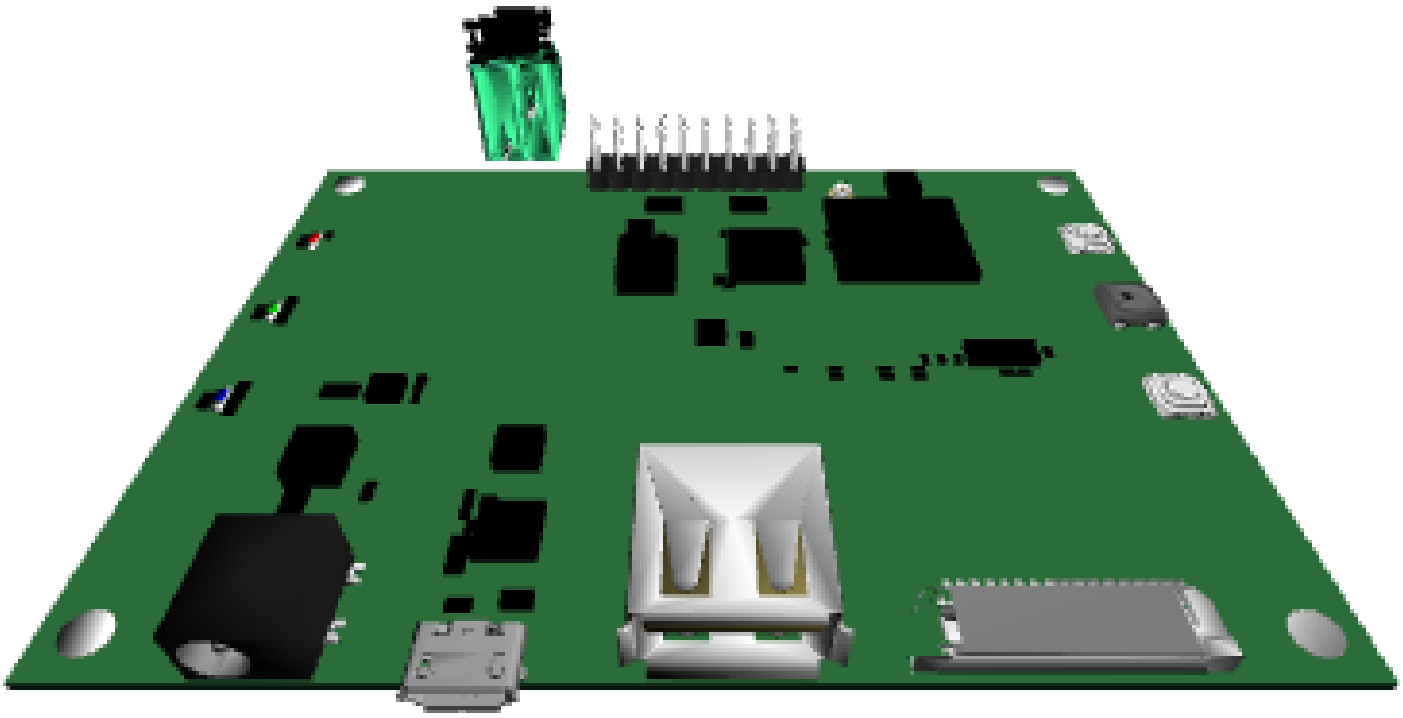
Chatterbox for RPi



This board was designed and built by Geppetto

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