

28Pins  
Variant: 5V/3V3

7/2/2025  
V1I1

RELEASED 03-JUL-2025

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DESIGN CONSIDERATIONS

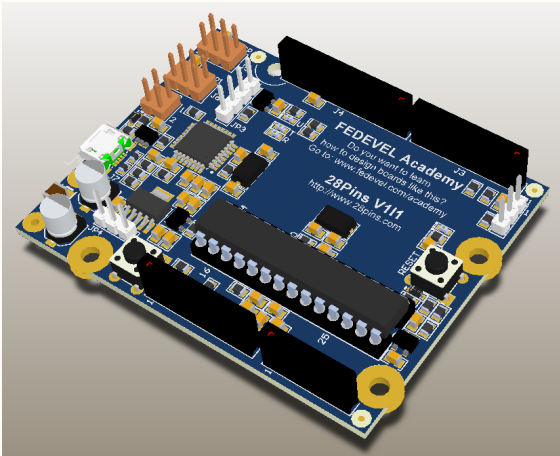
DESIGN NOTE:  
Example text for informational  
design notes.

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.

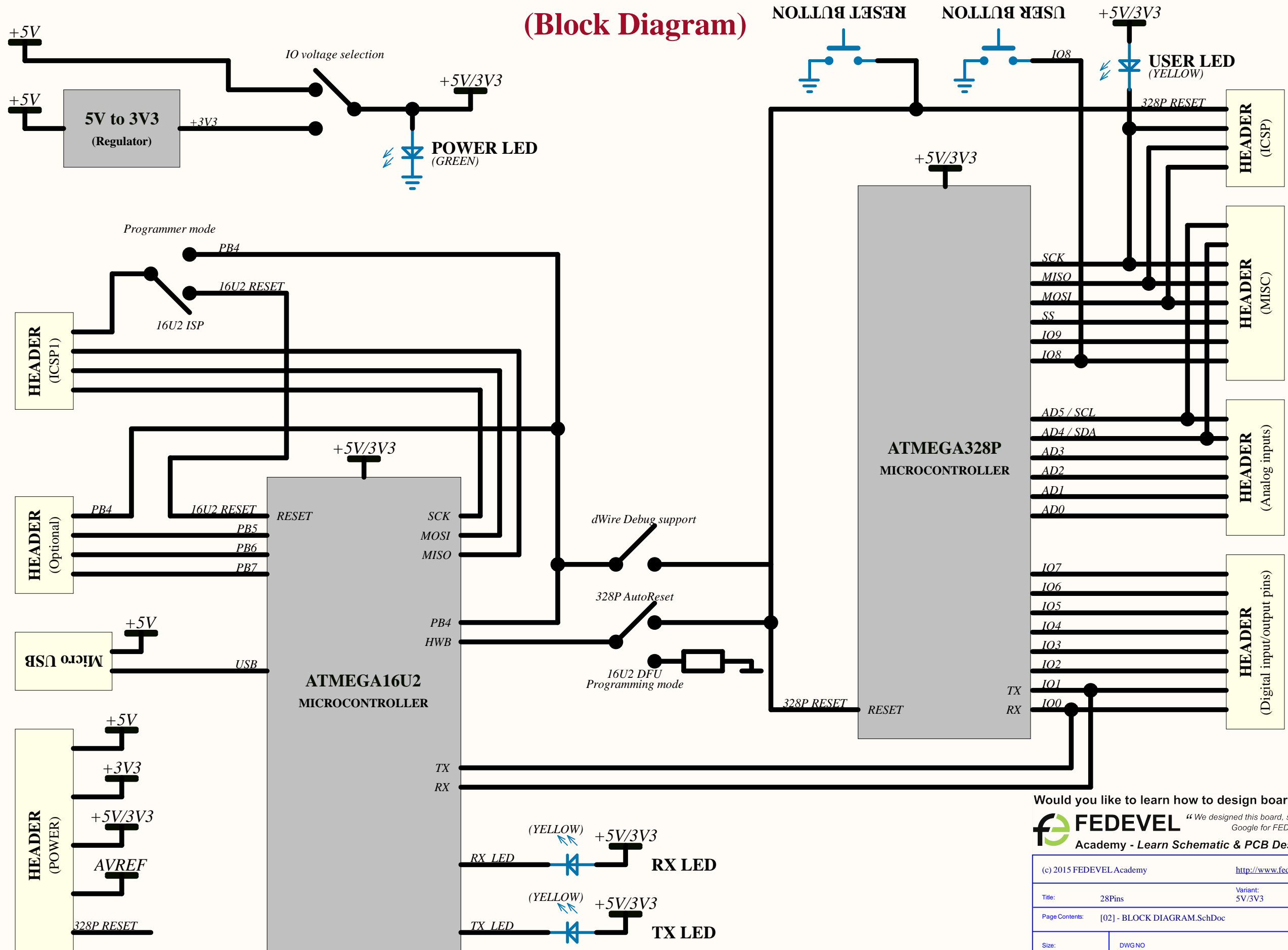


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# 28Pins (Block Diagram)

