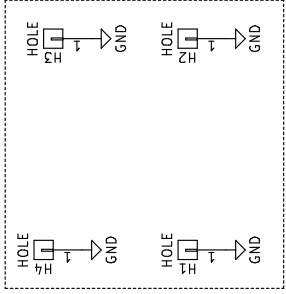
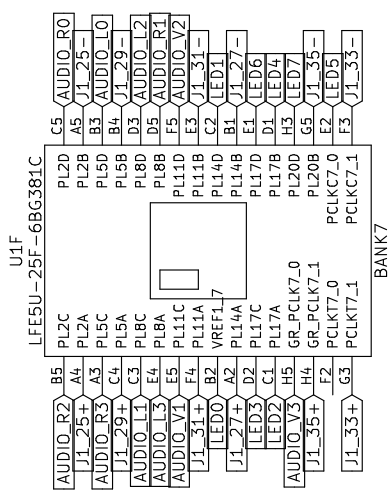
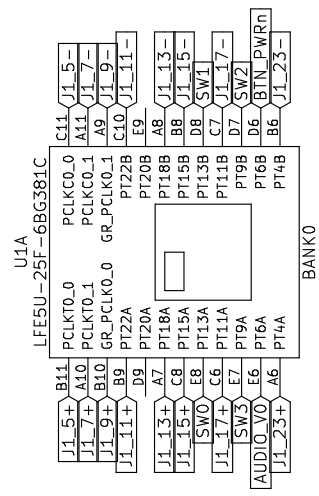
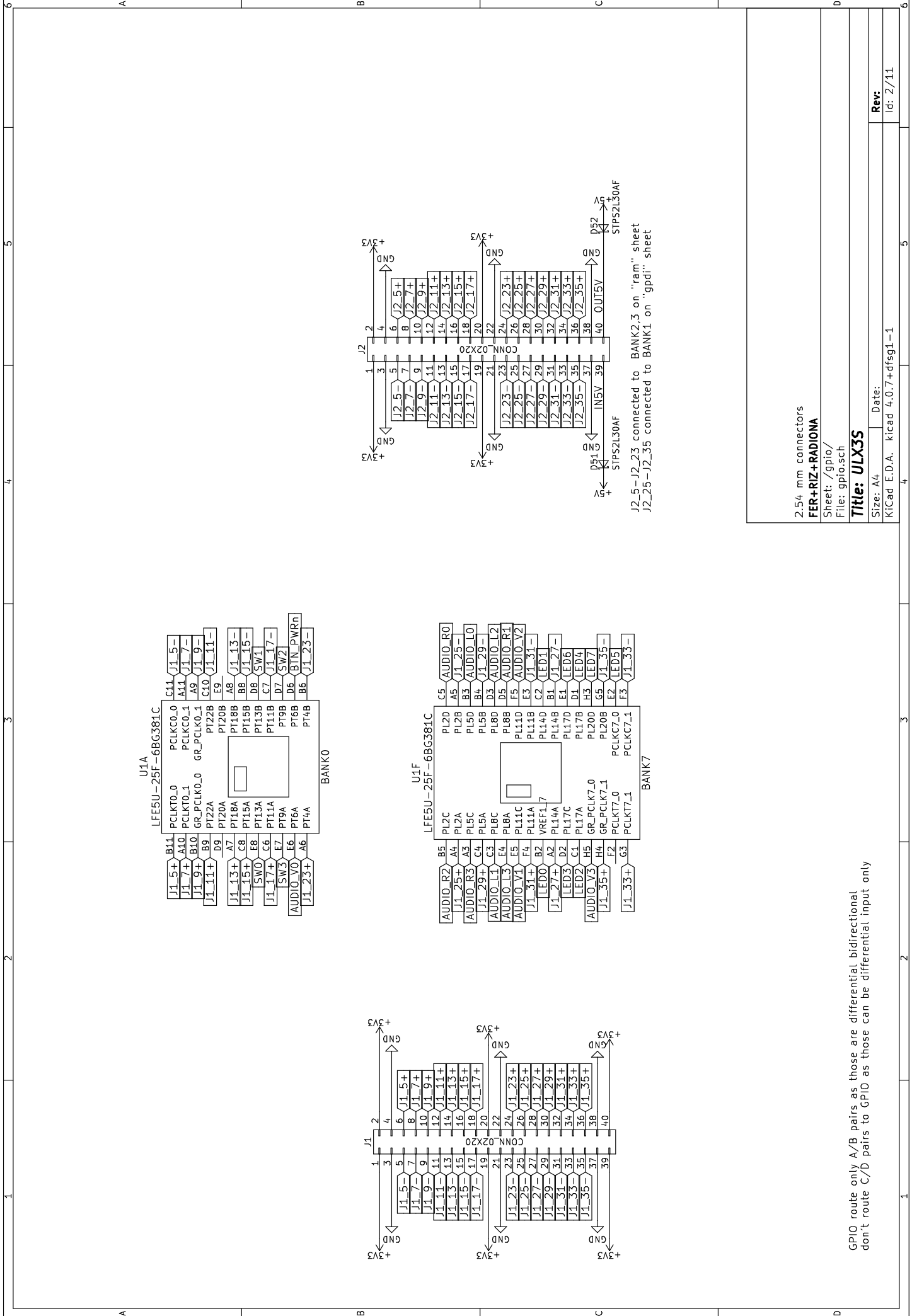


