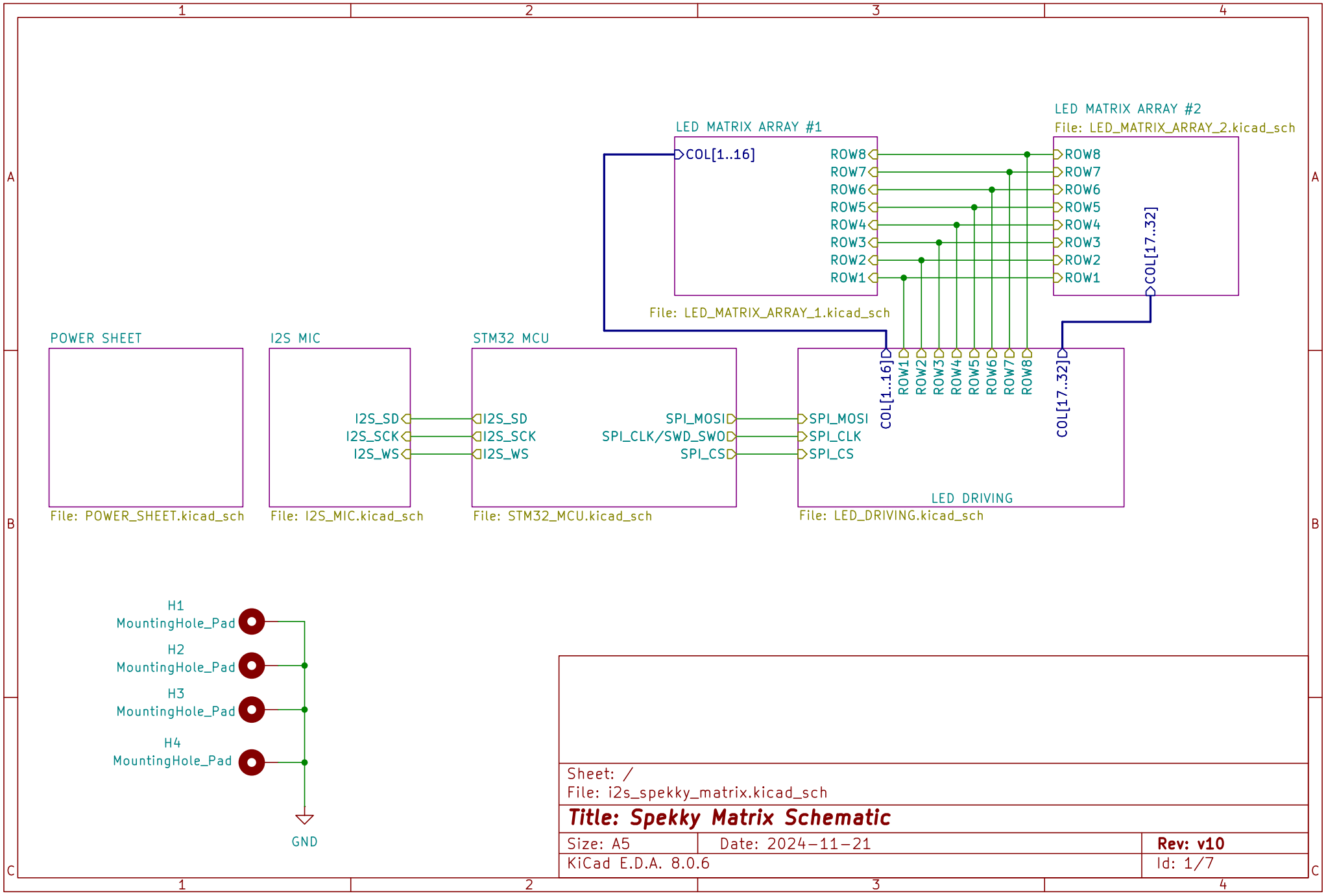
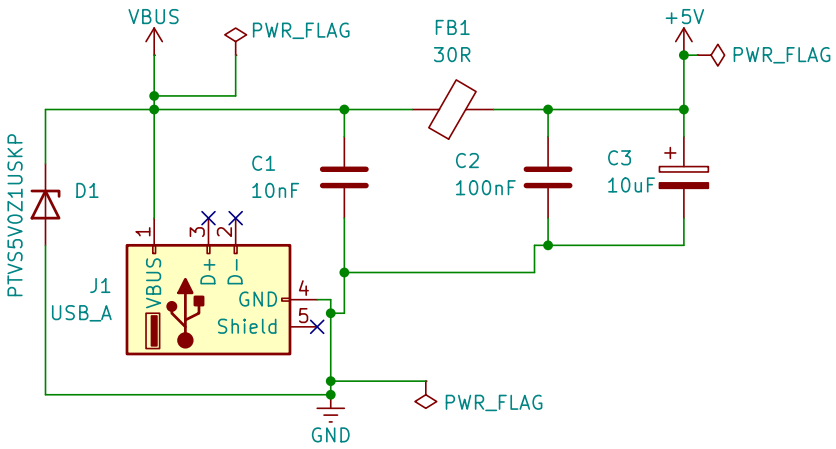
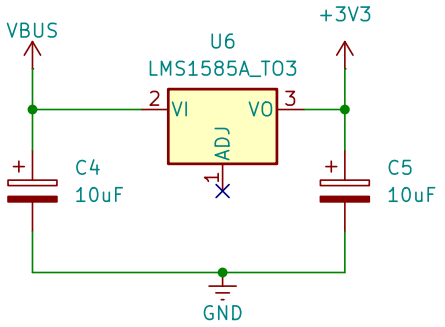

