

28Pins
Variant: FIXED 5V

4/28/2015
V1I1

RELEASED 07-APR-2015

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DESIGN CONSIDERATIONS

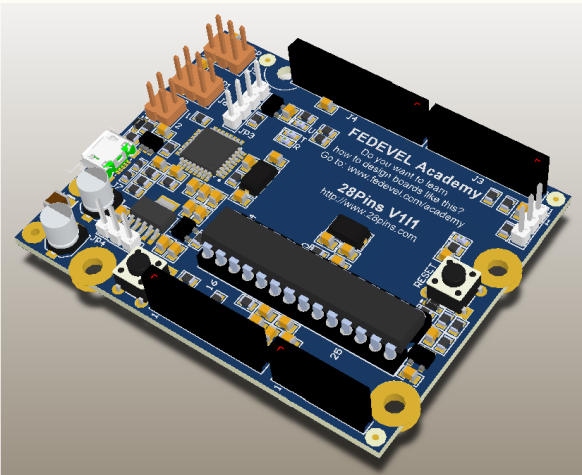
DESIGN NOTE:
Example text for informational
design notes.

DESIGN NOTE:
Example text for cautionary
design notes.

DESIGN NOTE:
Example text for debug notes.

DESIGN NOTE:
Example text for critical
design notes.

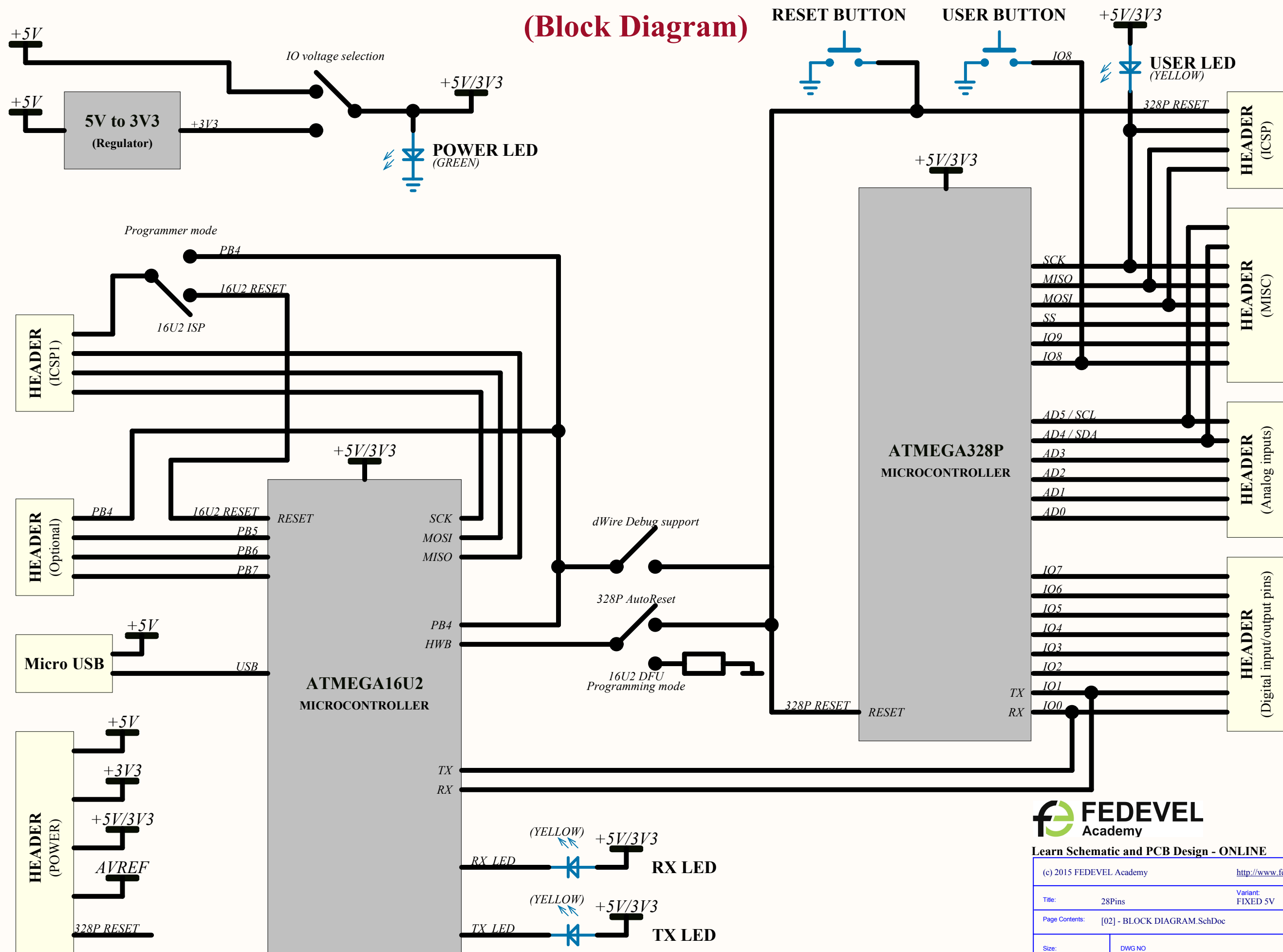
LAYOUT NOTE:
Example text for critical
layout guidelines.



