

[CARRIER BOARDS](#)[Copy](#)

Mini Carrier Board

Working Conditions and Performance

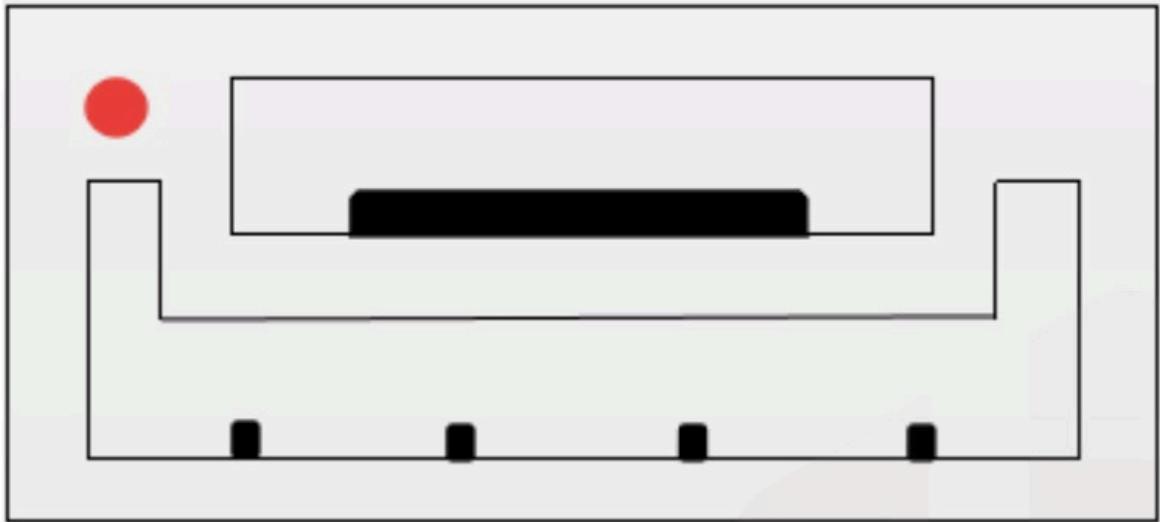
Parameter	Description
POWER Input Voltage / Rated Input Current	4-5.7V / 2.5A; 0-20V is safe for the system but it will not work
POWER rated output / input power	14 W
USB port input voltage / rated input current	4-5.7V / 250mA
Servo rail input voltage	4-10.5V
Waterproof performance	Not waterproof. External waterproof protection is needed
Working temperature	-10°C / 55°C

Size and Specifications

Type	Description
Mini Carrier Board Size / Chassis Material	47.5x38.5x17.8 (mm) / ABS Molding

