EightByEight PCB Notes/Changelog

Revision A:
-Power circuit doesn't power device when charging, need to add bypass diodes to connect USB_5V to +5V. Should also add diode in-line with output from regulator so they don't conflict.

Revision B:

TODO:
-Connect gpo0/reset on the ESP to the ARM, so we can initiate firmware updates automatically?
-Connect arm to I2C bus for LED control sans serial?
-Test power supply for ESP8266, is something bigger required?

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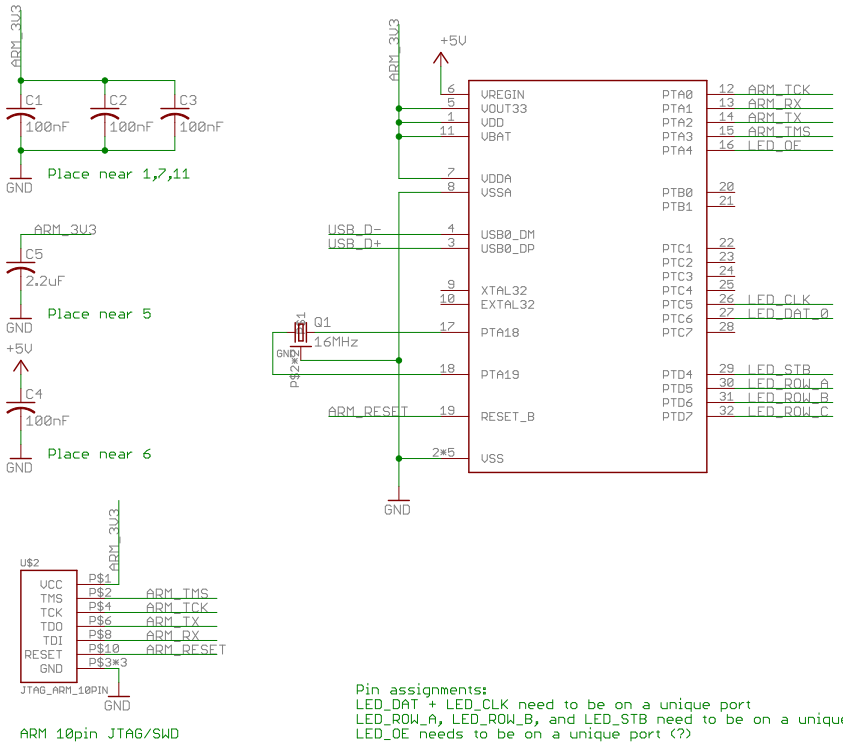
ARM microcontroller

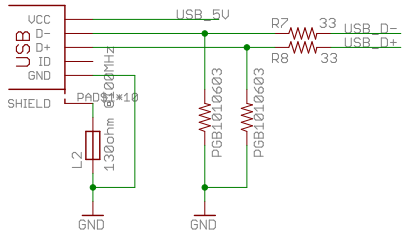
Provides LED drive signal, USB/Serial conversion



Pin assignments:
LED_DAT + LED_CLK need to be on a unique port
LED_ROW_A, LED_ROW_B, and LED_STB need to be on a unique port
LED_OE needs to be on a unique port (?)

USB port

Battery charge, ARM programming using DFU, ESP programming using ACM



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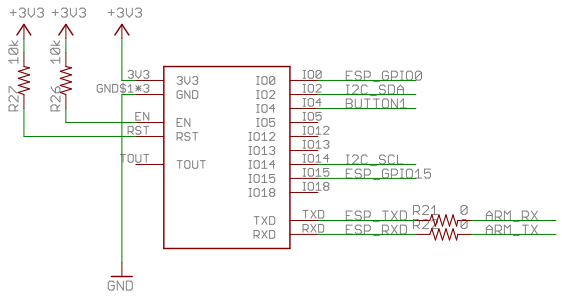
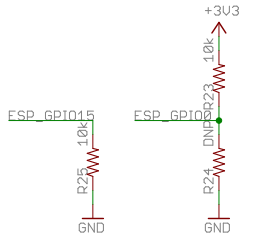
ESP8266