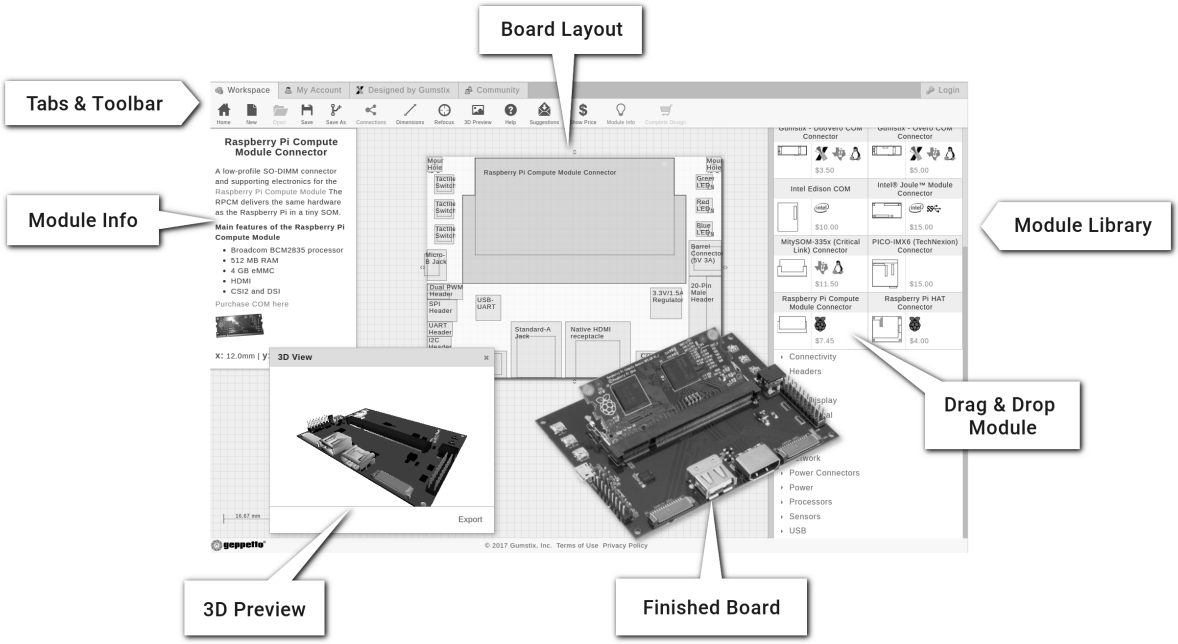

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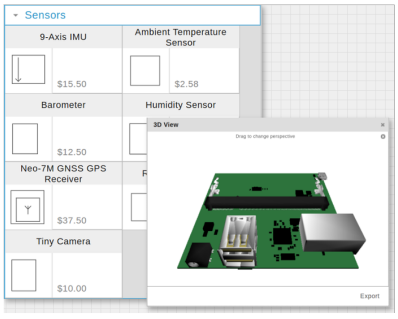
Board Description