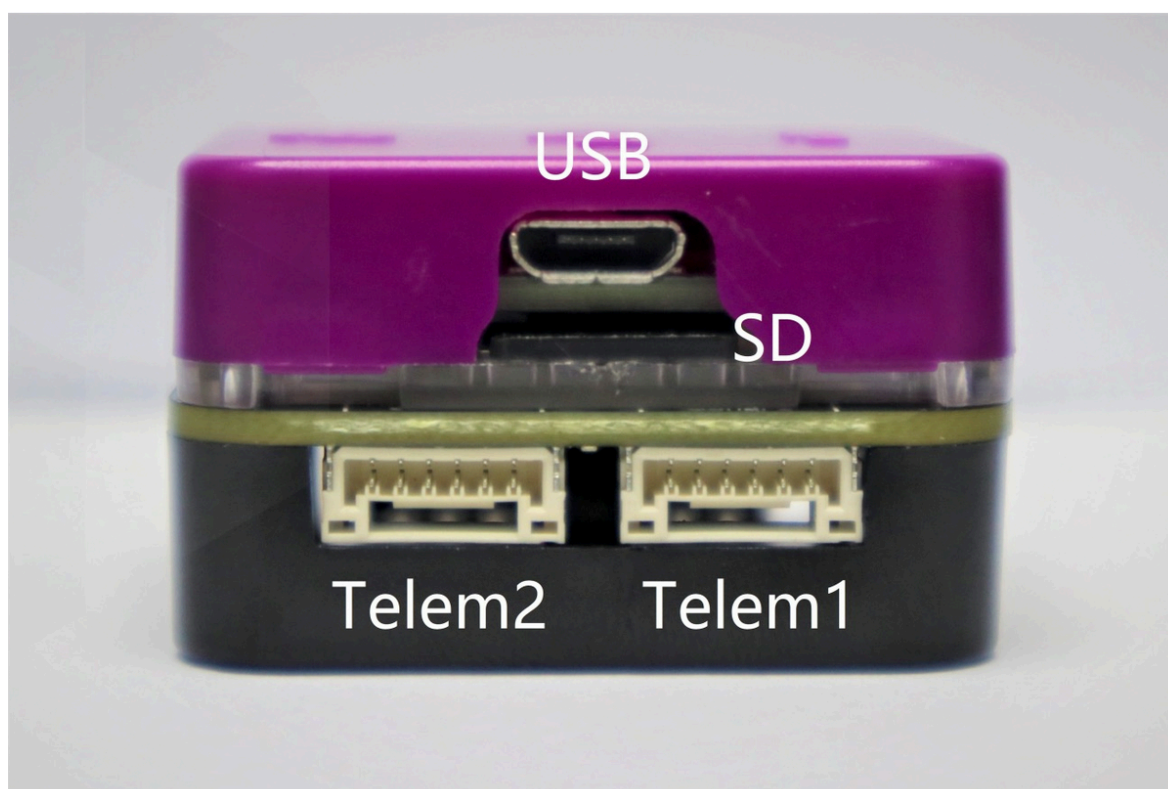
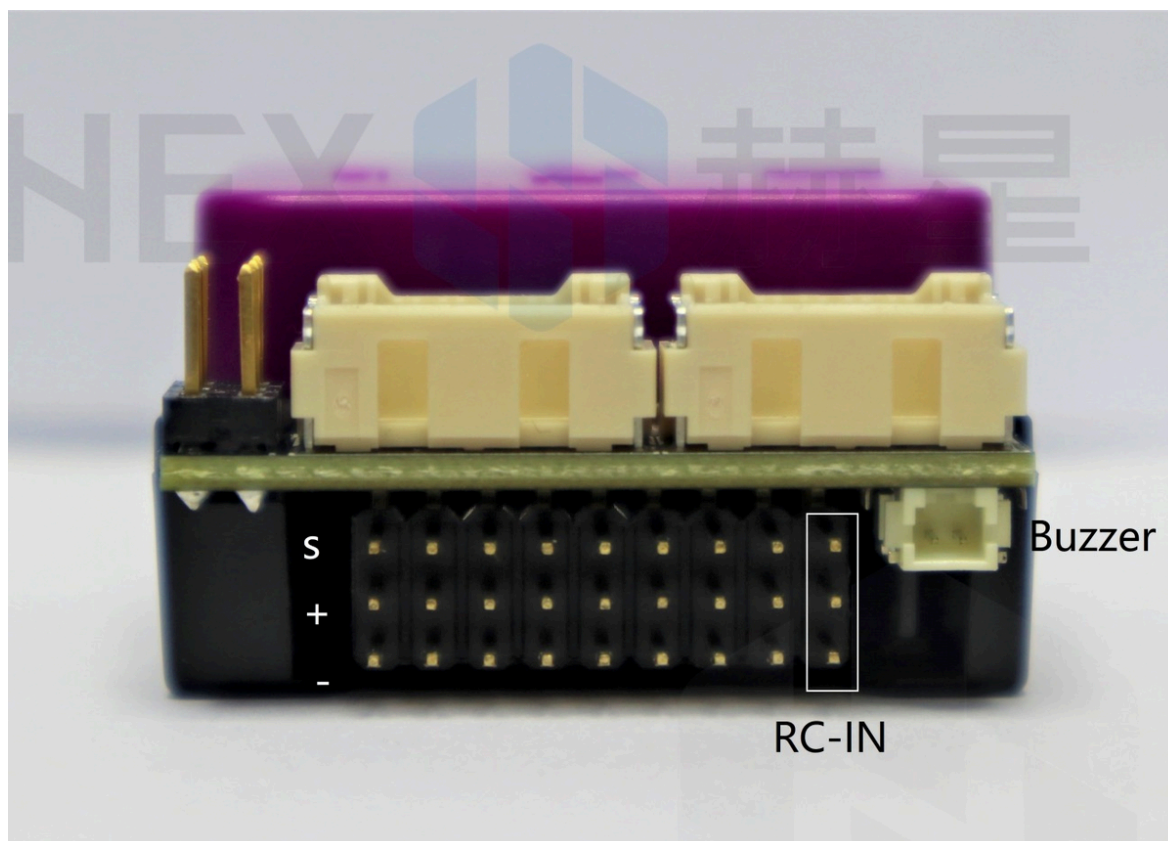
Interfaces and Definitions