LED MATRIX ARRAY #1
COL[1..16]
ROW8
ROW7
ROW6
ROW5
ROW4
ROW3
ROW2
ROW1
File: LED_MATRIX_ARRAY_1.kicad_sch
LED MATRIX ARRAY #2
File: LED_MATRIX_ARRAY_2.kicad_sch
COL[17..32]
POWER SHEET
File: POWER_SHEET.kicad_sch
I2S MIC
I2S_SD
I2S_SCK
I2S_WS
File: I2S_MIC.kicad_sch
STM32 MCU
SPI_MOSI
SPI_CLK/SWD_SWO
SPI_CS
File: STM32_MCU.kicad_sch
LED DRIVING
File: LED_DRIVING.kicad_sch
H1
MountingHole_Pad
H2
MountingHole_Pad
H3
MountingHole_Pad
H4
MountingHole_Pad
GND
Sheet: /
File: i2s_spekky_matrix.kicad_sch
Title: Spekky Matrix Schematic
Size: A5
Date: 2024-11-21
Rev: v10
KiCad E.D.A. 8.0.6
Id: 1/7



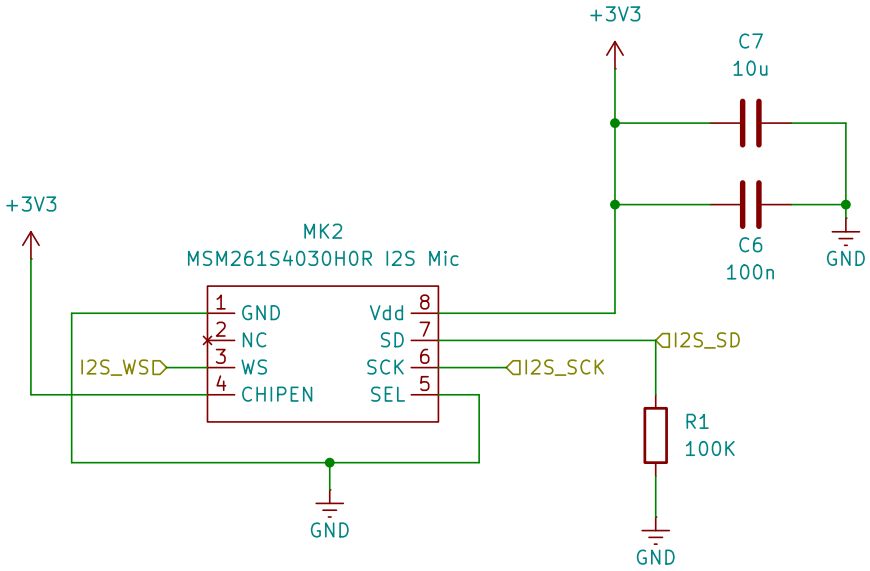


All things power related

Sheet: /POWER SHEET/
File: POWER_SHEET.kicad_sch

Title: Power Sheet

Size: A5	Date: 2024-11-18	**Rev: v02**
KiCad E.D.A. 8.0.6		Id: 2/7

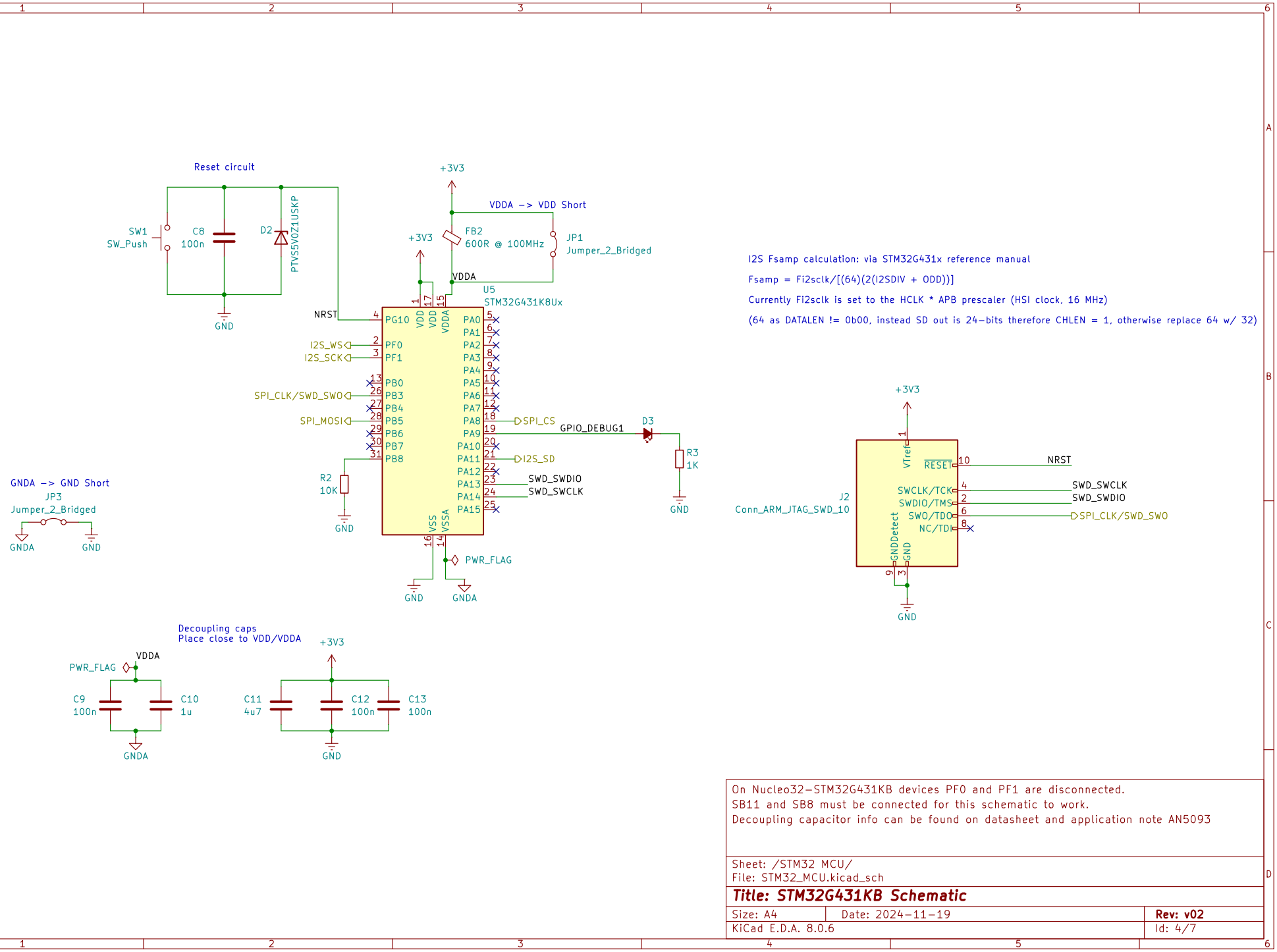


Same as Fermion I2S mic breakout board

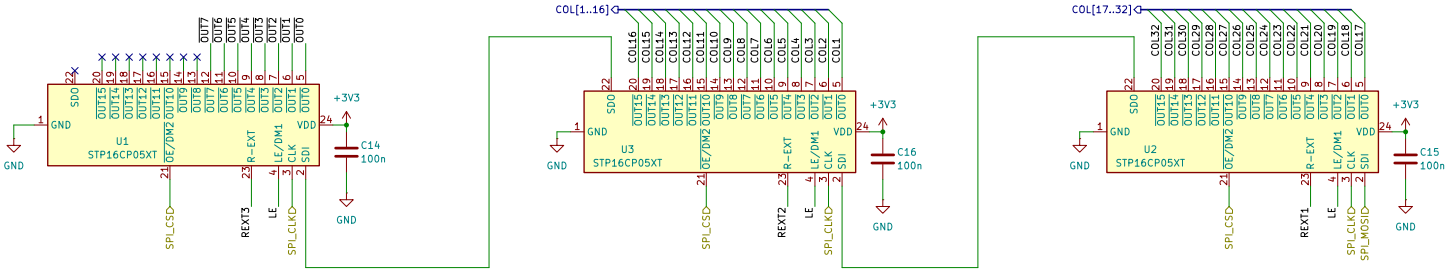
Sheet: /I2S MIC/
File: I2S_MIC.kicad_sch

