# Minicube F3 v1.1 6DOF flight controller quick user guide

#### Feature:

- 1. 27x27mm board with 20mm mounting M2.5 holes.
- 2. Next-generation STM32 F3 processor
- 3. Low-noise MPU-6000 SPI-bus gyro chip for faster acquisition of gyro data.
- 4. Pass-through ESC-BLHELI/BLHELI-S programming and configure with UART1.
- 5. Battery voltage monitor.
- 6. Supports direct connection of SBus, SumD, Spektrum1024/2048,

Ibus receivers. No external inverters required (built-in).

- 7. Dedicated SAT receiver solder pad with 3.3v(Switchable)
- 8. Dedicated PPM receiver input with 5V power.
- 9. Integrated LC-Power Filter
- 10. Telemetry support.
- 11. LED strip support.
- 12. Buzzer port for audible warnings and notifications.
- 13. Flashing via USB or serial port.

14.Support Betaflight 3.1 Dshot150/300/600 available.

15.Integrate Betaflight OSD( Batt voltage, RSSI , Artificial Horizon , Fly mode , -Flytime, Craft name etc.)

#### Pins connection diagram:



## Minicube F3 power connection with Minicube 4 in 1 ESC



#### MiniCUBE F3 V1.1 Connection to computer



#### **Getting start:**

1. Install latest STM32 Virtual COM Port Driver

http://www.st.com/web/en/catalog/tools/PF257938

2. Install and launch the Cleanflight Configurator tool

https://chrome.google.com/webstore/detail/betaflight-configurator/kdaghagfopac dngbohiknlhcocjccjao?utm\_source=chrome-ntp-icon (you need to open this link in Google Chrome. If you don't have Google Chrome, download and install this first)

- 3. Connect the flight controller to the computer via USB cable.
- 4. Select the correct COM port if it is not automatically detected.

5. Click connect, verify that communication is established (Fig 1).



#### Software:

The Mini cube F3 flight controller runs the Open-source Betaflight flight control (FC) software . The newest version is Betaflight 3.1 which supports DSHOT very well . HEX Firmware target:

https://github.com/betaflight/betaflight/releases/download/v3.1.0-RC10/betaflight\_3.1.0\_OMNIBUS.hex\_

Bin Firmware target: OMNIBUS.BIN from

http://andwho.sytes.net:8080/job/BorisB\_BetaFlight/

DFUSE tools:

http://www.st.com/zh/development-tools/stsw-stm32080.html DFUMODE to flash firmware should first Connect the boot pad and install the STM32 Bootloader driver.

### **Receiver Configurations**

1. SBUS Receiver:

Connect your SBUS receiver to [RCIN +5V GND] port; Enable Serial\_RX for UART3 from the Port tab in Betaflight configurator, then select RX\_SERIAL from the RECEIVER Mode and set the Serial Receiver Provider to be SBUS in Betaflight Configurator.

orts					WI
Note: not Note: Do N	all combinations are valid. Wh	nen the flight controller firmware o serial port unless you know what y	letects this the serial port config ou are doing. You may have to re	uration will be reset. eflash and erase your	configuration if you do
Identifier	Data	Logging	Telemetry	RX	GPS
USB VCP	MSP 115200 T	Blackbox 115200 V	Disabled V AUTO V	Serial RX	57600 •
JART1	MSP 115200 ▼	Blackbox 115200 •	Disabled V AUTO V	Serial RX	57600 •
JART2	MSP 115200 V	Blackbox 115200 V	Disabled V AUTO V	Serial RX	57600 •
	MSP 115200 Y	Blackbox 115200 V	Disabled V AUTO V	Serial RX	57600 •

Receiver mode		
RX_PPM	PPM RX input	
RX_SERIAL	Serial-based receiver (SPEKSAT, SBUS, SUMD)	
RX_PARALLEL_PWM	PWM RX input (one wire per channel)	
RX_MSP	MSP RX input (control via MSP port)	
Serial Receiver Provider		
Serial Receiver Provider Note: Remember to configure RX_SERIAL feature. SPEKTRUM1024 SPEKTRUM2048	a Serial Port (via Ports tab) and choose a Serial Receiver Provider when using	5
Serial Receiver Provider Note: Remember to configure RX_SERIAL feature. SPEKTRUM1024 SPEKTRUM2048 SBUS	a Serial Port (via Ports tab) and choose a Serial Receiver Provider when using	5

#### 2. PPM Receiver:

Connect your PPM receiver to [RCIN +5V GND] port and then set the Receiver Mode to RX\_PPM from the configuration in Betaflight configurator.

