

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 : STMP52 & 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.

A

Notes to generate the board layout.

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.

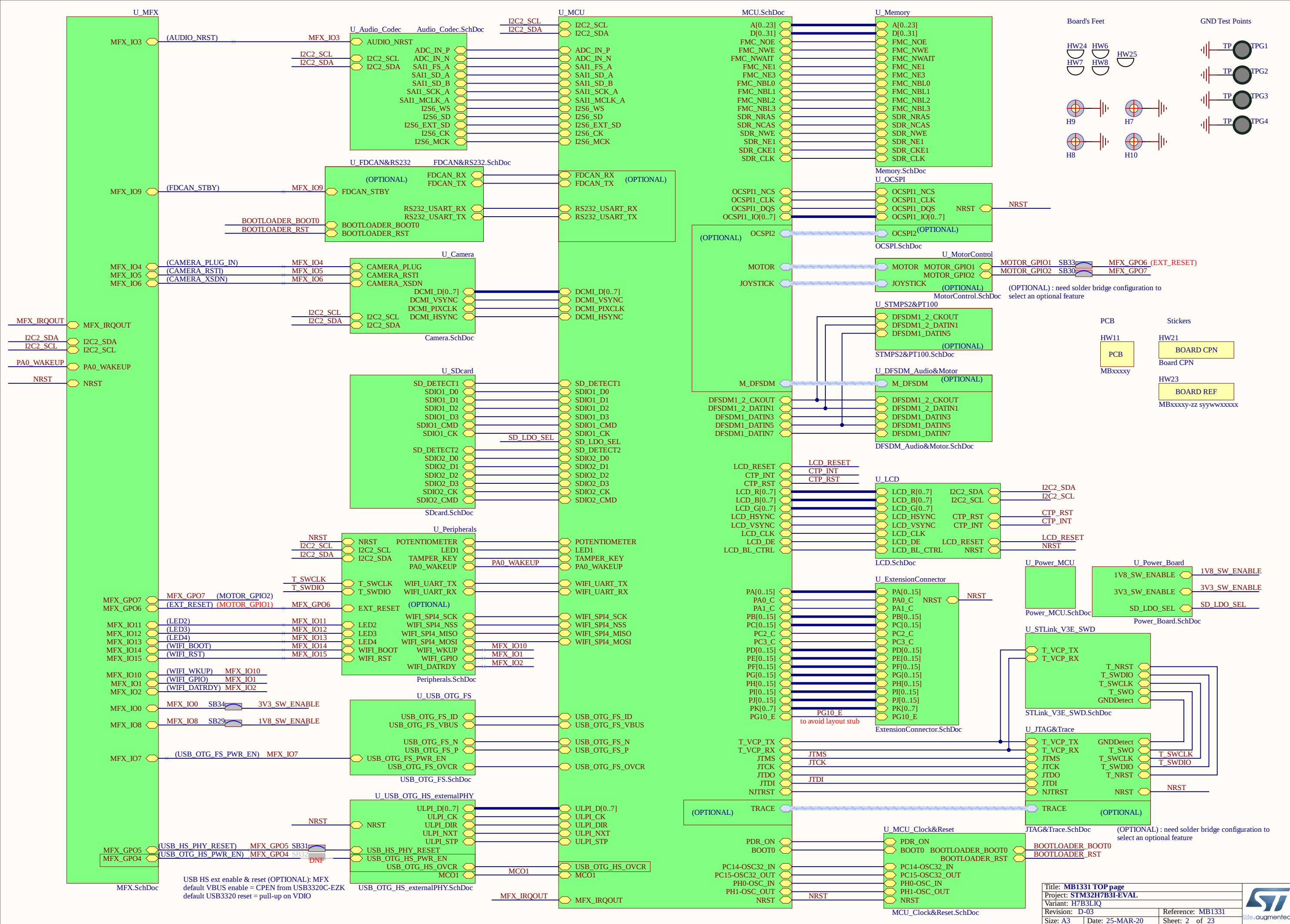
The complete Open Platform License Agreement can be found on www.st.com/opla.

U_Top
MB1331_TOP.SchDoc



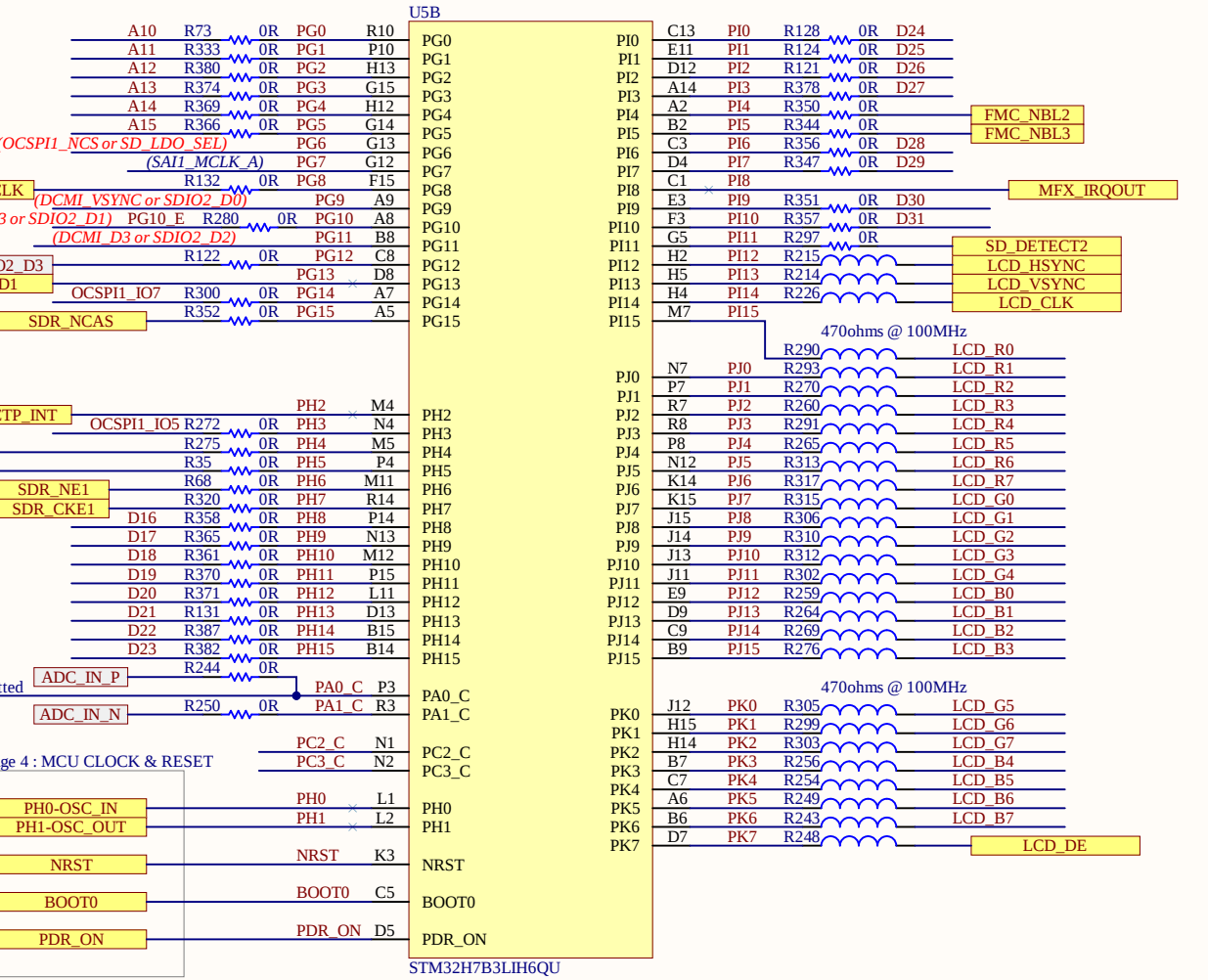
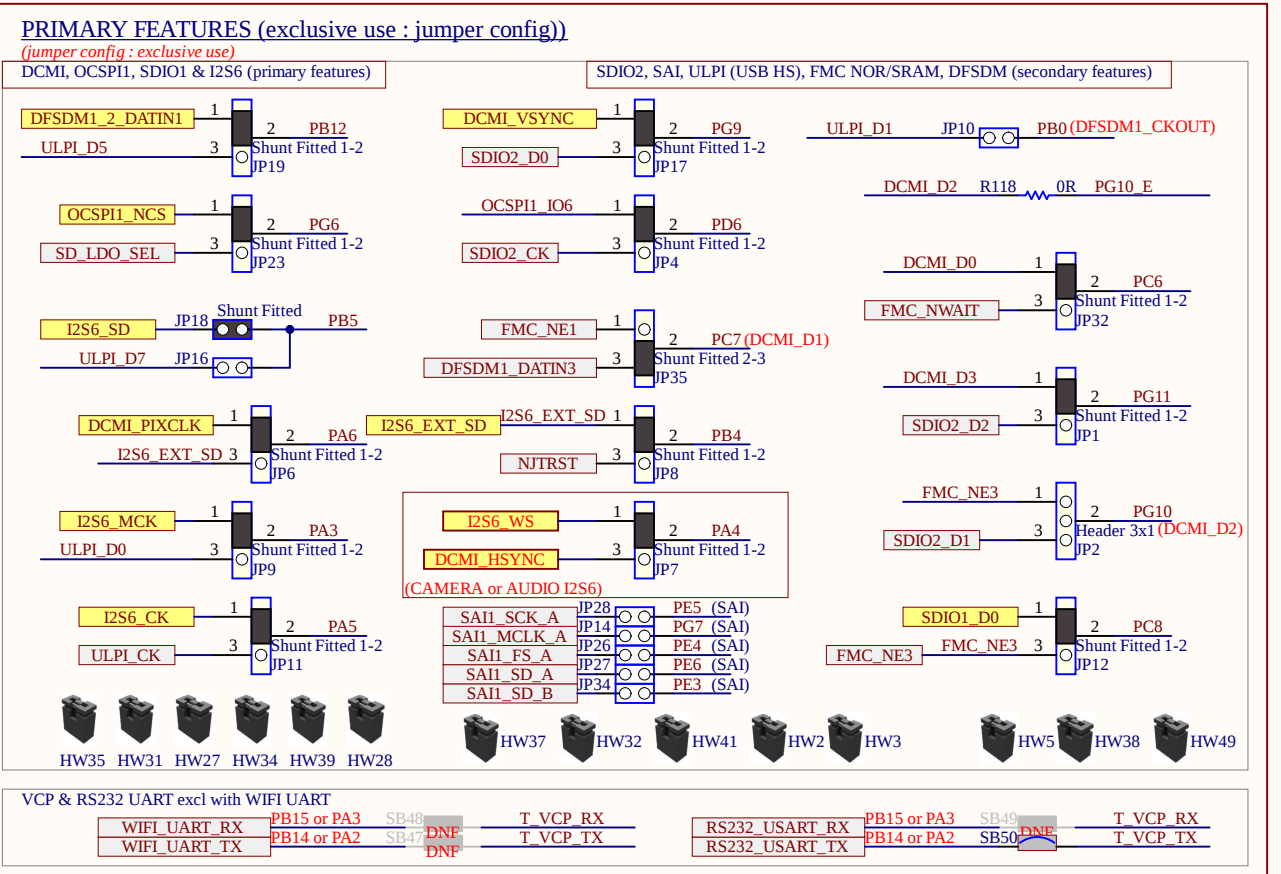
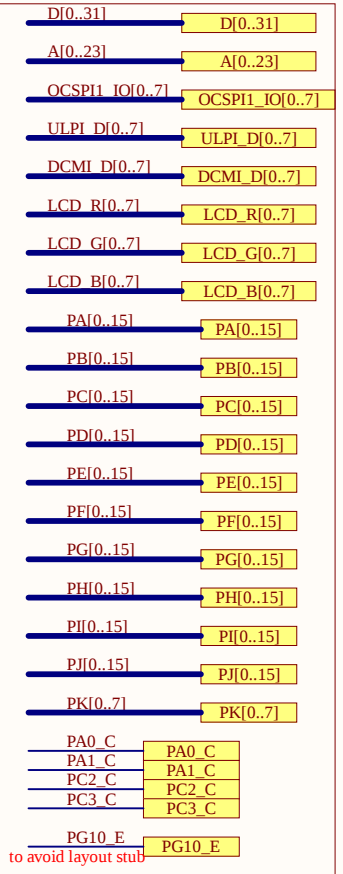
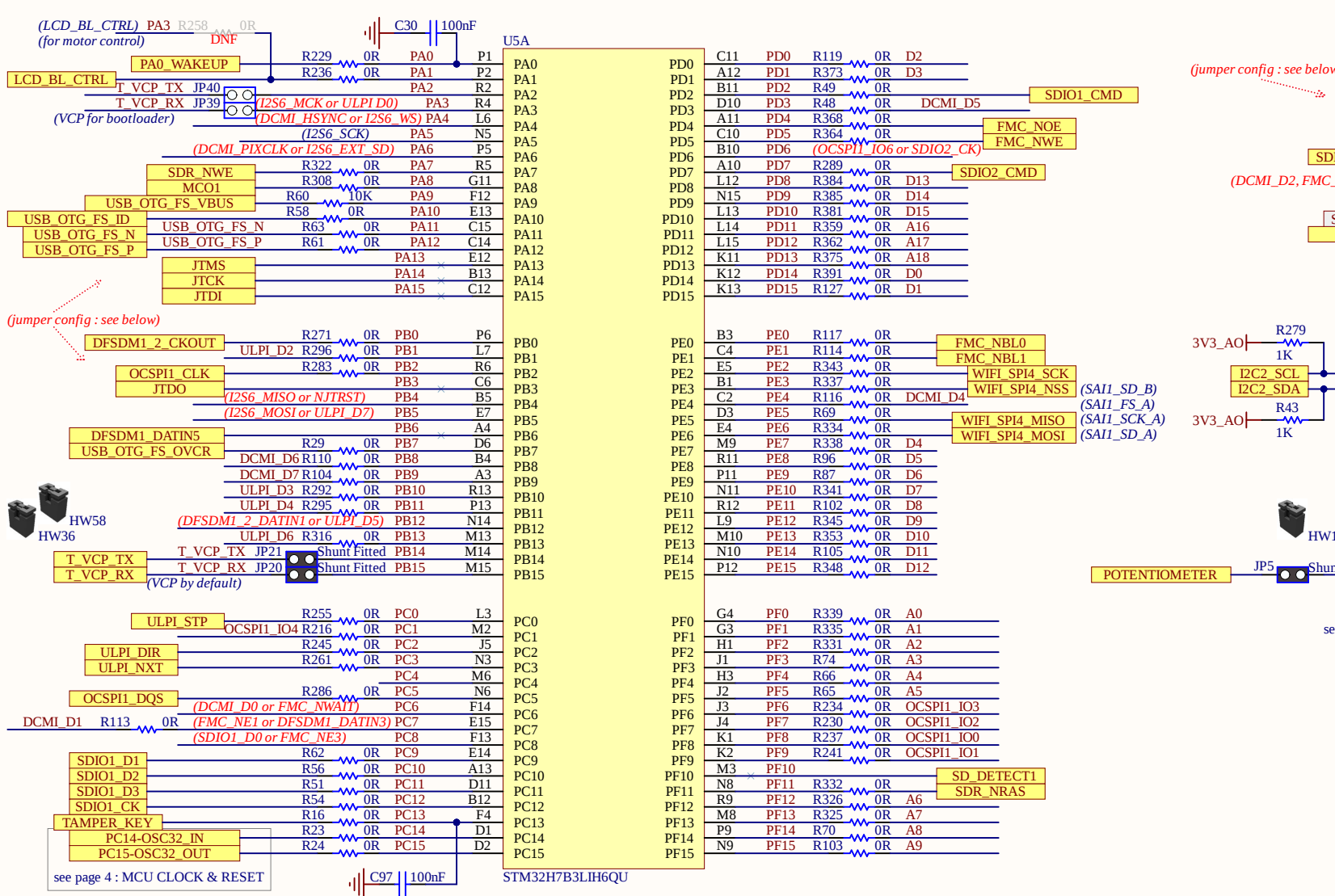
Title: Project overview		
Project: STM32H7B3I-EVAL		
Variant: H7B3LIQ		
Revision: D-03	Reference: MB1331	
Size: A4	Date: 25-MAR-20	Sheet: 1 of 23



