The Cube Module Overview

The Cube Fixed Board

- Black, Green, BlueF4, PurpleF4 STM32F427; flash 2MB, RAM 256KB.
- Yellow STM32F777; flash 2MB, Ram 512KB.
- Orange, BlueH7, PurpleH7 STM32H753; flash 2MB, RAM 1MB.
- Orange+ STM32H757; flash 2MB, RAM 1MB.
- On-board 16KB SPI FRAM
- Black, Green, BlueF4, Purple MPU9250 16G integrated accelerometer / gyro.
- Orange,Orange+, BlueH7, ICM 20649 30G integrated accelerometer / gyro.
- MS5611 Barometer
- All sensors connected via SPI.
- Micro SD interfaces via SDIO.

*CubeBlue “manufactured in USA with US and allied components”

EOL And Substitution

- MPU9250, LSM303D, L3GD20 are all EOL, As such, all new designs should use the H7 based boards CubeBlueH7, CubeOrange, and CubePurpleH7 are 100% plug and play with all carrier boards that are compliant with our reference design dating back to 2014.
- at the time of the latest edit here, cube PurpleF4 was still in stock, but when stocks run out, CubePurpleH7 will take its place.

Vibration Damped IMU board version 1 (Fitted to Cube Black, Cube BlueF4, Cube Green)

- LSM303D integrated accelerometer / magnetometer.
- L3GD20 gyro.
- MPU9250 Gyro / Accel
- MS5611 Barometer
- All sensors connected via SPI.

Vibration Damped IMU board version 2 (Fitted to Cube Orange, Cube BlueH7 and Cube Yellow)

- ICM20602
- ICM 20948
- MS5611 Barometer
- All sensors connected via SPI.

Vibration Damped IMU board version 3 (Fitted to Cube Orange+)

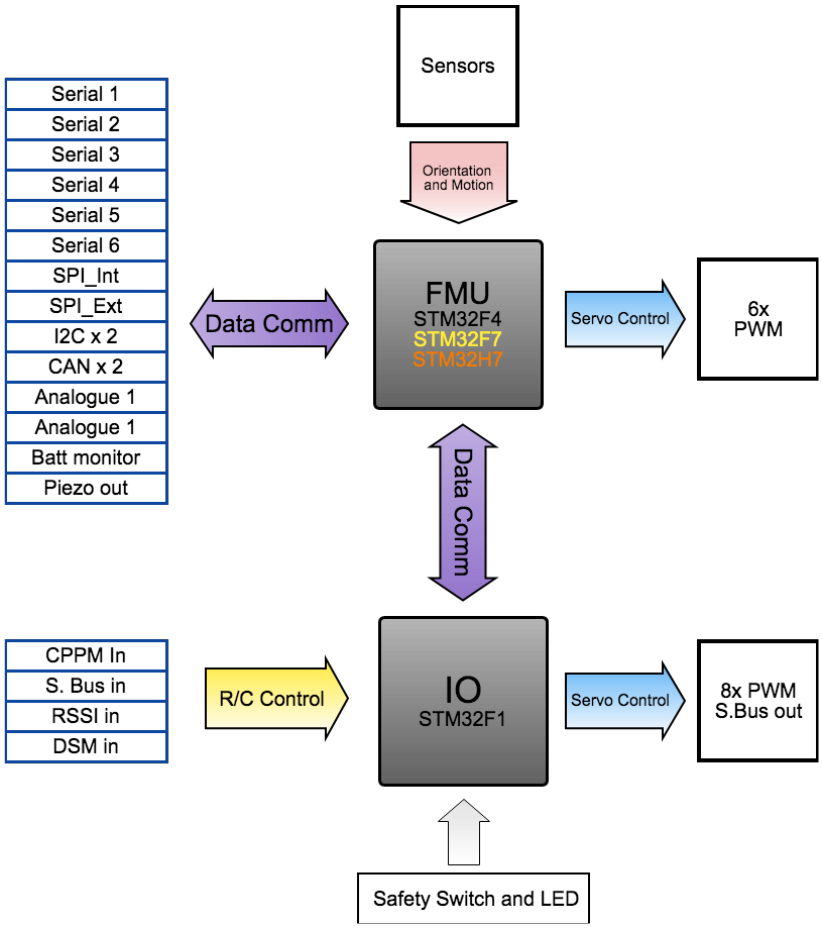
- ICM20948
- ICM42688
- MS5611 barometer
- All sensors connected via SPI.

