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PBA-CD-15

phyBOARD Polis i.MX 8M Mini/Nano

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Project: PBA-CD-15 phyBOARD Polis i.MX 8M Mini/Nano		Department : F&E Author: A. Merrath, T. Metz	
08.11.2022	PCB-No.: 1532.3	Revision : 001	Sheet 1 of 21

Overview

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I.MX 8M Mini		I.MX 8M Nano
ON: Alternate-BOOT OFF: Default-BOOT	S1-1	ON: BOOT_MODE[2] = 1 OFF: BOOT_MODE[2] = 0
ON: QSPI-BOOT OFF: SD-BOOT	S1-2	ON: BOOT_MODE[1] = 1 OFF: BOOT_MODE[1] = 0
ON: Serial Downloader OFF: Internal Boot	S1-3	ON: BOOT_MODE[0] = 1 OFF: BOOT_MODE[0] = 0
ON: UART1 RS485 OFF: UART1 RS232	S1-4	ON: UART1 RS485 OFF: UART1 RS232
Not Used	S1-5	ON: USB OTG Port OFF: USB HUB
ON: UART4 to X8 OFF: UART4 to FTDI	S1-6	ON: Baseboard Bootmode OFF: SOM Bootmode
RESET	S2	RESET
ON/OFF	S3	ON/OFF

Z1

PHYTEC

Logo

DMC1

DMC

DMC

DMC2

DMC

DMC

Z2

Fiducial-Round

Z4

Fiducial-Square

Z3

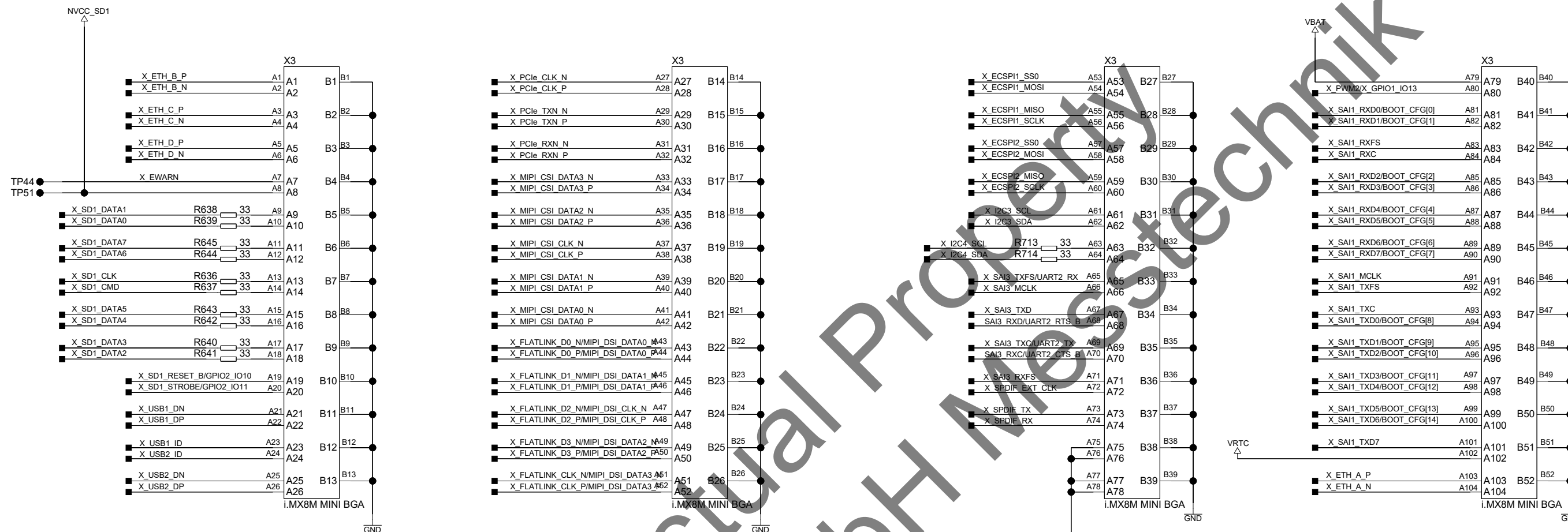
Fiducial-Round

Z5

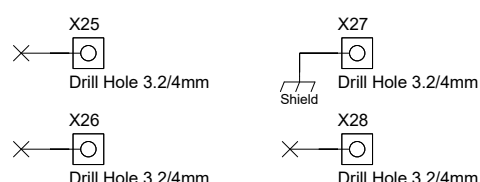
Fiducial-Square

SOM Connector Page 1

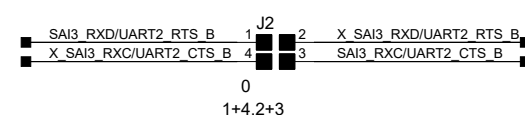
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Baseboard Mounting Holes



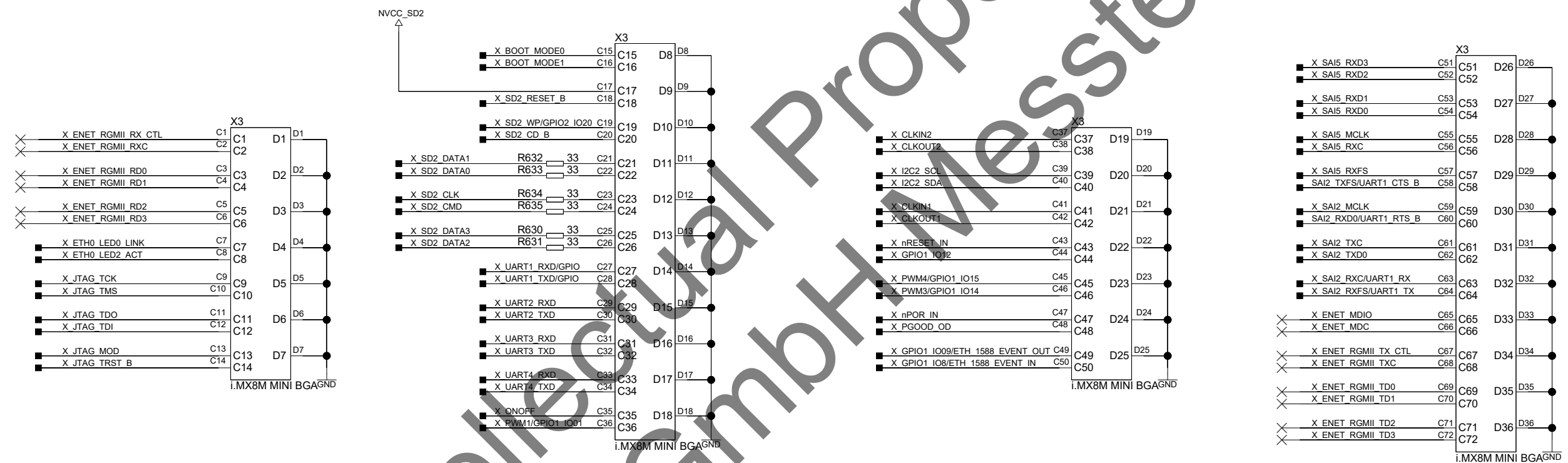
UART2 RTS/CTS Jumper



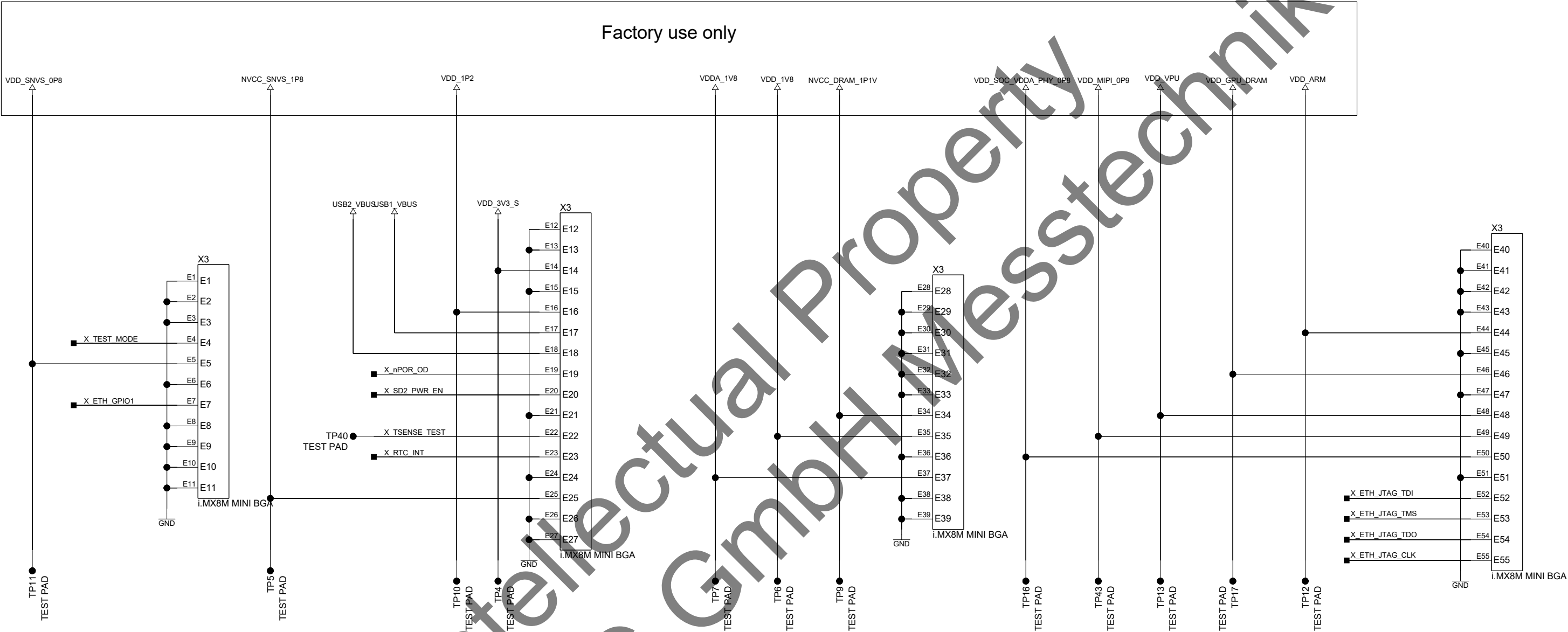
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SOM Connector Page 2

