

# Arduino board

Variant: 5V/3.3V

2/4/2024  
V1

RELEASED 02/2024

Page	Index	Page	Index	Page	Index	Page	Index
1	COVER PAGE	11	.....	21	.....	31	.....
2	BLOCK DIAGRAM	12	.....	22	.....	32	.....
3	28PINS SCHEMATIC	13	.....	23	.....	33	.....
4	REVISION HISTORY	14	.....	24	.....	34	.....
5	.....	15	.....	25	.....	35	.....
6	.....	16	.....	26	.....	36	.....
7	.....	17	.....	27	.....	37	.....
8	.....	18	.....	28	.....	38	.....
9	.....	19	.....	29	.....	39	.....
10	.....	20	.....	30	.....	40	.....

DESIGN CONSIDERATIONS

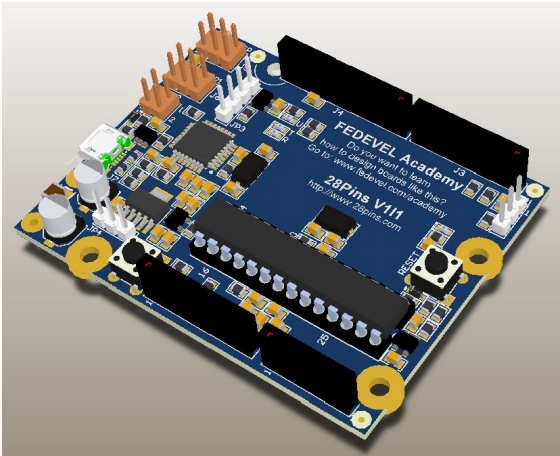
DESIGN NOTE:  
Example text for informational  
design notes.

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.



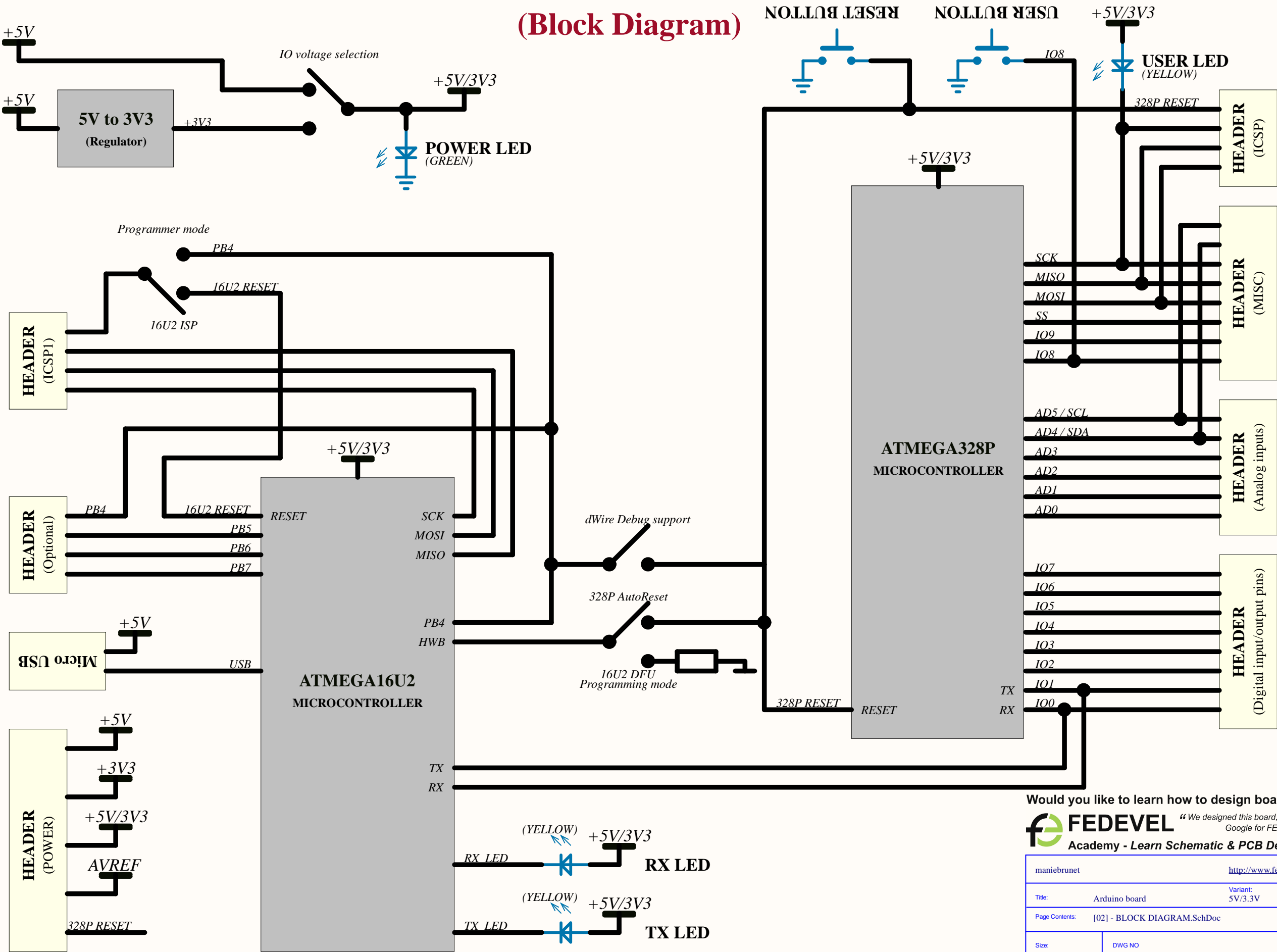
Would you like to learn how to design boards like this?

