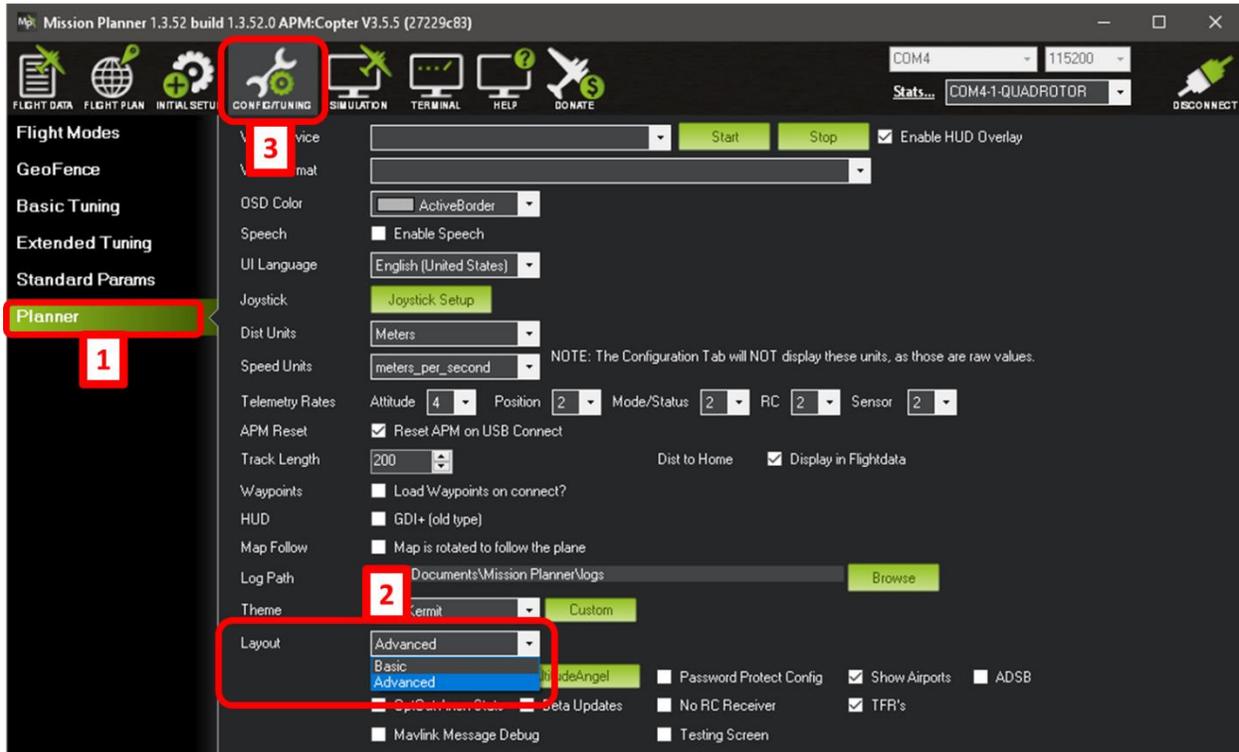
For more details on how to flash an ArduPilot firmware, visit:

[ardupilot.org/copter/docs/common-loading-firmware-onto-pixhawk.html](http://ardupilot.org/copter/docs/common-loading-firmware-onto-pixhawk.html)

## 4. ArduPilot installation (continued)

➤ **Configure the serial port used by the flight controller for FrSky telemetry:**

1. Access the ArduPilot configuration by clicking on the CONNECT button in the upper right Mission Planner window. Once connected, click on “Planner,” and under the “Layout” dropdown menu, select “Advanced,” then click “CONFIG/TUNING.”



An ArduPilot configuration file (FlightDeck\_copter.param), located in the FlightDeck zip file, can be loaded instead of following the serial port configuration steps below. The configuration file sets Serial 4 as the port for FrSky telemetry, calibrates the RC channels to a range that is optimal for a calibrated Taranis, and sets Copter flight modes on the switches in the upper left according to the Iris+ setup found here: <https://3dr.com/wp-content/uploads/2017/03/IRIS-Operation-Manual-v6.pdf>

*If you don't use the supplied ArduPilot configuration file, follow steps 2-4:*

2. Select either “Full Parameter List” or “Full Parameter Tree.”



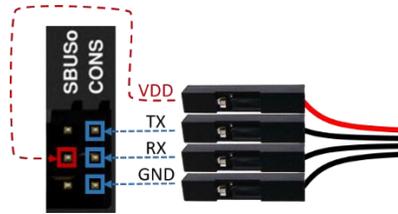
## 4. ArduPilot installation (continued)

- Set to the value “10” the SERIAL#\_PROTOCOL parameter corresponding to the serial port on which the telemetry cable is connected (to activate the “FrSky Passthrough” protocol). Refer to the table below to identify the serial port chosen and find its corresponding SERIAL#\_PROTOCOL parameter.

