

28Pins

Variant: Fixed 5V

03-12-2022
V1I1

RELEASED 03-DEC-2022

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

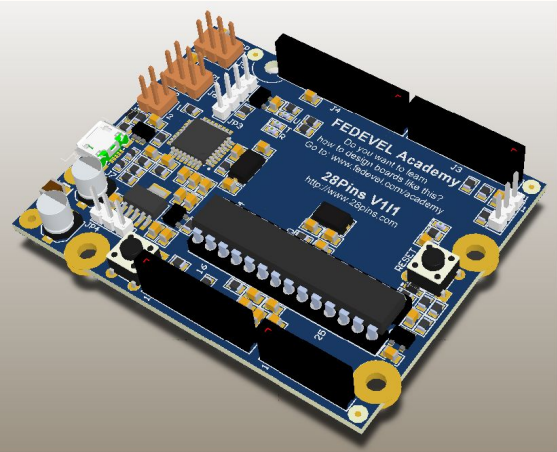
DESIGN NOTE:
Example text for informational
design notes.

DESIGN NOTE:
Example text for cautionary
design notes.

DESIGN NOTE:
Example text for debug notes.

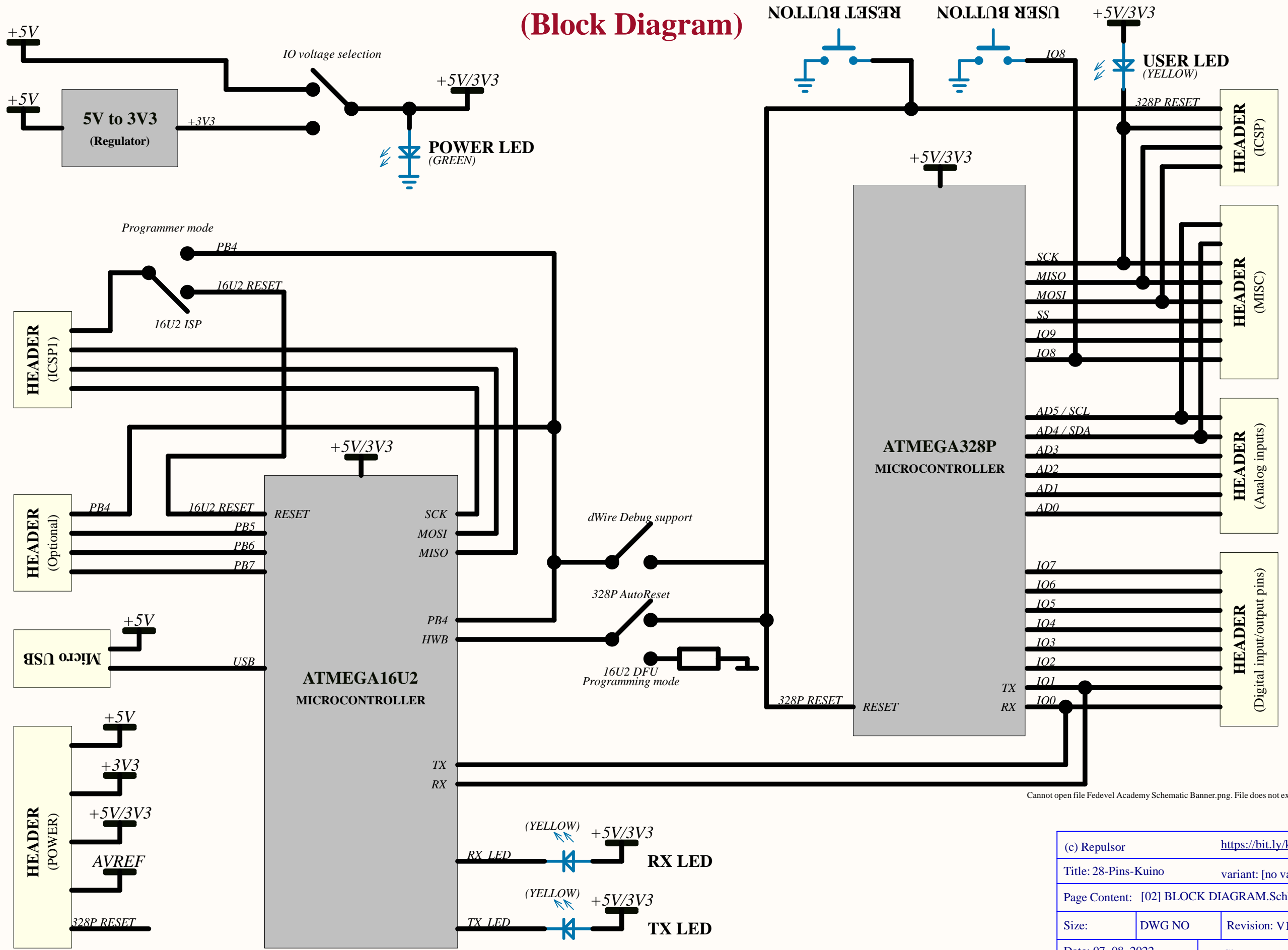
DESIGN NOTE:
Example text for critical
design notes.

