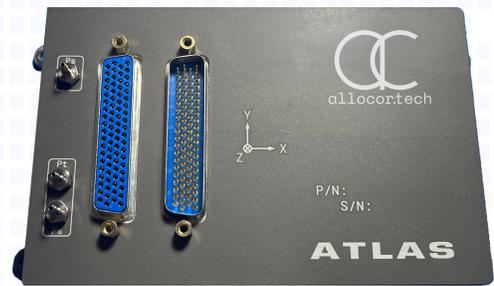


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Atlas Flight Computer Physical ICD

601-0074-000 Rev. B

The Atlas Flight Computer is a low-cost flight-computer solution based on the PixHawk PX4 FMUV6 open-source autopilot that also includes a mission-computer, airdata sensors, ethernet switch, and optional internal GPS and INS. The Atlas Flight Computer enables autonomous operation in a highly integrated and ruggedized package.

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Version History

Rev	Date	Notes
A	4/24/2025	Initial Draft - UNRELEASED

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Introduction

The Atlas flight computer is a low cost flight compute system which incorporates a Pixhawk FMUV6X based autopilot, a Linux Mission Computer, and an allocor.tech Wasp. With a wide variety of interfaces including RS232, RS422, CAN, Ethernet, PWM, and more, the Atlas is able to integrate into a wide variety of systems and perform flight and payload management.

Specifications

Dimensions	6.5 x 3.82 x 1.36"
Mass	~386g
Operating Temp.	-20°C to 71°C
Storage Temp.	-40°C to 85°C
Power In	Two redundant, prioritized inputs
Input Voltage	9-36VDC
Power Consumption	<20W, varies with configuration
Power Outputs	4, 2x5VDC, 2x28VDC
Internal storage	Mission Comp.: 128GB FMU: 32 GB
Networking	5 Port Integrated Ethernet Switch
Pressure Sensing	2 Port, Absolute and Differential Pressure
Internal GPS	Optional
Internal INS	Optional

Interfaces

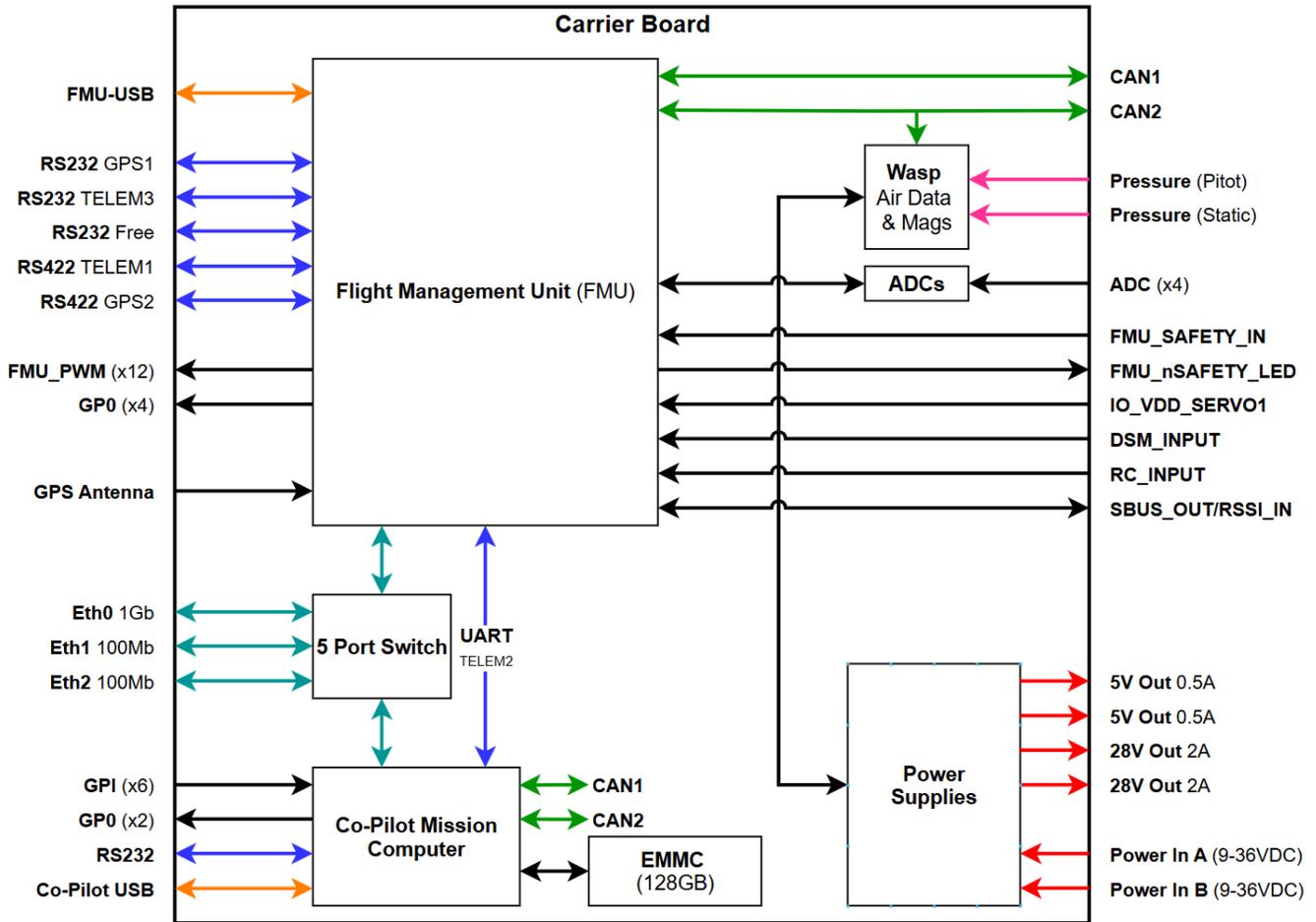
Type	Quantity
RS232	4
RS422	2
CANBUS	2
PWM Out	12 to 16
General Purpose Out	2 to 6
General Purpose In	6
Analog In	4
5V, 500mA Out*	2
28V, 2A Out*	2
1Gb Ethernet	1
100Mb Ethernet	2
PX4/RC control Signals	7
GPS 1PPS In	1
Debug USB	2