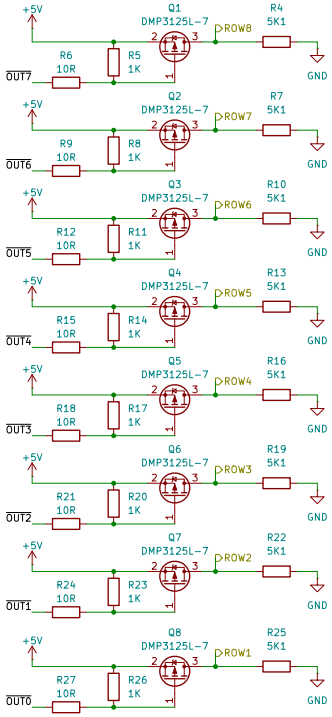
Title: I2S Mic

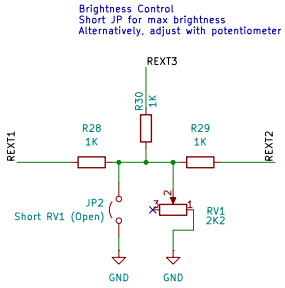
Size: A5	Date: 2024-11-18	**Rev: v01**
KiCad E.D.A. 8.0.6		Id: 3/7


Reset circuit
SW1
SW_Push
C8
100n
D2
PTVS5V0Z1USKP
GND
+3V3
VDDA -> VDD Short
FB2
600R @ 100MHz
JP1
Jumper_2_Bridged
VDDA
U5
STM32G431K8Ux
NRST
PG10
VDD
VDDA
PA0
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PA8
PA9
PA10
PA11
PA12
PA13
PA14
PA15
I2S_WS
I2S_SCK
PF0
PF1
SPI_CLK/SWD_SWO
PB0
PB3
PB4
PB5
PB6
PB7
PB8
SPI_MOSI
SPI_CS
GPIO_DEBUG1
I2S_SD
SWD_SWDIO
SWD_SWCLK
D3
R3
1K
R2
10K
VSS
VSSA
PWR_FLAG
GNDA
GNDA -> GND Short
JP3
Jumper_2_Bridged
I2S Fsamp calculation: via STM32G431x reference manual
Fsamp = Fi2sclk/[(64)(2(I2SDIV + ODD))]
Currently Fi2sclk is set to the HCLK * APB prescaler (HSI clock, 16 MHz)
(64 as DATALEN != 0b00, instead SD out is 24-bits therefore CHLEN = 1, otherwise replace 64 w/ 32)
J2
Conn_ARM_JTAG_SWD_10
VTref
RESET
SWCLK/TCK
SWDIO/TMS
SWO/TDO
NC/TDI
GNDDetect
Decoupling caps
Place close to VDD/VDDA
C9
100n
C10
1u
C11
4u7
C12
100n
C13
100n
On Nucleo32-STM32G431KB devices PF0 and PF1 are disconnected.
SB11 and SB8 must be connected for this schematic to work.
Decoupling capacitor info can be found on datasheet and application note AN5093
Sheet: /STM32 MCU/
File: STM32_MCU.kicad_sch
Title: STM32G431KB Schematic
Size: A4
Date: 2024-11-19
Rev: v02
KiCad E.D.A. 8.0.6
Id: 4/7

Cascade Direction
Last (in chain) <--- First (in chain)







Replace 16 w/ 64 for STP04CM05 device (not used)

Rext = (Vref/Iout) * 16

1K = 16(1.25/Iout)

