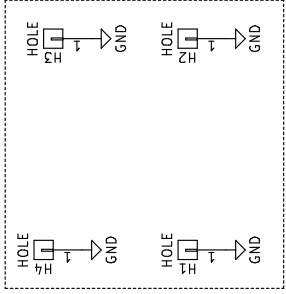
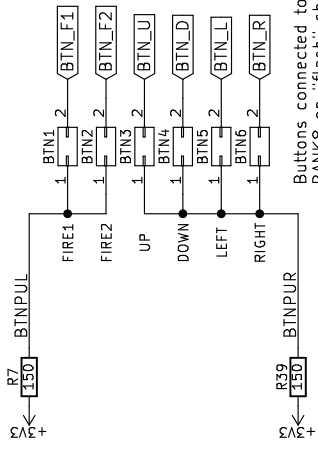
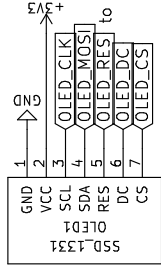
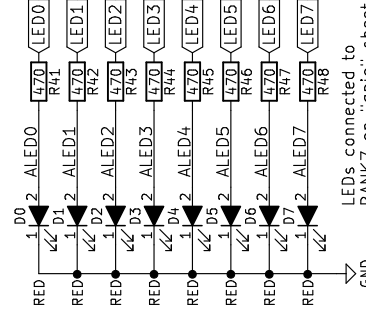


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1	2	3	4	5																												
			<p>click on mouse pointer arrow on top of right toolbar and double-click on sheet to open</p> <table border="1"> <tr> <td>Sheet: power</td> <td>Sheet: usb</td> <td>Sheet: blinky</td> <td>Sheet: ram</td> <td>Sheet: sdcard</td> </tr> <tr> <td>File: power.sch</td> <td>File: usb.sch</td> <td>File: blinky.sch</td> <td>File: ram.sch</td> <td>File: sdcard.sch</td> </tr> <tr> <td>Sheet: gpio</td> <td>Sheet: gpd</td> <td>Sheet: analog</td> <td>Sheet: wifi</td> <td>Sheet: flash</td> </tr> <tr> <td>File: gpio.sch</td> <td>File: gpd.sch</td> <td>File: analog.sch</td> <td>File: wifi.sch</td> <td>File: flash.sch</td> </tr> </table>	Sheet: power	Sheet: usb	Sheet: blinky	Sheet: ram	Sheet: sdcard	File: power.sch	File: usb.sch	File: blinky.sch	File: ram.sch	File: sdcard.sch	Sheet: gpio	Sheet: gpd	Sheet: analog	Sheet: wifi	Sheet: flash	File: gpio.sch	File: gpd.sch	File: analog.sch	File: wifi.sch	File: flash.sch	<p>Root sheet FER+RIZ+RADIONA Sheet: / File: ulx3s.sch Title: ULX3S</p> <table border="1"> <tr> <td>Size: A4</td> <td>Date:</td> </tr> <tr> <td colspan="2">KiCad E.D.A. kicad 4.0.7+dfsg1-1</td> </tr> <tr> <td colspan="2" style="text-align: right;">Rev. 1.7.5</td> </tr> <tr> <td colspan="2" style="text-align: right;">Id: 1/11</td> </tr> </table>	Size: A4	Date:	KiCad E.D.A. kicad 4.0.7+dfsg1-1		Rev. 1.7.5		Id: 1/11	
Sheet: power	Sheet: usb	Sheet: blinky	Sheet: ram	Sheet: sdcard																												
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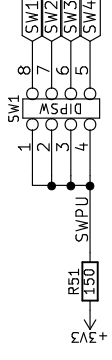
SSD1306 B/W or SSD1331 COLOR
 compatible OLED 0.96" or 1.3" PCB
 1.4x1.4 units
 1 unit = 2.54 mm



Buttons connected to BANK8 on "flash" sheet

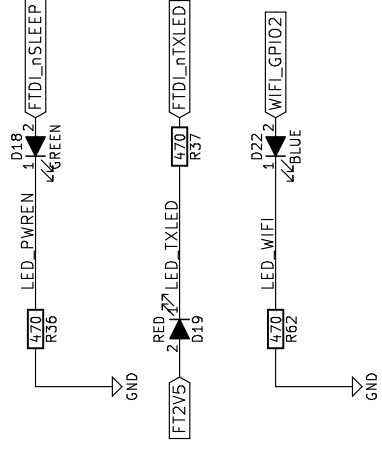


LEDs connected to BANK7 on "gpio" sheet



DIP switch connected to BANK0 on 'gpio' sheet

To fix issues with FT231XS rev A,B,C Short-circuit D18 LED, but then board cannot keep awake by USB. chip rev D works properly See TN140_FT231X Errata



TXLED blinks when FPGA sends data to FTDI

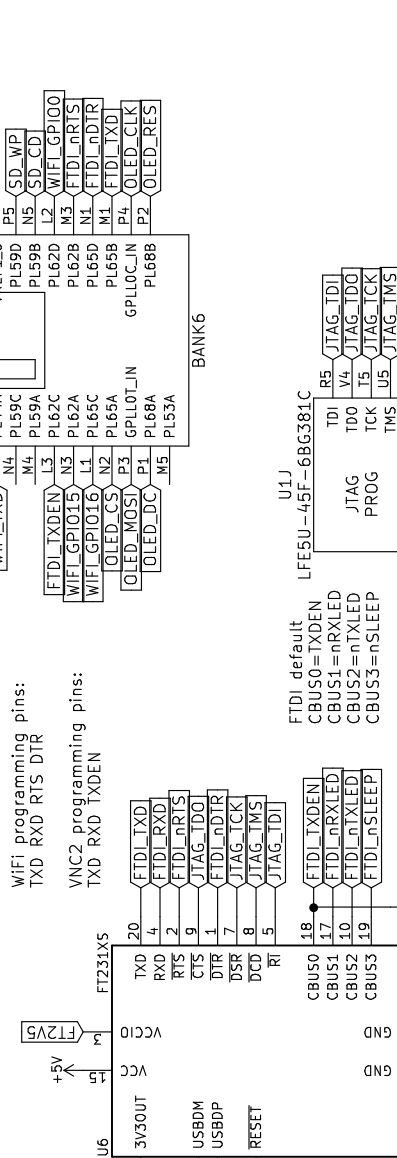
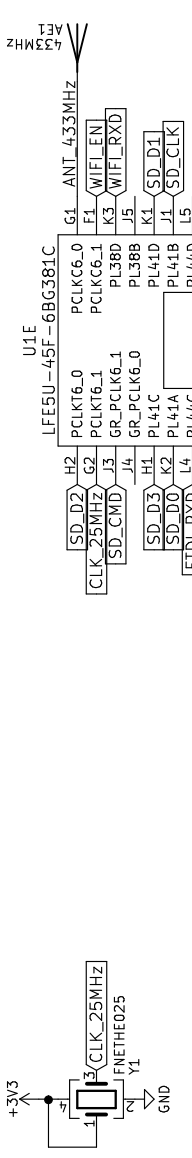
Buttons, LEDs, OLED display
FER+RIZ+RADIONA

Sheet: /blinky/
 File: blinky.sch

Title: ULX3S

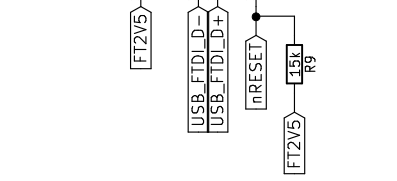
Size: A4 Date:
 KiCad E.D.A. kicad 4.0.7+dfsg1-1

