Flightcell
Always Connected

Flightcell® SmartHUB Design Specification
Revision 1.2

REVISIONS & APPROVAL

Revision	Effective Date	Approved By	Reasons for Change
1.0	06.04.22	R A Benfield	Initial Release
1.1	12.03.2024	R A Benfield	HW-2586
1.2	28.05.2025	J J Booyse	HWD-460

CONTENTS

1 Introduction

Designed specifically for rotorcraft, the Flightcell SmartHUB is a state-of-the-art HD video, audio, flight recording hub, and is an access point for USB/IP devices.

The SmartHUB allows for the connection of a USB camera for in flight video recording.

The front of the unit offers an RJ45 Ethernet port, dual USB A port (one with charge capability), USB C port, SD slot with secure vault cover, power switch and a 256 x 64 UI OLED display including a mode pushbutton which selects different display menu options. To the rear of the unit various connectivity options are available including 5x Ethernet connections, additional 3x USB ports and power. RF connectors are provided on the rear of the unit for a GPS antenna and Wi-Fi.

The SmartHUB is designed to be mounted using 4 quarter turn DZUS studs and DZUS rails as per MIL-F-25173A with a spacing of 5.365" between rail centers. Four additional mounting holes are provided on the top and bottom of the unit, M5 sized thread.

2 Electrical Specifications

Parameter		Specification
Input Voltage		**12 – 32VDC**
Power Supply Current (Max)		**~1.93A @ 28VDC**
Display		**256 x 64 White OLED 150 cd/m^2**
Line Audio	**Input Levels**	**20mVrms to 1.15Vrms** **775mVrms**
	Input Impedance	**600Ω**
USB		**USB 2.0**
Ethernet		**10/100/1000 BASE T ports**
Wi-Fi		**Wi-Fi 802.11ac/a/b/g/n** **Dual Frequency 2.4/5GHz support**
GPS Voltage	Antenna Bias	**5V**
	Antenna current	**Up to 100mA**
	Sensitivity	**-162dBm (with Flightcell Antenna)**
	Time to First Fix	**26s**

3 Mechanical Design

All metalwork in the SmartHUB is machined from 6061 aluminium and passivated with Oxsilan conversion coating (except for the front panel) to maintain electrical conductivity between mechanical components and prevent corrosion.

3.1 Front Panel

The SmartHUB consists of a 256 x 64 OLED UI display with single mode switch, RJ45 port, USB C port, power switch, dual USB A ports, SD card slot behind protective vault cover and anodized faceplate. The SmartHUB is designed to be mounted using 4 quarter turn DZUS studs and DZUS rails as per MIL-F-25173A with a spacing of 5.365" between rail centers.

3.2 Enclosure

The SmartHUB main enclosure is a custom designed aluminium clam shell style design which is designed for strength with sufficient mechanical integrity to allow high probability of flight data recovery from the SD card after a catastrophic event that may include fire, water and extreme mechanical stress.

3.3 Rear Panel

Two HD44 D Type connectors J2 (Male) and J3 (Female) on the rear of the unit provide multiple connectivity options with the unit including, power, data ports and other input/outputs.

Two SMA type connectors (GPS antenna + Wi-Fi)

3.4 Dimensions

	DZUS mounted
Faceplate width	146mm
Chassis width	122mm
Faceplate height	57.2mm
Chassis height	50mm
Depth (from front face to rear face)	160mm

3.5 Mass

Approximate mass of the unit is approximately 750g.

4 Antennas

The SmartHUB requires external antennas for the GPS. Contact Flightcell for information on recommended antennas.

5 Data Interfaces

The SmartHUB supports the following data interfaces:

5.1 Serial Port

The SmartHUB has two 3-wire serial ports, one for DEBUG and the other for connectivity with other equipment i.e. GPS modules or legacy devices such as external modems, PCs etc.

5.2 USB

The SmartHUB contains a USB HUB with three ports available on the J2 HD 44 pin D Type connector and three front ports (2x USB A and 1x USB C port). Two of the USB ports are charging ports, USB A (front top) and USB C. These ports both support BC 1.2 standard (CDP mode 2.4A @5V)

5.3 10/100/1000 Ethernet

The SmartHUB contains multiple 10/100/1000 base-T Ethernet ports which can be used for interfacing to a variety of networked components such as Wi-Fi routers, PC's or to an Ethernet hub.