1K/16 = 1.25/Iout

Iout (1K/16) = 1.25 ---> Iout = 16(1.25/1K)
= 0.02A ---> 20mA

Ich = [Vref - 3(Vref*Rreg)/((3 * Rreg) + Rset)]*16/Rset

Where Rset = Rext
Where Rreg = RV1

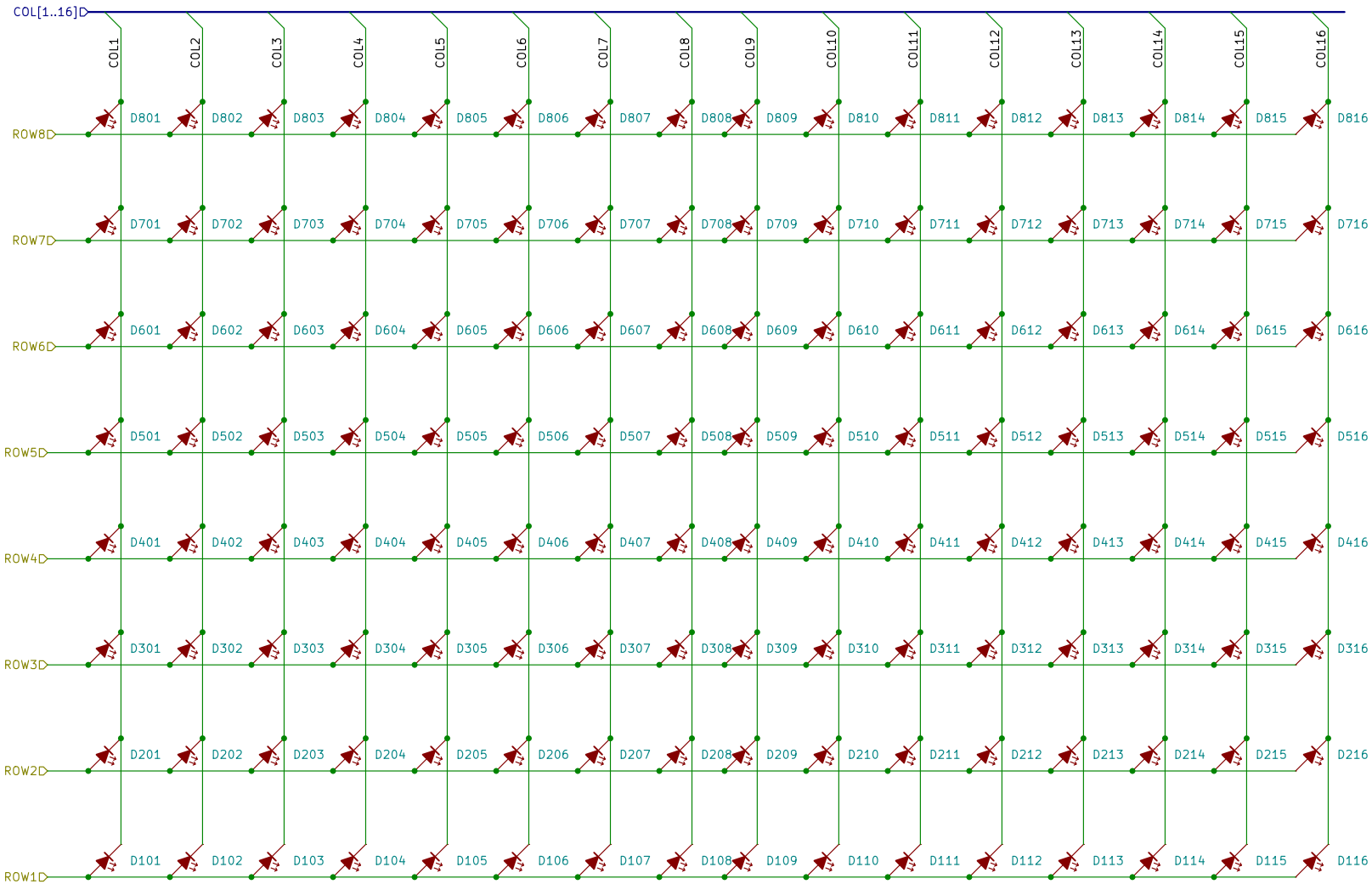
Ich_min = 0.00263157894736 A --> 2.6 mA (minumum)
Ich_max = 19.9mA (for RV1 = 1 ohm)