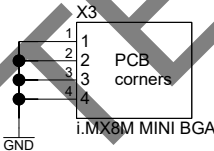
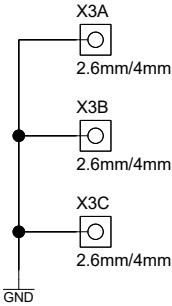
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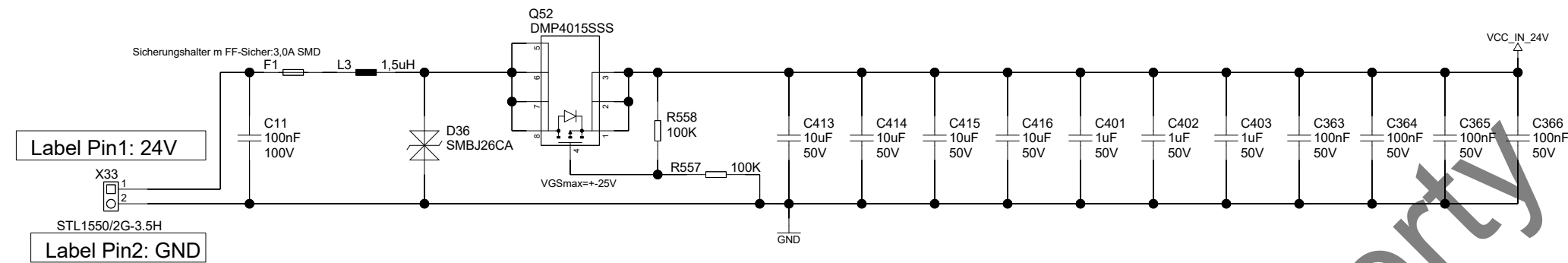
Heatspreader Mounting



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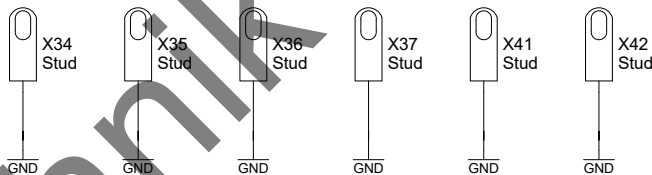
Power1

reverse polarity
protection

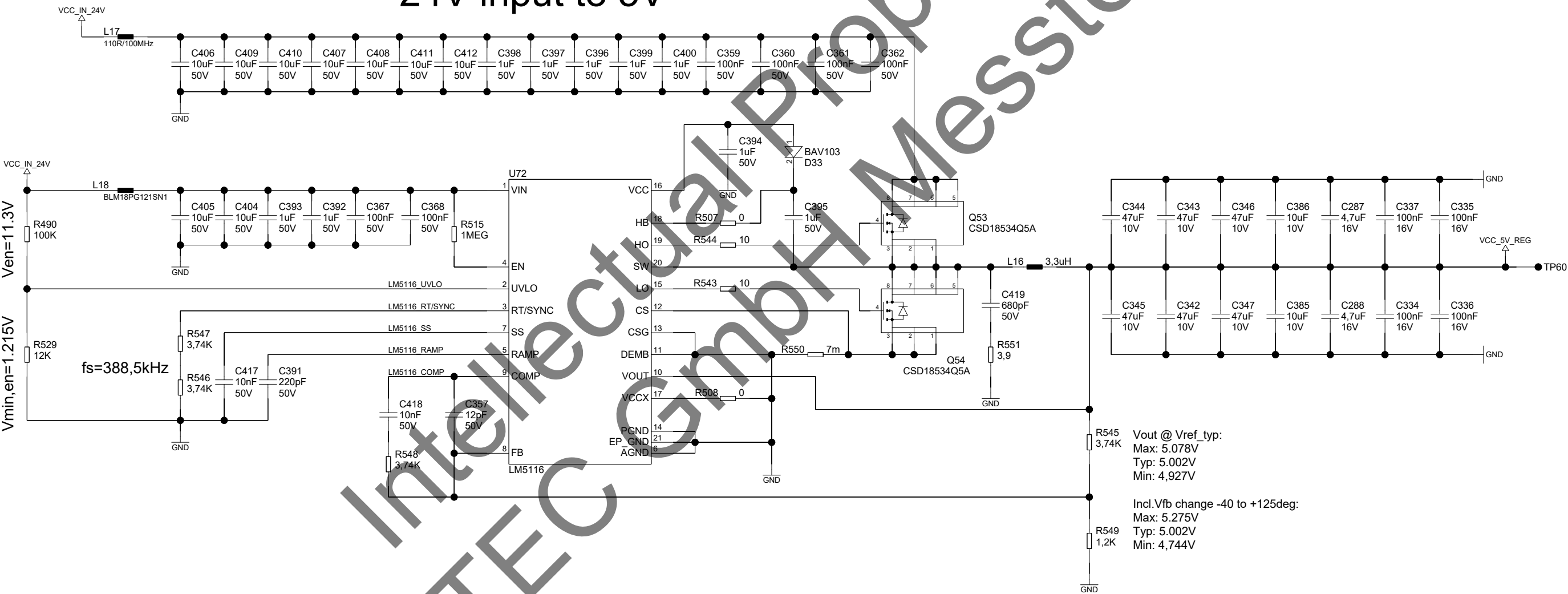


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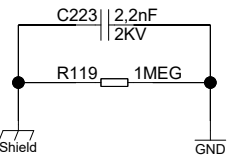
GND for Measurement



24V input to 5V



Shield

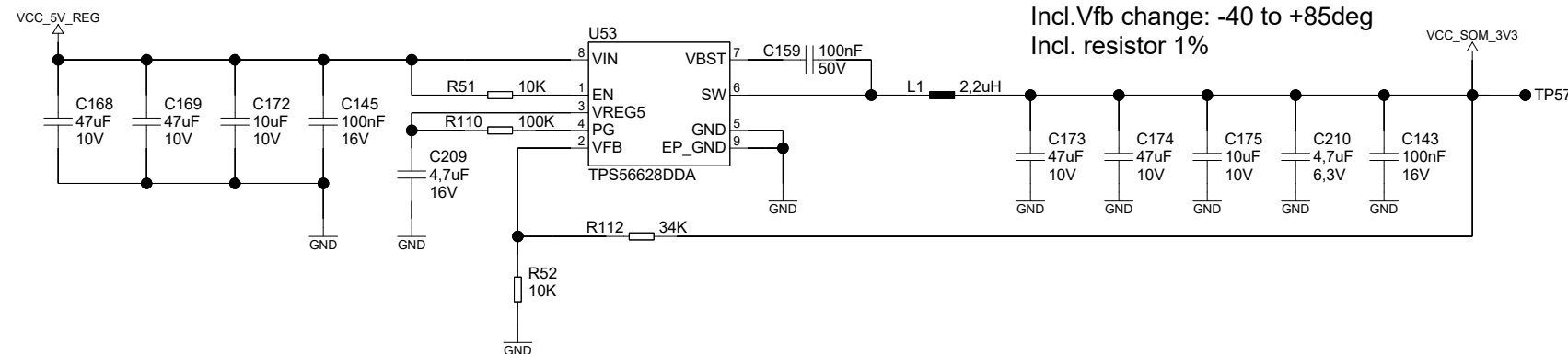


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Power2

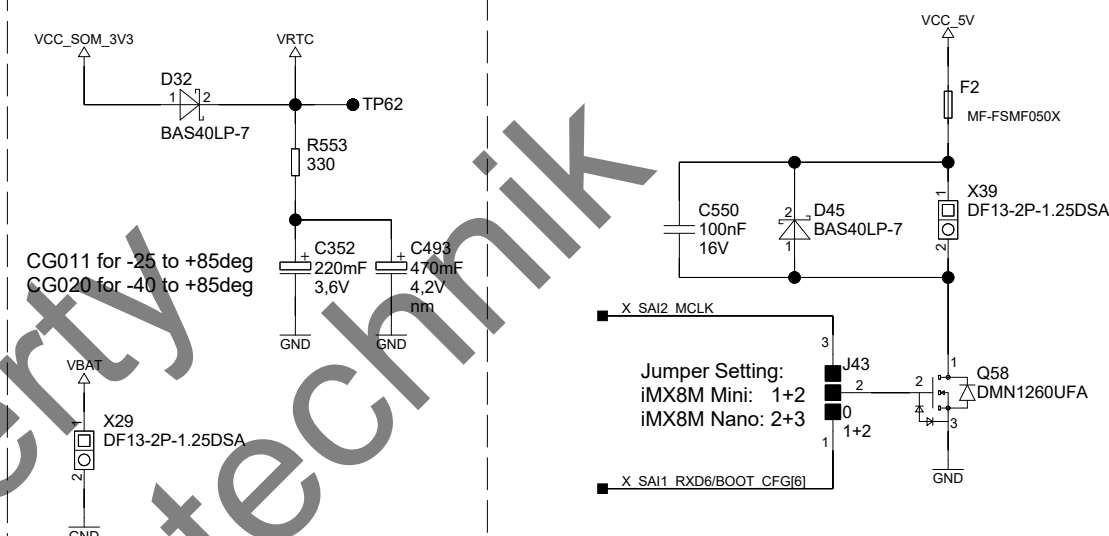
3.3V / 6A

Vmin: 3,254V
Vtyp: 3,366V
Vmax:3,481V
Incl.Vfb change: -40 to +85deg
Incl. resistor 1%

