







# CORTEX HYBRID POWER SYSTEM



The Cortex Hybrid Power System (CHPS) is a fully-featured UAV Power Management Unit (PMU) designed specifically for **Unmanned Vehicles**. Providing up to **750W** of electrical power and weighing only **188 grams**, it also boasts **remote starting** and a hybrid architecture allowing power to be delivered from either the generator, the battery, or both simultaneously for power boosting / **overdrive capability**.

## KEY FEATURES

-  Full featured Power Management Unit (PMU)
-  Remote engine starting
-  Hybrid architecture allows battery assist and overload protection
-  Battery input and charging up to 14S/60V
-  Three independently controlled and regulated power rails
-  CAN/RS232 control and telemetry interface

# THE NUMBERS



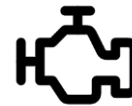
**750W**

Under typical conditions



**188g**

Weight



**100cc**

Integrated engine starting



**24-60V**

Battery voltage

## Dimensions

Length	120mm (4.72 inch)
Width	78mm (3.07 inch)
Height	20.4mm (0.80 inch)
Weight	188g

## Environment

	Min	Max
Ambient temperature	-20°C	+55°C
Operating temperature	-	+100°C

## Electrical Supplies

	Min. Voltage	Max. Voltage	Max. Current	Max. Power	Efficiency
Generator Input	-	75V	20A	750W	-
Battery Input	20V	60V	20A	750W	-
Shore Input	20V	75V	10A	750W	-
HV Rail Output	20V	75V	10A	500W	-
Payload Output	12V	28V	10A	250W	97%*
Servo Output	5V	12V	10A	100W	95%*
Avionics Output	12V	18V	5A	75W	99%*
Battery Charger	20V	60V	1.5A	75W	99%*

\*Maximum efficiency at full load

## FEATURE SET

### Quad Plane Compatible

The Cortex Hybrid Power System (CHPS) has been specifically designed to work with a single battery when used in quad planes. The vehicle can use the VTOL high voltage battery pack to start the engine and then CHPS will recharge the pack once the vehicle is underway.

### Tightly Integrated

The Cortex Hybrid Power System provides class leading SWaP, by leveraging Currawong's motor control and hybrid power electronics pedigree, and utilizing the latest available electronics technology.

### Integrated Engine Starting

Integrated engine starting simplifies engine operation, providing safe and reliable remote engine starting. The hybrid power architecture also keeps the engine running during transients or poor fuelling conditions.

### Hybrid Power Delivery

The hybrid design of the CHPS ensures consistent power delivery under all conditions. The controller can provide energy from the engine and connected battery simultaneously, and controls power flow based on varying system power demands. Short term high electrical load requirements are seamlessly managed.

### Intelligent Power Limiting

The CHPS provides a unique power limiting feature which intelligently regulates the amount of power taken from the generator to ensure that the engine and generator are operated within safe limits.

At low RPM, where drawing excess power may otherwise stall the engine, the CHPS will supplement with battery power to ensure the engine is not overloaded.

### Battery Charging

An integrated regulated battery charger ensures that the external battery remains at the correct state of charge during operation. When excess energy is available from the generator, the CHPS will actively monitor and charge the battery. Battery voltage is fully configurable across the supported voltage range (24V to 60V)

### Wide Voltage Range

The CHPS supports high voltage battery operation (up to 14S LiPo / 60V). This allows the aircraft to run off a single high voltage battery pack if required. The CHPS will also run with a battery input as low as 24V (6S) without issue.