Provides WiFi



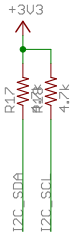
ESP826 Boot Select
UART Download:
GPIO15 Low, GPIO0 Low, GPIO2 High

Flash Boot:
GPIO15 Low, GPIO0 Hight, GPIO2 High



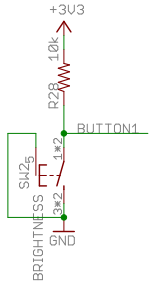
I2C pullups

Note: Check that these values are correct for 3.3V



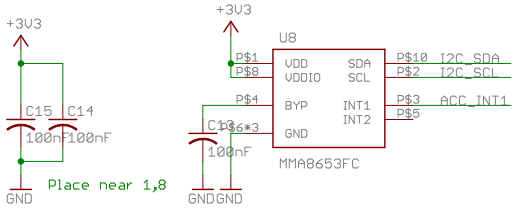
Button input

Momentary, active low
Connected to ESP and ARM



3 axis accelerometer

??



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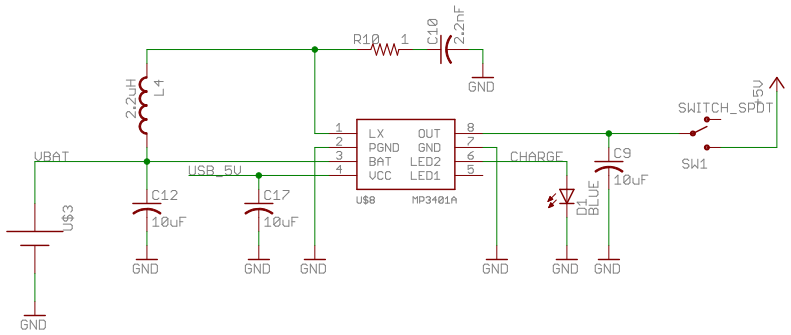
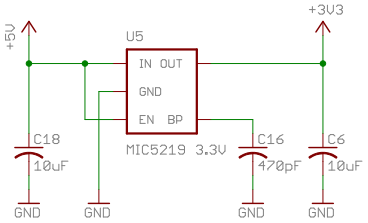
Battery Charger / 5v boost

Integrated charge circuit and 5v boost regulator.



3.3V Regulator

Powers the ESP8266 and other ICs



Note: LED constant current drivers are powered by a regulator built into the ARM part.

