28-PINS PROJECT

Implemented by Phil McMillan in KiCad

Design by FEDEVEL Academy

DESIGN NOTE:
This board supports 5V or 3V3 voltage level on the IO pins.
1) 5V IO - Fit everything as defined in this schematic. NF means do not fit this component.

2) 3.3V IO - Remove R27, Fit R28, * Replace Y1 (change from 16MHz to 10MHz), * Replace Y2 (change from 16MHz to 8MHz).

3) Both 5V and 3V3, selected through JP4 - Remove R27, Remove R28, Fit JP4, * Replace Y1 (change from 16MHz to 10MHz), * Replace Y2 (change from 16MHz to 8MHz).

* Note the 16MHz crystals are not recommended for 4.4V operation. We need to adjust their values, that's why the change.

IMPORTANT: Once you change the crystal value, you may need to re-compile your source code.

DESIGN NOTE:

About JP3:
1) DebugWire support - Short 1&2. This was added to support possible debugWire debugging (programming?) of 328P through 16U2. In this case, the 16U2 needs to have a correct firmware and has to behave as a debugWire tool.

2) ISP programmer mode - Short 2&3. In this case, take a cable and connect J5 and J6 together. Upload AVRISP MkII firmware in the 16U2 and you can program the 328P. Example of AVRISP MkII firmware can be found at LUFA projects.
http://www.fourwalledcubicle.com/LUFA.php (Tip: remap LEDs of the default AVRISP MkII LUFA project to the RX and TX LEDs on the 28Pin board)

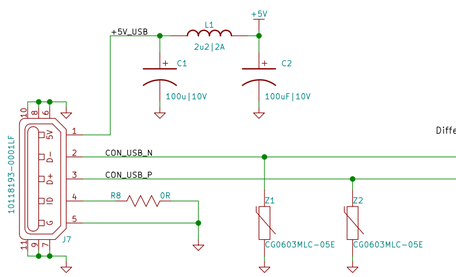
3) ISP header - Short 3 & 4. In this mode, the ICSP1 header is used as a standard ISP header to program 16U2 through ISP interface by an ISP programmer.

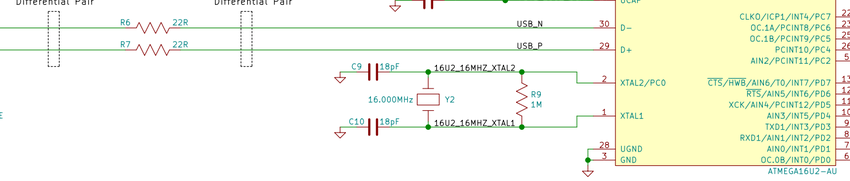
DESIGN NOTE:

About JP1:
1) Autoreset Enabled - Short 1&2. Int his case, 16U2 is used to reset 328P when firmware inside 328P is updated from Arduino IDE.

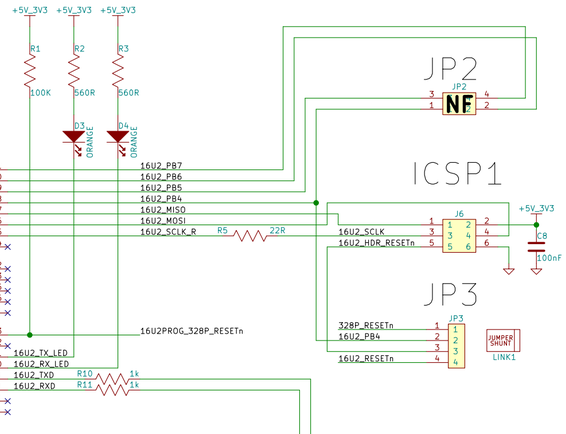
2) 16U2 DFU mode enabled - Short 2&3. 16U2 HWB pin is sampled by 16U2 during RESET. If pulled low, then after Reset the 16U2 will go into DFU mode (it's the mode where you can flash 16U2 firmware through USB and Atmel Flip software.
http://www.atmel.com/tools/flip.aspx).

Micro USB





16U2

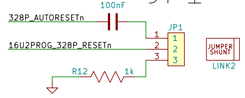


JP2

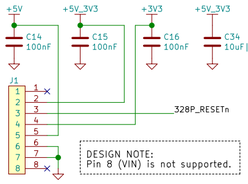
ICSP1

JP3

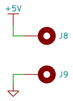
JP1



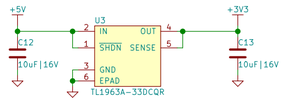
Power



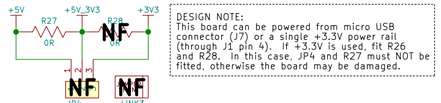
Power Pads



3V3 LDO



Power Selection



DESIGN NOTE:
This board can be powered from micro USB connector (J7) or a single +3.3V power rail (through J1 pin 4). If +3.3V is used, fit R26 and R28. In this case, JP4 and R27 must NOT be fitted, otherwise the board may be damaged.