I/O ports

- 14 PWM servo outputs (8 from IO, 6 from FMU).
- R/C inputs for CPPM, Spektrum / DSM and S.Bus.
- Analogue / PWM RSSI input.
- S.Bus servo output.
- 5 general purpose serial ports, 2 with full flow control
- Two I2C ports
- One SPI port (un-buffered, for short cables only not recommended for use).
- Two CAN Bus interface. (CAN FD for BlueH7 and Orange with CubePilot Logo)
- 3 Analogue inputs
- High-powered piezo buzzer driver. (On expansion board)
- High-power RGB LED. (I2C driver compatible Connected externally only)
- Safety switch / LED.

System architecture

The Cube continues with the FMU + IO architecture from the previous generation, incorporating the two functional blocks in a single physical module.



PWM Outputs

The Cube has eight PWM outputs that are connected to IO and can be controlled by IO directly via R/C input and on-board mixing even if FMU is not active (failsafe / manual mode). Multiple update rates can be supported on these outputs in three groups; one group of four and two groups of two. PWM signal rates up to 400Hz can be supported. These 8 PWM's are output ONLY and are capable of driving up to 50mA each, but only a total of 100mA for the 8.

Six PWM outputs are connected to FMU and feature reduced update latency. These outputs cannot be controlled by IO in failsafe conditions. Multiple update rates can be supported on these outputs in two groups; one group of four and one group of two.
PWM signal rates up to 400Hz can be supported.

All PWM outputs are EDS-protected, and they are designed to survive accidental mis-connection of servos without being damaged. The servo drivers are specified to drive a 50pF servo input load over 2m of 26AWG servo cable.

the I/O PWM outputs can also be configured as individual GPIOs. Note that these are not high-power outputs – the PWM drivers are designed for driving servos and similar logic inputs only, not relays or LEDs.

Peripheral Ports

All peripherals are connected through a single 80 pin connector, and the peripherals are connected via a baseboard that can be customized for each application

Base Board

The initial base board features separate connectors for each of the peripheral ports (with a few exceptions.

Five serial ports are provided. Serial 1 and 2 feature full flow control. Serial 3 is recommended as the GPS port and has the safety button and (possibly the safety led) as well as I2C for the compass and RGB LED. Serial 4 also has I2C, but on the second bus, thus allowing two compass modules to be connected at the same time. Serial 5 is available as a header underneath the board. Serial ports are 3.3V CMOS logic level, 5V tolerant, buffered and ESD-protected.

The SPI port is not buffered; it should only be used with short cable runs. Signals are 3.3V CMOS logic level, but 5V tolerant. SPI is only available to test points on the first base board, along with a CS and INT pin.

Analogue 1-3 are protected against inputs up to 12V, but scaled for 0-3.3V inputs. The RSSI input supports either PWM or analogue RSSI. This input shares a pin with S.Bus output - only one may be connected at a time.

CPPM, S.Bus and DSM/Spektrum input are unchanged from previous versions.

The CAN ports are standard CAN-Bus; termination for one end of the bus is fixed on- board. Drivers are on-board the FMU

The piezo port will drive most piezo elements in the 5 - 300nF range at up to 35V. it is intended to be *extremely loud*, with the achievable sound pressure level limited by the sensitivity of the piezo element being driven.

I2C is direct driven, un-buffered, and pulled up to ***3.3v on-board*** the FMU

Serial 5 is used for the on-board ADSB-IN receiver that is featured on newer carrier boards

Sensors

All flight sensors in The Cube are connected via SPI.

CUBE TYPE	Life Cycle	IMU1	IMU2
CubeBlack CubeBlueF4 CubeGreen	EOL	MPU9250	LSM303D/L3GD20
CubeBlack+	EOL	MPU9250	ICM20602
CubePurpleF4	EOL	MPU9250	NA
CubePurpleH7	ACTIVE	ICM20649	NA
CubeOrange CubeYellow CubeBlueH7	ACTIVE	ICM20649	ICM20602
CubeOrange+	ACTIVE	ICM42688	ICM20648