Chatterbox for RPi

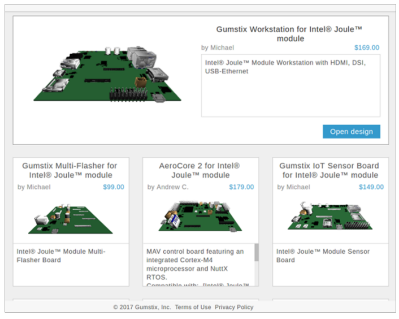
Board Dimensions

9cm x 6.5cm

Geppetto Makes Hardware Easy



Custom Library and 3D Design Preview



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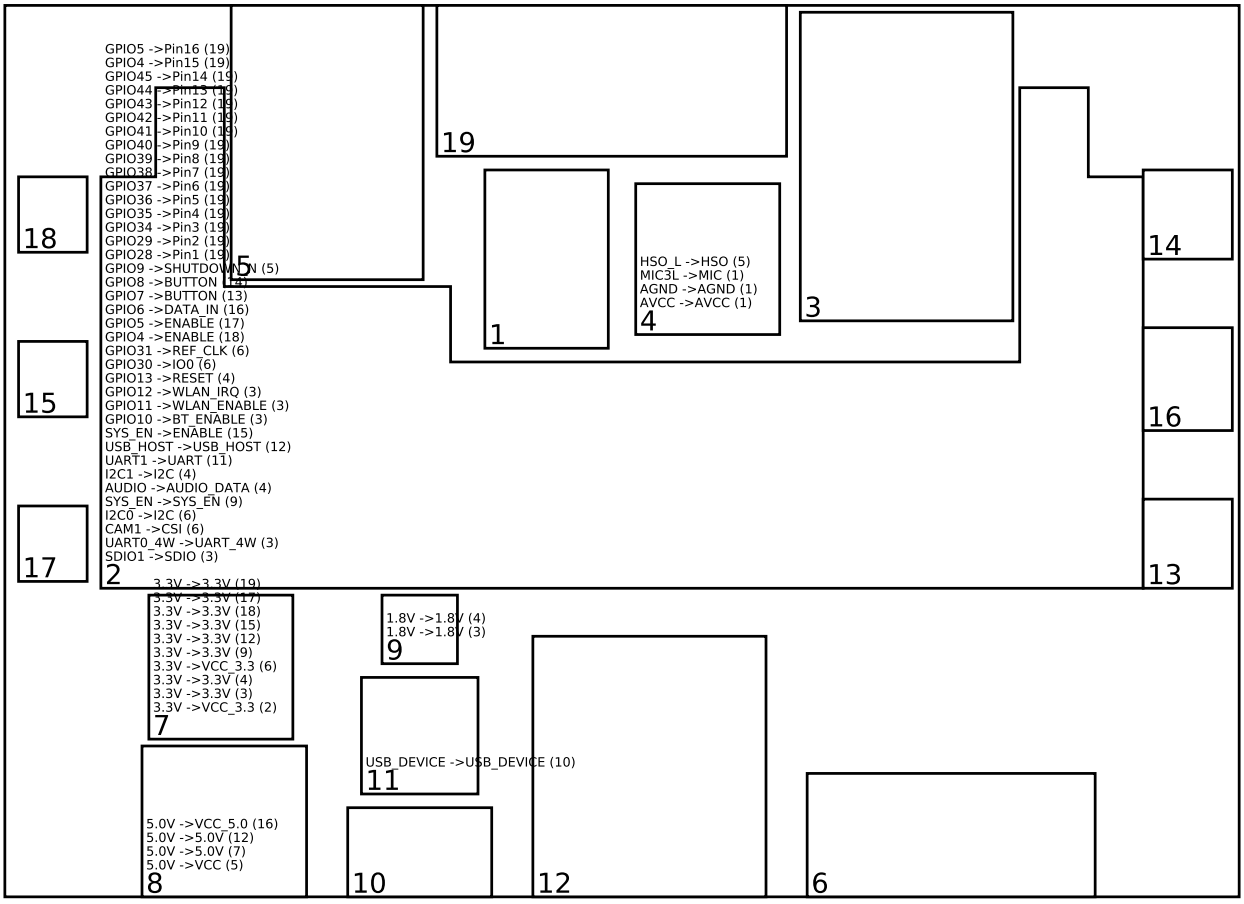
1 Modules on Board



1.1 Audio

1.1.1 Microphone (v7) (1)

This compact omnidirectional electret condenser microphone offers mono microphone in for MIC3L on Audio Codec (4).

1.1.2 Audio Codec (v20) (4)

A low-power stereo audio codec with stereo headphone amplifier, as well as multiple inputs and outputs programmable in single-ended or fully differential configurations.

For more information, visit `http://www.ti.com/product/tlv320aic3106`. This module requires Raspberry Pi Compute Module Connector (Flip-side) (2).

This module provides the following output buses:

- AVCC to Microphone (1)
- AGND to Microphone (1)

- MIC3L to Microphone (1)
- HSO_L to 2.5W Speaker Driver (5)

1.1.3 2.5W Speaker Driver (v3) (5)

This PAM8302A audio power amplifier has an average output of 2.5W

driving loudspeaker output for Audio Codec (4) .