Pinout

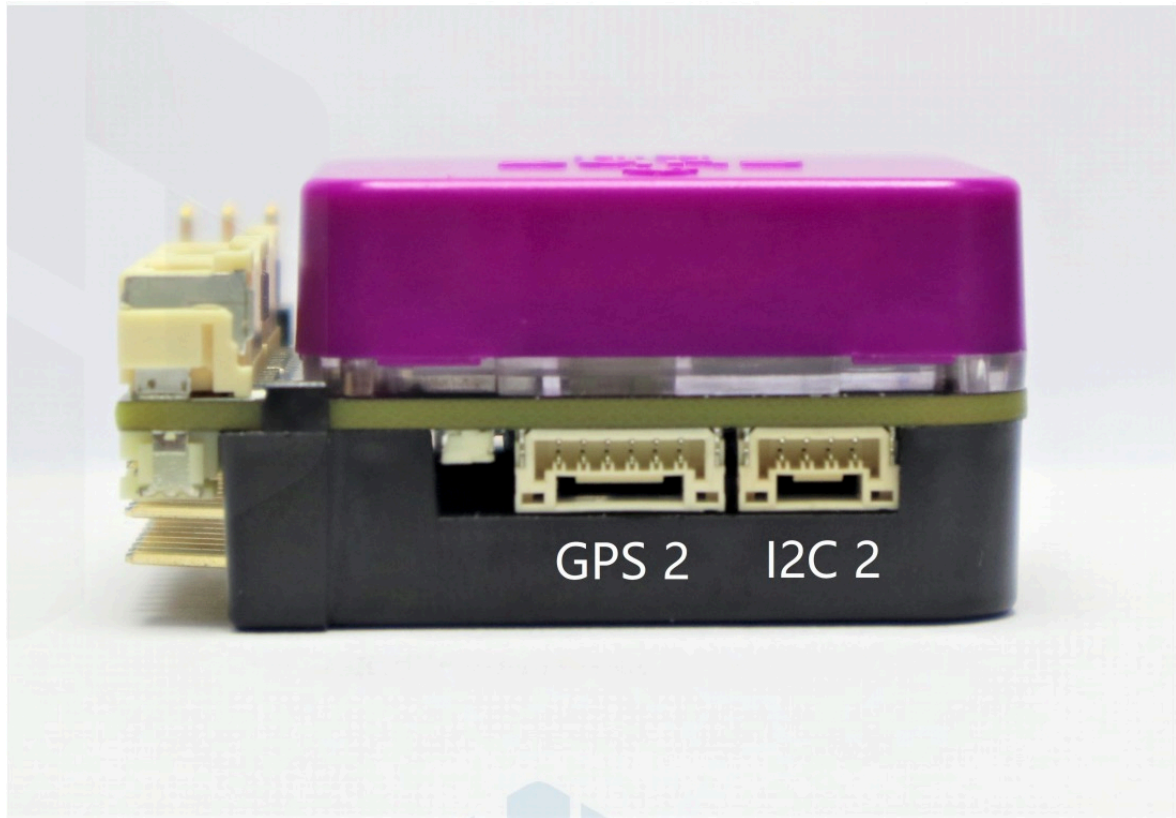


The red dot on the plug side denotes Pin 1.