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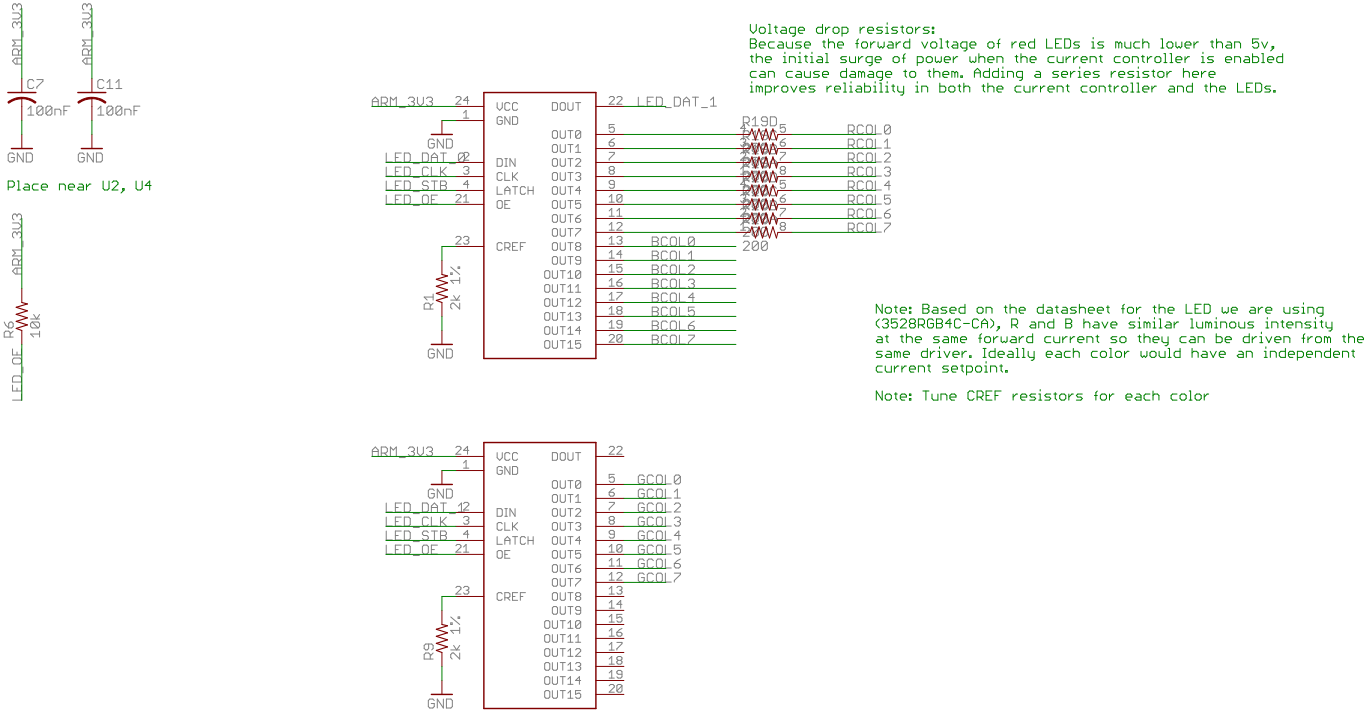
Low side (column) drivers

Constant current shift registers, PWM signal is generated by the processor



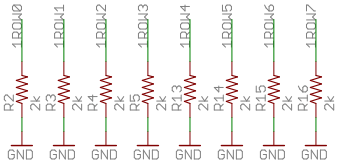
Voltage drop resistors:
Because the forward voltage of red LEDs is much lower than 5v, the initial surge of power when the current controller is enabled can cause damage to them. Adding a series resistor here improves reliability in both the current controller and the LEDs.

Note: Based on the datasheet for the LED we are using (3528RGB4C-CA), R and B have similar luminous intensity at the same forward current so they can be driven from the same driver. Ideally each color would have an independent current setpoint.