Flight controller	Telemetry cable type	Serial port label	ArduPilot Parameter name
Pixhawk	Pixhawk	TELEM1	SERIAL1_PROTOCOL
		TELEM2	SERIAL2_PROTOCOL
		GPS	SERIAL3_PROTOCOL
		SERIAL 4/5	SERIAL4_PROTOCOL
Pixhawk 2.1 “The Cube”	Pixhawk 2 / Pixhawk 3 Pixhawk 4 / PixRacer / Mini Pix	TELEM 1	SERIAL1_PROTOCOL
		TELEM 2	SERIAL2_PROTOCOL
		GPS 1	SERIAL3_PROTOCOL
		GPS 2	SERIAL4_PROTOCOL
	Single pins	SBUSo/CONS	SERIAL5_PROTOCOL
Pixhawk 3 Pro	Pixhawk 2 / Pixhawk 3 Pixhawk 4 / PixRacer / Mini Pix	TELEM1	SERIAL1_PROTOCOL
		TELEM2	SERIAL2_PROTOCOL
		GPS	SERIAL3_PROTOCOL
		TELEM3/4	SERIAL4_PROTOCOL
Pixhawk 4 Pixhawk 4 Mini	Pixhawk 2 / Pixhawk 3 Pixhawk 4 / PixRacer / Mini Pix	TELEM1	SERIAL1_PROTOCOL
		TELEM2	SERIAL2_PROTOCOL
		UART & I2C B	SERIAL4_PROTOCOL
PixRacer Mini Pix	Pixhawk 2 / Pixhawk 3 Pixhawk 4 / PixRacer / Mini Pix	TELEM1	SERIAL1_PROTOCOL
		TELEM2	SERIAL2_PROTOCOL
Pixhawk Mini PixFalcon	Pixhawk Mini / PixFalcon	TELEM	SERIAL1_PROTOCOL
Pixhack	Pixhack	SERIAL 4/5	SERIAL4_PROTOCOL
PixHack V5	PixHack V5	UASRT 2	SERIAL2_PROTOCOL
		UASRT 3	SERIAL3_PROTOCOL
		UASRT 4	SERIAL4_PROTOCOL
Dropix	Single pins	S1	SERIAL1_PROTOCOL
		S2	SERIAL2_PROTOCOL
		GPS	SERIAL3_PROTOCOL
		S4	SERIAL4_PROTOCOL
		S5	SERIAL5_PROTOCOL
Holybro Kakute F4/F7 Airbot Omnibus F7	Single pins	Varies	Varies

## 4. ArduPilot installation (continued)

Connection of “Single pins” telemetry cable to the SBUSo/CONS port on the Pixhawk 2 (servo rail voltage “VDD\_Servo” must remain below 6V, otherwise damage will occur!):



- Once the parameter has been changed, click on “Write Params.” Serial port configuration changes require a reboot to take effect, so make sure to restart the flight controller before using FlightDeck.



**Only one SERIAL#\_PROTOCOL parameter should be set to 10. Keep the other SERIAL#\_PROTOCOL parameters to their default values or at least to something other than 3, 4, or 10, as only one serial port can be used for FrSky telemetry at a time!**

