

STM32H7B3I-EVAL

MB1331

Table of contents

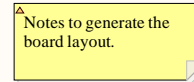
Sheet 1 : Project overview
Sheet 2 : MB1331 TOP page
Sheet 3 : MCU STM32H7B3LIH6Q
Sheet 4 : MCU Clocks & Reset
Sheet 5 : USB_OTG_FS
Sheet 6 : USB_OTG_HS with external PHY
Sheet 7 : Memories (NOR, SRAM, SDRAM)
Sheet 8 : OCSPI 1 & 2
Sheet 9 : SD Card 1 & 2
Sheet 10 : Audio Codec
Sheet 11 : Audio & Motor DFSDM
Sheet 12 : Camera
Sheet 13 : LCD
Sheet 14 : Peripherals (WIFI, buttons, LEDs)
Sheet 15 : FDCAN & RS232
Sheet 16 : STMPS2 & PT100
Sheet 17 : Motor Control
Sheet 18 : MFX I/O Expander
Sheet 19 : Extension Connectors
Sheet 20 : Board Power
Sheet 21 : MCU Power
Sheet 22 : JTAG & Trace
Sheet 23 : ST-LINK V3 SWD

Legend

General comment such as function title, configuration, ...

Text to be added to silkscreen.

Warning text.



Open Platform License Agreement

The Open Platform License Agreement (“Agreement”) is a binding legal contract between you (“You”) and STMicroelectronics International N.V. (“ST”), a company incorporated under the laws of the Netherlands acting for the purpose of this Agreement through its Swiss branch 39, Chemin du Champ des Filles, 1228 Plan-les-Ouates, Geneva, Switzerland.

By using the enclosed reference designs, schematics, PC board layouts, and documentation, in hardcopy or CAD tool file format (collectively, the “Reference Material”), You are agreeing to be bound by the terms and conditions of this Agreement. Do not use the Reference Material until You have read and agreed to this Agreement terms and conditions. The use of the Reference Material automatically implies the acceptance of the Agreement terms and conditions.

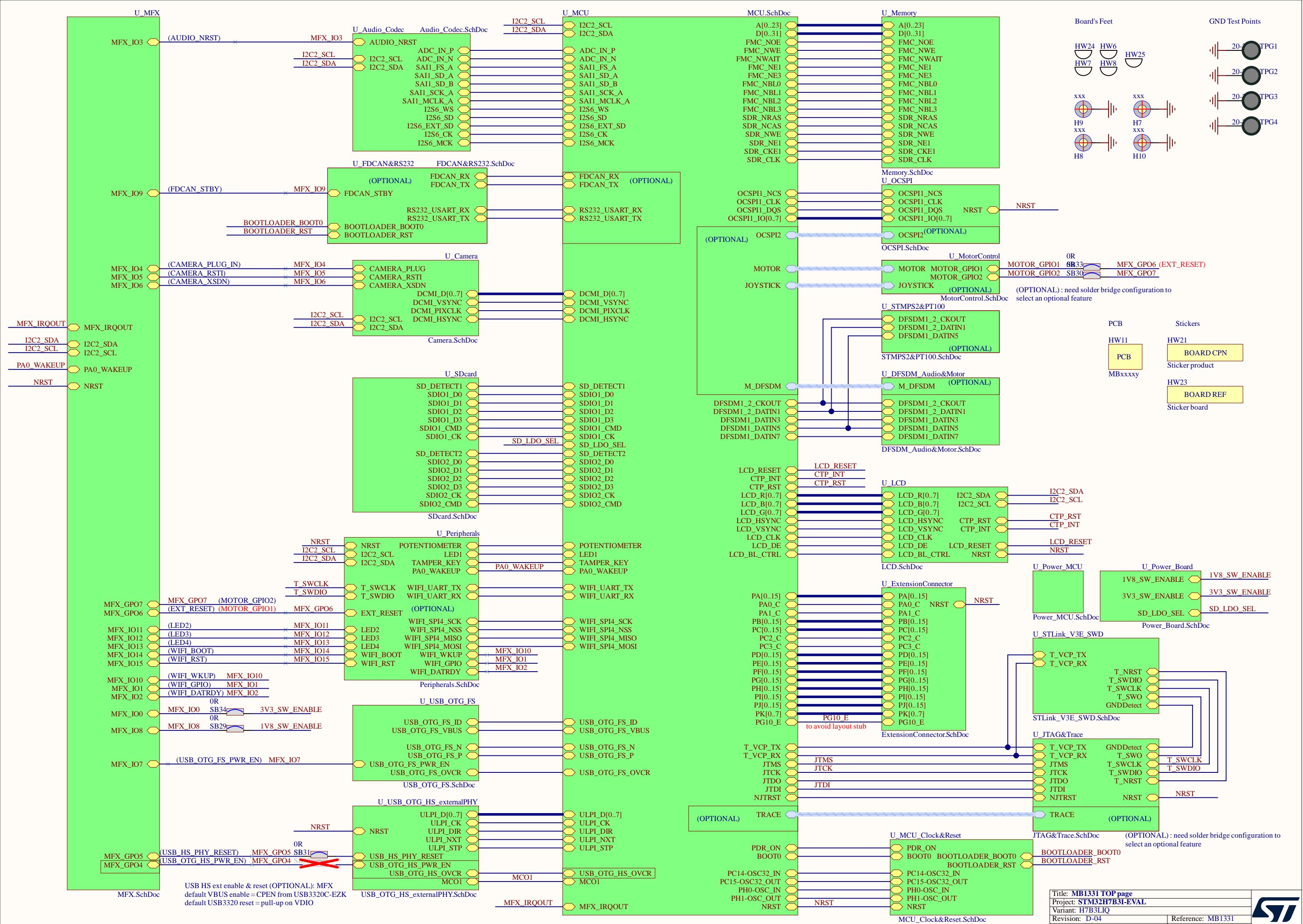
The complete Open Platform License Agreement can be found on www.st.com/opla.

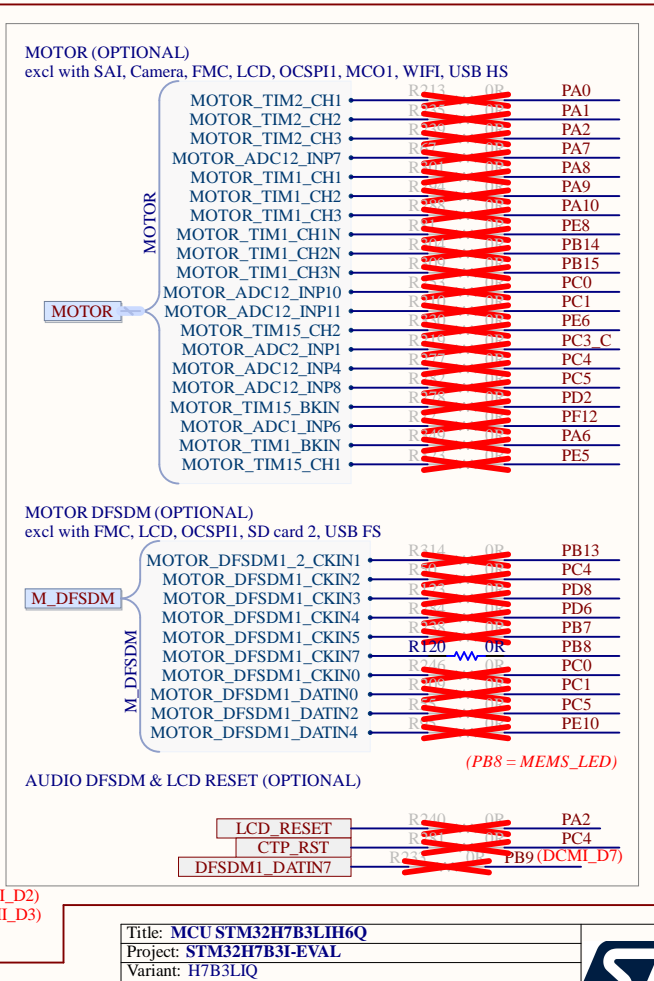
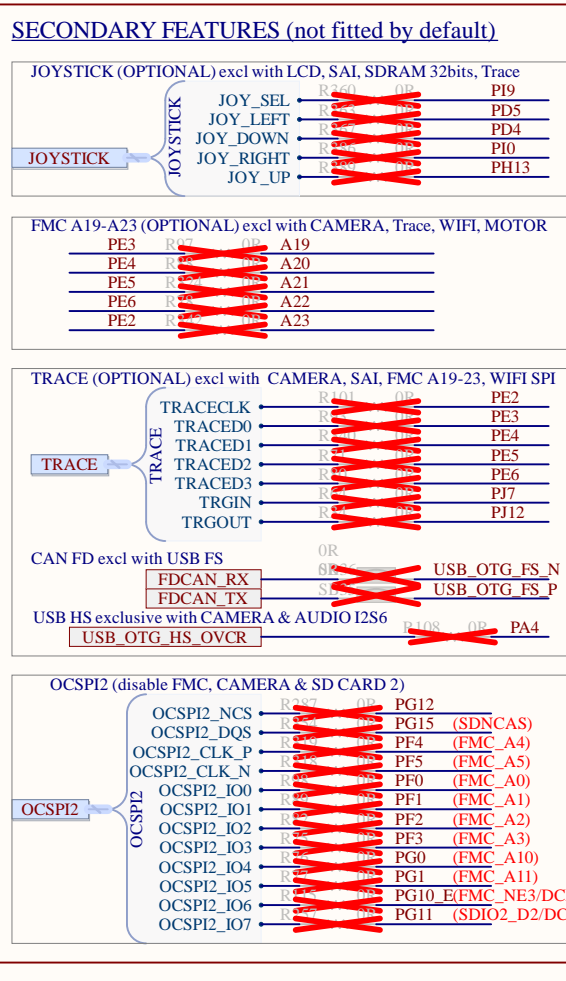
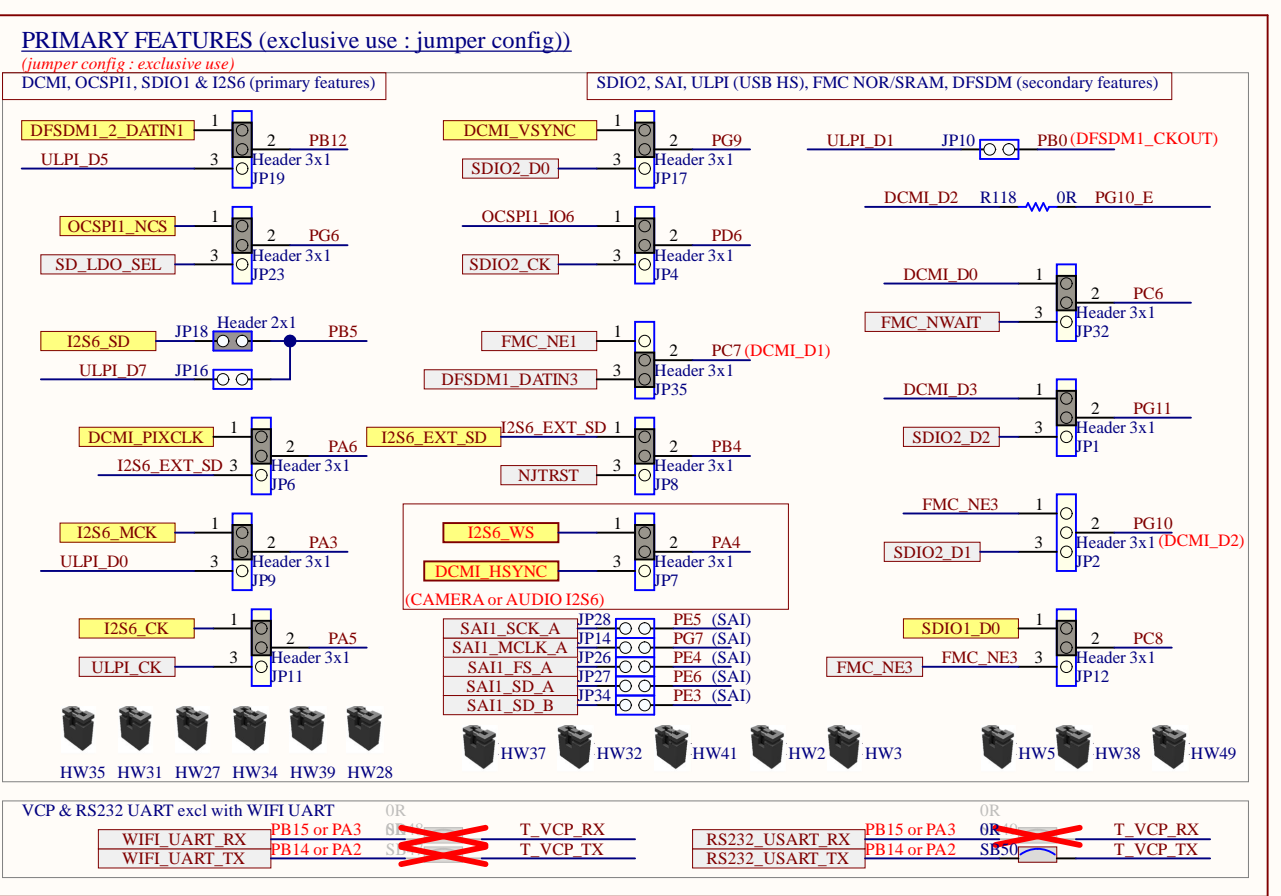
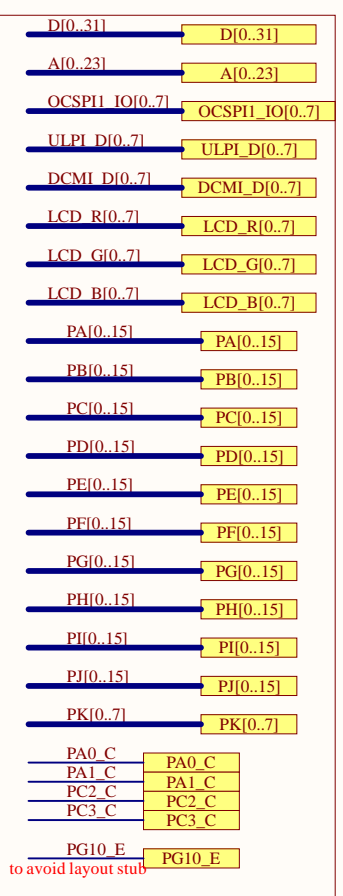
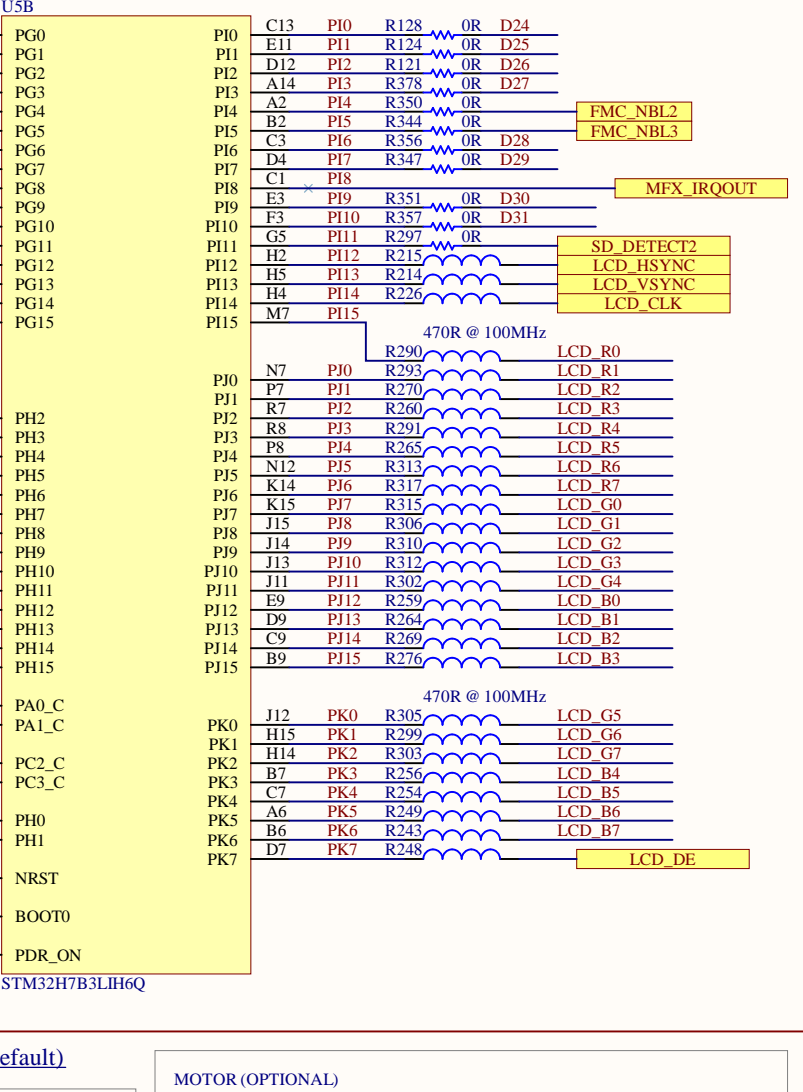
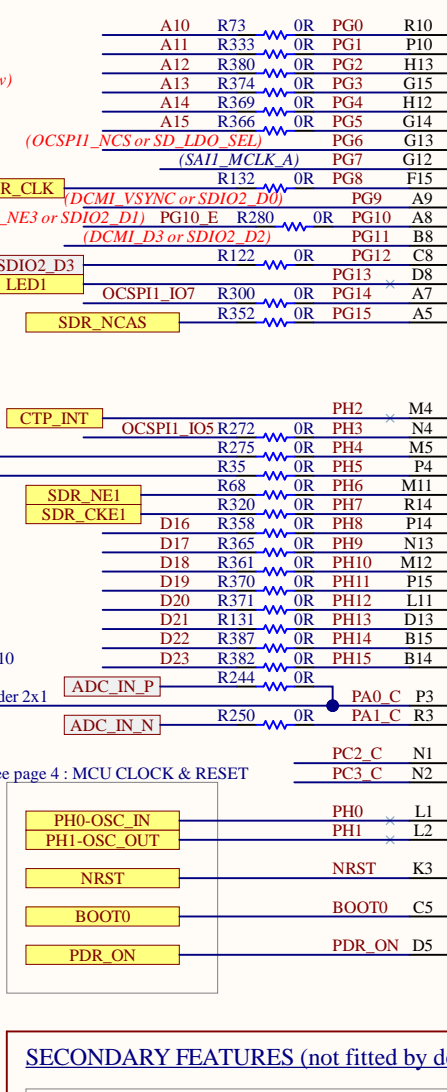
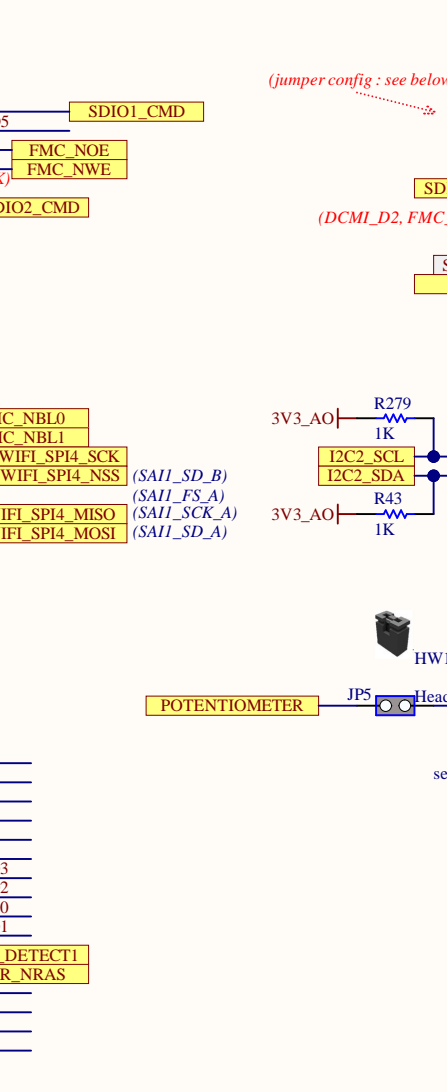
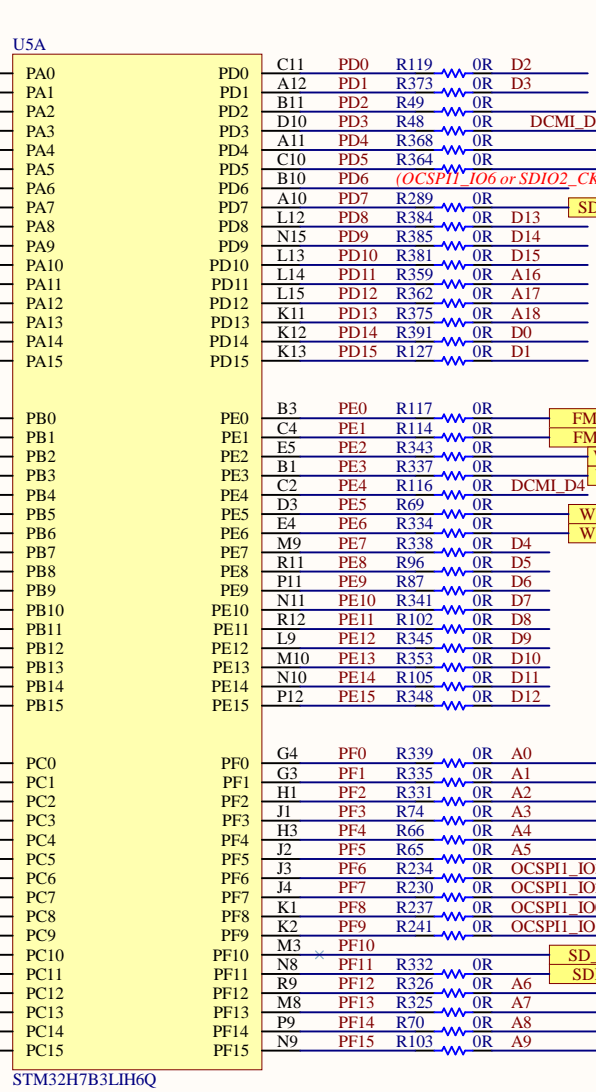
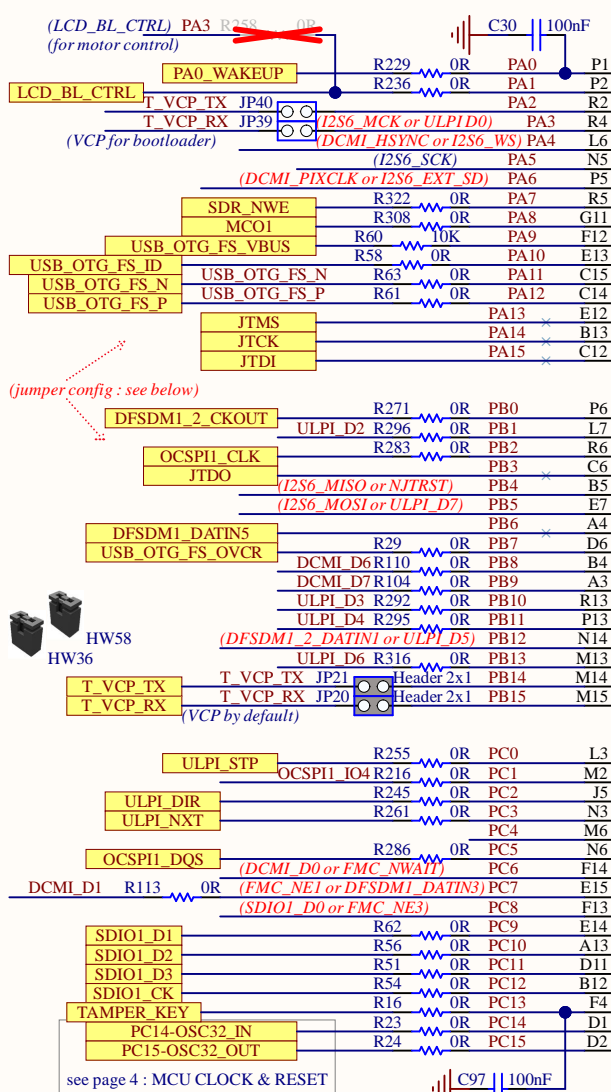
U_Top
Top.SchDoc



