

click on mouse pointer arrow on top of right toolbar
and double-click on sheet to open

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: gpd1	Sheet: analog	Sheet: wifi	Sheet: flash
File: gpio.sch	File: gpd1.sch	File: analog.sch	File: wifi.sch	File: flash.sch

Root sheet

EMARD

Sheet: /

File: ulx3s.sch

Title: ULX3S

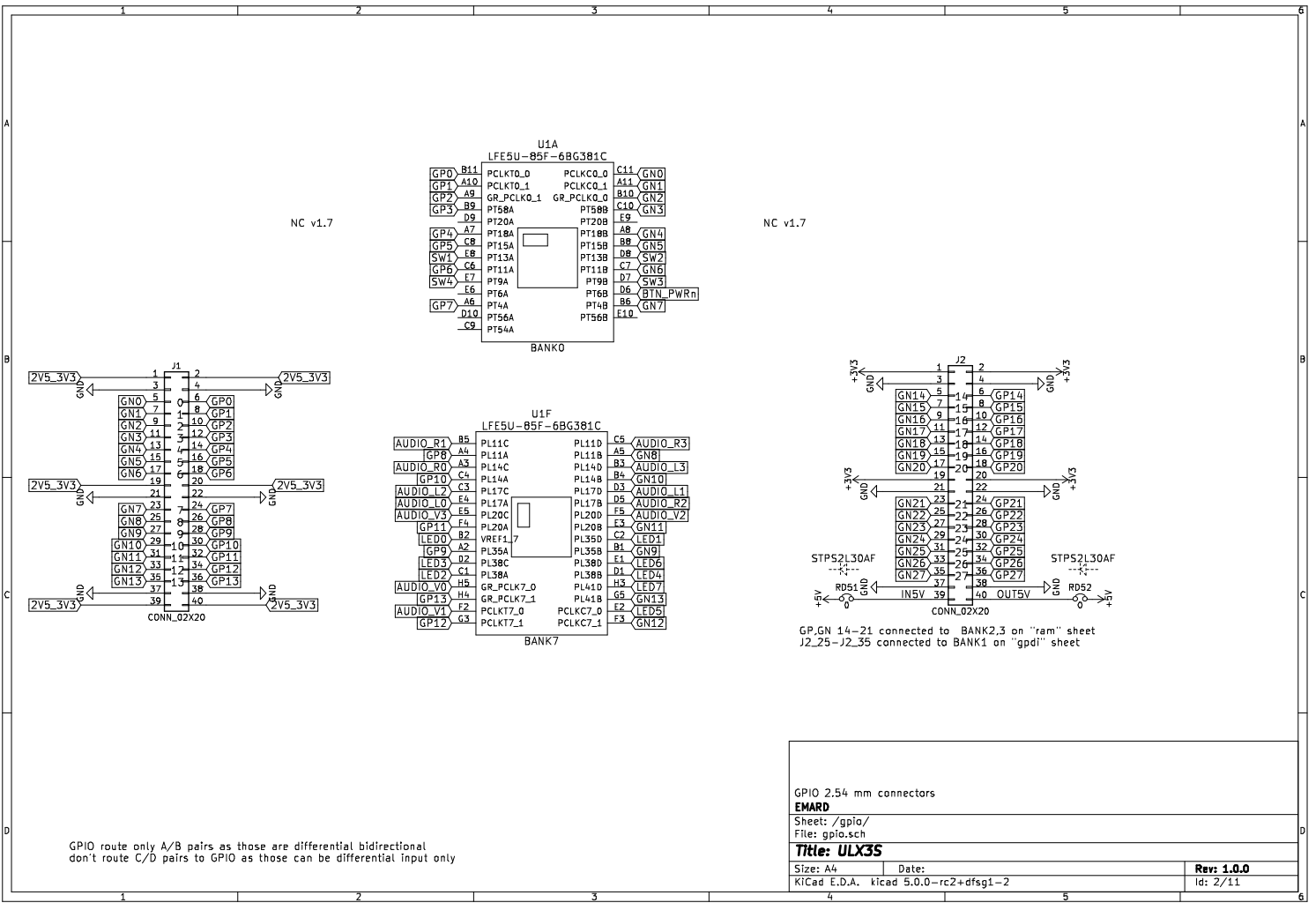
Size: A4

Date:

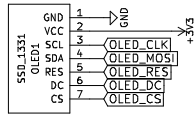
Rev: 1.8.11

KiCad E.D.A. kicad 5.0.0-rc2+dfsg1-2

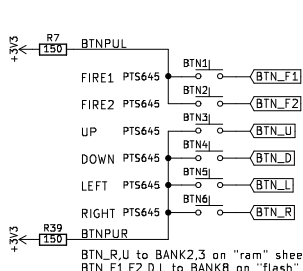
Id: 1/11



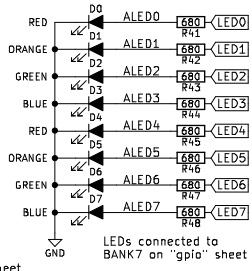
SSD1306 B/W or SSD1331 COLOR
compatible OLED 0.96" or 1.3" PCB
14x14 units
1 unit = 2.54 mm



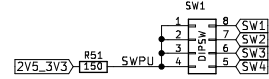
OLED connected to BANK6 on "usb" sheet



BTN_R,U to BANK2,3 on "ram" sheet
BTN_F1,F2,D,L to BANK8 on "flash" sheet

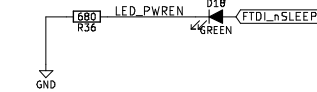


LEDs connected to BANK7 on "gpio" sheet



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



GPIO2 on PCB v1.7

Buttons, LEDs, OLED display

EMARD

Sheet: /blinky/

File: blinky.sch

Title: ULX3S

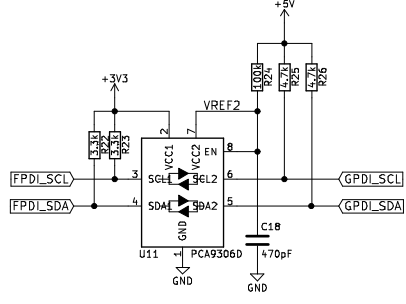
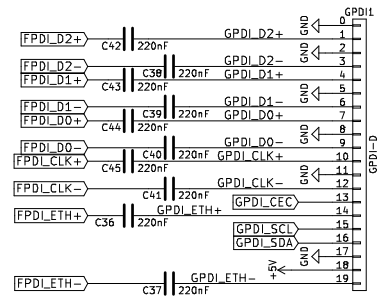
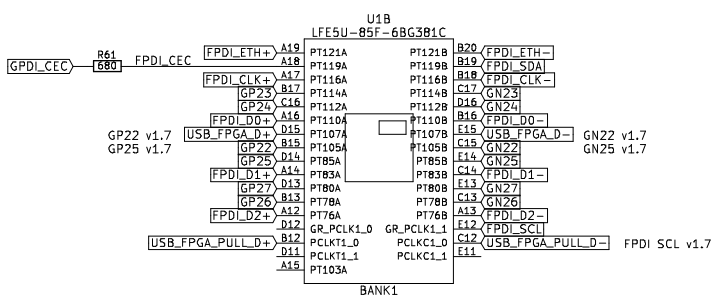
Size: A4

Date:

Rev: 1.0.0

KiCad E.D.A. kicad 5.0.0-rc2+dfsg1-2

Id: 4/11

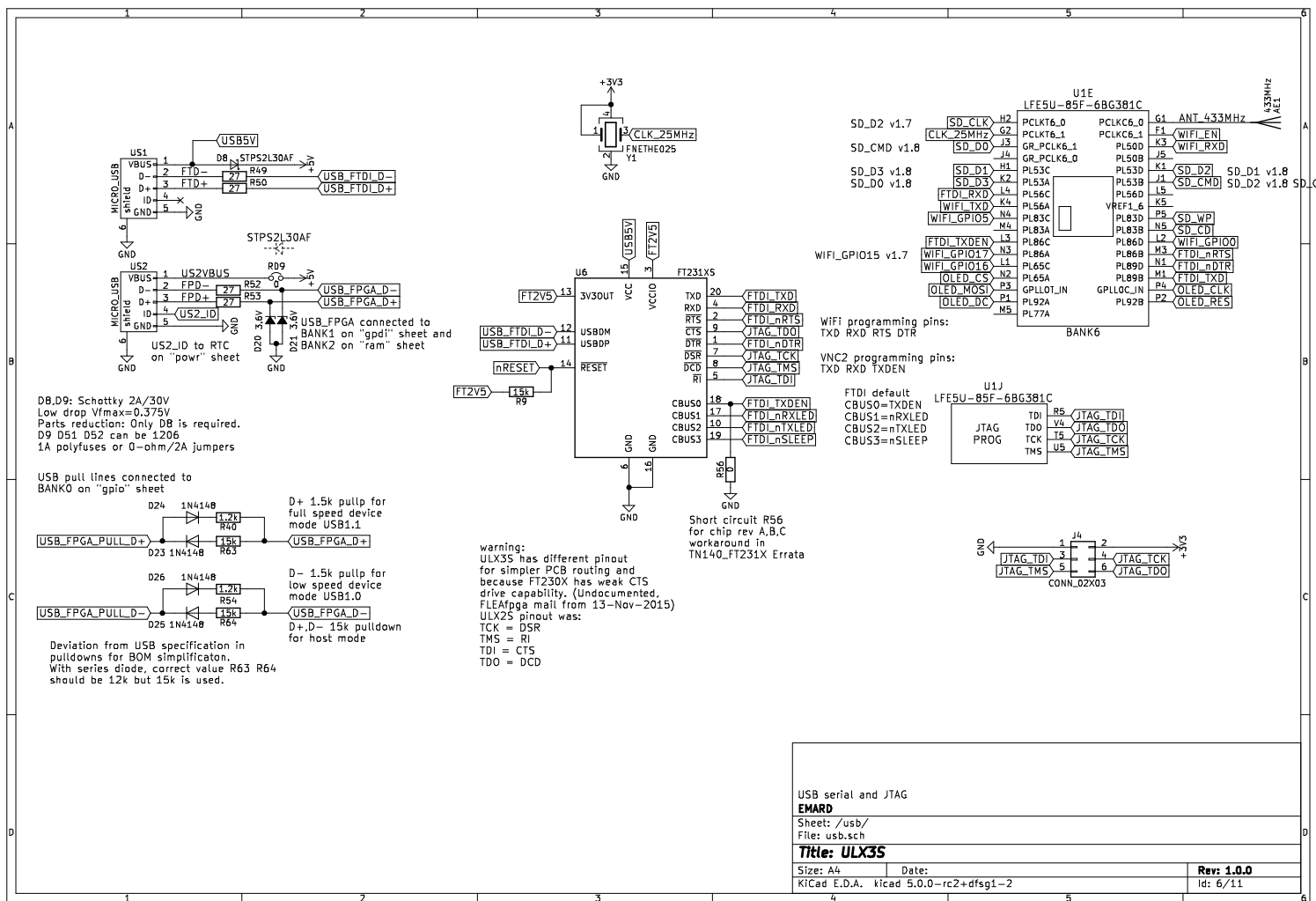


I2c shared with RTC on "power" sheet

PCB v1.8.1 and higher accept FCI 10029449-111RLF
www.amphenol-icc.com
 mouser PN: 649-10029449-111RLF
<https://portal.fciconnect.com/Comergent/fci/drawing/10029449.pdf>