Note: Tune CREF resistors for each color

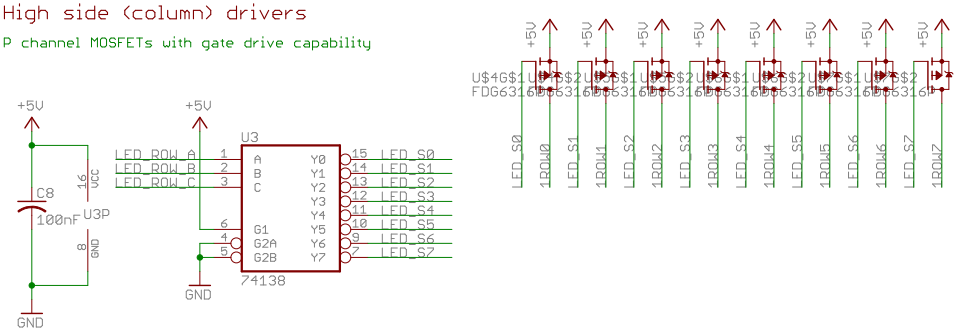
Ghostbusting resistors

Reduces ghosting by draining row capacitance



High side (column) drivers

P channel MOSFETs with gate drive capability



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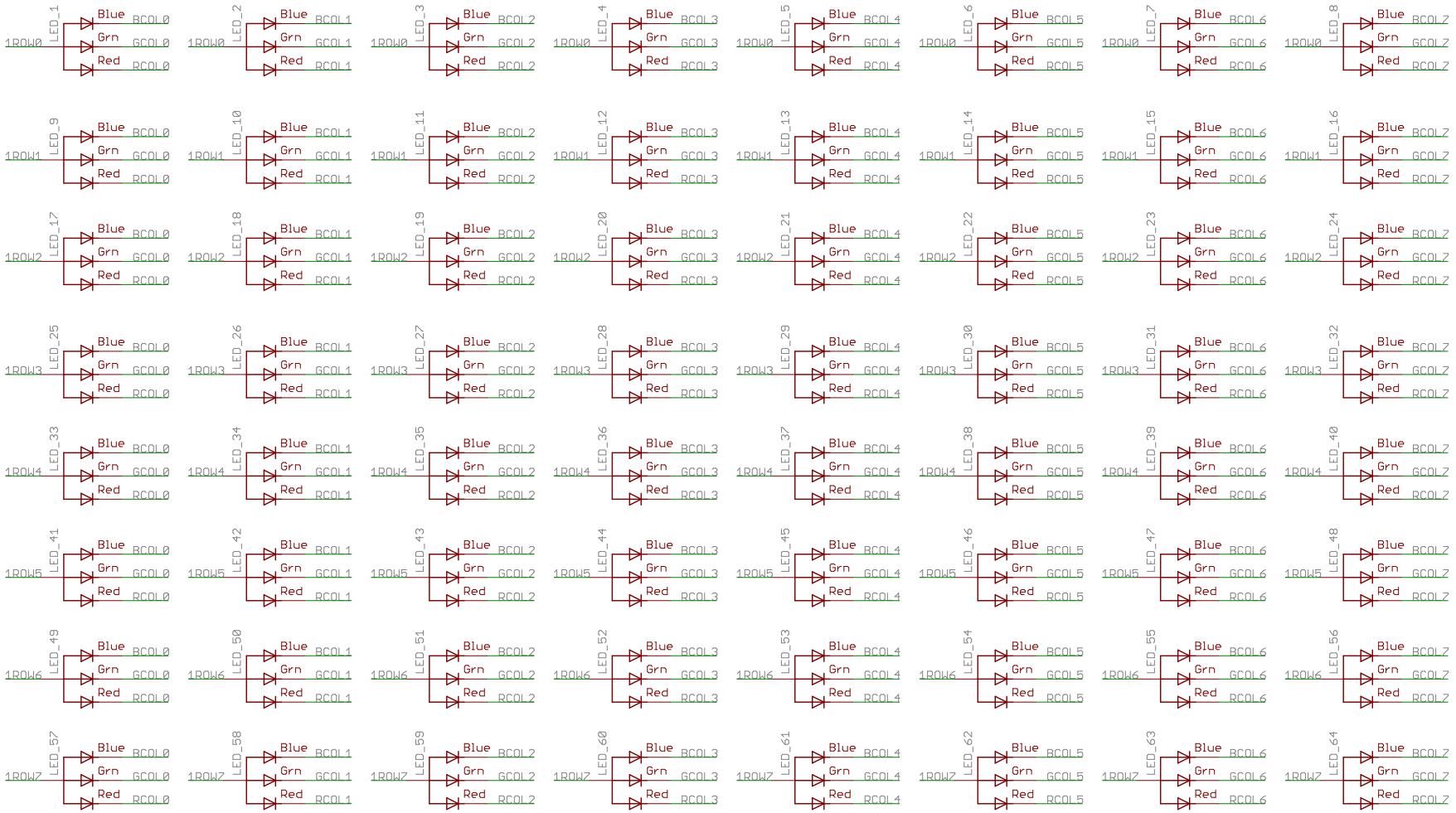
LED array

RGB, 3528, common anode LEDs. Arranged as an 24x8 matrix



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