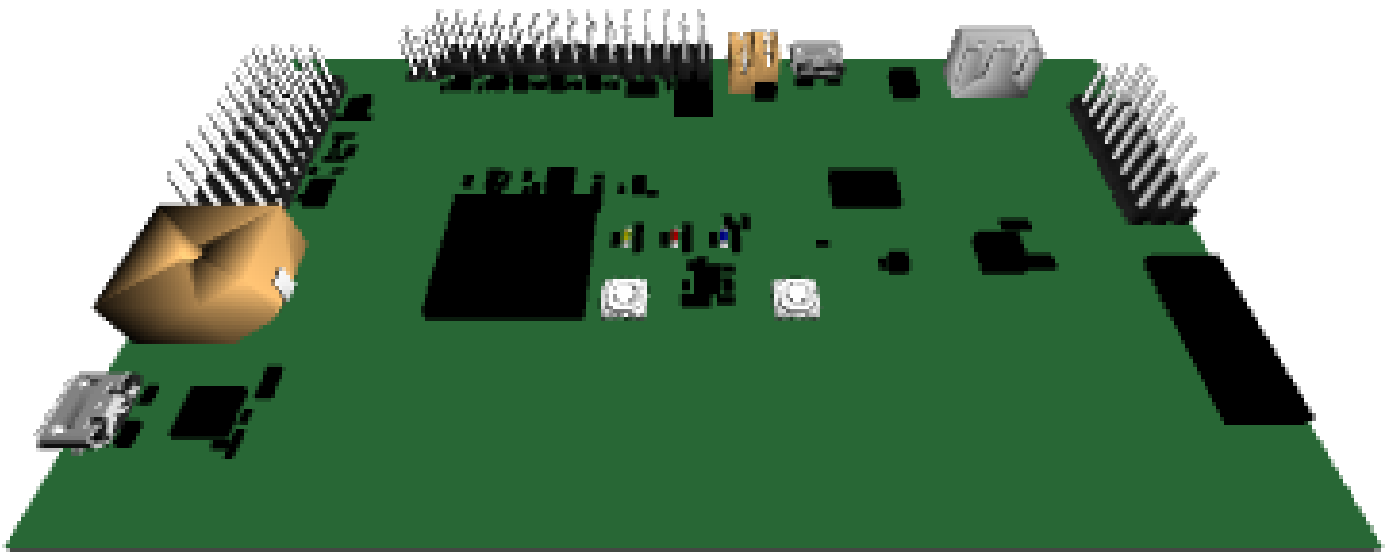


AeroCore 2 for DragonBoard



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Board Description

MAV control board featuring an integrated Cortex-M4 microprocessor and NuttX RTOS. Compatible with: [96Board COMs], the [Pre-GO](<https://store.gumstix.com/accessories/prego.html>), and the [Pre-GO PPP](<https://store.gumstix.com/accessories/prego-ppp.html>).