1.2 COM Connectors

1.2.1 Raspberry Pi Compute Module Connector (Flip-side) (v6) (2)

The **R**aspberry **P**i **C**ompute **M**odule (**RPCM**) connector is a SODIMM socket powering the RPCM and providing the module's function to Geppetto designs. The RPCM COM connector is pin-compatible with 3 variants of the module: RPCM1, RPCM3 and RPCM3L.

Module features:

	RPCM1	RPCM3	RPCM3L
SoC	BCM2835	BCM2837	BCM2837
CPU Clock	700MHz	1.0GHz	1.0GHz
Cores	1x32-bit	4x64-bit	4x64-bit
DDR2 RAM	512 MB	1.0 GB	1.0 GB
eMMC	4 GB	4 GB	N/A

More technical details for the RPCM modules can be found at:

https://www.raspberrypi.org/documentation/hardware/computemodule/datasheet.md

It requires:

- VCC_3.3 from 3.3V/1.5A Regulator (7)

The Geppetto Pi Compute connector provides the following outputs:

- SDIO1 to TI WiLink8 (3)
- VLOGIC to:
  - TI WiLink8 (3)
  - Raspberry Pi Camera Connector (6)
  - Audio Codec (4)
  - USB-UART (11)
  - Top-side RGB LED (16)
  - Tactile Switch (13)
  - Tactile Switch (14)
  - 20-Pin Male Header (19)
- UART0_4W to TI WiLink8 (3)

- CAM1 to Raspberry Pi Camera Connector (6)
- I2C0 to Raspberry Pi Camera Connector (6)
- SYS_EN to:
  - 1.8V/0.6A Regulator (9)
  - Top-side LED (15)
- AUDIO to Audio Codec (4)
- I2C1 to Audio Codec (4)
- UART1 to USB-UART (11)
- USB_HOST to Standard-A Jack (12)
- GPIO10 to TI WiLink8 (3)
- GPIO11 to TI WiLink8 (3)
- GPIO12 to TI WiLink8 (3)
- GPIO13 to Audio Codec (4)
- GPIO30 to Raspberry Pi Camera Connector (6)
- GPIO31 to Raspberry Pi Camera Connector (6)
- GPIO4 to:
  - Top-side LED (18)
  - 20-Pin Male Header (19)
- GPIO5 to:
  - Top-side LED (17)
  - 20-Pin Male Header (19)
- GPIO6 to Top-side RGB LED (16)
- GPIO7 to Tactile Switch (13)
- GPIO8 to Tactile Switch (14)
- GPIO9 to 2.5W Speaker Driver (5)
- GPIO28 to 20-Pin Male Header (19)
- GPIO29 to 20-Pin Male Header (19)
- GPIO34 to 20-Pin Male Header (19)
- GPIO35 to 20-Pin Male Header (19)
- GPIO36 to 20-Pin Male Header (19)
- GPIO37 to 20-Pin Male Header (19)
- GPIO38 to 20-Pin Male Header (19)
- GPIO39 to 20-Pin Male Header (19)

- GPIO40 to 20-Pin Male Header (19)
- GPIO41 to 20-Pin Male Header (19)
- GPIO42 to 20-Pin Male Header (19)
- GPIO43 to 20-Pin Male Header (19)
- GPIO44 to 20-Pin Male Header (19)
- GPIO45 to 20-Pin Male Header (19)

1.3 Network and Wireless

1.3.1 TI WiLink8 (v18) (3)

The TI Wilink8 module includes BT4.1 and 802.11(a/b/g/n) signals on one antenna. TI's WL1831MOD, a fully contained integrated WiFi/Bluetooth controller, provides SISO 802.11a/b/g/n and Bluetooth wireless communications via 2 external u.FL antennas. WLAN data is delivered to the host by way of an SDIO interface, while BT uses a UART bus. The module includes a dedicated oscillator, providing a 32.768kHz clock for the SDIO bus.