Title: Project overview		
Project: STM32H7B3I-EVAL		
Variant: H7B3LIQ		
Revision: D-04		Reference: MB1331
Size: A4	Date: 05-MAR-2024	Sheet: 1 of 23

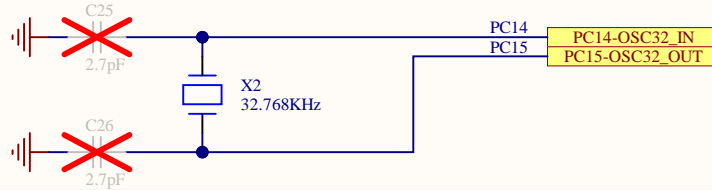




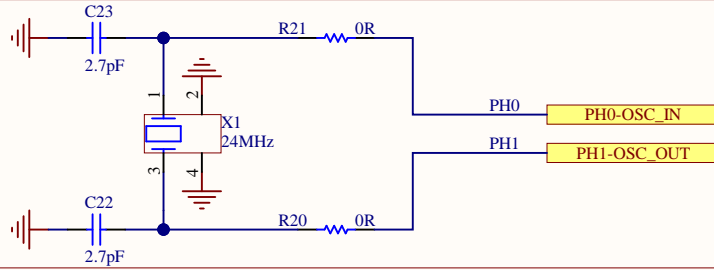


STM32H7B3LIH6Q MCU CLOCK, RESET & BOOT

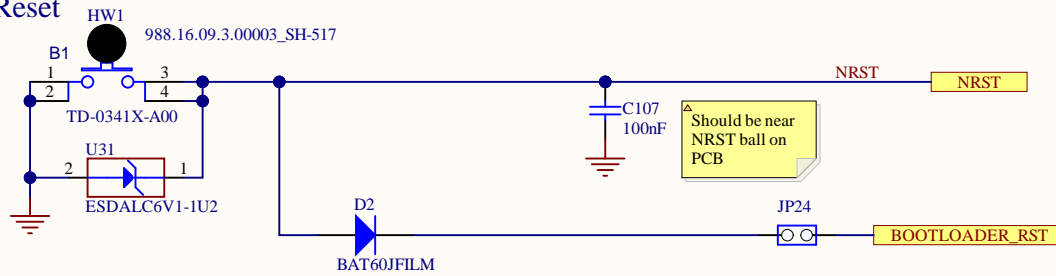
32kHz Clock



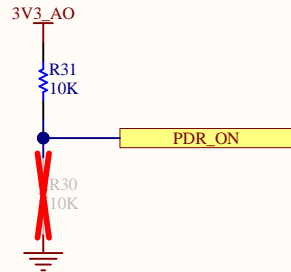
24MHz Clock



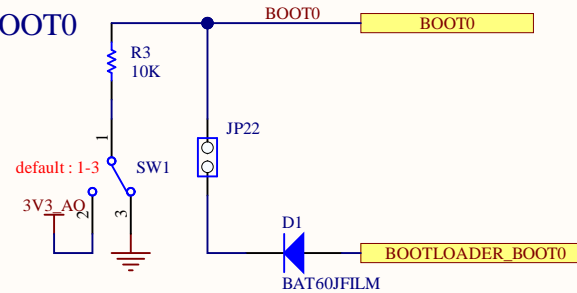
Reset



PDR ON

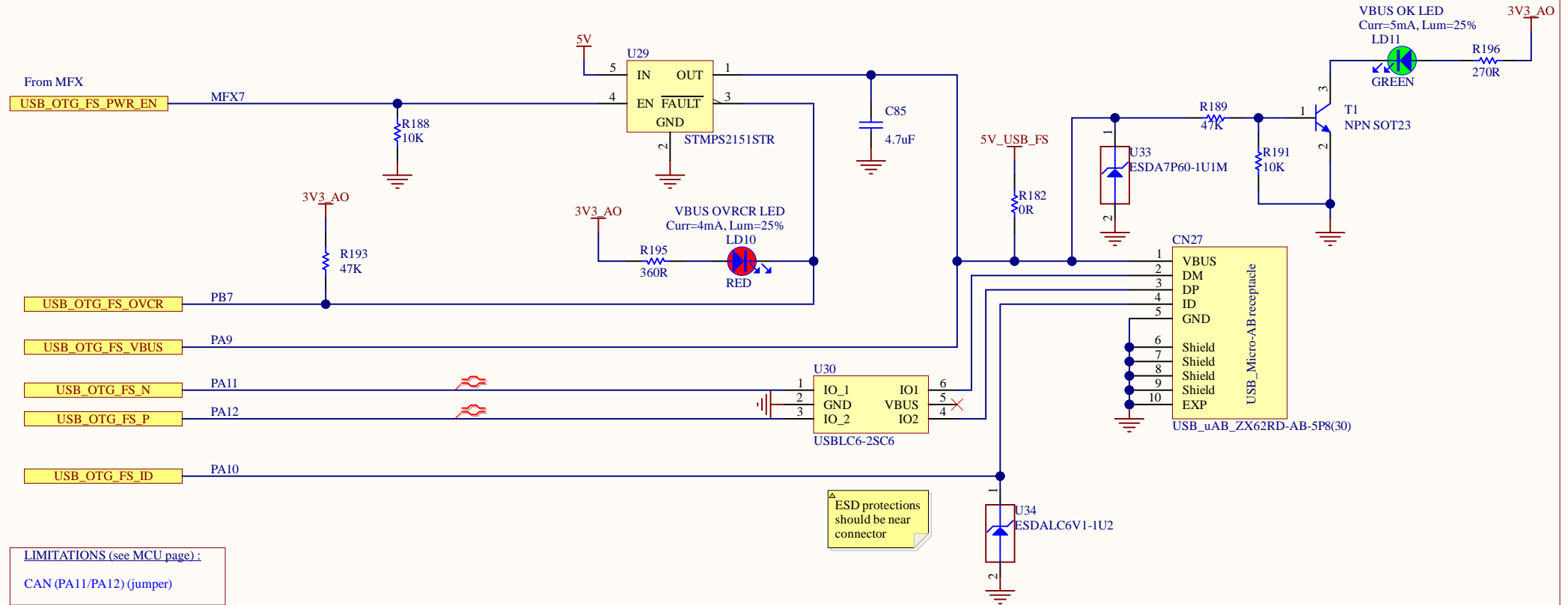


BOOT0



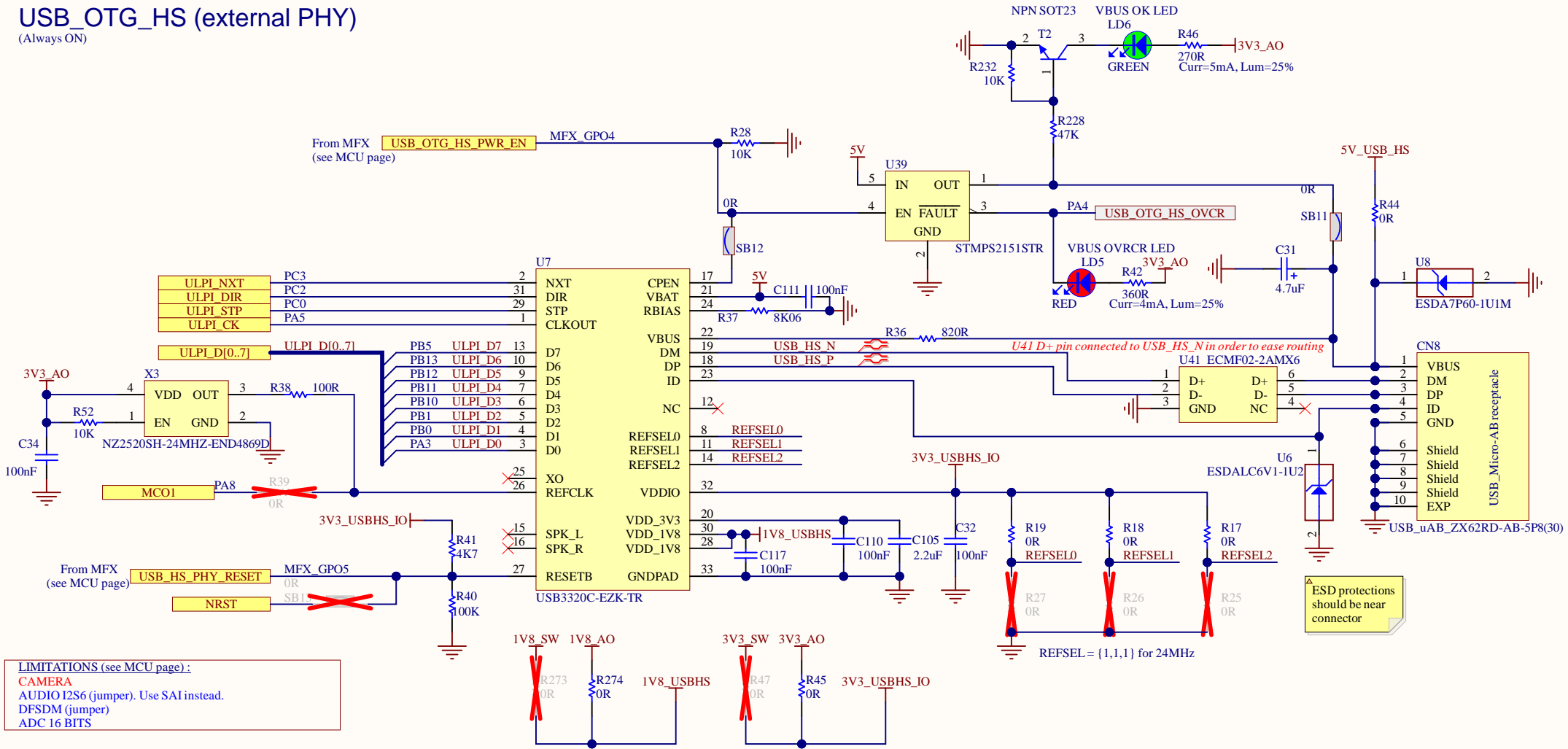
USB_OTG_FS

(Always ON)