Rev: 0.0.1
 Id: 4/11

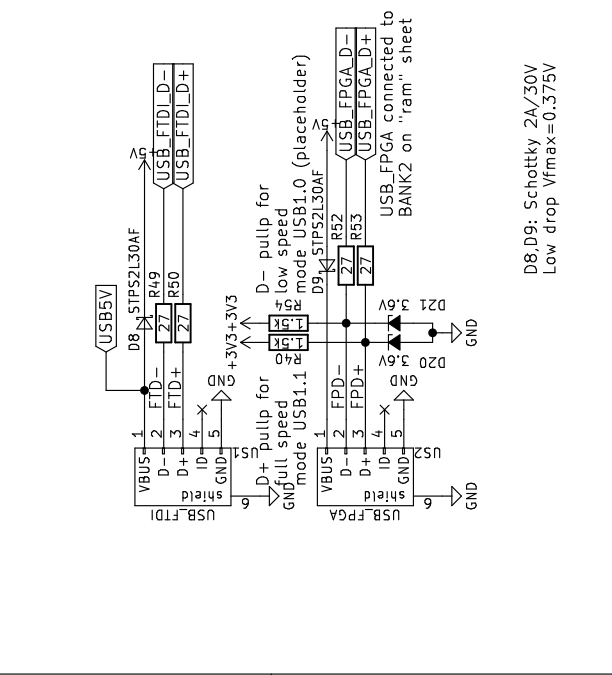
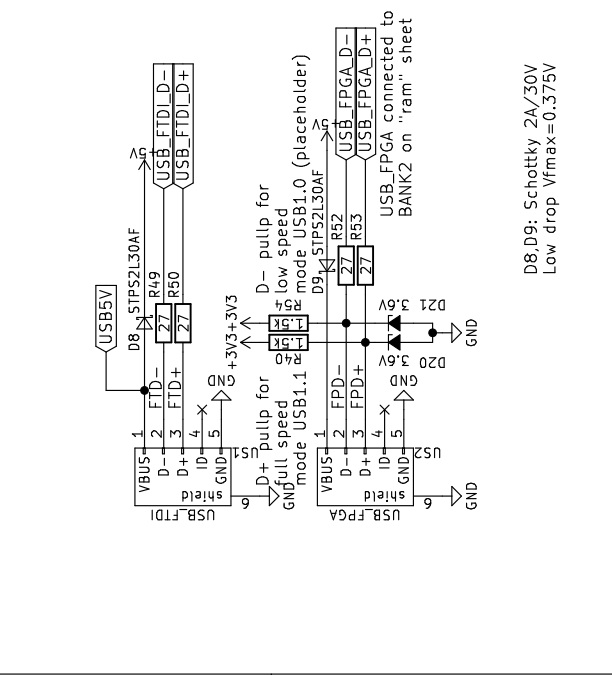
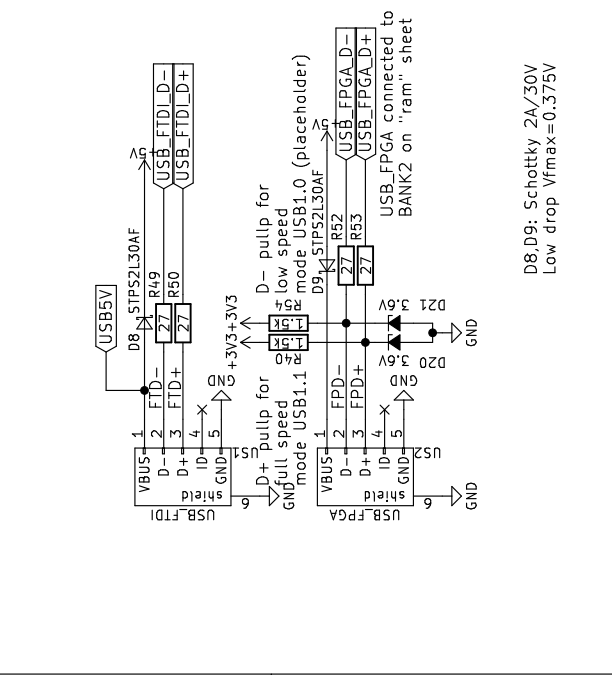
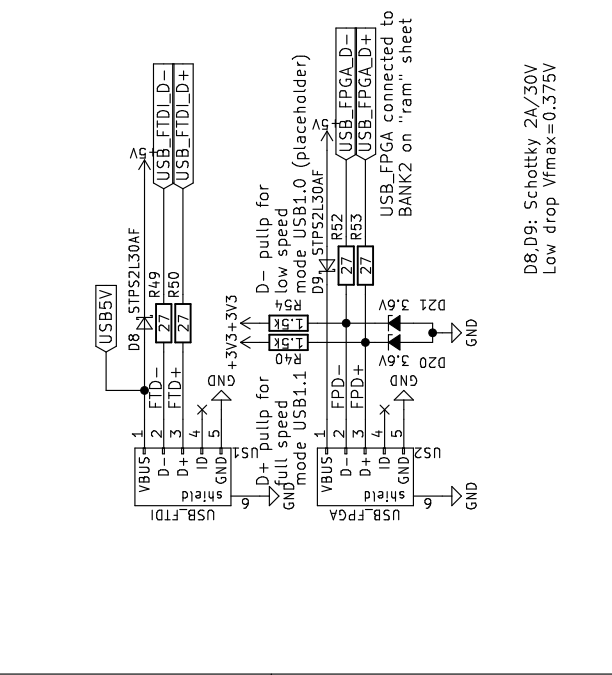
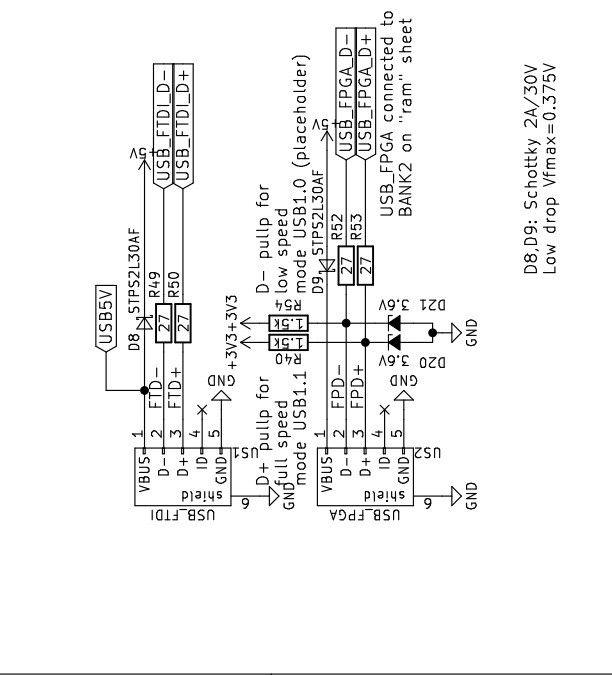
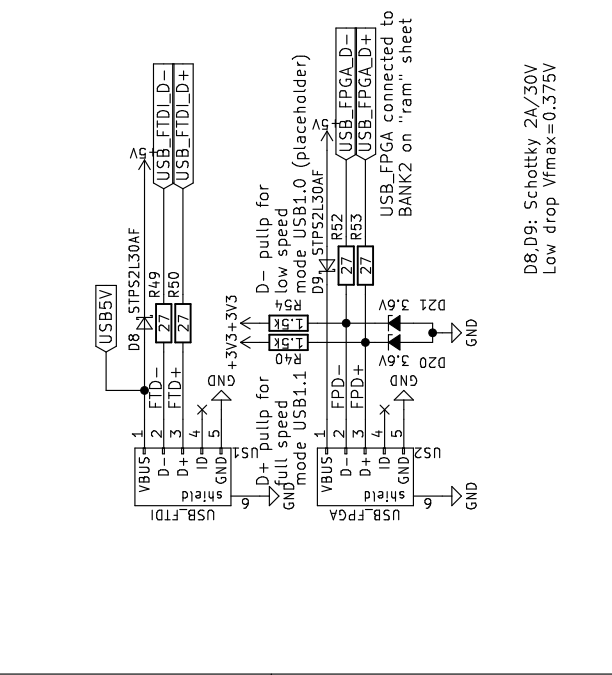
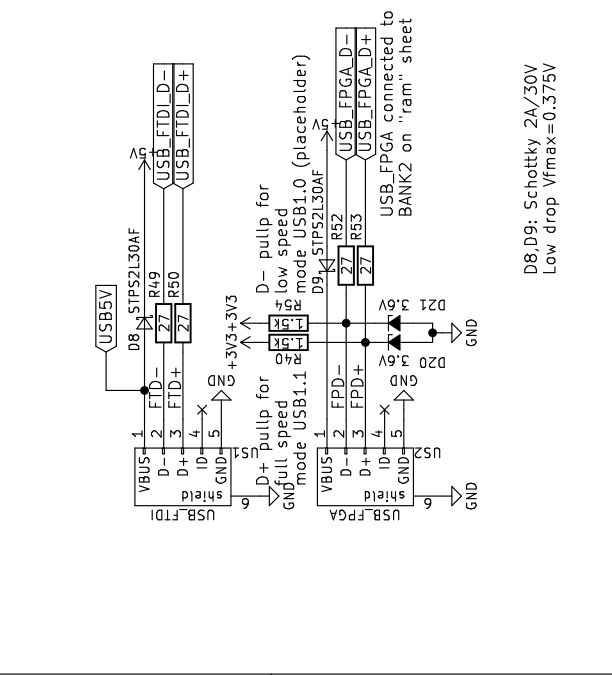
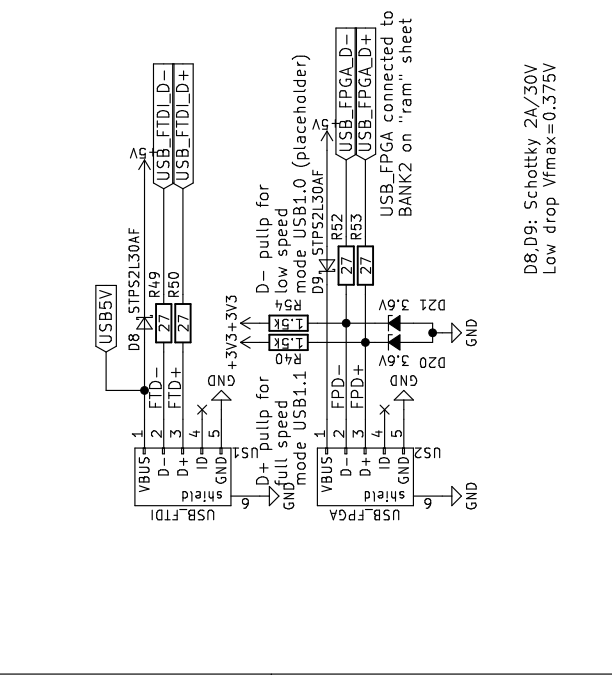
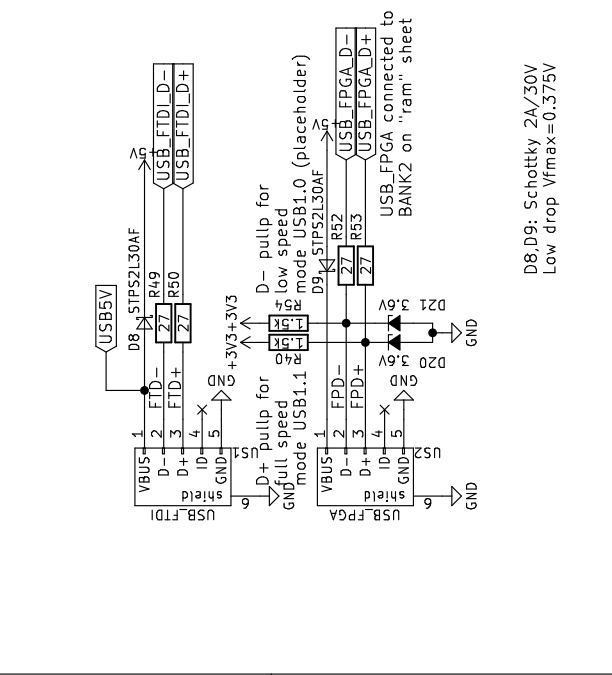
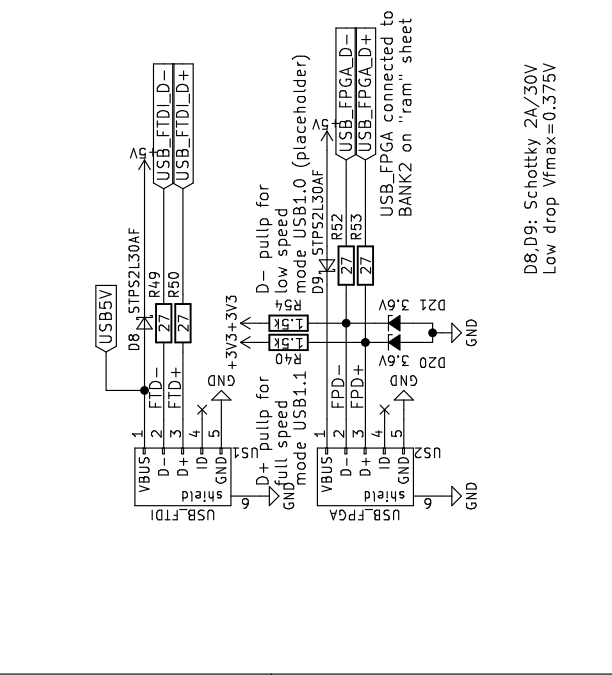