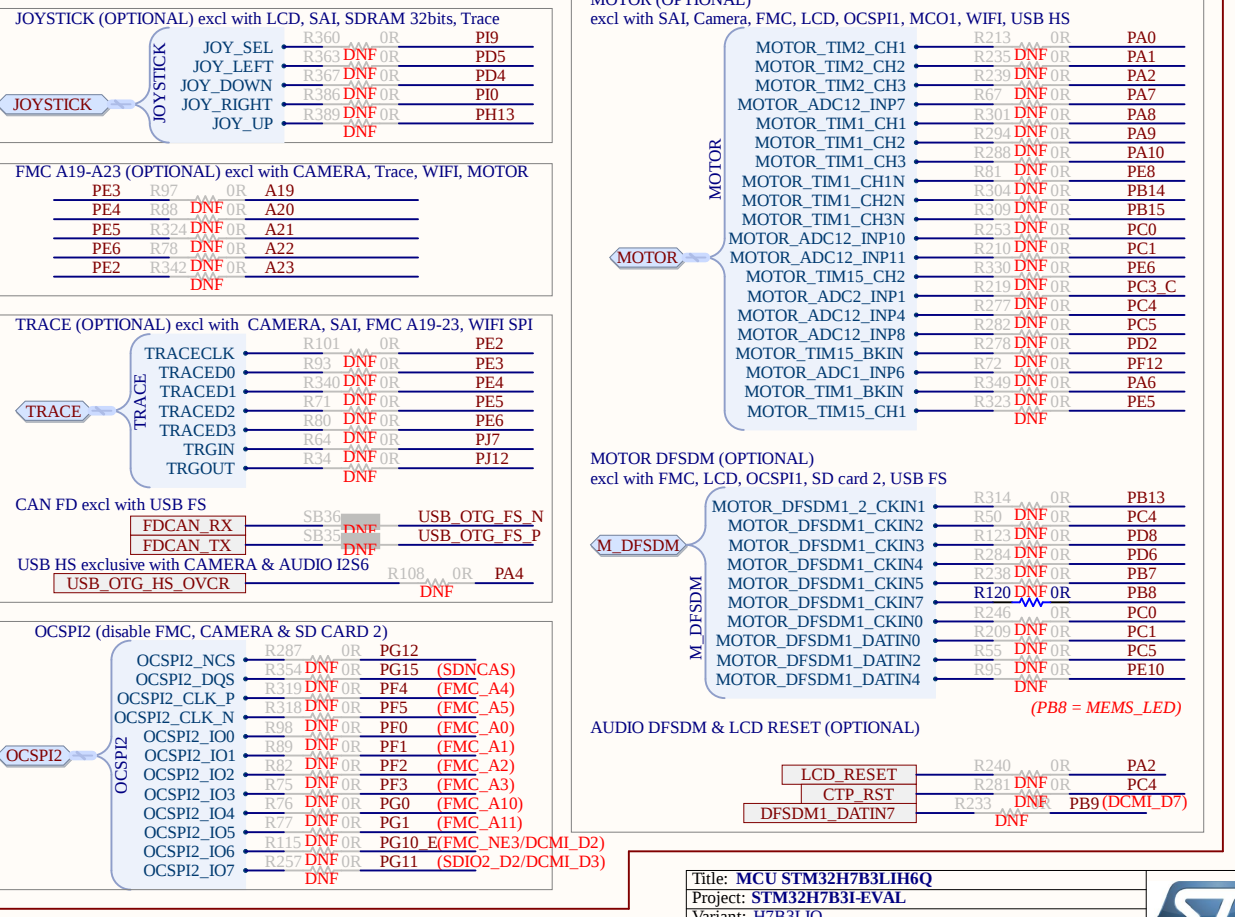


STM32H7B3LIH6Q MCU I/Os

PRIMARY FEATURES (fitted by default)

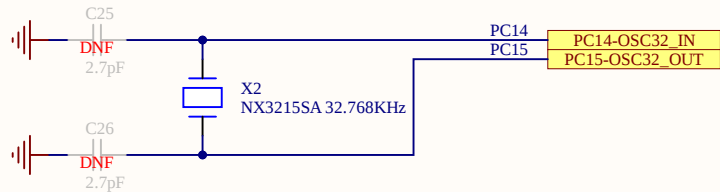


SECONDARY FEATURES (not fitted by default)

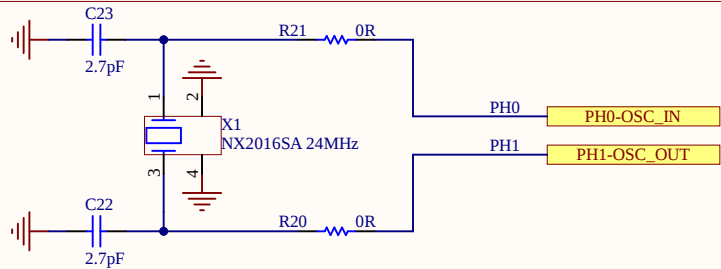


STM32H7B3LIH6Q MCU CLOCK, RESET & BOOT

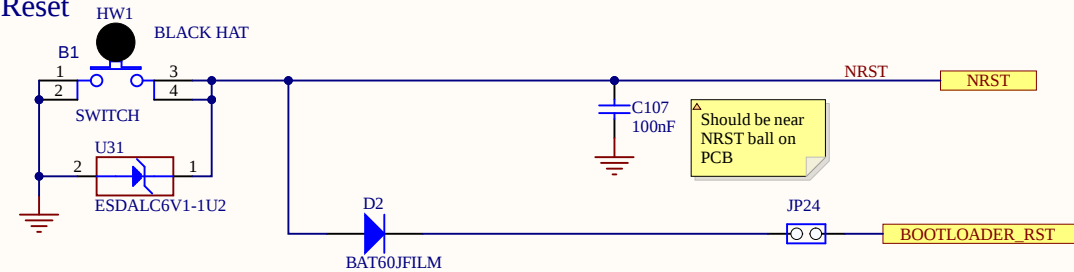
32kHz Clock



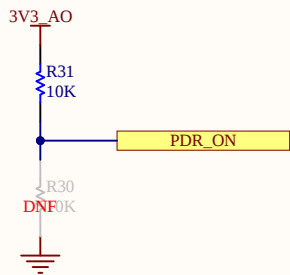
24MHz Clock



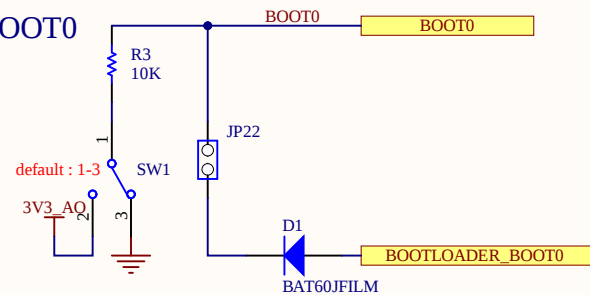
Reset



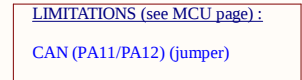
PDR ON



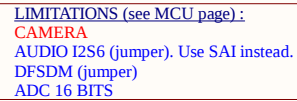
BOOT0



(Always $\overline{ON}$)

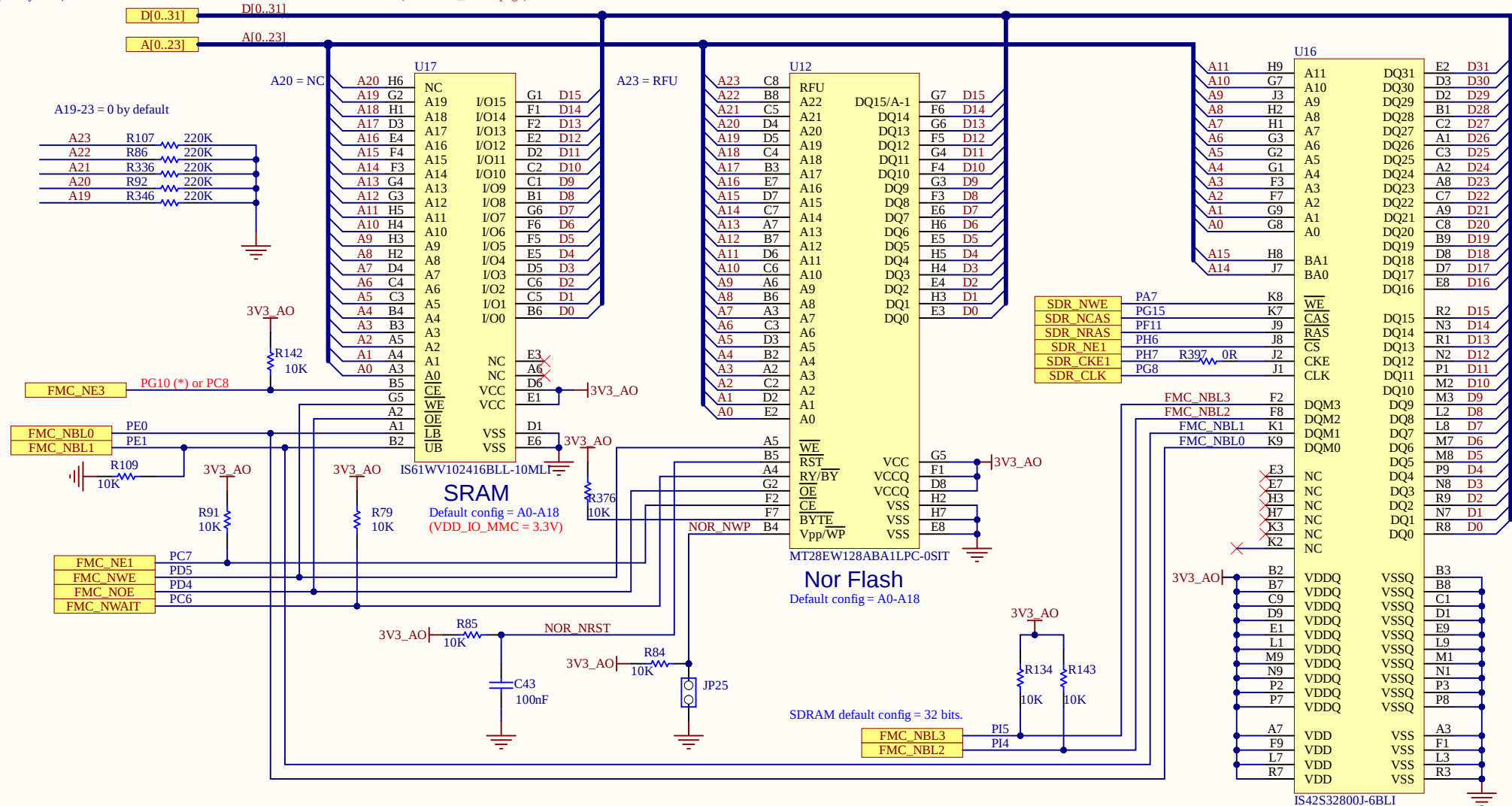


(Always $\overline{ON}$)



(Always ON)

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

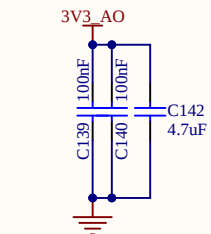


LIMITATIONS (SDRAM): OCSPI2

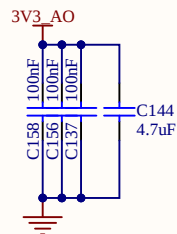
LIMITATIONS (NOR):
CAMERA
OCSP12, DFSDM DATIN3

LIMITATIONS & BACK-UP (SRAM) :