USB_OTG_HS (external PHY)

(Always ON)



LIMITATIONS (see MCU page):

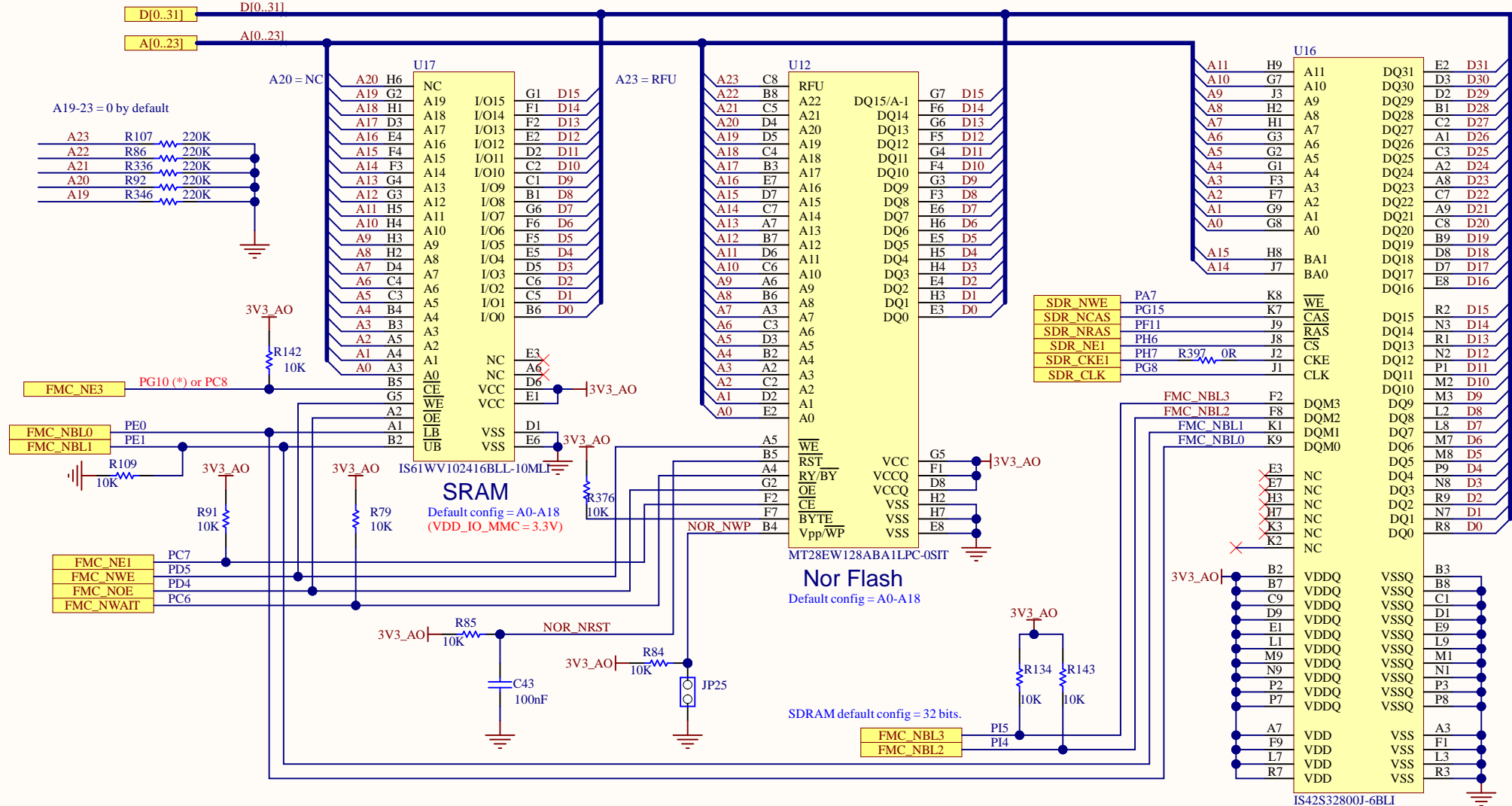
- CAMERA
- AUDIO I2S6 (jumper). Use SAI instead.
- DFSDM (jumper)
- ADC 16 BITS



MEMORIES

(Always ON)

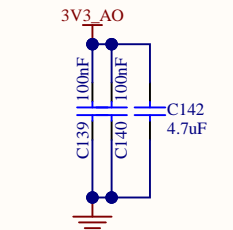
(*) Some SRAM I/Os are supplied by VDD_IO_MMC
(make sure to control MFX0 & PG6)
(see Power_Board page)



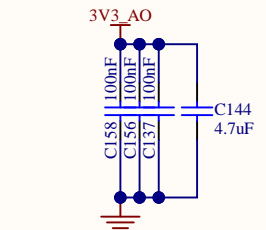
LIMITATIONS (SDRAM):
 OCSP12

LIMITATIONS (NOR):
 CAMERA
 OCSP12, DFSMDM DATIN3

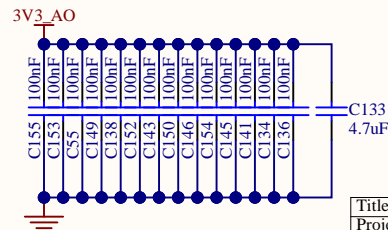
LIMITATIONS & BACK-UP (SRAM):
 CAMERA
 SD CARD : NE3 = PG10 (if SD CARD 1 is used) / PC8 (if SD CARD 2 is used)
 OCSP12
 (*) Make sure to set VDD_IO_MMC = 3.3V



Place close to SRAM



Place close to Nor Flash



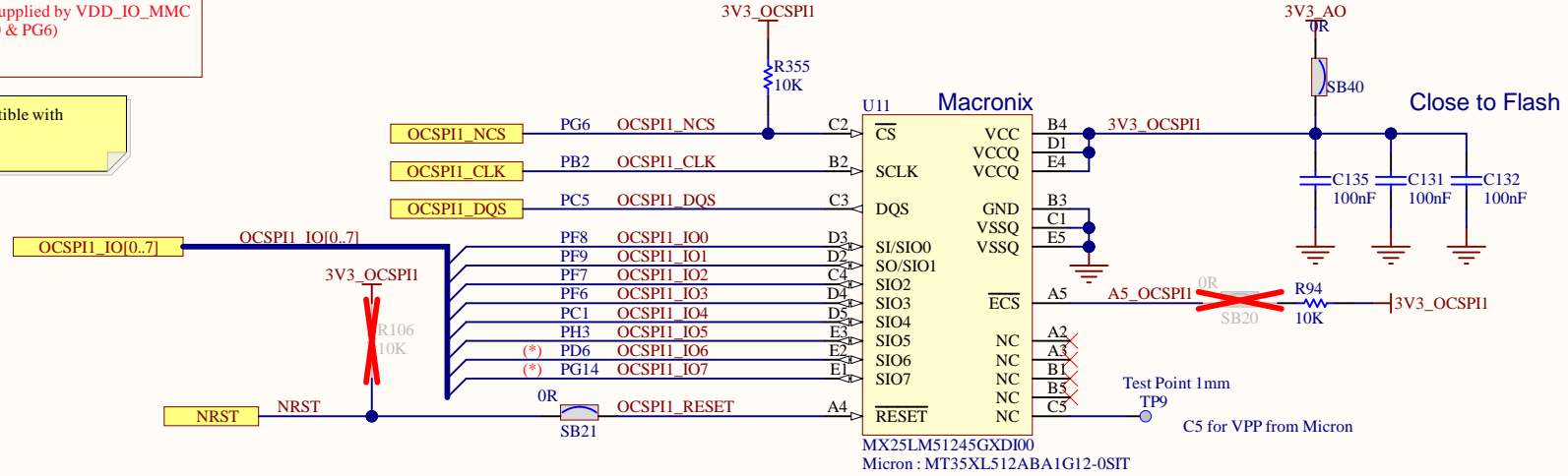
Place close to SDRAM



OCSPI 1

(* Some OCSPI1 I/Os are supplied by VDD_IO_MMC (make sure to control MFX0 & PG6) (see Power_Board page)

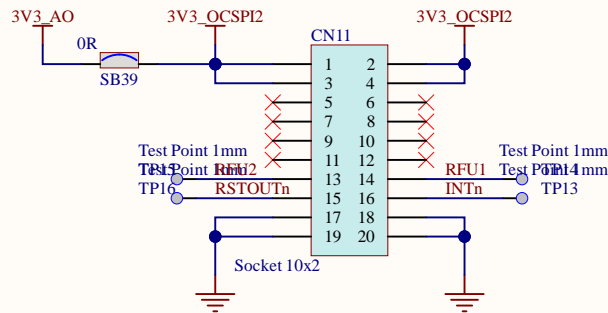
Double footprint to be compatible with Macronix and Micron MT35XL512ABA1G12-0SIT



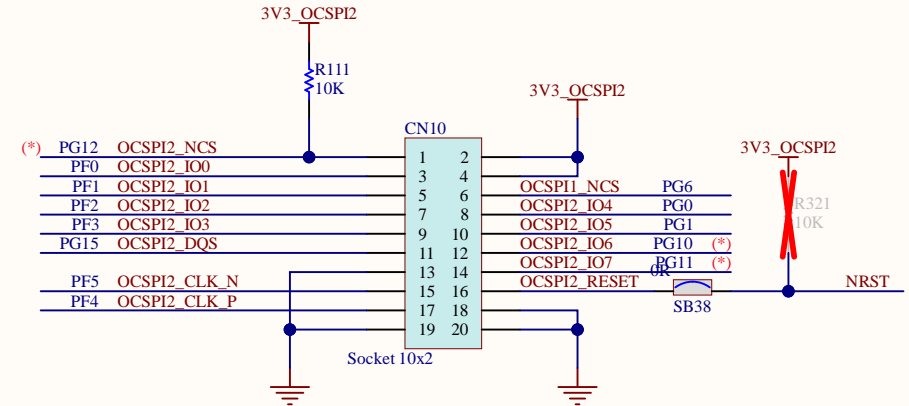
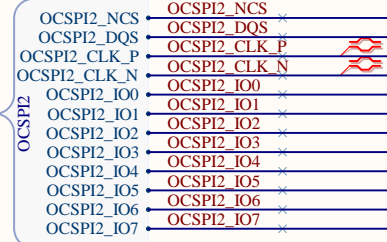
LIMITATIONS (see MCU page) :
 SD CARD 2 (jumper)
 (*) Make sure to set VDD_IO_MMC = 3.3V

OCSPI 2 (MB1242 Module connector)

(* Some OCSPI2 I/Os are supplied by VDD_IO_MMC (make sure to control MFX0 & PG6) (see Power_Board page)



OCSPI2 (OPTIONAL)

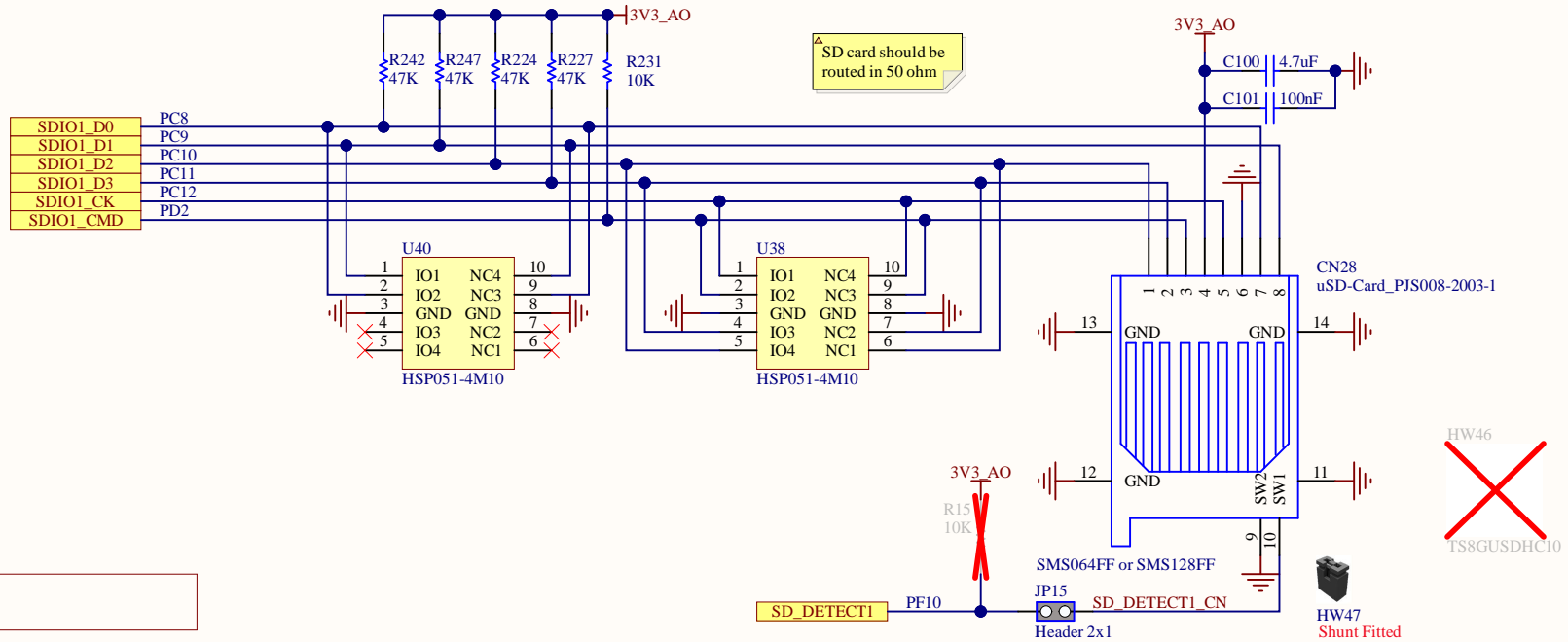


LIMITATIONS & BACK-UP (see MCU page):
 FMC (NOR, SRAM & SDRAM)
 SD CARD 2 (jumper)
 (*) Make sure to set VDD_IO_MMC = 3.3V



MICRO SD2.0 Card 1

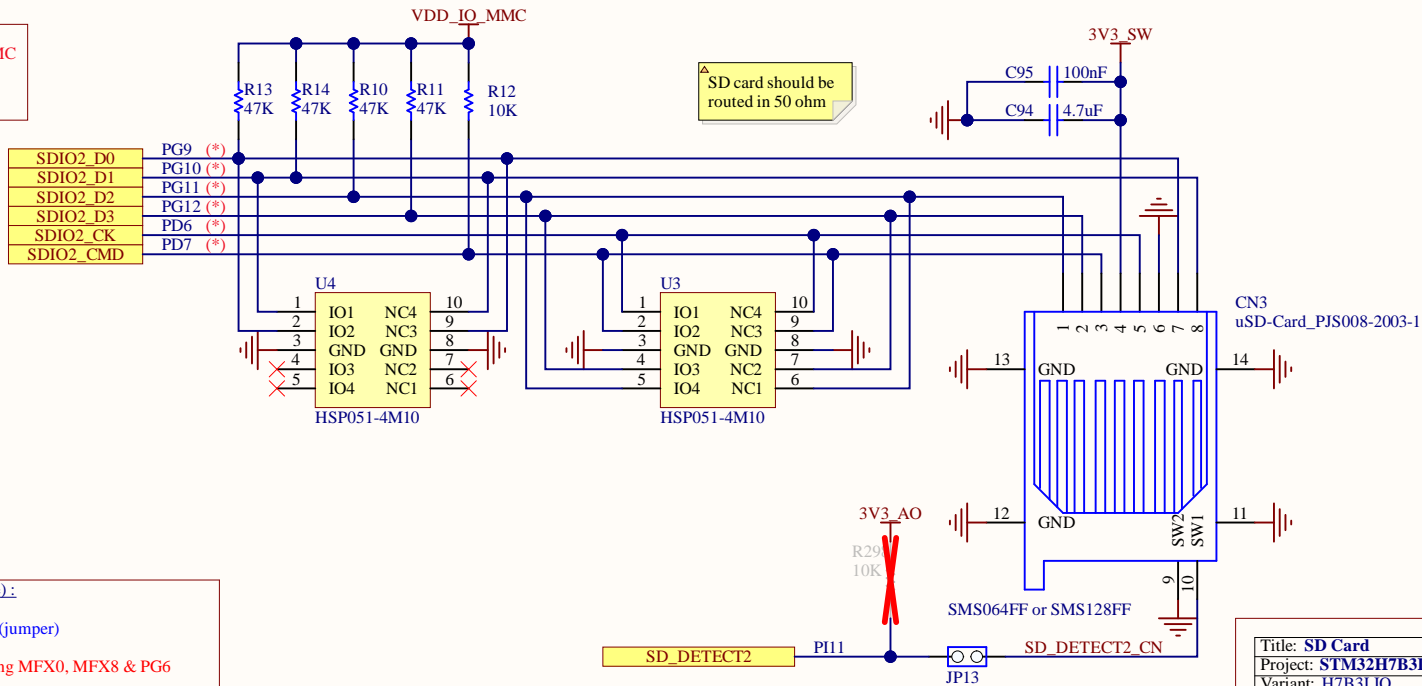
3V3 only
(Always ON)