A	A	B	C	D
1			<p>click on mouse pointer arrow on top of right toolbar and double-click on sheet to open</p> <p>Sheet: power_ Sheet: usb Sheet: blinky Sheet: ram Sheet: sdcard</p> <p>File: power.sch File: usb.sch File: blinky.sch File: ram.sch File: sdcard.sch</p> <p>Sheet: gpio Sheet: gpd1 Sheet: analog Sheet: wifi Sheet: flash</p> <p>File: gpio.sch File: gpd1.sch File: analog.sch File: wifi.sch File: flash.sch</p>	<p>Root sheet</p> <p>FER+RIZ+RADIONA</p> <p>Sheet: /</p> <p>File: ulx3s.sch</p> <p>Title: ULX3S</p> <p>Size: A4 Date:</p> <p>KiCad E.D.A. kicad 4.0.7+dfsg1-1 Rev: 0.0.1</p> <p>Id: 1/11</p>
2				
3				
4				
5				
6				



J2_5-J2_23 connected to BANK2_3 on "ram" sheet
 J2_25-J2_35 connected to BANK1 on "gpd" sheet

2.54 mm connectors
FER+RIZ+RADIONA

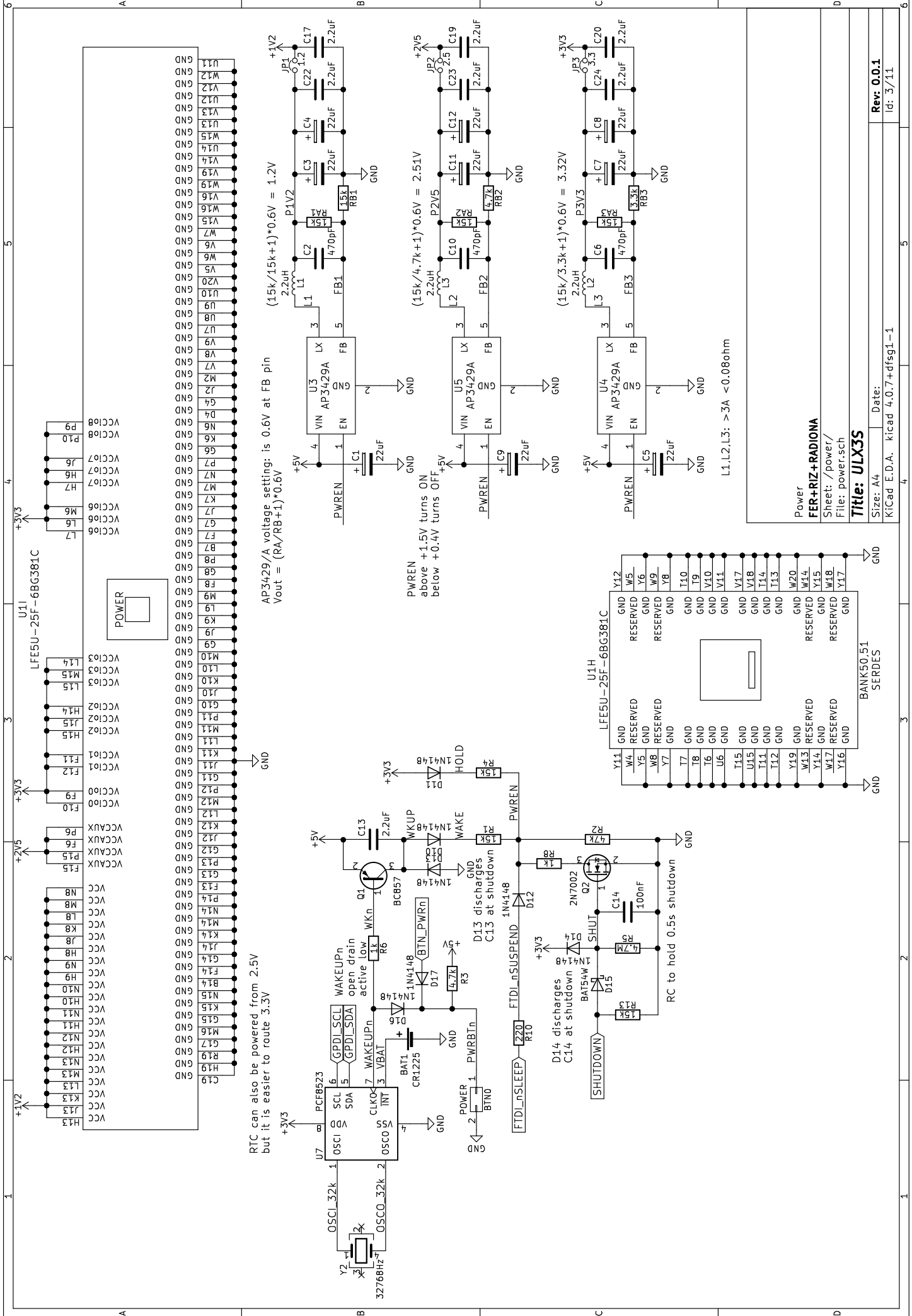
Sheet: /gpio/
 File: gpio.sch

Title: ULX3S

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

GPIO route only A/B pairs as those are differential, bidirectional
 don't route C/D pairs to GPIO as those can be differential input only

Rev:
 Id: 2/11



RTC can also be powered from 2.5V but it is easier to route 3.3V

AP3429/A voltage setting: is 0.6V at FB pin
 $V_{out} = (RA/RB+1) \cdot 0.6V$

$$(15k/15k+1) \cdot 0.6V = 1.2V$$

PWREN above +1.5V turns ON
 below +0.4V turns OFF

$$(15k/4.7k+1) \cdot 0.6V = 2.51V$$

$$(15k/3.3k+1) \cdot 0.6V = 3.32V$$

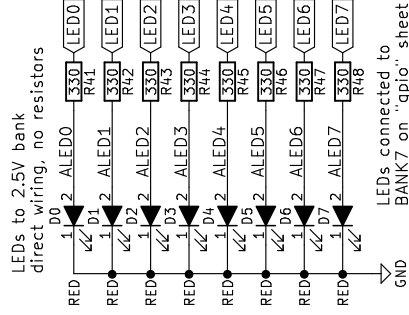
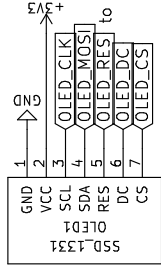
L1, L2, L3: >3A <0.08ohm