Mini Carrier Board Interface Model

Ports	Corresponding Connector Model
GPS1	JST-GH 1.25 mm (8-pin)
GPS2	JST-GH 1.25 mm (6-pin)
TELEM1	JST-GH 1.25 mm (6-pin)
TELEM2	JST-GH 1.25 mm (6-pin)
I2C	JST-GH 1.25 mm (4-pin)
CAN2	JST-GH 1.25 mm (4-pin)
POWER1	Molex CLIK-Mate 2 mm (6-pin)
POWER2	Molex CLIK-Mate 2 mm (6-pin)
BUZZER	DF13 1.25 mm (2-pin)

Mini Cube 80-pin DF17 Connector Assignments (same as the Cube Black)

Pin Number	Name	Direction	Description
1	FMU_SWDIO	I/O	FMU serial wire debug I/O
2	FMU_LED_AMBER	O	Boot error LED (drive only, controlled by FET)
3	FMU_SWCLK	O	FMU serial wire debug clock
4	I2C_2_SDA	I/O	I2C data I/O
5	EXTERN_CS	O	Chip select for external SPI (NC, only for debugging)
6	I2C_2_SCL	O	I2C clock
7	FMU_!RESET	I	Reset pin for the FMU
8	PROT_SPARE_1		Spare
9	VDD_SERVO_IN	I	Power for last resort I/O failsafe
10	PROT_SPARE_2		Spare
11	EXTERN_DRDY	I	Interrupt pin for external SPI (NC, just for debugging)
12	SERIAL_5_RX	I	UART 5 RX (Receive Data)
13	GND		System GND
14	SERIAL_5_TX	O	UART 5 TX (Transmit Data)
15	GND		System GND
16	SERIAL_4_RX	I	UART 4 RX (Receive Data)

17	SAFETY		Safety button input
18	SERIAL_4_TX	O	UART 4 TX (Transmit Data)
19	VDD_3V3_SPEKTRUM_EN	O	Enable for the spectrum voltage supply
20	SERIAL_3_RX	I	UART 3 RX (Receive Data)
21	PRESSURE_SENS_IN	AI	Analogue port, for pressure sensor, or Laser range finder, or Sonar
22	SERIAL_3_TX	O	UART 3 TX (Transmit Data)
23	AUX_BATT_VOLTAGE_SENS	AI	Voltage sense for Aux battery input
24	ALARM	O	Buzzer PWM signal
25	AUX_BATT_CURRENT_SENS	AI	Current sense for Aux battery input
26	IO_VDD_3V3	I	IO chip power, pinned through for debugging
27	VDD_5V_PERIPH_EN	O	Enable voltage supply for Peripherals
28	IO_LED_SAFETY_PROT	O	IO-LED_SAFETY(safety LED) pinned out for IRIS
29	VBUS	I	USB VBus (VDD)
30	SERIAL_2_RTS		UART 2 RTS (Request To Send)