*May be derated based on heat sinking when Atlas is used as a bare PCB stack.



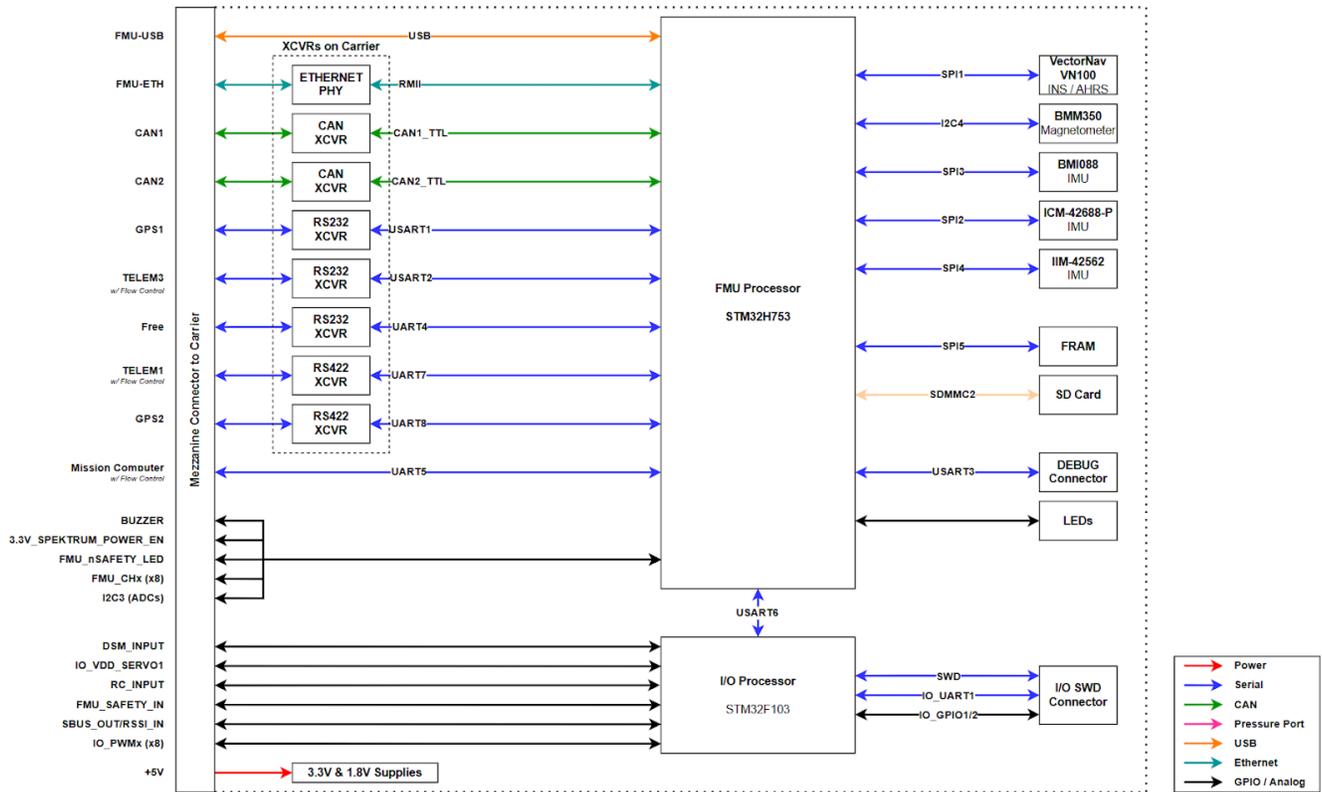
System Architecture

The Atlas Flight Computer comprises three major systems, each with its own processing capabilities. The Flight Management Unit (FMU), the Mission Computer, and the Wasp each serve a unique purpose in the Atlas. Also included in the Atlas are an Ethernet Switch and a Power Distribution System.



Flight Management Unit (FMU)

The FMU is based on the Pixhawk FMUV6X open source autopilot. It includes two processors and a variety of sensors, inputs, and outputs. The FMU performs the real-time calculations to fly an aircraft, taking input of a radio transmitter, the mission computer, a ground station, and the onboard sensors, the FMU is able to run the Pixhawk PX4 autopilot software or can be integrated with a custom software solution. With 16 outputs which can be used for PWM, and with RS232, RS422, CAN, Analog, and Ethernet capabilities, the FMU is able to interface with a wide variety of servos, motor controllers, actuators, and payloads in an aircraft.



Mission Computer

The mission computer is a Toradex Verdin System on Module (SoM) which runs Linux. It is able to execute more strenuous software than the FMU, while also not interrupting the FMU's autopilot processor with lower priority or less time sensitive tasks. This can include mission planning, communication with a ground station, payload management, and more.

Also managed by the Mission Computer is a five port Ethernet switch connecting the Mission Computer, the FMU, and up to three external devices.

Wasp

The Wasp is a derivative of the allocor.tech Hornet product which is a standalone sensor hub. The Wasp incorporates the main functionality of the Hornet as an air data sensor suite but also manages the power system and configuration of the Atlas. The Wasp is able to turn the output loads on and off, monitor input and system voltages, select between internal and external GPS, and more. The Wasp is connected to the CAN2 bus, which allows communication to the FMU, Mission Computer, and any other external system on the same bus.

The Wasp additionally holds the DroneCAN configuration for the Atlas. Through this, various system parameters can be adjusted over CAN.