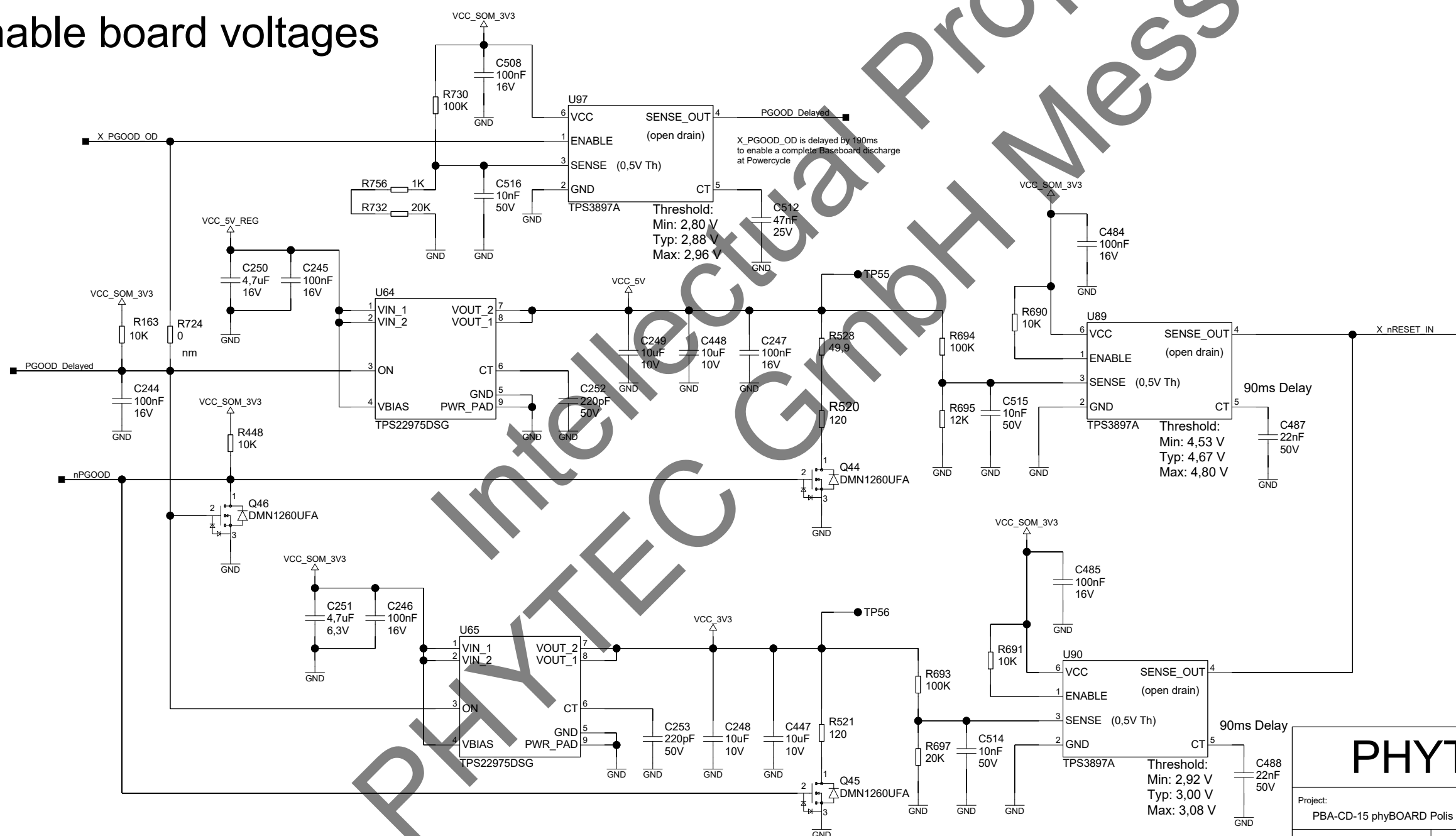


Gold CAP Fan

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Enable board voltages

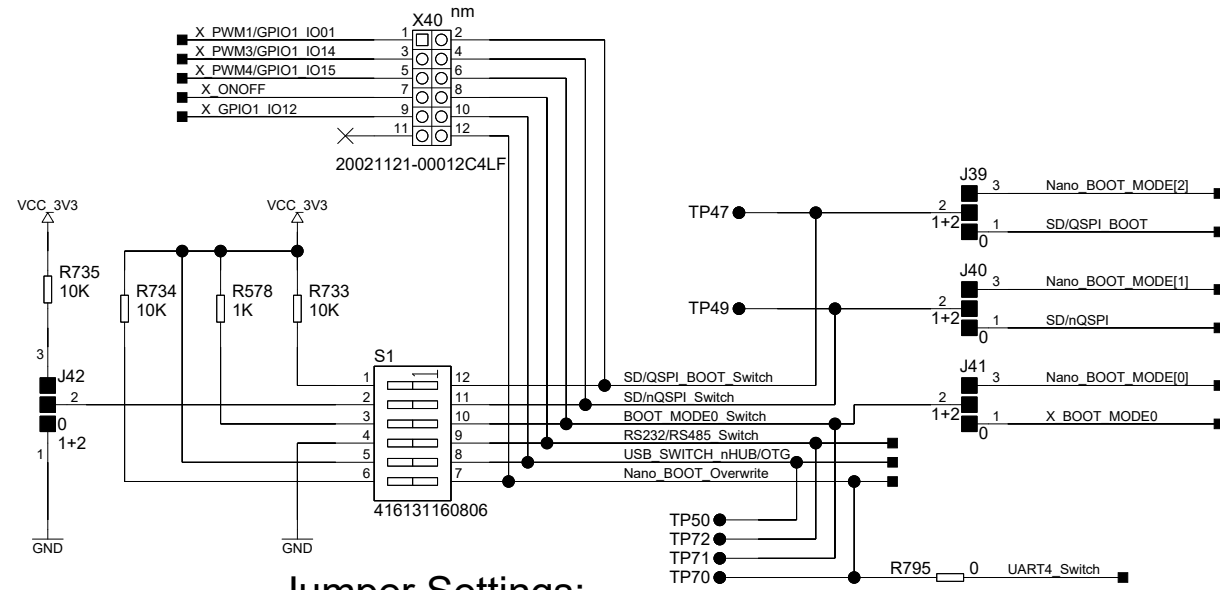


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Dip-Switch

X40 not mounted
Pads for factory use only

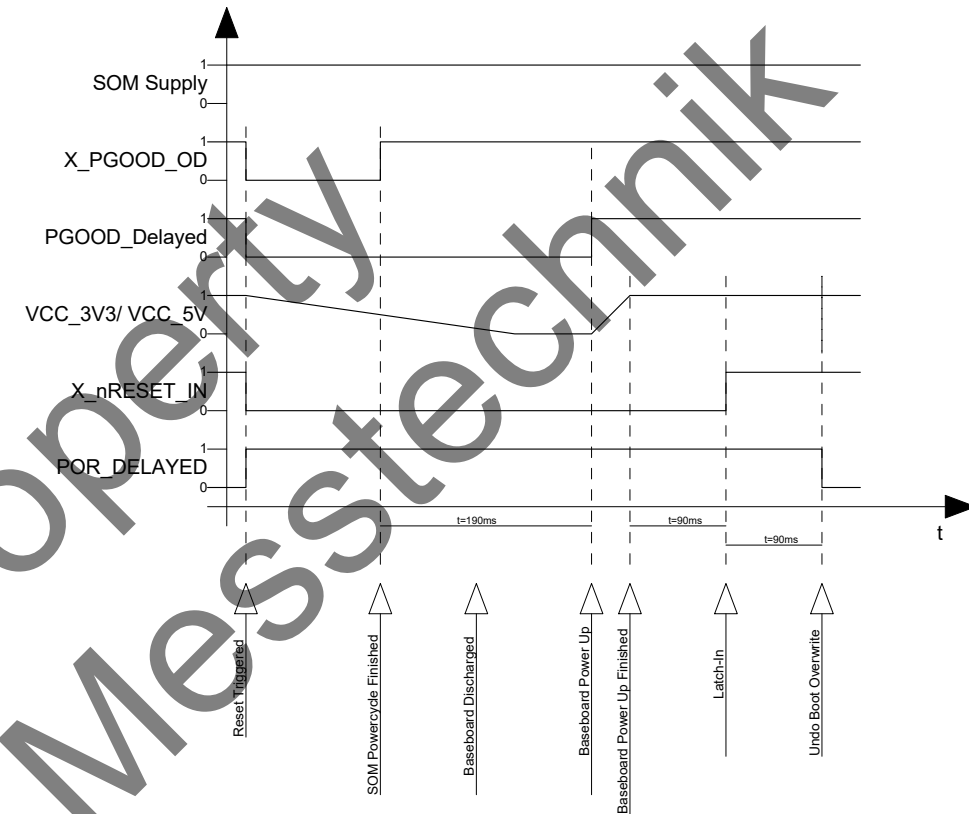


Jumper Settings:
iMX8M Mini: 1+2
iMX8M Nano: 2+3

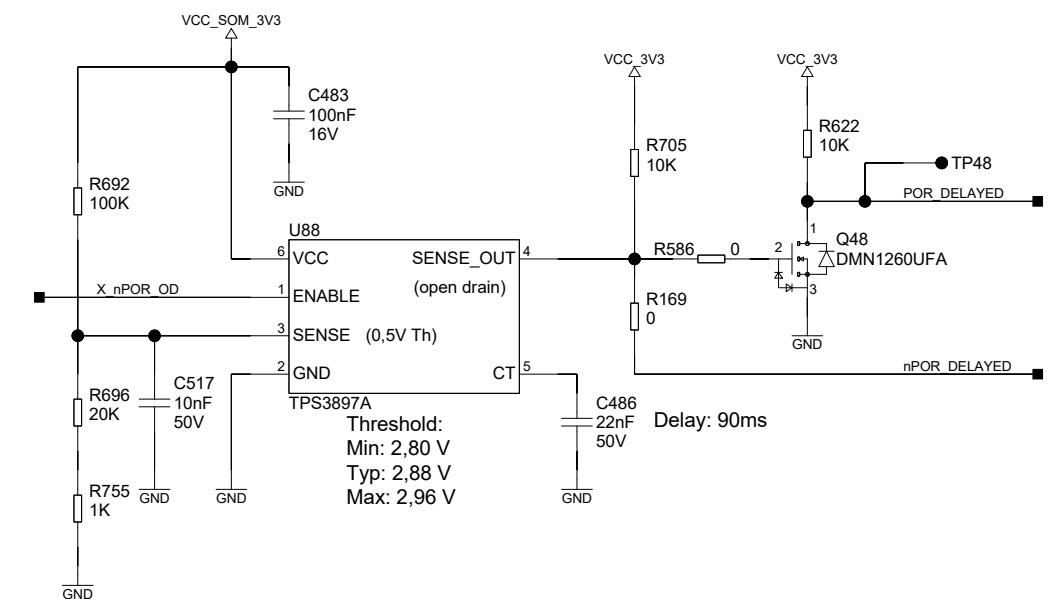
I.MX 8M Mini		I.MX 8M Nano
ON: Alternate-BOOT OFF: Default-BOOT	S1-1	ON: BOOT_MODE[2] = 1 OFF: BOOT_MODE[2] = 0
ON: QSPI-BOOT OFF: SD-BOOT	S1-2	ON: BOOT_MODE[1] = 1 OFF: BOOT_MODE[1] = 0
ON: Serial Downloader OFF: Internal Boot	S1-3	ON: BOOT_MODE[0] = 1 OFF: BOOT_MODE[0] = 0
ON: UART1 RS485 OFF: UART1 RS232	S1-4	ON: UART1 RS485 OFF: UART1 RS232
Not Used	S1-5	ON: USB OTG Port OFF: USB HUB
ON: UART4 connected to Expansion Connector OFF: UART4 connected to FTDI	S1-6	ON: Baseboard Bootmode OFF: SOM Default Bootmode

Sequencing Details

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POR Delay [90ms]



