

à la mods.

PWRM17225

20W DC-to-DC Power Supply

User Guide

Revision History

REV	DATE	DESCRIPTION
0	June, 2020	Initial release

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Support

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Warranty

The à la mods product warranty can be obtained from the website at www.alamods.com/documents/warranty.html

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Introduction

The à la mods PWRM17225 is a 20W DC-DC power supply based upon a switch-mode design for high efficiency, consistent power to a Raspberry Pi or à la mods stack of modules connected to a Raspberry Pi.

It supports a wide input voltage range from 7.5 to 36 Vdc to accommodate many different industrial environments.

It can be stacked at any level in a tower of à la mods modules or power a single Raspberry Pi. A standard barrel jack is used as the input connection which is supported by most AC/DC wall adapter power supplies.

There is a status LED that is connected to GPIO25 of the 40 pin GPIO header that can be controlled directly from the host computer. And a momentary push button switch connected to GPIO21.

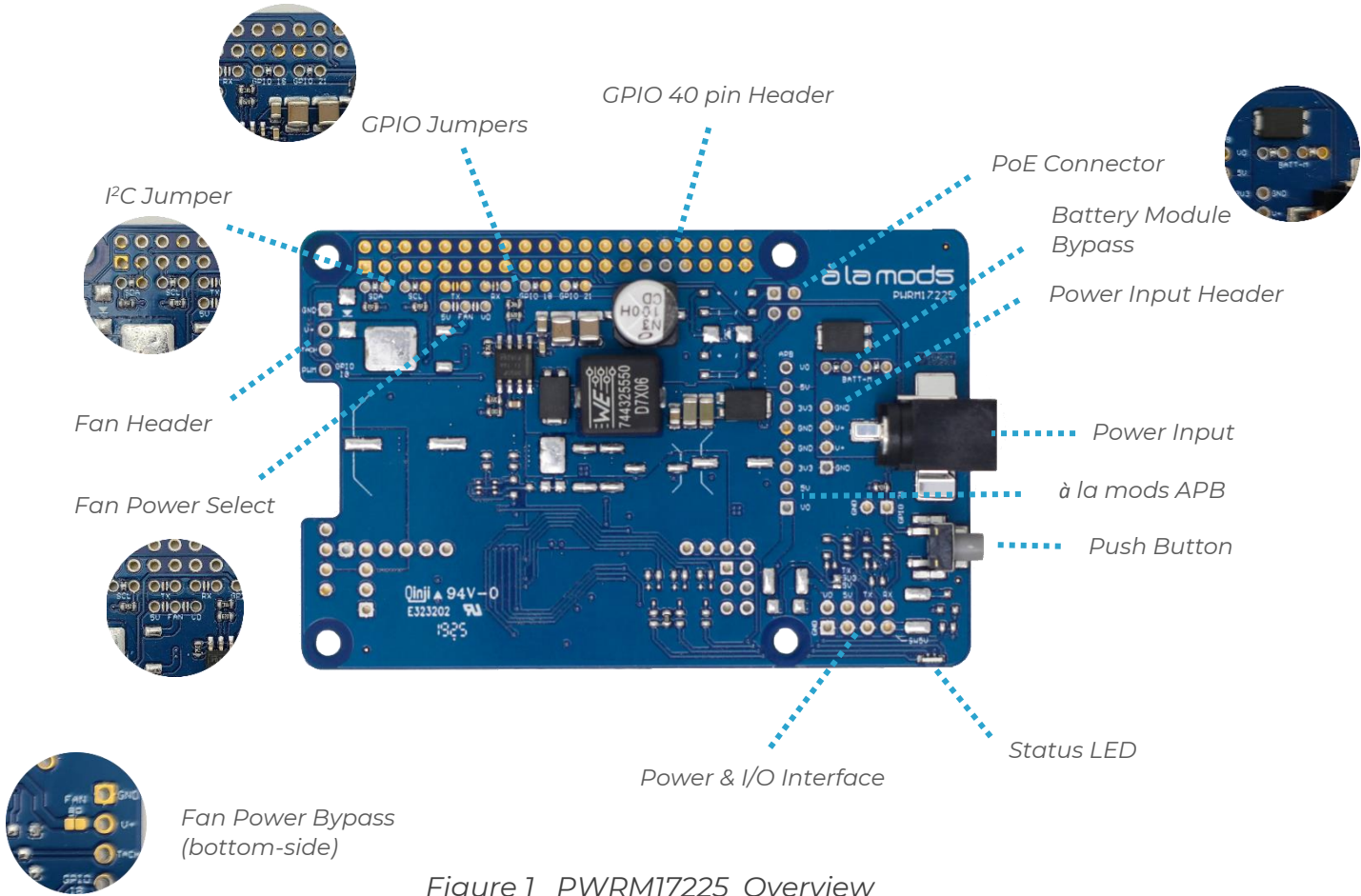


Figure 1 PWRM17225 Overview

Mechanical Specifications

The à la mods “M” series modules are all compatible with the Raspberry Pi® form factor and are designed to be stacked onto the Raspberry Pi.