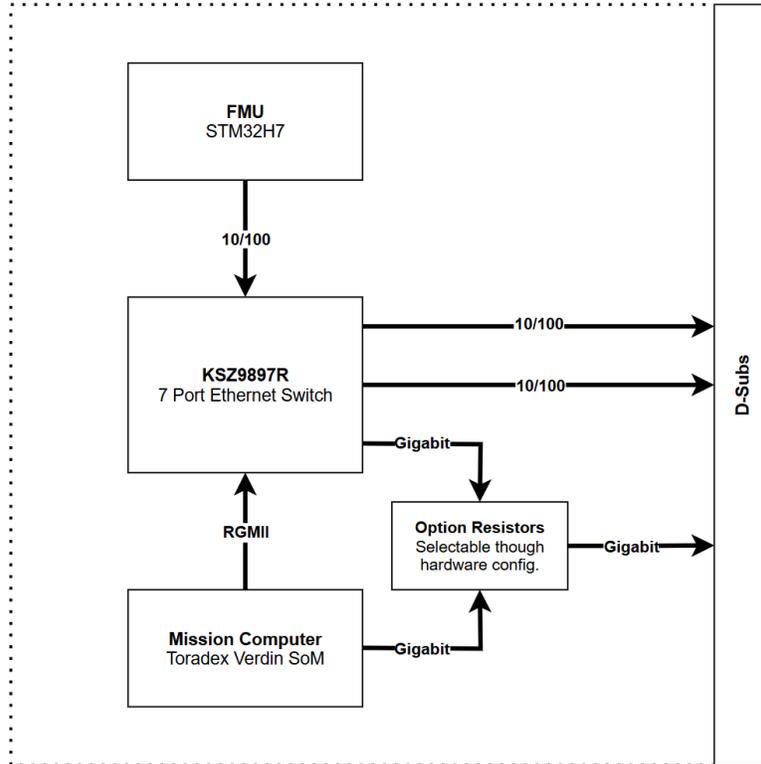
Ethernet Switch

The internal 5 port Ethernet switch is managed by the Mission Computer and connects the Mission computer, FMU, and up to three external devices. The FMU is connected as a



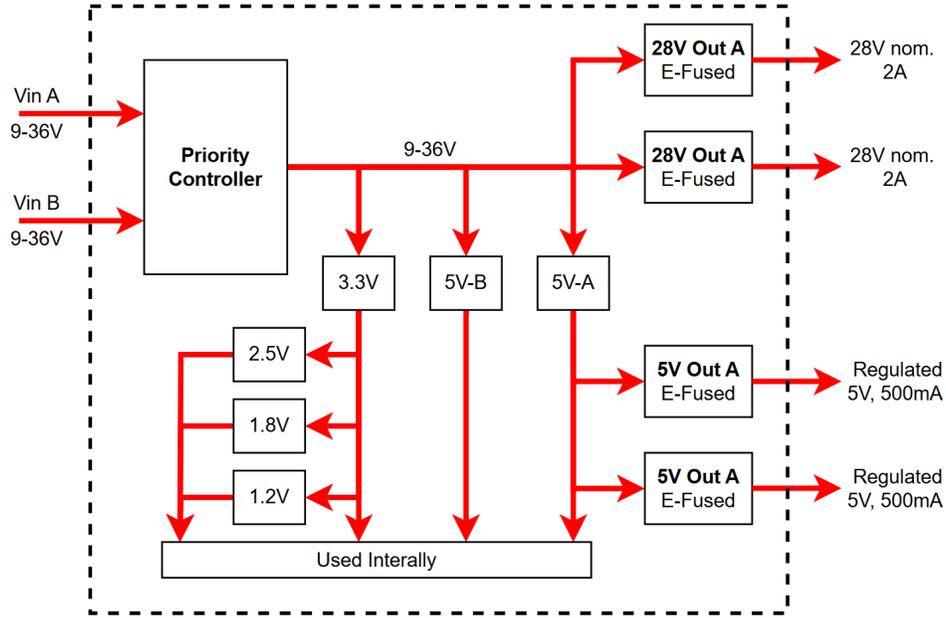
10/100Mb/s, the Mission computer is connected by RGMII (1Gb/s), and the external devices are one 1Gb/s connection and two 10/100Mb/s connections.

A legacy option is available which connects another Mission Computer 1Gb/s MDI connection to the D-Sub connector in place of the gigabit connection from the switch. This option is still available by request but is no longer the standard configuration.



Power Distribution

There are four output load channels on the Atlas Flight Computer. All four outputs have E-Fuses, and the two 5V, 500mA loads are regulated internally. The two 28V, 2A loads are not, and will mirror the input voltage to Atlas. The E-Fuses are set 50% higher than the rated current limit, but it is not recommended to exceed the rated limit.