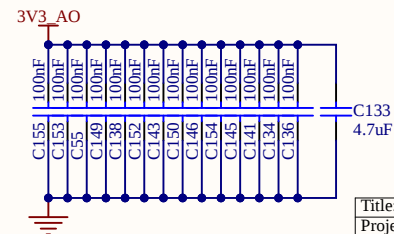
CAMERA
SD CARD : NE3 = PG10 (if SD CARD 1 is used) / PC8 (if SD CARD 2 is used)
OCSPI2
(*) Make sure to set VDD_IO_MMC = 3.3V



Place close to SRAM



Place close to Nor Flash



Place close to SDRAM

SDRAM

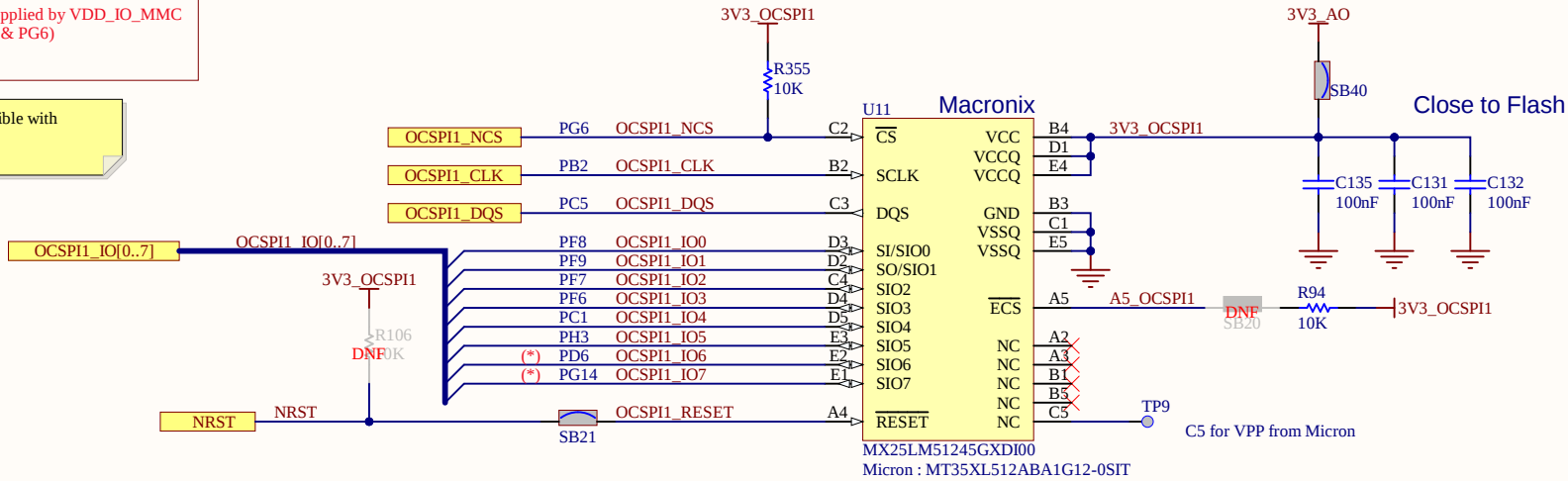
Default config = 32 bits.

Title: Memory			 lfe.augmented.com
Project: STM32H7B3I-EVAL			
Variant: H7B3LIQ			
Revision: D-03		Reference: MB1331	
Size: A4	Date: 25-MAR-20	Sheet: 7 of 23	

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

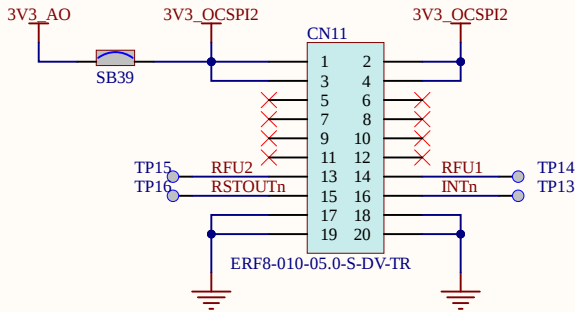


LIMITATIONS (see MCU page):
SD CARD 2 (jumper)
(*) Make sure to set VDD_IO_MMC = 3.3V

(RESET pins of Flash have internal pull-up (both) by default
and VPP connection is tbc on Micron)

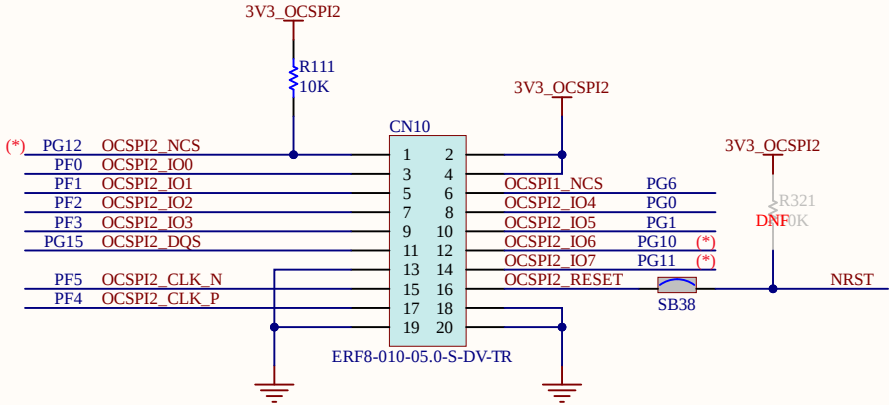
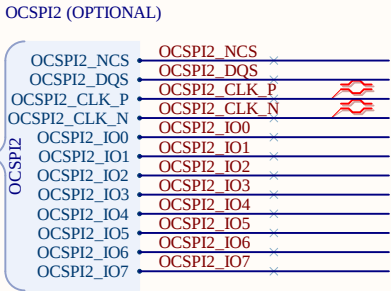
OCSPI 2 (MB1242 Module connector)

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



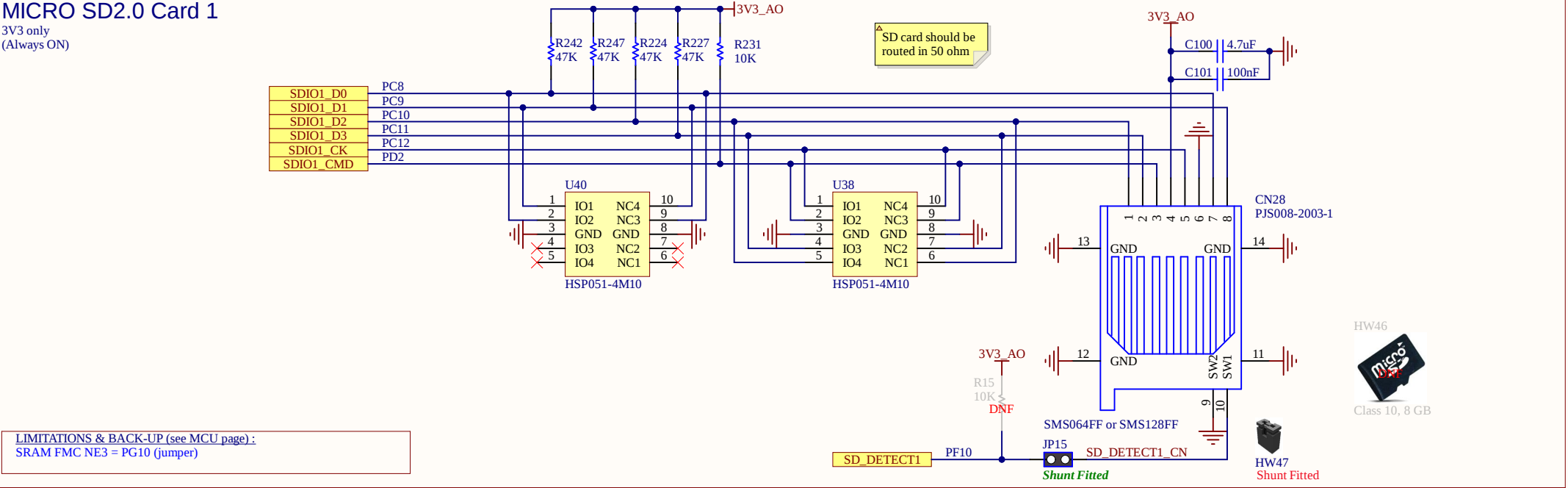
LIMITATIONS & BACK-UP (see MCU page):
FMC (NOR, SRAM & SDRAM)
SD CARD 2 (jumper)
(*) Make sure to set VDD_IO_MMC = 3.3V

HW29
DNF
MB1242 - ERM8 BGA24 Octal SPI module



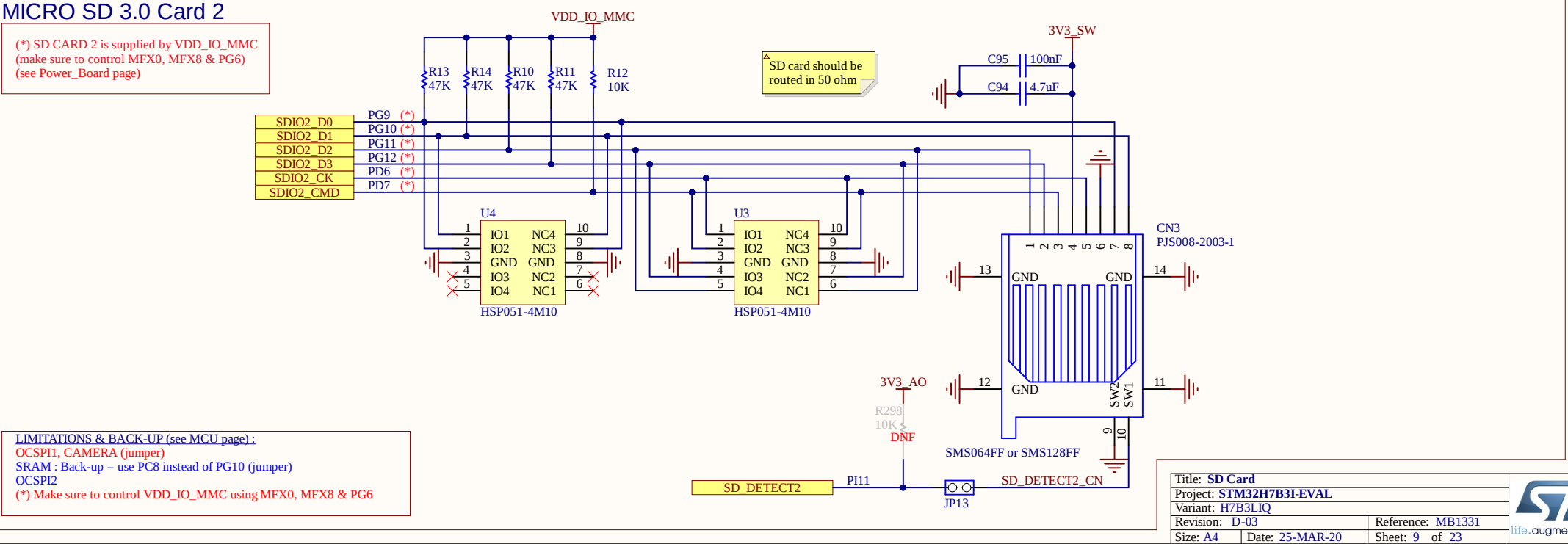
MICRO SD2.0 Card 1

3V3 only
(Always ON)



