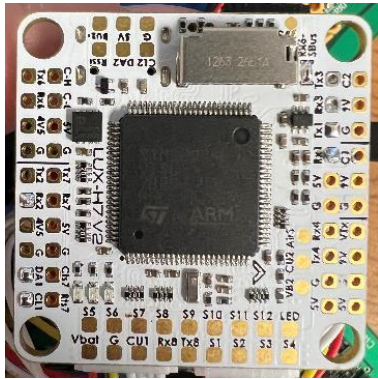


UxV/35™ Third Party Integration

The UxV/35 Standard allows easy interoperability and integration of non UxV/35 components through the use of interoperability boards.

Lumenier makes a flight controller (FC) based on the STM32H743 chip. This board is based on the ad hoc standard of 30.5mm x 30.5mm and uses JST-SH1 connectors making it non compatible with UxV/35 modules.



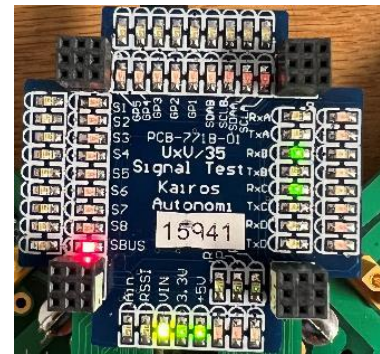
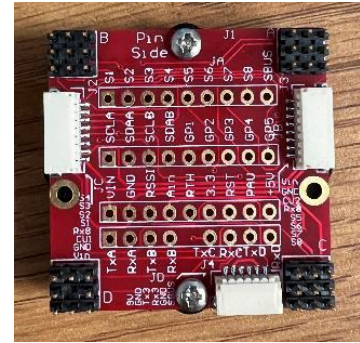
The FC was loaded with Arducopter 4.4.4 over USB using the STM32 Cube programmer

Connecting the flight controller and interoperability board through the JST-SH connectors allowed the flight controller to be installed in a UxV/35 stack and receive power but did not have the required signaling for full operation because the JST-SH connectors only brought S1-8, Tx3, Rx3, Rx8, Vbat, 9V, G, and SBUS to the interop board. The FC was installed in a UxV/35 stack with standard modules (GPS, SBUS, Telemetry) powered by an 18650 power base board. The FC would connect to

Mission Planner through the USB but would not communicate with any of the other UxV/35 modules in the stack.

Using the hardware definition file, a UxV/35 signal test LED board, and schematics for both the Lumenier FC and Kairos FC based on the same H743 chip showed what additional connections were needed and where to connect.

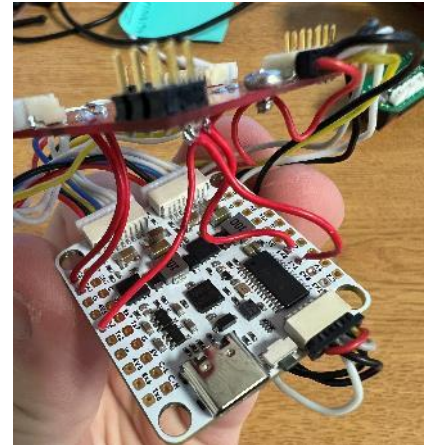
Turning on the stack without the FC installed displayed RxC and Rx8 signals on the LED test board. Unplugging the GPS and telemetry radio helped establish which module was using what serial line and the schematics confirmed suspicion. Looking at the hardware definition file, the H743 chip expects Telemetry on USART 1 and GPS on USART 2. Telemetry is Bi-Directional so Rx8 and Tx8 on the interop board were connected to Rx1 and Tx1 on the FC. RxC on the interop board was connected to Rx2 on the FC for GPS. After these connections were made, the FC now connected to Mission Planner through telemetry radios and was able to obtain a GPS fix. Despite these additional connections, the FC would not receive RCin/SBUS or see the compass on the GPS board.



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According to the hardware definition file, the chip probes the I2C bus for external compasses so SCLA and SDAA on the interop board was connected to CL1 and DA1 on the FC which allowed the compass to be seen and used.

With the 5 additional connections between the interop board and FC, Telemetry, GPS, and compass now communicate with the FC but SBUS was not functional.



Rx6-SBUS Jumper

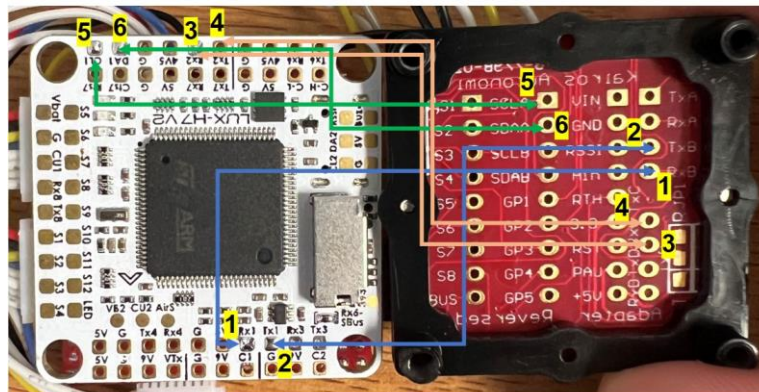


If using non-DJI FPV remote controller, keep this pad unbridged



If using DJI FPV Remote Controller, Bridging this pad will link Rx6 to SBUS pin on JST-SH-6P connector

In the user manual for the Lumenier FC, it displays a jumper to connect Rx6 and SBUS and bring Rx6 down with one of the JST-SH connectors. The manual warns to keep this jumper unbridged if using a non DJI remote. Although we don't use a DJI remote, bridging this jumper made SBUS function.



Connection	Lumenier H743	UxV/35 Interoperability	
1 USART (Blue)	Rx1	RxB	Telemetry Radio
2 USART (Blue)	Tx1	TxB	Telemetry Radio
3 USART (Green)	Rx2	RxC	GPS
4 USART (Green)	Tx2	TxC	GPS
5 I2C (Tan)	CL1	SCLA	Compass
6 I2C (Tan)	DA1	SDAA	Compass

UxV/35™ Third Party Integration