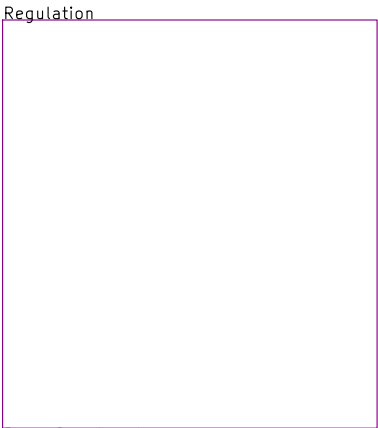
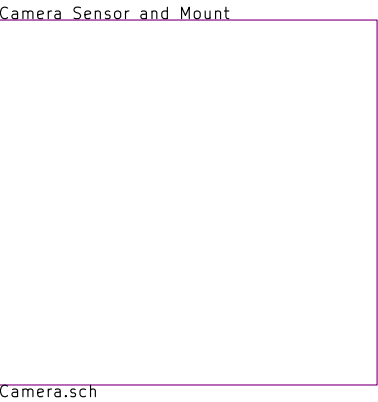


STM32–Camera Board Overview

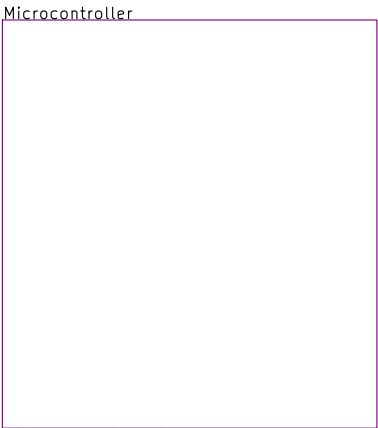
Regulator to power microcontroller and sensor.
Input protection and filtering as required.



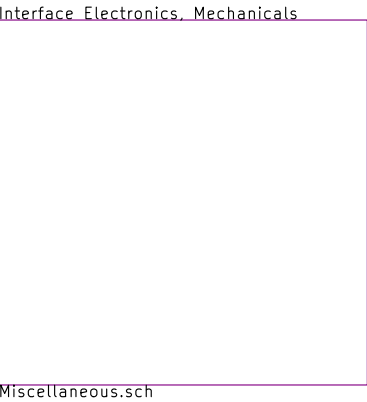
Sensor, mounts and supporting electronics



STM32F4 based processor handles the show.
Clocks, debug and related hardware.
Uses standard ARM CORTEX SWD 10–pin to program