31	OTG_DP1	I/O	USB Data+
32	SERIAL_2_CTS		UART 2 CTS (Clear To Send)
33	OTG_DM1	I/O	USB Data-
34	SERIAL_2_RX	I	UART 2 RX (Receive Data)
35	I2C_1_SDA	I/O	I2C data I/O
36	SERIAL_2_TX	O	UART 2 TX (Transmit Data)
37	I2C_1_SCL	O	I2C clock
38	SERIAL_1_RX	I	UART 1 RX (Receive Data)
39	CAN_L_2	I/O	FMU CAN bus Low signal driver
40	SERIAL_1_TX	O	UART 1 TX (Transmit Data)
41	CAN_H_2	I/O	FMU CAN bus High signal driver
42	SERIAL_1_RTS		UART 1 RTS (Request To Send)
43	VDD_5V_PERIPH_OC	I	Error state message from peripheral power supply
44	SERIAL_1_CTS		UART 1 CTS (Clear To Send)
45	VDD_5V_HIPOWER_OC	I	Error state message 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 from main battery
48	IO_USART1_RX_SPECTRUM_DSM	O	Signal from Spectrum 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 debug only
52	FMU_CH2_PROT	O	FMU PWM output channel 2
53	VDD_SERVO	I	VDD_Servo, for monitoring servo bus
54	FMU_CH3_PROT	O	FMU PWM output channel 3
55	VDD_BRICK_VALID	I	Main power valid signal
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 signal
60	FMU_CH6_PROT	O	FMU PWM output channel 6
61	VDD_5V_IN_PROT	I	Main power (5V) into FMU from power selection

62	PPM_SBUS_PROT	I	PPM / S.Bus signal input
63	VDD_5V_IN_PROT	I	Main power (5V) into 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 debug only
68	IO_CH7_PROT	O	I/O PWM output channel 7
69	IO_SWDIO	I/O	I/O serial wire debug
70	IO_CH6_PROT	O	I/O PWM output channel 6
71	IO_SWCLK	O	I/O serial wire debug clock
72	IO_CH5_PROT	O	I/O PWM output channel 5
73	SPI_EXT_SCK	O	External SPI, for debug 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	0	I/O PWM output channel 2
79	CAN_H_1	I/O	FMU CAN bus High signal driver
80	IO_CH1_PROT	0	I/O PWM output channel 1

Serial Ports Parameter and Power Distribution

SERIAL 1 / UART 1 | Connector: TELEM1

Pin Number	Name	Direction	Voltage	Wire Color	Caption
1	VCC_5V	OUT	5 V	RED/GRAY	VCC
2	SERIAL_1_TX	OUT	3.3 V - 5.0 V TTL	YELLOW/BLACK	UART 1 TX (Transmit Data)
3	SERIAL_1_RX	IN	3.3 V - 5.0 V TTL	GREEN/BLACK	UART 1 RX (Receive Data)
4	SERIAL_1_CTS (TX)	OUT	3.3 V - 5.0 V TTL	GRAY/BLACK	UART 1 CTS (Clear To Send)
5	SERIAL_1_RTS (RX)	IN	3.3 V - 5.0 V TTL	GRAY/BLACK	UART 1 RTS (Request To Send)
6	GND		GND	BLACK	GND

SERIAL 2 / UART 2 | Connector: TELEM2

Pin Number	Name	Direction	Voltage	Wire Color	Caption
1	VCC_5V	OUT	5 V	RED/GRAY	VCC
2	SERIAL_2_TX	OUT	3.3 V - 5.0 V TTL	YELLOW/BLACK	UART 2 TX (Transmit Data)
3	SERIAL_2_RX	IN	3.3 V - 5.0 V TTL	GREEN/BLACK	UART 2 RX (Receive Data)
4	SERIAL_2_CTS (TX)	OUT	3.3 V - 5.0 V TTL	GRAY/BLACK	UART 2 CTS (Clear To Send)
5	SERIAL_2_RTS (RX)	IN	3.3 V - 5.0 V TTL	GRAY/BLACK	UART 2 RTS (Request To Send)
6	GND		GND	BLACK	GND