STP16CP05 based cascaded LED matrices

Sheet: /LED DRIVING/
File: LED_DRIVING.kicad_sch

Title: 8x32 LED Matrix

Size: A3	Date: 2024-11-22	Rev: v02
KiCad E.D.A. 8.0.6		Id: 5/7

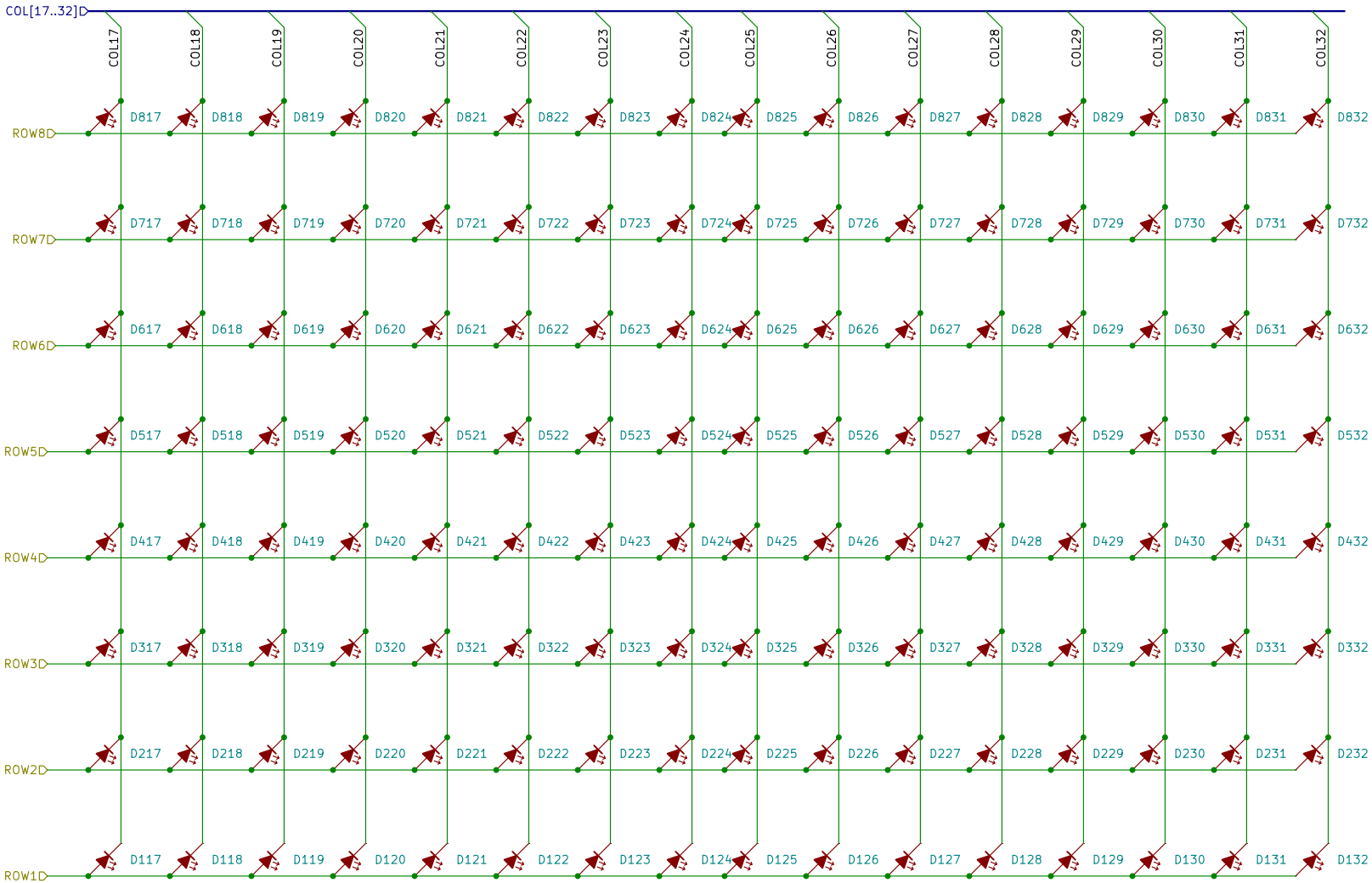


8x16 matrix

Sheet: /LED MATRIX ARRAY #1/
File: LED_MATRIX_ARRAY_1.kicad_sch

Title: LED Matrix #1

Size: A4	Date: 2024-11-23	**Rev: v01**
KiCad E.D.A. 8.0.6		Id: 6/7



8x16 matrix

Sheet: /LED MATRIX ARRAY #2/
File: LED_MATRIX_ARRAY_2.kicad_sch

Title: LED Matrix #2

Size: A4	Date: 2024-11-23	**Rev: v01**
KiCad E.D.A. 8.0.6		Id: 7/7