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08.11.2022

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Bootmode Configuration for i.MX 8M Mini

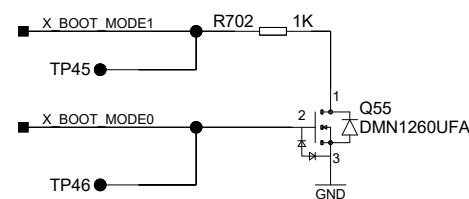
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BOOT_CFG	[14]	[13]	[12]	[11]	[10]	[9]	[8]	[7]	[6]	[5]	[4]	[3]	[2]	[1]	[0]
Default/ eMMC	0	1	0	1	0	1	0	0	1	0	1	0	1	1	0
Overwrite/ SD-Card	0	0	1	0	1	0	x	0	x	x	1	0	0	0	x
Overwrite/ QSPI	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Jumper QSPI				J8			J7					J6	J5	J4	J3

These Parts are only mounted with a i.MX 8M Mini SOM

Boot-Type

S1-4:
OFF: Serial Downloader
ON: Internal Boot

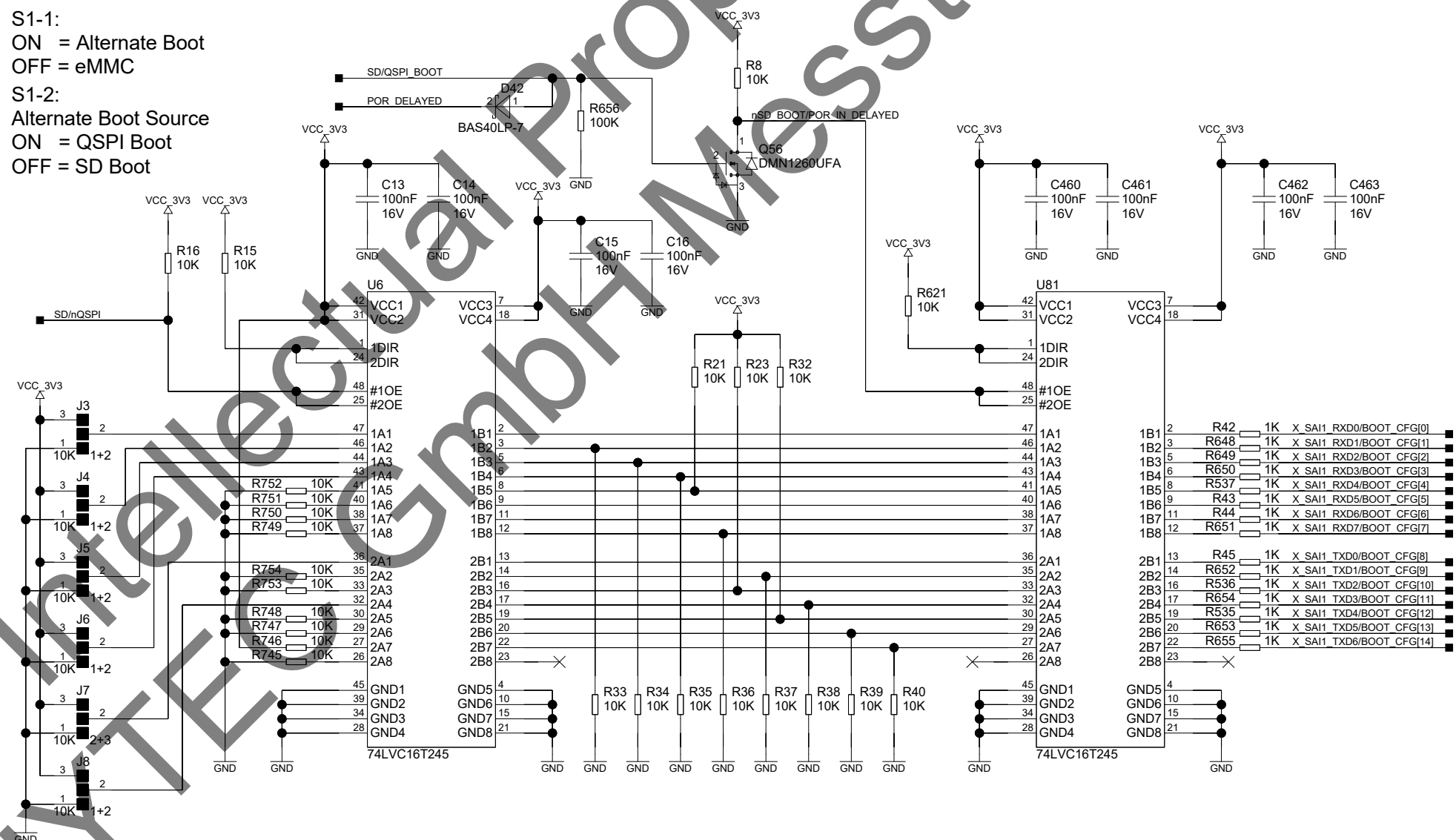


BOOT_MODE[1:0]	BOOT TYPE
00	Boot from fuses
01	Serial Downloader
10	Internal Boot (GPIO overwrite)
11	Reserved

SOM Default: Internal Boot [10]

Boot-Source

S1-1:
ON = Alternate Boot
OFF = eMMC
S1-2:
Alternate Boot Source
ON = QSPI Boot
OFF = SD Boot



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Bootmode Configuration for i.MX 8M Nano