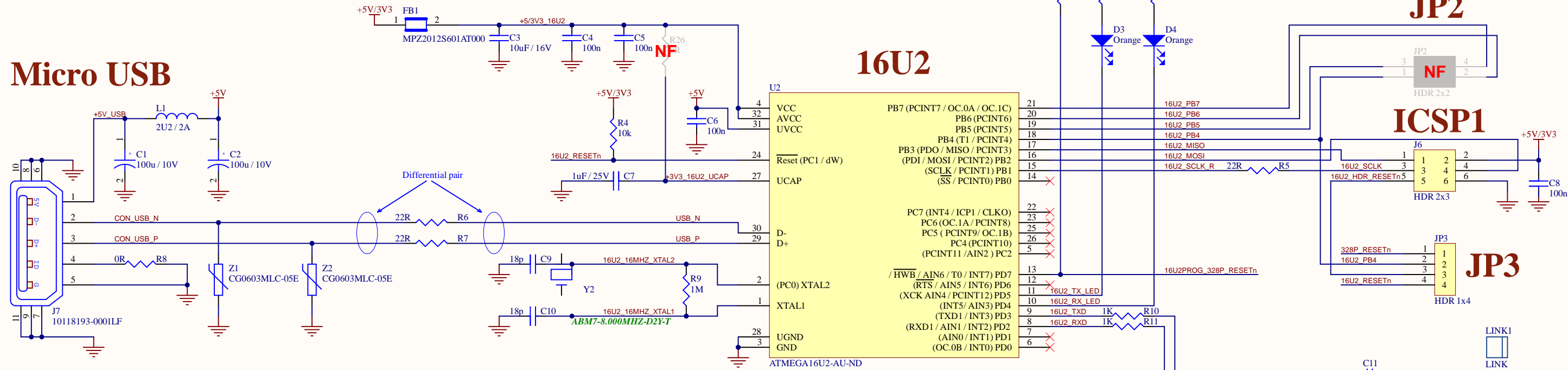


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## 28PINS - SCHEMATIC



DESIGN NOTE:

This board supports 5V or 3V3 voltage level on the IO pins:

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, thats 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:

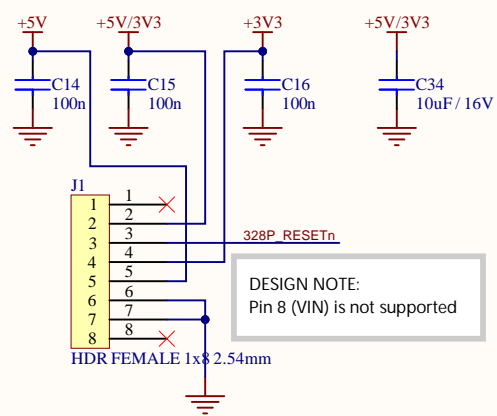
### About JP1:

1) Autoreset Enabled - Short 1&2. In this case, 16U2 is used to reset 328P when firmware inside 328P is updated from Arduino IDE.

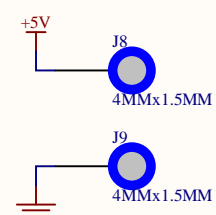
2) 16U2 DFU mode Enabled - Short 2&3. 16U2 HWB pin is sampled by 16U2 during RESET. If

flash 16U2 firmware through USB and Atmel Flip software:  
<http://www.atmel.com/tools/flip.aspx>).