Power
FER+RIZ+RADIONA
 Sheet: /power/
 File: power.sch

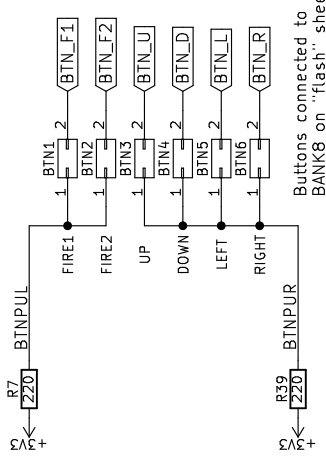
Title: ULX3S

Size: A4 Date: Rev: 0.0.1
 KiCad E.D.A. kicad 4.0.7+dfsg1-1 Id: 3/11

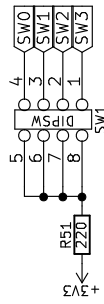
SSD1306 B/W or SSD1331 COLOR
compatible OLED 0.96" or 1.3" PCB
1.4x1.4 units
1 unit = 2.54 mm



LEDs to 2.5V bank
direct wiring, no resistors

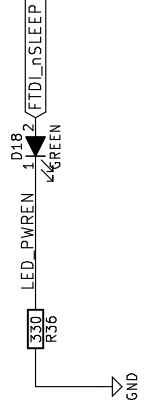


Buttons connected to
BANK8 on "flash" sheet



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



Buttons, LEDs, OLED display

FER+RIZ+RADIONA

Sheet: /blinky/
File: blinky.sch