The datasheet for the WL18xx series is available from TI at:

`http://www.ti.com/lit/ds/symlink/wl1831mod.pdf`

The module connects to the following buses:

- SDIO to SDIO1 on Raspberry Pi Compute Module Connector (Flip-side) (2)
- VLOGIC to VLOGIC on Raspberry Pi Compute Module Connector (Flip-side) (2)
- UART_4W to UART0_4W on Raspberry Pi Compute Module Connector (Flip-side) (2)
- BT_ENABLE to GPIO10 on Raspberry Pi Compute Module Connector (Flip-side) (2)
- WLAN_ENABLE to GPIO11 on Raspberry Pi Compute Module Connector (Flip-side) (2)
- WLAN_IRQ to GPIO12 on Raspberry Pi Compute Module Connector (Flip-side) (2)
-

1.4 Connectors (Signal)

1.4.1 Raspberry Pi Camera Connector (v10) (6)

The CSI-2 connector module is a 15-pin ribbon connector that exposes a 2-lane MIPI camera system to an external high-resolution camera module.

The CSI port is connected to CAM1 on Raspberry Pi Compute Module Connector (Flip-side) (2).

I2C communication is connected to I2C0 on Raspberry Pi Compute Module Connector (Flip-side) (2).

REF_CLK is provided by GPIO31 on Raspberry Pi Compute Module Connector (Flip-side) (2).

1.5 Power

1.5.1 3.3V/1.5A Regulator (v14) (7)

This DC to DC step down regulator provides a 3.3V DC output at 1.5A needed by certain components on this board. It is capable of accepting an input voltage between 3.1 to 16V DC and output is controlled by the TI TPS6211 buck regulator.
It recieves 5.0V from Barrel Connector (5V 3A) (8).

The dataheet for the TPS6211 regulator is available at:

`http://www.ti.com/lit/ds/symlink/tps62110.pdf`

This regulator provides 3.3V to:

- Raspberry Pi Compute Module Connector (Flip-side) (2)
- TI WiLink8 (3)
- Audio Codec (4)
- Raspberry Pi Camera Connector (6)
- 1.8V/0.6A Regulator (9)
- Standard-A Jack (12)
- Top-side LED (15)
- Top-side LED (18)
- Top-side LED (17)
- 20-Pin Male Header (19)

1.5.2 1.8V/0.6A Regulator (v9) (9)

This DC-DC regulator has an integrated inductor and tiny footprint. The Enpirion EP5368QI provides power to modules that require a 1.8V input.

It recieves 3.3V from 3.3V/1.5A Regulator (7). A SYS_EN signal is provided by Raspberry Pi Compute Module Connector (Flip-side) (2).

The following modules receive 1.8V DC from this regulator:

- TI WiLink8 (3)
- Audio Codec (4)

1.6 Power Connectors

1.6.1 Barrel Connector (5V 3A) (v10) (8)

This power jack is compatible with Gumstix 5V/3.5A DC power adapter using a 4.0mm x 1.7mm barrel connector. It provides more current than a standard 5V DC power supply, suitable for use with multi-processor designs.

This power jack provides 5V to the following modules:

- 2.5W Speaker Driver (5)
- 3.3V/1.5A Regulator (7)
- Standard-A Jack (12)
- Top-side RGB LED (16)

1.7 USB

1.7.1 Micro-B Jack (v12) (10)

The USB micro-B port module allows your design to connect as a USB device to a USB host.

This module is connected to USB_DEVICE on USB-UART (11).

This module does not supply power.

1.7.2 Standard-A Jack (v12) (12)

A standard A USB host port that allows you to connect USB devices to the board. This port is connected to USB_HOST on Raspberry Pi Compute Module Connector (Flip-side) (2).

1.8 Converters

1.8.1 USB-UART (v19) (11)

Also known as an FTDI, this USB to UART converter allows a USB connection to the board to behave as a virtual RS232 serial connection. It offers direct and complete access to the system from a development machine by way of the FTDI FT232RQ USB – UART IC.

Technical documentation for the FT232RQ is available at:

`http://www.ftdichip.com/Support/Documents/DataSheets/ICs/DS_FT232R.pdf`

This USB to UART converter connects a host machine from Micro-B Jack (10) to UART1 on Raspberry Pi Compute Module Connector (Flip-side) (2).