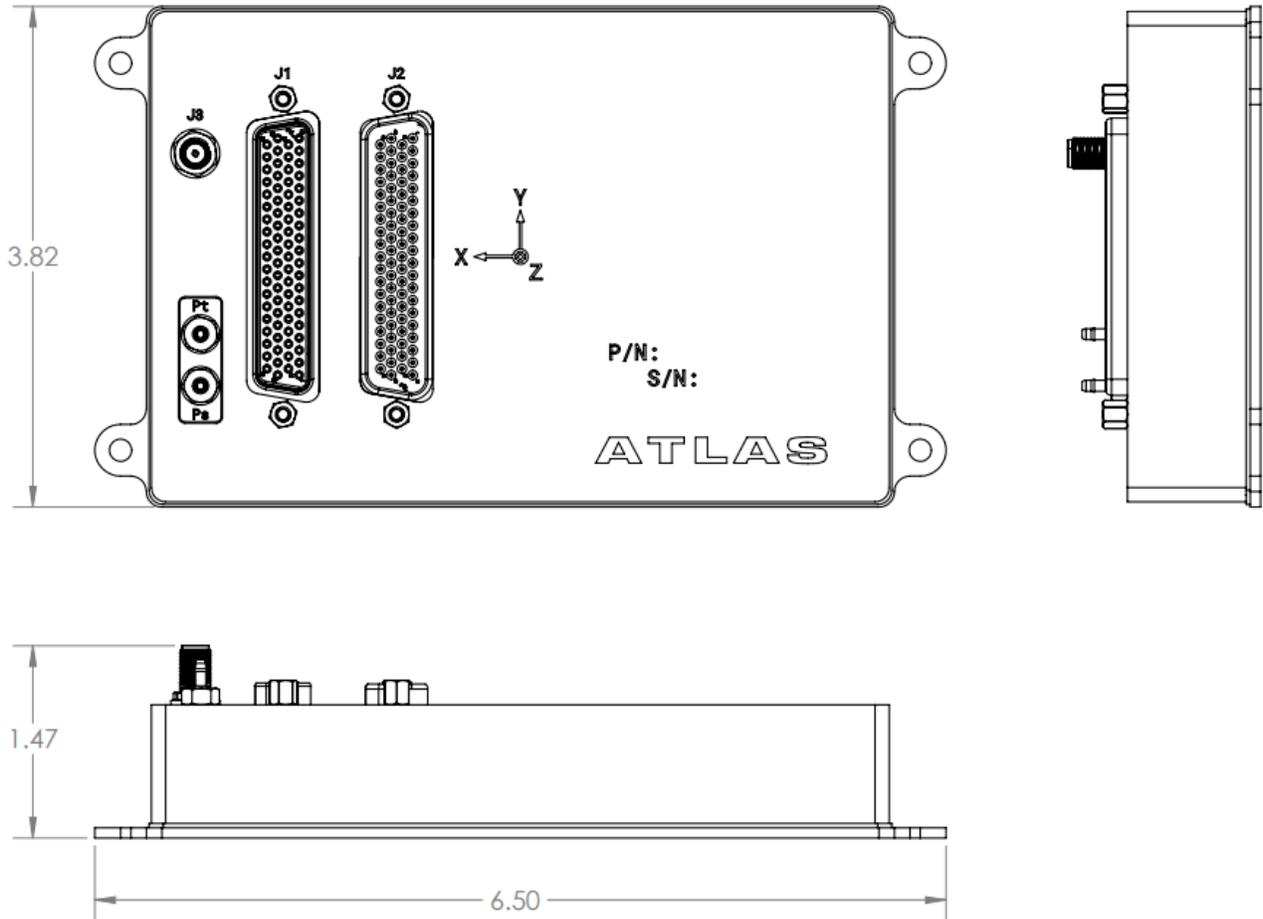


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Mechanical

Dimensions and Outline

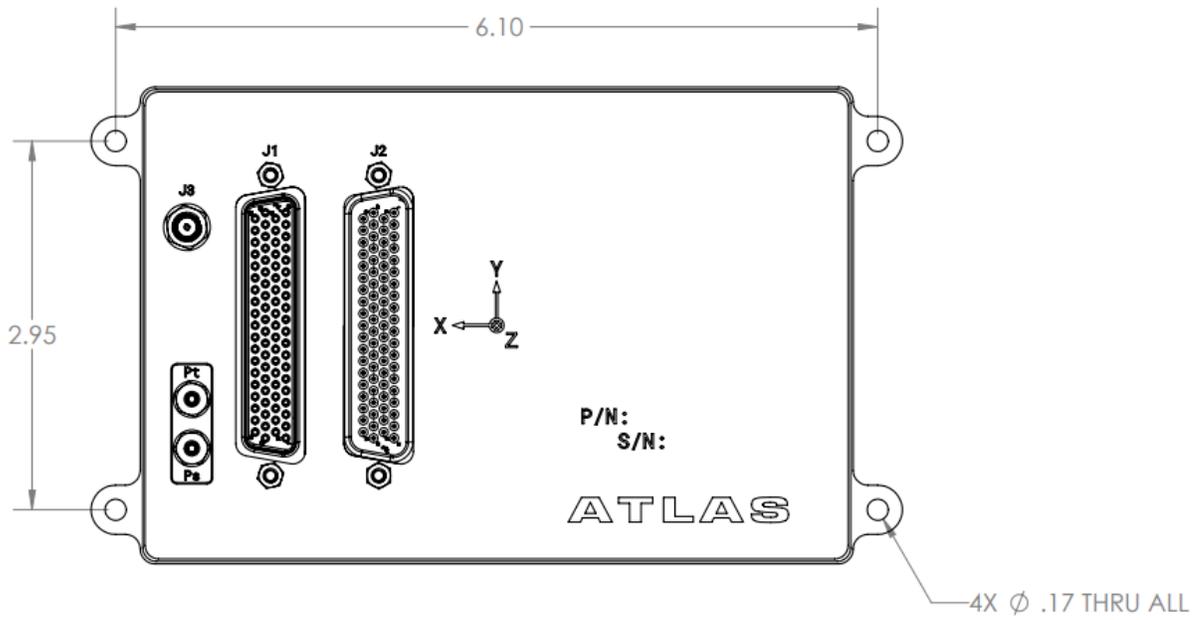


Mass

Bare PCB stack: Approx. 184g, varying with hardware configuration
With Enclosure: Approx. 390g, varying with hardware configuration



Mounting Interfaces



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Hardware Options

Internal Global Positioning System (GPS)

The Atlas Flight Computer can be optionally fitted with an internal Ublox Max-M10S GPS and the necessary supporting circuitry. Contact allocor.tech for details and pricing.

Internal Inertial Navigation System (INS)

The Atlas Flight Computer can be optionally fitted with an internal VectorNav INS and the necessary supporting circuitry. Contact allocor.tech for details and pricing.

Software

Software loads on these computers can vary from use case to use case. Reference the Flight Computer Software Users Manual for more details (link TBD).

Electrical