**FEDEVEL** “ We designed this board, so you can learn,  
Google for FEDEVEL Academy “  
Academy - Learn Schematic & PCB Design ONLINE

maniebrunet			
Title: Arduino board		Variant: 5V/3.3V	
Page Contents: [01] - COVER PAGE.SchDoc		Checked by	
Size:	DWG NO		Revision: V1
Date: 2/4/2024	Designed by www.fedevel.com		Sheet 1 of 5

# Arduino board

## (Block Diagram)



Would you like to learn how to design boards like this?

**FEDEVEL** “ We designed this board, so you can learn,  
Google for FEDEVEL Academy “  
**Academy - Learn Schematic & PCB Design ONLINE**

maniebrunet		<a href="http://www.fedevcl.com/academy">http://www.fedevcl.com/academy</a>	
Title:		Variant: 5V/3.3V	
Page Contents:		[02] - BLOCK DIAGRAM.SchDoc	
Size:	DWG NO		Revision: V1
Date:	2/4/2024	Designed by <a href="http://www.fedevcl.com">www.fedevcl.com</a>	Sheet 2 Checked by

28 PINS - SCHEMATIC

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 R14, Fit R15, "Replace XTAL1 (change from 16MHz to 10MHz),  
"Replace XTAL2 (change from 16MHz to 8MHz).  
3) Both 5V and 3V3, selected through J8 - Remove R14, Remove R15, Fit J8, "Replace XTAL1 (change from 16MHz to 10MHz), "Replace XTAL2 (change from 16MHz to 8MHz).  
\*Note: The 16MHz crystals are not recommended for 3.3V operation. We need to adjust their values, thats why the change.  
IMPORTANT: Once you change the crystal value, you may need to re-compile your source code.

DESIGN NOTE:  
About J4:  
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 MKIIl 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 J5:  
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> ).

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.

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

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.