Command	Value	Range
SERIAL0		
SERIAL1		
SERIAL1_BAUD	57	1:1200 2:2400 4:4800 9:9600 19:19200 38:38400 57:57600 111:111100 115:115200 500:5000
SERIAL1_PROTOCOL	1	-1:None 1:MAVLink1 2:MAVLink2 3:Frsky D 4:Frsky SPort 5:GPS 7:Alexmos Gimbal Serial 10:Frsky SPort Passthrough (OpenTX) 11:Lidar360
SERIAL2		
SERIAL2_BAUD	57	1:1200 2:2400 4:4800 9:9600 19:19200 38:38400 57:57600 111:111100 115:115200 500:5000
SERIAL2_PROTOCOL	1	-1:None 1:MAVLink1 2:MAVLink2 3:Frsky D 4:Frsky SPort 5:GPS 7:Alexmos Gimbal Serial 10:Frsky SPort Passthrough (OpenTX) 11:Lidar360 // @
SERIAL3		
SERIAL3_BAUD	38	1:1200 2:2400 4:4800 9:9600 19:19200 38:38400 57:57600 111:111100 115:115200 500:5000
SERIAL3_PROTOCOL	5	-1:None 1:MAVLink1 2:MAVLink2 3:Frsky D 4:Frsky SPort 5:GPS 7:Alexmos Gimbal Serial 10:Frsky SPort Passthrough (OpenTX) 11:Lidar360 // @
SERIAL4		
SERIAL4_BAUD	57	1:1200 2:2400 4:4800 9:9600 19:19200 38:38400 57:57600 111:111100 115:115200 500:5000
SERIAL4_PROTOCOL	10	-1:None 1:MAVLink1 2:MAVLink2 3:Frsky D 4:Frsky SPort 5:GPS 7:Alexmos Gimbal Serial 10:Frsky SPort Passthrough (OpenTX) 11:Lidar360 // @
SERIAL5		
SERIAL5_BAUD	57	1:1200 2:2400 4:4800 9:9600 19:19200 38:38400 57:57600 111:111100 115:115200 500:5000
SERIAL5_PROTOCOL	-1	-1:None 1:MAVLink1 2:MAVLink2 3:Frsky D 4:Frsky SPort 5:GPS 7:Alexmos Gimbal Serial 10:Frsky SPort Passthrough (OpenTX) 11:Lidar360 // @

Example ArduPilot configuration where the telemetry cable is connected to SERIAL 4/5 on a Pixhawk.

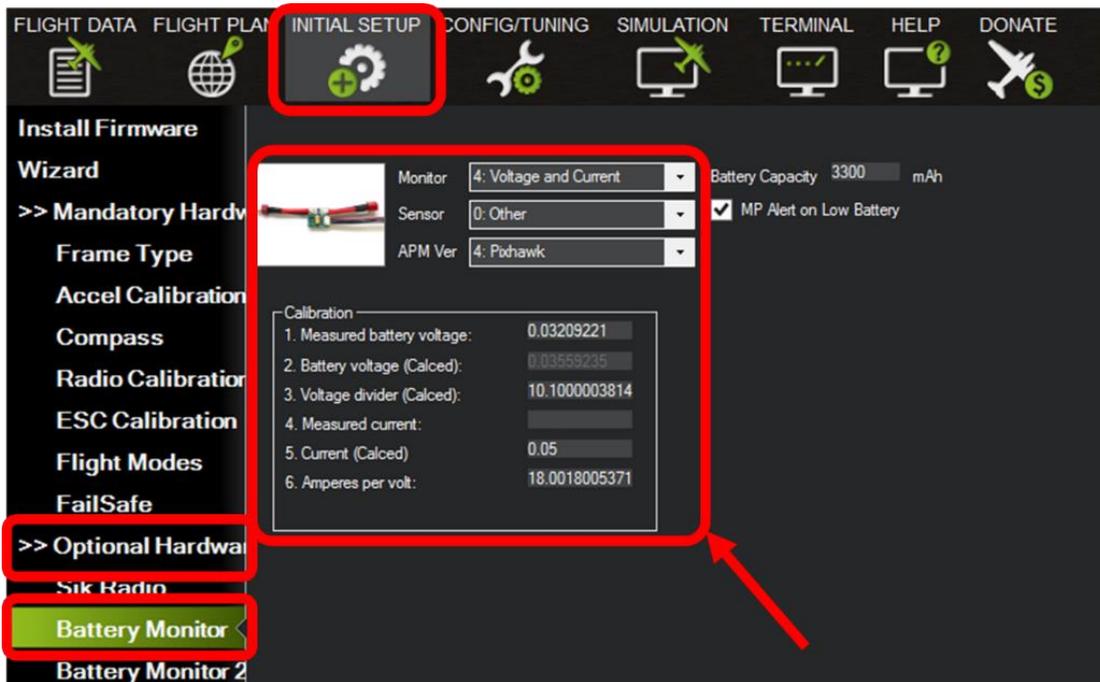
## 4. ArduPilot installation (continued)