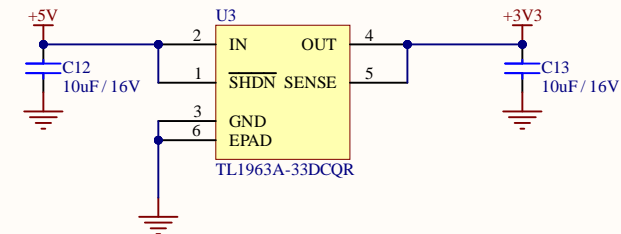
# POWER



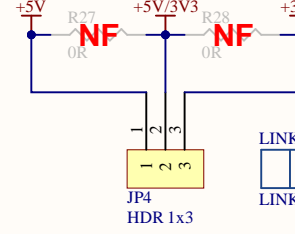
## POWER PADS



## 3V3 LDO

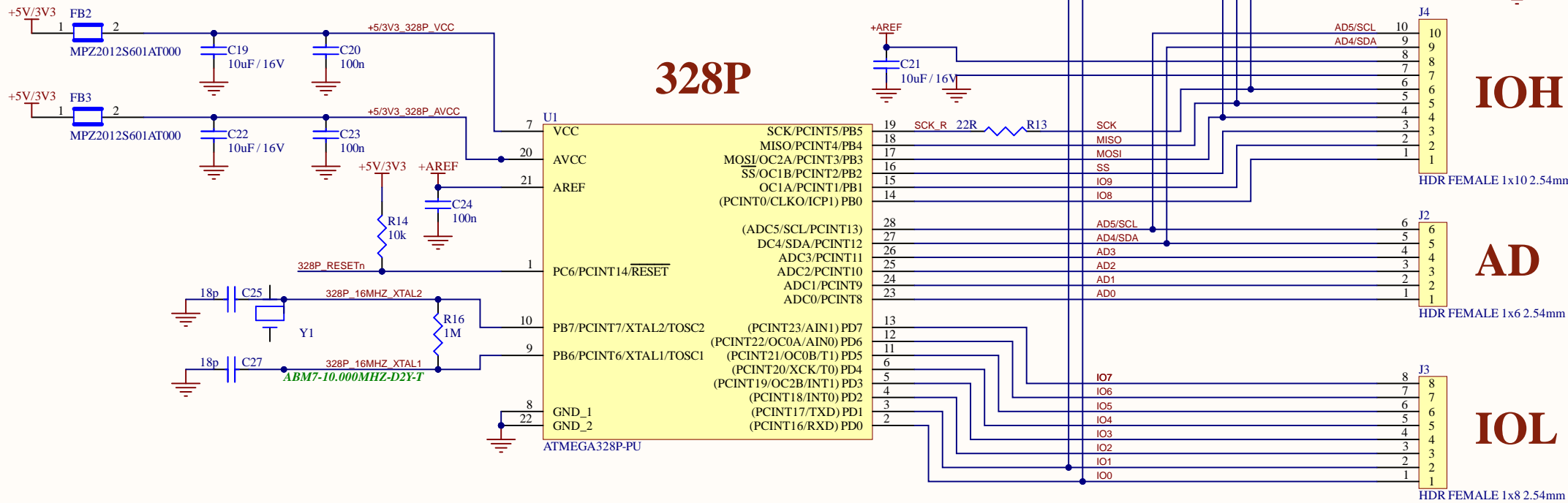


## Power Selection



**DESIGN NOTE:**  
This board can be fitted with a 10-pin D-sub connector (J7) or a 15-pin D-sub connector (through J1 pin 15 and R28). In this case, it can be fitted, otherwise it will be damaged.