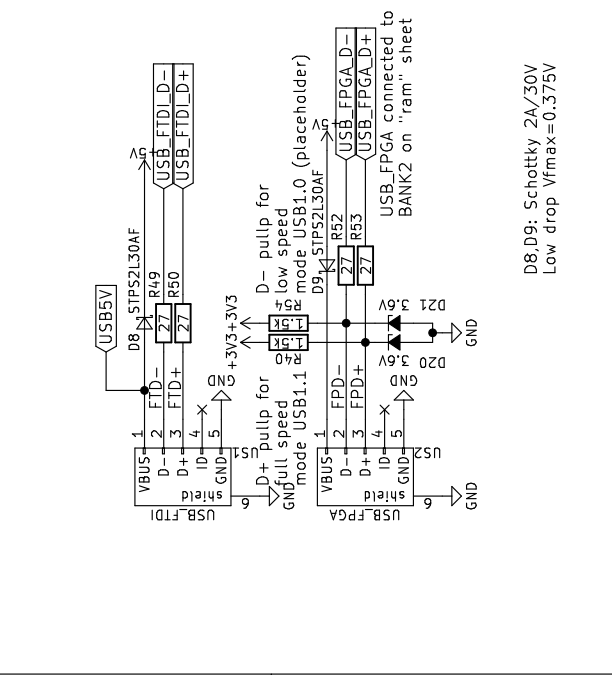
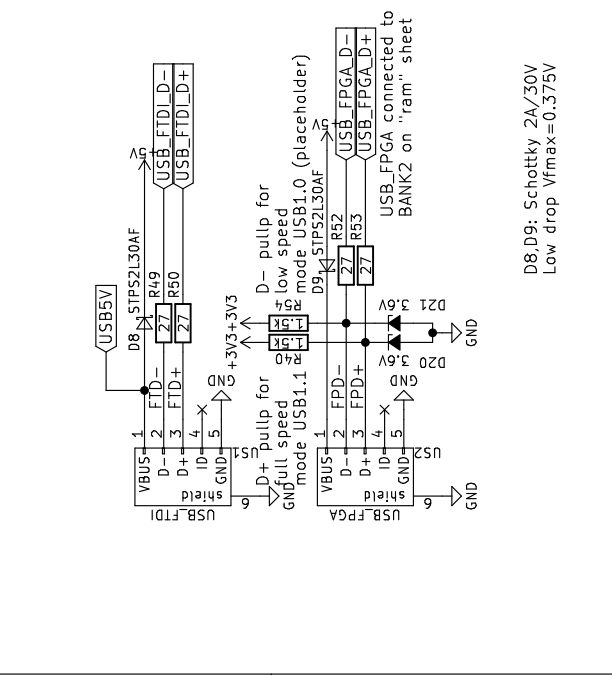
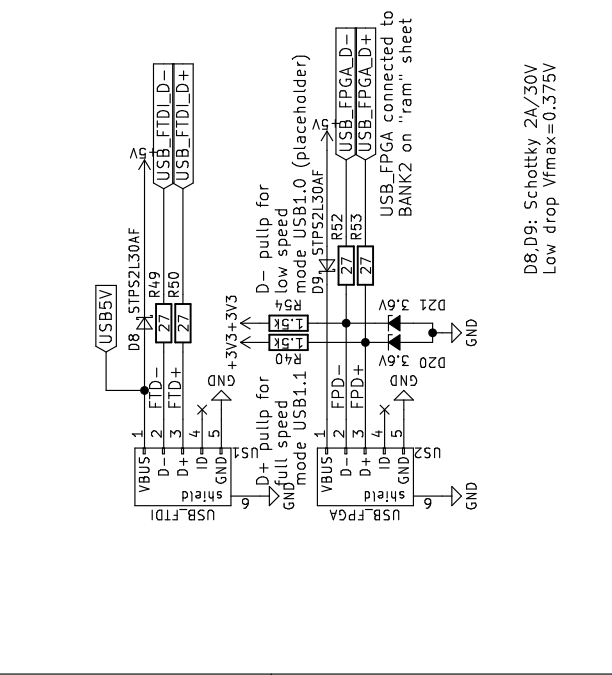
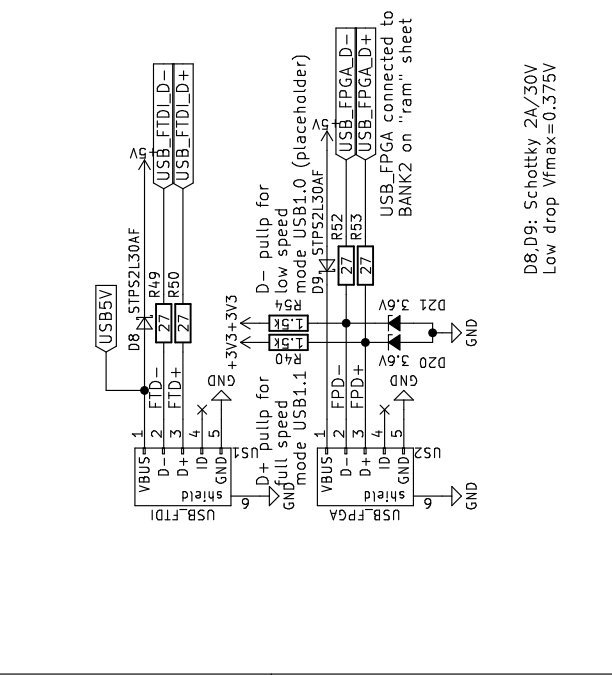
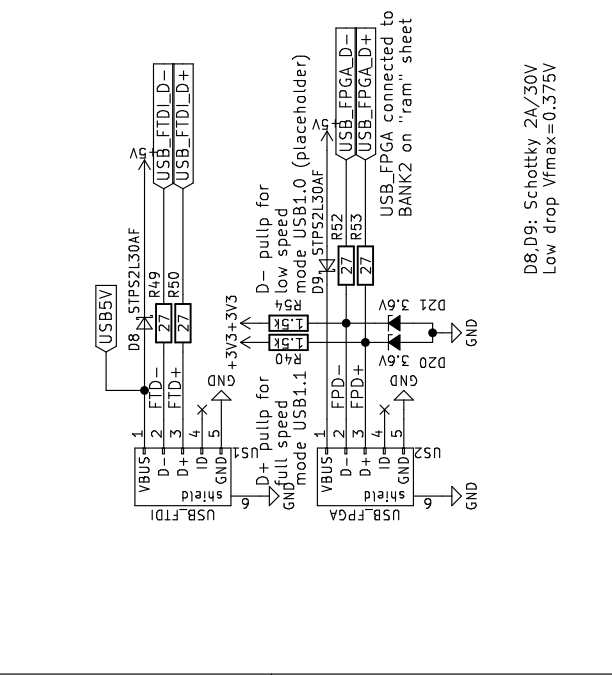
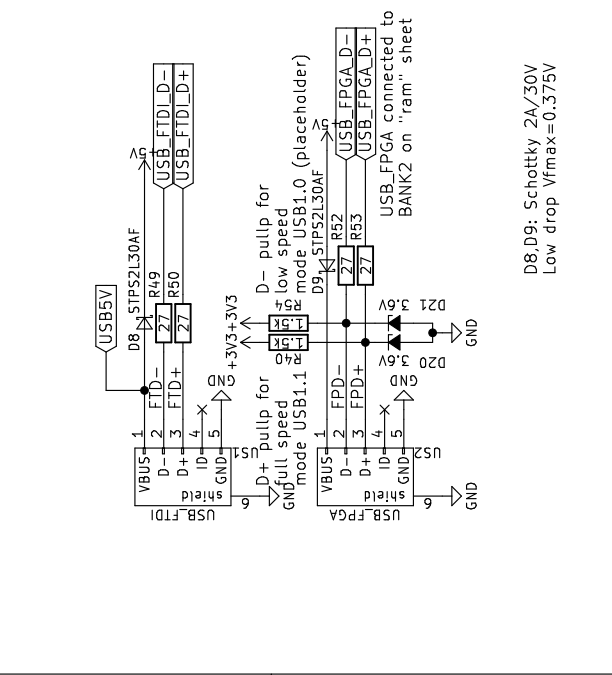
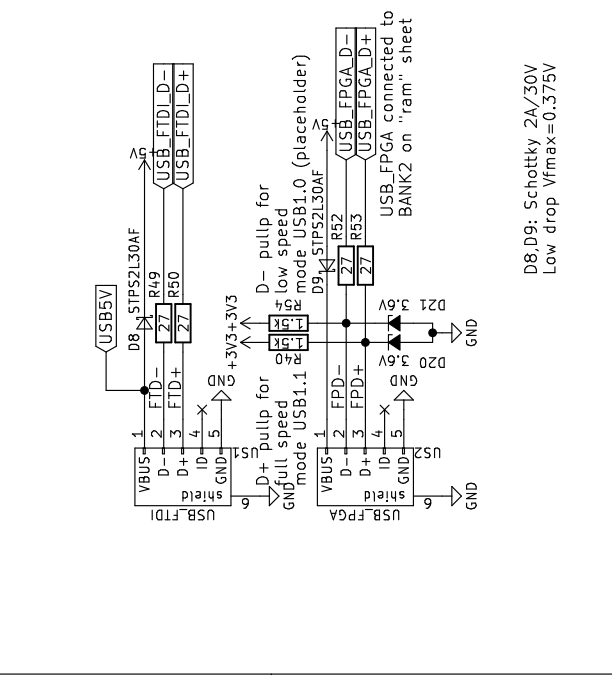
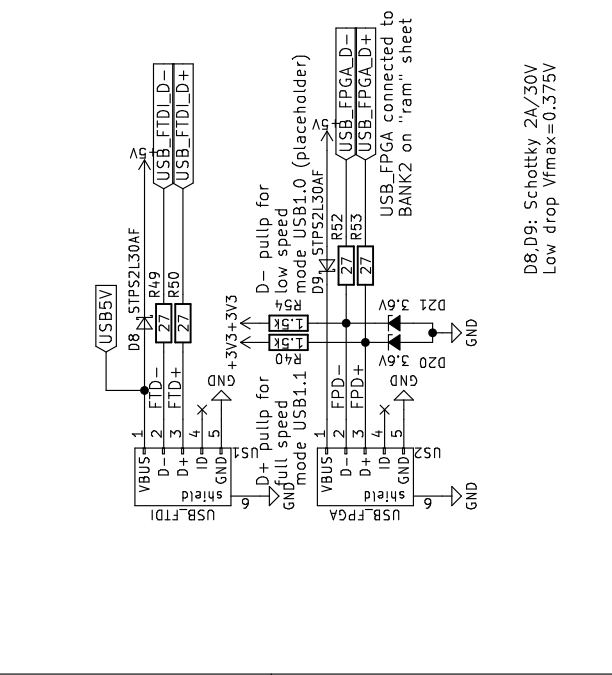
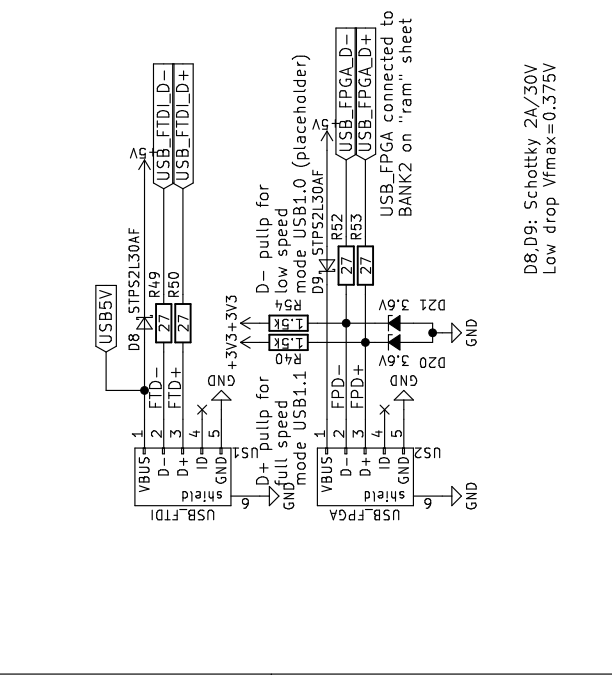
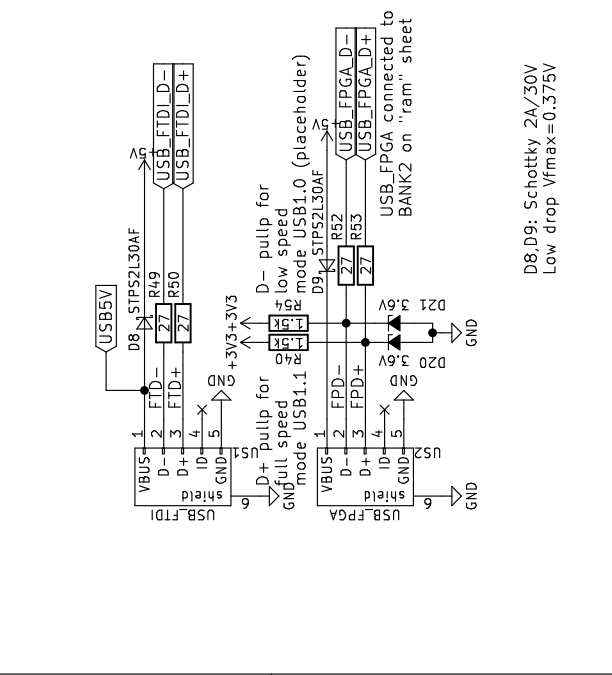
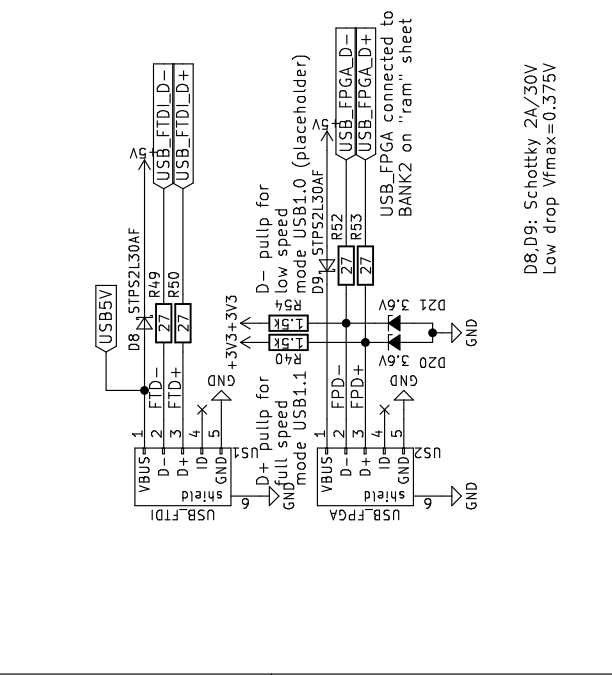