LIMITATIONS & BACK-UP (see MCU page):
SRAM FMC NE3 = PG10 (jumper)

MICRO SD 3.0 Card 2

(*) SD CARD 2 is supplied by VDD_IO_MMC
(make sure to control MFX0, MFX8 & PG6)
(see Power_Board page)



LIMITATIONS & BACK-UP (see MCU page):

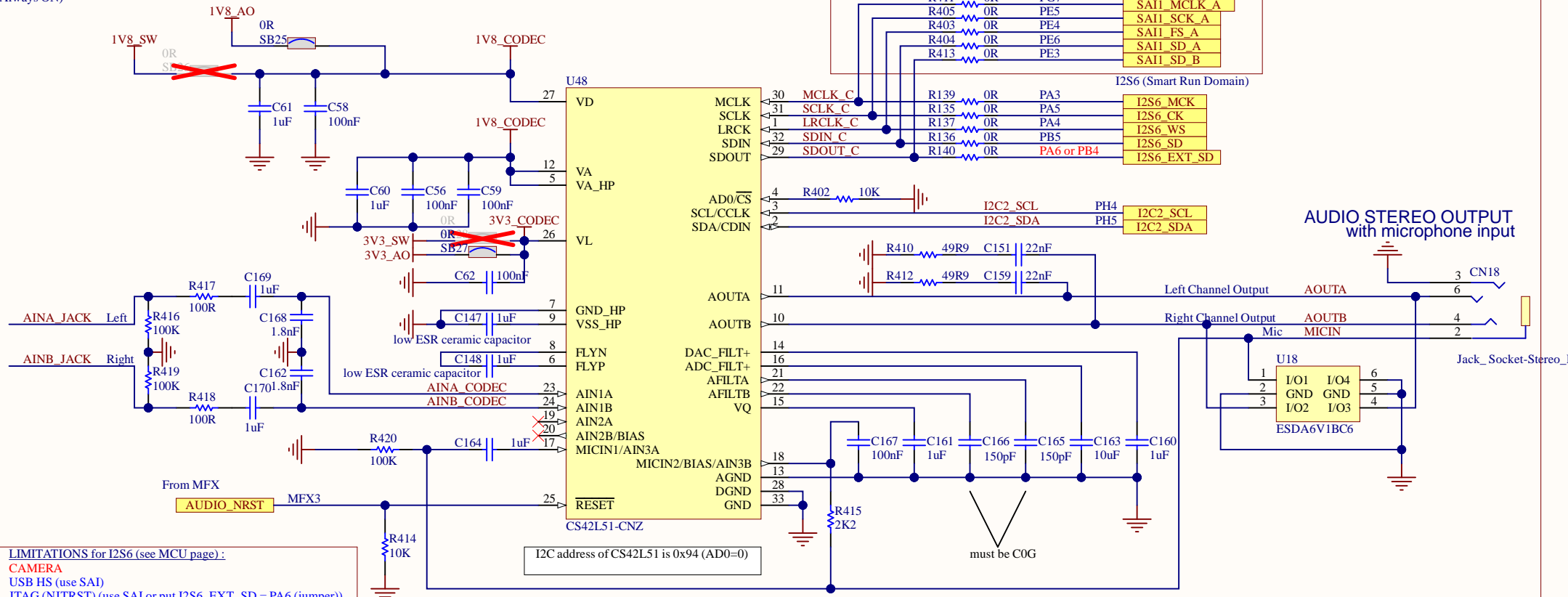
- OCSP11, CAMERA (jumper)
- SRAM : Back-up = use PC8 instead of PG10 (jumper)
- OCSP12
- (*) Make sure to control VDD_IO_MMC using MFX0, MFX8 & PG6

Title: SD Card	
Project: STM32H7B3I-EVAL	
Variant: H7B3LIQ	
Revision: D-04	Reference: MB1331
Size: A4	Date: 05-MAR-2024
Sheet: 9 of 23	



AUDIO CODEC & ADC

(Always ON)

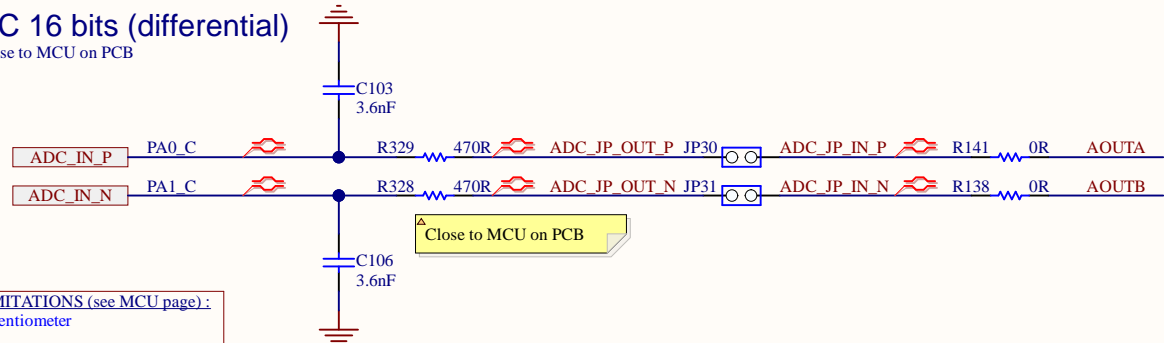


LIMITATIONS for I2S6 (see MCU page):
 CAMERA
 USB HS (use SAI)
 JTAG (NJTRST) (use SAI or put I2S6_EXT_SD = PA6 (jumper))

LIMITATIONS for SAI (see MCU page):
 CAMERA, WIFI SPI (use I2S6)

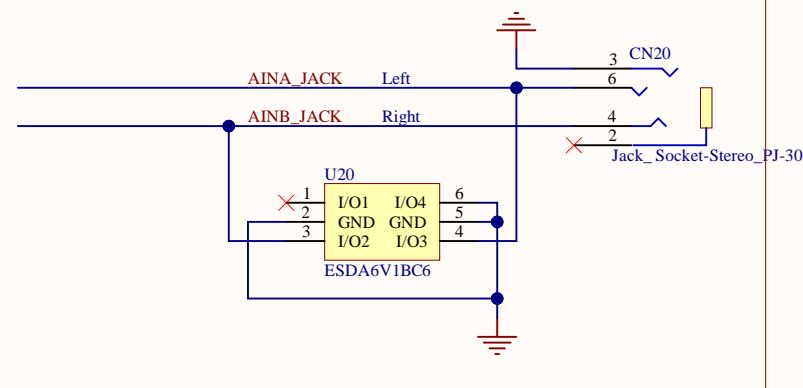
ADC 16 bits (differential)

Close to MCU on PCB



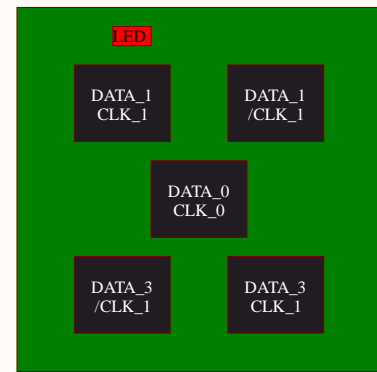
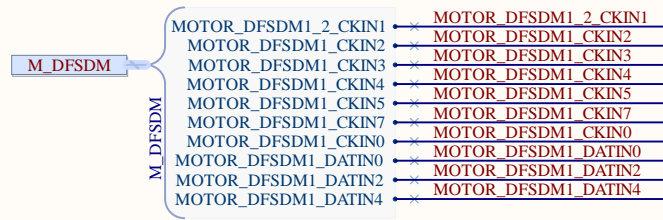
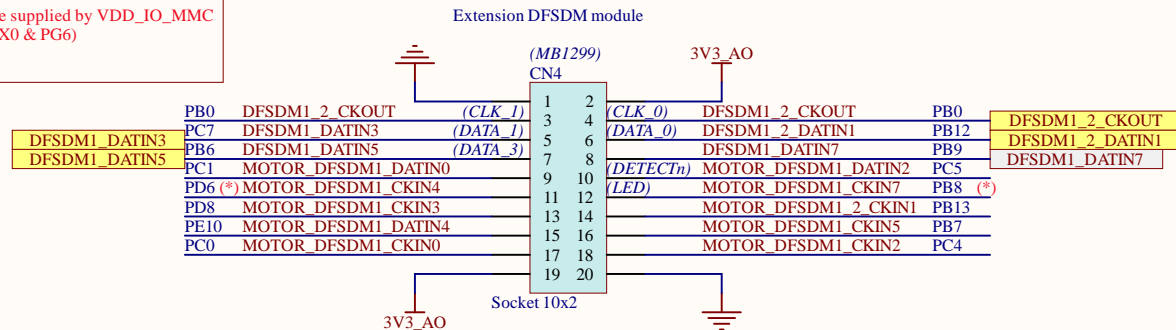
LIMITATIONS (see MCU page):
 Potentiometer

AUDIO STEREO INPUT



DFSDM AUDIO & MOTOR

(*) Some DFSDM I/Os are supplied by VDD_IO_MMC
(make sure to control MFX0 & PG6)
(see Power_Board page)

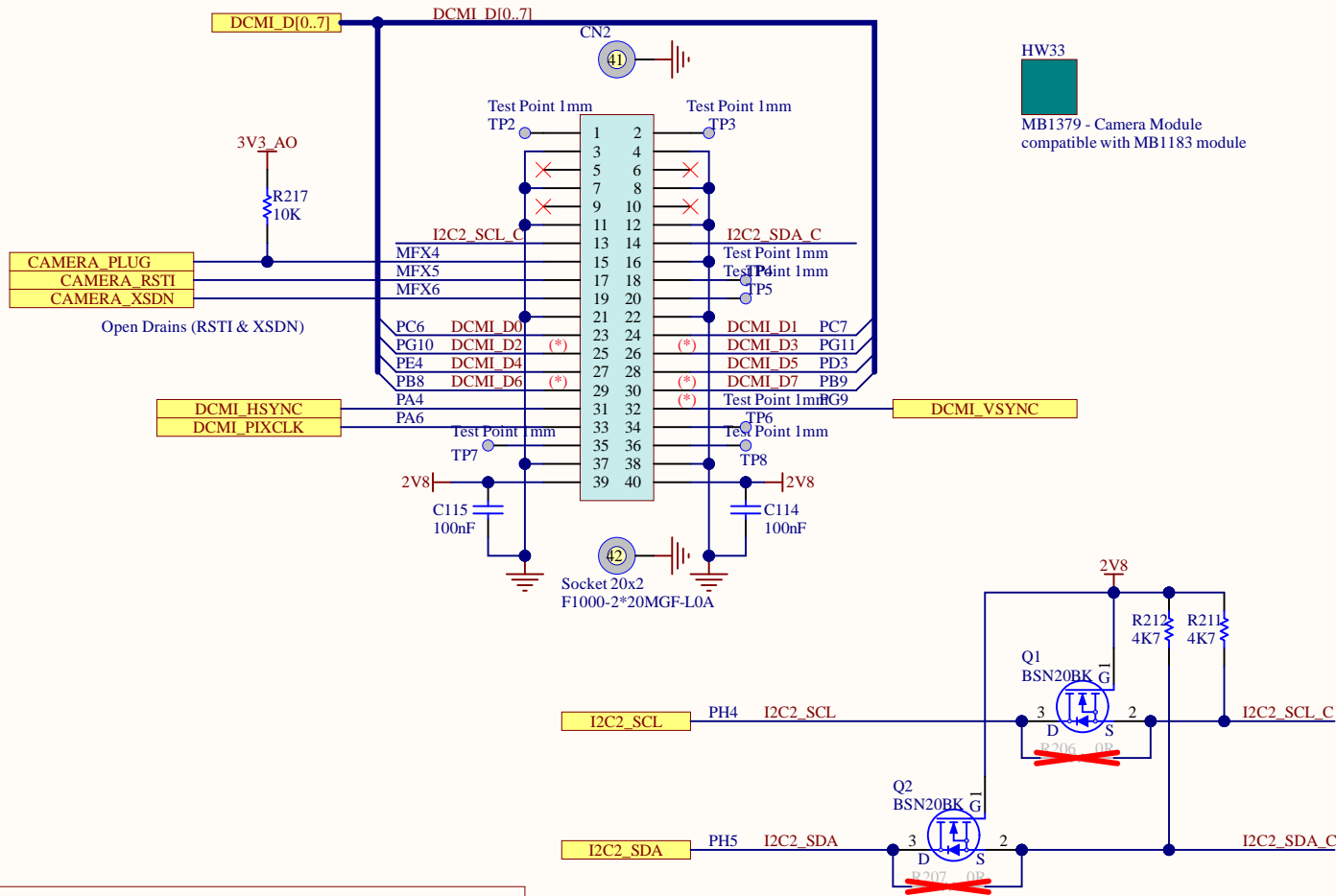


(MB1299)
CLK0 & CLK1 = data valid when clk is high
/CLK1 = data valid when clk is low

LIMITATIONS AUDIO DFSDMx4 (see MCU page) :
(*) Make sure to set VDD_IO_MMC = 3.3V
CAMERA
USB HS, FMC NOR (jumper)

CAMERA MODULE CONNECTOR

(*) Some DCMI I/O are supplied by VDD_IO_MMC
(make sure to control MFX0 & PG6)
(see Power_Board page)