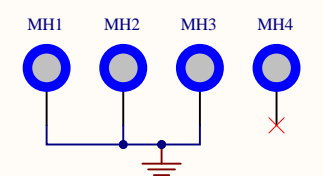
## 328P



## DIP SOCKET



## MOUNTING HOLES

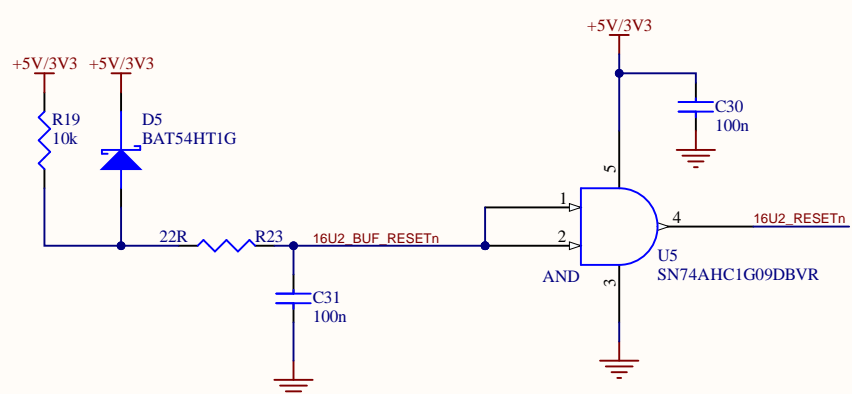


Mounting holes 7.4mm pad 3.2mm drill

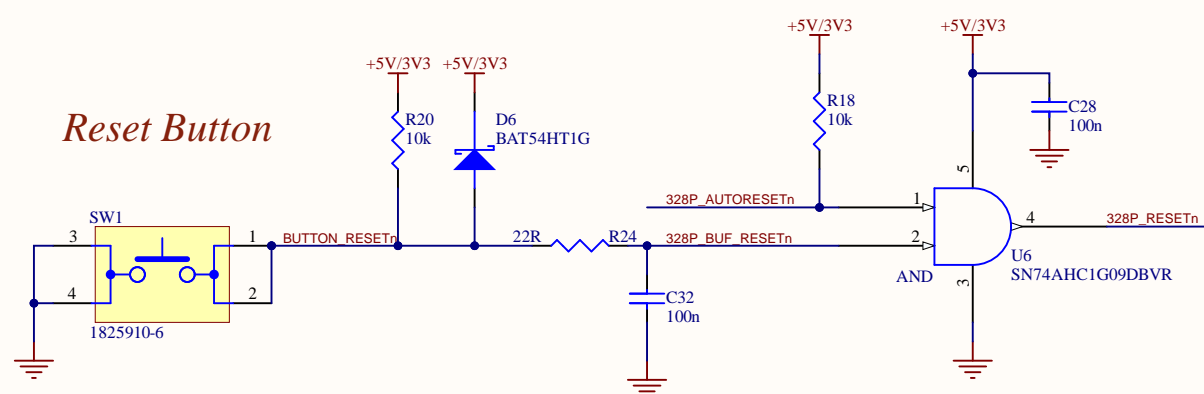
## FIDUCIALS



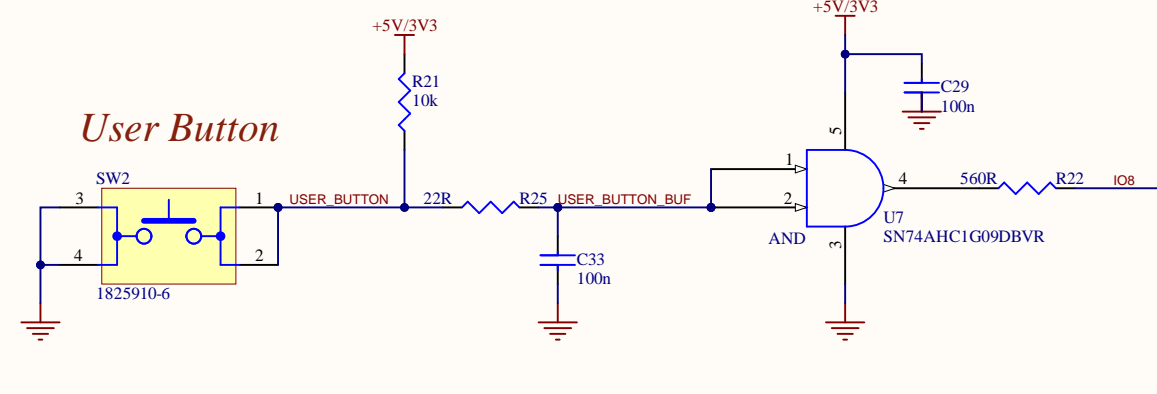
## RESET (16U2)



## 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. 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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# REVISION HISTORY

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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	<div>NOTES</div> <div>Mark Not Fitted Components as NF</div> <div>DRAFT - Very early stage of schematic, ignore details.</div> <div>PRELIMINARY - Close to final schematic.</div> <div>CHECKED - There should not be any mistakes. Tell the engineer if you find one.</div> <div>RELEASED - A board with this schematic has been sent to production.</div>				<div>Would you like to learn how to design boards like this?</div> <div><div><div></div><div>FEDEVEL</div><div>Academy - Learn Schematic &amp; PCB Design ONLINE</div></div><div>“ We designed this board, so you can learn, Google for FEDEVEL Academy “</div></div> <table><tr><td colspan="2">(c) 2015 FEDEVEL Academy</td><td colspan="2"><a href="http://www.fedevel.com/academy">http://www.fedevel.com/academy</a></td></tr><tr><td>Title:</td><td>28Pins</td><td>Variant:</td><td>5V/3V3</td></tr><tr><td>Page Contents:</td><td colspan="2">28Pins_Project_V1111 Project.SchDoc</td><td>Checked by</td></tr><tr><td>Size:</td><td colspan="2">DWGNO</td><td>Revision: V111</td></tr><tr><td>Date:</td><td>7/2/2025</td><td>Designed by <a href="http://www.fedevel.com">www.fedevel.com</a></td><td>Sheet 5 of 5</td></tr></table>				(c) 2015 FEDEVEL Academy		<a href="http://www.fedevel.com/academy">http://www.fedevel.com/academy</a>		Title:	28Pins	Variant:	5V/3V3	Page Contents:	28Pins_Project_V1111 Project.SchDoc		Checked by	Size:	DWGNO		Revision: V111	Date:	7/2/2025	Designed by <a href="http://www.fedevel.com">www.fedevel.com</a>	Sheet 5 of 5
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