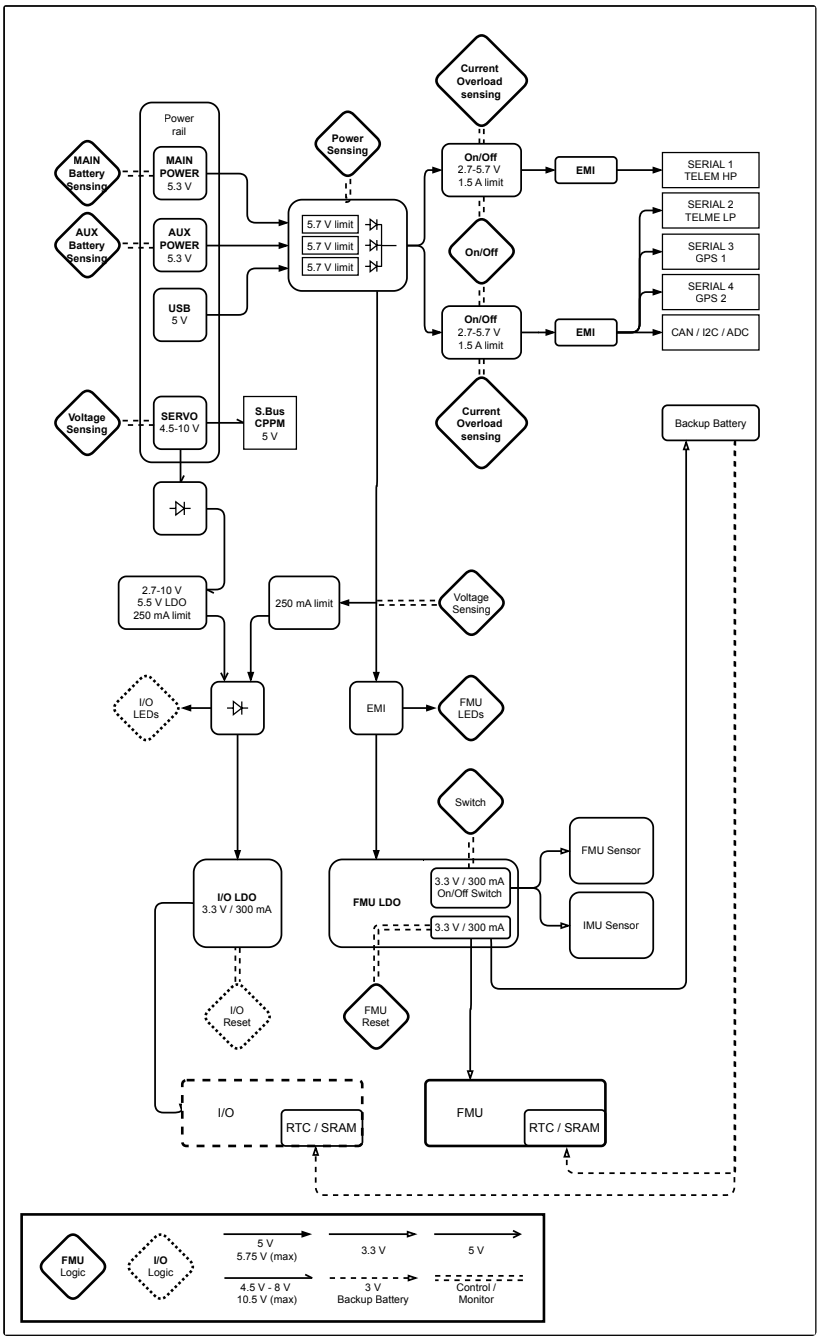
IMU1, Non-Isolated
IMU2 & 3, Isolated
Data-ready signals from all sensors are **NOT ROUTED on the Isolated IMU**

*CubeBlue “manufactured in USA with US and allied components”

Power Architecture

The Cube removes the power management from the FMU, the Servo rail is no longer the primary source of backup power for the FMU, and it leaves it there for the IO last chance failsafe.
The supply of 3.3v

- Split digital and analogue power domains for FMU and sensors.
- Backup power for IO in the case of FMU power supply failure.



Power management module (separate from the FMU)

Key features of The Cube power architecture:

- Single, independent 5V supply for the flight controller and peripherals.
- Integration with ***2 power bricks*** or compatible alternative, including current and voltage sensing.
- Low power consumption and heat dissipation.
- Power distribution and monitoring for peripheral devices.
- Protection against common wiring faults; under/over-voltage protection, overcurrent protection, thermal protection.
- Brown-out resilience and detection.

FMU and IO Power Supplies

Both FMU and IO operate at 3.3V, and each has its own private dual-channel regulator. As in The Cube (formerly known as Pixhawk), each regulator features a power-on reset output tied to the regulator's internal power-up and drop-out sequencing.