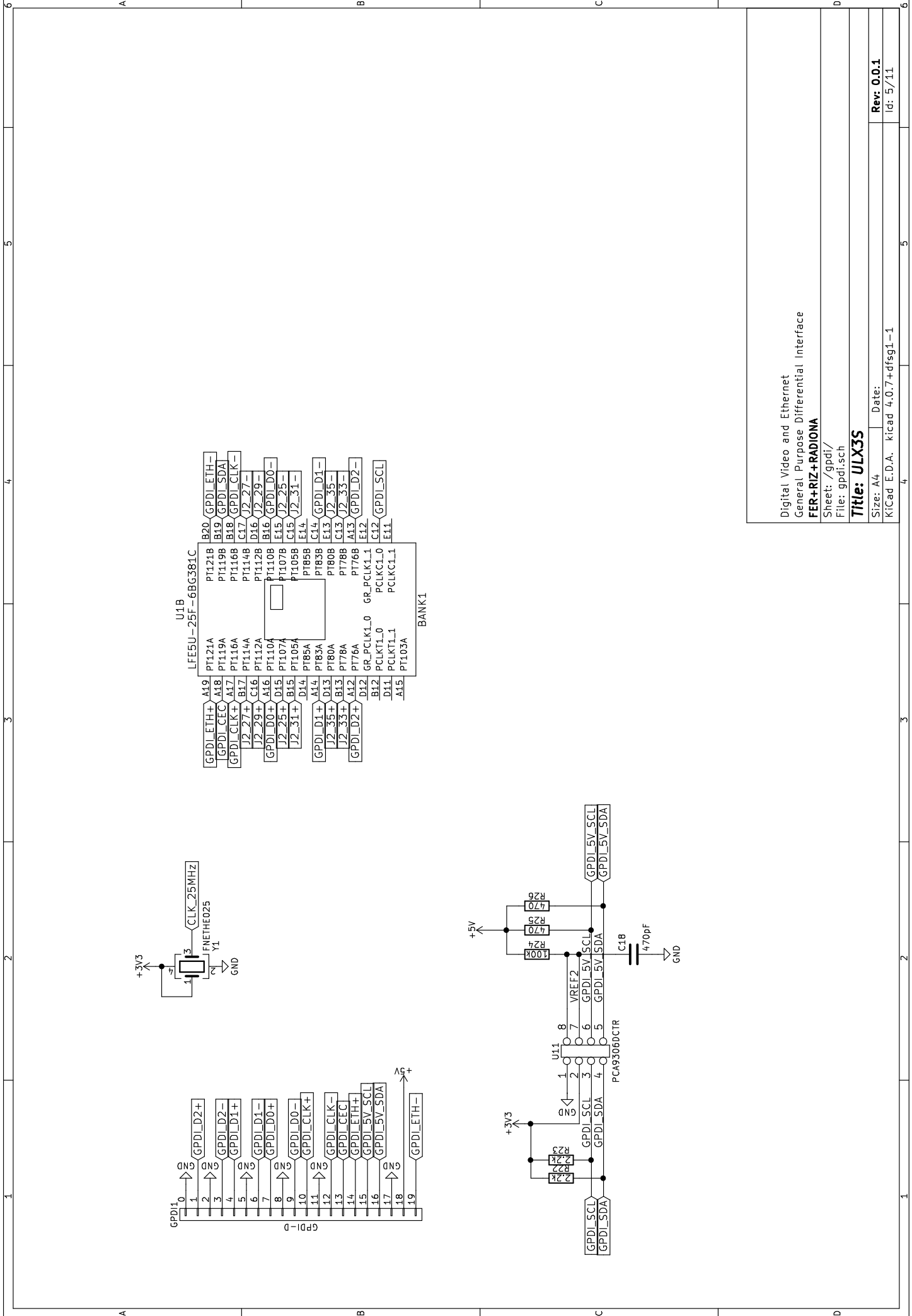
Title: ULX3S

Size: A4 Date:

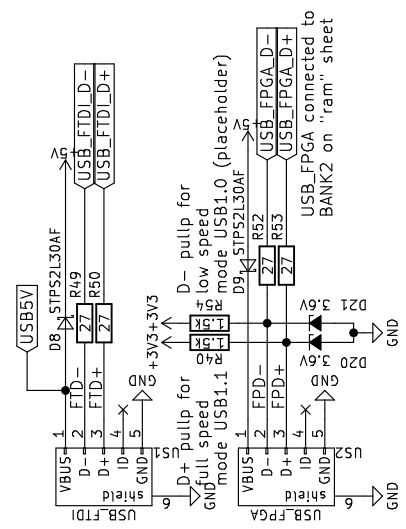
KiCad E.D.A. kicad 4.0.7+dfsg1-1

Rev: 0.0.1

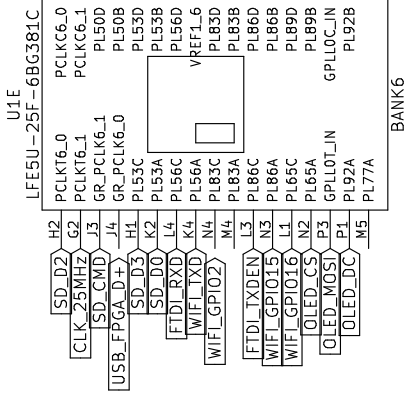
Id: 4/11



Digital Video and Ethernet
 General Purpose Differential Interface
FER+RIZ+RADIONA
 Sheet: /gpd/
 File: gpd1.sch
Title: ULX3S
 Size: A4 | Date:
 KiCad E.D.A. kicad 4.0.7+dfsg1-1

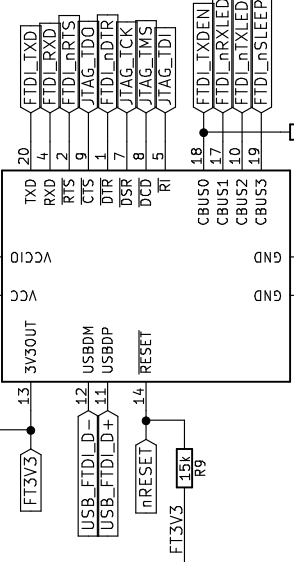


D8,D9: Schottky 2A/30V
Low drop V_{fmax}=0.375V



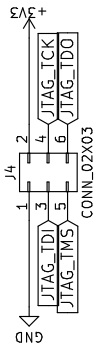
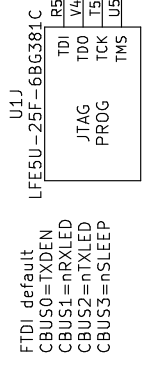
WiFi programming pins:
TXD RXD RTS DIR