Miscellaneous periphery. MicroSD card.
Mounting holes, fiducials, branding, etc



<https://github.com/Scottapotamas/stm32-camera>

Scott Rapson

Sheet: /

File: stm32-camera.sch

Title: STM32 Camera Board

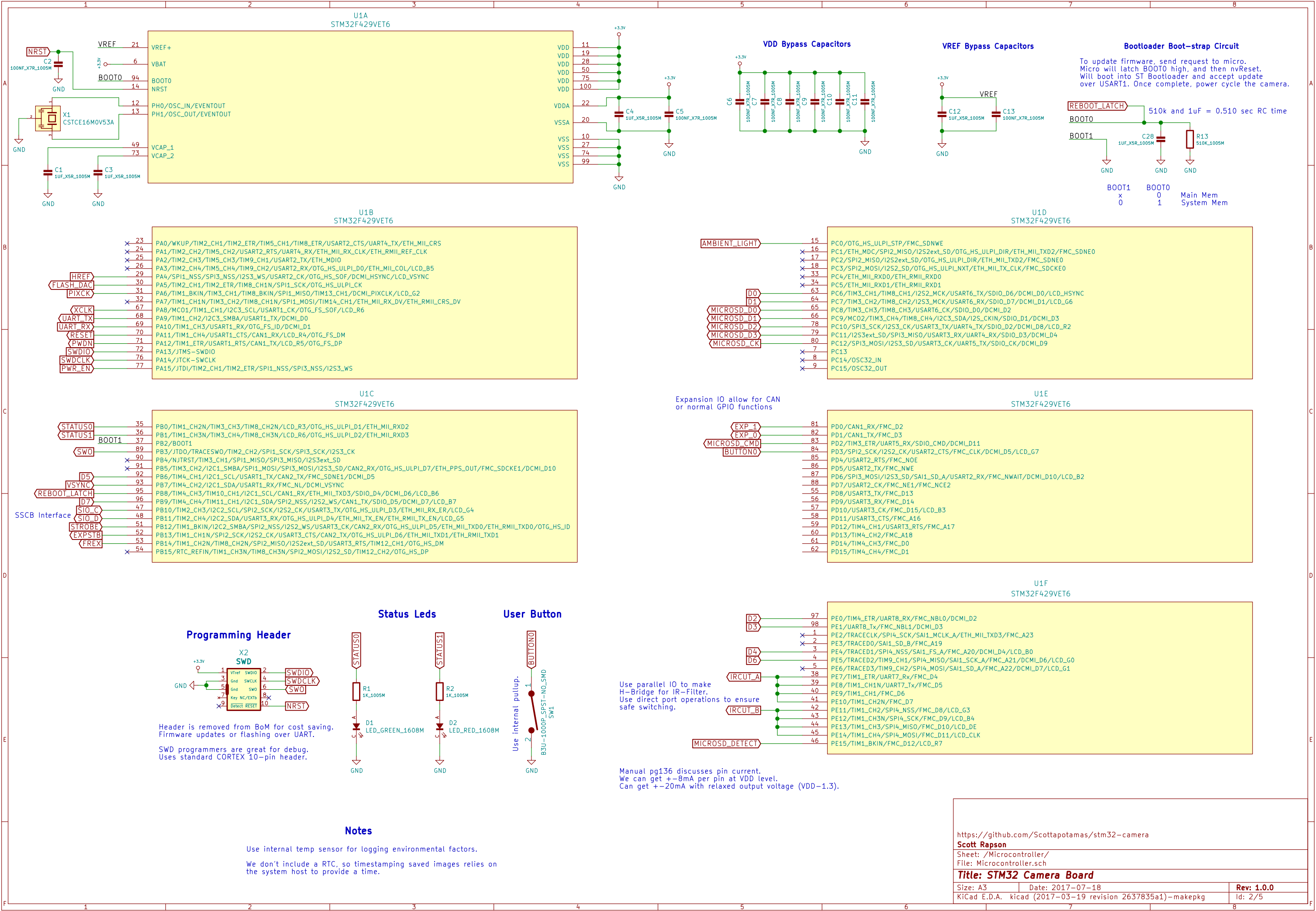
Size: A4

Date: 2017-07-18

Rev: 1.0.0

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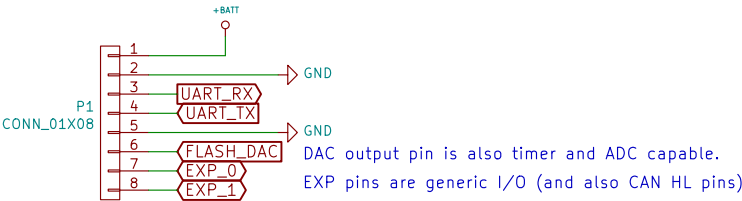
Id: 1/5



Input Protection and Regulation

Main Connector

Main power and IO connection.
Consider using a 'stackable' style header to add a IR LED flash ring.



Low voltage regs can be disabled by micro.
Helps reduce quiescent power draw and control power to the camera IC.

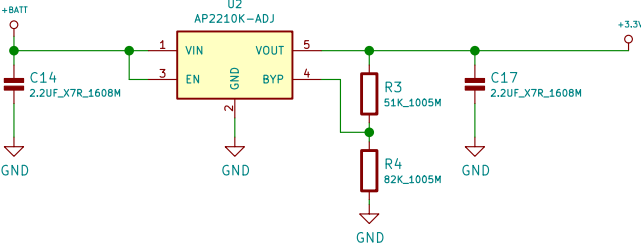
Logic High to enable.

Input capacitors on regulators might not all be required.
Evaluate behaviour with scope and optionally remove from BoM.