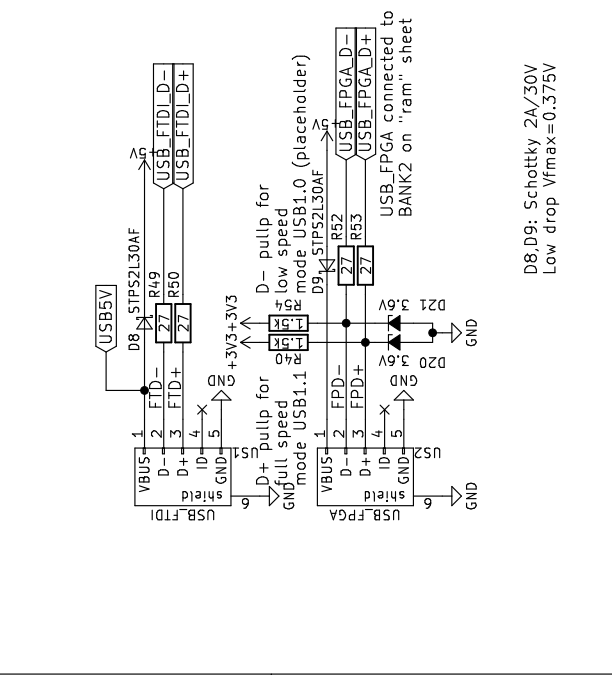
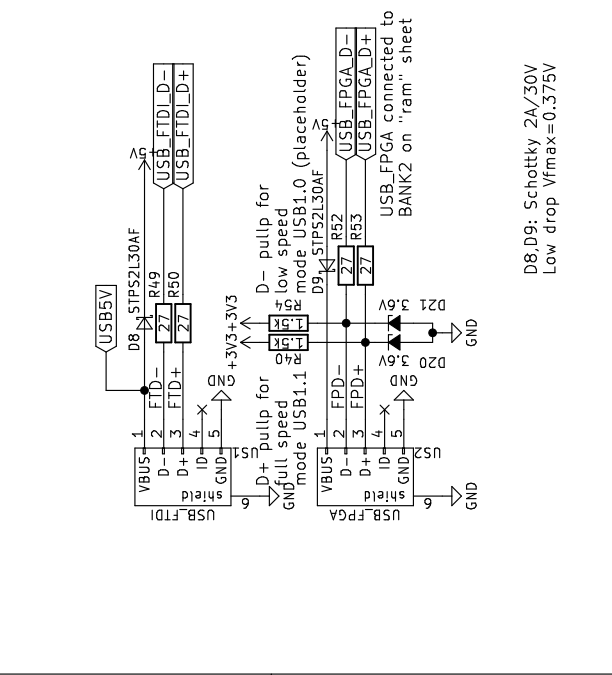
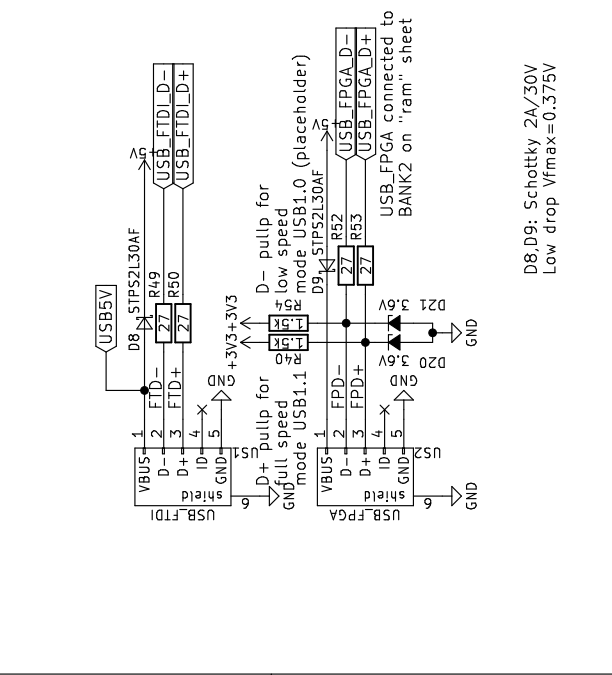
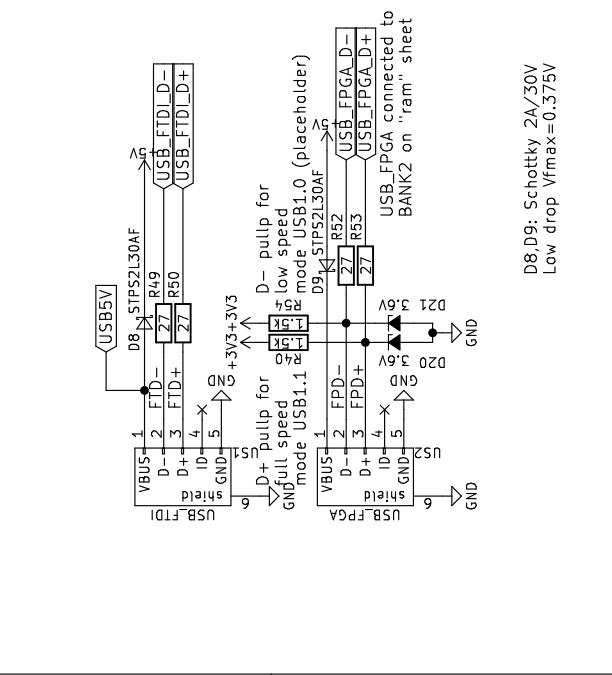
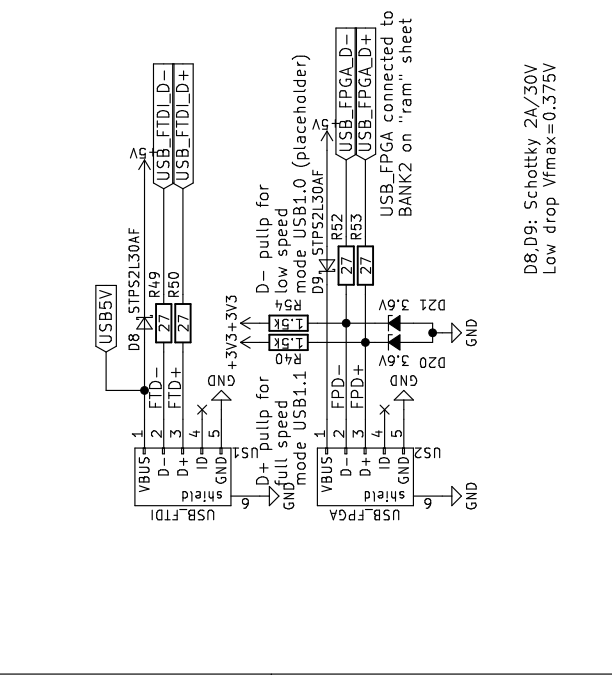
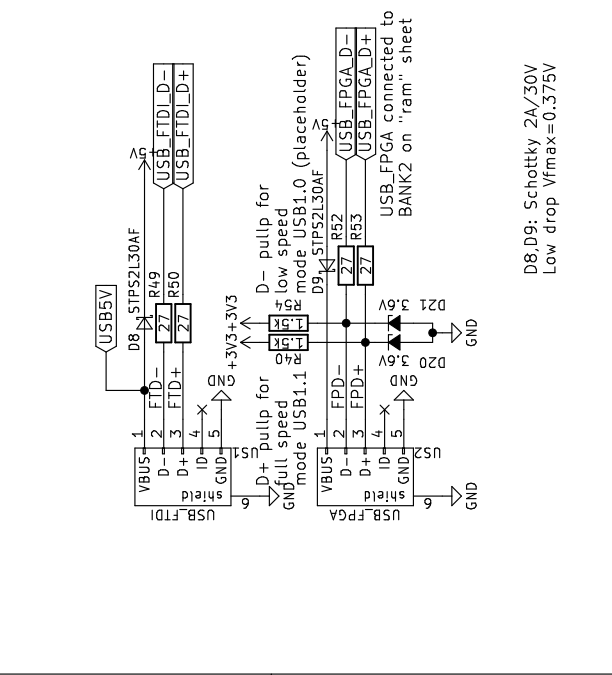
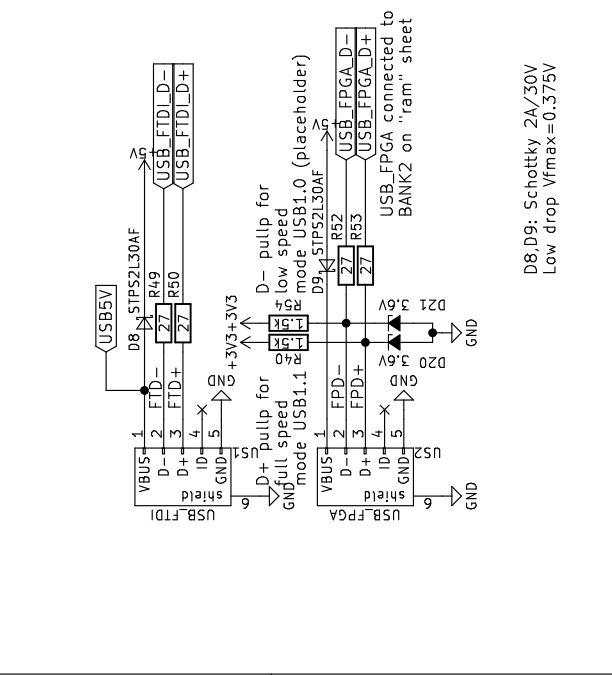
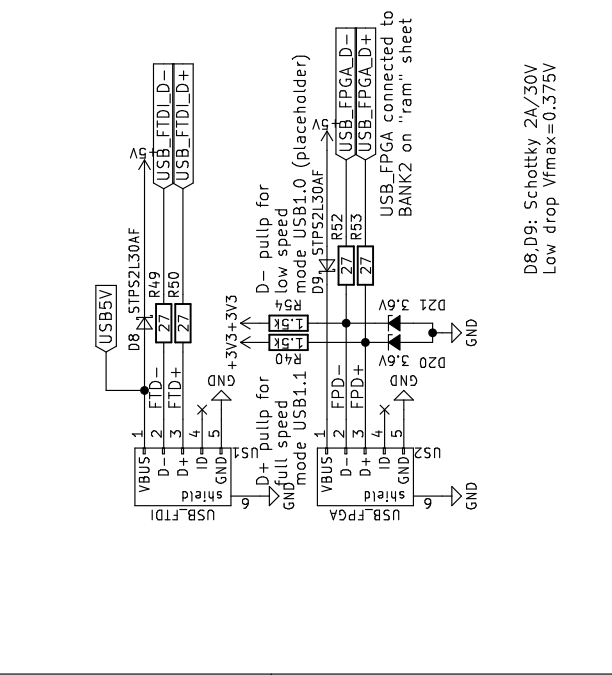
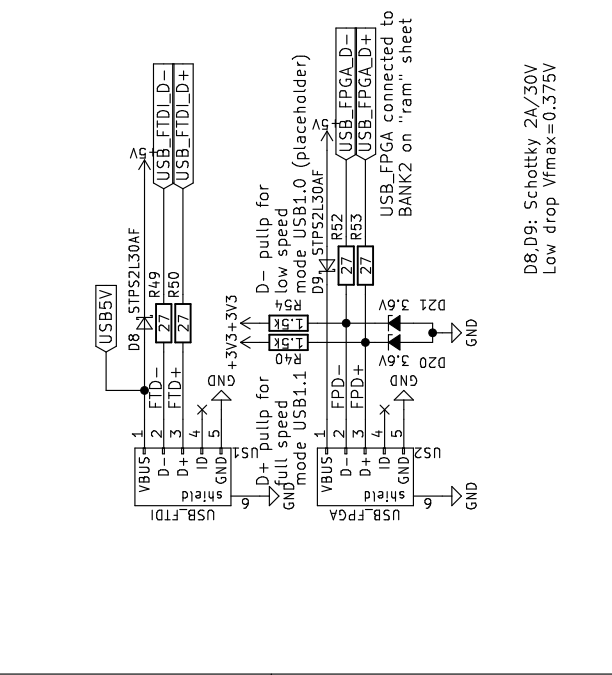
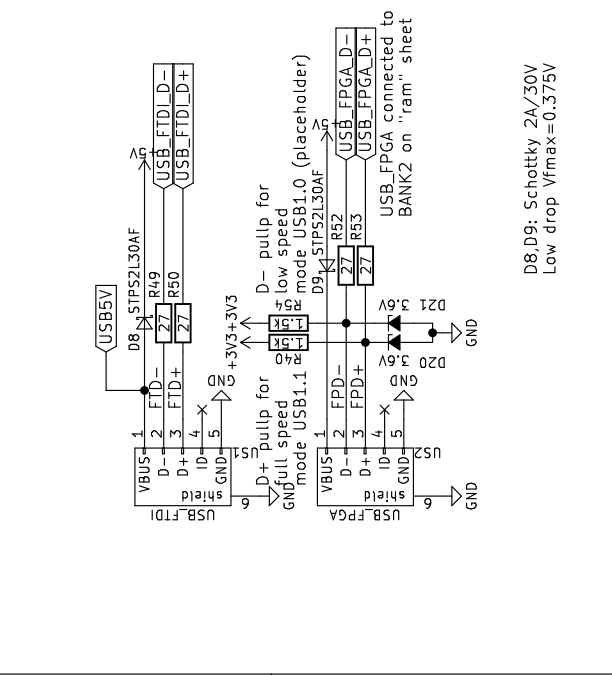
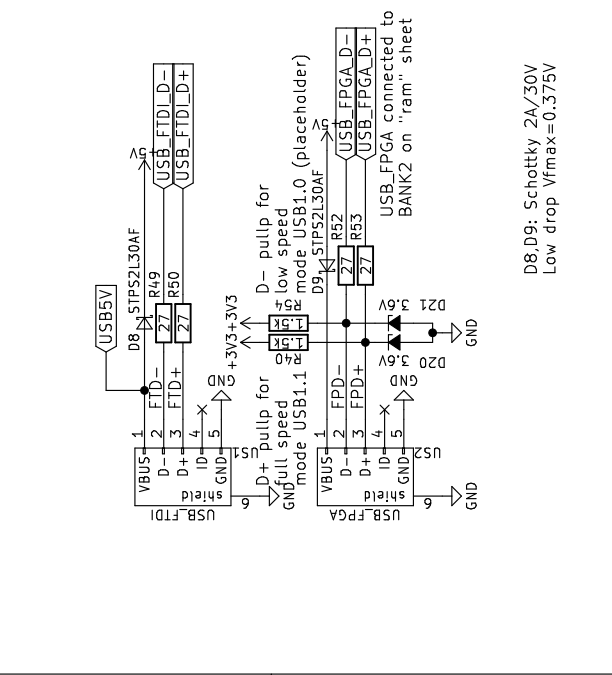