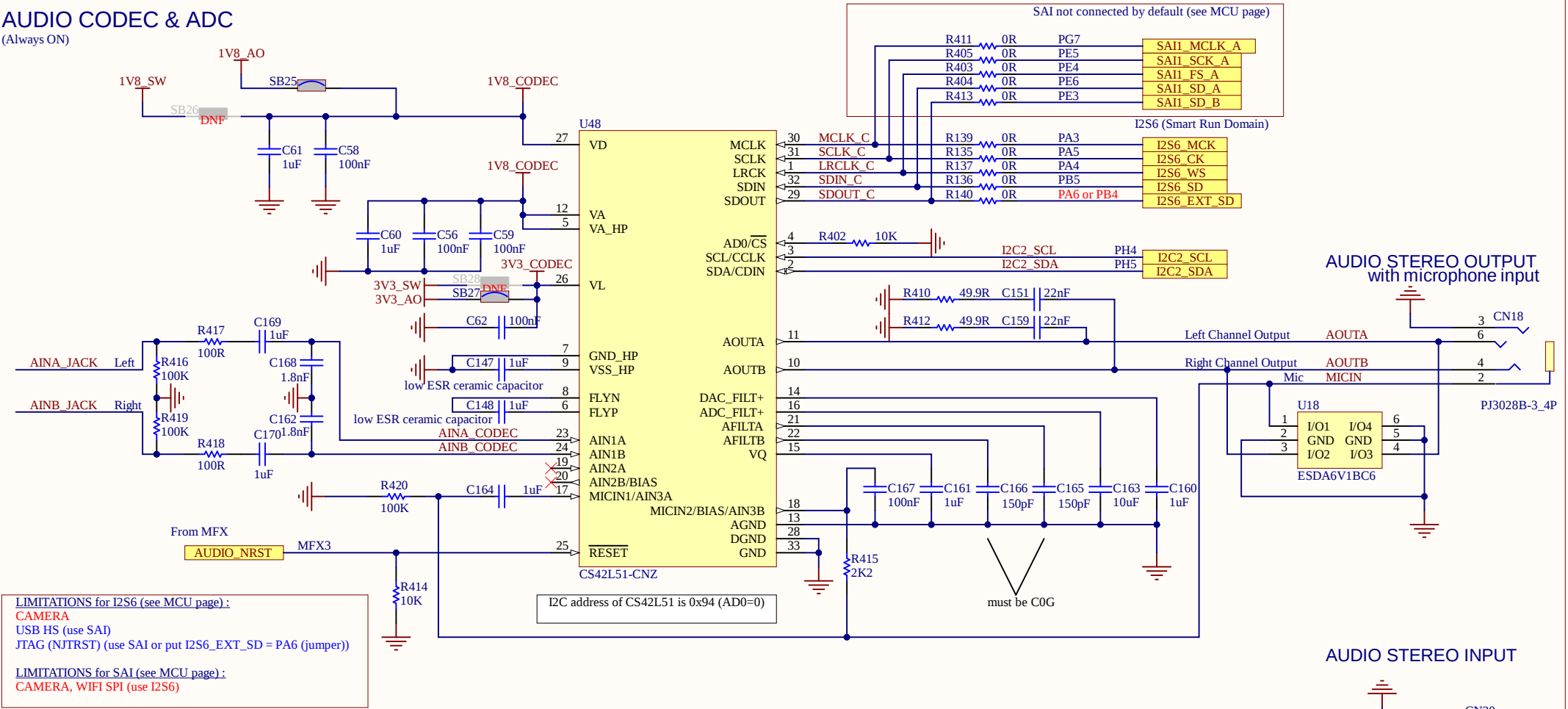
MICRO SD 3.0 Card 2

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



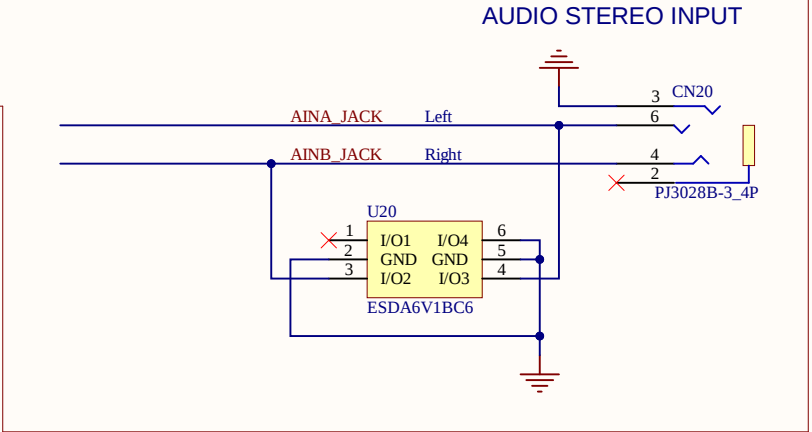
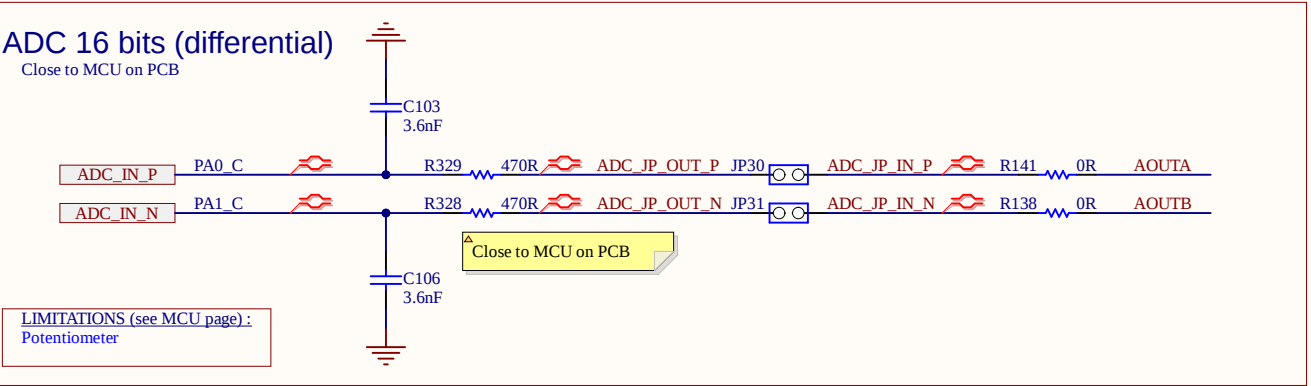
AUDIO CODEC & ADC

(Always ON)



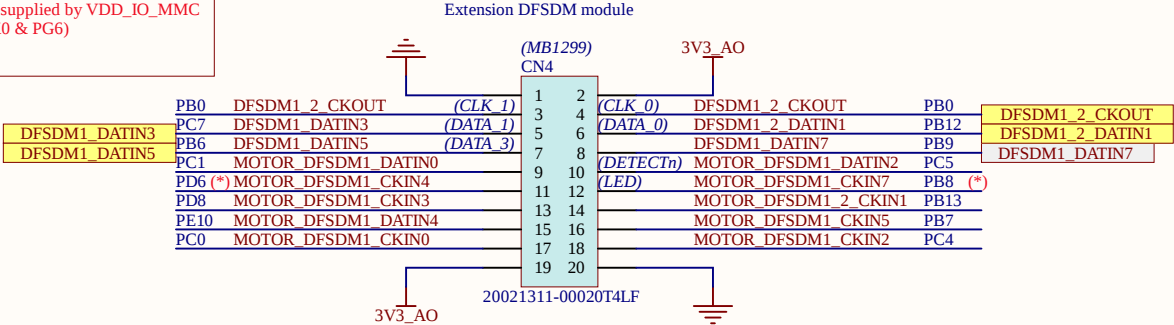
ADC 16 bits (differential)

Close to MCU on PCB

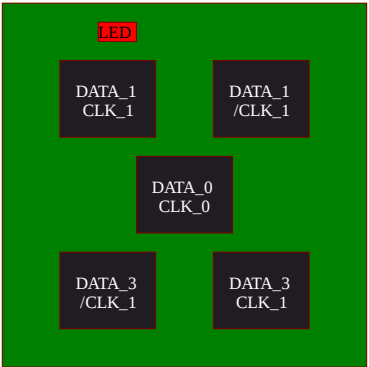


DFSDM AUDIO & MOTOR

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



HW30
DNF
MB1299-5_MEMS_Microphone_Expansion_Board



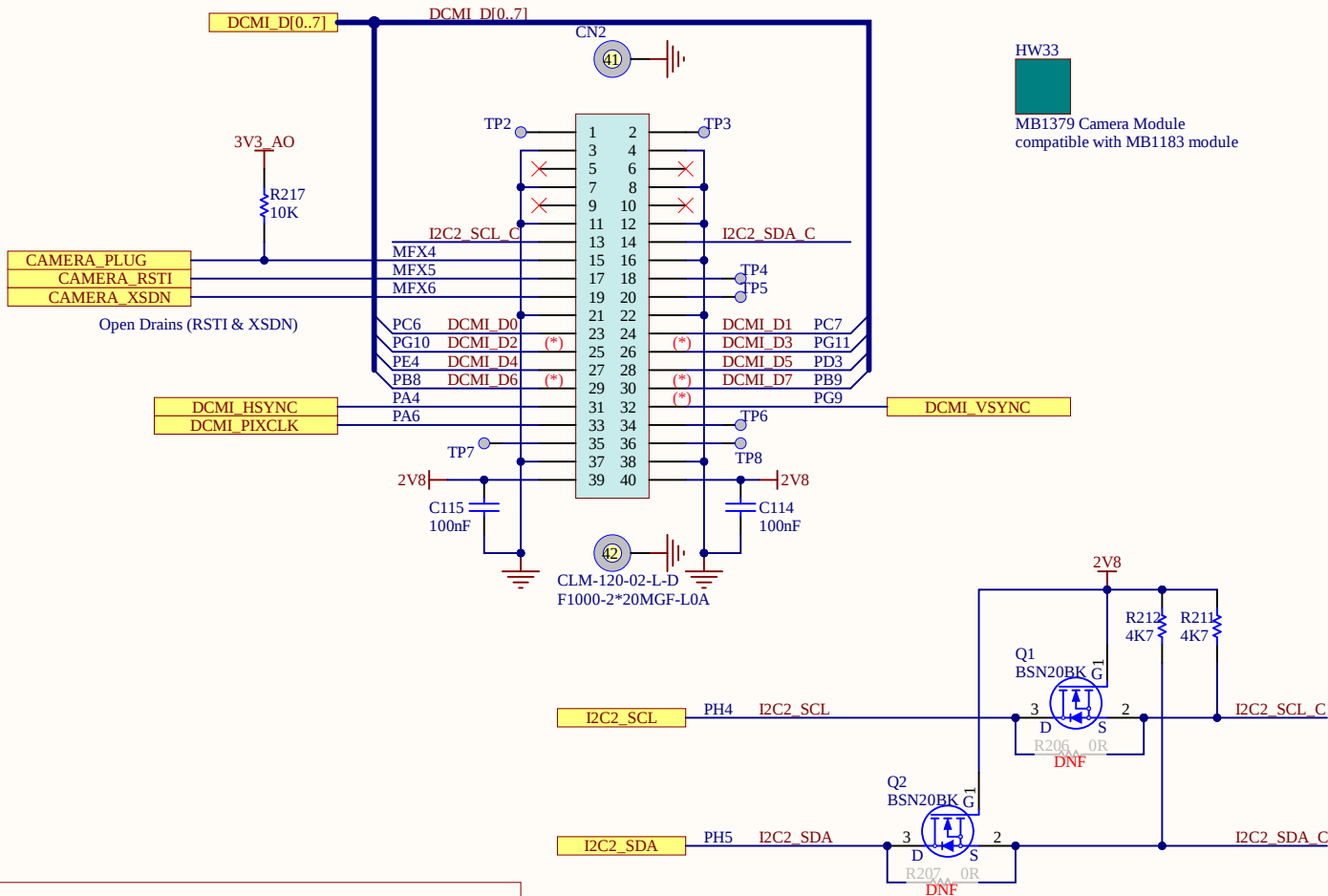
(MB1299)
CLK0 & CLK1 = data valid when clk is high
/CLK1 = data valid when clk is low

LIMITATIONS AUDIO DFSDMx4 (see MCU page):

(*) Make sure to set VDD_IO_MMC = 3.3V
CAMERA
USB HS, FMC NOR (jumper)

CAMERA MODULE CONNECTOR

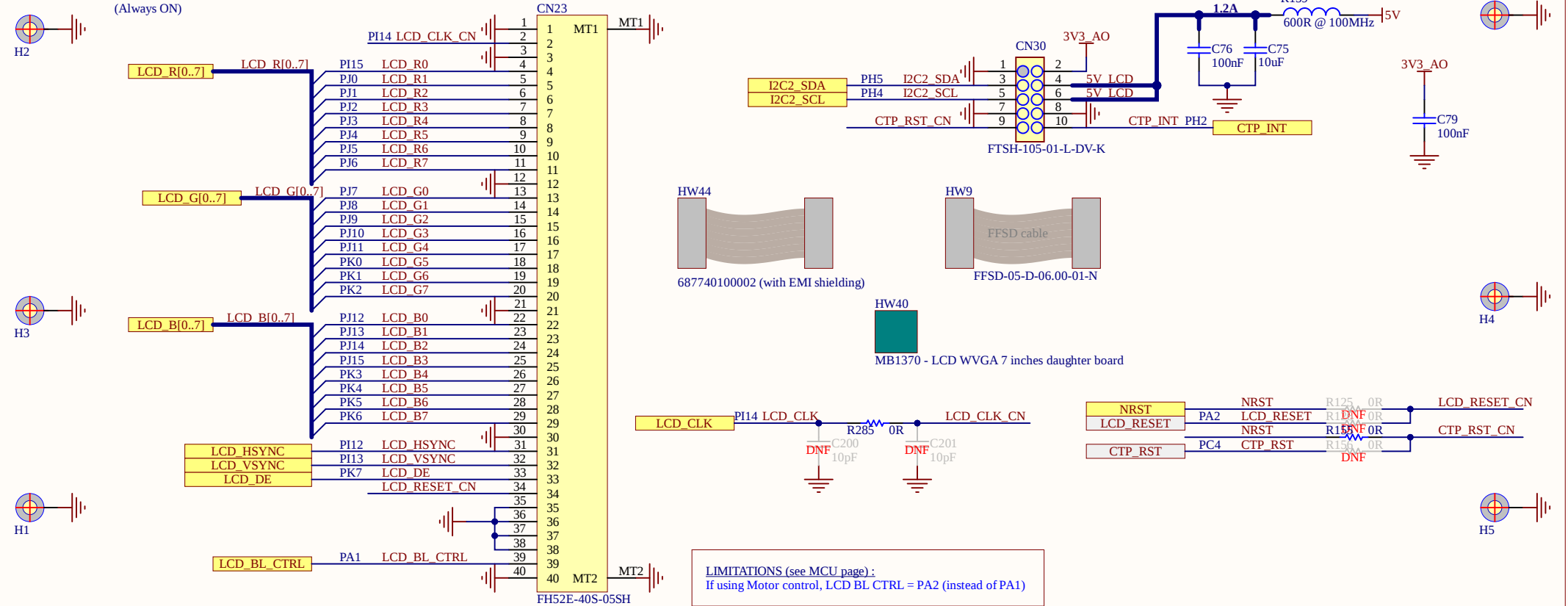
(*) Some DCM1 I/O are supplied by VDD_IO_MMC
(make sure to control MFX0 & PG6)
(see Power_Board page)



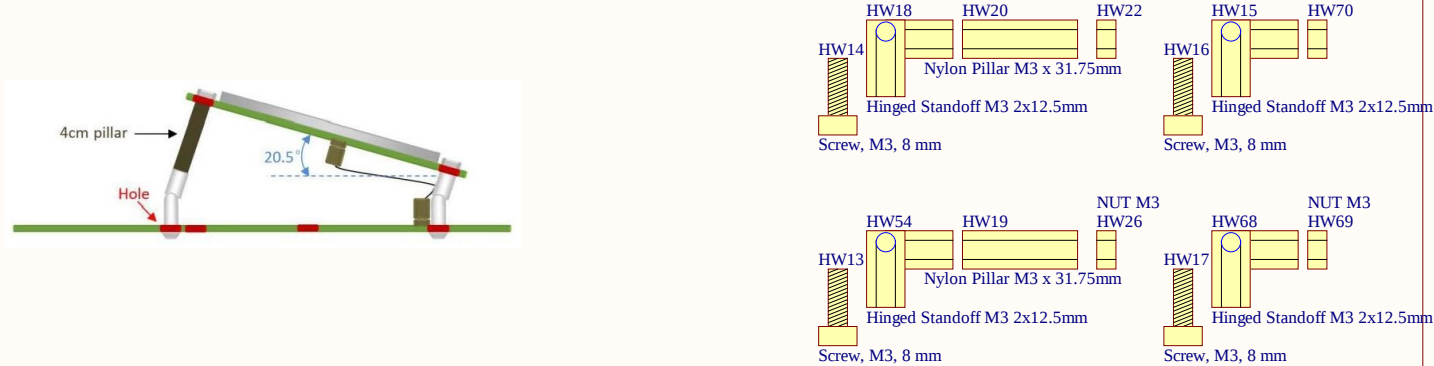
LIMITATIONS (see MCU page) :
AUDIO (I2S6), DFSDM
AUDIO (SAI), SRAM, NOR, SD CARD 2, OCSPI2
(*) Make sure to set VDD_IO_MMC = 3.3V