3.3V Regulator

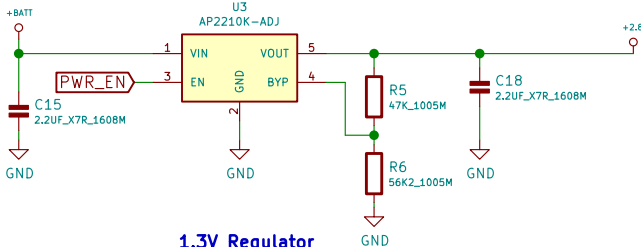
Regulator provides for microcontroller, other IC's and is used predominantly on all pullups etc.

$$V_{OUT} = 1.25V * (1 + R2/R1)$$



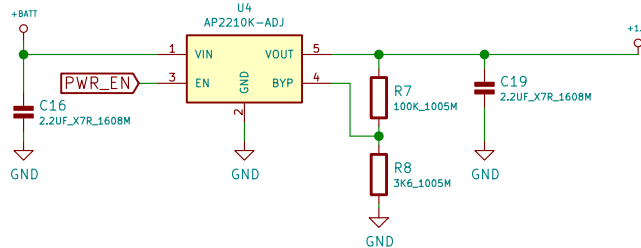
Aims for 3.259V

2.8V Regulator



Aims for 2.744V

1.3V Regulator



Aims for 1.295V

<https://github.com/Scottapotamas/stm32-camera>

Scott Rapson

Sheet: /Regulation/
File: PowerSupply.sch

Title: STM32 Camera Board

Size: A4 Date: 2017-07-18

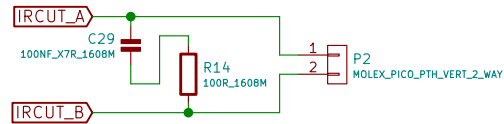
KiCad E.D.A. kicad (2017-03-19 revision 2637835a1)-makepkg

Rev: 1.0.0

Id: 3/5

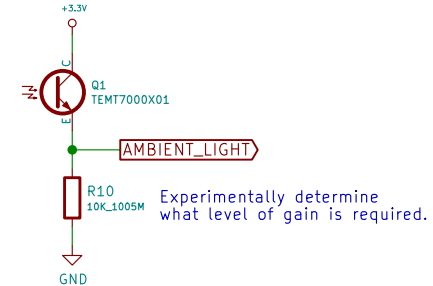
IR Cut Filter Driver

Hardware switching IR-Cut is bistable solenoid.
Use a H-Bridge style drive for control. Approx 60mA required.
See the electronics readme for test info.



Ambient Light Sensor

Read ambient light to select IR-cut filter etc.