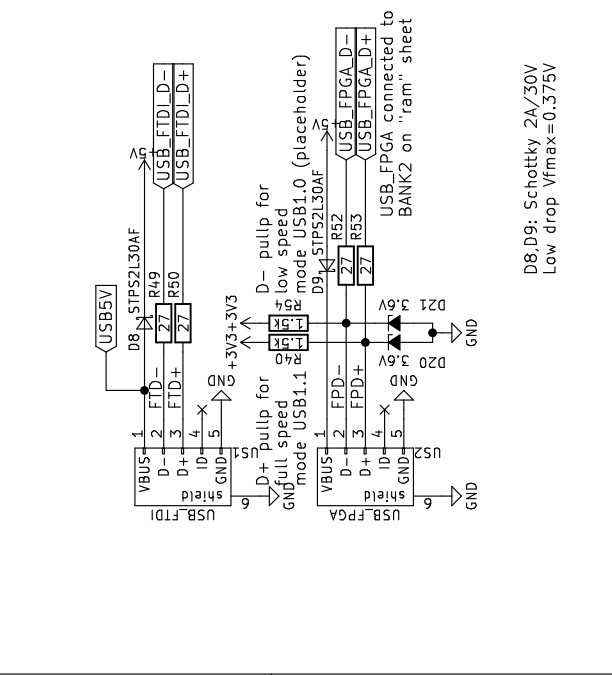
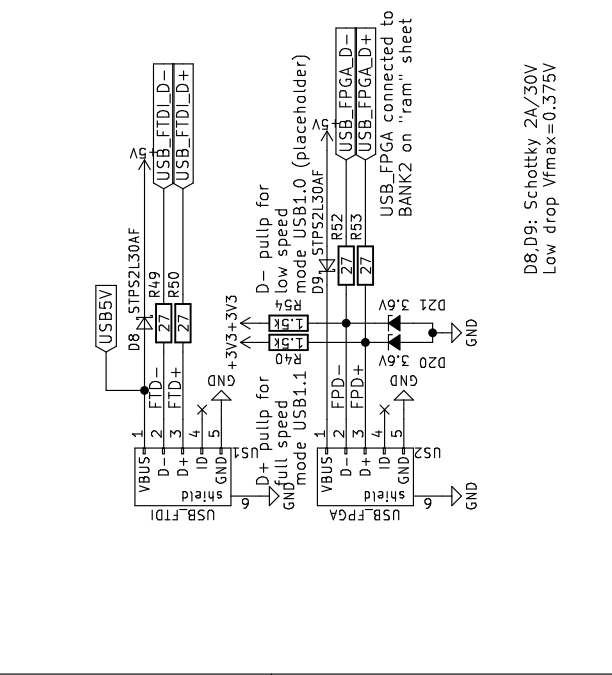
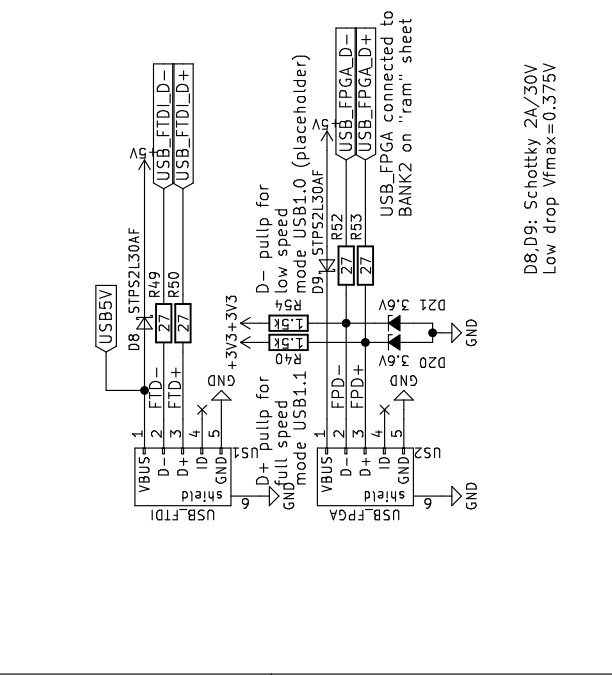
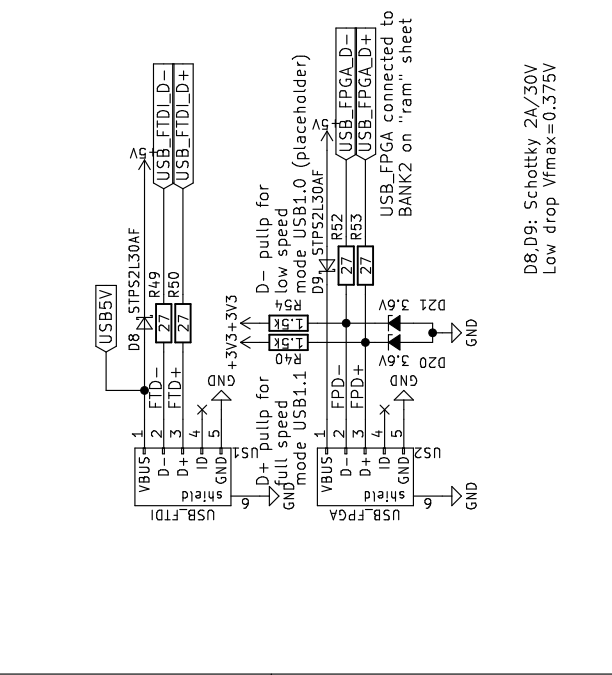
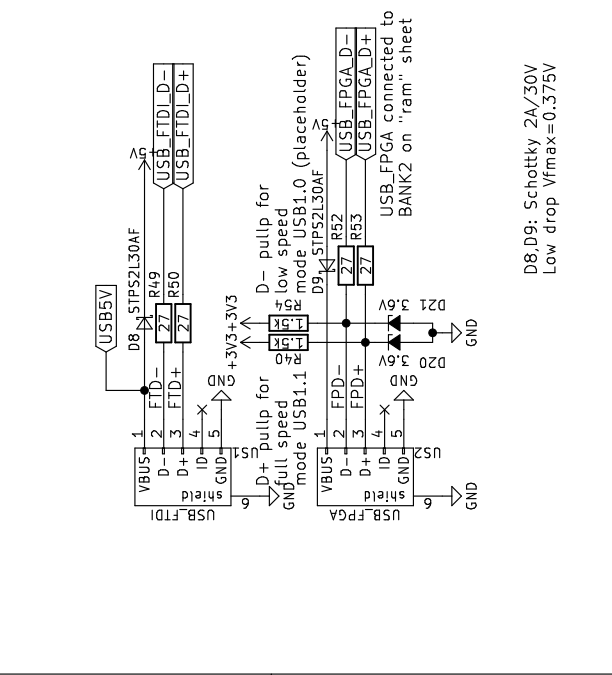
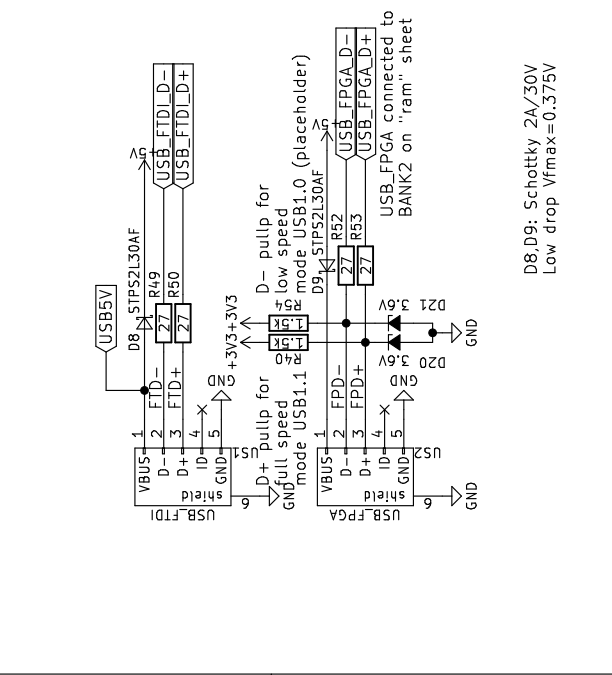
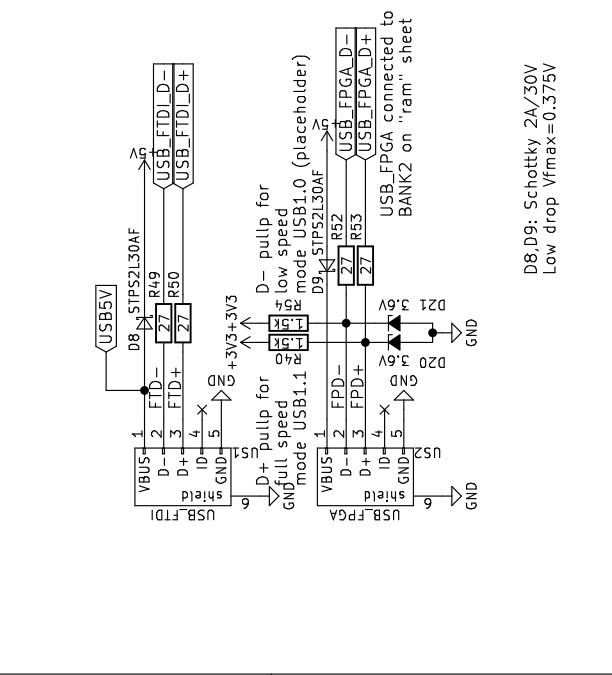
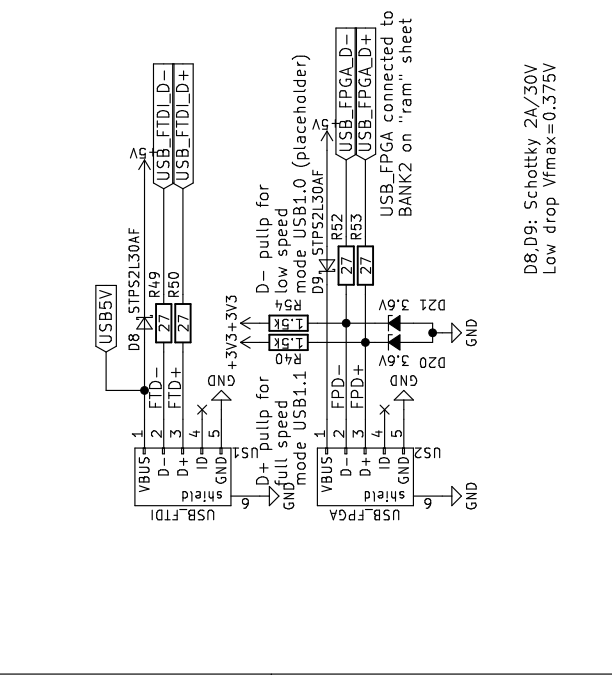
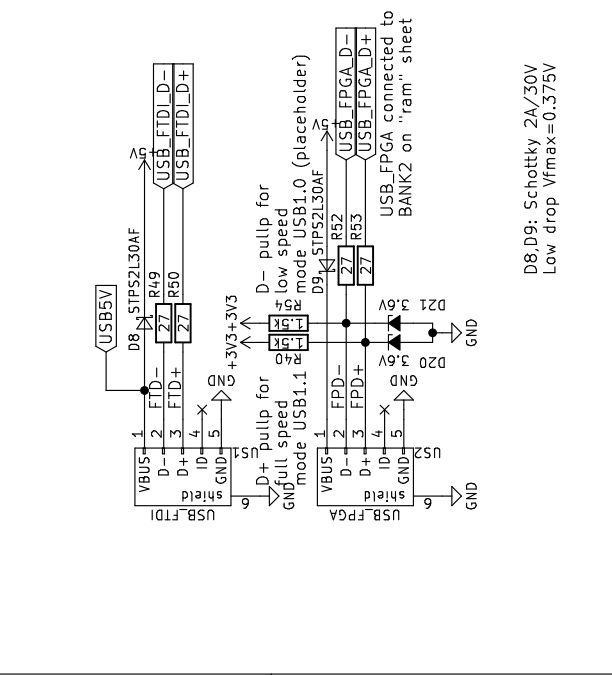
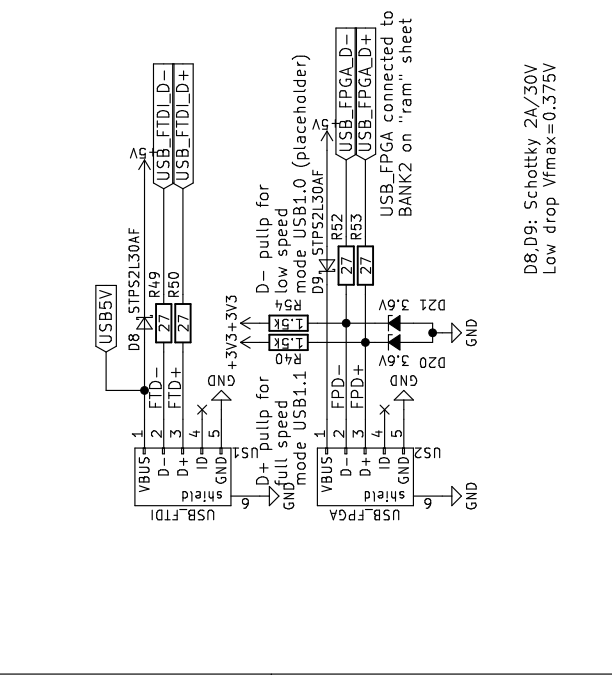