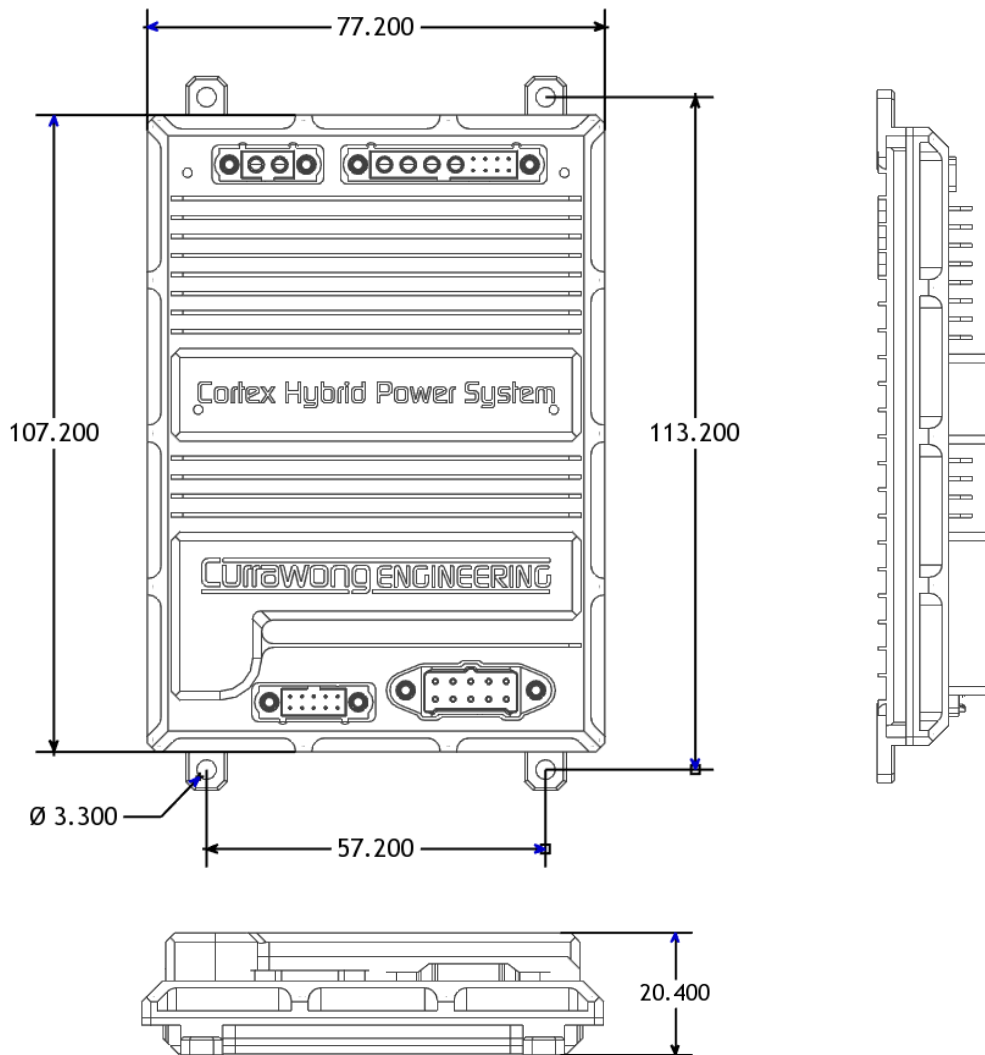
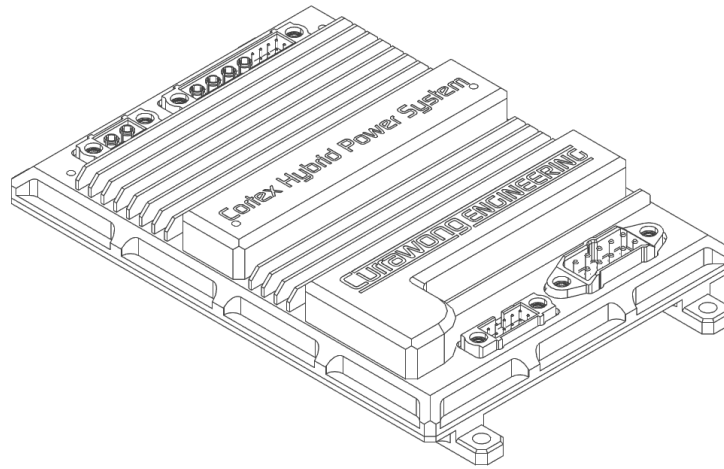
### Regulated Rails

In addition to regulated battery charging, three regulated voltage rails are provided for running external aircraft system. An unregulated high voltage rail is also provided which can be used as an input for external power regulation systems.