Board Dimensions

11.5cm x 6.65cm



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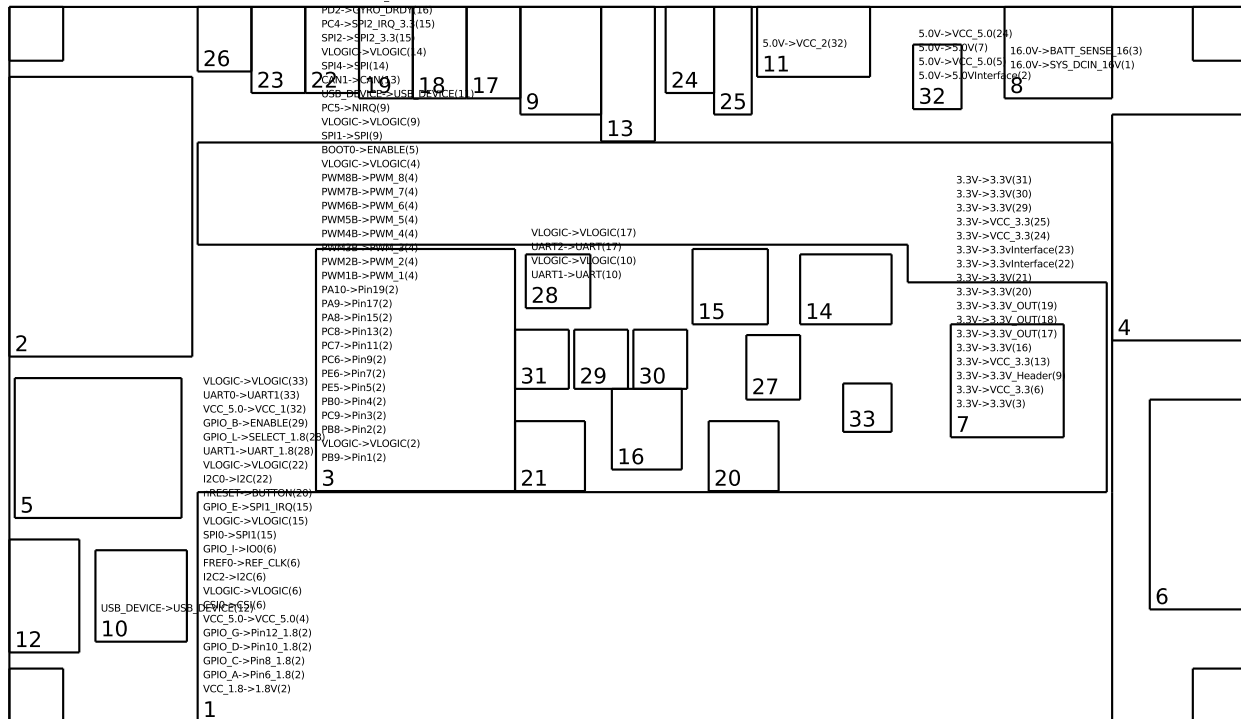
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1 Modules on Board



1.1 COM Connectors

- SYS_DCIN_16V from Battery 2-Cell Balance Connector (8)

The 96 board connectors provide the following outputs:

- CSI0 to COM to CSI2 Connector (6)
- VCC_5.0 to Octal PWM Header (4), Power Muxer (two 5V sources) (32)
- GPIO_B to Red LED (29)
- SPI0 to SPI Bridge (15)
- VCC_1.8 to 40 Pin Header (2)
- UART1 to UART Mux (2 output) (28)
- UART0 to UART-UART (33)
- GPIO_L to UART Mux (2 output) (28)
- nRESET to Tactile Switch (20)
- FREF0 to COM to CSI2 Connector (6)
- VLOGIC to COM to CSI2 Connector (6), SPI Bridge (15), I2C Header (22), UART-UART (33)
- GPIO_I to COM to CSI2 Connector (6)



- GPIO_G to 40 Pin Header (2)
- GPIO_D to 40 Pin Header (2)
- GPIO_E to SPI Bridge (15)
- I2C0 to I2C Header (22)
- GPIO_C to 40 Pin Header (2)
- I2C2 to COM to CSI2 Connector (6)
- GPIO_A to 40 Pin Header (2)

1.2 Headers

The 40-Pin header connects up to 16 GPIO or PWM signals and outputs them at 3.3V or 5.0V. An additional voltage rail and ground is provided for compatibility with standard 3-pin headers.

The header also includes two ground pins, a 1.8V/3.3V reference, and an output level reference.

To output signals at a custom voltage, a zero ohm resistor can be depopulated and an external reference provided.

1.2.1 Octal PWM Header (v9) (4)

This module offers eight PWM headers for controlling servo motors and other PWM-controlled devices.

This header offers PWM outputs connected to:

- VCC_5.0 on 96Boards - Consumer Edition Connector (1)
- VLOGIC on ST Micro Cortex-M4 (3)
- PWM_1 on ST Micro Cortex-M4 (3)
- PWM_2 on ST Micro Cortex-M4 (3)
- PWM_3 on ST Micro Cortex-M4 (3)
- PWM_4 on ST Micro Cortex-M4 (3)
- PWM_5 on ST Micro Cortex-M4 (3)
- PWM_6 on ST Micro Cortex-M4 (3)
- PWM_7 on ST Micro Cortex-M4 (3)
- PWM_8 on ST Micro Cortex-M4 (3)

1.2.2 COM to CSI2 Connector (v5) (6)

The DSI connector was chosen as compatible with Raspberry Pi family cameras. The DSI port selected is on .



1.2.3 SPI Header (v11) (9)

This header breaks out the SPI1 SPI bus on ST Micro Cortex-M4 (3).

CAN Header.

1.2.4 UART Header (v8) (17)

The UART header provides a 2-wire interface alongside power and ground pins for UART signals.

This module is connected to the UART2 bus on UART Mux (2 output) (28).