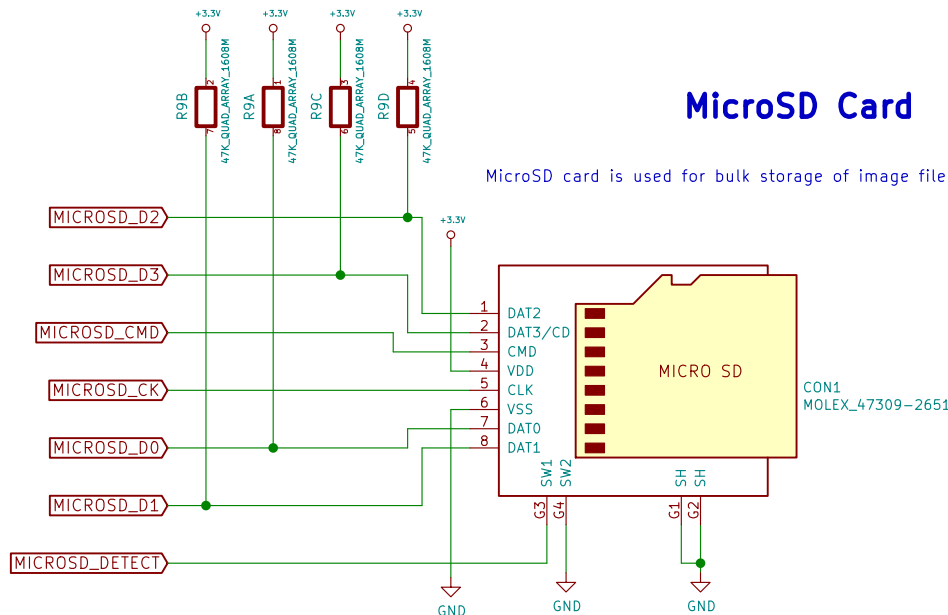


Fiducials

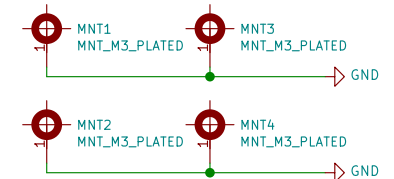
N/A for V1.0.0

MicroSD Card

MicroSD card is used for bulk storage of image files, config setting and logs.



Mounting Holes



Logos and Markings

Text only at this stage

<https://github.com/Scottapotamas/stm32-camera>

Scott Rapson

Sheet: /Interface Electronics, Mechanicals/

File: Miscellaneous.sch

Title: STM32 Camera Board

Size: A4 Date: 2017-07-18

KiCad E.D.A. kicad (2017-03-19 revision 2637835a1)-makepkg

Rev: 1.0.0

Id: 4/5

Camera Specifications

1600x1200px resolution.
140mW for 15fps 2MP.
1/4" sensor. 2.2um pitch.
0.6V/Lux-sec sensitivity.
40dB S/N with 50dB dynamic range.
ADC run at 20Mhz at 10-bit.

IR-Cut Switchable Filter Lens Mount

Bisable Solenoid drive and connector on misc page

MP1
M12_LENS_MOUNT_IR_SWITCHNG

HAS FLYING LEAD WITH
1.25mm 2x1 PLUG

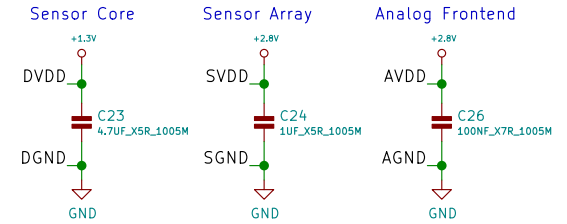
2MP CMOS Camera

In 8-bit mode, Y0 and Y1 aren't used.
Thus LSB is D2.
No pull resistors on these pins.

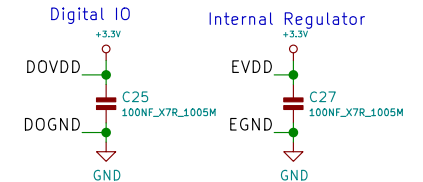
PIXCK – Pixel clock from sensor
6Mhz = 2.5fps
36Mhz = 15fps

VSYNC – Active FRAME
HREF – Active Pixels/Line
See page 7 of overview appnote

If DOVDD is same as AVDD, share reg and use hardware RC to separate.
Otherwise use 3 regs...



AGND and DGND should be connected outside sensor area grounding



I2C Config Interface.
Recommended 100k during bringup.
400kHz capable.

XCLK is master clock.
Must be >6Mhz. 24MHz typ.

FREX activates a snapshot sequence.
EXPSTB 0 – sensor starts exposure (only works with snapshot)
EXPSTB 1 – sensor stays in reset

If micro is disabling/enabling regs sequentially, ensure turn on order is:
3.3V -> 1.3V -> 2.8V or the camera gets angry.

After last supply is on for 3ms, the reset line on the OV2460 can go high.

RESET Active Low (internal pullup?)
PWDN Active High (internal pulldown?)
STROBE indicates flash LED (no pull R)

Pull Up/Down specified in main pinout.
Specified as not included in hardware appnote.
Microcontroller pins can be configured
as pullup or pulldown if required.

<https://github.com/Scottapotamas/stm32-camera>

Scott Rapson

Sheet: /Camera Sensor and Mount/

File: Camera.sch

Title: STM32 Camera Board

Size: A4 Date: 2017-07-18

KiCad E.D.A. kicad (2017-03-19 revision 2637835a1)-makepkg

Rev: 1.0.0

Id: 5/5