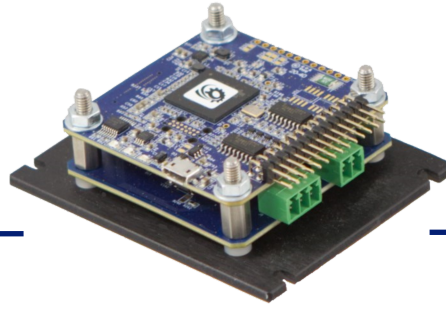


# OMA-21



The OMA-21 is a small formfactor servo amplifier and controller capable of Sensorless, Hall sensors, Incremental or Absolute Encoders (SSI or BiSS). Ideal for managing motors of 140W or less in a tightly controlled feedback loop for superior performance. The OMA-21 communication is through USB 2.0 and offers more than 170 motion commands for a variety of application requirements. The OMA operates from a single power supply of 15 to 50 VDC and is internally monitored for overcurrent and overvoltage. Overtravel limit and home inputs are included as well as up to 8 general purpose I/O. The small size outline matches the NEMA23 frame motor dimensions for flexible mounting options.

## FEATURES

- Highly integrated, high performance combined motion controller and BLDC servo amplifier
- Small formfactor (PCB size: 2.22" x 2.22" x 0.83")(with heatsink: 2.6" x 3.27" x 1.1")
- Up to 5A motor current, 8A Peak (140W typical\*)
- Control loop update rate FOC configurable up to 100kHz.
- Control loop update rate for motion planning configurable from 1024 - 8192Hz.
- Rotor position feedback using incremental encoder or hall sensor.
- Eight opto-isolated +3.3 to +24VDC general purpose input/output including Home and Limit.
- Home and Limit low or high true state selectable by command input.
- Two differential quadrature incremental encoder inputs, up to 16,000,000 counts/s
- Alternative BiSS absolute encoder support for up to 50-bits on one incremental encoder.
- +5VDC 500mA supply pins to power encoders.
- Support for dual-loop position maintenance for load position control.
- Cascaded PID loops provide options for torque or velocity command mode
- OMS ASCII communication interface on virtual COM port over USB.
- Over 170 commands to configure and control the OMA-21.
- Position range  $\pm 562,949,953,421,311$
- Velocity 0 to  $\pm 4,194,176$  counts/s with a resolution of 1 count/s.
- Acceleration 1 to 8,000,000,000 counts/s<sup>2</sup> with a resolution of 1 count/s<sup>2</sup>.
- All configuration parameters by command input are archivable to power-up defaults.
- Single supply: +15 to +50VDC
- LED state signaling of the device.



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## Electrical Specifications

Parameter	Min	Typ	Max	Unit	Notes
Supply Voltage	15		50	VDC	Current depends on load
Motor Output Current	0		6	A	8-Amp Peak
Logic Output	0	12	30	mA	Vopto value defines current
Logic Input	1		4	mA	Vopto value dependent
Opto Voltage (Vopto)	3.3		24	VDC	
Incremental Encoder	0		4	MHz	Counts per second
BiSS/SSI Data resolution		32	50	Bits	Data bits are programmable
BiSS/SSI Communications	125k		6M	Hz	Optional CRC

## Environmental Specifications

- Operating Temperature..... 0.0 to +50° C (heatsink & ventilation recommended)
- Storage Temperature..... - 20° to +85° C
- Weight..... 88g (including supplied heatsink)
- Humidity..... 20 to 95% Φ, non-condensing
- Dimension Outline..... 2.22" x 2.22" x 0.83" (including mating connectors)  
(with heatsink: 2.6" x 3.27" x 1.1")

## Tuning Software Included

The screenshot displays the OMS MOTION, Inc. software interface. On the left, there are tabs for 'Configuration', 'Tuning Controls', 'Motion Generation', and 'Data Capture'. The 'Tuning Controls' tab is active, showing 'Graph Settings' with options for 'Data Capture' (Planned motion position, Encoder position, Dual-loop load encoder position) and 'Data Capture Color Legend'. Below this are 'Data Capture Display' checkboxes and 'Data Sampling' settings (Motion Update Rate: 1024 Hz, Drive Update Rate: 40000 Hz, Sample Size: 500, Downsample Count: 0). The 'Motion Controls' section has 'GO', 'STOP', and 'KILL' buttons. The 'Command/Response History' shows TX and RX data for AC, UR, and DU commands. The 'Position Status Information' shows Command Position, Actual Position, and Min/Max Position Error. The 'Graphed Response' plot shows Velocity vs. Time (milliseconds) with a step response reaching a steady state of 2000. At the bottom, there are buttons for 'Save Graph Data', 'Save Graph Image', 'Display Data File', and 'Clear Graph'.