LAYOUT NOTE:
Example text for critical
layout guidelines.



(c) Repulsor		https://bit.ly/kishankrs
Title: 28-Pins-Kuino		variant: [no variations]
Page Content: [01] COVER PAGE.SchDoc		
Size:	DWG NO	Revision: V1I1
Date: 07 .08. 2022		Sheet 1

28Pins (Block Diagram)



Cannot open file Fedevel Academy Schematic Banner.png. File does not exist.

(c) Repulsor		https://bit.ly/kishankrs	
Title: 28-Pins-Kuino		variant: [no variations]	
Page Content: [02] BLOCK DIAGRAM.SchDoc			
Size:	DWG NO	Revision: V111	
Date: 07 .08. 2022		Sheet 2	

28PINS - SCHEMATIC

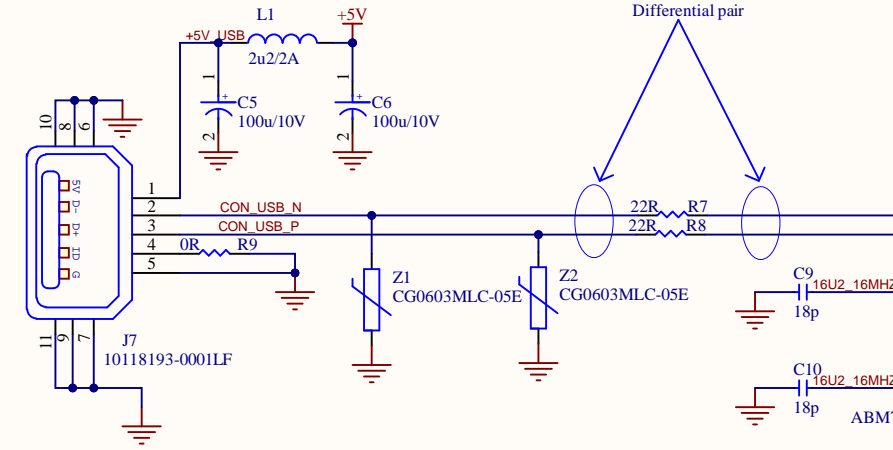
LAYOUT NOTE:
1) Route all the POWER tracks with minimum track width 0.4mm.
2) Route all the other tracks by 0.4mm and change them by the end of the design to 0.2mm. To change all of them at once, use this filter "(not InNet('+*') and not InNet('GND')) and IsTrack and (OnLayer('L1') or OnLayer('L2'))" and then set 0.2mm width in PCB Inspector panel.

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 Y1 (change from 16MHz to 10MHz), *Replace Y2 (change from 16MHz to 8MHz).
3) Both 5V and 3V3, selected through JP4 - Remove R14, Remove R15, 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.

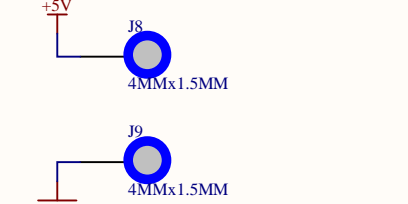
DESIGN NOTE:
About JP3:
1) DebugWire support - Short 1&2. This was added to support possible debugWire debugging (programming?) of 328P through 16U2. In this case, the 16U2 needs to have a correct firmware and has to behave as a debugWire tool.
2) ISP programmer mode - Short 2&3. In this case, take a 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

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>).

