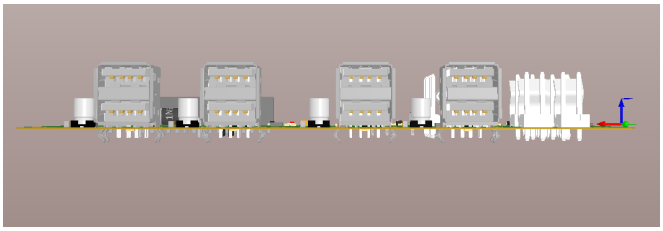
ATX Power Supply splitter for Raspberry Pi Clusters

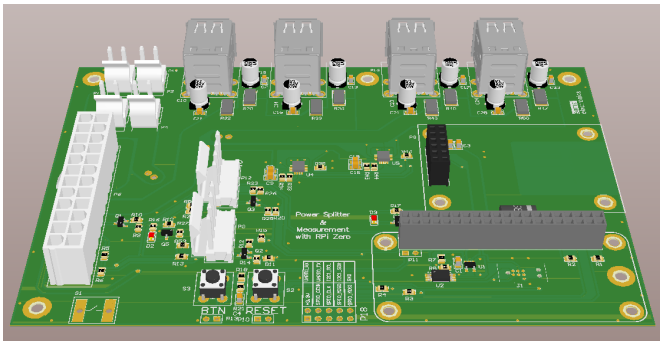
1 Overview

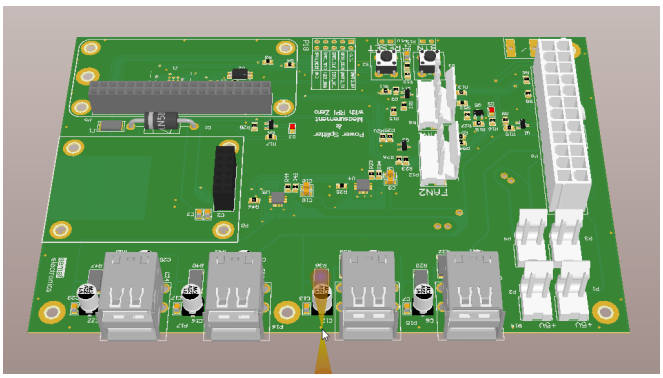


- 8x USB-A port for 5V output
- Voltage, Current and power measurements
- 2x 5V output for general purposes
- 2x 12V output for general purposes
- 2x FAN connector