The primary Ethernet WAN port is connected to the rear of the unit on the J2 HD 44 D Type connector with a secondary RJ45 Ethernet port being available on the front of the SmartHUB.

Included in the SmartHUB is an Ethernet Switch which has four 10/100/1000 BASE T ports which are wired to the rear HD 44 D Type connectors J2 and J3.

5.4 ARINC-429

The SmartHUB supports connection to ARINC-429 buses with 2 receivers.

5.5 Wi-Fi

The SmartHUB supports Wi-Fi. This is enabled via an App and allows access to the SmartHUB from connected tablets or phones. The SmartHUB can act as a Wi-Fi access point to share any available data connection with connected devices.

5.6 I/O

The SmartHUB contains 3 x General Purpose digital inputs as well as 1 x isolated output.

The digital inputs are open-collector active Grounds and have an active input range of 0 – 28 VDC with over/under voltage protection to +/-32VDC. Active < 2.4V and Non- Active > 2.8V These can be used for a range of functions, such as Oil pressure switch, Takeoff switch, WiFi Radio switch or User defined switch.

5.6.1 Isolated Outputs

The SmartHUB has 1 isolated output which is a single-pole form 1 solid state relay (OUTPUT A and OUTPUT B terminals). The maximum load current for each output is 500mA and the maximum OFF state voltage is 60V. These can be configured to indicate Power On/Off or Recording On/Off.

5.6.2 External Power On/Off Control

The unit power can be controlled externally via the EXT SWITCH input on the J2 rear connector. This is normally open, pull to ground to turn-off the unit power (Main unit power switch must be On for this to work).

6 Appendix

6.1 Appendix A: Connector Pinouts

6.1.1 Main Connector

Connector type: HD44 D Type Male

Mating part: M24308/2-13Z (or equivalent)

Pin No	Function	Direction	Notes
33	ARINC-429 RX CH1-	Input	ARINC-429 RX Channel 1 -
34	ARINC-429 RX CH1+	Input	ARINC-429 RX Channel 1 +
35	ARINC-429 RX CH2-	Input	ARINC-429 RX Channel 2 -
36	ARINC-429 RX CH2+	Input	ARINC-429 RX Channel 2 +
18	CHASSIS GND	Ground	Internally connected to SmartHUB Chassis
15	DC IN	PWR	DC Supply Input
30	DC IN	PWR	DC Supply Input
41	DEBUG RXD	Output	
29	DEBUG TXD	Input	
13	DEBUG GND	Ground	
40	EXT SWITCH	Input	External Power Control Input
7	GND	Ground	
8	GND	Ground	
14	GND	Ground	
17	GND	Ground	
1	LINE IN N	Input	Audio Input
2	LINE IN P	Input	Audio Input
6	ETH 10/100/1000 BI_DA-	I/O	Ethernet P4 1G
22	ETH 10/100/1000 BI_DA+	I/O	Ethernet P4 1G
5	ETH 10/100/1000 BI_DB-	I/O	Ethernet P4 1G
21	ETH 10/100/1000 BI_DB+	I/O	Ethernet P4 1G
4	ETH 10/100/1000 BI_DC-	I/O	Ethernet P4 1G
20	ETH 10/100/1000 BI_DC+	I/O	Ethernet P4 1G
3	ETH 10/100/1000 BI_DD-	I/O	Ethernet P4 1G
19	ETH 10/100/1000 BI_DD+	I/O	Ethernet P4 1G
12	ETH 10/100/1000 BI_DA-	I/O	WAN 1G
28	ETH 10/100/1000 BI_DA+	I/O	WAN 1G
11	ETH 10/100/1000 BI_DB-	I/O	WAN 1G

27	ETH 10/100/1000 BI_DB+	I/O	WAN 1G
10	ETH 10/100/1000 BI_DC-	I/O	WAN 1G
26	ETH 10/100/1000 BI_DC+	I/O	WAN 1G
9	ETH 10/100/1000 BI_DD-	I/O	WAN 1G
25	ETH 10/100/1000 BI_DD+	I/O	WAN 1G
23	NC		
24	NC		
16	P4 USB VBUS	PWR	
31	P4 USB D-	I/O	
32	P4 USB D+	I/O	
37	P5 USB VBUS	PWR	
38	P5 USB D-	I/O	
39	P5 USB D+	I/O	
42	P6 USB VBUS	PWR	
43	P6 USB D-	I/O	
44	P6 USB D+	I/O	
HD44 SHELL	CHASSIS GND	Ground	