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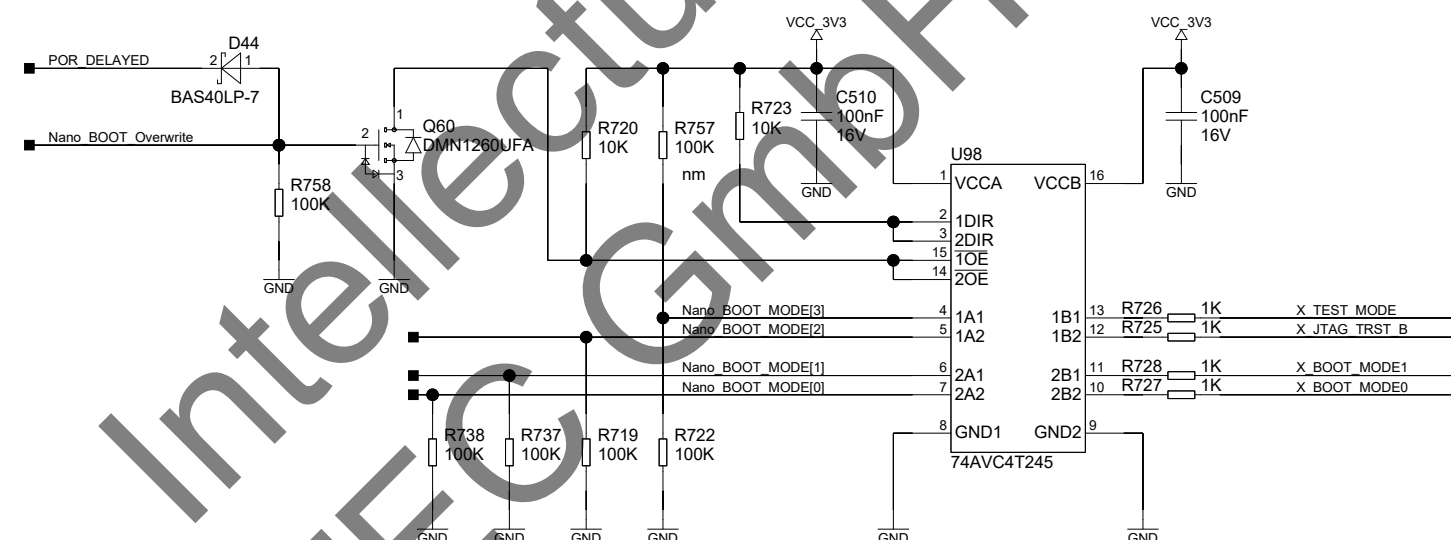
Switch-Setting ON = 1 OFF = 0 →			S1-1	S1-2	S1-3
Bootmode Options i.MX 8M Nano		X_TEST_MODE	X_JTAG_TRST_B	X_BOOT_MODE1	X_BOOT_MODE0
Boot-Source	MODE [Nr.] →	[3]	[2]	[1]	[0]
↓ Fuses		0	0	0	0
USB Serial Download		0	0	0	1
USDHC3 (eMMC)		0	0	1	0
USDHC2 (SD)		0	0	1	1
FlexSPI 3B Read		0	1	1	0

Bootmode setting via S1

S1-6 = "ON": Baseboard Bootmode

S1-6 = "OFF": SOM Default Bootmode

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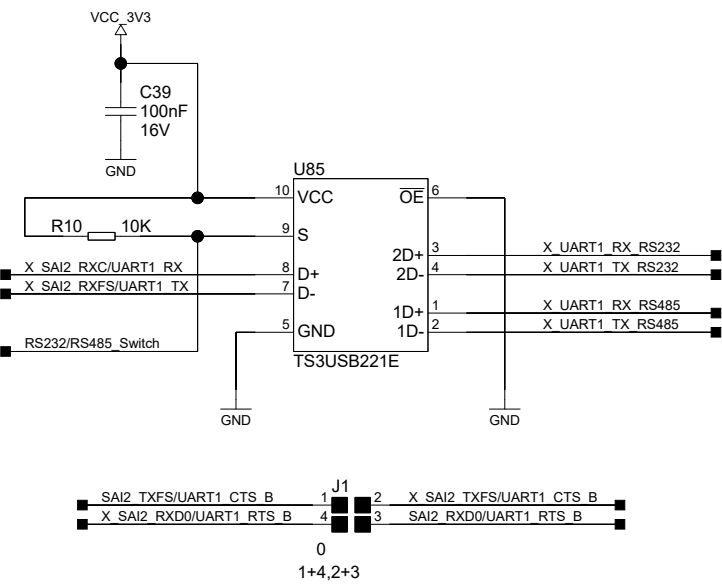
08.11.2022

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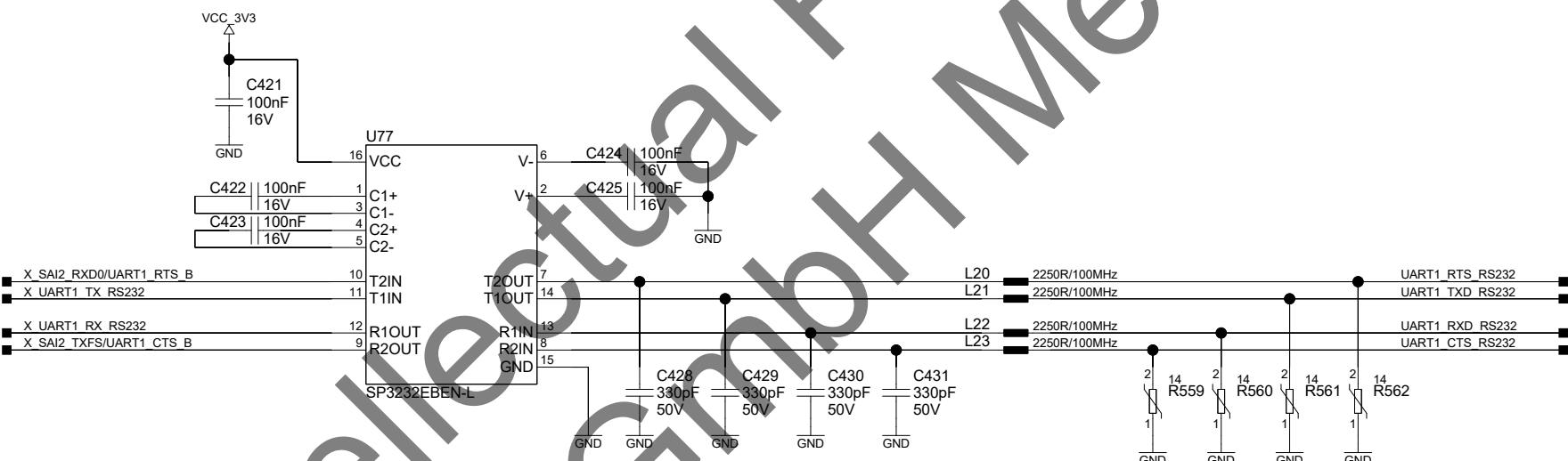
UART1 Multiplexer, RTS/CTS-Jumper