Electrical Characteristics

Parameter	Min	Nom	Max	Unit
Input Voltage	9	28	36	V
Input Current (Vin = 28V, Loads OFF, Mission Comp.: AM62)			0.72	A
Input Current (Vin = 28V, Loads ON, Mission Comp.: AM62)			4.9	A
Input Current (Vin = 9V, Loads OFF, Mission Comp.: AM62)			2.2	A
Input Current (Vin = 9V, Loads ON, Mission Comp.: AM62)			6.8	A
Input Power (Loads OFF, Mission Comp.: AM62)			20	W
Input Power (Loads ON, Mission Comp.: AM62)			170	W
PWM Output Voltage	0		5	V
PWM Output Impedance		150		Ω
GPO Voltage	0		5	V
GPO Impedance		150		Ω
GPI V _{IH} Voltage	3	5	50	V
GPI V _{IL} Voltage	0	2		V
GPI Impedance	>1000*			Ω
ADC Input Voltage	0		3.3	V
+5V_OUT-x Current		500	750*	mA
+28V_OUT-x Current		2000	3000*	mA



Operating Temperature	-20		71	°C
Storage Temperature	-40		85	°C

*E-fuse setpoint. Not recommended to exceed nominal value. See section XXX for details.

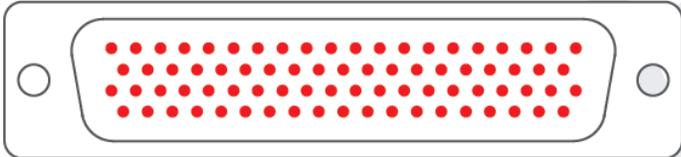
**GPI pins utilize a constant current sink with variable input impedance. See section XXX for details.