### Advanced Telemetry

CHPS supports multiple command, control and telemetry interface options. CAN bus (supporting either DroneCAN or PiccoloCAN protocols) or UART interfaces ensure that CHPS can be easily integrated with any autopilot or flight controller.

# DRAWINGS



# SYSTEM ARCHITECTURE

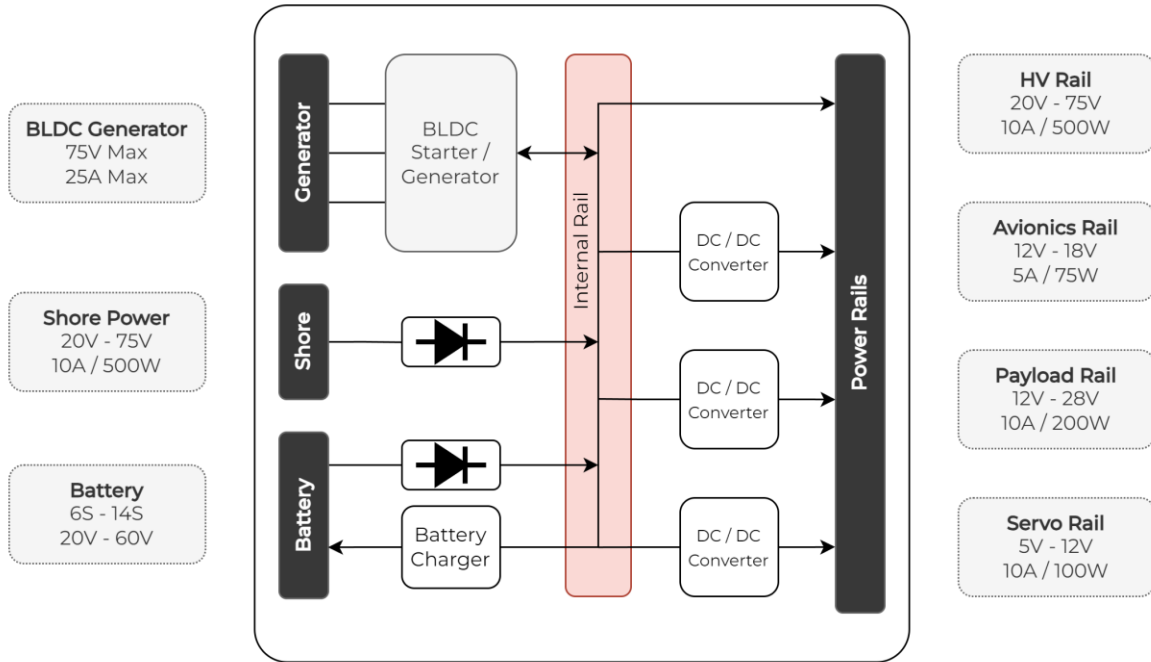


Figure 1 - High level functional block diagram

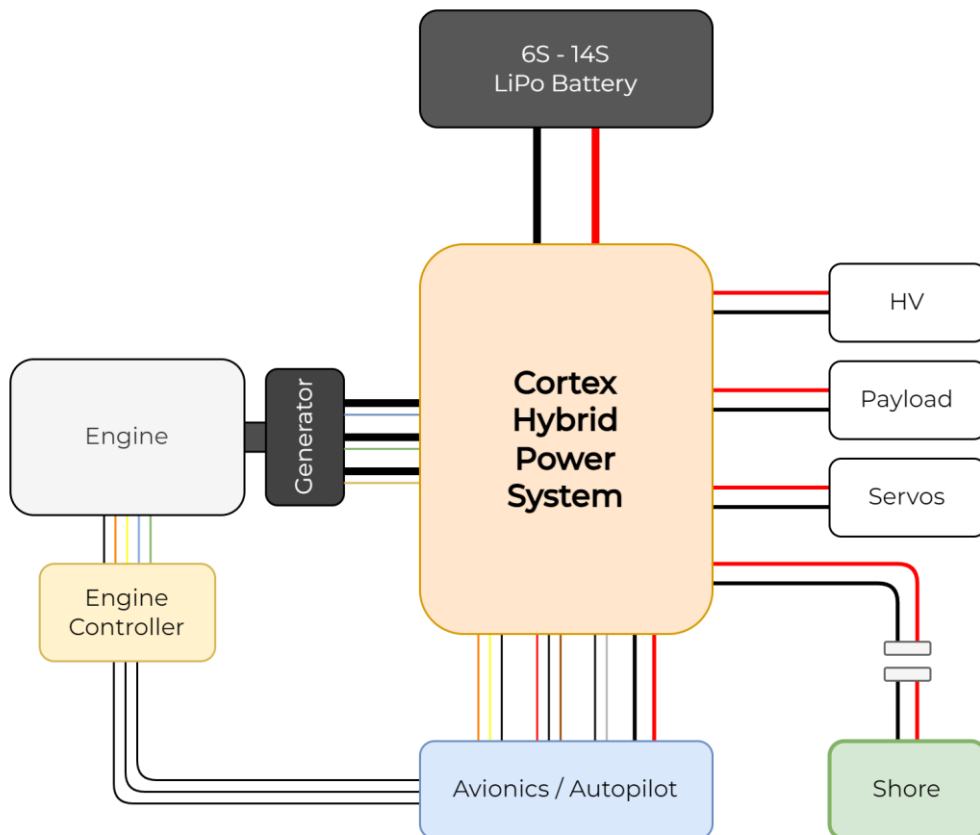
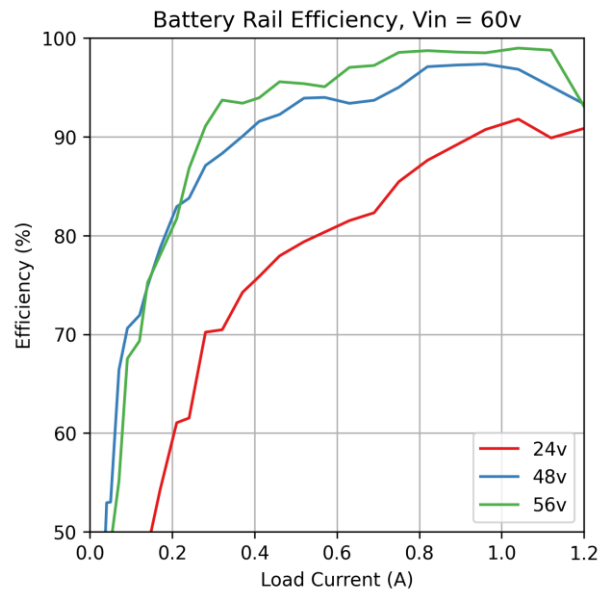
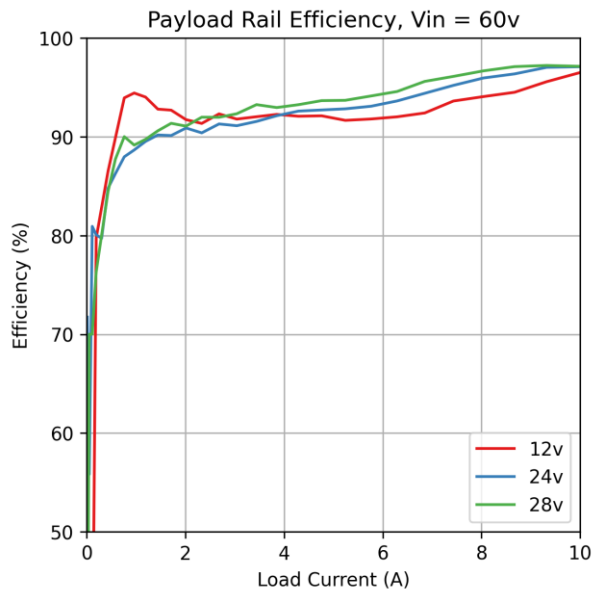
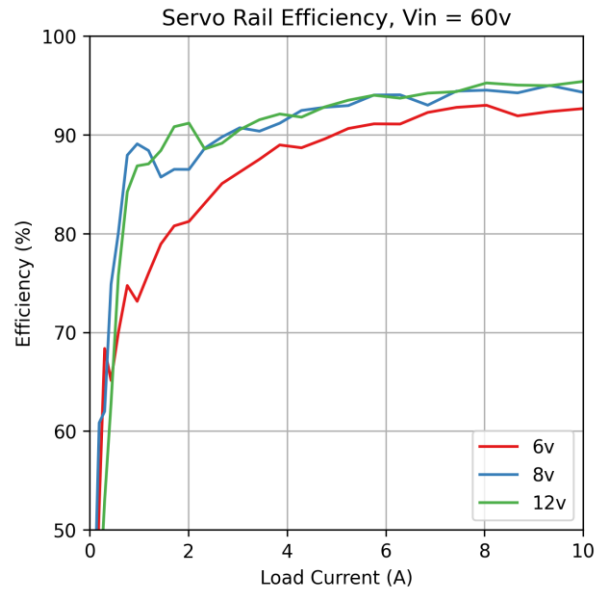
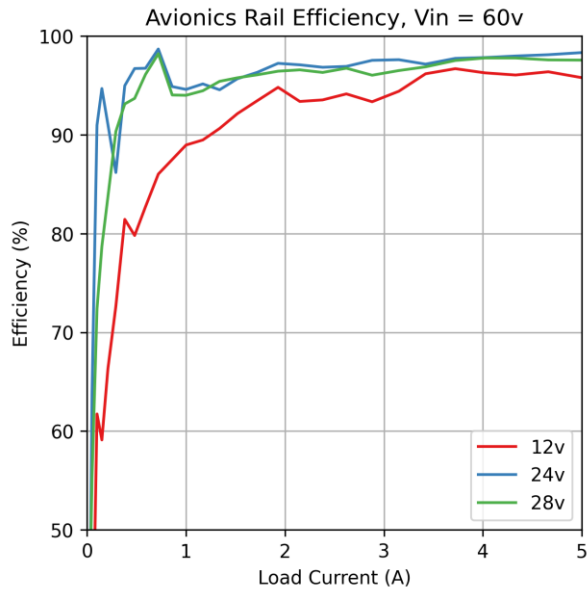