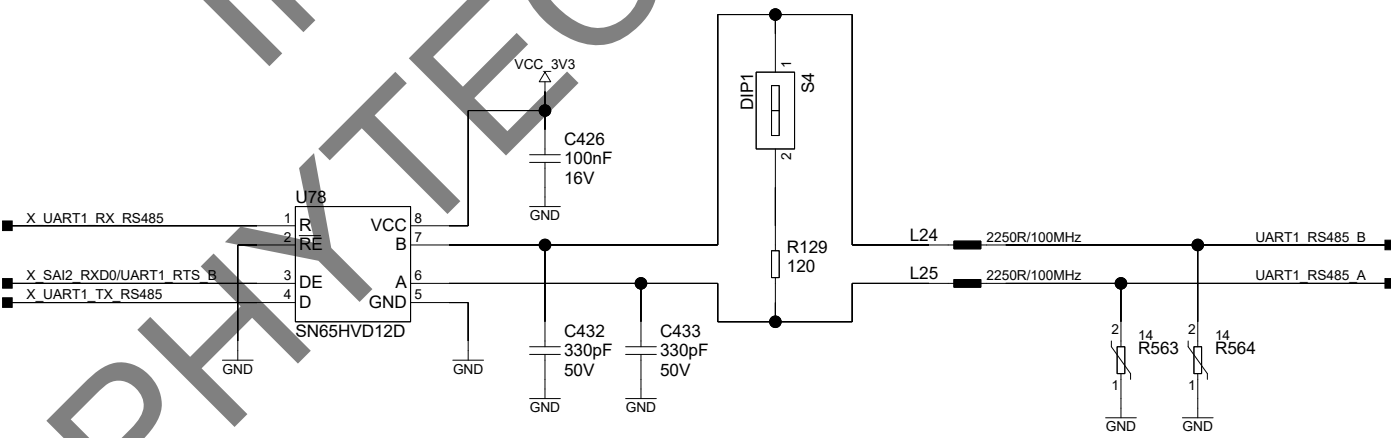
RS232/ RS485 Connector

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RS232 Transceiver



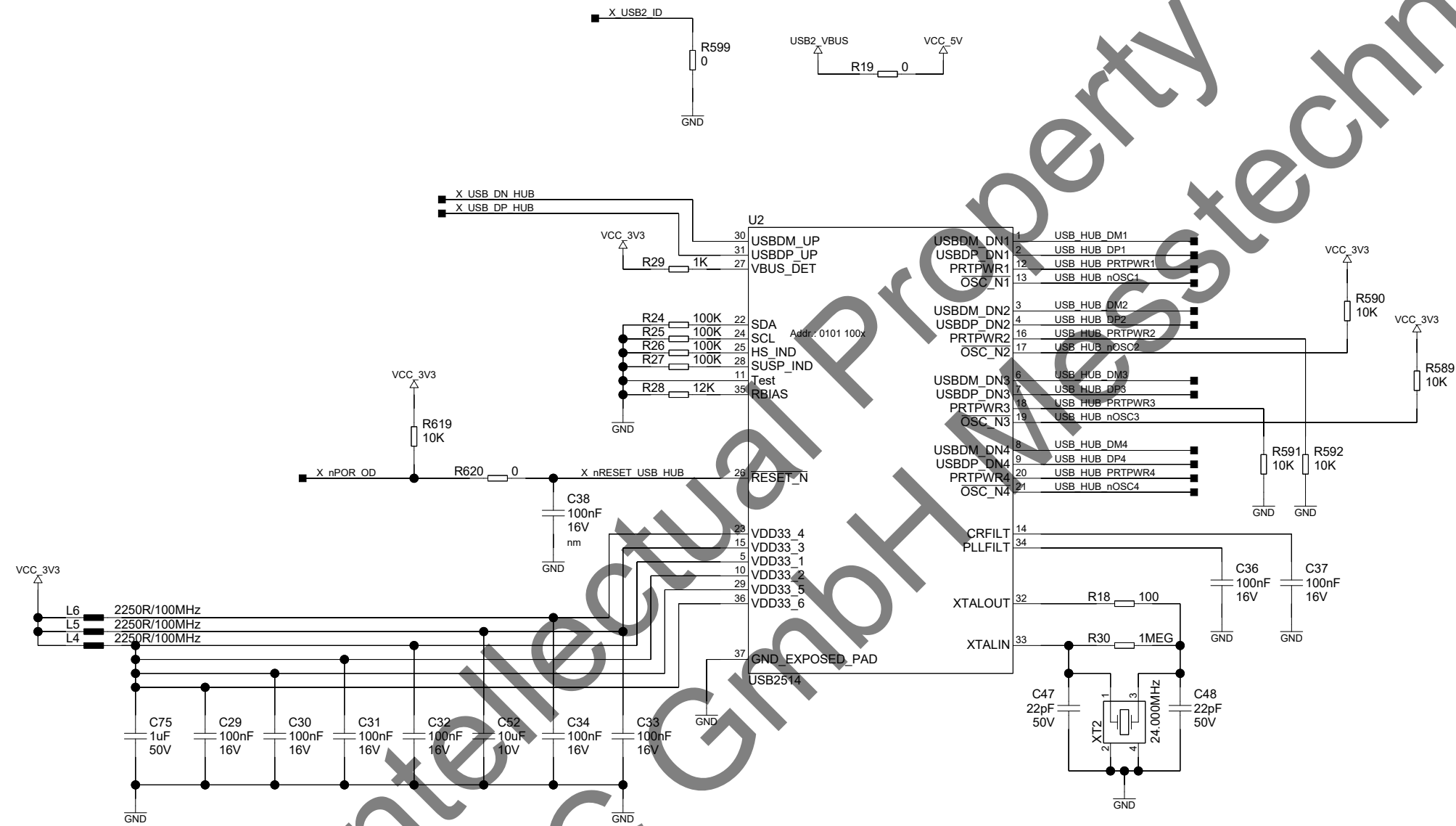
RS485 Transceiver



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USB-HUB

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USB-A

USB OTG

USB OTG1 useable for serial downloader

USB Switch (i.MX 8M Nano only)

Modul	J31	J32	J33	J34	J35	J36	U93
iMX8M Mini	1+2	1+2	1+2	1+2	1+2	1+2	nm
iMX8M NANO	2+3	2+3	2+3	2+3	2+3	2+3	mount

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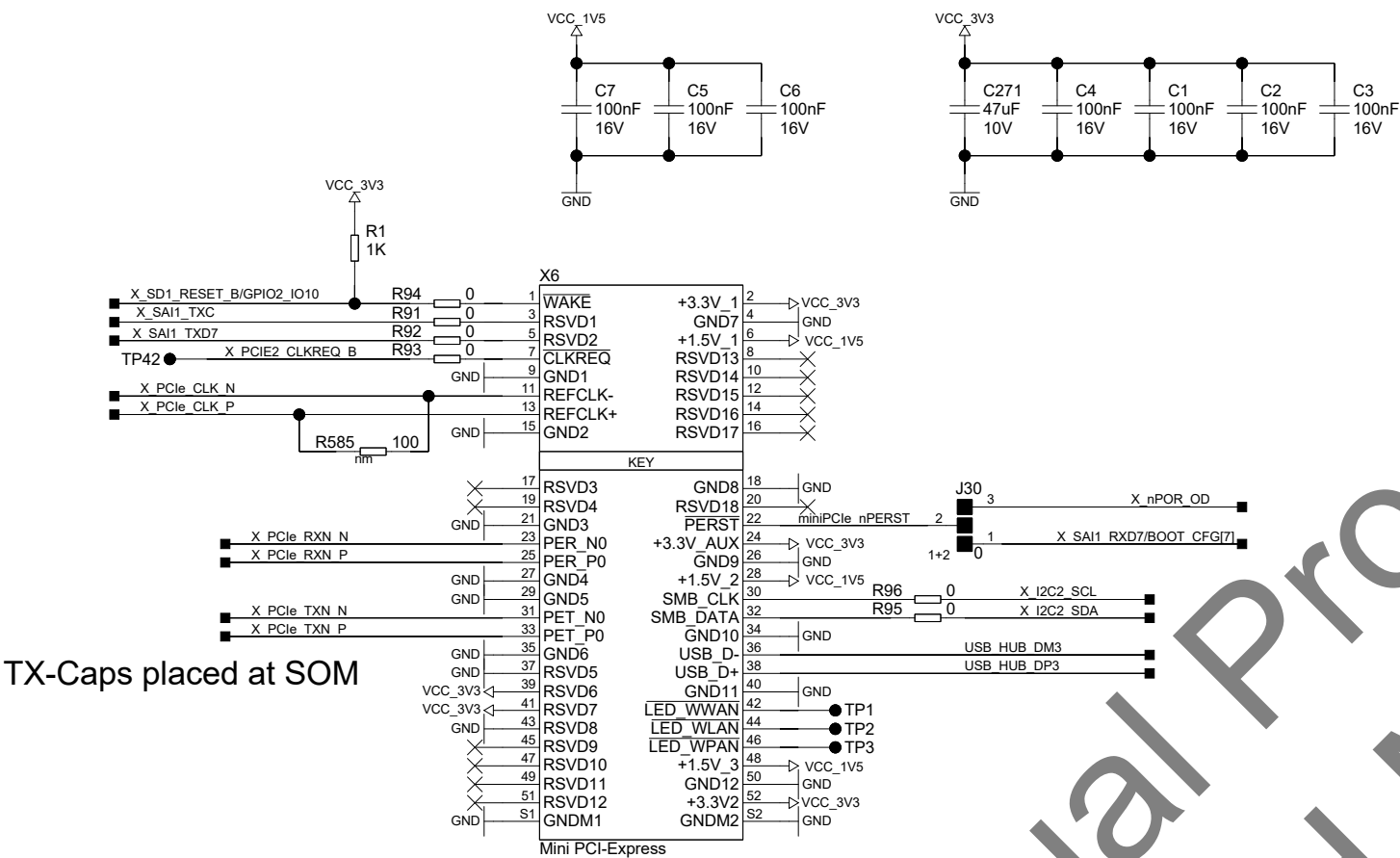
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Author: A. Merrath, T. Metz

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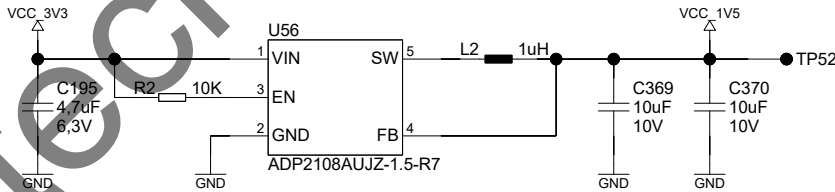
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miniPCle Connector