VNC2 programming pins:
TXD RXD TXDEN

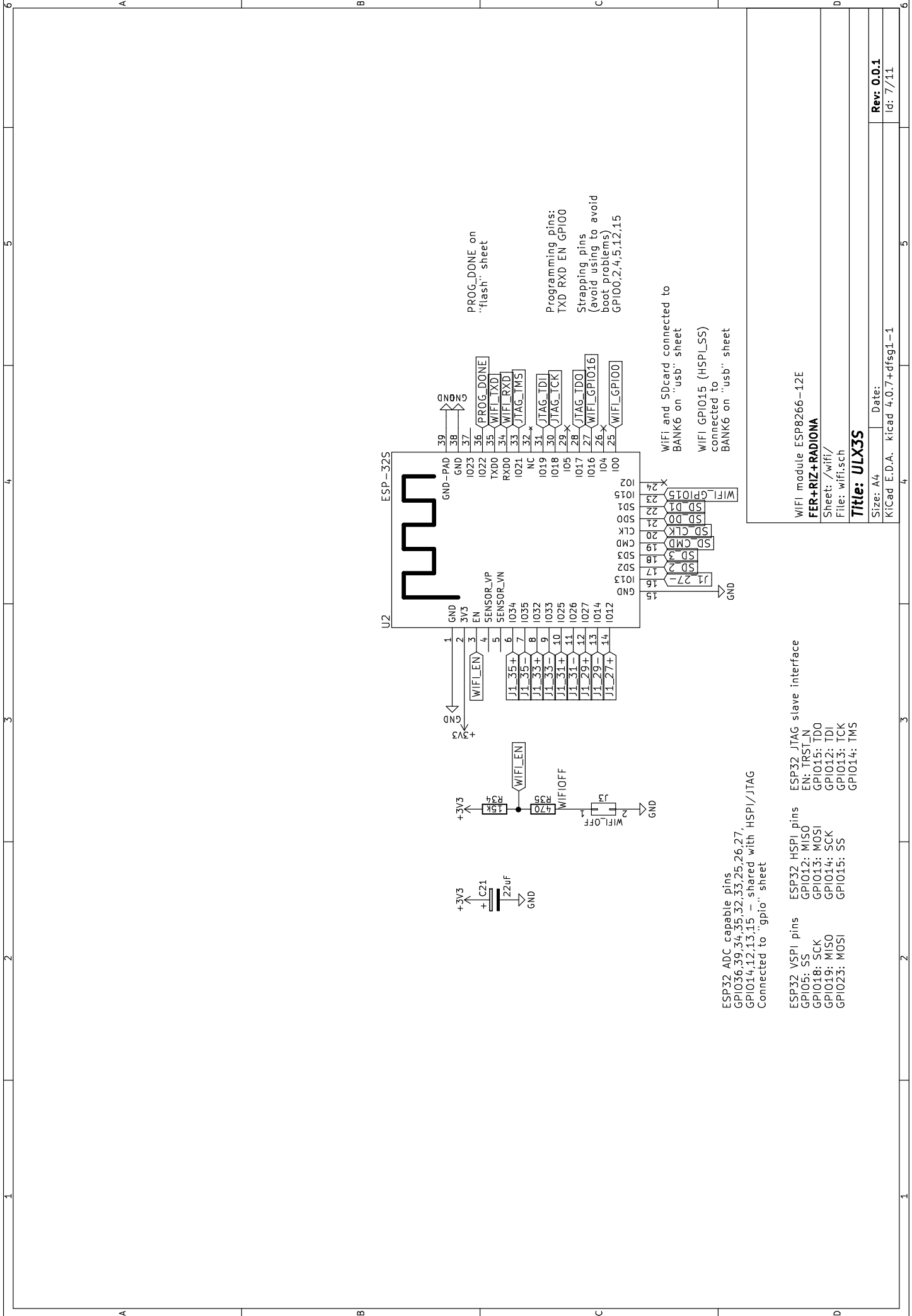


Short circuit R56
for chip rev A,B,C
workaround in
TN140_FT232RL Errata

warning:
ULX35 has different pinout
for simpler PCB routing and
because FT230X has weak CTS
drive capability. (Undocumented,
FLEApga mail from 13-Nov-2015)
ULX25 pinout was:
TCK = DSR
TMS = RI
TDI = CTS
TDO = DCD



Root sheet
FER+RIZ+RADIONA
Sheet: /usb/
File: usb.sch
Title: ULX35
Size: A4 Date:
KiCad E.D.A. kicad 4.0.7+dfsg1-1