- Configure ArduPilot for the power module and battery used (optional):

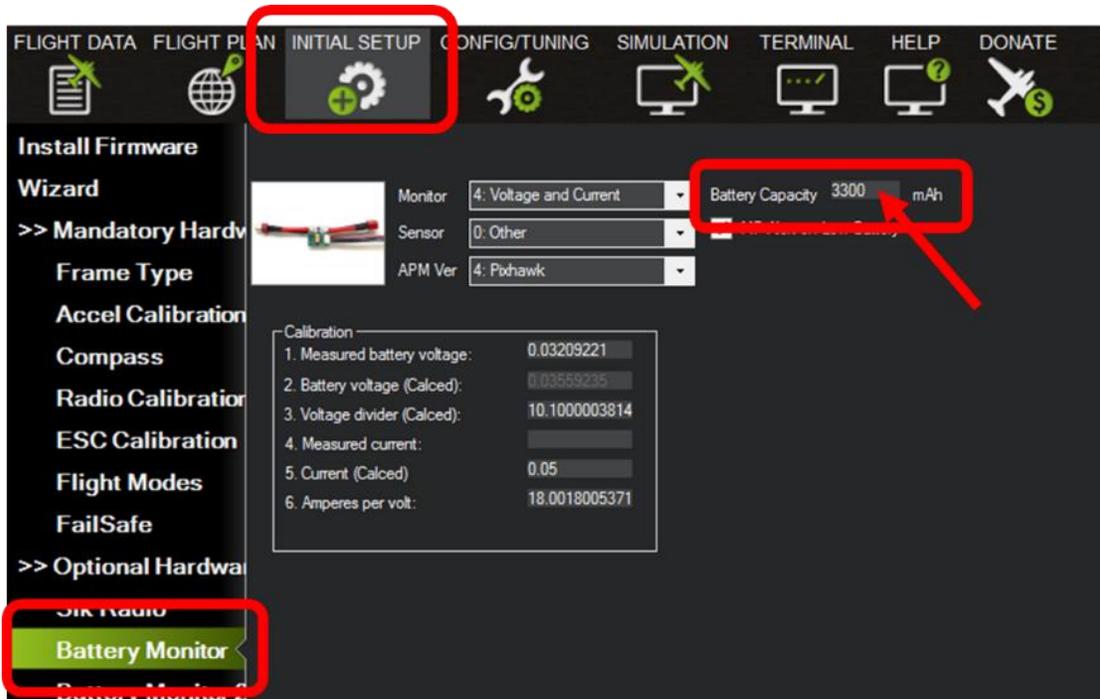


It is highly recommended to configure the Battery Monitor, otherwise the battery information reported by FlightDeck may not be accurate!!!

1. Click on the “INITIAL SETUP” top menu icon. In the “Optional Hardware” tab, verify the power module configuration.



2. Set Battery Capacity to your battery pack capacity in mAh.



## 4. ArduPilot installation (continued)

### ➤ Configure ArduPilot for the second battery (optional):

ArduPilot and FlightDeck support monitoring of two batteries where one voltage/current sensor (power module) is connected to each battery. This setup works on the Pixhawk, Pixhawk 2, and all other ArduPilot compatible flight controllers which support dual battery monitoring.

Configure Battery Monitor2 on the same way as Battery Monitor1 (including calibration of voltage/current sensor). Batteries do not need to have the same voltage/cell count or capacity (mAh).

### ➤ Configure ArduPilot battery failsafes (optional):

If battery failsafes are used, in the “Mandatory Hardware” tab, click on “Failsafe” and set the “Low Battery” voltage and the “Reserved mAh” capacity.



**Better yet, edit the BATT\_ and BATT2\_ parameters from the “Full Parameter List” or “Full Parameter Tree” since many options are not configurable from the Failsafe tab.**

For a complete tutorial on power module configuration, visit:

[ardupilot.org/copter/docs/common-power-module-configuration-in-mission-planner.html](http://ardupilot.org/copter/docs/common-power-module-configuration-in-mission-planner.html)



**Before going out to fly, verify the Battery Monitor and Failsafe configuration, especially when using batteries of various capacities (mAh) and/or voltages.**

## 5. FlightDeck usage

### ➤ Start FlightDeck:

Turn on the Taranis and the flight controller (in any order). From the main OpenTX screen, long press on PAGE to start FlightDeck. If the Taranis is configured properly, the Taranis LCD should display this splash screen. Once communication with the flight controller is established (normally within 15 seconds), the Flight Screen will appear:



Splash Screen on X9D+ and X9E



Splash Screen on X7 and X-Lite



**If the Taranis is stuck on the splash screen, the flight controller is not communicating properly with the Taranis. Refer to the troubleshooting section for help on this issue.**

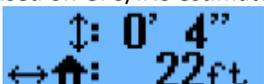
### Flight Screen

Top bar	
Flight mode and simple/super simple mode (if active).	Loiter+SS FlightT:04:36 Tx: 7.0v
Flight timer automatically triggered by ArduPilot.	Loiter+SS FlightT:04:36 Tx: 7.0v
Radio link quality between Taranis and receiver.	Loiter+SS FlightT:04:36 Tx: 7.0v
Taranis battery voltage.	Loiter+SS FlightT:04:36 Tx: 7.0v

Message bar (bottom)	
Latest ArduPilot message shown for 10 seconds (blinking for the first 3 seconds).	

HUD		
Roll, pitch, horizontal speed on left, altitude and vertical speed on right, and heading with rotating compass bezel at the bottom also showing direction of home with a home icon.		Horizontal speed is airspeed if an airspeed sensor is enabled (Plane only), otherwise groundspeed is represented. ARMED/DISARMED appears for five seconds in the HUD. Failsafe alerts (battery, EKF) are also shown blinking in the HUD.

## 5. FlightDeck usage (continued)

Status information		
<p>Left: battery pack voltage from power module (if used), otherwise from cell sensor (if used).            Right: lowest cell voltage from cell sensor (if used), otherwise averaged from pack voltage.</p>		<p>Confirm [ENT] so show the lowest recorded pack and cell voltages, along with the number of cells in the battery pack (e.g., 3S = 3 cells)</p> 
<p>Current or power draw from power module (if used). Confirm [ENT] to toggle between current and power.</p>		
<p>Left: battery bar with percentage remaining. Bar blinks below 25%.            Right: battery capacity used/total.  <b>To be relevant, a fully charged battery is must be used!</b></p>		<p>Configure ArduPilot for the power module and battery used:  <a href="http://ardupilot.org/copter/docs/common-power-module-configuration-in-mission-planner.html">ardupilot.org/copter/docs/common-power-module-configuration-in-mission-planner.html</a></p>
<p>Direction of home position relative to vehicle orientation (e.g., arrow pointing straight up means the vehicle is facing home).</p>		<p>The home position is determined by ArduPilot so a good GPS fix is required for this feature to work properly.</p>
<p>Top: vertical distance to terrain (if rangefinder active), otherwise altitude from home (in meters or feet).            Bottom: distance from home (in meters or feet).</p>		<p>The mountain icon indicates a distance based on rangefinder readings, otherwise the distance is based on GPS/INS estimates:</p> 
<p>GPS fix status (no GPS, no fix, 2D fix, 3D fix, DGPS fix, RTK float, RTK fixed).</p>		<p>Confirm [ENT] to show the number of satellites and the quality of the GPS fix (HDOP) alternating:</p> 

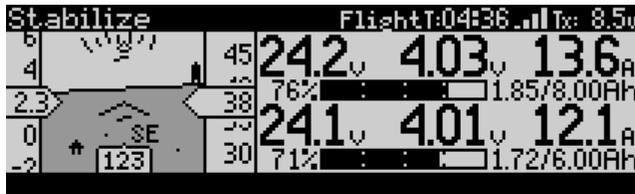
The other FlightDeck interface screens are accessed from the Flight Screen by pressing the +/- buttons, the wheel for the X7, or the D-pad on the X-Lite.



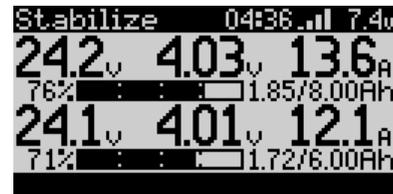
## 5. FlightDeck usage (continued)

### Battery Monitoring Screen (dual battery setups only)

This screen is only available when two cell sensors, two power modules, or both are used, and shows the battery information for the first (top) and second (bottom) battery individually:



Battery Monitoring Screen on X9D+ and X9E



Battery Monitoring Screen on X7 and X-Lite

In this setup, the battery information displayed on the Flight Screen combines the information from both batteries (as a summary). For voltages, the lowest value is shown. For all other information (i.e., current, power, Ah used, capacity), the values shown are added together.