NOTE: *GPIO 40 pin is designed for a double stacking header connector. The Auxiliary Power Bus (APB) 8 pin header can use a traditional male header connector or a double stacking header connector depending upon where in the module stack the power supply is located.*

Use 17 mm M2.5 standoff with double stacking headers

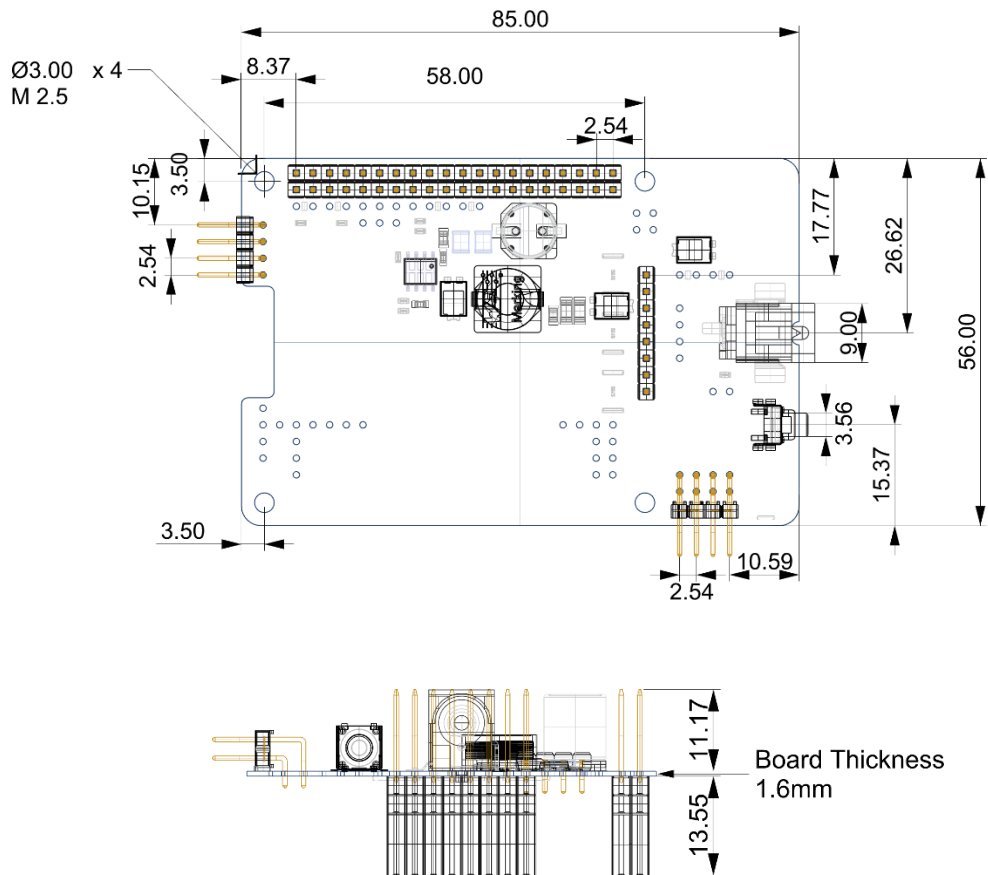


Figure 2 Mechanical Dimensions (mm)

Electrical Specifications

The à la mods PWRM17225 module is designed to be electrically compatible with the Raspberry Pi® 40 pin GPIO header power.

Table 1 Electrical Operating Characteristics

PARAMETER	PERFORMANCE			UNIT
	Min	Typ	Max	
Input Vin	7.5		36	V
Input Current			3.33	A
Output Voltage 5V0	4.75	5.0	5.25	V
Output Current 5V0			4.0	A
Output Voltage 3V3	3.14	3.3	3.47	V
Output Current 3V3			800	mA
Output Voltage Vo	7.5		36	V
Output Current Vo			3.0	A
Fan V+ ¹	4.75		36	V
Fan V+ Current			2.0	A
Vo Output	7.5		36	V
Vo Output Current			2.0	A
5V Output	4.75		5.25	V
5V Output Current			1.0	A
Operating Temperature	-40		+85	°C

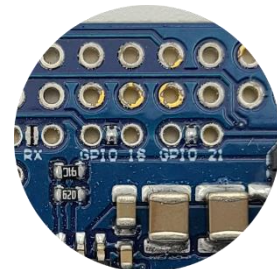
¹ Depends upon Vin voltage (V+ connected to Vo)

Hardware Configuration Options

Push Button I/O

This is a configuration jumper for the pushbutton on the power supply. By default, it is connected to GPIO21, but can be disconnected or jumpered to other I/O lines.