External Connectorization

Connector	Description
P1	PWM, Serial Comms, GPIO
P2	Power In and Out, Ethernet, CAN, USB, RC-IO, ADC
P3	GPS Antenna

External Connector List

P1 - GPIO and Serial Comms

	<p>Connector P/N: DD78S3S600X or equivalent</p> <p>Mate P/N: DD78M00000/AA or equivalent</p>
-------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------

Pin	Name	Origin	Notes
P1-1	PWM_OUT_1	FMU	
P1-2	PWM_OUT_2	FMU	
P1-3	PWM_OUT_3	FMU	
P1-4	PWM_OUT_4	FMU	
P1-5	PWM_OUT_5	FMU	
P1-6	PWM_OUT_6	FMU	
P1-7	PWM_OUT_7	FMU	
P1-8	PWM_OUT_8	FMU	
P1-9	PWM_OUT_9	FMU	
P1-10	PWM_OUT_10	FMU	
P1-11	PWM_OUT_11	FMU	
P1-12	PWM_OUT_12	FMU	
P1-13	GPO_1	FMU	



P1-14	GPO_2	FMU	
P1-15	GPO_3	FMU	
P1-16	GPO_4	FMU	
P1-17	GPO_5	Mission Comp.	
P1-18	GPO_6	Mission Comp.	
P1-19	FREE-232-TX	FMU	
P1-20	FREE-232-RX	FMU	
P1-21	GND		
P1-22	GND		
P1-23	GND		
P1-24	GND		
P1-25	GND		
P1-26	GND		
P1-27	GND		
P1-28	GND		
P1-29	GND		
P1-30	GND		
P1-31	GND		
P1-32	GND		
P1-33	GND		
P1-34	GND		
P1-35	GND		
P1-36	GND		
P1-37	GND		
P1-38	GND		
P1-39	GND		
P1-40	GPI_1	Mission Comp.	
P1-41	GPI_2	Mission Comp.	
P1-42	GPI_3	Mission Comp.	
P1-43	GPI_4	Mission Comp.	
P1-44	GPI_5	Mission Comp.	
P1-45	GPI_6	Mission Comp.	
P1-46	TELEM3-232-TX	FMU	
P1-47	TELEM3-232-RX	FMU	
P1-48	GPS1-232-TX	FMU	
P1-49	GPS1-232-RX	FMU	
P1-50	TORADEx-232-TX	Mission Comp.	
P1-51	TORADEx-232-RX	Mission Comp.	
P1-52	TELEM1-422-TX_P	FMU	
P1-53	TELEM1-422-TX_N	FMU	
P1-54	TELEM1-422-RX_P	FMU	



P1-55	TELEM1-422-RX_N	FMU	
P1-56	GPS2-422-TX_P	FMU	
P1-57	GPS2-422-TX_N	FMU	
P1-58	GPS2-422-RX_P	FMU	
P1-59	GPS2-422-RX_N	FMU	
P1-60	GND		
P1-61	GND		
P1-62	GND		
P1-63	GND		
P1-64	GND		
P1-65	GND		
P1-66	GND		
P1-67	H_MCU_Recovery	Wasp	
P1-68	GND		
P1-69	H_EEPROM_1WIRE	Wasp	
P1-70	GND		
P1-71	RFU		Reserved for Future Use
P1-72	GND		
P1-73	RFU		Reserved for Future Use
P1-74	RFU		Reserved for Future Use
P1-75	RFU		Reserved for Future Use
P1-76	GPS_PPS_P		1PPS input from external GPS, differential
P1-77	GPS_PPS_N		1PPS input from external GPS, differential
P1-78	GND		



P2 - Power, Ethernet, CAN

	<p>Connector P/N: DD78M3S600X or equivalent</p> <p>Mate P/N: DD78S00000/AA or equivalent</p>
--	------------------------------------------------------------------------------------------------------------