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28Pins (Block Diagram)



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28PINS - SCHEMATIC

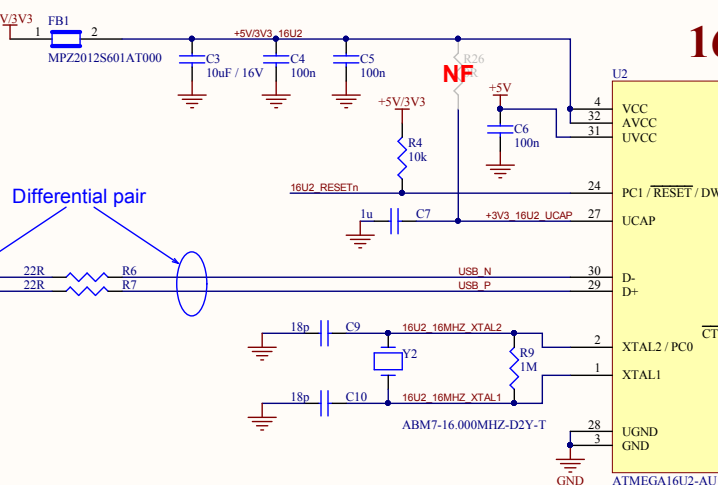
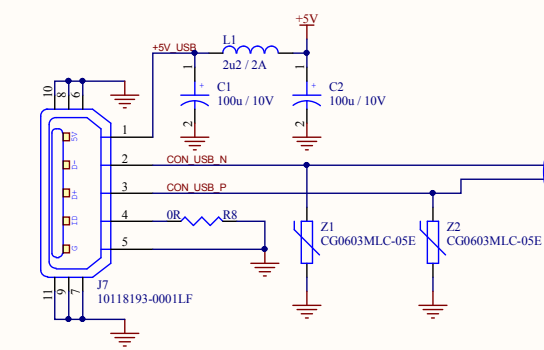
<http://www.28pins.com>

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 3.3V 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 & J6 together. Upload AVRISP MKII firmware into 16U2 and you can program 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.

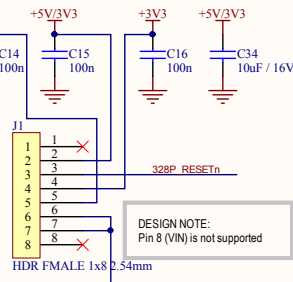
DESIGN NOTE:
About JP1:
1) Autoreset Enabled - Short 1&2. In this case, 16U2 is used to reset 328P when firmware inside 328P is updated from Arduino IDE.
2) 16U2 DFU mode Enabled - Short 2&3. 16U2 HWB pin is sampled by 16U2 during RESET. If pulled low, then after Reset the 16U2 will go into DFU mode (it's the mode when you can flash 16U2 firmware through USB and Atmel Flip software: <http://www.atmel.com/tools/flip.aspx>).

Micro USB

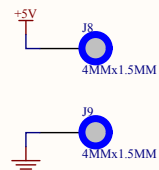


16U2

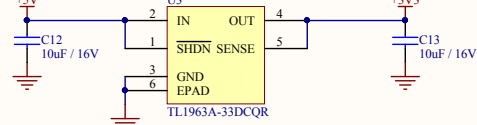
POWER



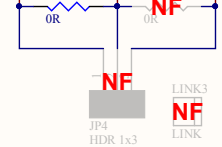
POWER PADS



3V3 LDO



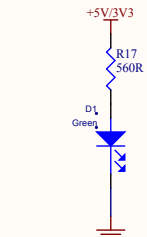
Power Selection



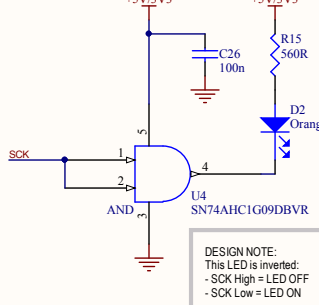
DESIGN NOTE:
This board can be powered from micro USB connector (J7) or a single +3.3V power rail (through J1 pin 4). If +3.3V is used, fit R26 and R28. In this case, JP4 & R27 must NOT be fitted, otherwise the board may be damaged.