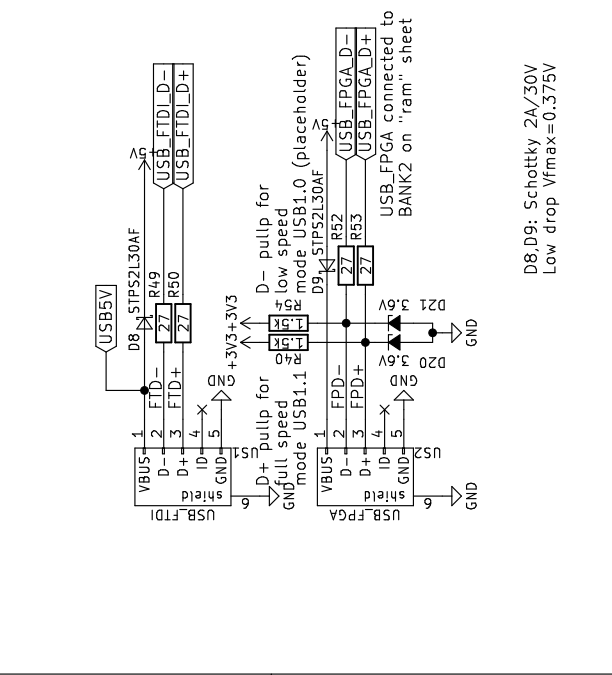
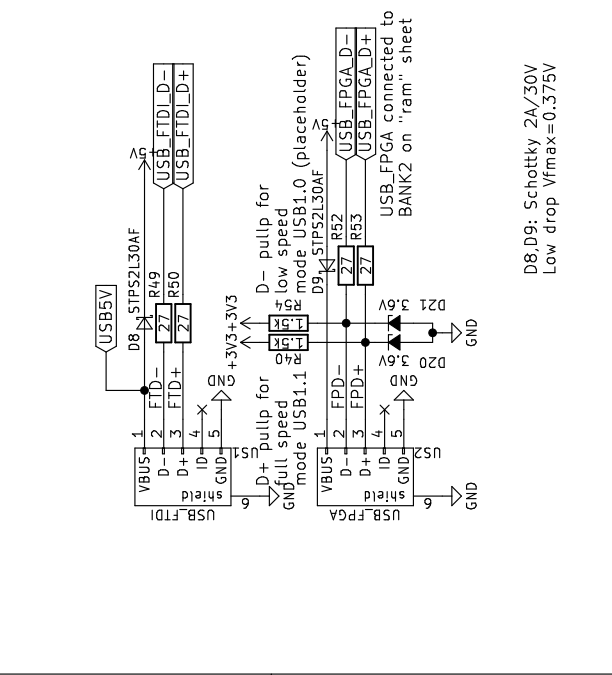
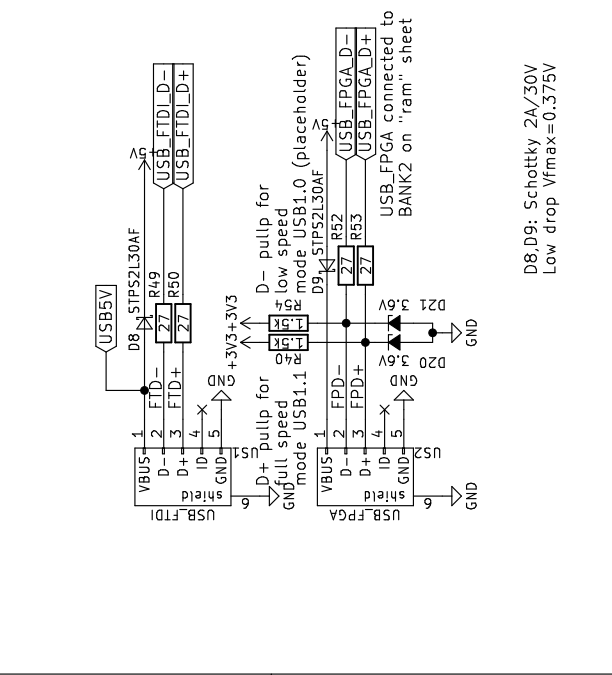
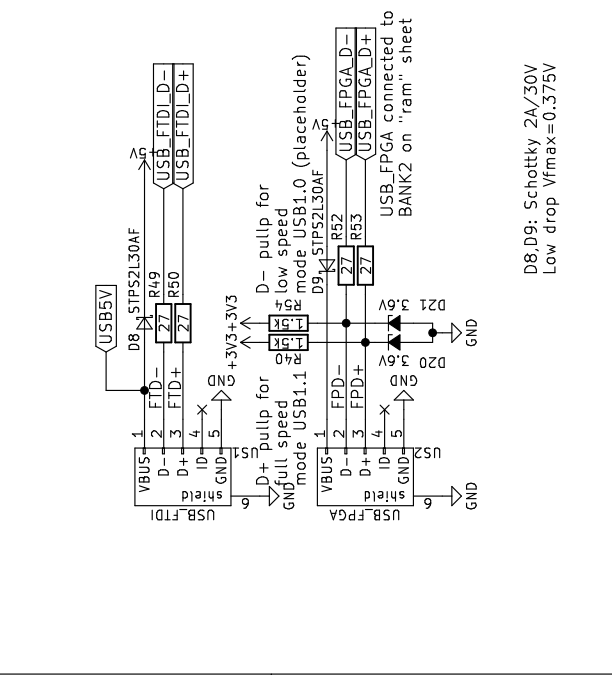
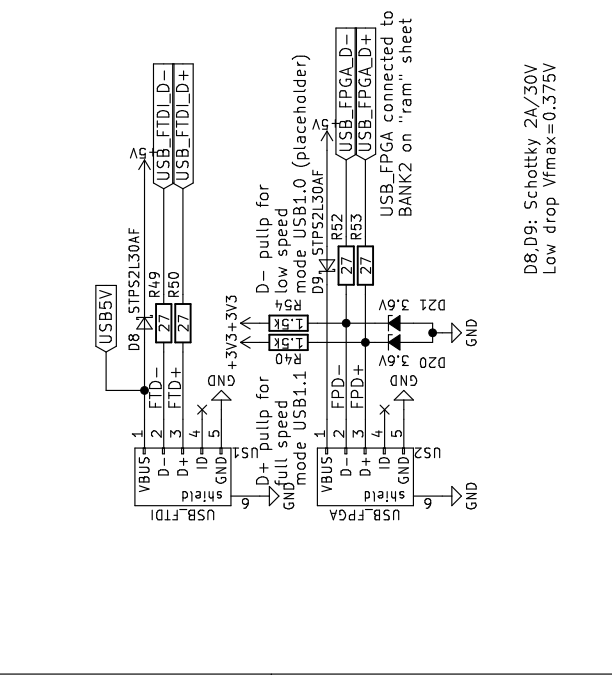
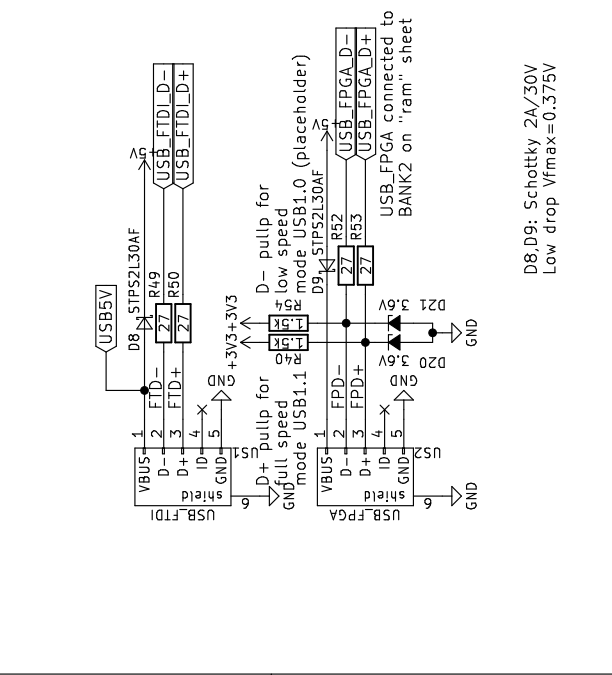
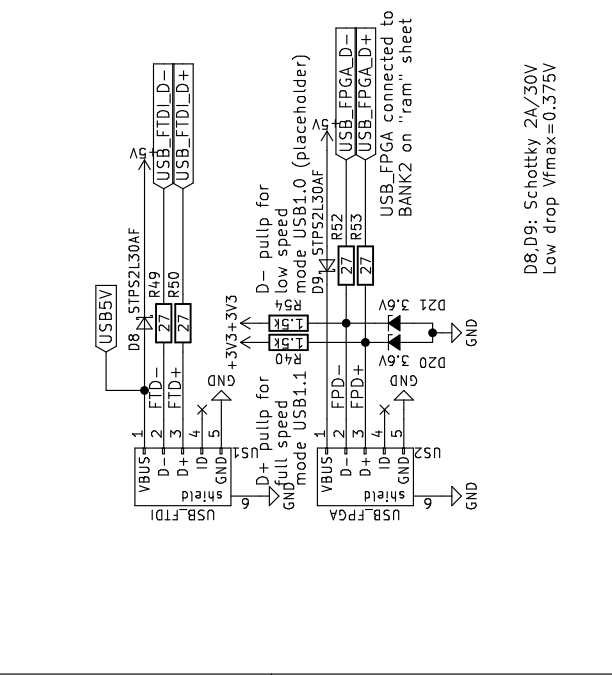
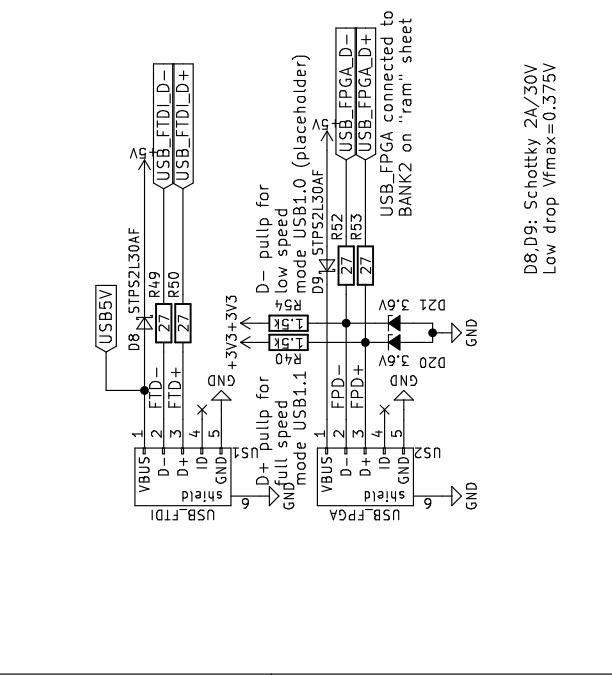
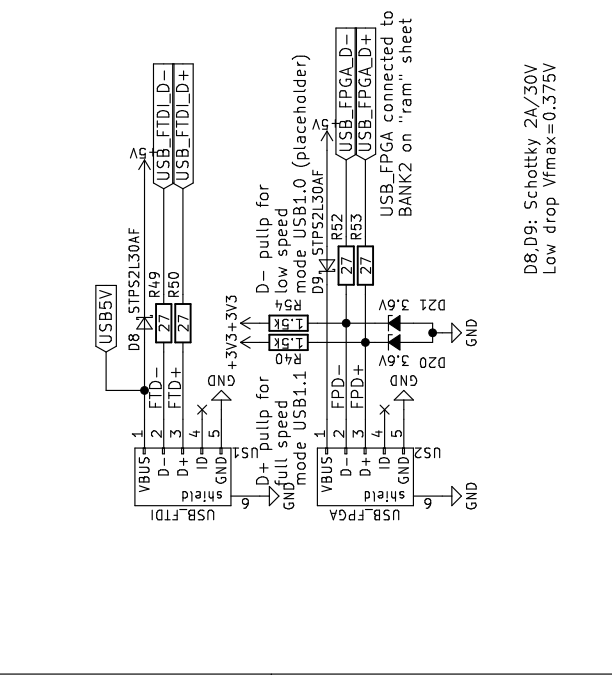
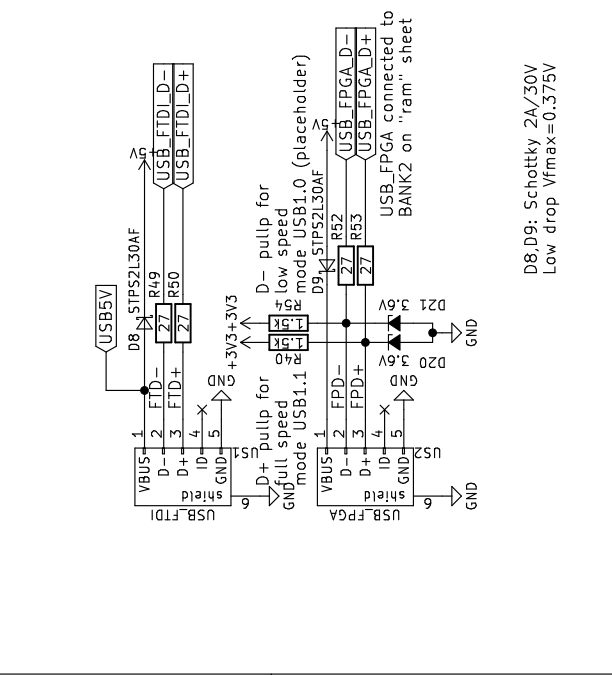
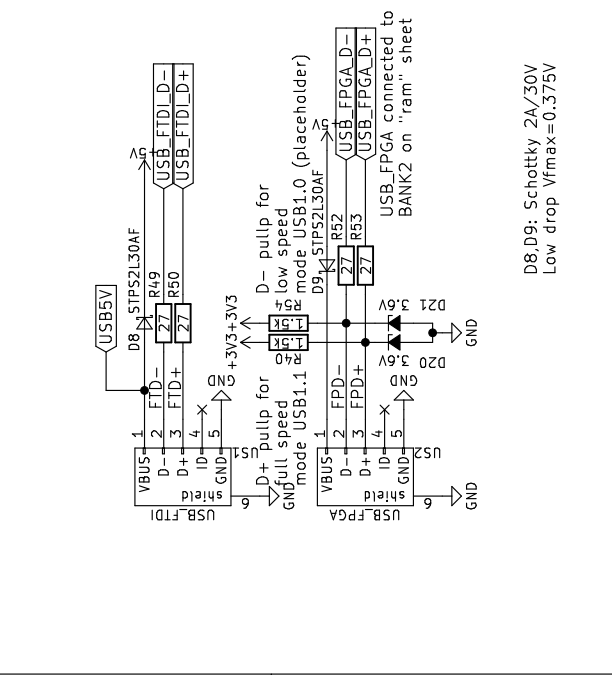