Rev: 0.0.1
Id: 6/11



ESP32 ADC capable pins
 GPIO36,39,34,35,32,33,25,26,27,
 GPIO14,12,13,15 - shared with HSPi/JTAG
 Connected to "gpio" sheet

ESP32 VSPi pins
 GPIO5: SS
 GPIO12: MISO
 GPIO13: MOSI
 GPIO19: MISO
 GPIO23: MOSI

ESP32 JTAG slave interface
 EN: TRST_N
 GPIO15: TDO
 GPIO12: TDI
 GPIO13: TCK
 GPIO14: TMS

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

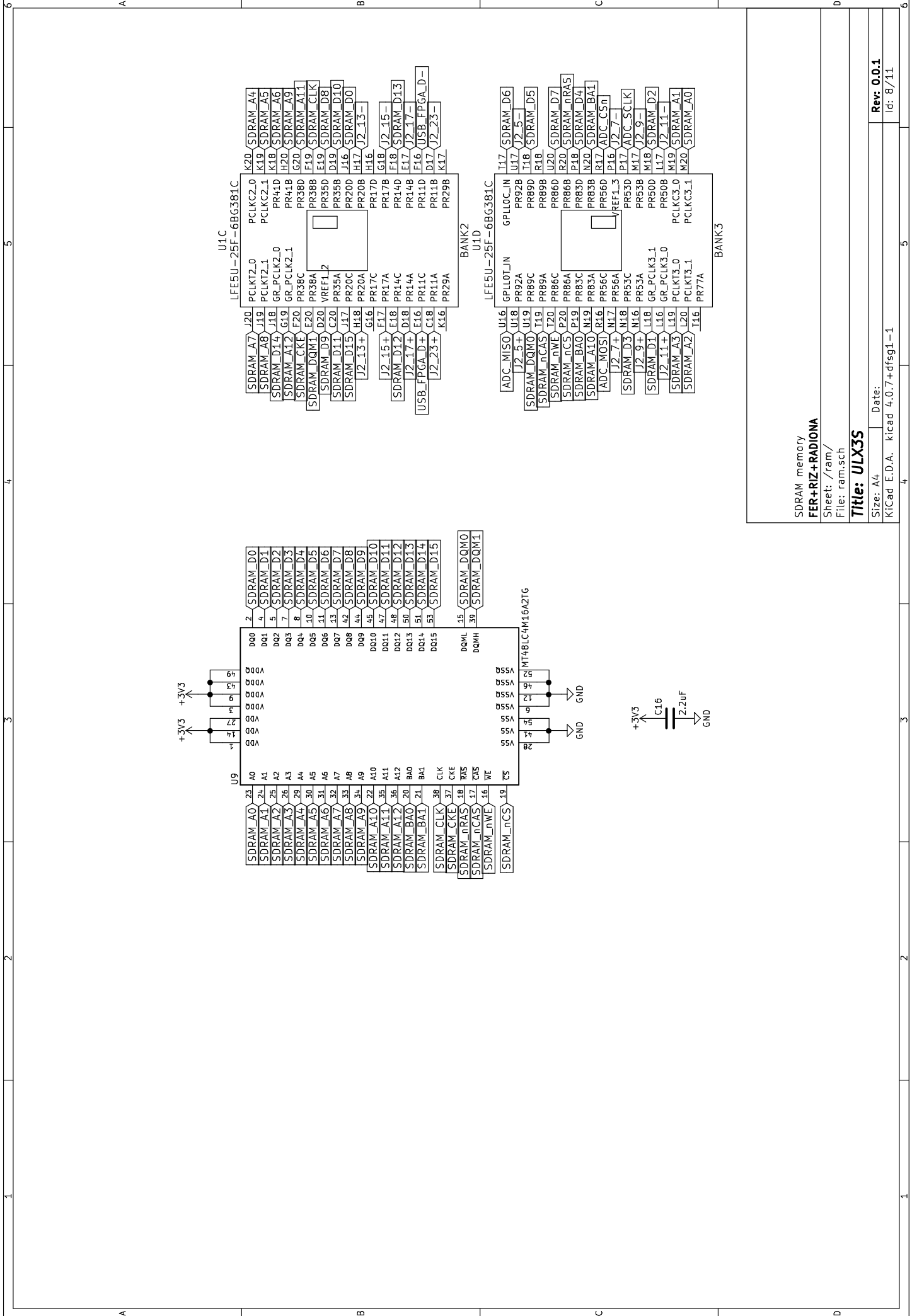
WiFi GPIO15 (HSPi_LSS)
 connected to
 BANK6 on "usb" sheet