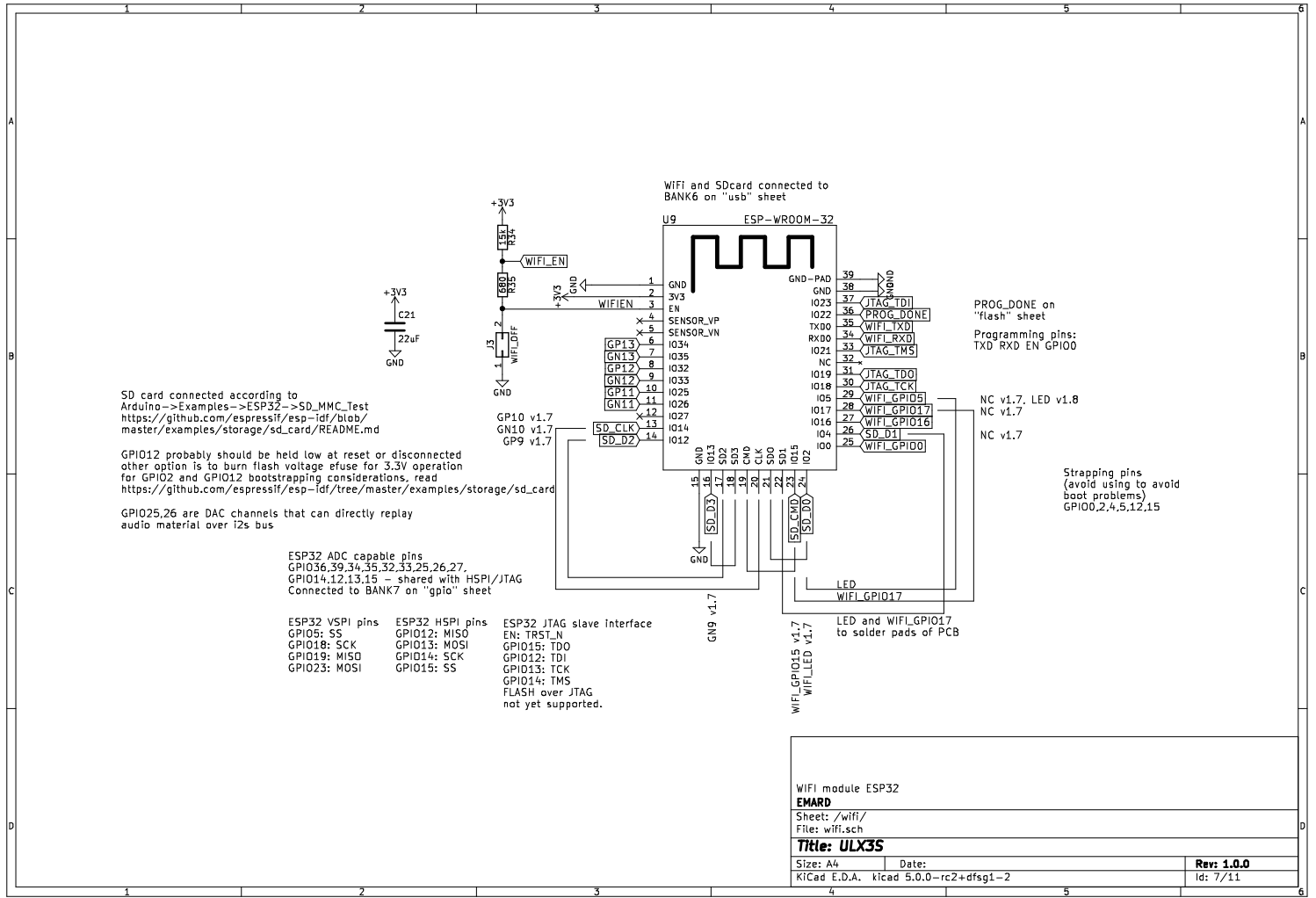
PCB v1.7 and v1.8 accept
 mouser PN: 538-47151-1001 (Molex)
https://www.molex.com/pdm_docs/sd/471511001_sd.pdf
 mouser PN: 710-685119134923 (Würth)
<https://catalog.wurth-elektronik.com/em/datasheet/685119134923.pdf>

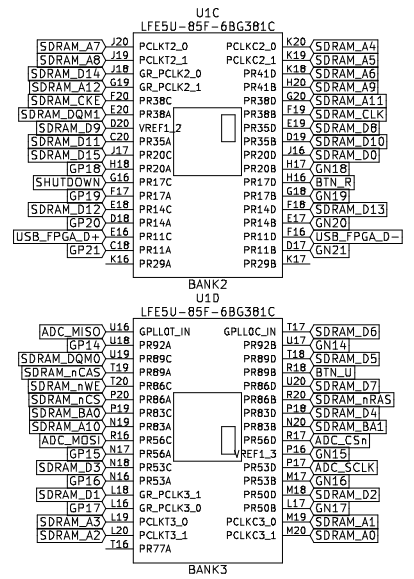
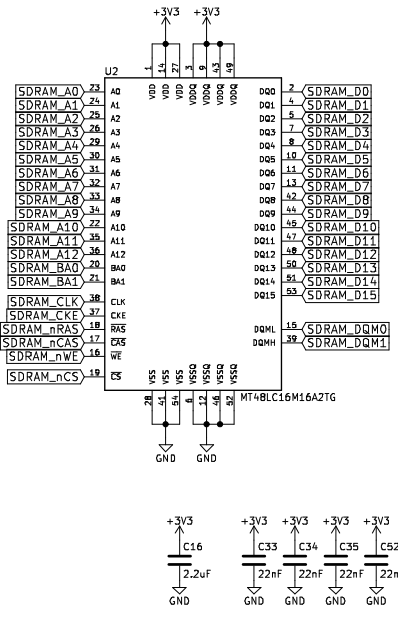
Digital Video and Ethernet General Purpose Differential Interface		
EMARD		
Sheet: /gpd/ File: gpd1.sch		
Title: ULX3S		
Size: A4	Date:	Rev: 1.0.0
KiCad E.D.A. kicad 5.0.0-rc2+dfsg1-2		Id: 5/11