1.9 Lights and Switches

1.9.1 Tactile Switch (v18) (13)

This 4.9 sq. mm pull-down touch switch provides a user input for the signal GPIO7 on Raspberry Pi Compute Module Connector (Flip-side) (2).

1.9.2 Tactile Switch (v18) (14)

This 4.9 sq. mm pull-down touch switch provides a user input for the signal GPIO8 on Raspberry Pi Compute Module Connector (Flip-side) (2).

1.9.3 Top-side LED (v5) (15)

The top-side LED module contains a 1608 standard size LED of a user-selected color, mounted on the top side of a Geppetto board.

The LED is active-high on SYS_EN from Raspberry Pi Compute Module Connector (Flip-side) (2).

1.9.4 Top-side RGB LED (v1) (16)

The top-side RGB LED includes a 5050 RGB LED chip that can be controlled by PWM signal from MCU GPIO pins.

Download the datasheet for the SK6812 at:

`https://cdn-shop.adafruit.com/product-files/1138/SK6812+LED+datasheet+.pdf`

The RGB LED

Requires:

- DATA_IN from Raspberry Pi Compute Module Connector (Flip-side) (2)
- VLOGIC from Raspberry Pi Compute Module Connector (Flip-side) (2)
- VCC_5.0 from Barrel Connector (5V 3A) (8)

The RGB LED

1.9.5 Top-side LED (v5) (17)

The top-side LED module contains a 1608 standard size LED of a user-selected color, mounted on the top side of a Geppetto board.

The LED is active-high on GPIO5 from Raspberry Pi Compute Module Connector (Flip-side) (2).

1.9.6 Top-side LED (v5) (18)

The top-side LED module contains a 1608 standard size LED of a user-selected color, mounted on the top side of a Geppetto board.

The LED is active-high on GPIO4 from Raspberry Pi Compute Module Connector (Flip-side) (2).

1.10 Headers

1.10.1 20-Pin Male Header (v11) (19)

The 20-pin male header module offers up to 16 bi-directional GPIO or Pulse Width Modulation (PWM) signals.

This module has the following connections:

- Pin1 to GPIO28 from Raspberry Pi Compute Module Connector (Flip-side) (2)

- Pin2 to GPIO29 from Raspberry Pi Compute Module Connector (Flip-side) (2)
- Pin3 to GPIO34 from Raspberry Pi Compute Module Connector (Flip-side) (2)
- Pin4 to GPIO35 from Raspberry Pi Compute Module Connector (Flip-side) (2)
- Pin5 to GPIO36 from Raspberry Pi Compute Module Connector (Flip-side) (2)
- Pin6 to GPIO37 from Raspberry Pi Compute Module Connector (Flip-side) (2)
- Pin7 to GPIO38 from Raspberry Pi Compute Module Connector (Flip-side) (2)
- Pin8 to GPIO39 from Raspberry Pi Compute Module Connector (Flip-side) (2)
- Pin9 to GPIO40 from Raspberry Pi Compute Module Connector (Flip-side) (2)
- Pin10 to GPIO41 from Raspberry Pi Compute Module Connector (Flip-side) (2)
- Pin11 to GPIO42 from Raspberry Pi Compute Module Connector (Flip-side) (2)
- Pin12 to GPIO43 from Raspberry Pi Compute Module Connector (Flip-side) (2)
- Pin13 to GPIO44 from Raspberry Pi Compute Module Connector (Flip-side) (2)
- Pin14 to GPIO45 from Raspberry Pi Compute Module Connector (Flip-side) (2)
- Pin15 to GPIO4 from Raspberry Pi Compute Module Connector (Flip-side) (2)
- Pin16 to GPIO5 from Raspberry Pi Compute Module Connector (Flip-side) (2)
- 3.3V to 3.3V from 3.3V/1.5A Regulator (7)