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

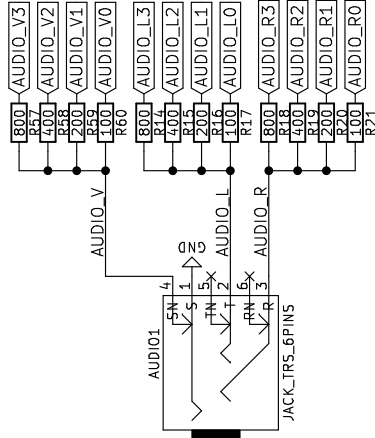
Title: ULX3S

Size: A4 Date:
 KiCad E.D.A. kicad 4.0.7+dfsg1-1
 Id: 77/11

Rev: 0.0.1
 Id: 77/11

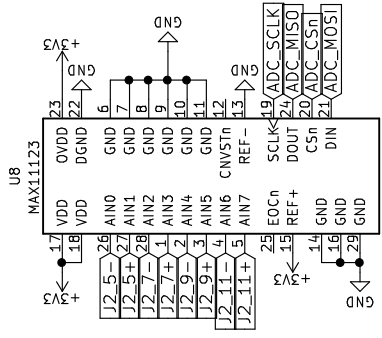


SDRAM memory
FER+RIZ+RADIONA
 Sheet: /ram/
 File: ram.sch
Title: ULX3S
 Size: A4 Date:
 KiCad E.D.A. kicad 4.0.7+dfsg1-1
 Rev: 0.0.1
 Id: B/11



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 and BANK0 on "gpio" sheet



ADC SPI connected to
 BANK3 of "ram" sheet

Analog audio and video

FER+RIZ+RADIONA

Sheet: /analog/

File: analog.sch

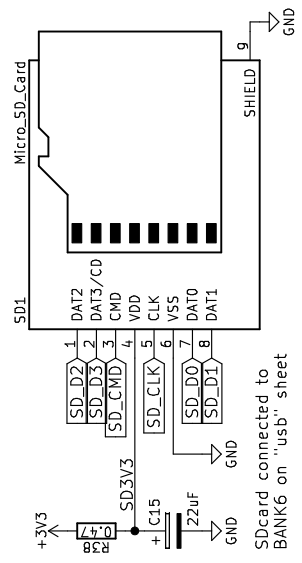
Title:

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