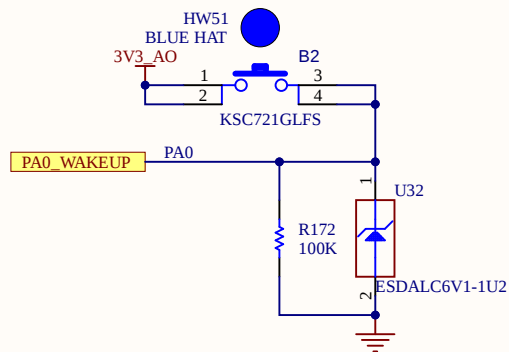
RGB LCD MODULE CONNECTORS



LCD MODULE MECHANICAL ASSEMBLY

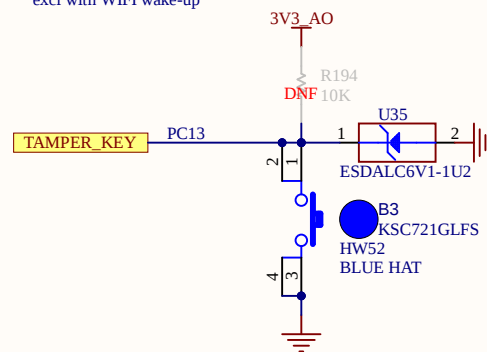


USER WAKE-UP BUTTON

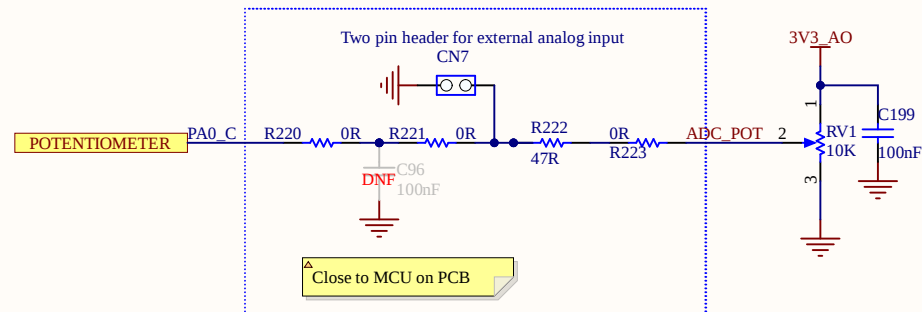


TAMPER & KEY BUTTON

excl with WIFI wake-up

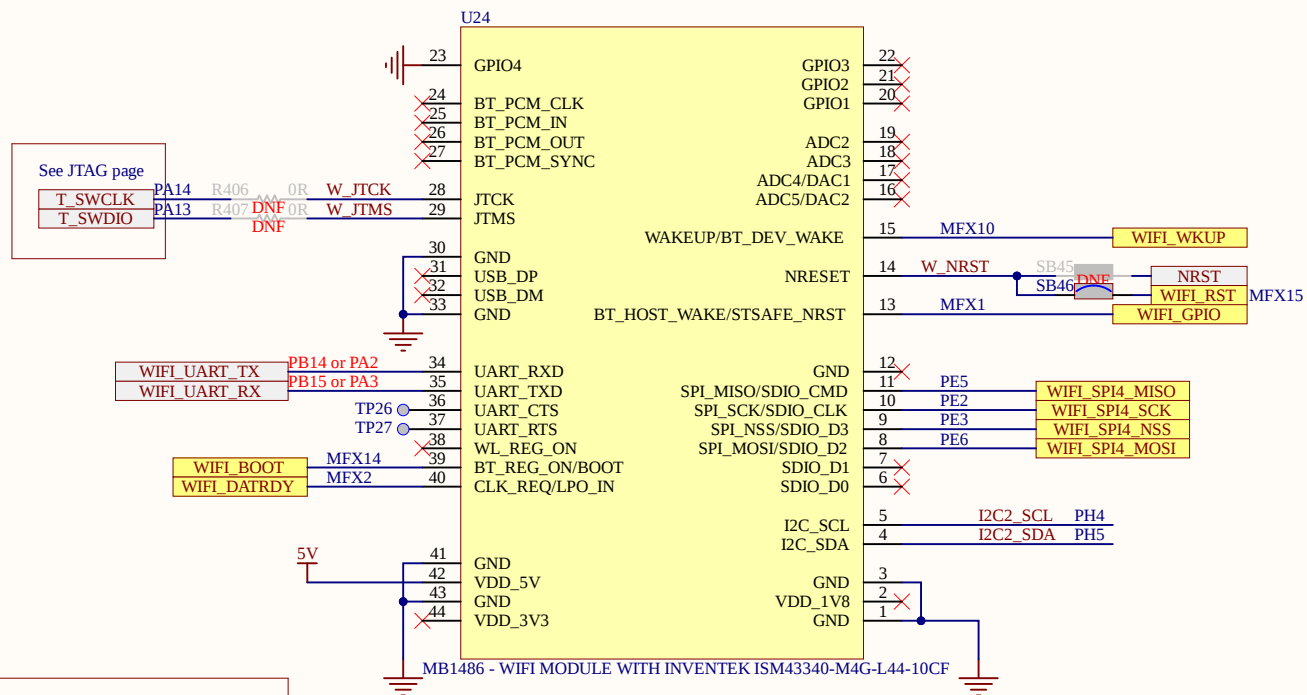


POTENTIOMETER



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

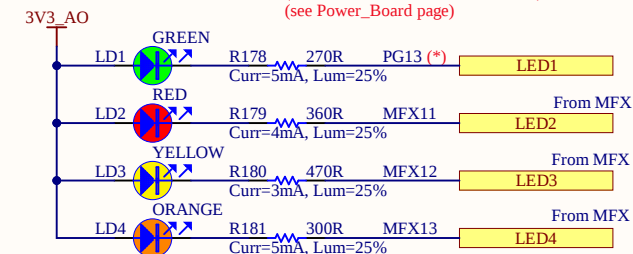
(WIFI SPI by default)
(Always ON)



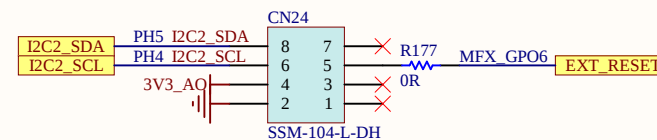
LIMITATIONS (see MCU page):
EXT I2C

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

(Always ON)



PB14/PB15 : not a bootloader compatible UART

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

(optional : not fitted)
(Always ON)



USB FS



life.augmented

(optional : not fitted)

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

current shunt

R197 1K

R198 1K

C86 4.7uF

R+jX Load



(optional : not fitted)

[illegible]

LIMITATIONS :

Title: STMP52&PT100		
Project: STM32H7B3I-EVAL		
Variant: H7B3LIQ		
Revision: D-03		Reference: MB1331
Size: A4	Date: 25-MAR-20	Sheet: 16 of 23

MOTOR CONTROL
(optional : not fitted)

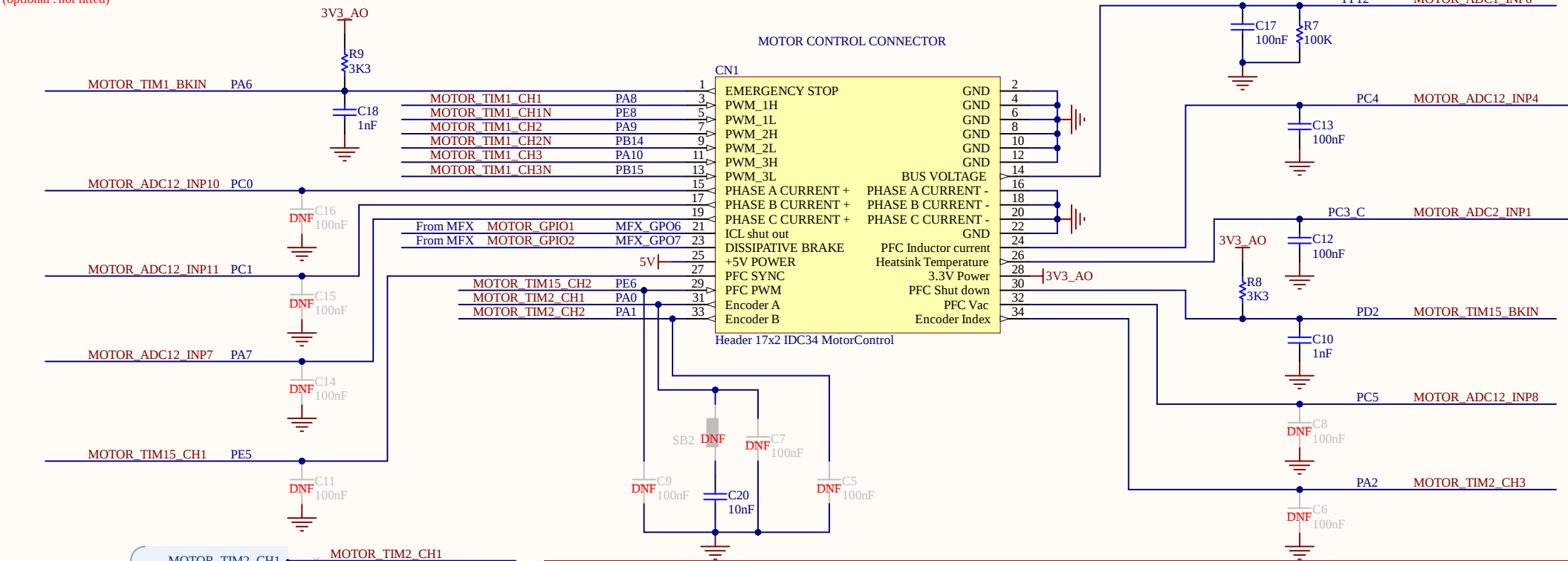
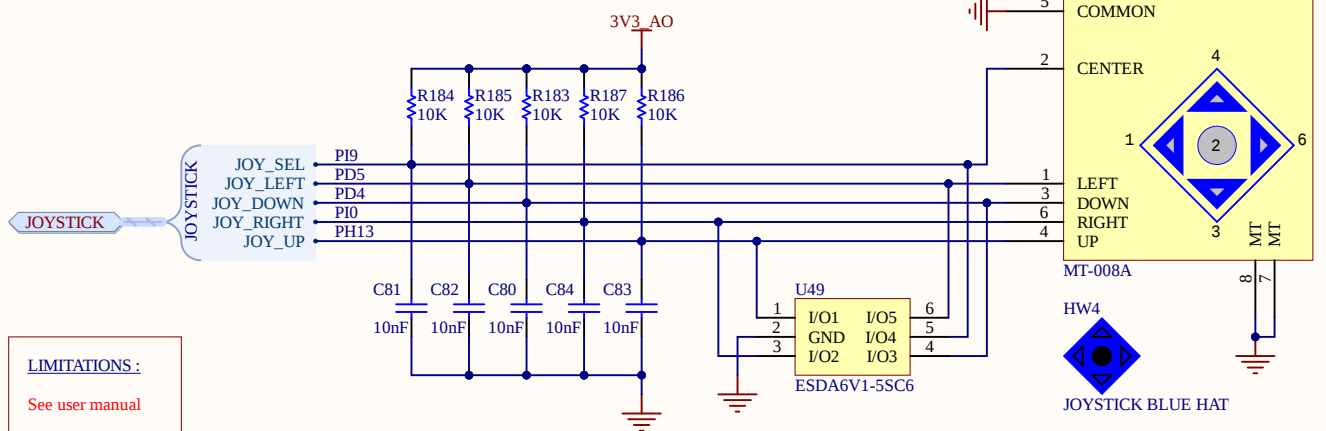


Table mapping motor control signals to specific pins and components. Includes columns for MOTOR, MOTOR_TIM, MOTOR_ADC, and MOTOR_GPIO.