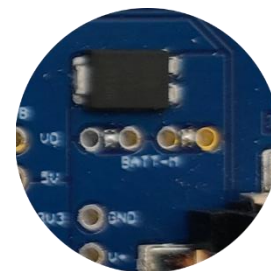
Default: GPIO pin 40 (GPIO21)



Battery Module Bypass

This is a configuration jumper to accommodate an external battery module to provide battery backup capability. Without the battery backup module these jumpers must be connected (bridged)

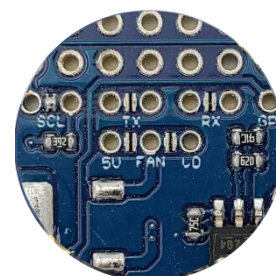
Default: Both jumpers bridged



Fan Power

This is a configuration jumper to connect the fan power output pin to the appropriate voltage. This can be set to 5 Vdc or Vo (Vin).

Default: not connected.



Fan Power Bypass (bottom-side)

This is a configuration jumper to bypass the fan power FET and provide power direct from the power select jumper to the fan connector.

Default: not connected

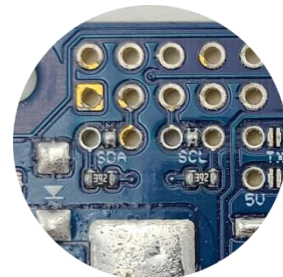


I²C

This jumper provides I2C connectivity to GPIO expansion circuitry on this module.

The I²C functionality is not used on the “basic” power supply model.

Default: Both jumpers bridged



I/O Pinouts

Specific I/O pins of the 40 pin header are used by default for the Status LED and push button switch.

These pin assignments can be easily modified without cutting PCB traces by simply removing the solder bridges of the individual default control signals and providing a jumper from the control signal to a different GPIO line.

GPIO Header – 40 Pin

Table 2 40 Pin GPIO Header Pin Assignments

PIN	DIRECTION	NAME	DESCRIPTION
1	Power	3V3	3.3 Volt power from host processor
2	Power	5V0	5.0 Volt power
3	I/O	I²C SDA	I ² C Data Signal
4	Power	5V0	5.0 Volt power
5	O	I²C SCL	I ² C Clock Signal
6	Power	GND	GND
7	I/O	-	unused
8	-	-	unused
9	Power	GND	GND
10	-	-	unused
11	I/O	-	unused
12	I/O	Fan Speed Control	GPIO18 configured as output
13	I/O	-	unused
14	Power	GND	GND
15	I/O	-	unused
16	I/O	-	unused
17	Power	3V3	3.3 Volt power from host processor
18	I/O	-	unused
19	-	-	unused
20	Power	GND	GND

21	-	-	unused
22	I/O	Status LED	GPIO25 configured as output
23	-	-	unused
24	I/O	-	unused
25	Power	GND	GND
26	I/O	-	unused
27	-	-	unused
28	-	-	unused
29	I/O	-	unused
30	Power	GND	GND
31	I/O	-	unused
32	I/O	-	unused
33	I	-	unused
34	Power	GND	GND
35	I/O	-	unused
36	I	-	unused
37	O	-	unused
38	O	-	unused
39	Power	GND	GND
40	I/O	Push Button	GPIO21 configured as input

Remote Push Button I/O

Table 3 Remote Push Button Connector

PIN	DIRECTION	NAME	DESCRIPTION
1	PWR	GPIO21	Push Button Input Signal
2	PWR	GND	Common Ground

Auxiliary Power Bus

Table 4 Auxiliary Power Bus (APB)

PIN	DIRECTION	NAME	DESCRIPTION
1	PWR	Vo	Connected directly to Vin
2	PWR	5V0	5.0 Vdc
3	PWR	3V3	3.3 Vdc
4	PWR	GND	Common Ground
5	PWR	GND	Common Ground
6	PWR	3V3	3.3 Vdc
7	PWR	5V0	5.0 Vdc
8	PWR	Vo	Connected directly to Vin

Fan Power & Control

Table 5 Fan Power Connector

PIN	DIRECTION	NAME	DESCRIPTION
1	PWR	GND	Common Ground
2	PWR	Fan V+	Fan power (configurable) (Vo or 5V)
3	Input	Tach	Not Used
4	Output	PWM	PWM Fan Speed Control

Module Operation

Setup

The power supply will function without any setup. The Status LED, push button switch and fan speed control require I/O configuration before they can be used.

Using the default setup, the host computer must setup the I/O pins as follows:

- Pin 12 Output (fan speed control – not used on “basic” model)
- Pin 22 Output (Status LED)
- Pin 40 Input (push button)

Operation

Setting pin 22 to a logic high value will turn the Status LED on.

Reading a logic low (0) on input 40 indicates the push button is pushed and active.