### Messages Screen

On this screen, the last messages from ArduPilot are shown, in the order in which they were received (latest message appears at the bottom), along with the severity of the messages:

```
1.[Info] APM:Copter V3.5.0 (1301b979) QUAD
2.[Info] Calibrating barometer
3.[Critical] PreArm: Need 3D Fix
4.[Critical] Arm: Safety Switch
5.[Critical] Bad AHRS (x2)
6.[Warning] Reached command #3
7.[Critical] Error compass variance
8.[Warning] Reached command #4
```

Message Screen on X9D+ and X9E

```
4.[Critical] Arm: Safety Switch
5.[Critical] Bad AHRS (x2)
6.[Warning] Reached... command #3
7.[Critical] Error compass... variance
8.[Warning] Reached... command #4
```

Message Screen on X7 and X-Lite

### HUD with condensed status information (X7 and X-Lite only)

Because of the smaller LCD screen size of the Taranis X7 and X-Lite, an additional screen is available on these versions which combines the HUD with condensed status information. Status information shown on this screen includes battery pack voltage measured by the power modules (if used) or by cell sensors (if used) along with the lowest recorded battery pack voltage and the number of cells in the battery pack (e.g., 3S = 3 cells). Below that, a battery bar with percentage remaining, current draw measured by the power modules (if used), distance from home (in meters or feet) and GPS status information, are shown.



By validating [ENT], some of the information is replaced by the lowest cell voltage from the cell sensors (if used) or averaged from pack voltage along with the lowest recorded cell voltage, power draw from power modules (if used), and number of satellites and GPS fix quality (HDOP).



## 5. FlightDeck usage (continued)

### Configuration Screen

The Configuration Screen is accessed by pressing MENU from any FlightDeck screen:

```
FlightDeck configuration v3.3.0
Battery cell low alert 3.6V
Battery cell critical alert 3.4V
Cell V difference alert 0.10V
Battery A difference alert 10%
Battery1 capacity override ---
Battery2 capacity override ---
Sound On
Repeat period 10s
Text language English
Voice Female
```

The FlightDeck parameters configured from the Configuration Screen are:

- Battery cell low alert Defines the cell voltage triggering the low cell voltage alarm [default: 3.6V].
- Battery cell critical alert Defines the cell voltage triggering the critical cell voltage alarm [default: 3.4V].
- Cell V difference alert Defines the voltage difference between cell triggering a warning popup (requires one or two cell sensors) [default: 0.10V].
- Battery A difference alert Defines the percentage of difference between the currents (A) of the two batteries triggering a warning popup (requires two power modules – one per battery) [default: 10%].
- Battery1 capacity override Defines the capacity (mAh) for battery 1. *Set this parameter to override the battery capacity parameter set in ArduPilot.* This is particularly useful when swapping batteries of different capacities while in the field [default: “- - -” = disabled, which means that the battery capacity parameter found in ArduPilot is used].
- Battery2 capacity override Same for battery 2 [default: “- - -”].
- Sound Defines whether the FlightDeck sounds are played [default: On].
- Repeat period Defines the time between some sounds, to prevent them from repeating too often [default: 10 seconds].
- Text language Defines the language used for the text displayed in FlightDeck [default: same as OpenTX firmware language].
- Voice Defines whether to use a female or male voice for the announcements [default: Female].

The parameters apply to and are saved for each OpenTX model individually, so a different configuration can be set for each model.



## 5. FlightDeck usage (continued)

### *Sounds*

FlightDeck plays sounds even if the FlightDeck interface is not displayed. These sounds can be disabled by setting the “Sound” parameter to “Off.” The time between repetitions of some sounds can be changed using the “Repeat period” parameter. The FlightDeck sounds consist of:

- Flight mode (e.g., “stabilize,” “loiter”),
- “Normal/simple/super simple mode” (Copter only),
- “Landing complete” each time the aircraft lands (which also pauses the flight timer),
- “Armed”/“disarmed,”
- “Battery at 50%” and “Battery at 25%,”
- “Battery low” if the lowest cell voltage reached the cell low alert level,
- “Battery critical” if the lowest cell voltage reached the cell critical alert level,
- “Battery failsafe” and “EKF failsafe” if triggered in ArduPilot,
- “GPS signal lost” and “GPS signal recovered” based on 3D fix,
- “Rangefinder active” and “rangefinder inactive,”
- A chime sound which rings each time a message is received from ArduPilot.