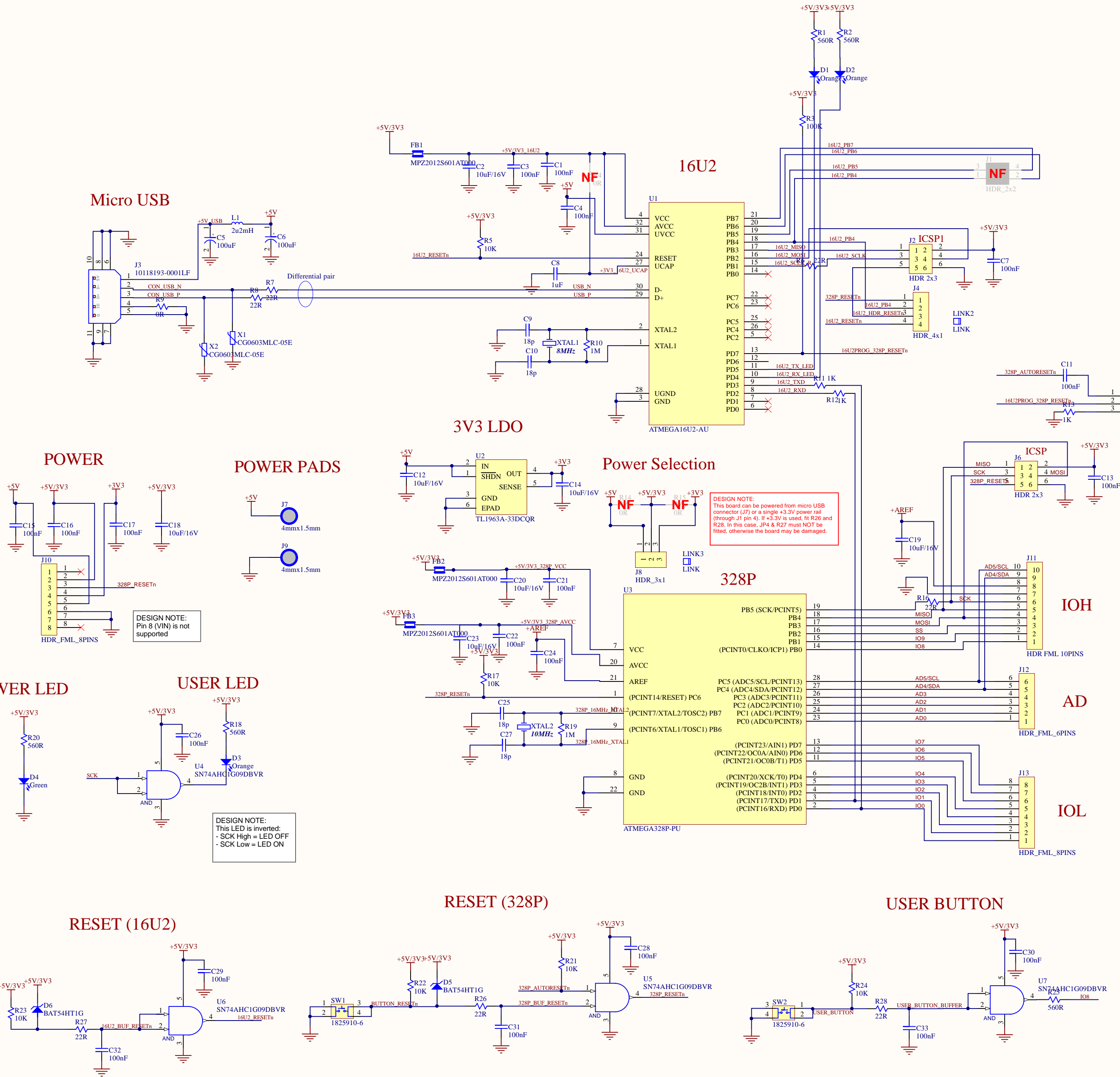
Would you like to learn how to design boards like this?



We designed this board, so you can learn,  
Google for FEDEVEL Academy

Academy - Learn Schematic & PCB Design ONLINE

maniebrunet		<a href="http://www.fedevel.com/academy">http://www.fedevel.com/academy</a>	
Title: Arduino board		Variant: 5V/3.3V	
Page Contents: [03] - 28PINS SCHEMATIC.SchDoc		Checked by:	
Size:	DWG NO	Revision:	
Date: 2/4/2024	Designed by www.fedevel.com	Sheet 3	of 5



# REVISION HISTORY

Would you like to learn how to design boards like this?



*“ We designed this board, so you can learn,  
Google for FEDEVEL Academy “*

**Academy - Learn Schematic & PCB Design ONLINE**

maniebrunet		<a href="http://www.fedevel.com/academy">http://www.fedevel.com/academy</a>	
Title:	Arduino board		Variant: 5V/3.3V
Page Contents:	[04] - REVISION HISTORY.SchDoc		Checked by
Size:	DWG NO		Revision: V1
Date:	2/4/2024		Sheet 4 of 5

	1	2	3	4	5	6	7	8
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.

Would you like to learn how to design boards like this?

**FEDEVEL**

*“ We designed this board, so you can learn,  
Google for FEDEVEL Academy “*

**Academy - Learn Schematic & PCB Design ONLINE**

maniebrunet		<a href="http://www.fedevel.com/academy">http://www.fedevel.com/academy</a>	
Title:	Arduino board	Variant:	5V/3.3V
Page Contents:	28Pins_Project_V1I1 Project.SchDoc		Checked by
Size:	DWG NO		Revision: V1
Date:	2/4/2024	Designed by	www.fedevel.com
Sheet	5	of	5