Power Sources

Power may be supplied to The Cube via USB, via the power brick port, or the second brick port. Each power source is protected against reverse-polarity connections and back-powering from other sources.

The Cube F4 series FMU + IO power budget is 450mA, including all LEDs and the Piezo buzzer. Peripheral power is limited to 2.5A total. The Cube F7 and H7 series FMU + IO power budget is 550mA, including all LEDs and the Piezo buzzer. Peripheral power is limited to 2.5A total.

The increase in power budget is due to the improved heater on the cube orange

USB IS NOT RECOMMENDED IN FLIGHT ON Nuttx code

Power Brick Port

The brick port is the preferred power source for Cube, and brick power will always be selected if it is available.

Servo Power

The Cube supports both standard (5V) and high-voltage (up to 10V) servo power with some restrictions.

IO will accept power from the servo connector up to 10V. This allows IO to failover to servo power in all cases if the main power supply is lost or interrupted.

FMU and peripherals will NOT accept power from the servo connector.

Aux Power

The Cube introduces a backup power port; this is set up the same as the primary power input.

At input voltages over 5.7V power is locked out.

The Cube and peripherals combined may draw up to 2.75A total when operating on Aux power, provided that the Brick or other power source can supply the required current.

Power is never supplied by The Cube to servos.

Servo rail

The I/O chip takes power up to 10.5v from the servo rail; this is used to revert to manual mode in the unfortunate event that the other two main sources of power fail. This is only useful for plane, and only useful if the I/O chip has been mapped correctly.

USB Power

Power from USB is supported for software update, testing and development purposes. USB power is supplied to the peripheral ports for testing purposes, however total current consumption must typically be limited to 500mA, including peripherals, to avoid overloading the host USB port.

Multiple Power Sources

When more than one power source is connected, power will be drawn from the highest-priority source with a valid input voltage.

In most cases, FMU should be powered via the power brick or a compatible off board regulator via the brick port or auxiliary power rail.

In desktop testing scenarios, taking power from USB avoids the need for a BEC or similar servo power source (though servos themselves will still need external power).

Summary

For each of the components listed, the input voltage ranges over which the device can be powered from each input is shown.

	Brick port	Aux port	USB port
FMU	4 - 5.7V	4 - 5.7V	4 - 5.7V
IO	4 - 5.7V	4 - 5.7V	4 - 5.7V
Peripherals	4 - 5.7 2.5A max	4 - 5.7 2.5A max	4 - 5.7 2.5A max

The Cube provides power routing, over/under voltage detection and protection, filtering, switching, current-limiting and transient suppression for peripherals. Power outputs to peripherals feature ESD and EMI filtering, and the power supply protection scheme ensures that no more than 5.5V is presented to peripheral devices. Power is disconnected from the peripherals when the available supply voltage falls below 2.7V or rises above approximately 5.7V.

Peripheral power is split into two groups.

Serial 1 (`TELEM 1`) has a private 1.5A current limit, intended for powering a low power. This output is separately EMI filtered and draws directly from the USB / Brick inputs. Peak power draw on this port should not exceed 1.5A, never power your telemetry from this port under any circumstance.

All other peripherals share a 1A current limit and a single power switch. Peak power draw on this port should not exceed 1.5A. Each group is individually switched under software control.

The Spektrum / DSM R/C interface draws power **from its own regulator**, rather than from either of the groups above. This port is switched under software control so that Spektrum / DSM binding can be implemented. Spektrum receivers generally draw ~25mA.

S.Bus and CPPM receivers are powered by a dedicated power supply. Please do not connect any servos to this power, only an RX by itself.

Capacitor Backup

Both the FMU and IO microcontrollers feature Capacitor-backed real-time clocks and SRAM. The on-board backup Capacitor has capacity sufficient for the intended use of the clock and SRAM, which is to provide storage to permit orderly recovery from unintended power loss or other causes of in-air restarts. The capacitors are recharged from the FMU 3.3V rail. this will only function in the event of software existing to support this feature.

Voltage, Current and Fault Sensing

The battery voltage and current reported **by both bricks** can be measured by the FMU. In addition, the 5V unregulated supply rail can be measured (to detect brown- out conditions). IO can measure the servo power rail voltage.

Over-current conditions on the peripheral power ports can be detected by the FMU. Hardware lock-out prevents damage due to persistent short-circuits on these ports. The lock- out can be reset by FMU software. The under/over voltage supervisor for FMU provides an output that is used to hold FMU in reset during brown-out events.