Figure 2 - Typical use diagram showing common connections

# TYPICAL PERFORMANCE CURVES



# CONNECTOR PINOUT

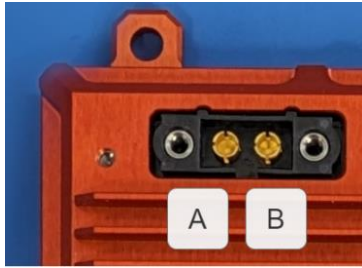


Figure 3 - J1 Battery



Figure 4 - J2 BLDC Motor



Figure 5 - J3 Avionics



Figure 6 - J4 Servo/Payload

J1 BATTERY		J2 BLDC		J3 AVIONICS		J4 SERVO/PAYLOAD	
A	Bat +	A	Phase A	1	+5V	1	Shore +
B	Bat -	B	Phase B	2	CAN_H	2	VBus +
		C	Phase C	3	CAN_L	3	Payload +
		D	GND	4	Arm	4	Servo +
		1	Hall GND	5	Start	5	Avionics +
		2	Hall Power	6	GND	6	Shore -
		3	Temperature	7	GND	7	VBus -
		4	GND	8	GND	8	Payload -
		5	Hall U	9	RS232_RX	9	Servo -
		6	Hall V	10	RS232_TX	10	Avionics -
		7	Hall W				
		8	NC				

Table 1 - Pin Labels

For access to the full product documentation, please contact Currawong Engineering.

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