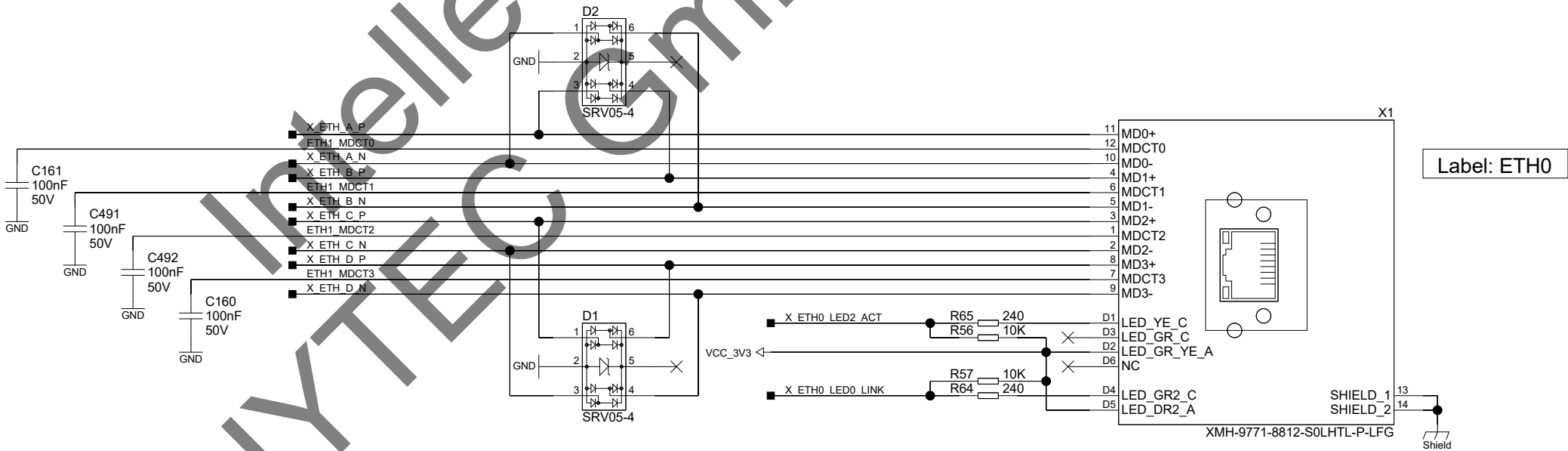
TX-Caps placed at SOM

miniPCle/Exp. 1V5 Supply



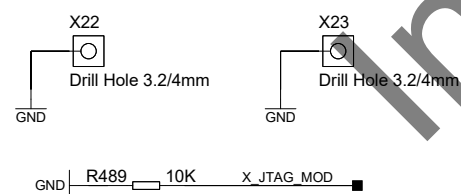
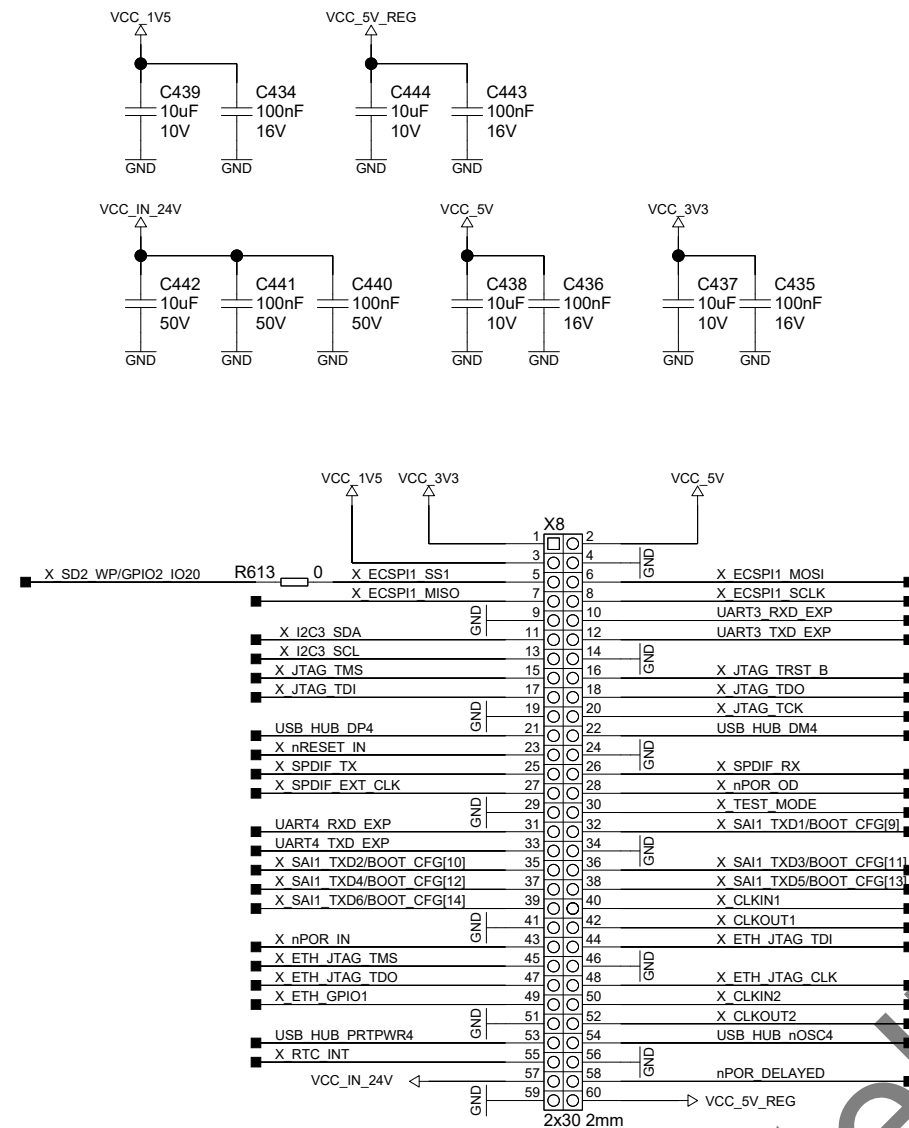
Power needed:
MAX = 375 mA
MAX PEAK = 500 mA

ENET Gbit-Connector



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Expansion Connector

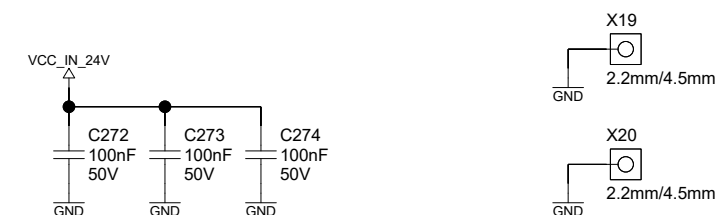
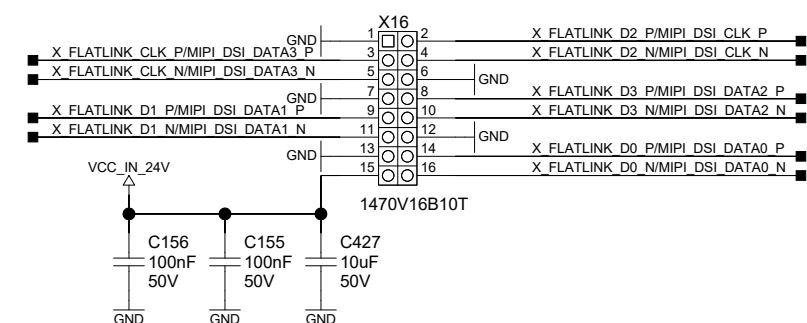
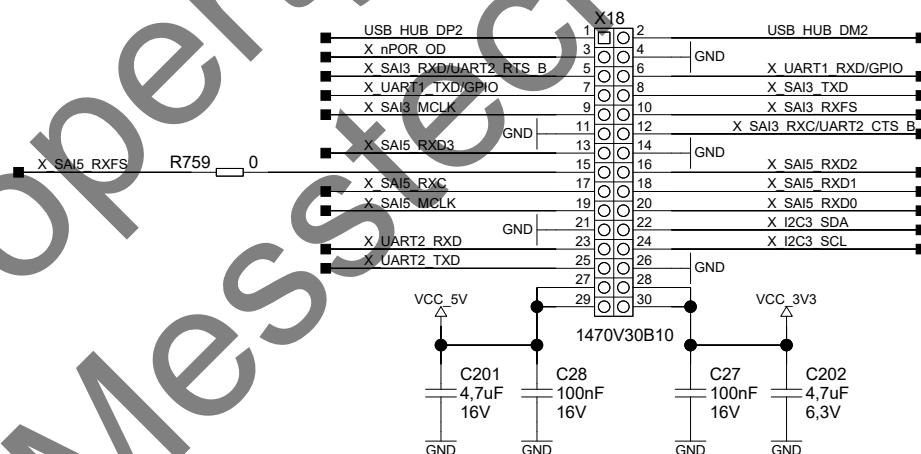


Compatibility with PEB-EVAL-01:

- X8 Pin 37 (S1) Only Mini
- X8 Pin 38 (S2) Only Mini
- X8 Pin 33 (S3) Mini and Nano
- X8 Pin 35 (Red LED) Only Mini
- X8 Pin 36 (Yellow LED) Only Mini
- X8 Pin 31 (Green LED) Mini and Nano