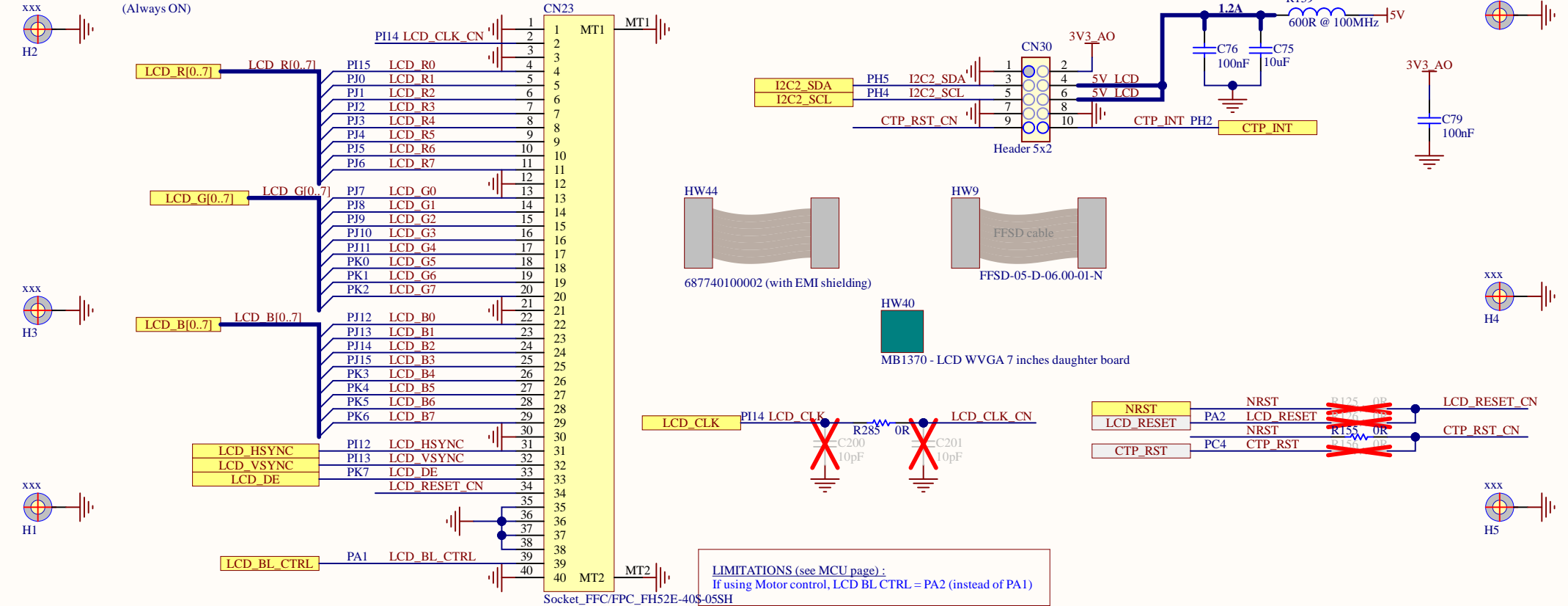


HW33
MB1379 - Camera Module
compatible with MB1183 module

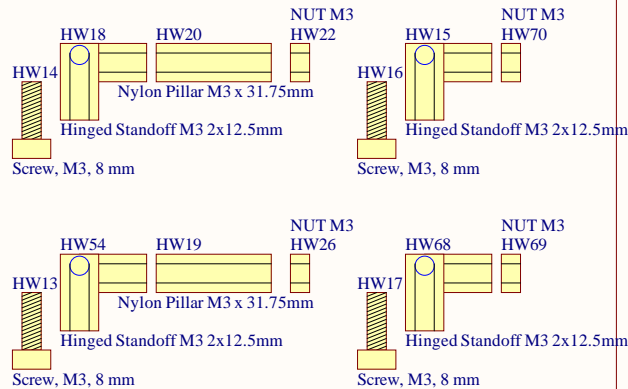
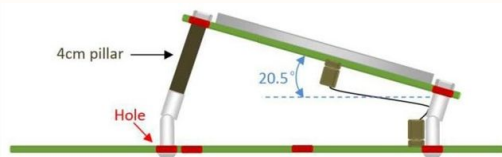
LIMITATIONS (see MCU page):
AUDIO (I2S6), DFSDM
AUDIO (SA1), SRAM, NOR, SD CARD 2, OCSP12
(* Make sure to set VDD_IO_MMC = 3.3V)



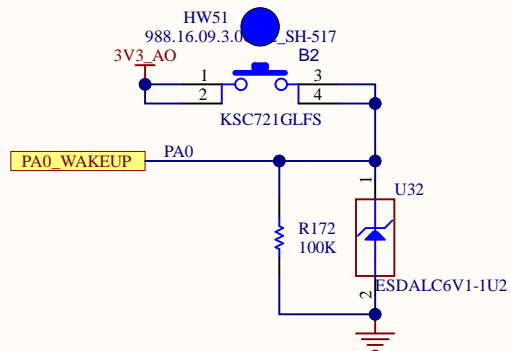
RGB LCD MODULE CONNECTORS



LCD MODULE MECHANICAL ASSEMBLY

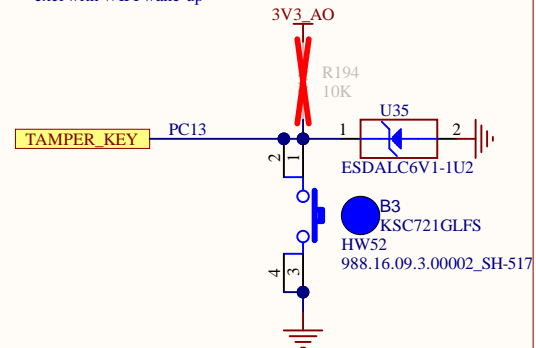


USER WAKE-UP BUTTON

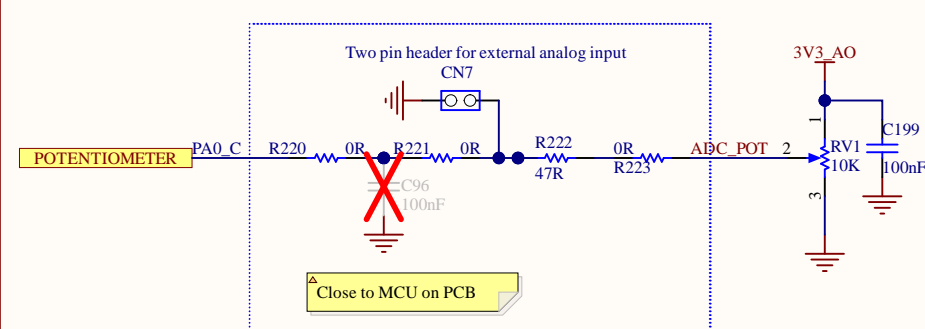


TAMPER & KEY BUTTON

excl with WIFI wake-up

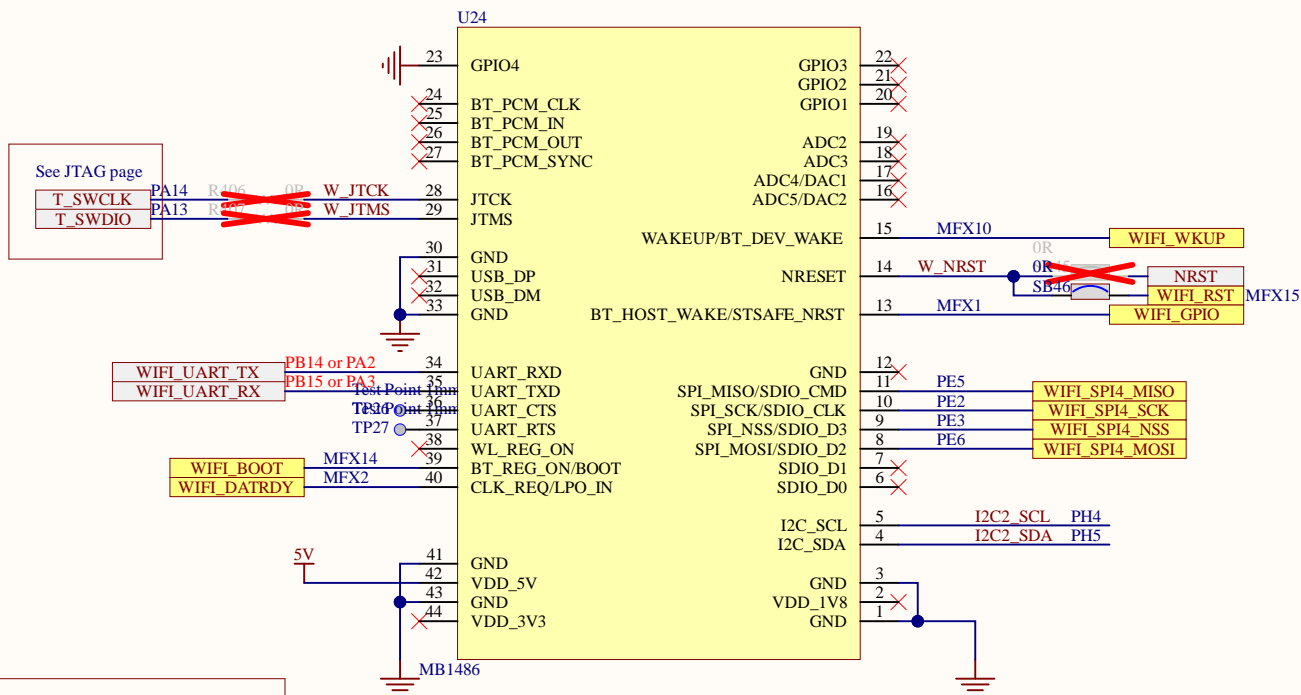


POTENTIOMETER



MB1486 - WIFI MODULE WITH INVENTEK ISM43340-M4G-L44-10CF

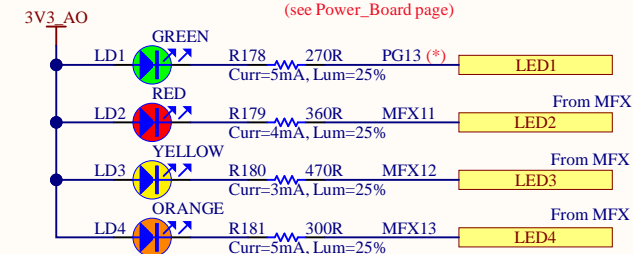
(WIFI SPI by default)
(Always ON)



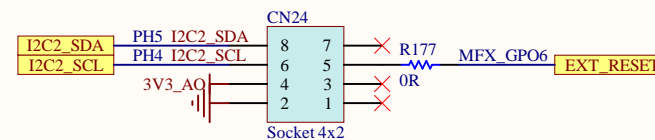
LIMITATIONS (see MCU page):
EXT I2C

LEDs

(*) LED1 I/O is supplied by VDD_IO_MMC
(make sure to control MFX0 & PG6)
(see Power_Board page)



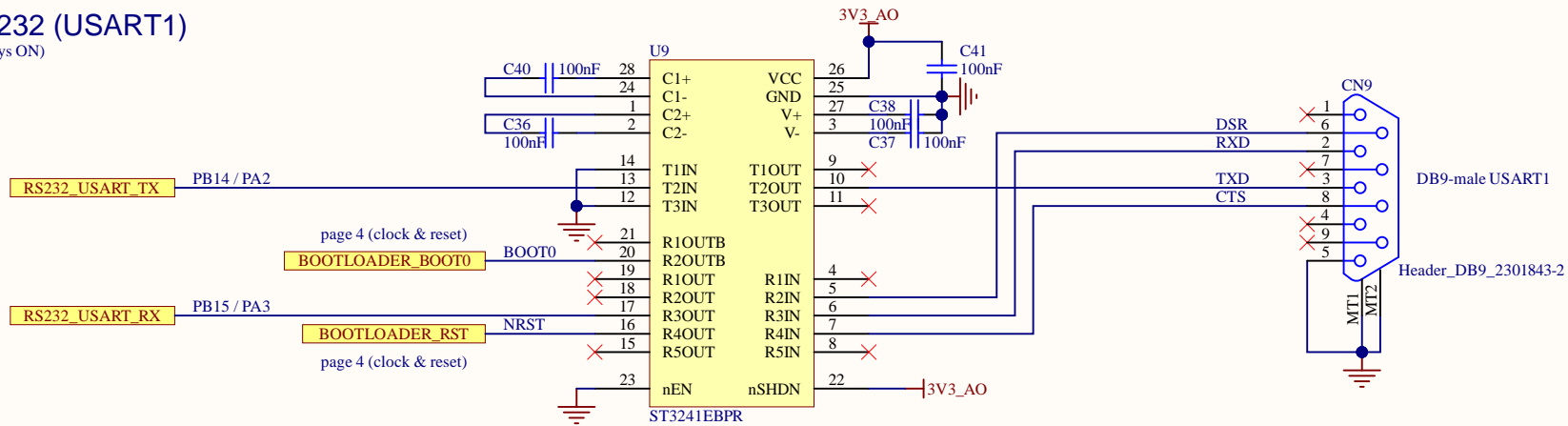
EXT_I2C



LIMITATIONS (see MCU page):
WIFI

RS232 (USART1)

(Always ON)



LIMITATIONS (see MCU page) :

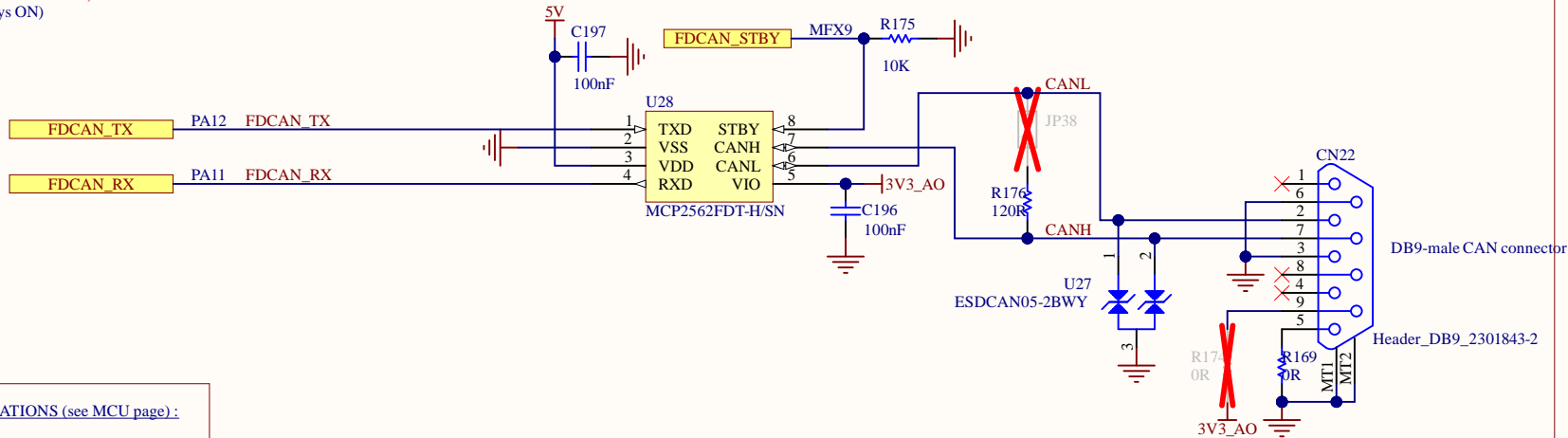
PB14/PB15 : not a bootloader compatible UART

PA2/PA3 : AUDIO I2S6, USB HS, MOTOR CONTROL

CAN FD

(optional : not fitted)

(Always ON)



LIMITATIONS (see MCU page) :

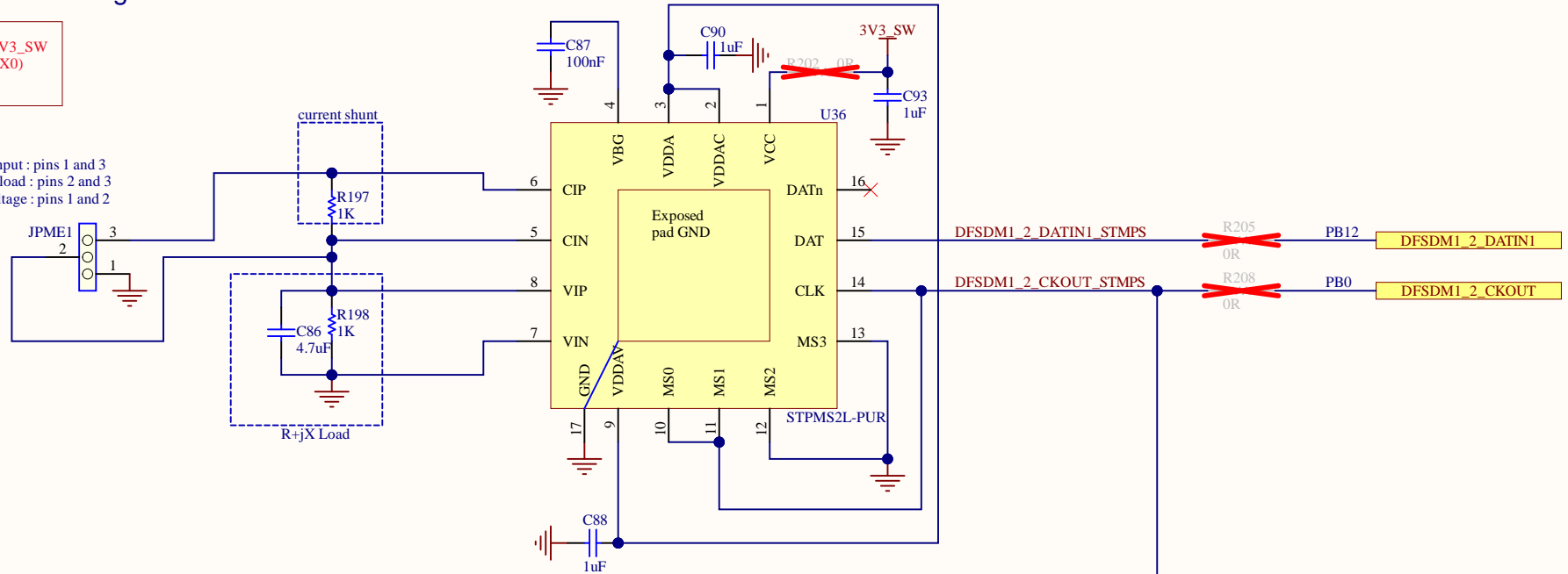
USB FS

STPMS2 power metering

(optional : not fitted)