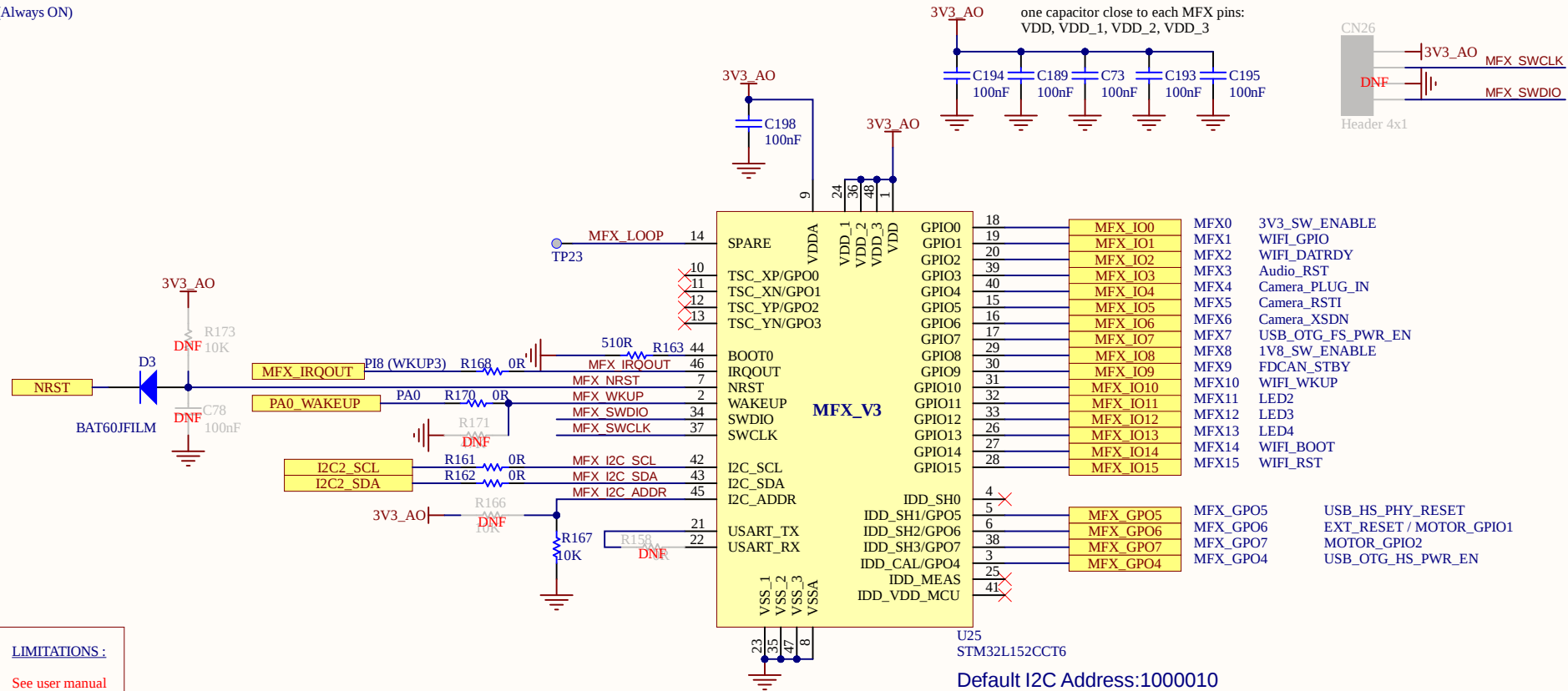
LIMITATIONS :
See user manual

MOTOR CONTROL JOYSTICK (OPTIONAL : not fitted)

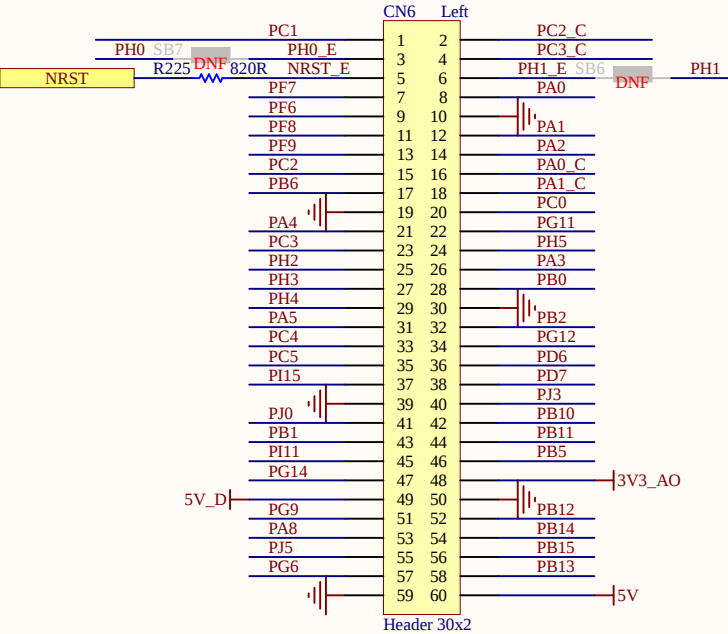


LIMITATIONS :
See user manual

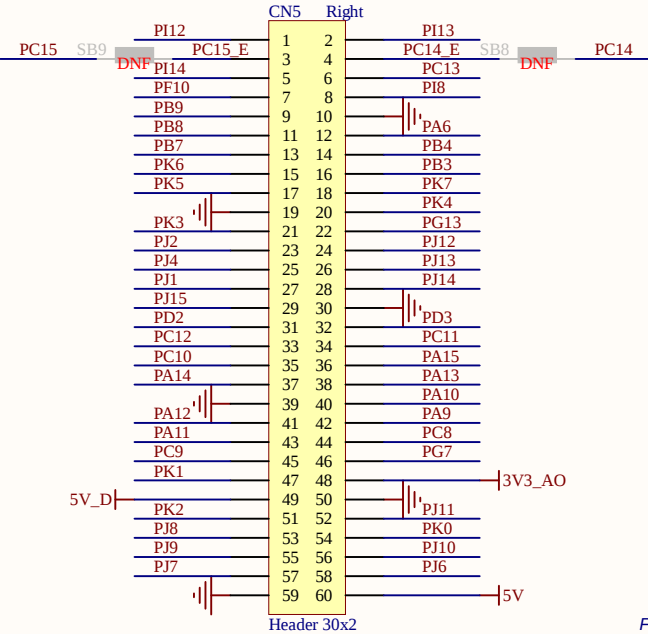
(Always ON)



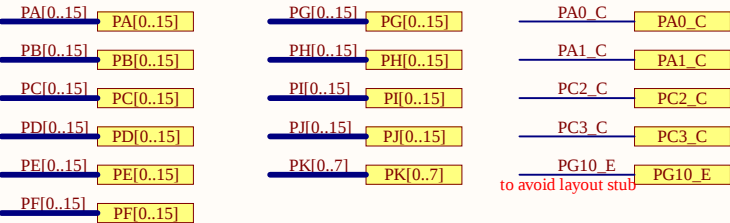
MCU EXTENSION CONNECTORS



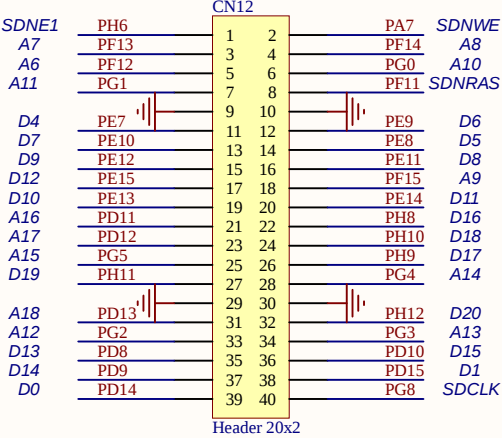
FTR-130-03-L-D-LC (Samtec)
or FTR-130-53-L-D-LC (Samtec) ?



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

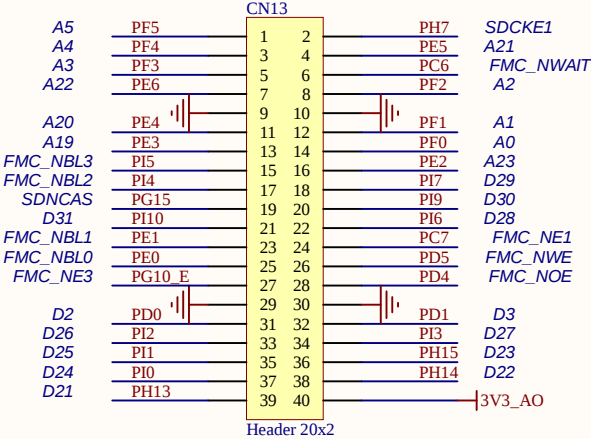


Place close Memory



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

Place close Memory

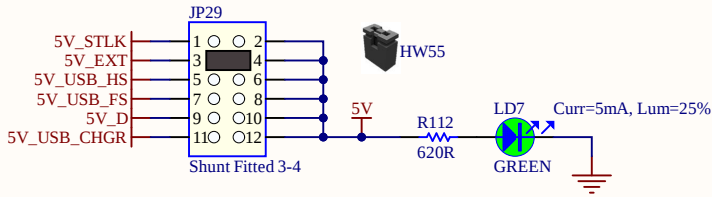


FTR-120-03-L-D-LC (Samtec)
or FTR-120-53-L-D-LC (Samtec) ?

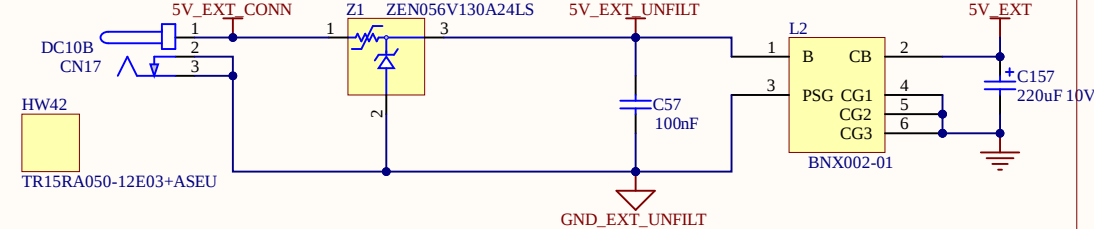


BOARD POWER

5V Power Supply options

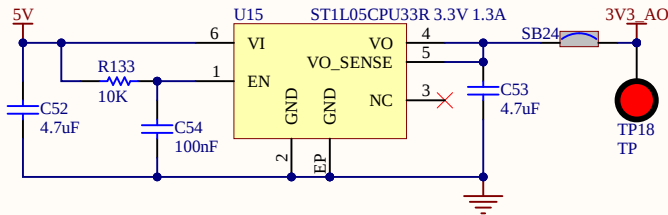


5V External supply (Always ON)

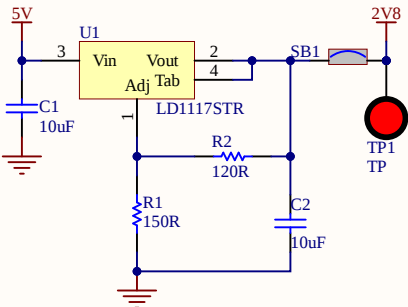


3V3 Supply (Always ON)

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

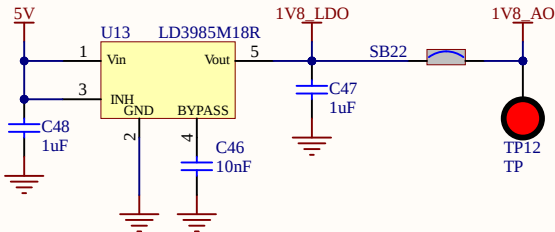


2V8 supply (Always ON)

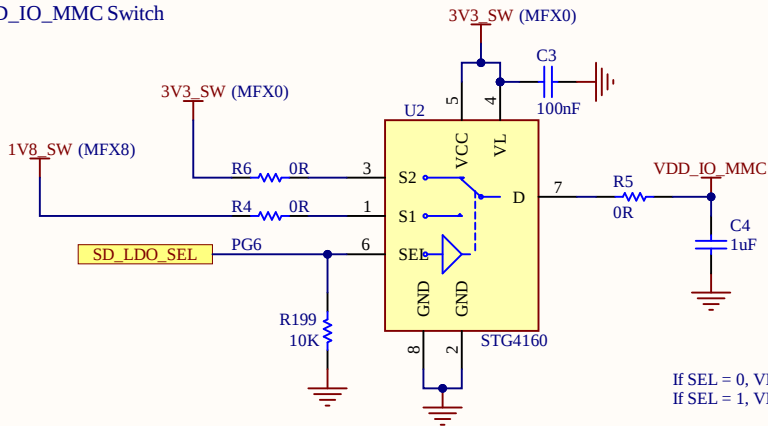


1V8 (Always ON)

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



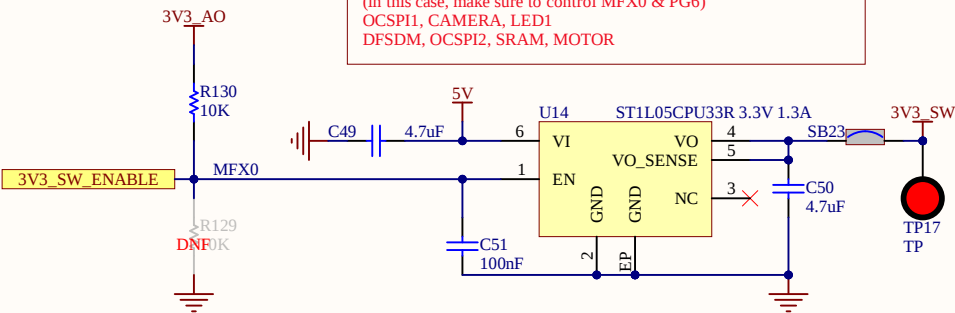
VDD_IO_MMC Switch



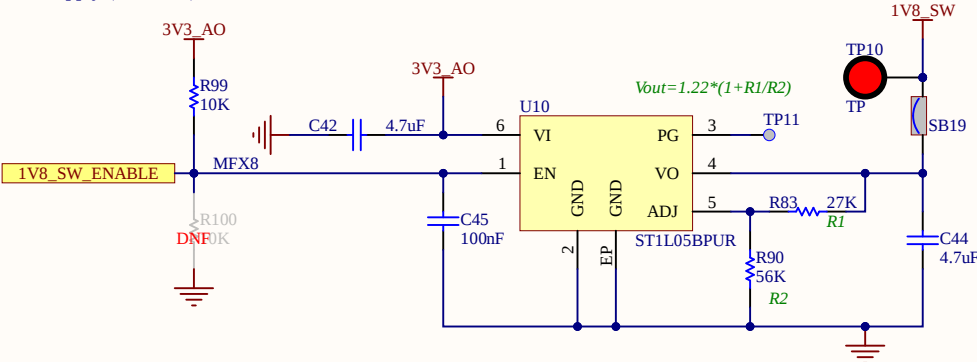
If SEL = 0, VDD_MMC = 3V3 (default)
If SEL = 1, VDD_MMC = 1V8