2 Description

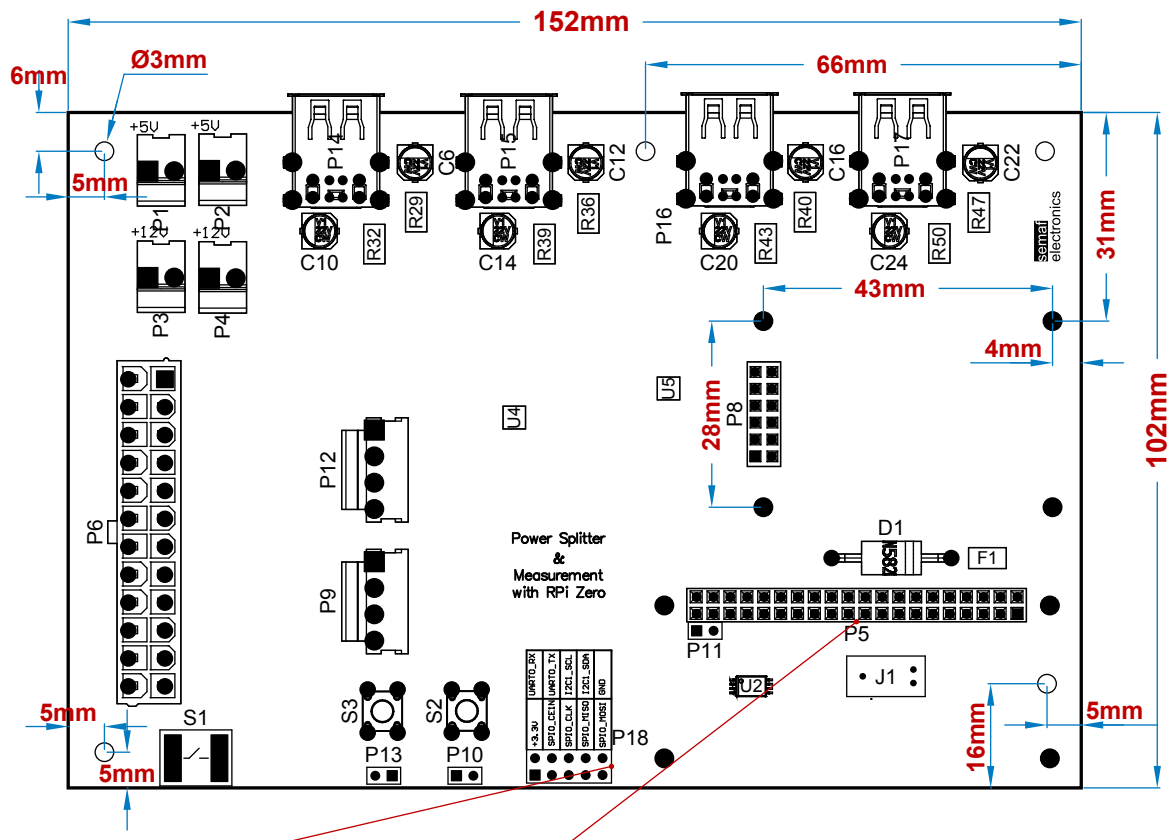
The ATX power splitter utilizes ATX power to split the power to 8x USB port for Raspberry Pi cluster applications. Raspberry Pi Zero can be used to control the board and read voltage and current measurements by plugging it to 40-pin header connector. Voltage, current and power measurement for each channel are available on I²C bus. Raspberry Pi Zero is powered by 5V Standby current from ATX power supply.
There are 2 connctors for standard 4-pin FAN and they can be controlled by Raspberry Pi with PWM output. FAN RPMs are also available for Reaspberry Pi to read. One user button and one user LED are available for user programming. Button can be programmed as on/off switch for ATX power supply.
2x PAC1934 voltage and current sensors from microchip are utilized for voltage and current measurement for each channel and values are read over I²C bus by Pi Zero. Linux kernel driver and device tree blob for current sensor are available. Device I²C addresses: 0x10, 0x1F.
If needed, An Ethernet over SPI module can be connected to 12-pin header to bring the ethernet functionality to Raspberry Pi.
Onboard EEPROM for board specific data as well as for HAT (Hardware Attached on Top) specifications. There is a 10-pin header for UART, I²C, SPI connections.





3 Technical specification

View from Top side (Scale 1:1)



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Serial ports connector

+3.3V	1	2	UART0_RX
SPI0_CE1N	3	4	UART0_TX
SPI0_CLK	5	6	I2C1_SCL
SPI0_MISO	7	8	I2C1_SDA
SPI0_MOSI	9	10	GND

Connectors and buttons

P1	+5V
P2	+5V
P3	+12V
P4	+12V
P5	RPi Zero connector
P6	ATX connector
P9	FAN2 connector
P12	FAN1 connector
P13	User button connector
P10	RPi reset header
P11	RPi reset connector
P8	ETH-SPI module connector
P18	Connector for SPI, I2C, UART
S2	User button
S3	RPi reset button

RPi header connections

Function	GPIO	Header Pin		GPIO	Function
			12	18	(out) FAN1 PWM
(in) User button	27	13			
			16	23	(in) FAN1 Tacho
(in) PS_ON from ATX	6	31			
(in) FAN2 Tacho	13	33			
(out) FAN2 PWM	19	35	36		(in) PWR_OK from ATX
			40	21	(out) LED1 (D3)

Notes:

1. All dimensions in mm.