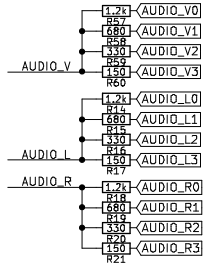
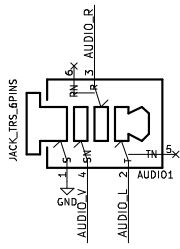
USB serial and JTAG
EMARD
 Sheet: /usb/
 File: usb.sch
Title: ULX3S

Size: A4	Date:	Rev: 1.0.0
KiCad E.D.A. kicad 5.0.0-rc2+dfsg1-2		Id: 6/11



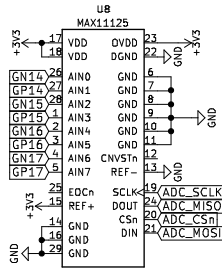


SDRAM memory	
EMARD	
Sheet: /ram/	
File: ram.sch	
Title: ULX3S	
Size: A4	Date:
KiCad E.D.A. kicad 5.0.0-rc2+dfsg1-2	Rev: 1.0.0
	Id: B/11



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 on 'gpio' sheet



ADC SPI connected to BANK3 of 'ram' sheet

Analog audio and video

EMARD

Sheet: /analog/

File: analog.sch

Title: ULX3S

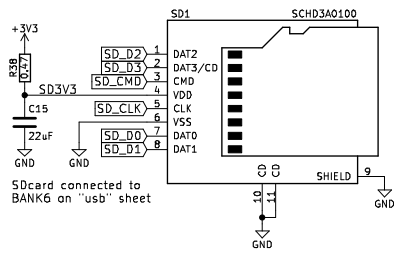
Size: A4

Date:

Rev: 1.0.0

KiCad E.D.A. kicad 5.0.0-rc2+dfsg1-2

Id: 9/11



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

SD card

EMARD

Sheet: /sdcards/

File: sdcards.sch

Title: ULX3S

Size: A4

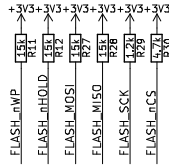
Date:

Rev: 1.0.0

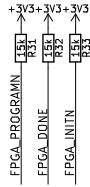
KiCad E.D.A. kicad 5.0.0-rc2+dfsg1-2

Id: 10/11

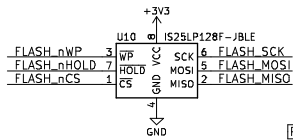
pullups for Master SPI (MSPI) required by
TN1260: lattice ECP5 sysCONFIG guide p.6



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

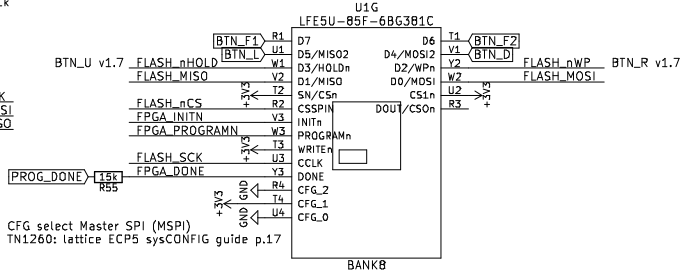


Deviation from TN1260 in pullup:
values for BOM simplification.
Correct values should be 10k and 1k
but 15k and 1.2k are used.



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

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



SPI flash
EMARD

Sheet: //flash/
File: flash.sch

Title: ULX3S

Size: A4

Date:

Rev: 1.0.0

KiCad E.D.A. kicad 5.0.0-rc2+dfsg1-2

Id: 11/11