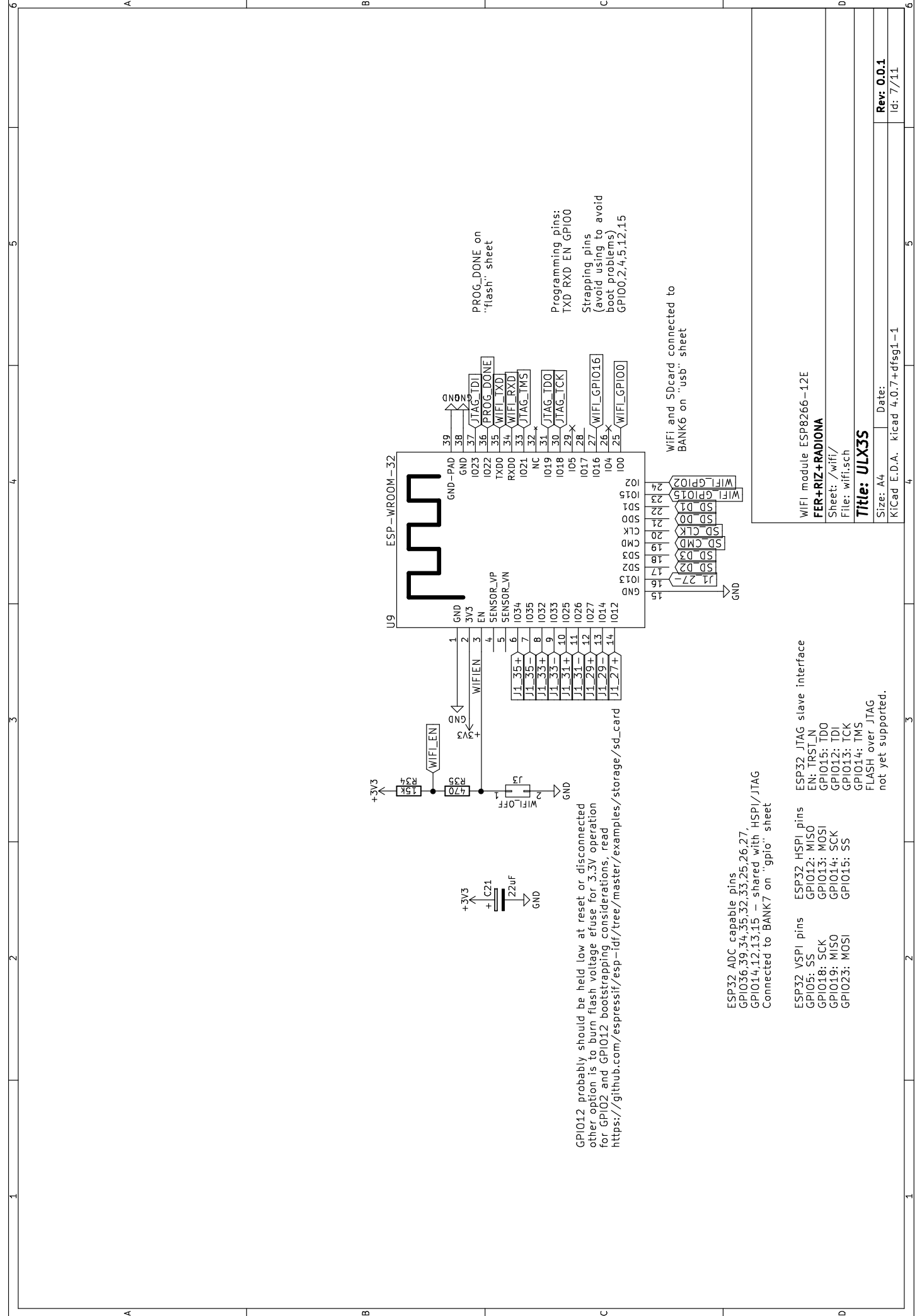
warning:
 ULX3S has different pinout for simpler PCB routing and because FT230X has weak CTS drive capability. (Undocumented, FLEAPga mail from 13-Nov-2015)
 ULX2S pinout was:
 TCK = DSR
 TMS = RI
 TDI = CTS
 TDO = DCD