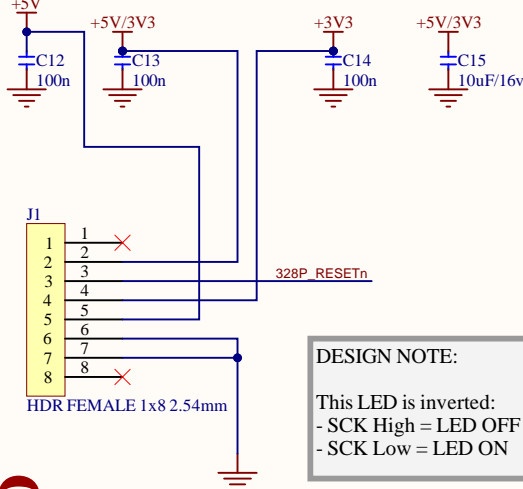
Micro USB



POWER PADS



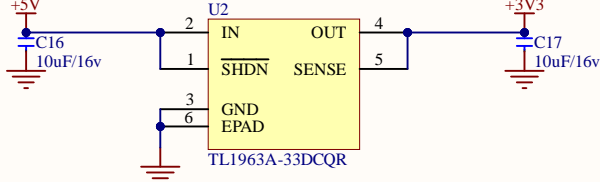
POWER



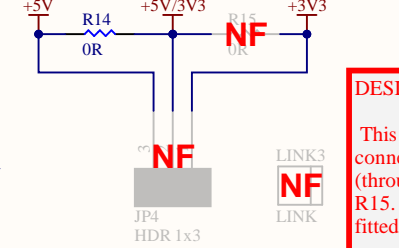
POWER LED

USER LED

3V3 LDO

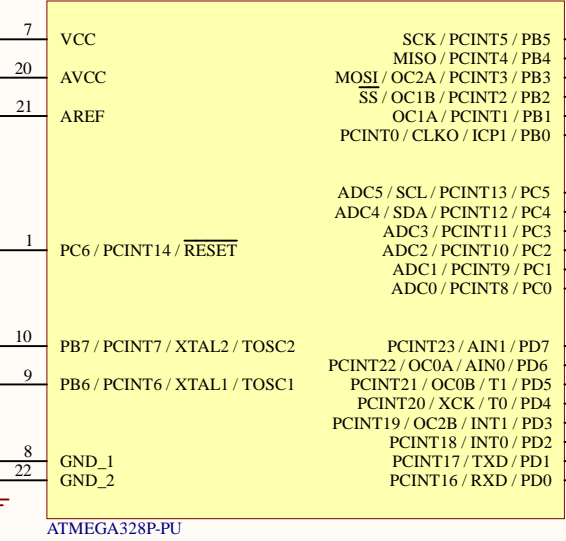


Power Selection

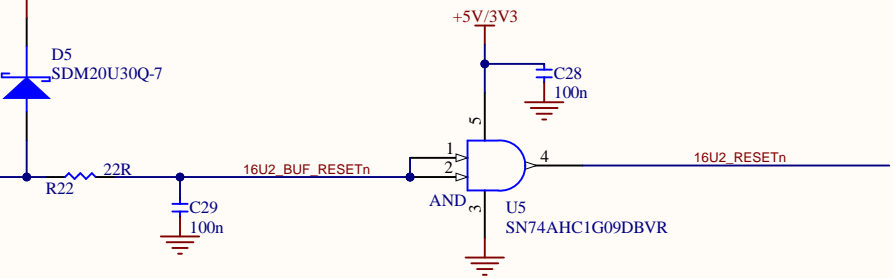


DESIGN NOTE:
This board can be powered from micro USB connector (J7) or a single +3.3V power rail (through J1 pin 4). If +3.3V is used, fit R4 and R15. In this case, JP4 & R14 must NOT be fitted, otherwise the board may be damaged.