6.1.2 Secondary Connector

Connector type: HD44 D Type Female

Mating Part: M24308/4-19F (or equivalent)

Pin No	Function	Direction	Notes
34	CAN -	I/O	Optional: CAN -
33	CAN +	I/O	Optional: CAN +
44	CHASSIS GND	PWR	
35	DATA GND	Ground	
31	DATA RX	Output	
32	DATA TX	Input	
36	GND	Ground	
37	GND	Ground	
38	GND	Ground	
41	INPUT 1	Input	General Purpose Input 1 (open collector active ground)
40	INPUT 2	Input	General Purpose Input 2 (open collector active ground)
39	INPUT 3	Input	General Purpose Input 3 (open collector active ground)
1	ETH 10/100/1000 BI_DA-	I/O	Ethernet P1 1G
16	ETH 10/100/1000 BI_DA+	I/O	Ethernet P1 1G
2	ETH 10/100/1000 BI_DB-	I/O	Ethernet P1 1G
17	ETH 10/100/1000 BI_DB+	I/O	Ethernet P1 1G
3	ETH 10/100/1000 BI_DC-	I/O	Ethernet P1 1G
18	ETH 10/100/1000 BI_DC+	I/O	Ethernet P1 1G
4	ETH 10/100/1000 BI_DD-	I/O	Ethernet P1 1G
19	ETH 10/100/1000 BI_DD+	I/O	Ethernet P1 1G
23	ETH 10/100/1000 BI_DA-	I/O	Ethernet P2 1G
8	ETH 10/100/1000 BI_DA+	I/O	Ethernet P2 1G
24	ETH 10/100/1000 BI_DB-	I/O	Ethernet P2 1G
9	ETH 10/100/1000 BI_DB+	I/O	Ethernet P2 1G
25	ETH 10/100/1000 BI_DC-	I/O	Ethernet P2 1G
10	ETH 10/100/1000 BI_DC+	I/O	Ethernet P2 1G
26	ETH 10/100/1000 BI_DD-	I/O	Ethernet P2 1G
11	ETH 10/100/1000 BI_DD+	I/O	Ethernet P2 1G
27	ETH 10/100/1000 BI_DA-	I/O	Ethernet P3 1G
12	ETH 10/100/1000 BI_DA+	I/O	Ethernet P3 1G
28	ETH 10/100/1000 BI_DB-	I/O	Ethernet P3 1G
13	ETH 10/100/1000 BI_DB+	I/O	Ethernet P3 1G
29	ETH 10/100/1000 BI_DC-	I/O	Ethernet P3 1G

14	ETH 10/100/1000 BI_DC+	I/O	Ethernet P3 1G
30	ETH 10/100/1000 BI_DD-	I/O	Ethernet P3 1G
15	ETH 10/100/1000 BI_DD+	I/O	Ethernet P3 1G
5	NC		
6	NC		
7	NC		
20	NC		
21	NC		
22	NC		
42	OUTPUT A	Output	single-pole, normally-open (1-Form-A) solid state relay
43	OUTPUT B	Output	single-pole, normally-open (1-Form-A) solid state relay
44	CHASSIS GND	Ground	
HD44 SHELL	CHASSIS GND	Ground	
			OUTPUT A/B form single -pole relay output

6.2 Appendix B: Associated documents

6.2.1 Interconnect Drawings

114-00012 SH Wiring Diagram

114-00011 SH Test Loom

6.2.2 Mechanical Assembly Drawings

115-00006 SH General Arrangement Drawing

6.2.3 Flightcell GPS Antenna Drawings

Please contact Flightcell for antenna options

6.2.4 DZMx Declaration of Design and Performance

120-00004 SHP_01 Flightcell SmartHUB DDP

6.2.5 Manuals

117-00016 Flightcell SmartHUB and Camera Installation Manual

117-00017 Flightcell SmartHUB and Camera Operators' Manual