# Mimosa Power Hat Test Protocol

Jérôme Béguin

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## 1 Power

First step before connecting the board to a Raspberry Pi, ensure the voltage regulator *U4* works correctly.

- Connect 12V power supply to *J4 PWR IN* connector.
- Measure 12V on Pin 1 & 2 of *U4*.
- Measure 5V on Pin 10 & 11 of *U4*
- Measure 5V on Pin 2 & 4 of 40 Pins connector
- Measure with an oscilloscope the stability of 5V on Pin 2 & 4 of 40 Pins connector

If these firsts are passed it's possible to plug the board on to a raspberry pi. Then test the other voltages.

- Measure 3.3V on Pin 1 of 40 pins connector
- Measure 3.3V on Pin 2 of *J5* connector

## 2 Real Time Clock

Real time clock chip is the *U5* chip on the board. It is connected to raspberry pi via $I^2C$ to Raspberry Pi. *SDA* on pin 3 and *SCL* on pin 5 of 40 pins connector.

**NOTE** On the version 0 of the Power hat PCB the coin cell enclosure is too small to accept 3V coin cell battery. It will be corrected in future version of the board.

- Find $I^2C$ device on Raspberry pi using

  ```
  i2cdetect -y 1
  ```

  and find the adresse 0xD2 or 0xD3
- it then should be possible to setup and use the RTC with some Raspberry pi library.

## 3 PWM Fan control

The connector *M1 CPU FAN* is supposed to be connected to a 5V PWM computer fan.

- Using Raspberry pi, create a PWM signal on Pin 32 (GPIO 12) of 40 pins connector.
- Measure PWM signal on Pin 4 of *M1 CPU FAN* connector with 5V amplitude.
- If a Fan is connected on *M1 CPU FAN* connector a 3V feedback signal of rotation speed of the fan should be sent back on Pin 22 (GPIO 24) of 40 pin connector.

## 4 NMEA0183 Interface

The connector *J1* is the *NMEA0183* interface. It is connected to the raspberry pi via serial connection on Pin 8 & 10 (GPIO 14 & 15) of 40 Pins connector. The *NMEA0183* connector is a *RS422* port with one differential input and one differential output.

- Connect an *RS422 NMEA0183* divise like a GPS on *J1* connector
- Receive *NMEA0183* phrases on serial port of raspberry pi.

## 5 NMEA2000 CAN bus

The connector *J2* is a CAN interface. It is supposed to be connected on a CAN bus as a device and should be able to communicate with the other device on the bus. The CAN is translated into SPI and connected to raspberry pi through 40 pins connector via Pins 19, 21 & 23 (GPIO 10, 9 & 11) for MOSI, MISO & CLK. Chip select (CS) is on Pin 26 (GPIO8).

- Connect *J2* connector to a CAN bus.
- receive CAN messages on SPI on raspberry pi.