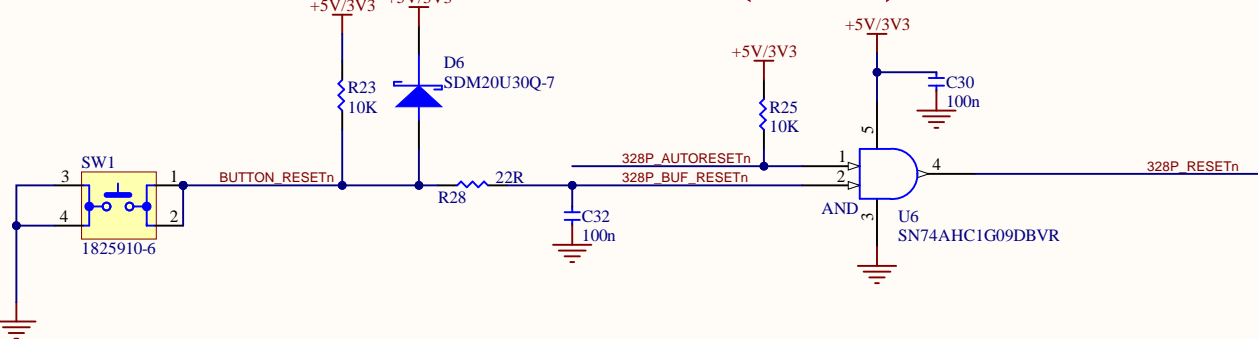
328P



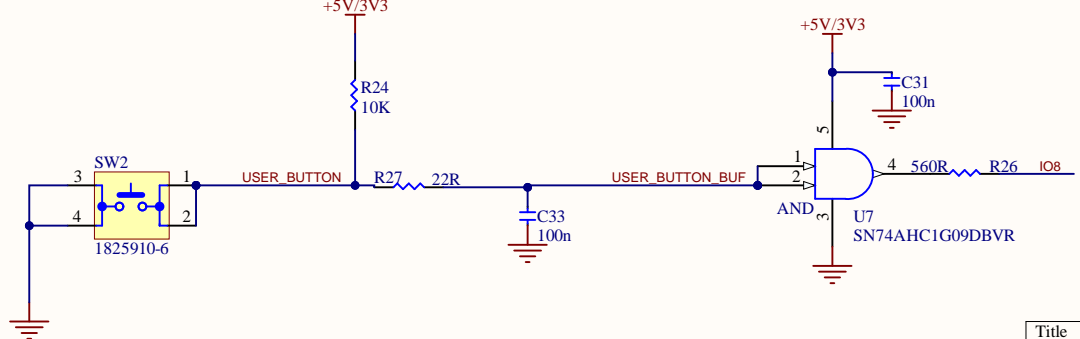
RESET (16U2)



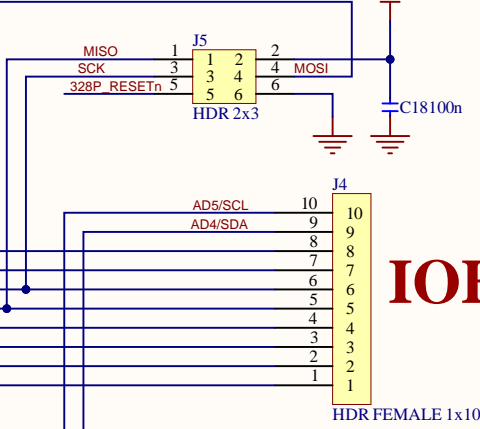
RESET (328P)



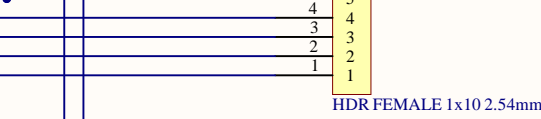
USER BUTTON



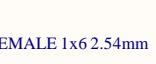
ICSP



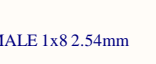
IOH



AD



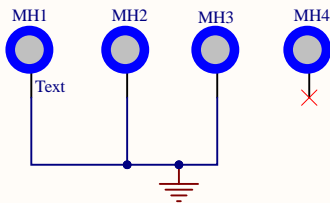
IOL



DIP SOCKET



MOUNTING HOLES



FIDUCIALS



(c) Repulsor		https://bit.ly/kishankrs
Title: 28-Pins-Kuino		variant: [no variations]
Page Content: [03] 28PINS SCHEMATIC.SchDoc		
Size:	DWG NO	Revision: V111
Date: 07.08.2022	Sheet 3	

Title		
Size A2	Number	Revision
Date:	12-03-2022	Sheet of
File:	C:\Users\...[03] - 28PINS SCHEMATIC.SchDoc	Drawn By:

REVISION HISTORY

Cannot open file Fedevel Academy Schematic Banner.png. File does not exist.

(c) Repulsor		https://bit.ly/kishankrs
Title: 28-Pins-Kuino		variant: [no variations]
Page Content: [04] Revision Page.SchDoc		
Size:	DWG NO	Revision: V111
Date: 07 .08. 2022		Sheet 4

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	<div><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>							
	1	2	3	4	5	6	7	8