SERIAL 3 / UART 3 (GPS) / I2C 1 | Connector: GPS1

Pin Number	Name	Direction	Voltage	Wire Color	Caption
1	VCC_5V	IN	5 V	RED	VCC Power Supply To GPS From AP
3	SERIAL_3_TX	OUT	3.3 V - 5.0 V TTL	BLACK	UART 3 TX (Transmit Data)
2	SERIAL_3_RX	IN	3.3 V - 5.0 V TTL	BLACK	UART 3 RX (Receive Data)
4	I2C_1_SCL	IN	3.3 V	BLACK	I2C 1 Clock Signal
5	I2C_1_SDA	IN/OUT	3.3 V	BLACK	I2C 1 Serial Data
6	BUTTON		GND	BLACK	Signal shorted to GND on press
7	IO_LED_SAFETY_BUTTON		GND	BLACK	LED Driver For Safety Button
8	GND		GND	BLACK	GND Connection

SERIAL 4 / UART 4 / I2C 2 | Connector: GPS2

Pin NUmber	Name	Direction	Voltage	Wire Color	Caption
1	VCC_5V	OUT	5 V	RED/GRAY	VCC Power Supply To GPS From AP
2	SERIAL_4_TX	OUT	3.3 V - 5.0 V TTL	YELLOW/BLACK	UART 4 TX (Transmit Data)
3	SERIAL_4_RX	IN	3.3 V - 5.0 V TTL	GREEN/BLACK	UART 4 RX (Receive Data)
4	I2C_2_SCL	OUT	3.3 V - 5.0 V	GRAY/BLACK	I2C 2 Clock Signal
5	I2C_2_SDA	IN	3.3 V - 5.0 V	GRAY/BLACK	I2C 2 Serial Data
6	GND		GND	BLACK	GND

Buzzer | Connector: BUZZER

Pin Number	Name	Direction	Voltage	Wire Color	Caption
1	BUZZER	OUT	Battery voltage	GRAY/BLACK	VBAT (8.4 - 42 V)
2	GND		GND	BLACK	GND Connection

I2C 2 | Connector: I2C 2

Pin Number	Name	Direction	Voltage	Wire Color	Caption
1	VCC_5V	OUT	+5 V	RED/GRAY	Power supply
2	SCL	IN/OUT	+3.3 V (PULLUPS)	BLUE/BLACK	SCL, 5 V level, pull-up on AP
3	SDA	IN/OUT	+3.3 V (PULLUPS)	GREEN/BLACK	SDA, 5 V level, pull-up on AP
4	GND		GND	BLACK	GND Connection

Main Power POWER 1 | Connector: POWER1

Pin Number	Name	Direction	Voltage	Wire Color	Caption
1	VDD_5V_BRICK	IN	5 V	RED/GRAY	Supply To AP from Power Brick
2	VDD_5V_BRICK	IN	5 V	RED/GRAY	Supply To AP from Power Brick
3	BATT_CURRENT_SENS_PROT	IN	3.3 V	BLACK	Battery Current Connector
4	BATT_VOLTAGE_SENS_PROT	IN	3.3 V	BLACK	Battery Voltage Connector
5	GND		GND	BLACK	GND
6	GND		GND	BLACK	GND

Backup Power POWER 2 | Connector: POWER2

Pin Number	Name	Direction	Voltage	Wire Color	Caption
1	VDD_5V_BRICK	IN	5 V	RED/GRAY	Supply To AP from Power Brick
2	VDD_5V_BRICK	IN	5 V	RED/GRAY	Supply To AP from Power Brick
3	AUX_BATT_CURRENT_SENS	IN	3.3 V	BLACK	Aux Battery Current Connector
4	AUX_BATT_VOLTAGE_SENS	IN	3.3 V	BLACK	Aux Battery Voltage Connector
5	GND		GND	BLACK	GND Connection
6	GND		GND	BLACK	GND

CAN | Connector: CAN2

Pin Number	Name	Direction	Voltage	Wire Color	Caption
1	VCC_5V	OUT	5 V	RED/GRAY	VCC Power Supply
2	CAN_H_2	IN/OUT	12 V	YELLOW/BLACK	CAN High
3	CAN_L_2	IN/OUT	12 V	GREEN/BLACK	CAN Low
4	GND		GND	BLACK	GND