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

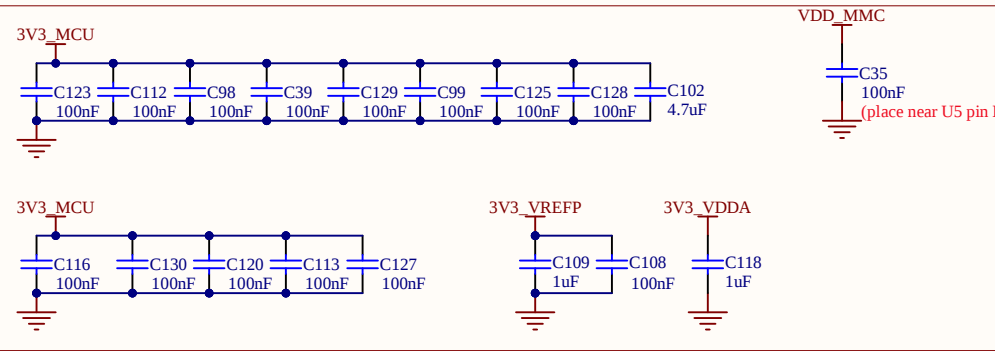
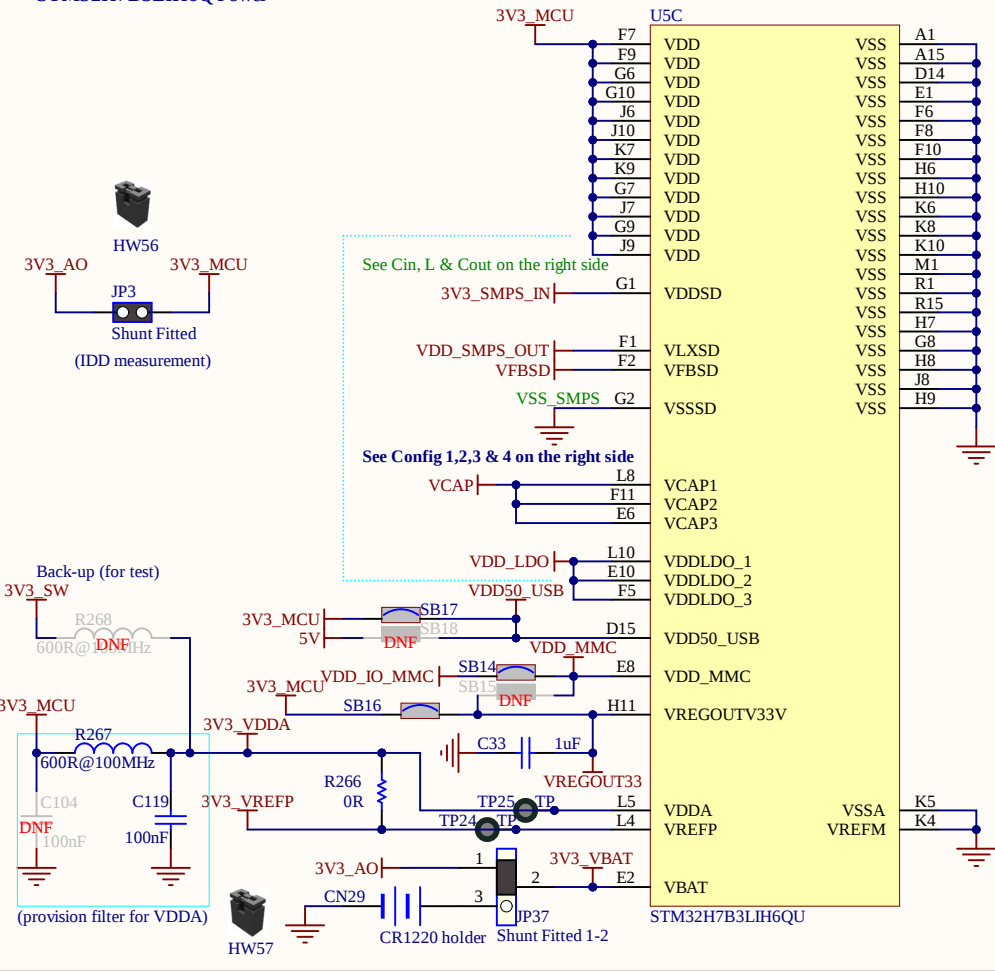


1V8 Supply (Switched)



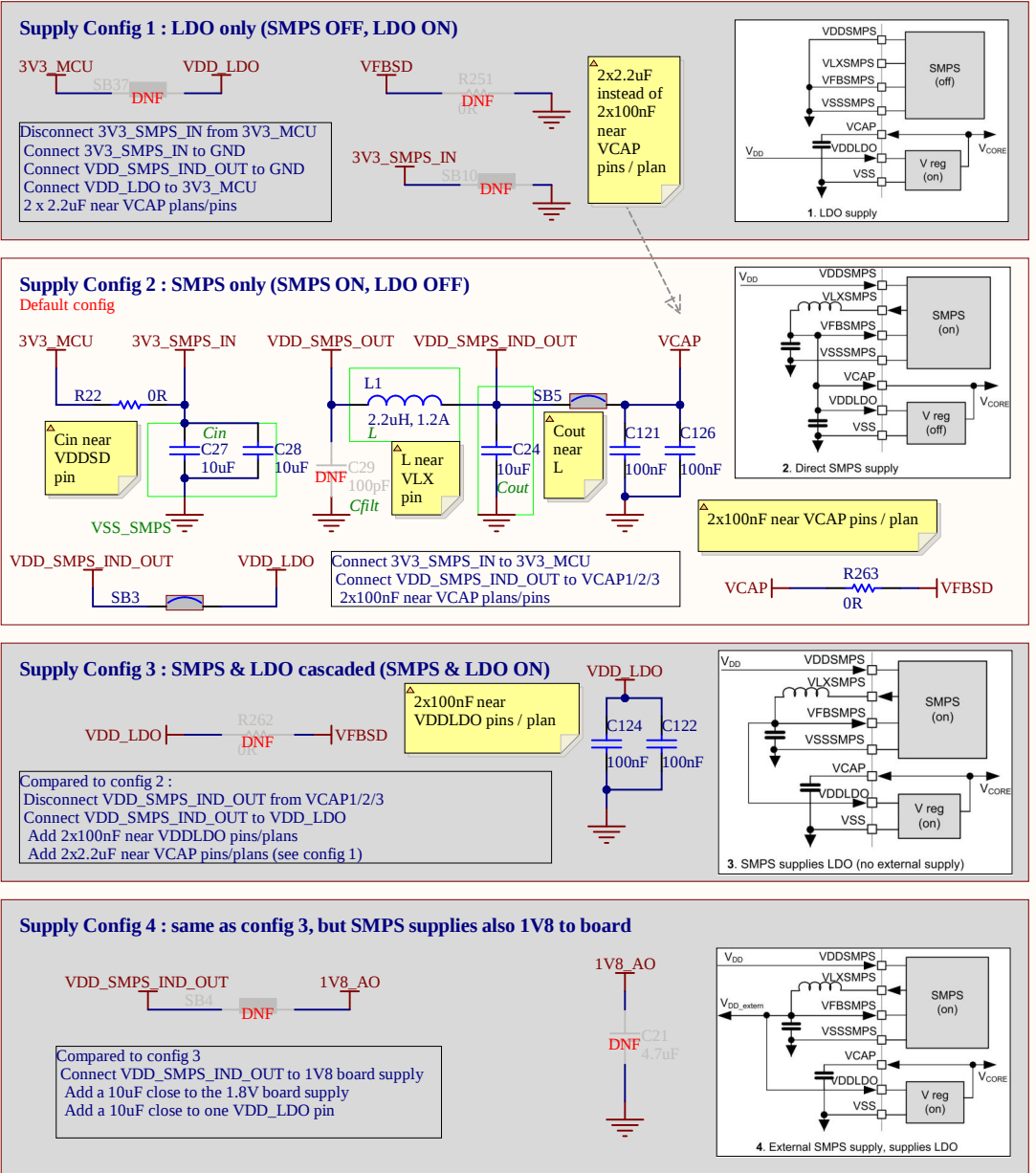
MCU POWER

STM32H7B3LIH6Q Power



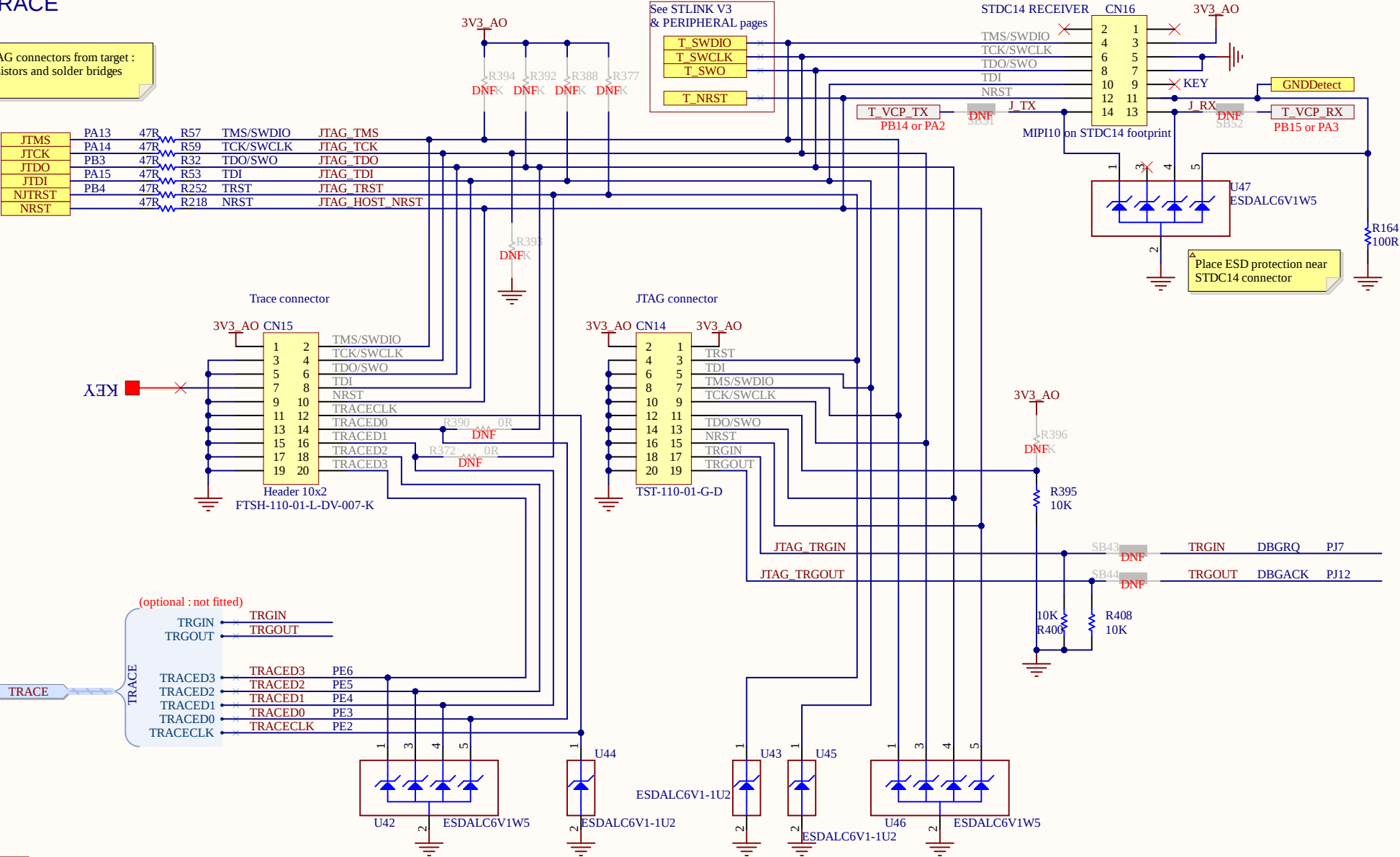
Internal LDO/SMPS Supply Configuration

For further details, please see UM2662 User Manual and RM0455 STM32H7A3 Reference Manual



JTAG & TRACE
(Always ON)

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



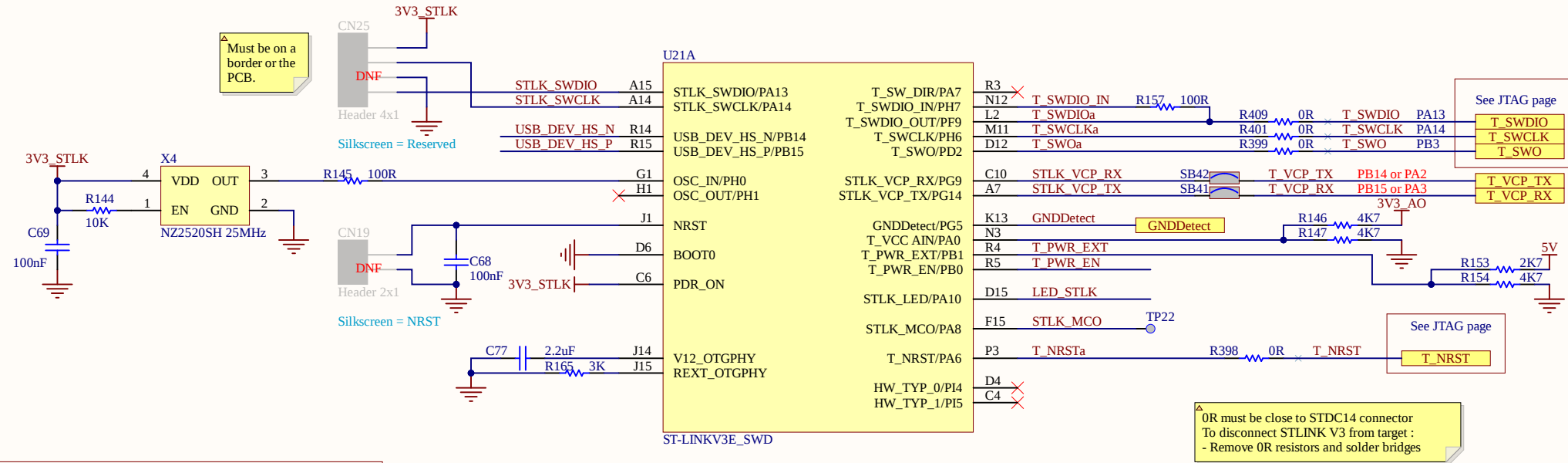
LIMITATIONS :

see User Manual



STLINK V3E SWD
(Always ON)