STPMS2 is supplied by 3V3_SW
(make sure to control MFX0)
(see Power_Board page)

external generator input : pins 1 and 3
voltage of complex load : pins 2 and 3
shunt voltage : pins 1 and 2



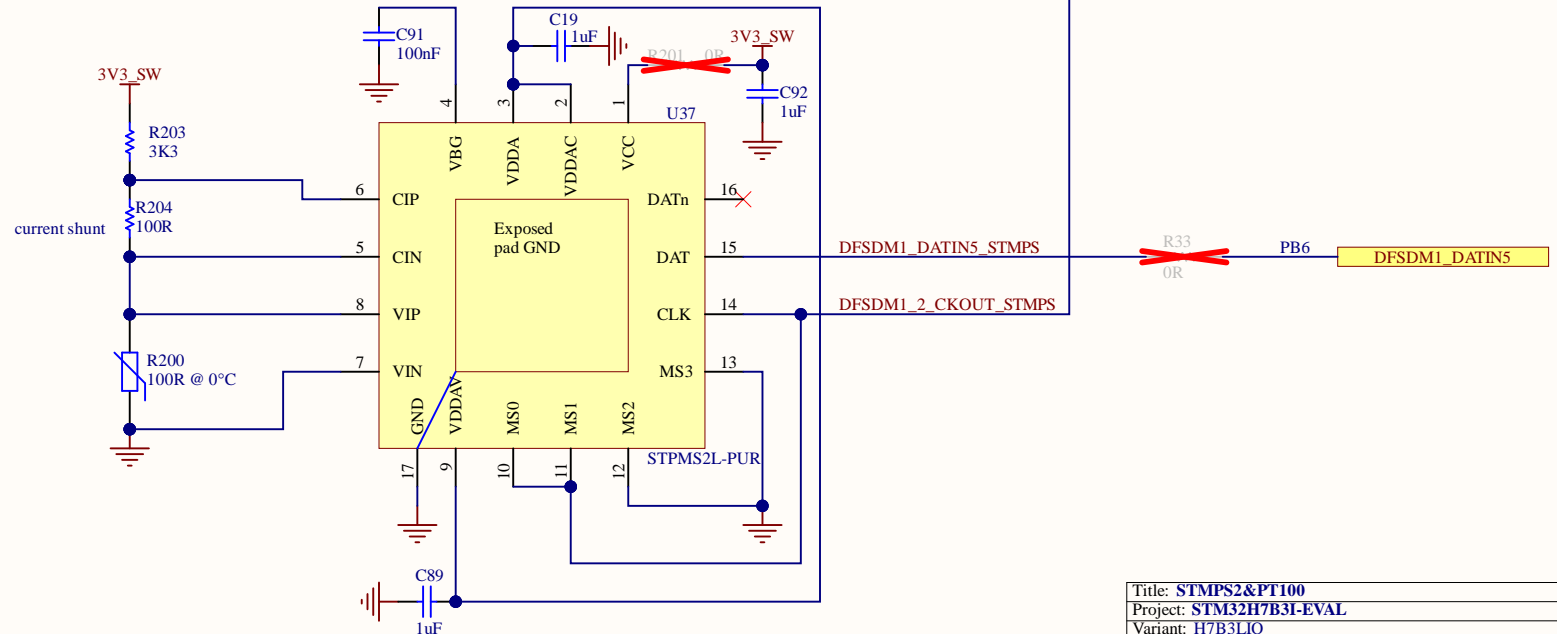
LIMITATIONS :

See user manual

PT100 measurement using SigmaDelta STPMS2

(optional : not fitted)

STPMS2 is supplied by 3V3_SW
(make sure to control MFX0)
(see Power_Board page)



LIMITATIONS :

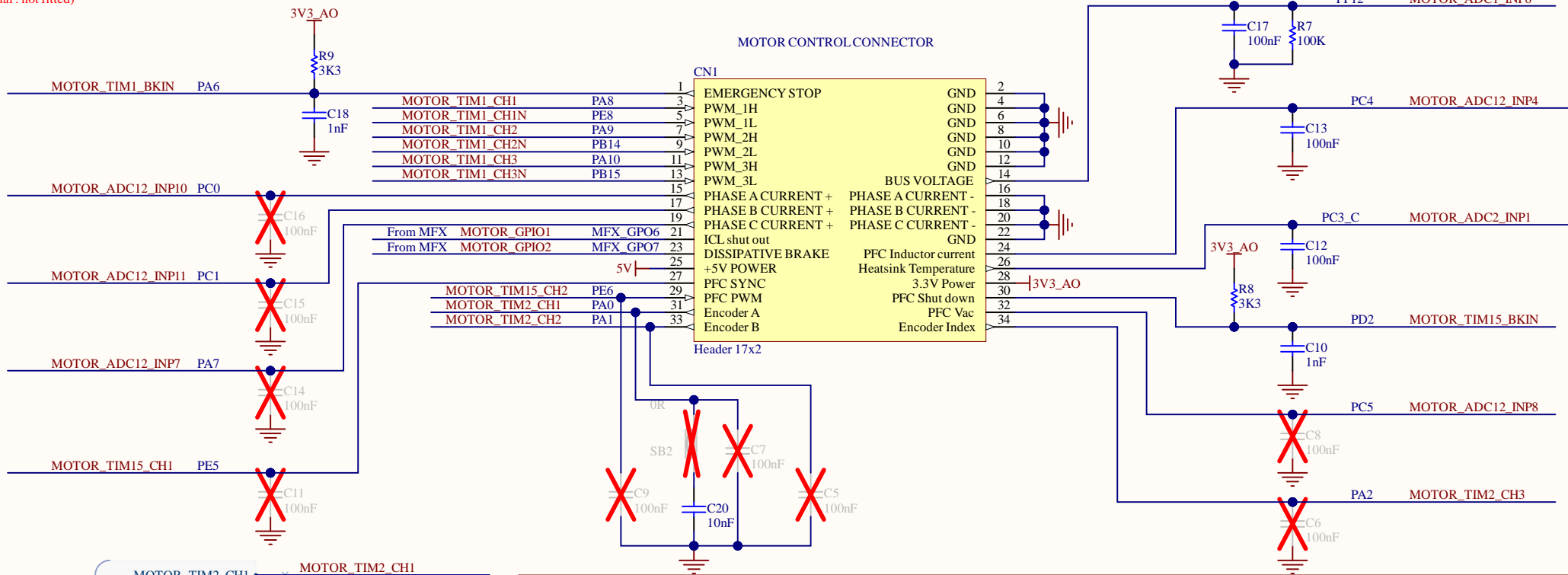
See user manual

Title: STPMS2&PT100		
Project: STM32H7B31-EVAL		
Variant: H7B3LIQ		
Revision: D-04	Reference: MB1331	
Size: A4	Sheet: 16 of 23	

Date: 05-MAR-2024

MOTOR CONTROL

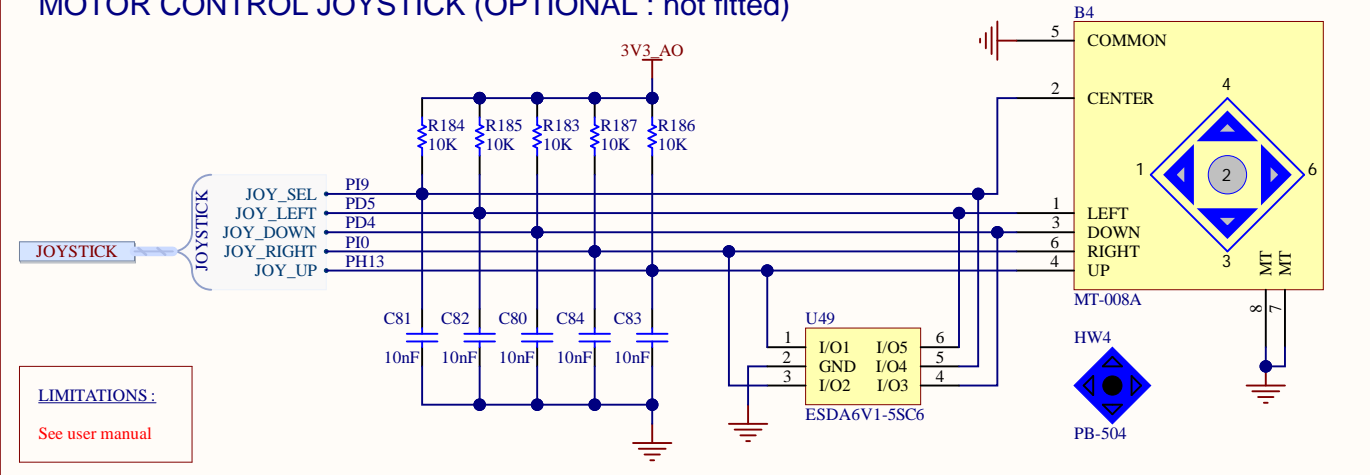
(optional : not fitted)



MOTOR_TIM2_CH1	MOTOR_TIM2_CH1
MOTOR_TIM2_CH2	MOTOR_TIM2_CH2
MOTOR_TIM2_CH3	MOTOR_TIM2_CH3
MOTOR_ADC12_INP7	MOTOR_ADC12_INP7
MOTOR_TIM1_CH1	MOTOR_TIM1_CH1
MOTOR_TIM1_CH2	MOTOR_TIM1_CH2
MOTOR_TIM1_CH3	MOTOR_TIM1_CH3
MOTOR_TIM1_CH1N	MOTOR_TIM1_CH1N
MOTOR_TIM1_CH2N	MOTOR_TIM1_CH2N
MOTOR_TIM1_CH3N	MOTOR_TIM1_CH3N
MOTOR_ADC12_INP10	MOTOR_ADC12_INP10
MOTOR_ADC12_INP11	MOTOR_ADC12_INP11
MOTOR_TIM15_CH2	MOTOR_TIM15_CH2
MOTOR_ADC2_INP1	MOTOR_ADC2_INP1
MOTOR_ADC12_INP4	MOTOR_ADC12_INP4
MOTOR_ADC12_INP8	MOTOR_ADC12_INP8
MOTOR_TIM15_BKIN	MOTOR_TIM15_BKIN
MOTOR_ADC1_INP6	MOTOR_ADC1_INP6
MOTOR_TIM1_BKIN	MOTOR_TIM1_BKIN
MOTOR_TIM15_CH1	MOTOR_TIM15_CH1
MOTOR_GPIO1	MOTOR_GPIO1
MOTOR_GPIO2	MOTOR_GPIO2

LIMITATIONS:
See user manual

MOTOR CONTROL JOYSTICK (OPTIONAL : not fitted)

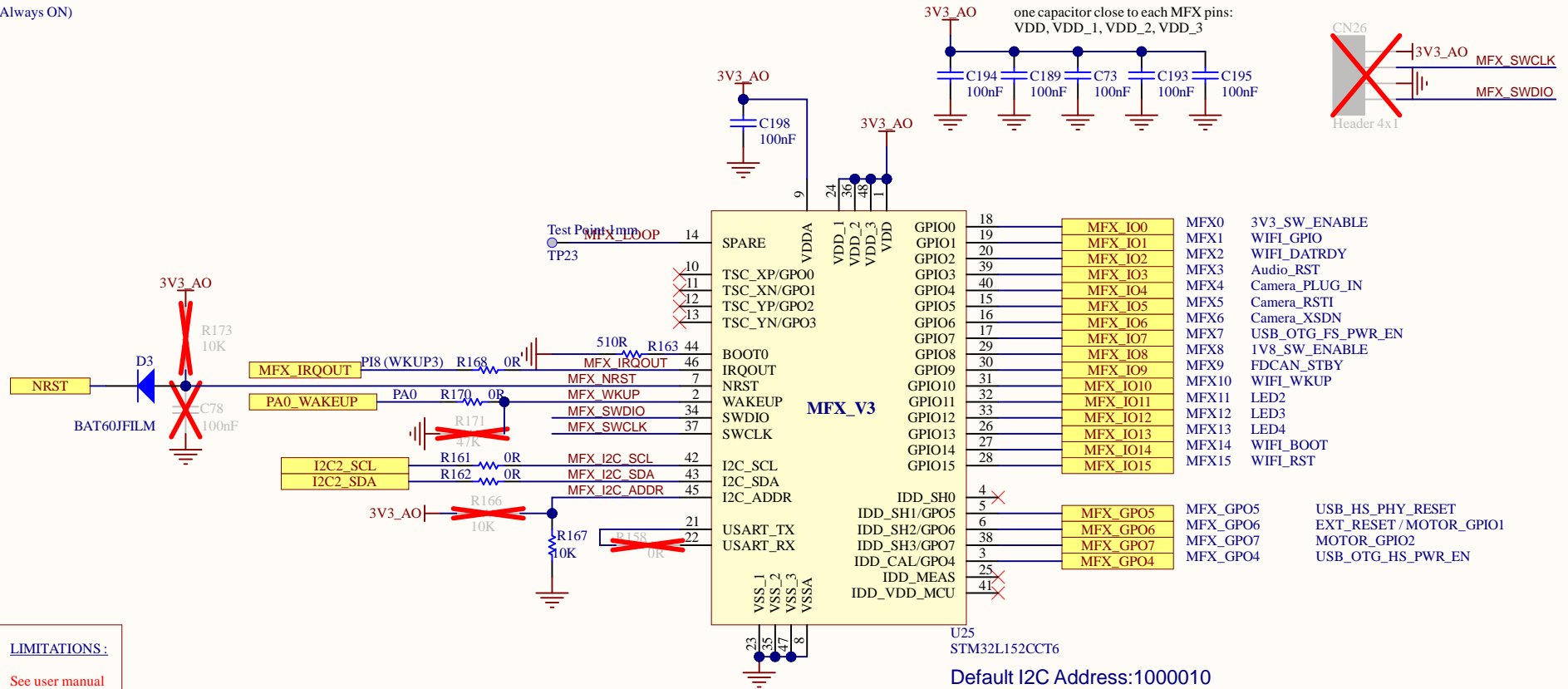


LIMITATIONS:
See user manual



MFX I/O EXPANDER

(Always ON)

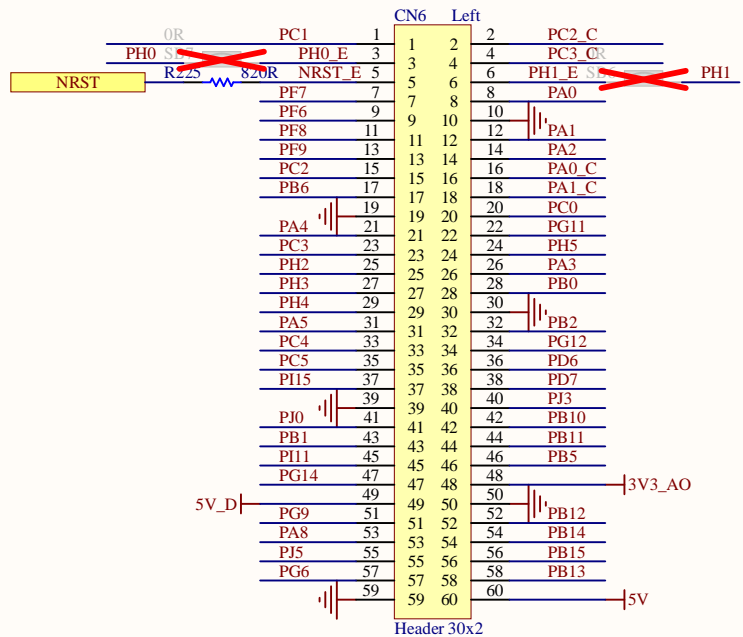


LIMITATIONS :

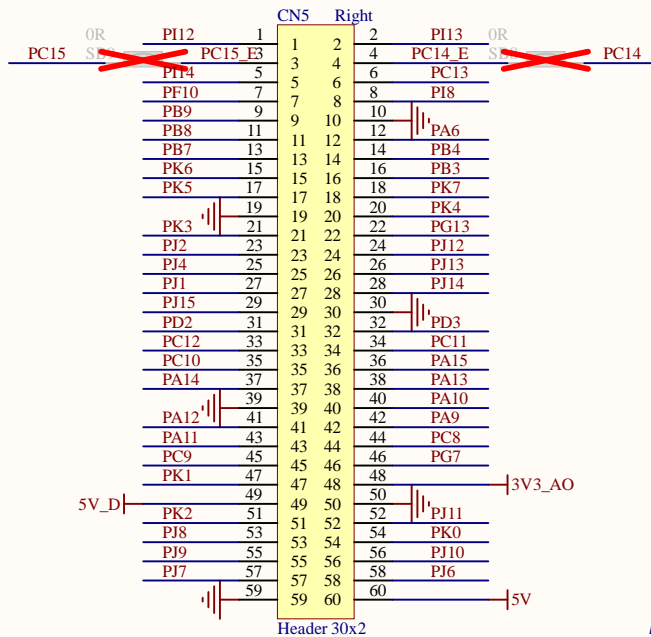
See user manual



MCU EXTENSION CONNECTORS

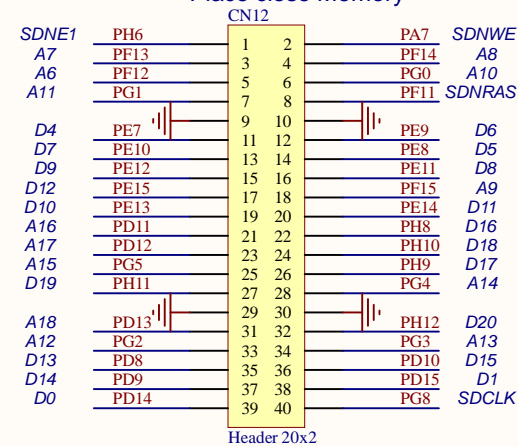


FTR-130-03-L-D-LC (Samtec)
or FTR-130-53-L-D-LC (Samtec) ?