IO USART 1 / DSM | Connector: SPKT

1	IO_USART1_RX_SPECTRUM_DSM	IN		IO USART 1 RX, DSM INPUT
2	GND		GND	GND
3	VDD_3V3_Spectrum	OUT	3.3 V	Independent Power Supply

CPPM / S.BUS / SERVO SYSTEM | Connector: RCIN MAIN OUT

S - 1	IO_CH1_PROT	OUT	3.3 V Servo Signal, Servo Rail Power	PWM Signal
S - 2	IO_CH2_PROT	OUT	3.3 V Servo Signal, Servo Rail Power	PWM Signal
S - 3	IO_CH3_PROT	OUT	3.3 V Servo Signal, Servo Rail Power	PWM Signal
S - 4	IO_CH4_PROT	OUT	3.3 V Servo Signal, Servo Rail Power	PWM Signal
S - 5	IO_CH5_PROT	OUT	3.3 V Servo Signal, Servo Rail Power	PWM Signal
S - 6	IO_CH6_PROT	OUT	3.3 V Servo Signal, Servo Rail Power	PWM Signal
S - 7	IO_CH7_PROT	OUT	3.3 V Servo Signal, Servo Rail Power	PWM Signal
S - 8	IO_CH8_PROT	OUT	3.3 V Servo Signal, Servo Rail Power	PWM Signal
S - 9	PPM_SBUS_PROT	IN/OUT	3.3 V / 4.5 V Powered	PPM / S.Bus Signal

PPM S.bus Signal and SPKT Signal Switching

By default, the Mini carrier board uses PPM and S.bus (PPM/S.B) for the RC IN input. Specifically,

- Left center pad is connected to the 5V pad (provides power).

- Right center pad is connected to the PPM/S.B pad (receives the signal).

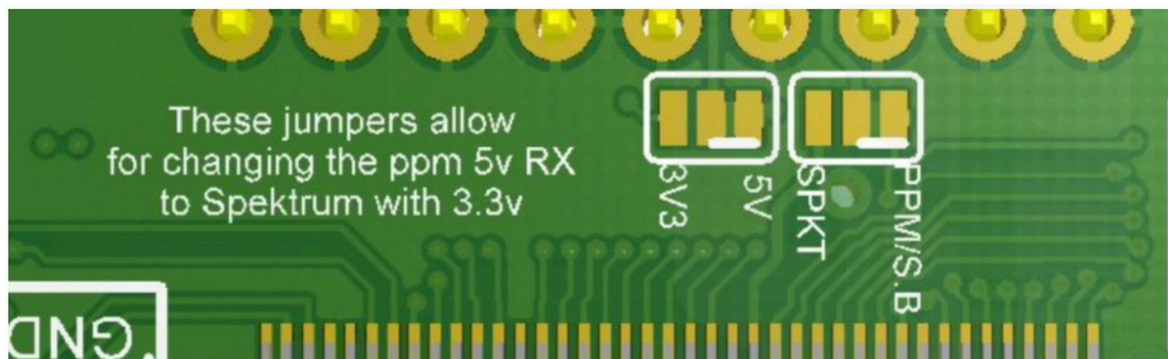
To modify the PCB to receive SPKT signals, complete the following steps:

1. Cut the existing connections:

- Disconnect the left center pad from the 5V pad.
- Disconnect the right center pad from the PPM/S.B pad.

2. Solder the new connections:

- Connect the 3V3 pad to the left center pad.
- Connect the SPKT pad to the right center pad.



The following Github link can be used to revise and update the Mini carrier board information:

<https://github.com/CubePilot/cubepilot-docs/edit/master/carrier-boards/mini-carrier-board.md> ↗

Last updated 5 months ago

Was this helpful?