EMI Filtering and Transient Protection (on the normal Base Board, must be specified for externally supplied base boards.)

EMI filtering is provided at key points in the system using high-insertion-loss pass- through filters. These filters are paired with TVS diodes at the peripheral connectors to suppress power transients.

Reverse polarity protection is provided at each of the power inputs. USB signals are filtered and terminated with a combined termination/TVS array.

Most digital peripheral signals (all PWM outputs, serial ports, I2C port) are driven using ESD-enhanced buffers and feature series blocking resistors to reduce the risk of damage due to transients or accidental misconnections.

The Cube Series Interface Specification

Scope of this Document

This document covers the complete interface standard and core mechanical, electrical and external connection options of The Cube module series. Sections marked as LT (long term) are intended to be kept stable to isolate vehicle from autopilot revisions.

Interface Standard

Connector Series

Low density: 0.1” over mould Futaba keyed servo connectors (Mfg. to be identified)

> Cabling: AWG24, ribbon or round, iconic colour scheme

Stack: Hirose DF17, 80pos , 4 mm stacking height, 0.5 mm pitch, drop-proof

High density: JST-GH 1.25 mm

> Cabling: AWG28, ribbon, iconic colour scheme

Power Module: Molex Clik-Mate 2 mm for both main and backup power(on bottom of board?)

The Cube

Mechanical: 30x30 mm M3 mounting hole pattern, 35x35 mm footprint
80 position DF17 connector. Carries *all* autopilot interface connections.

Minimal (read: really minimal) electrical protection

No power management

3.8 to 5.7V operation (absolute maximum ratings)

4.0 to 5.5V operation (compliant rating)

The Cube IO

Total connectivity:

2x I2C

2x CAN: CAN1 and CAN2

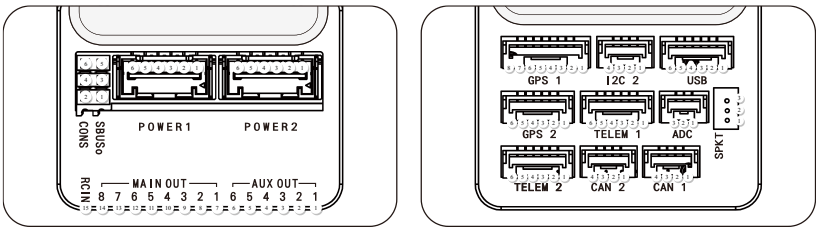
4x UART: TELEM1, TELEM2, GPS (I2C 1 embedded), SERIAL4(I2C 2 embedded)

1x Console: CONSOLE (SERIAL5)

1x HMI: USB extender

Serial Ports Parameter

Port Interface and Pin Label



Main Power - | Connector：POWER1

Pin #	Name	I/O	Voltage
1	VDD_5V_BRICK	IN	5 V
2	VDD_5V_BRICK	IN	5 V
3	BATT_CURRENT_SENS	IN	3.3 V
4	BATT_VOLTAGE_SENS	IN	3.3 V
5	GND	-	GND
6	GND	-	GND

Backup Power - | Connector：POWER2

Pin #	Name	I/O	Voltage
1	VDD_5V_BRICK	IN	5 V
2	VDD_5V_BRICK	IN	5 V
3	AUX_BATT_CURRENT_SENS	IN	3.3 V
4	AUX_BATT_VOLTAGE_SENS	IN	3.3 V
5	GND	-	GND
6	GND	-	GND

I2C - 4 pos (1 fitted as a standalone, 1 old internal) | Connector：I2C2

Pin #	Name	I/O	Voltage
1	VCC_5V	OUT	5 V
2	I2C_2_SCL	IN/OUT	3.3 V (PULLUPS)
3	I2C_2_SDA	IN/OUT	3.3 V (PULLUPS)
4	GND		GND

CAN (2 fitted) | Connector：CAN1, CAN2

Pin #	Name	I/O	Voltage
1	VCC_5V	OUT	5 V
2	CAN_H	IN/OUT	12 V
3	CAN_L	IN/OUT	12 V
4	GND	-	GND

UART GENERIC (autopilot side) | Connector : TELEM1, TELEM2

Pin #	Name	I/O	Voltage
1	VCC_5V	OUT	5 V
2	MCU_TX	OUT	3.3 V - 5.0 V TTL
3	MCU_RX	IN	3.3 V - 5.0 V TTL
4	MCU_CTS (TX)	OUT	3.3 V - 5.0 V TTL
5	MCU_RTS (RX)	IN	3.3 V - 5.0 V TTL
6	GND	-	GND