2 Module Connections Graph

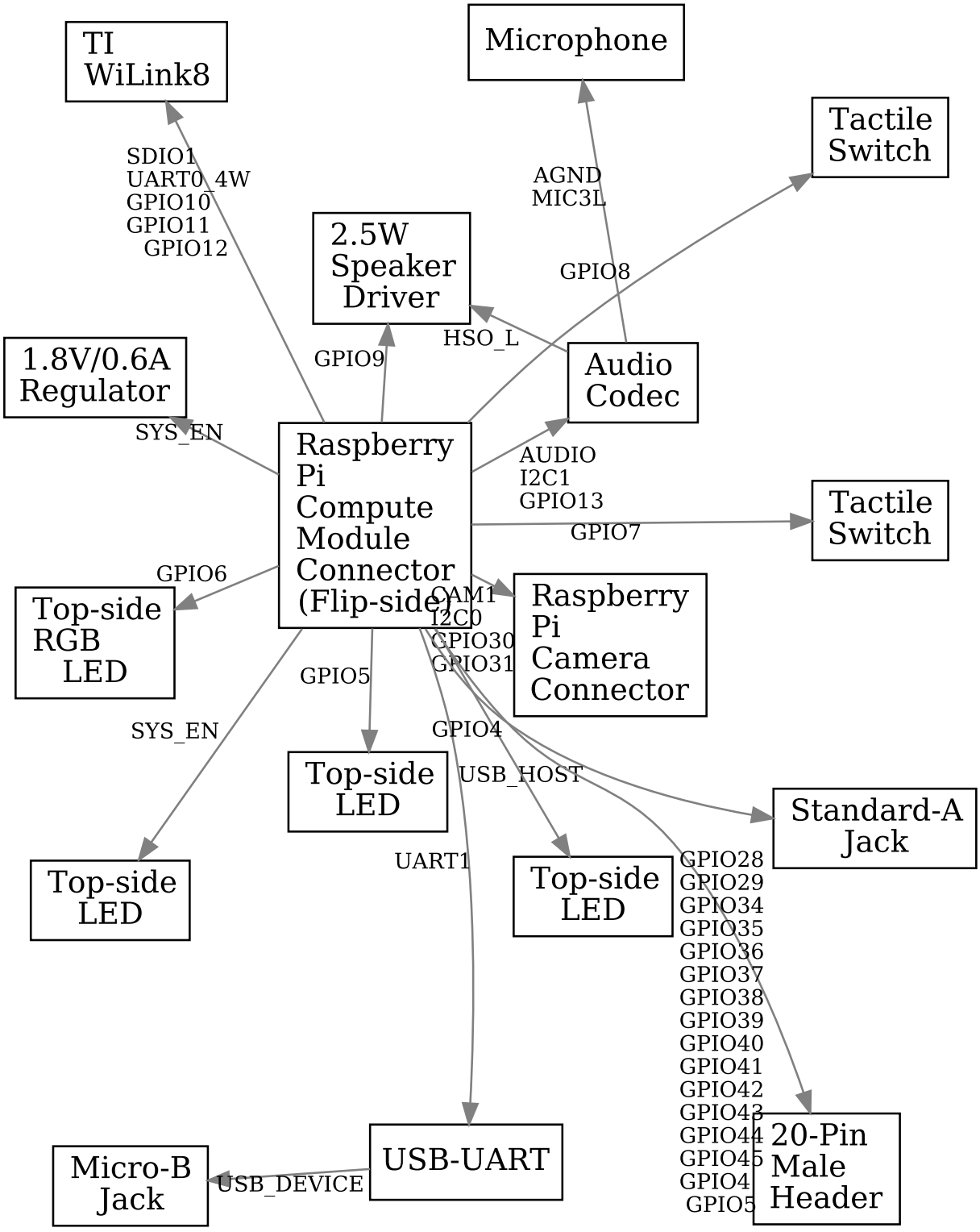
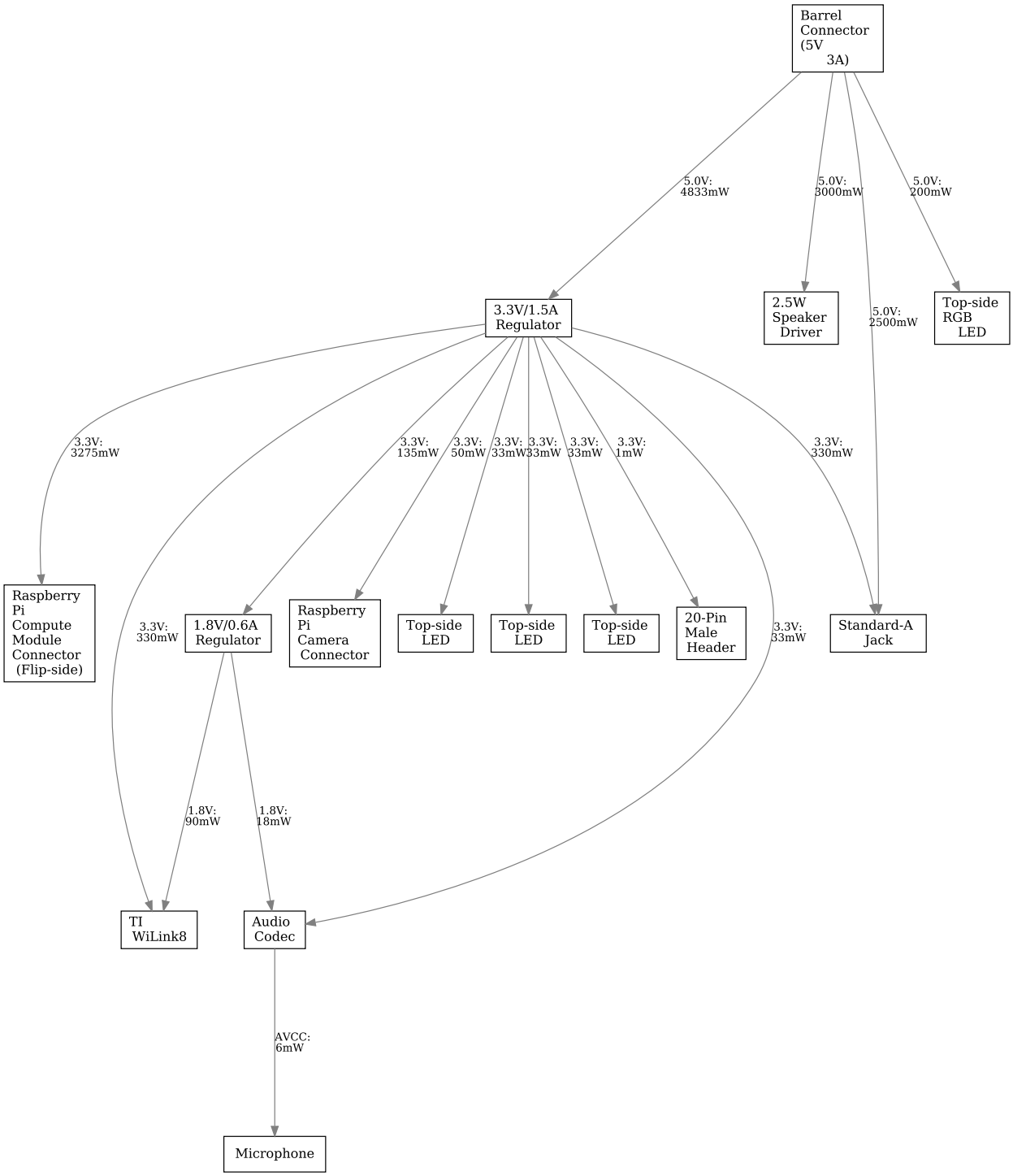


Figure 1: excludes power modules

3 Module Power Graph



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