Ports					WIKI
Note: not a Note: Do N	l combinations are valid. When OT disable MSP on the first seria	the flight controller firmware detects al port unless you know what you are	this the serial port configuration wi doing. You may have to reflash and	ll be reset. erase your configurati	on if you do.
Identifier	Data	Logging	Telemetry	RX	GPS
USB VCP	MSP 115200 ▼	Blackbox 115200 V	Disabled <b>v</b> AUTO <b>v</b>	Serial RX	57600 •
UART1	MSP 115200 ▼	Blackbox 115200 <b>T</b>	Disabled <b>v</b> AUTO <b>v</b>	Serial RX	57600 •
UART2	MSP 115200 V	Blackbox 115200 V	Disabled <b>v</b> AUTO <b>v</b>	Serial RX	57600 •

Receiver Mode	
RX_PPM	PPM RX input
RX_SERIAL	Serial-based receiver (SPEKSAT, SBUS, SUMD)
RX_PARALLEL_PWM	PWM RX input (one wire per channel)
RX_MSP	MSP RX input (control via MSP port)
Note: Remember to configure RX_SERIAL feature.	e a Serial Port (via Ports tab) and choose a Serial Receiver Provider when using
SPEKTRUM1024 SPEKTRUM2048 SBUS SUMD	*

3. Spektrum Satellite DSM2/DSMX or Receiver

Connect your DSM2/DSMX receiver to [RCIN +3.3V GND] port; Solder the power switchable pins(pin1+pin2) from the bottom side of the flight controller to get 3.3v output for the receiver; Enable Serial\_RX for UART3 from the Port tab in Betaflight configurator, then select RX\_SERIAL from the RECEIVER Mode and Select SPEKTRUM1024 for DSM2 Radio; Select SPEKTRUM2048 for DSMX Radio in Betaflight Configurator.

	Ports				WIKI
	Note: not all combinations are valid. W Note: Do NOT disable MSP on the first	When the flight controller firmware of the serial port unless you know what y	detects this the serial port config rou are doing. You may have to re	uration will be reset. eflash and erase your	configuration if you do.
	Identifier Data	Logging	Telemetry	RX	GPS
	USB VCP MSP 115200 •	Blackbox 115200 •	Disabled • AUTO •	Serial RX	57600 •
	UARTI MSP 115200 •	Blackbox 115200 V	Disabled • AUTO •	Serial RX	57600 •
	UART2 MSP 115200 -	Blackbox 115200 ¥	Disabled • AUTO •	Serial RX	57600 -
	UART3 MSP 115200 ¥	Blackbox 115200 •	Disabled • AUTO •	Serial RX	57600 -
	Receiver Mode				
	RX_PPM	PPM RX input			
	RX_SERIAL	Serial-based rec	eiver (SPEKSAT, SBUS, SU	MD)	
	RX_PARALLEL_PWM	PWM RX input (o	one wire per channel)		
	RX_MSP	MSP RX input (co	ontrol via MSP port)		
	Serial Receiver Provider				
	Note: Remember to config RX_SERIAL feature.	ure a Serial Port (via Ports	tab) and choose a Serial	Receiver Provide	er when using
For DSM2 Radio	SPEKTRUM1024 SPEKTRUM2048 SBUS SUMD	For DSMX Radie	0		*

Spektrum satellite DSM2/DSMX Receiver binding procedure :

(1) Connect your receiver to the Minicube flight controller then Connect Minicube F3 to computer and open Betaflight configurator, From CLI tab type: "set spektrum\_sat\_bind = 9" for DSMX radio or "set spektrum\_sat\_bind = 5" for DSM2 radio

(2) Type "save" and after Flight controller reboot remove USB cable (=Power off the board)

(3) Wait a second and reconnect the USB cable. After cold start satellite

led(Orange color LED) should start blinking and transmitter should be turned on while pressing the bind button

(4) After binding satellite led should be solid. Connect Betaflight and use receiver tab to test that satellite is working correctly.

(5) Final step is to go to CLI tab and type "set spektrum\_sat\_bind = 0" and then type "save". This must be done so that satellite doesn't go back to binding mode when the Minicube F3 is repowered again.

# **Betaflight OSD Configurations:**

1. Connect the Minicube F3 to the computer , open Betaflight Configurator , move to the OSD option, then you can configure the layout of the OSD.

lements	Preview (drag to change position)	Logo:	'Ideo Format	
Rssi Value			🖲 auto 🔍 pa	IL 🔍 NTSC
Main Batt Voltage	Contra Maria		Inite	
Crosshairs	BETAFLI			
🔾 Artificial Horizon			🤊 IMPERIAL 🔍	METRIC
Horizon Sidebars	s an	A	larms	
🜔 Ontime	The second se		0	A Deci
Flytime	Carlos Ca	2	200	Capacity
) Flymode	and the second s	1	0	Minutes
Craft Name	STAB	#R 4 1 1 1 1	00	Altitude
		HK 4:11		
Throttle Position		A State		

## 2. Craft Name set is in configuration option

ך Setup	SONAR	Sonar	
Ports	TELEMETRY	Telemetry output	3D
Configuration	3D	3D mode (for use with reversible ESCs)	1406     3D Deadband Low       1514     3D Deadband High
Beraiver	LED_STRIP	Multi-color RGB LED strip support	1460 🗘 3D Neutral
Modos C	DISPLAY	OLED Screen Display	0  C JD Deadband Throttle
• Niddes	BLACKBOX	Blackbox flight data recorder 🛛 🔞	
Motors     OSD     C	CHANNEL_FORWARDI	NG Forward aux channels to servo outputs	Misc
🛱 LED Strip	TRANSPONDER	Race Transponder 🕜	Aurora90 Craft name
I Blackbox	AIRMODE	Permanently enable Airmode	
3 CLI	OSD	On Screen Display	
C	ESC_SENSOR	Use KISS ESC 24A telemetry as sensor	

# Useful Links:

https://github.com/betaflight/betaflight/wiki