328P

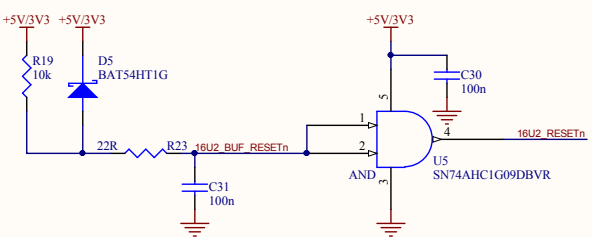
POWER LED



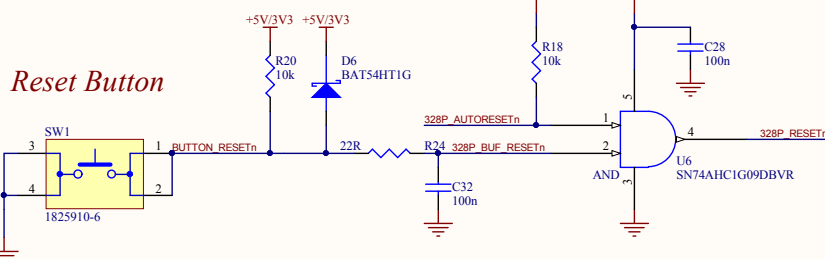
USER LED



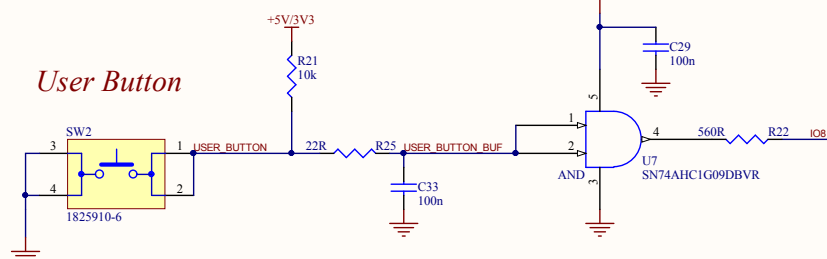
RESET (16U2)



RESET (328P)



USER BUTTON



JP2

ICSP1

JP3

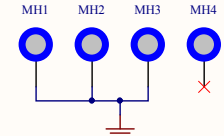
JP1

ICSP

DIP SOCKET

SKT FOR U1
28-DIP SOCKET
28-DIP Socket

MOUNTING HOLES



FIDUCIALS



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. To change all of them at once, use this filter "(not InNet(*))" and not InNet("GND") and IsTrack and (OnLayer("L1") or OnLayer("L2"))" and then set 0.2mm width in PCB Inspector panel.

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A	<div>REVISION HISTORY</div>								A																				
	<div><div>28-APR-2015: The block diagram has been corrected</div><div>Change: In the block diagram, user LED has been moved from MOSI to SCK</div></div>																												
B									B																				
C									C																				
D	<div><div><div><div><div></div><div>FEDEVEL</div><div>Academy</div></div><div>Learn Schematic and PCB Design - ONLINE</div></div><table><tr><td colspan="2">(c) 2015 FEDEVEL Academy</td><td colspan="2">http://www.fedevel.com/academy</td></tr><tr><td>Title:</td><td>28Pins</td><td>Variant:</td><td>FIXED 5V</td></tr><tr><td>Page Contents:</td><td colspan="2">[04] - REVISION HISTORY.SchDoc</td><td>Checked by</td></tr><tr><td>Size:</td><td colspan="2">DWG NO</td><td>Revision: VIII</td></tr><tr><td>Date:</td><td>4/28/2015</td><td>Sheet</td><td>4 of 5</td></tr></table></div></div>								(c) 2015 FEDEVEL Academy		http://www.fedevel.com/academy		Title:	28Pins	Variant:	FIXED 5V	Page Contents:	[04] - REVISION HISTORY.SchDoc		Checked by	Size:	DWG NO		Revision: VIII	Date:	4/28/2015	Sheet	4 of 5	D
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A	<div>Designator [01] - COVER PAGE.SchDoc</div> <div></div>	<div>Designator [02] - BLOCK DIAGRAM.SchDoc</div> <div></div>	<div>Designator [03] - 28PINS SCHEMATIC.SchDoc</div> <div></div>	<div>Designator [04] - REVISION HISTORY.SchDoc</div> <div></div>				
B								
C								
D								

NOTES

Mark Not Fitted Components as
NF

- DRAFT** - Very early stage of schematic, ignore details.
- PRELIMINARY** - Close to final schematic.
- CHECKED** - There should not be any mistakes. Tell the engineer if you find one.
- RELEASED** - A board with this schematic has been sent to production.



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