### *Warning popups*

To dismiss a warning, press EXIT. That warning will not reappear until the Taranis is restarted.

#### ➤ **Cell voltage balance warning (requires one or two cell sensors):**

This warning popup appears once on screen if the voltage difference between any two cells of the battery pack is greater than the configured “Cell V difference alert” voltage. The warning indicates that the cells of the battery pack are significantly out of balance, and that the battery pack should probably not be used until the cells are rebalanced.

```
Warning: Voltage difference between...  
battery cells > 0.1V!  
  
[EXIT]
```

#### ➤ **Current difference warning (requires two power modules – one per battery):**

In a dual parallel battery system, a current difference warning popup appears once on screen if the percentage of difference between currents drawn from each battery pack is greater than the configured “Battery A difference alert” percentage (currents measured by two power modules). The warning indicates that the current of one of the two battery packs is significantly more than the other, and typically indicates that one of the packs is starting to fail.

```
Warning: Current difference between...  
batteries > 10%!  
  
[EXIT]
```



## 6. Troubleshooting

Symptom	Cause	Solution
"SD Card Warning" appears when Taranis turned on.	Taranis SD card contents not up to date.	Follow the steps in the "Update Taranis SD card contents to match the version of OpenTX" section of this manual or find tutorials online.
"fltdk" script not selectable from the DISPLAY screen.	FlightDeck files not copied properly to the Taranis SD card.	Follow the steps in the "Copy FlightDeck onto Taranis SD card" section of this manual.
Stays on splash screen ("Wait for your flight controller") AND no sensor shown or updating (the * symbol) on the TELEMETRY screen (including receiver sensors such as RSSI) after starting discovery ("Discover new sensors").	FrSky receiver is not powered.	Check connections and power to receiver.
	Taranis and/or FrSky receiver firmwares need to be updated.	Download and update Taranis/RX firmwares: <a href="http://frsky-rc.com/download">frsky-rc.com/download</a> Firmware update guide: <a href="http://craftandtheoryllc.com/fw-guide">craftandtheoryllc.com/fw-guide</a>
	Taranis too close to FrSky receiver.	Separate Taranis and receiver by at least three feet / one meter. Also try turning Taranis off then back on while separated.
	FrSky receiver not bound or needs rebinding.	Follow steps in equipment manual to rebind receiver.
	Other radio equipment causes interference (433MHz in particular).	Turn off other radios or move radio antennas away from FrSky receiver.
Stays on splash screen ("Wait for your flight controller") AND RSSI updating in list of discovered sensors AND GPS missing (or not updating) in list of discovered sensors.	Flight controller not transmitting on FrSky Smart Port bus.	<ol style="list-style-type: none"> <li>1) Check connections and power to flight controller.</li> <li>2) Double check the ArduPilot serial port configuration by following the steps in the "Configure the serial port used by the flight controller for FrSky telemetry" section.</li> <li>3) Reformat the flight controller SD card, change it to a faster one, or minimize the amount of data that is logged (by changing the LOG_BITMASK ArduPilot parameter).</li> <li>4) Save ArduPilot configuration (.param file), flash a completely different firmware (e.g., ArduRover) to clear all ArduPilot parameters, flash back the desired firmware and restore the ArduPilot configuration.</li> </ol>



## 6. Troubleshooting (continued)

Symptom	Cause	Solution
Few to no update on FlightDeck interface (e.g., "Sensor Lost" announced by Taranis) AND armed or flying	FrSky radio range issue.	Check for interference with other radio equipment and for antenna damage/orientation. Validate with range test (see FrSky manual)
	Flight controller CPU overload.	1) Reformat the flight controller SD card, change it to a faster one, or minimize the amount of data that is logged (by changing the LOG_BITMASK ArduPilot parameter). 2) Check for other ArduPilot parameters that may cause the CPU to overload (e.g., Kalman filter).
Telemetry cable is overheating/hot to the touch.	Loose connection on serial port to which telemetry cable is plugged.	Check connections, connectors, wires related to that serial port.
	Telemetry cable plugged while flight controller was on.	<b>ALWAYS PLUG TELEMETRY CABLE BEFORE TURNING ON THE FLIGHT CONTROLLER.</b>



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