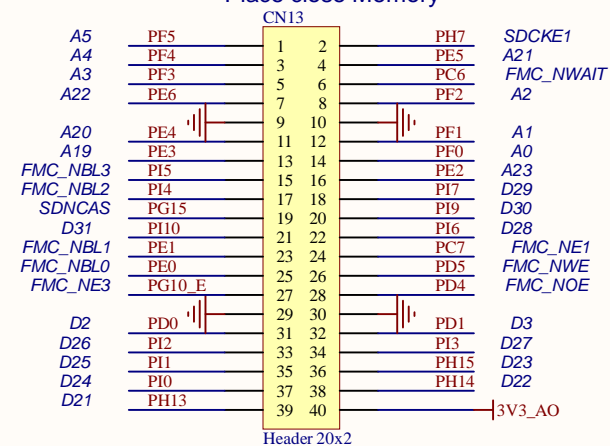
FTR-130-03-L-D-LC (Samtec)
or FTR-130-53-L-D-LC (Samtec) ?

Place close Memory

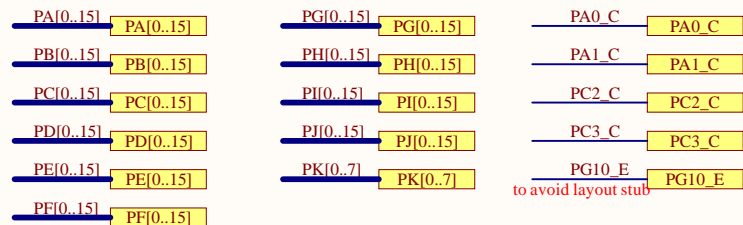


FTR-120-03-L-D-LC (Samtec)
or FTR-120-53-L-D-LC (Samtec) ?

Place close Memory

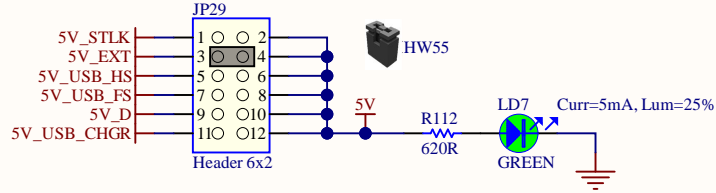


FTR-120-03-L-D-LC (Samtec)
or FTR-120-53-L-D-LC (Samtec) ?

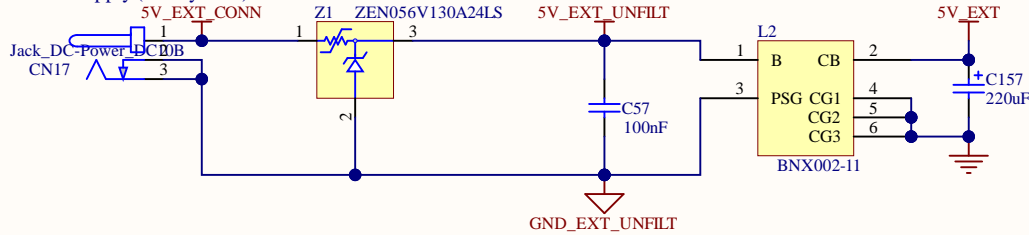


BOARD POWER

5V Power Supply options

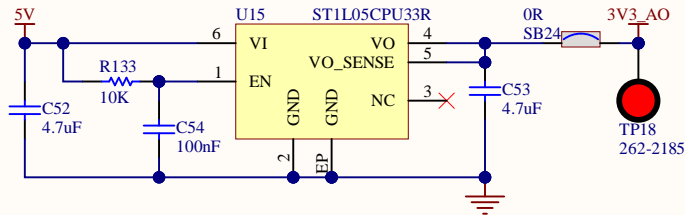


5V External supply (Always ON)

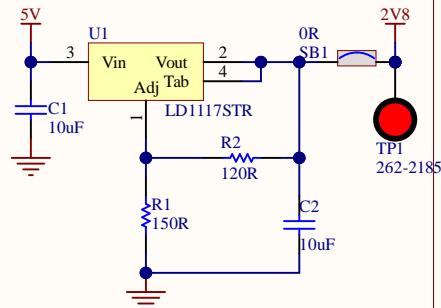


3V3 Supply (Always ON)

See Power MCU page
(also provides power to MCU VDD)

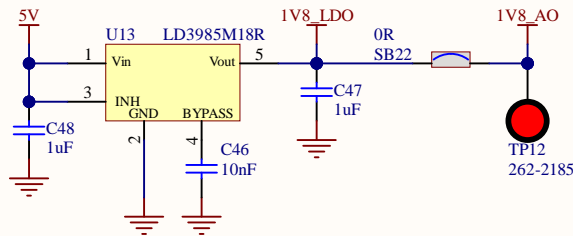


2V8 supply (Always ON)

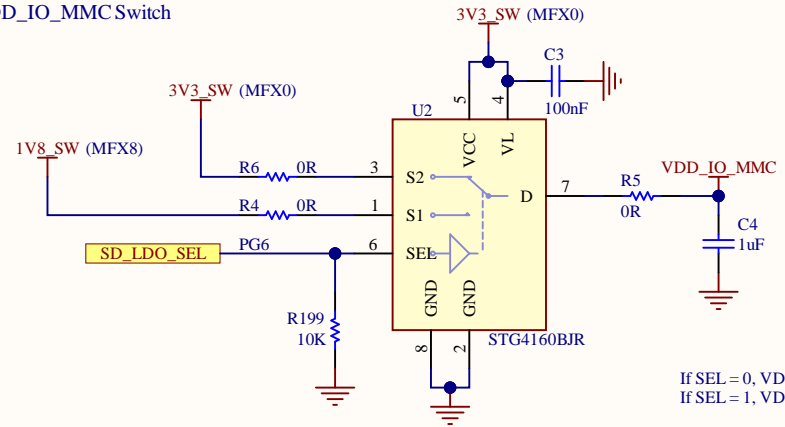


1V8 (Always ON)

See Power MCU page : can be replaced by MCU internal SMPS



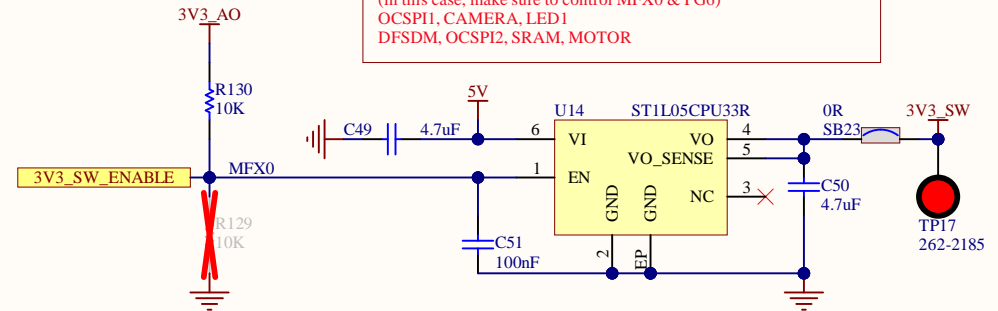
VDD_IO_MMC Switch



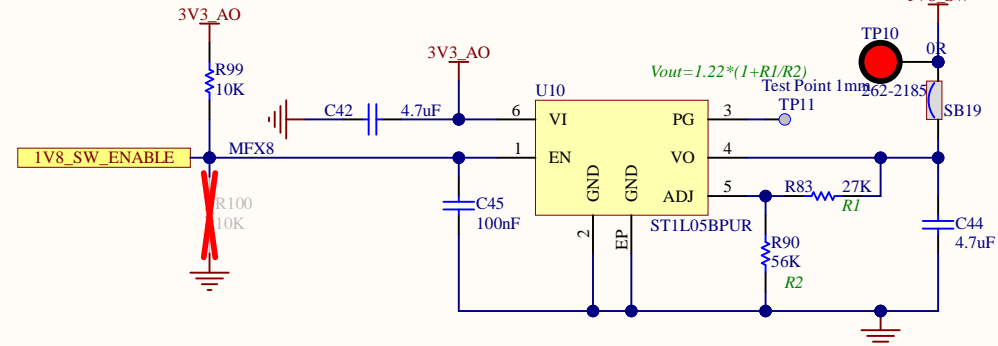
If SEL = 0, VDD_MMC = 3V3 (default)
If SEL = 1, VDD_MMC = 1V8

3V3 Supply (Switched)

SD CARD 2 is supplied by VDD_IO_MMC
(in this case, make sure to control MFX0, MFX8 & PG6)
Following interfaces are supplied by VDD_IO_MMC = 3.3V only
(in this case, make sure to control MFX0 & PG6)
OCSP11, CAMERA, LED1
DFSMD, OCSP12, SRAM, MOTOR



1V8 Supply (Switched)



JTAG & TRACE

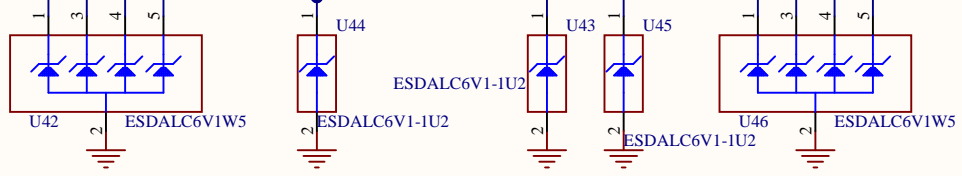
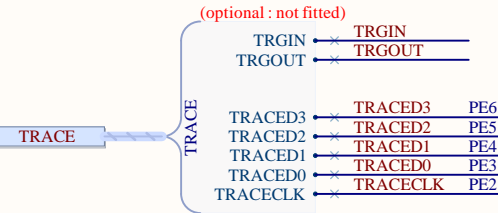
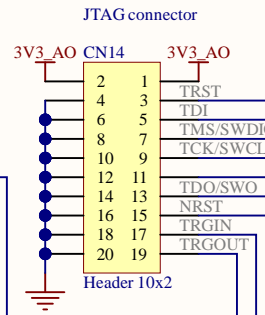
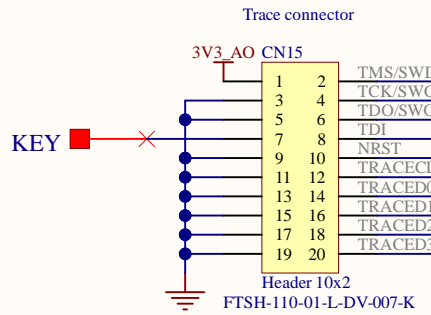
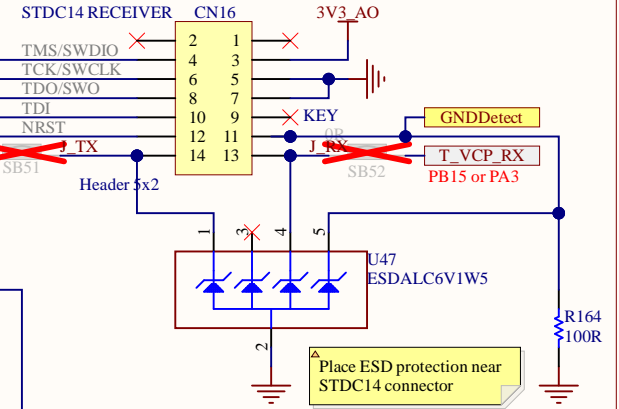
(Always ON)

To disconnect JTAG connectors from target :
- Remove 47R resistors and solder bridges

See STLINK V3 & PERIPHERAL pages

- T_SWKDIO
- T_SWCLK
- T_SWO
- T_NRST

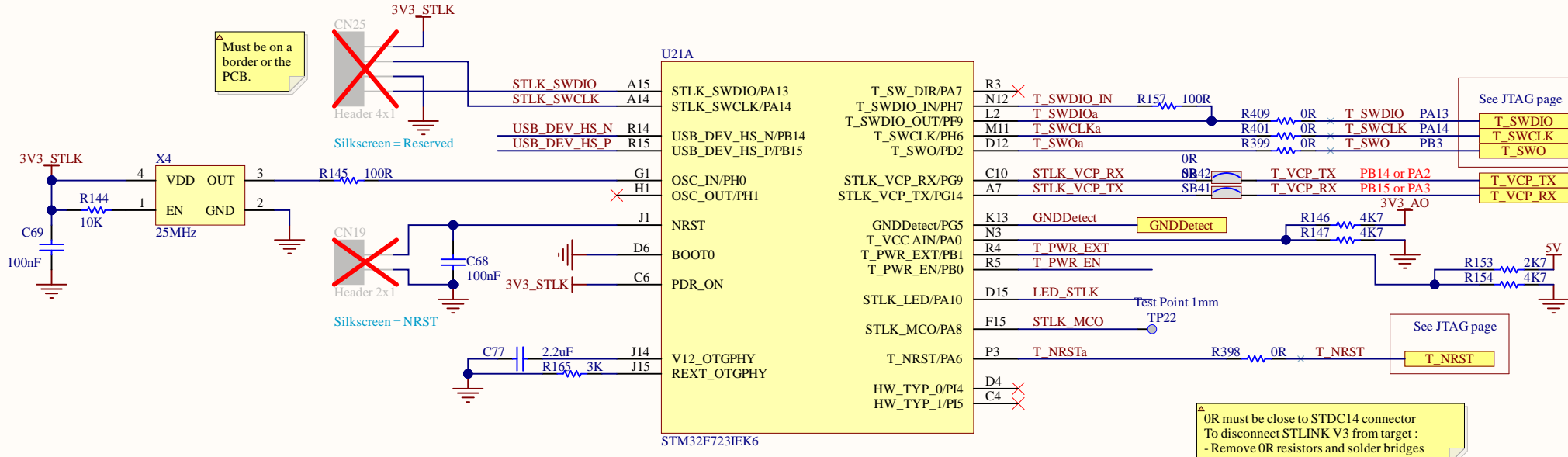
JTMS	PA13	47R	R57	TMS/SWDIO	JTAG TMS
JTCK	PA14	47R	R59	TCK/SWCLK	JTAG TCK
JTDO	PB3	47R	R32	TDO/SWO	JTAG TDO
JTDI	PA15	47R	R53	TDI	JTAG TDI
NJTRST	PB4	47R	R252	TRST	JTAG TRST
NRST		47R	R218	NRST	JTAG_HOST_NRST