UART GPS (autopilot side, I2C is the original “External” bus), UART 3 | Connector：GPS1

Pin #	Name	I/O	Voltage
1	VCC_5V	IN	5 V
2	GPS_TX	IN	3.3 V - 5.0 V TTL
3	GPS_RX	OUT	3.3 V - 5.0 V TTL
4	SCL	IN	3.3 V
5	SDA	IN/OUT	3.3 V
6	BUTTON	OUT	GND
7	IO_LED_SAFET_PROT	OUT	GND
8	GND	-	GND

UART 4 (I2C2, the original “Internal” bus) | Port：GPS2

Pin #	Name	I/O	Voltage
1	VCC_5V	OUT	5 V
2	MCU_TX	OUT	3.3 V - 5.0 V TTL
3	MCU_RX	IN	3.3 V - 5.0 V TTL
4	SCL	OUT	3.3 V - 5.0 V
5	SDA	IN	3.3 V - 5.0 V
6	GND	-	GND

UART 5 (Debug), S.Bus out - FR-SKY TELEM? or Debug | Port：CONS SBUSo

Pin #	Name	I/O	Voltage
1	S.Bus_Out	OUT	
2	MCU_TX	OUT	3.3 V - 5.0 V TTL
3	VDD_SERVO	OUT	Servo Voltage
4	MCU_RX	IN	3.3 V - 5.0 V TTL
5	GND	-	GND
6	GND	-	GND

Debug (New Standard Debug) (Digikey PN for housing SM06B-SURS-TF(LF)(SN)-ND)

IO DEBUG

Pin #	Name	I/O	Voltage
1	VDD 5V PEIPH	OUT	5 V
2	IO_TX	OUT	3.3 V - 5.0 V TTL
3	IO_RX	IN	3.3V - 5.0 V TTL
4	IO-SWDIO	I/O	3.3 V - 5.0 V TTL
5	IO-SWCLK	I/O	3.3 V - 5.0 V TTL
6	GND	OUT	GND

FMU DEBUG

Pin #	Name	I/O	Voltage
1	VDD 5V PEIPH	OUT	5 V
2	FMU_TX (SERIAL 5)	OUT	3.3 V - 5.0 V TTL
3	FMU_RX (SERIAL 5)	IN	3.3V - 5.0 V TTL
4	FMU-SWDIO	I/O	3.3 V - 5.0 V TTL
5	FMU-SWCLK	I/O	3.3 V - 5.0 V TTL
6	GND	OUT	GND

Analogue | Port : `ADC`

Pin #	Name	I/)	Voltage
1	VDD_5V_Periph	OUT	
2	Pressure sense in	IN	
3	GND	-	

IO USART 1 / DSM / Spektrum | Port : `SPKT`

Pin #	Name	I/O	Voltage
1	IO_USART1_RX_SPECTRUM_DSM	IN	
2	GND	-	GND
3	VDD_3V3_Spektrum	OUT	3.3 V

HMI (Buzzer, USB, LEDs) | Port : `USB`

Pin #	Name	I/O	Voltage
1	V BUS	OUT	5 V
2	OTG_DP1	IN/OUT	3.3 V

3	OTG_DM1	IN/OUT	3.3 V
4	GND	-	GND
5	BUZZER_OUT	OUT	Battery Voltage
6	FMU_LED_AMBER	OUT	

Back Edge (may rearrange to suit PCB layout) | Port : `RCIN` `MAIN OUT` `AUX OUT`

SERVO HEADER (0.1", 1/1/15 power layout)