1.2.5 UART Header (v8) (18)

The UART header provides a 2-wire interface alongside power and ground pins for UART signals.

This module is connected to the UART2 bus on ST Micro Cortex-M4 (3).

1.2.6 UART Header (v8) (19)

The UART header provides a 2-wire interface alongside power and ground pins for UART signals.

This module is connected to the UART7 bus on ST Micro Cortex-M4 (3).

1.2.7 I2C Header (v12) (22)

This header breaks out the I2C0 I2C bus on 96Boards - Consumer Edition Connector (1).

1.2.8 I2C Header (v12) (23)

This header breaks out the I2C2 I2C bus on ST Micro Cortex-M4 (3).

1.2.9 Five-pin GPS Header (v5) (24)

The off-board GPS header provides a 2-wire UART interface alongside power and ground pins for use with the Gumstix PRE-GO GNSS board. It also works with some third party positioning modules.

This module is connected to the UART1 bus on ST Micro Cortex-M4 (3).

1.2.10 Spektrum DSM-2 Remote Connector (v7) (25)

This header is used to connect to a Spektrum DSM/X satellite receiver. It uses a UART RX signal and has a switched 3.3V power supply.

This module is connected to the UART8 bus on ST Micro Cortex-M4 (3). 3.3V power is provided by on . Analog header. Provides access to 4 ADC pins and supplies a GND.



1.3 Processors

1.3.1 ST Micro Cortex-M4 (v32) (3)

An ARM Cortex-M4 processor of ST Microelectronics 32F427. The processor runs at 168MHz at 1.8 or 3.3 volts – and has a hardware floating point unit. The battery voltage is sensed on ADC_IN10 with a gain of 0.09091.

Requires:

- 3.3V from 3.3V/1.5A Regulator (7)
- BATT_SENSE_16 from Battery 2-Cell Balance Connector (8)

Provides:

- RESET to Tactile Switch (21)
- PD3 to 9-Axis IMU (16)
- PWM1B to Octal PWM Header (4)
- BOOT0 to Buzzer (5)
- PD2 to 9-Axis IMU (16)
- PWM5B to Octal PWM Header (4)
- PA10 to 40 Pin Header (2)
- PWM3B to Octal PWM Header (4)
- PWM7B to Octal PWM Header (4)
- SPI2 to SPI Bridge (15)
- SPI3 to 9-Axis IMU (16), Barometer (27)
- SPI1 to SPI Header (9)
- PB0 to 40 Pin Header (2)
- SPI4 to FRAM (128 KB) (14)
- PD4 to 9-Axis IMU (16)
- PB9 to 40 Pin Header (2)
- PB8 to 40 Pin Header (2)
- ADC_IN12 to 4-pin Analog Header (26)
- UART1 to Five-pin GPS Header (24)
- UART3 to UART-UART (33)
- UART2 to UART Header (18)
- ADC_IN11 to 4-pin Analog Header (26)
- UART7 to UART Header (19)



- PWM8B to Octal PWM Header (4)
- UART8 to Spektrum DSM-2 Remote Connector (25)
- PB5 to Power Muxer (two 5V sources) (32)
- AGND to 4-pin Analog Header (26)
- PWM2B to Octal PWM Header (4)
- CAN1 to CAN Header (13)
- PWM4B to Octal PWM Header (4)
- VLOGIC to 40 Pin Header (2), Octal PWM Header (4), SPI Header (9), FRAM (128 KB) (14), 9-Axis IMU (16), UART Header (18), UART Header (19), I2C Header (23), Five-pin GPS Header (24), Barometer (27), Power Muxer (two 5V sources) (32)
- ADC_IN13 to 4-pin Analog Header (26)
- PWM6B to Octal PWM Header (4)
- I2C2 to I2C Header (23)
- PC8 to 40 Pin Header (2)
- PC9 to 40 Pin Header (2)
- PE9 to Blue LED (30)
- PA8 to 40 Pin Header (2)
- PE5 to 40 Pin Header (2)
- PE6 to 40 Pin Header (2)
- PC6 to 40 Pin Header (2)
- PC7 to 40 Pin Header (2)
- PC4 to SPI Bridge (15)
- PC5 to SPI Header (9)
- USB_DEVICE to Micro-B Jack (11)
- PA9 to 40 Pin Header (2)
- PE15 to Spektrum DSM-2 Remote Connector (25)
- PE10 to Yellow LED (31)

1.4 Audio

1.4.1 Buzzer (v7) (5)

This SMT buzzer provides an audible indicator for the signal BOOT0 on ST Micro Cortex-M4 (3).