LIMITATIONS:
see User Manual

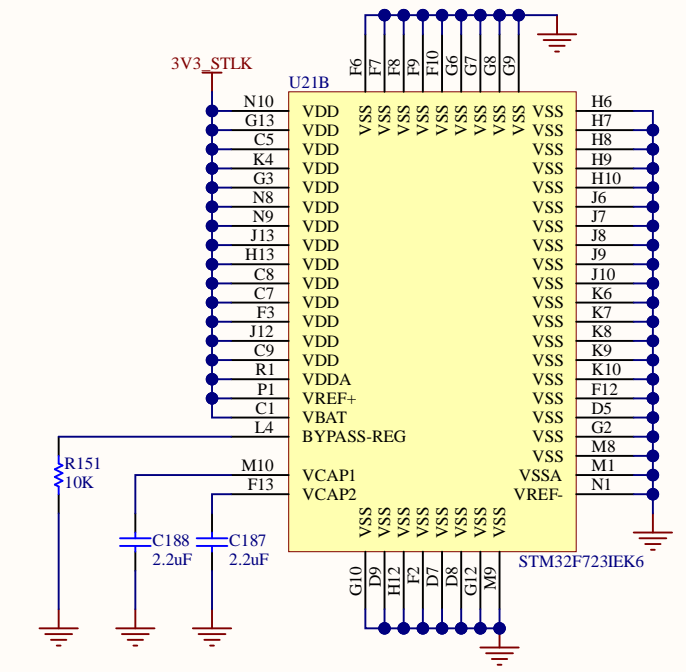


STLINK V3E

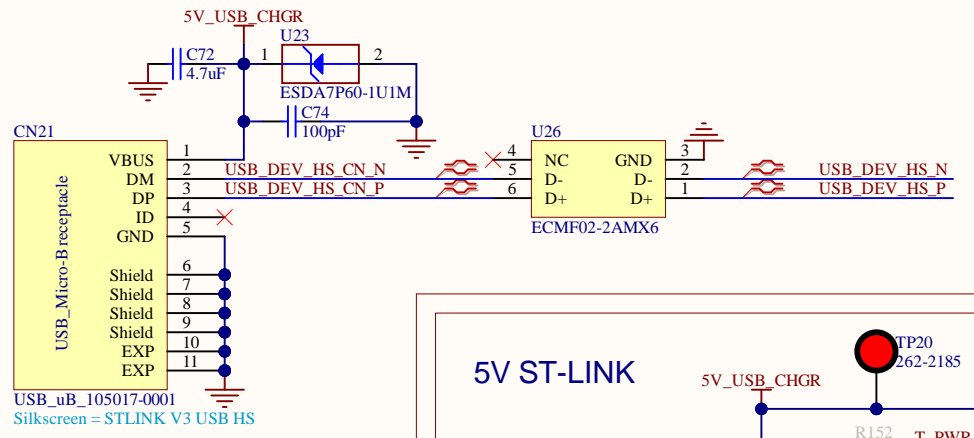


LIMITATIONS (see MCU page):
Back up : if SD CARD 2, use UART VCOM back-up (PB14/PB15)

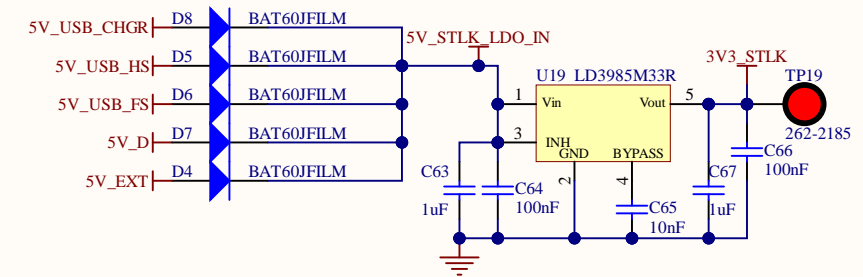
POWER



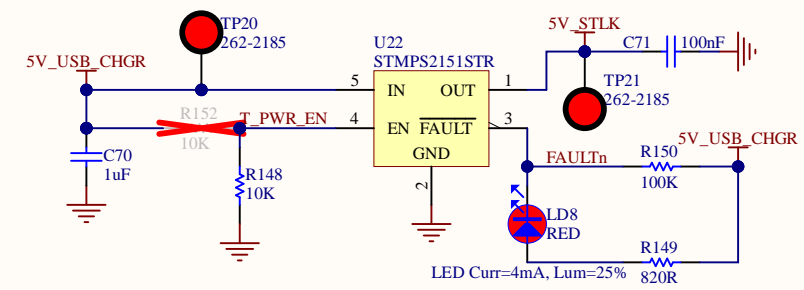
STLINK USB HS & 5V USB CHARGER



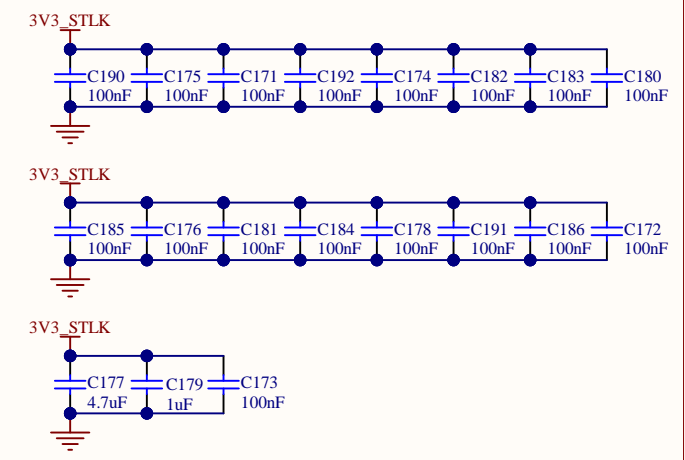
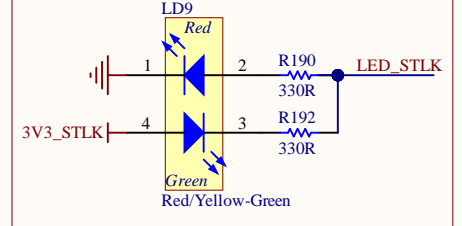
3.3V ST-LINK

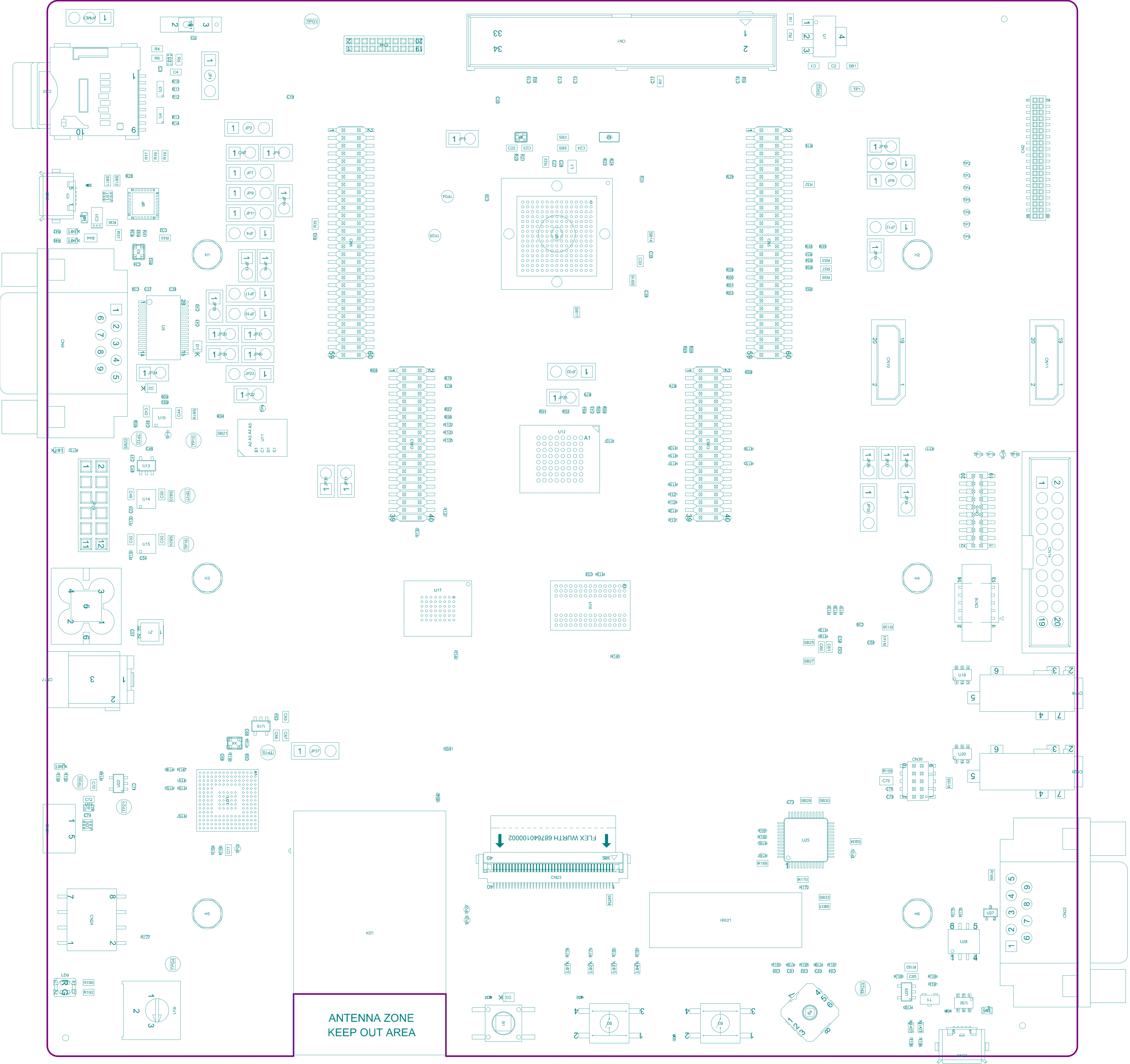



5V ST-LINK

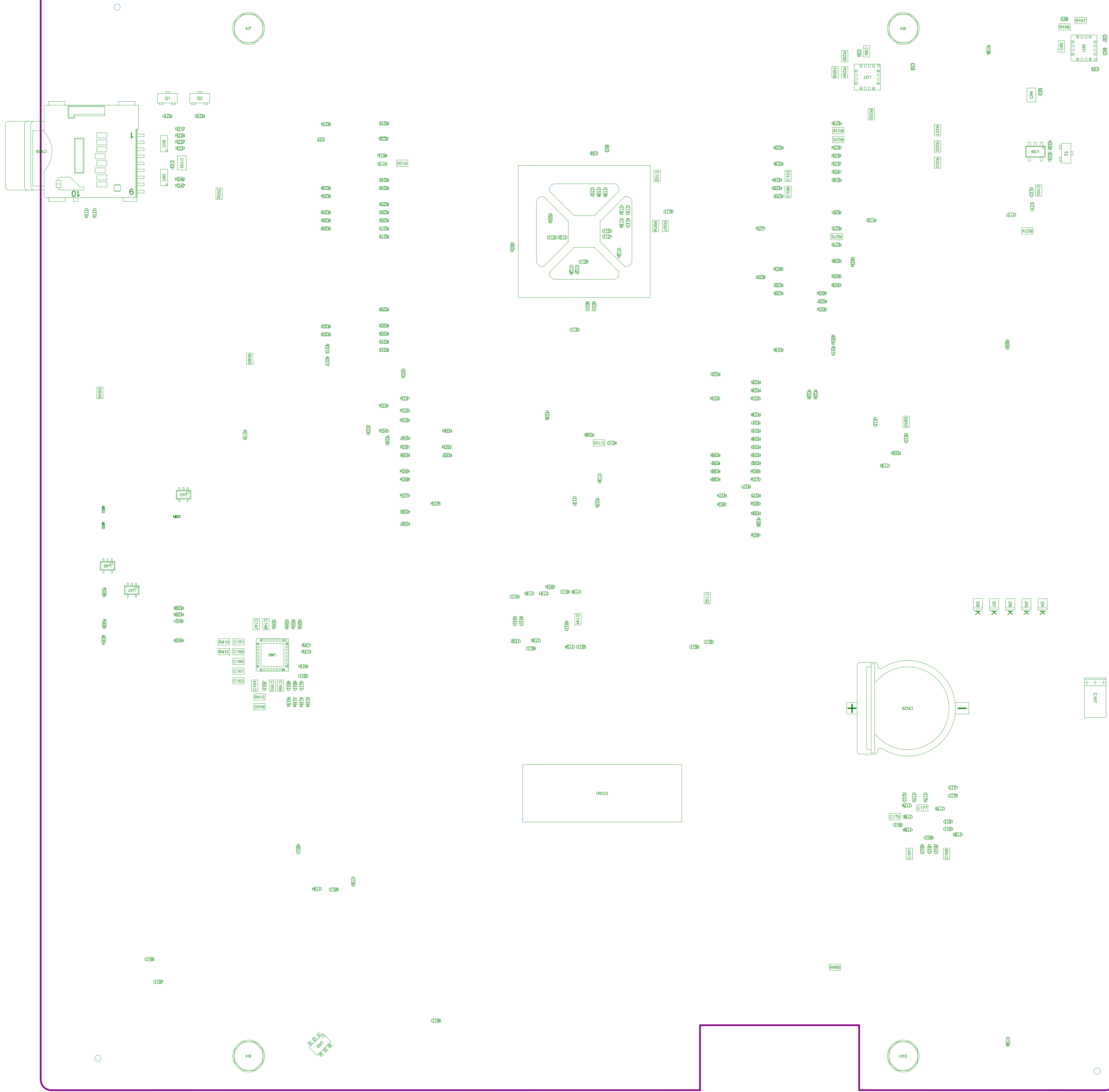



LED

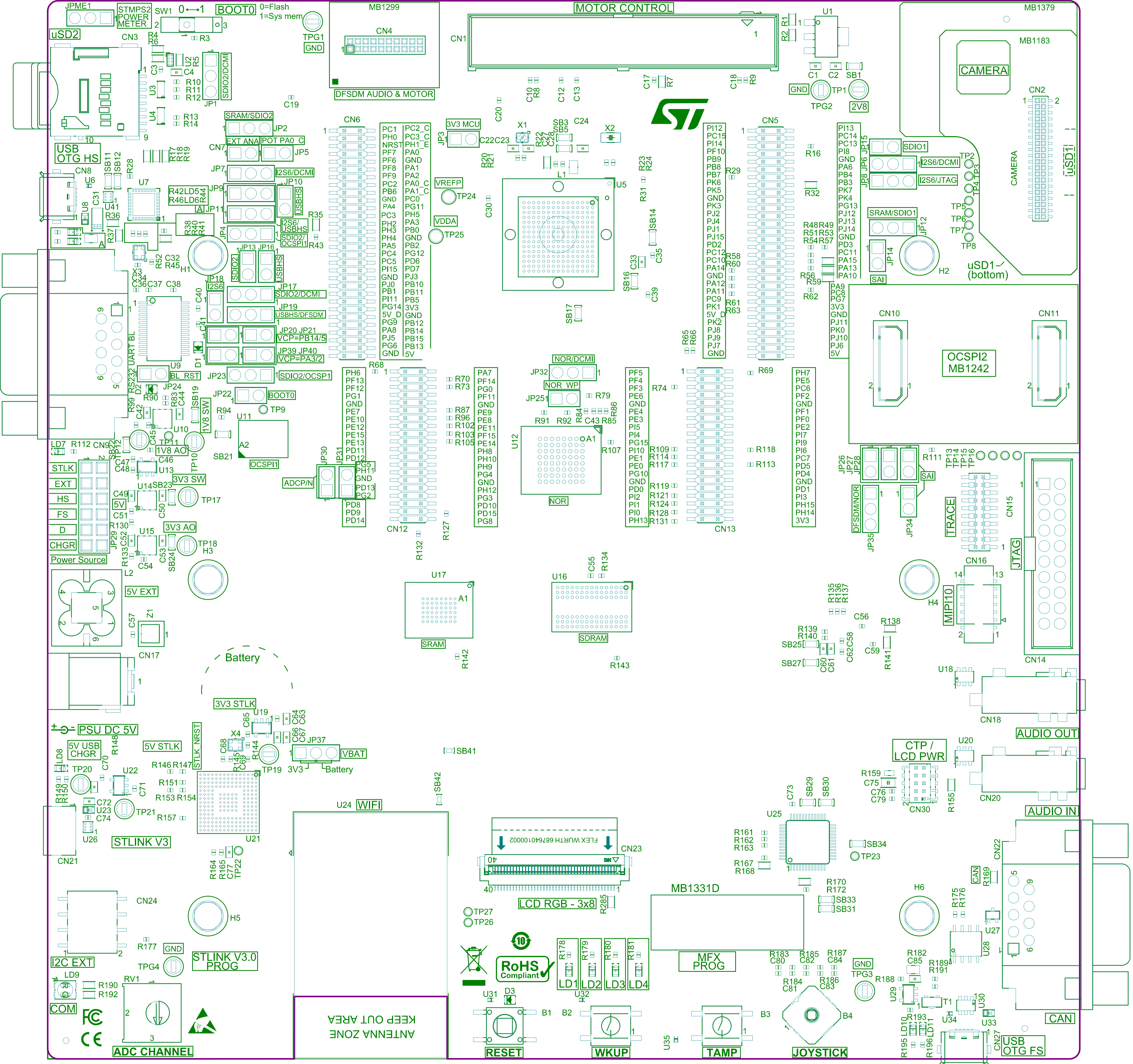




Project: STM32H7B3I-EVAL		
Layer: M14-Top Assembly	Gerber: .GM14	
Variant: H7B3LIQ	Ref: MB1331	
Date: 05-MAR-2024	Rev: D	



Project: STM32H7B3I-EVAL		
Layer: M15-Bottom Assembly	Gerber: .GM15	
Variant: H7B3LIQ	Ref: MB1331	
Date: 05-MAR-2024	Rev: D	



Top Overlay .GTO