Pin #	Name	I/O	Voltage
S - 1	FMU_CH1_PROT	OUT	3.3 V Servo Signal, Servo Rail Power
S - 2	FMU_CH2_PROT	OUT	3.3 V Servo Signal, Servo Rail Power
S - 3	FMU_CH3_PROT	OUT	3.3 V Servo Signal, Servo Rail Power
S - 4	FMU_CH4_PROT	OUT	3.3 V Servo Signal, Servo Rail Power
S - 5	FMU_CH5_PROT	OUT	3.3 V Servo Signal, Servo Rail Power
S - 6	FMU_CH6_PROT	OUT	3.3 V Servo Signal, Servo Rail Power
S - 7	IO_CH1_PROT	OUT	3.3 V Servo Signal, Servo Rail Power
S - 8	IO_CH2_PROT	OUT	3.3 V Servo Signal, Servo Rail Power
S - 9	IO_CH3_PROT	OUT	3.3 V Servo Signal, Servo Rail Power
S - 10	IO_CH4_PROT	OUT	3.3 V Servo Signal, Servo Rail Power
S - 11	IO_CH5_PROT	OUT	3.3 V Servo Signal, Servo Rail Power
S - 12	IO_CH6_PROT	OUT	3.3 V Servo Signal, Servo Rail Power
S - 13	IO_CH7_PROT	OUT	3.3 V Servo Signal, Servo Rail Power
S - 14	IO_CH8_PROT	OUT	3.3 V Servo Signal, Servo Rail Power
S - 15	PPM_SBUS_PROT	IN/OUT	3.3 V / 4.5 V Power

The Cube 80-pin DF17 Connector (LONG TERM STANDARD!)

Pin #	Name	I/O	Description
1	FMU_SWDIO	I/O	FMU serial wire deb I/O
2	FMU_LED_AMBER	O	Boot error LED (dri only, controlled by
3	FMU_SWCLK	O	FMU serial wire deb clock
4	I2C_2_SDA	I/O	I2C Serial Data Tx/
5	EXTERN_CS	O	Chip select for ext SPI (NC, just for debugging)
6	I2C_2_SCL	O	I2C Serial Clock Sig
7	FMU_!RESET	I	Reset pin for the F

8	PROT_SPARE_1		Spare
9	VDD_SERVO_IN	I	Power for last resc I/O failsafe
10	PROT_SPARE_2		Spare
11	EXTERN_DRDY	I	Interrupt pin for external SPI (NC, ju for debugging)
12	SERIAL_5_RX	I	UART 5 RX (Receiv Data)
13	GND		System GND
14	SERIAL_5_TX	O	UART 5 TX (Transn Data)
15	GND		System GND
16	SERIAL_4_RX	I	UART 4 RX (Receiv Data)
17	SAFETY		Safety button inpu
18	SERIAL_4_TX	O	UART 4 TX (Transn Data)
19	VDD_3V3_SPEKTRUM _EN	O	Enable for the Spektrum voltage regulator
20	SERIAL_3_RX	I	UART 3 RX (Receiv Data)
21	PRESSURE_SENS_IN	AI	Analogue Signal po for pressure senso Laser range finder, Sonar
22	SERIAL_3_TX	O	UART 3 TX (Transn Data)
23	AUX_BATT_VOLTAGE_ SENS	AI	Voltage sense for A battery input
24	ALARM	O	Buzzer PWM Signa
25	AUX_BATT_CURRENT _SENS	AI	Current sense for A battery input
26	IO_VDD_3V3	I	IO chip power, pinne through for debug
27	VDD_5V_PERIPH_EN	O	Enable voltage sup for Peripherals
28	IO_LED_SAFET_PROT	O	IO-LED_SAFETY (safety LED) pinnec out for IRIS
29	VBUS	I	USB VBus (VDD)
30	SERIAL_2_RTS		UART 2 RTS (Requ To Send)
31	OTG_DP1	I/O	USB Data+ (D)
32	SERIAL_2_CTS		UART 2 CTS (Clear Send)
33	OTG_DM1	I/O	USB Data- (M)
34	SERIAL_2_RX	I	UART 2 RX (Receiv Data)
35	I2C_1_SDA	I/O	I2C Serial Data Tx/
36	SERIAL_2_TX	O	UART 2 TX (Transn Data)
37	I2C_1_SCL	O	I2C Serial Clock Sig