1.5 Power

1.5.1 3.3V/1.5A Regulator (v9) (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. Currently, its input is 5V from Power Muxer (two 5V sources) (32).

The following modules are powered by this regulator:

- 3.3V to ST Micro Cortex-M4 (3), COM to CSI2 Connector (6), SPI Header (9), CAN Header (13), 9-Axis IMU (16), UART Header (17), UART Header (18), UART Header (19), Tactile Switch (20), Tactile Switch (21), I2C Header (22), I2C Header (23), Five-pin GPS Header (24), Spektrum DSM-2 Remote Connector (25), Red LED (29), Blue LED (30), Yellow LED (31)

1.5.2 Power Muxer (two 5V sources) (v5) (32)

Takes 5V input from 96Boards - Consumer Edition Connector (1) or Micro-B Jack (11) and provides up to 1.25A at 5V to:

1.6 Power Connectors

1.6.1 Battery 2-Cell Balance Connector (v6) (8)

This is a standard 2S LiPo balance connector (XH Type). Although it's a 2S connector, it can provide 16.0V or 36.0V.

The following modules are powered by this regulator:

- 16.0V to 96Boards - Consumer Edition Connector (1), ST Micro Cortex-M4 (3)

1.7 Connectivity

1.7.1 USB-UART (v14) (10)

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.

This USB to UART converter connects a host machine connected to to UART Mux (2 output) (28) on its UART bus.

1.7.2 SPI Bridge (v9) (15)

The SPI bridge connects two SPI interfaces on different modules, allowing them to communicate.

This module connects SPI0 on 96Boards - Consumer Edition Connector (1) to on .



1.7.3 UART Mux (2 output) (v5) (28)

A bidirectional 2 x SPDT switch connects two UART interfaces (RX/TX only). A SELECT line is used to control which UART is output.

This UART switch connects on or on to on . The output is controlled by on .

1.7.4 UART-UART (v6) (33)

A UART-UART bridge interfaces two modules with UART lines (e.g., interfacing two processors).

This UART bridge connects UART0 on 96Boards - Consumer Edition Connector (1) to on .

1.8 USB

1.8.1 Micro-B Jack (v8) (11)

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

This module is connected to ST Micro Cortex-M4 (3).

1.8.2 Micro-B Jack (v8) (12)

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

This module is connected to USB-UART (10).

1.9 Memory

1.9.1 FRAM (128 KB) (v8) (14)

This 128 KB non-volatile FRAM memory module is connected via SPI and is useful for storing small amounts of data.

This module is connected to SPI4 on ST Micro Cortex-M4 (3).

1.10 Sensors

1.10.1 9-Axis IMU (v16) (16)

This module provides 3-axis acceleration, 3-axis rotational rates and 3-axis magnetic field information. It is connected via a SPI bus. Data-ready pins are provided.

This module is connected to SPI3 on ST Micro Cortex-M4 (3). 3.3V power is provided by on .



1.10.2 Barometer (v6) (27)

An ultra-compact, low-power barometer useful for aerial vehicles. The barometer module offers a high resolution reading, accurate to within 10 cm and is optimized for altimeter and variometer applications. At altitudes close to sea level, covering the barometer module with a light piece of foam may help to improve the accuracy of readings.

This module is connected to ST Micro Cortex-M4 (3) via SPI.

Visit <http://www.meas-spec.com/downloads/MS5611-01BA03.pdf> for details.

1.11 IO

1.11.1 Tactile Switch (v8) (20)

This 4.9 sq. mm light touch switch provides a user input for the signal nRESET on 96Boards - Consumer Edition Connector (1).

1.11.2 Tactile Switch (v8) (21)

This 4.9 sq. mm light touch switch provides a user input for the signal RESET on ST Micro Cortex-M4 (3).

1.11.3 Red LED (v10) (29)

This 1608 standard size red LED provides an indicator for the signal GPIO_B on 96Boards - Consumer Edition Connector (1).

1.11.4 Blue LED (v13) (30)

This 1608 standard size blue LED provides an indicator for the signal PE9 on ST Micro Cortex-M4 (3).

1.11.5 Yellow LED (v12) (31)

This 1608 standard size yellow LED provides an indicator for the signal PE10 on ST Micro Cortex-M4 (3).