Short circuit R56 for chip rev A,B,C workaround in TN140_FT231X Errata



D8,D9: Schottky 2A/30V
 Low drop V_{fmax}=0.375V





GPIO12 probably should be held low at reset or disconnected other option is to burn flash voltage efuse for 3.3V operation for GPIO2 and GPIO12 bootstrapping considerations, read https://github.com/espressif/esp-idf/tree/master/examples/storage/sd_card

ESP32 ADC capable pins
 GPIO36,39,34,35,32,35,25,26,27,
 GPIO14,12,13,15 - shared with HSPi/JTAG
 Connected to BANK7 on "gpio" sheet

ESP32 VSPi pins
 GPIO5: SS
 GPIO18: SCK
 GPIO19: MISO
 GPIO23: MOSI

ESP32 JTAG slave interface
 EN: TRST_N
 GPIO15: TDO
 GPIO12: TDI
 GPIO13: TCK
 GPIO14: TMS
 FLASH over JTAG
 not yet supported.

WiFi module ESP8266-12E
FER+RIZ+RADIONA
 Sheet: /wifi/
 File: wifi.sch

Title: ULX3S

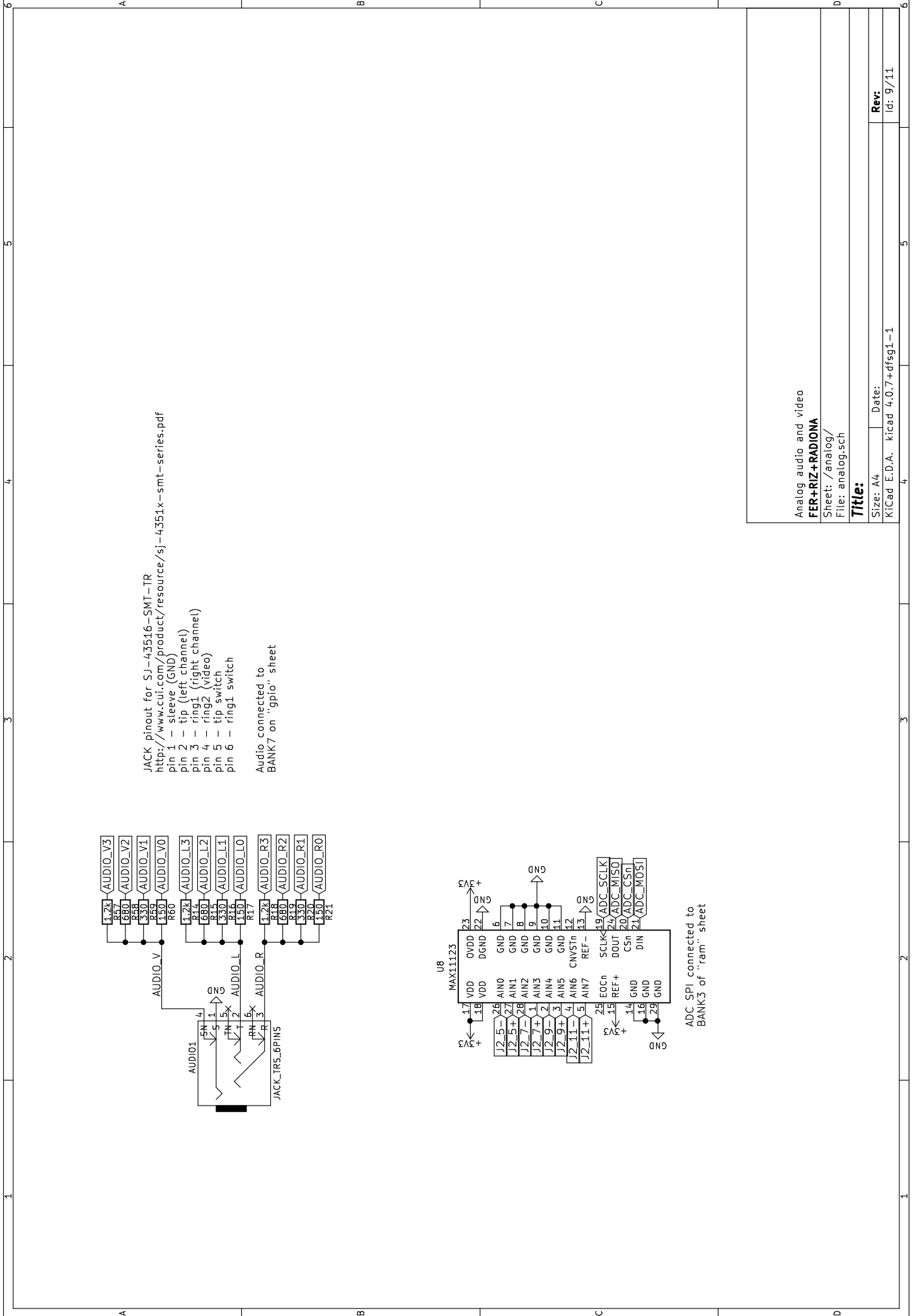
Size: A4 Date:
 KiCad E.D.A. kicad 4.0.7+dfsg1-1

Rev. 0.0.1
 Id: 77/11

PROG_DONE on
 "flash" sheet

Programming pins:
 TXD RXD EN GPIO0
 Strapping pins
 (avoid using to avoid
 boot problems)
 GPIO0,2,4,5,12,15

WiFi and SDcard connected to
 BANK6 on "usb" sheet



JACK pinout for SJ-43516-SMT-TR
<http://www.cui.com/product/resource/sj-4351x-smt-series.pdf>
 pin 1 - sleeve (GND)
 pin 2 - tip (left channel)
 pin 3 - ring1 (right channel)
 pin 4 - ring2 (video)
 pin 5 - tip switch
 pin 6 - ring1 switch

Audio connected to
 BANK7 on "gpio" sheet

ADC SPI connected to
 BANK3 of "ram" sheet

Analog audio and video
FER+RIZ+RADIONA

Sheet: /analog/
 File: analog.sch

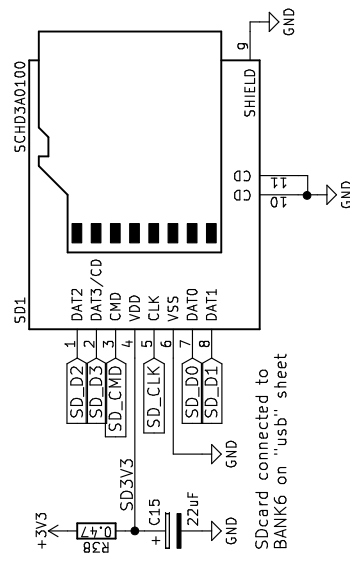
Title:

Size: A4 Date:

KiCad E.D.A. kicad 4.0.7+dfsg1-1

Rev:

Id: 9/11



minimum pins for compatible mode
SD_CLK, SD_CMD, SD_D0, SD_D3

SD card
FER+RIZ+RADIONA

Sheet: /sdcard/
File: sdcard.sch

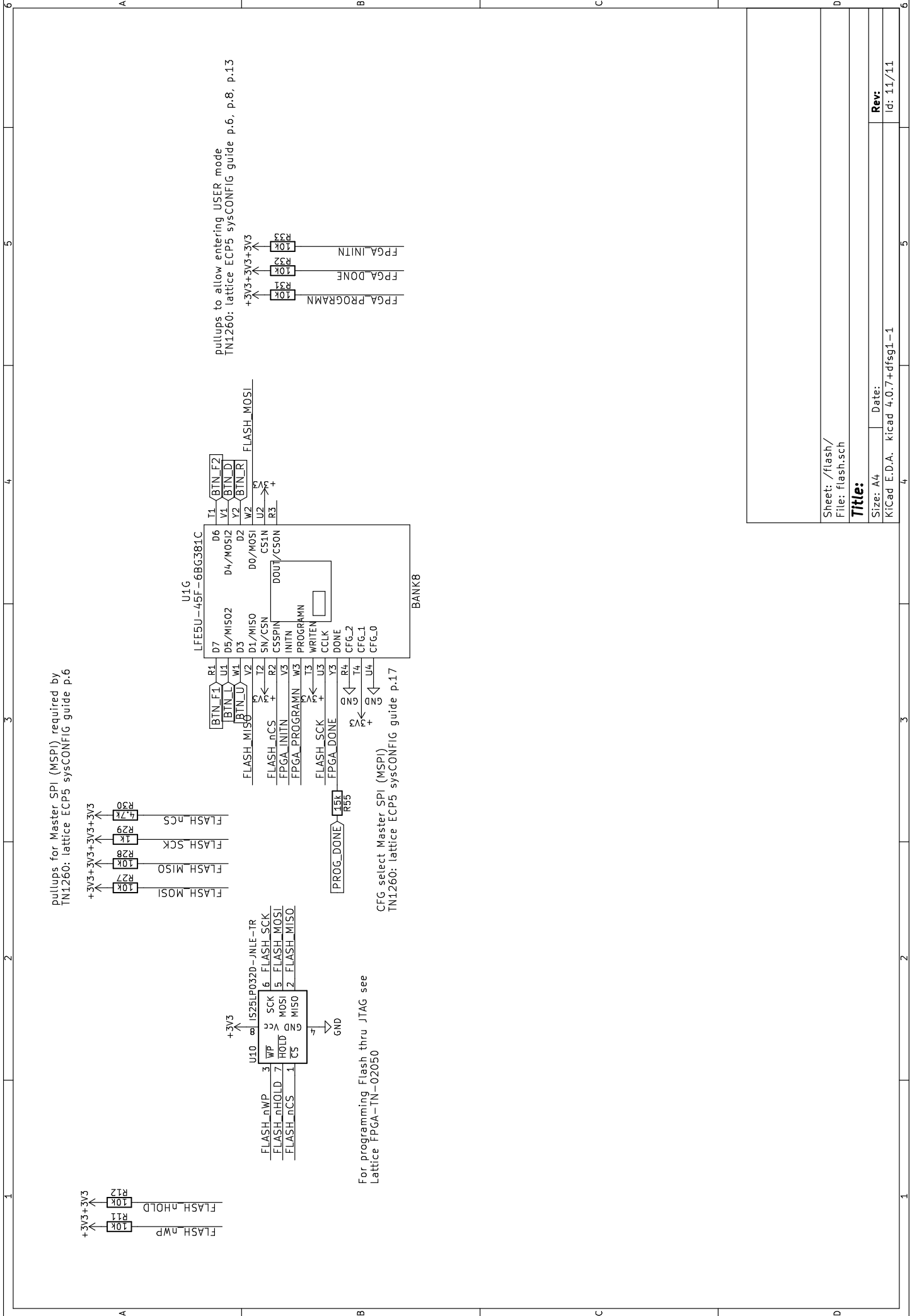
Title: ULX3S

Size: A4 Date:

KiCad E.D.A. kicad 4.0.7+dfsg1-1

Rev: 0.0.1

Id: 10/11



pullups for Master SPI (MSPi) required by TN1260: lattice ECP5 sysCONFIG guide p.6

pullups to allow entering USER mode TN1260: lattice ECP5 sysCONFIG guide p.6, p.8, p.13

For programming Flash thru JTAG see Lattice FPGA-IN-02050

CFG select Master SPI (MSPi) TN1260: lattice ECP5 sysCONFIG guide p.17

Sheet: /flash/
File: flash.sch
Title:
Size: A4 Date:
KICad E.D.A. kicad 4.0.7+dfsg1-1

Rev:
Id: 11/11