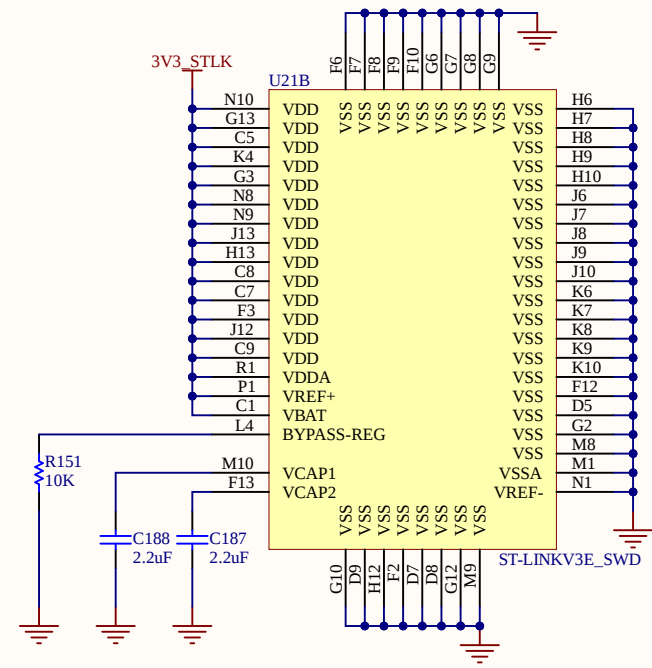
STLINK V3E



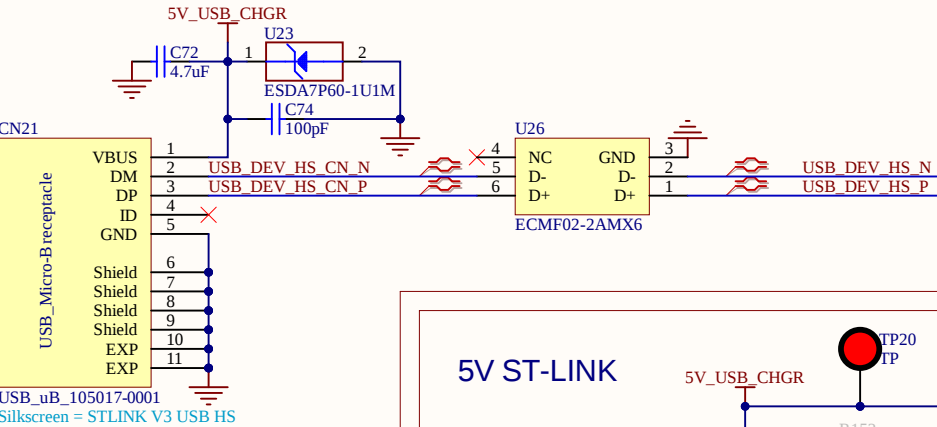
LIMITATIONS (see MCU page) :

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

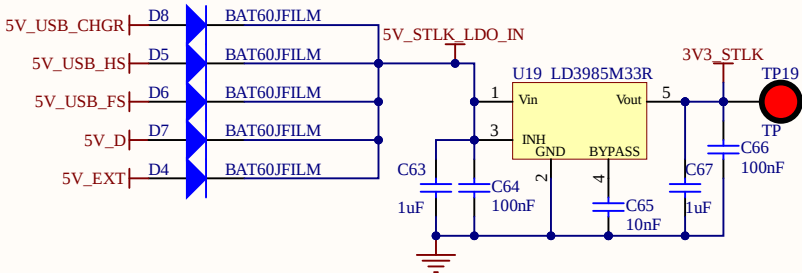
POWER



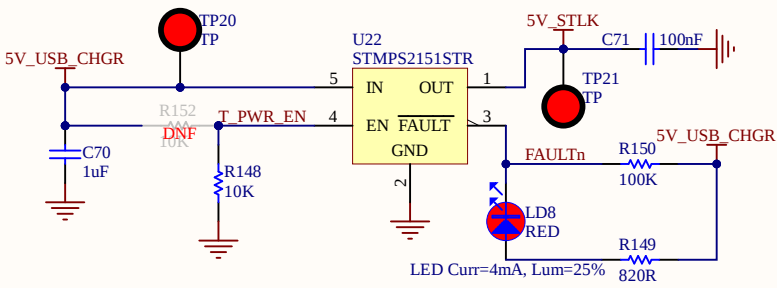
STLINK USB HS & 5V USB CHARGER



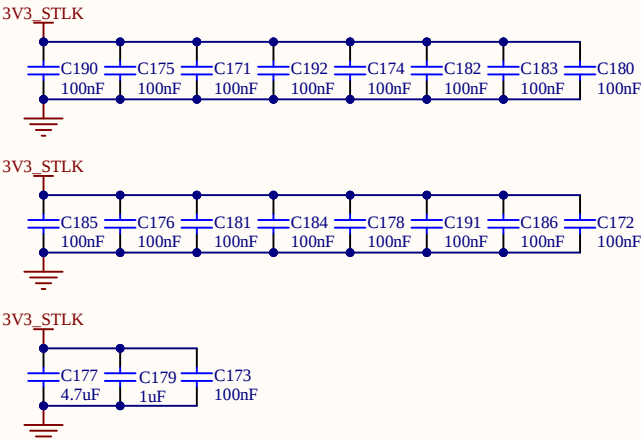
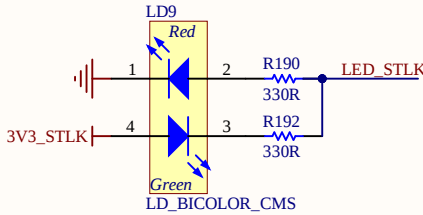
3.3V ST-LINK

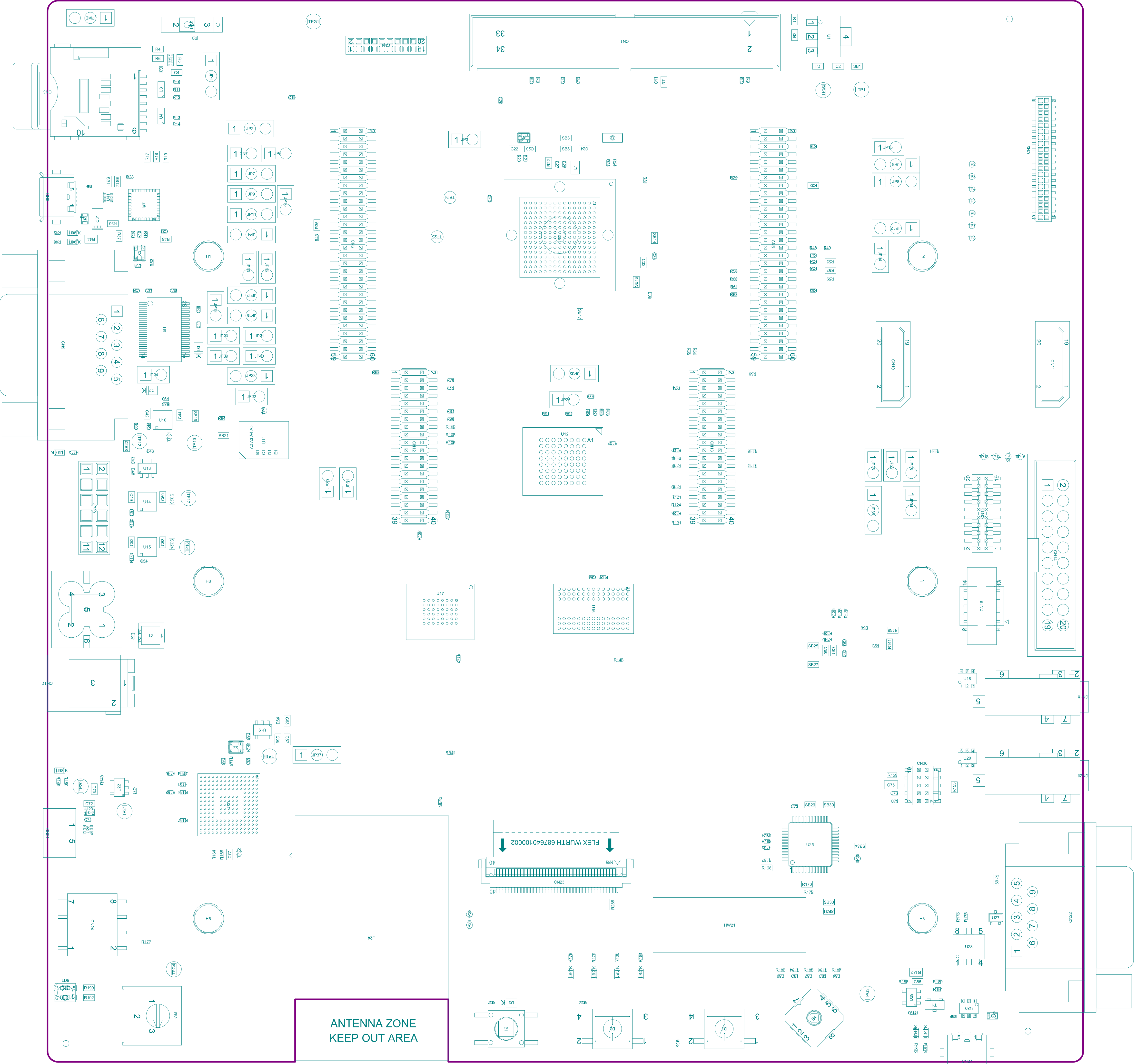


5V ST-LINK

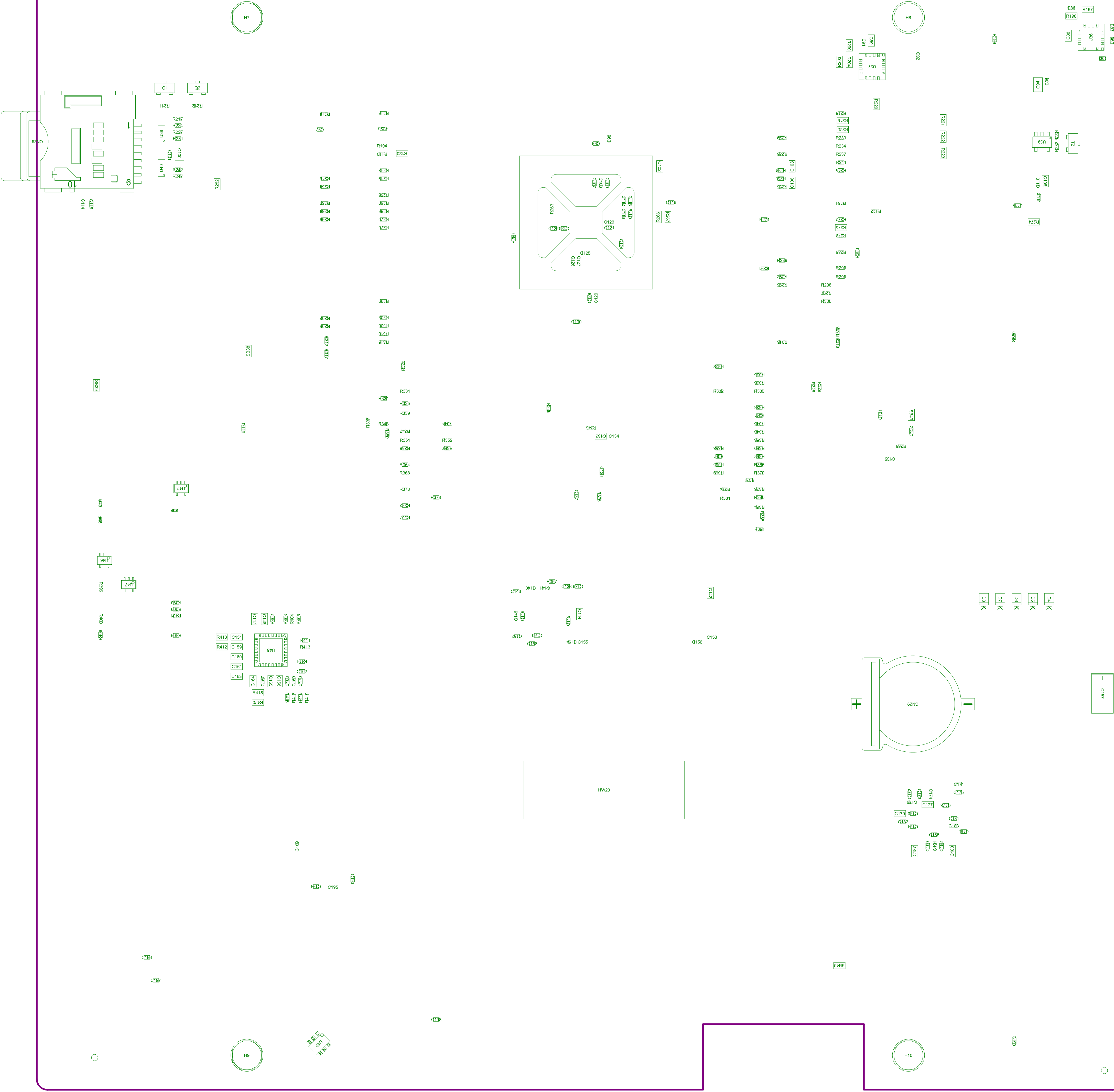


LED





Project: STM32H7B3I-EVAL		
Layer: M14-Top Assembly	Gerber: .GM14	
Variant: H7B3LIQ	Ref: MB1331	
Date: 25-MAR-20	Rev: D	



Project: STM32H7B3I-EVAL		
Layer: M15-Bottom Assembly	Gerber:.GM15	
Variant: H7B3LIQ	Ref: MB1331	
Date: 25-MAR-20	Rev: D	