1.12 Mechanical

1.12.1 Mounting Hole (2.2mm)

A #0 mounting hole for securing the board with mounting pins.

1.12.2 Mounting Hole (2.2mm)

A #0 mounting hole for securing the board with mounting pins.



1.12.3 Mounting Hole (2.2mm)

A #0 mounting hole for securing the board with mounting pins.

1.12.4 Mounting Hole (2.2mm)

A #0 mounting hole for securing the board with mounting pins.



2 Module Connections Graph

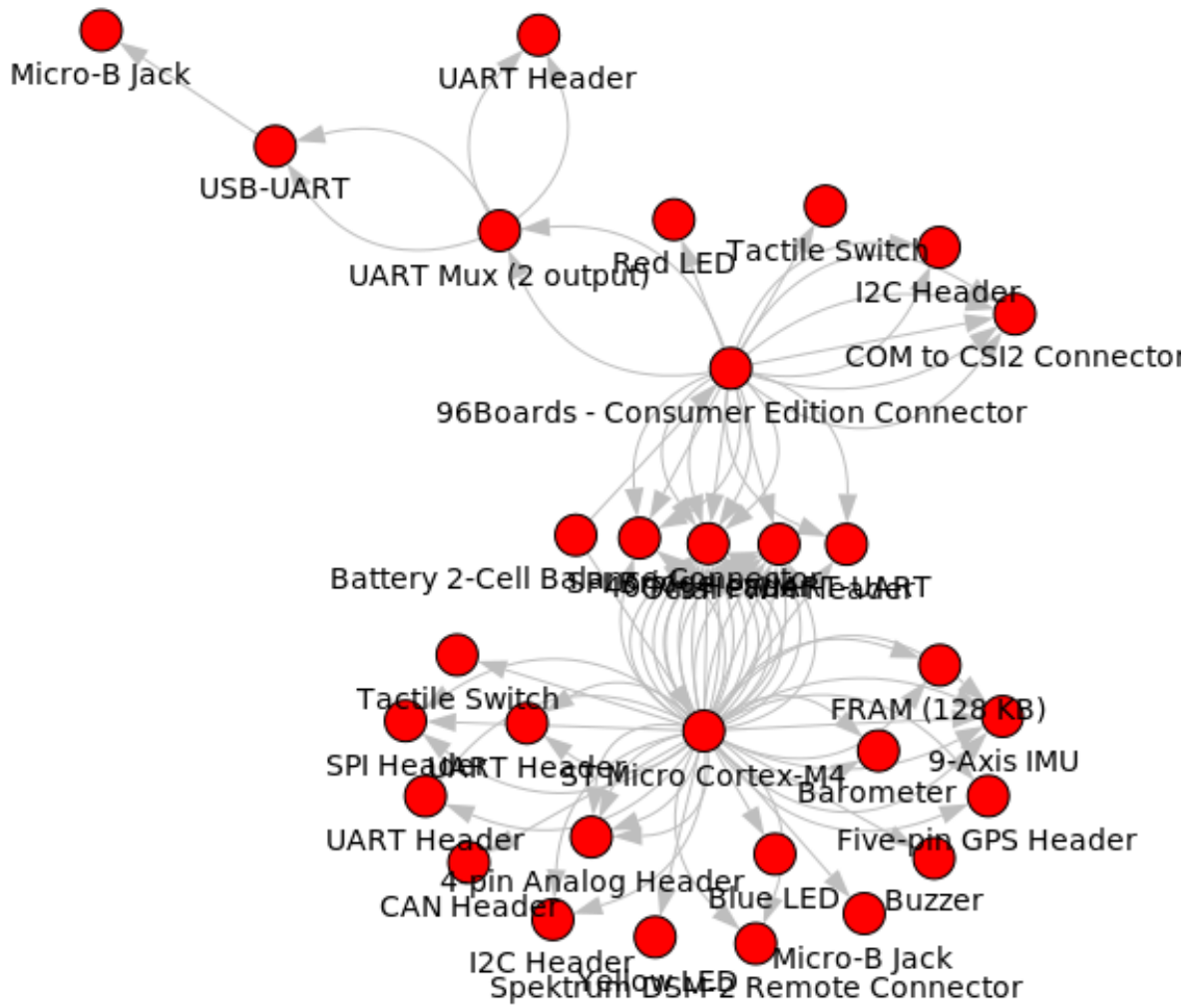


Figure 1: excludes power modules



3 Module Power Graph