38	SERIAL_1_RX	I	UART 1 RX (Receiv Data)
39	CAN_L_2	I/O	FMU CAN bus Low Signal Driver
40	SERIAL_1_TX	O	UART 1 TX (Transn Data)
41	CAN_H_2	I/O	FMU CAN bus High Signal Driver
42	SERIAL_1_RTS		UART 1 RTS (Requ To Send)
43	VDD_5V_PERIPH_OC	I	Error state messag from Peripheral pov supply
44	SERIAL_1_CTS		UART 1 CTS (Clear Send)
45	VDD_5V_HIPOWER_OC	I	Error state messag from High power Peripheral power supply
46	IO_USART_1_TX	O	I/O USART 1 TX
47	BATT_VOLTAGE_SENS_PROT	AI	Voltage sense fron main battery
48	IO_USART1_RX_SPECTRUM_DSM	O	Signal from Spectr receiver
49	BATT_CURRENT_SENS_PROT	AI	Current sense from main battery
50	FMU_CH1_PROT	O	FMU PWM output channel 1
51	SPI_EXT_MOSI	O	External SPI, for de only
52	FMU_CH2_PROT	O	FMU PWM output channel 2
53	VDD_SERVO	I	VDD_Servo, for monitoring servo bu
54	FMU_CH3_PROT	O	FMU PWM Output Channel 3
55	VDD_BRICK_VALID	I	Main Power valid si
56	FMU_CH4_PROT	O	FMU PWM Output Channel 4
57	VDD_BACKUP_VALID	I	Backup Power valid Signal
58	FMU_CH5_PROT	O	FMU PWM Output Channel 5
59	VBUS_VALID	I	USB bus valid signa
60	FMU_CH6_PROT	O	FMU PWM Output Channel 6
61	VDD_5V_IN_PROT	I	Main power (5V) int FMU from power selection
62	PPM_SBUS_PROT	I	PPM / S.Bus Signal Input
63	VDD_5V_IN_PROT	I	Main power (5V) int FMU from power selection
64	S.BUS_OUT	O	S.Bus Signal Output

65	IO_VDD_5V5	O	IO VDD 5.5 V
66	IO_CH8_PROT	O	I/O PWM Output Channel 8
67	SPI_EXT_MISO	I	External SPI, for De only
68	IO_CH7_PROT	O	I/O PWM Channel 7
69	IO_SWDIO	I/O	I/O serial wire debu
70	IO_CH6_PROT	O	I/O PWM Output Channel 6
71	IO_SWCLK	O	I/O Serial Wire Deb Clock
72	IO_CH5_PROT	O	I/O PWM Output Channel 5
73	SPI_EXT_SCK	O	External SPI, for De only
74	IO_CH4_PROT	O	I/O PWM Output Channel 4
75	IO_!RESET	I	I/O Reset Pin
76	IO_CH3_PROT	O	I/O PWM Output Channel 3
77	CAN_L_1	I/O	FMU CAN bus Low Signal Driver
78	IO_CH2_PROT	O	I/O PWM Output Channel 2
79	CAN_H_1	I/O	FMU CAN bus High Signal Driver
			I/O PWM Output

Differences between Cube colours

The Cube Series	Cube Orange+	Cube Orange	Cube Blu
Processor	STM32H757	STM32H753	STM32H
Remote Signal	PPM/SBUS/DSM	PPM/SBUS/DSM	PPM/SB
I/O PWN Voltage	3.3V/5V software selectable	3.3V/5V software selectable	3.3V/5V selectal
Redundancy	Triple Redundancy	Triple Redundancy	Triple Re
Isolation system	Y	Y	Y
Temp regulator	Y	Y	Y
Number of Accelerometer	3	3	3
Number of Gyroscope	3	3	3
Number of Magnetometer	1	1	1
Number of Barometer	2	2	2
Original of Manufacturing	Taiwan	Taiwan	U.S.A
Product lifecycle	Available	Available	Available

*CubeBlue “manufactured in USA with US and allied components”

List of features The Cube

- Three IMU's

    - these consist of 2 on the IMU board
    - 1 fixed to the FMU
- Two onboard compasses Cube Black, Green, Blue
    - these consist of 1 on the IMU board
    - 1 Fixed on the FMU
- One onboard compass Cube Orange, Cube Yellow
- Two Baros
    - 1 on the IMU (this Baro will most likely be removed in favour of a dedicated external Barometer.
    - 1 Fixed on the FMU
- Dual Power input
    - This removes the option of redundancy from the Servo rail and replaces it with a dedicated second power plug
    - A dedicated power protection Zener diode and Fet have been added to protect from voltages over 5.6v being applied to Aux input 2
    - This is only on the "PRO" carrier board mini carrier board still draws the backup from the servo rail.
- Dual external I2C
    - This allows for connection of items to either I2C port, potentially allowing two GPS / Mag units to be plugged in without the Mags conflicting.
- Power monitoring pins are now routed to the I/O chip, these will allow for the logging of power events during an inflight reboot.
    - Brick OK, Backup OK, and FMU 3.3V are all connected to a digital pin on the I/O via a 220Ohm resister.

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Last modified 6mo ago