Pin	Name	Origin	Notes
P2-1	ETH1_A_P		On Ethernet Switch with FMU and Mission Comp.
P2-2	ETH1_A_N		On Ethernet Switch with FMU and Mission Comp.
P2-3	ETH1_B_P		On Ethernet Switch with FMU and Mission Comp.
P2-4	ETH1_B_N		On Ethernet Switch with FMU and Mission Comp.
P2-5	ETH1_C_P		On Ethernet Switch with FMU and Mission Comp.
P2-6	ETH1_C_N		On Ethernet Switch with FMU and Mission Comp.
P2-7	ETH1_D_N		On Ethernet Switch with FMU and Mission Comp.
P2-8	ETH1_D_P		On Ethernet Switch with FMU and Mission Comp.
P2-9	ETH2_TX_P		On Ethernet Switch with FMU and Mission Comp.
P2-10	ETH2_TX_N		On Ethernet Switch with FMU and Mission Comp.
P2-11	ETH2_RX_N		On Ethernet Switch with FMU and Mission Comp.
P2-12	ETH2_RX_P		On Ethernet Switch with FMU and Mission Comp.
P2-13	ETH3_RX_N		On Ethernet Switch with FMU and Mission Comp.
P2-14	ETH3_RX_P		On Ethernet Switch with FMU and Mission Comp.
P2-15	ETH3_TX_N		On Ethernet Switch with FMU and Mission Comp.
P2-16	ETH3_TX_P		On Ethernet Switch with FMU and Mission Comp.
P2-17	GND		
P2-18	CAN1_N		
P2-19	CAN1_P		
P2-20	GND		
P2-21	+5V_OUT-A		500mA Max Recommended, 750mA E-Fuse
P2-22	GND		
P2-23	+5V_OUT-B		500mA Max Recommended, 750mA E-Fuse
P2-24	GND		
P2-25	+28V_OUT-A		2A Max Recommended, 3A E-Fuse
P2-26	GND		
P2-27	+28V_OUT-B		2A Max Recommended, 3A E-Fuse
P2-28	GND		
P2-29	F_USB_P	FMU	
P2-30	F_USB_N	FMU	
P2-31	F_VBUS_SENSE	FMU	



P2-32	GND		
P2-33	T_USB1_VBUS	Mission Comp.	
P2-34	T_USB1_ID	Mission Comp.	
P2-35	T_USB1_D_P	Mission Comp.	
P2-36	T_USB1_D_N	Mission Comp.	
P2-37	GND		
P2-38	GND		
P2-39	GND		
P2-40	VIN-A		Primary Power Input
P2-41	VIN-A		Primary Power Input
P2-42	VIN-A		Primary Power Input
P2-43	VIN-A		Primary Power Input
P2-44	GND		Use for Input Power Ground
P2-45	GND		Use for Input Power Ground
P2-46	GND		Use for Input Power Ground
P2-47	GND		Use for Input Power Ground
P2-48	VIN-B		Backup Power Input
P2-49	VIN-B		Backup Power Input
P2-50	VIN-B		Backup Power Input
P2-51	VIN-B		Backup Power Input
P2-52	GND		
P2-53	F_FMU_SAFETY_IN	FMU	
P2-54	F_FMU_nSAFETY_LED	FMU	
P2-55	F_IO_VDD_SERV01	FMU	
P2-56	F_DSM_INPUT	FMU	
P2-57	F_RC_INPUT	FMU	
P2-58	F_SBUS_OUT_RSSI_IN	FMU	
P2-59	F_nARMED	FMU	
P2-60	VIN-A		Primary Power Input
P2-61	VIN-A		Primary Power Input
P2-62	VIN-A		Primary Power Input
P2-63	VIN-A		Primary Power Input
P2-64	GND		Use for Input Power Ground
P2-65	GND		Use for Input Power Ground
P2-66	GND		Use for Input Power Ground
P2-67	GND		Use for Input Power Ground
P2-68	VIN-B		Backup Power Input
P2-69	VIN-B		Backup Power Input
P2-70	VIN-B		Backup Power Input
P2-71	VIN-B		Backup Power Input
P2-72	GND		



P2-73	CAN2_N		
P2-74	CAN2_P		
P2-75	ADC_IN0	FMU	0-3.3V
P2-76	ADC_IN1	FMU	0-3.3V
P2-77	ADC_IN2	FMU	0-3.3V
P2-78	ADC_IN3	FMU	0-3.3V

P3 - GPS Antenna

	Connector P/N: SMA Female - P/N TBD Mate P/N: SMA Male - P/N TBD
-----------------------------------------------------------------------------------	-----------------------------------------------------------------------------------

Pin	Name	Origin	Notes
P3-Ring	GND		
P3-Pin	RF		Optional 3.3 or 5VDC for active antennas