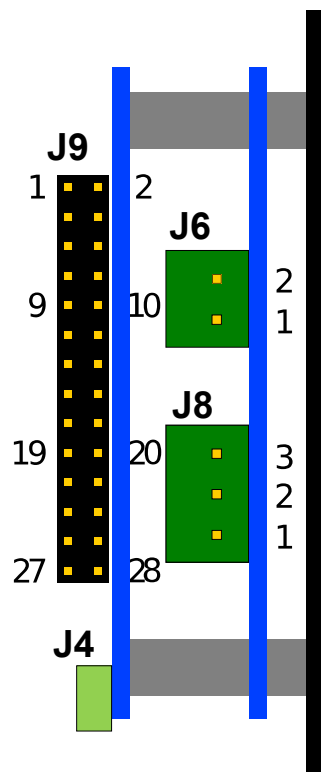
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## CONNECTOR DEFINITIONS

PIN	J6
1	15-50 VDC
2	GND

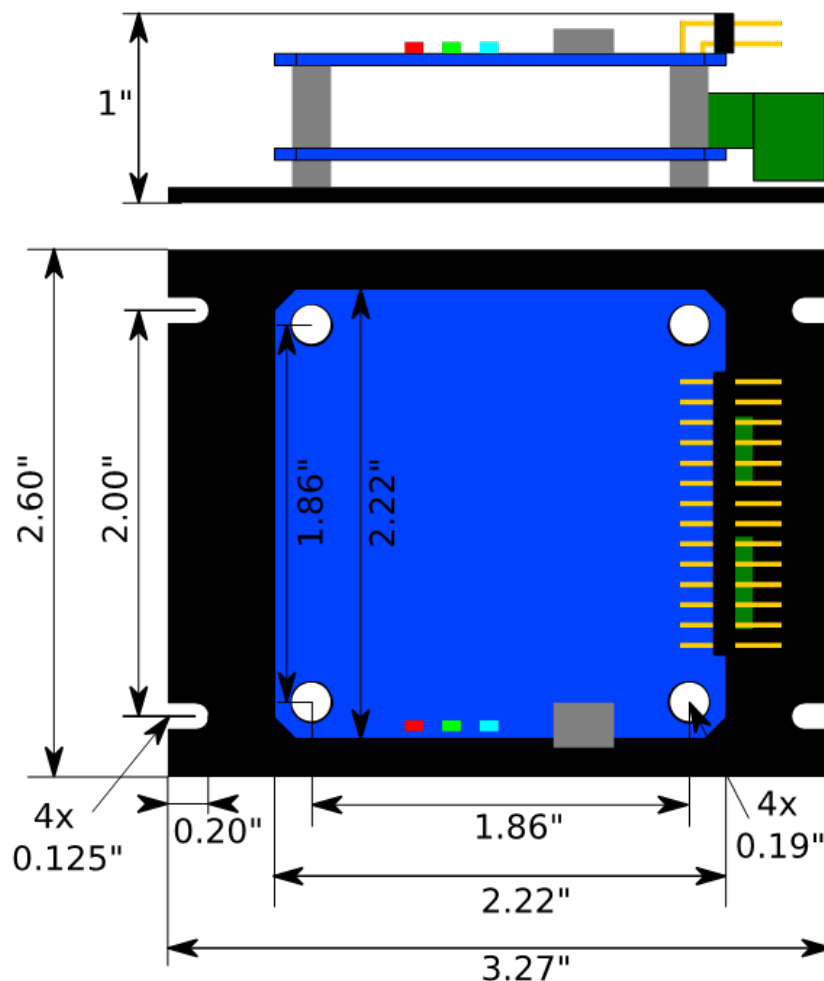
PIN	J8
1	Phase W
2	Phase V
3	Phase U

PIN	J9	PIN	J9
1	Enc1 PhA+ / BiSS D+	2	Enc1 PhA- / BiSS D-
3	Enc1 PhB+	4	Enc1 PhB-
5	Enc1 Ind+ / BiSS Dclk+	6	Enc1 Ind- / BiSS Dclk-
7	+5V	8	GND
9	Vopto2	10	GNDopto2
11	GPIO2 / pLim	12	GPIO3 / nLim
13	GPIO1 / Dir In	14	GPIO4 / Hm
15	GPIO0 / Step In	16	GPIO7 / Hall C
17	GPIO6 / Hall B	18	GPIO5 / Hall A
19	Vopto1	20	GNDopto1
21	+5V	22	GND
23	Enc0 PhA+	24	Enc0 PhA-
25	Enc0 PhB+	26	Enc0 PhB-
27	Enc0 Ind+	28	Enc0 Ind-



- USB 2.0 interface is located at **J4**.
- Encoder I/Os and motor phases are referenced to the supply power GND. GPIOs are split into the two opto-isolated groups Vopto1 and Vopto2.

## Dimensions



ORDERING INFORMATION	
Model	Description
OMA-21	Servo Amplifier & Control, 140W

\* = Typical values may vary



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