ICSP

DIP Socket

Mounting Holes

Mounting Holes (7.4mm pad, 3.2mm drill)
BOARD MOUNTING HOLES - ONE IN EACH CORNER

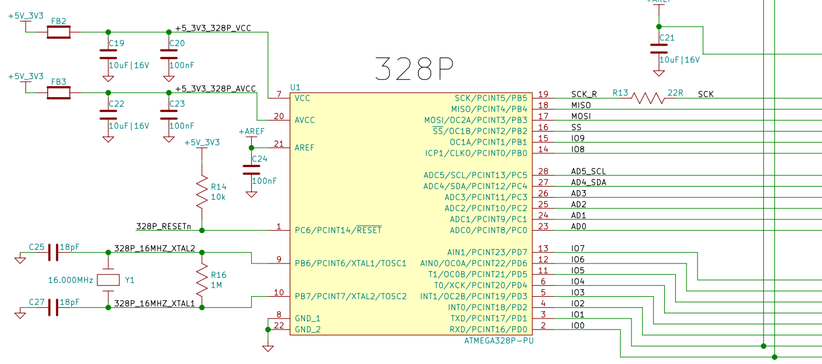
Fiducials

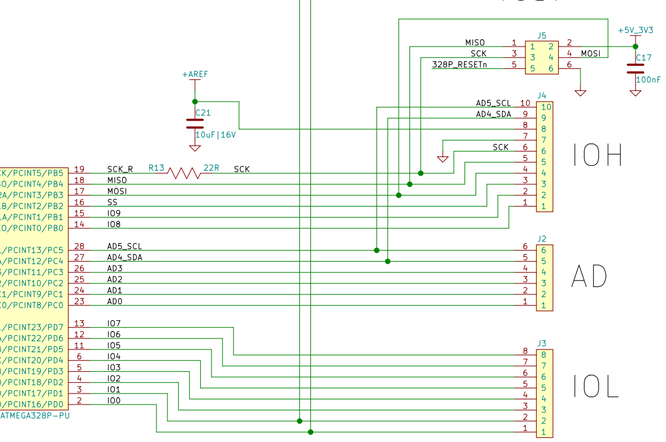
Fiducials 4x Top

Key

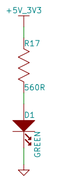
NF = Not Fitted

328P

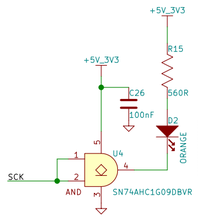




Power LED

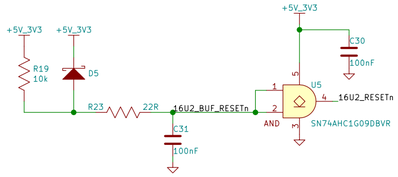


User LED

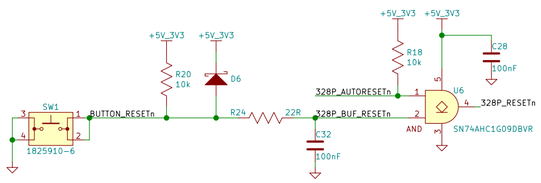


DESIGN NOTE:
This LED is inverted.
- SCK High = LED OFF
- SCK Low = LED ON

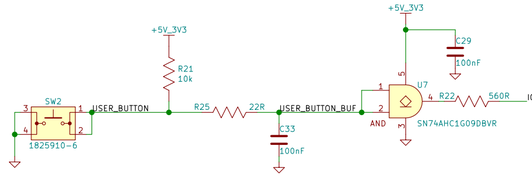
Reset (16U2)



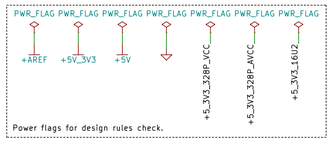
Reset (328P)



User Button



LAYOUT NOTE:
1) Route all the POWER tracks with minimum track width 0.4mm.
2) Route all the other tracks by 0.4mm and change them by the end of the design to 0.2mm.



Power flags for design rules check.

Design by FEDEVEL Academy Layout by Phil McMillan in KiCad v5.0	
Sheet: / File: arduinouno.sch	
Title: 28 Pins Project (Arduino Uno)	
Size: A2 | Date: 2018-09-16 KiCad E.D.A. kicad (5.0.0-3-g5ebb6b6)	**Rev: V1i1** Id: 1/1