Audio/Video-Connector

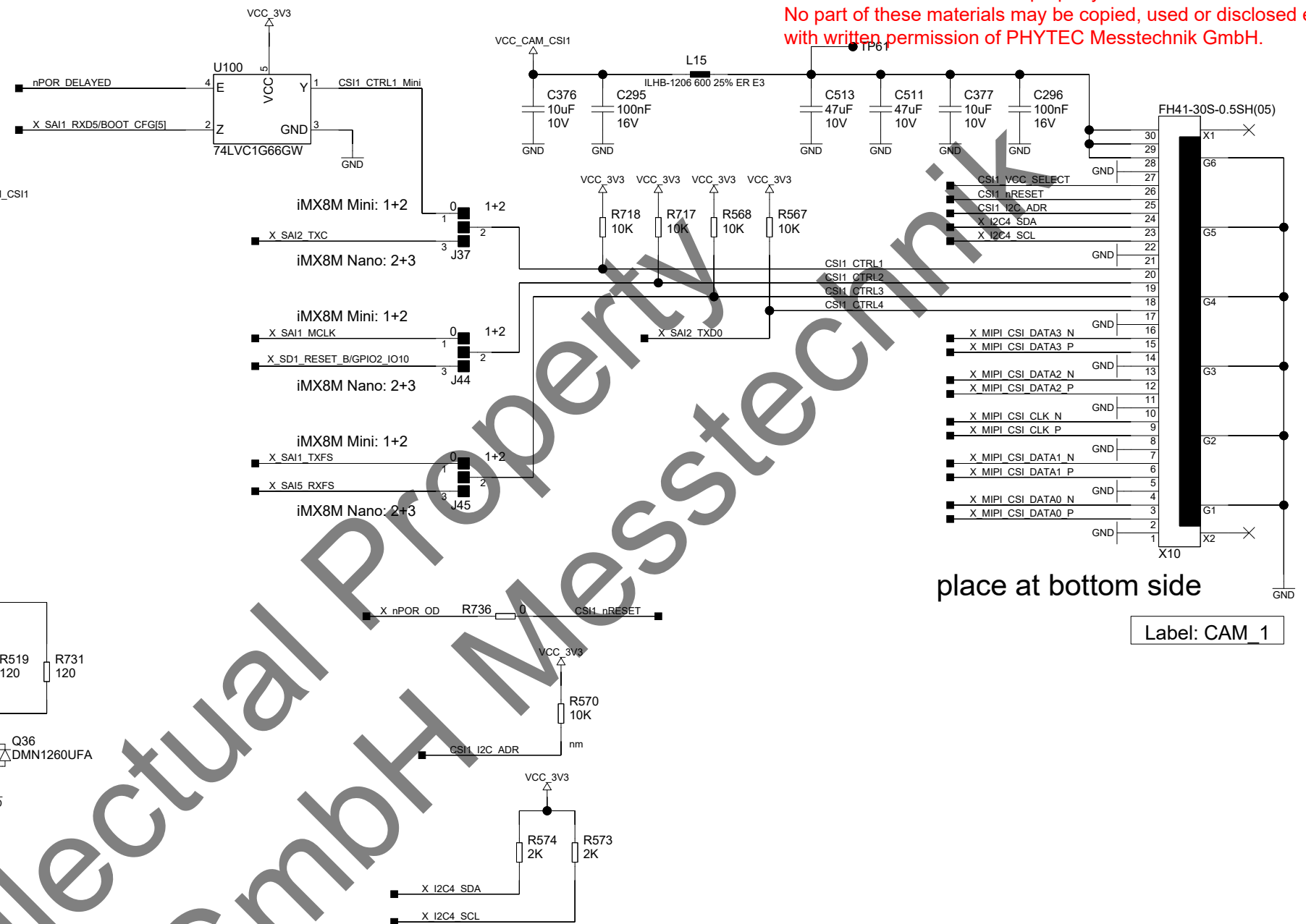
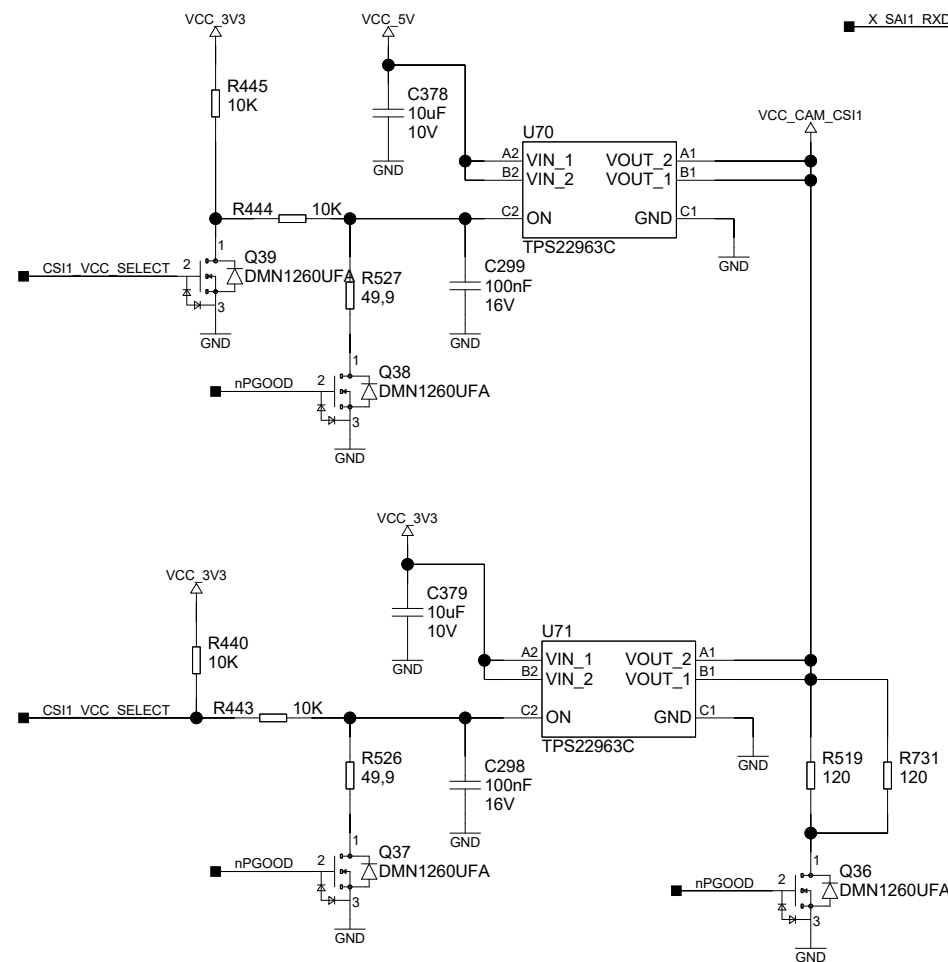
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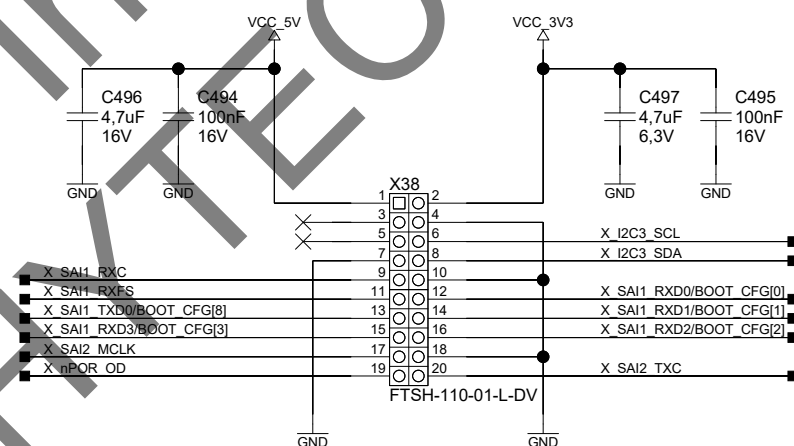
place capacitors along the trace

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CSI1/CAM1
phyCAM-M



VOICE ARRAY CONNECTOR

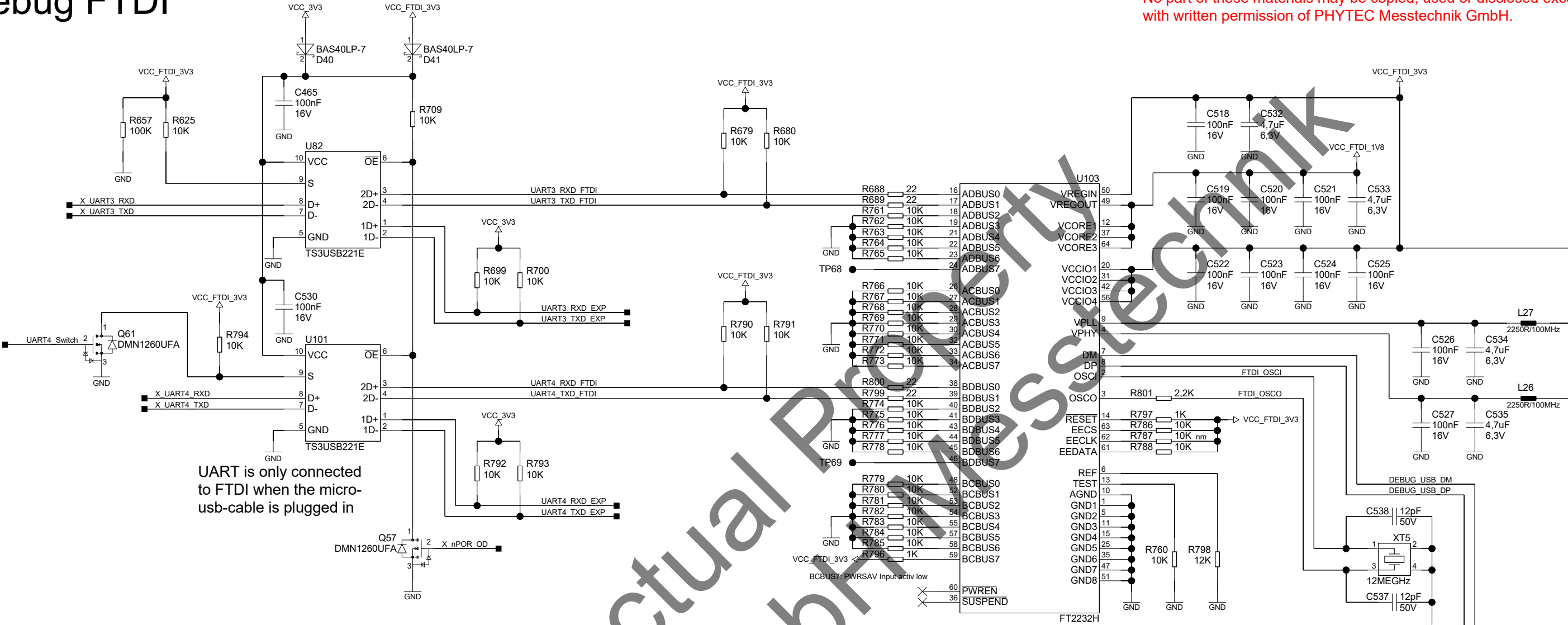


This Connector is only mounted with a i.MX 8M Mini SOM

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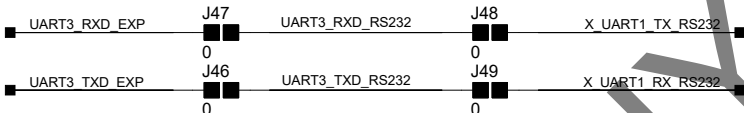
Debug FTDI

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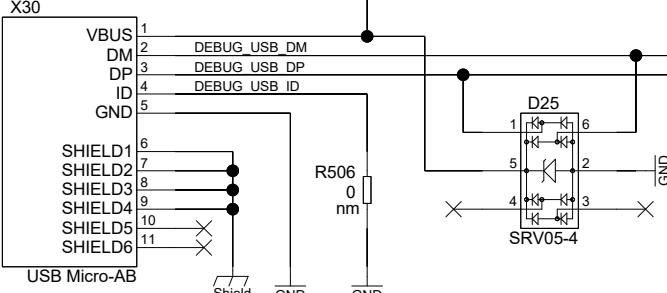


UART is only connected
to FTDI when the micro-
usb-cable is plugged in

Factory use only



Label: Debug-USB

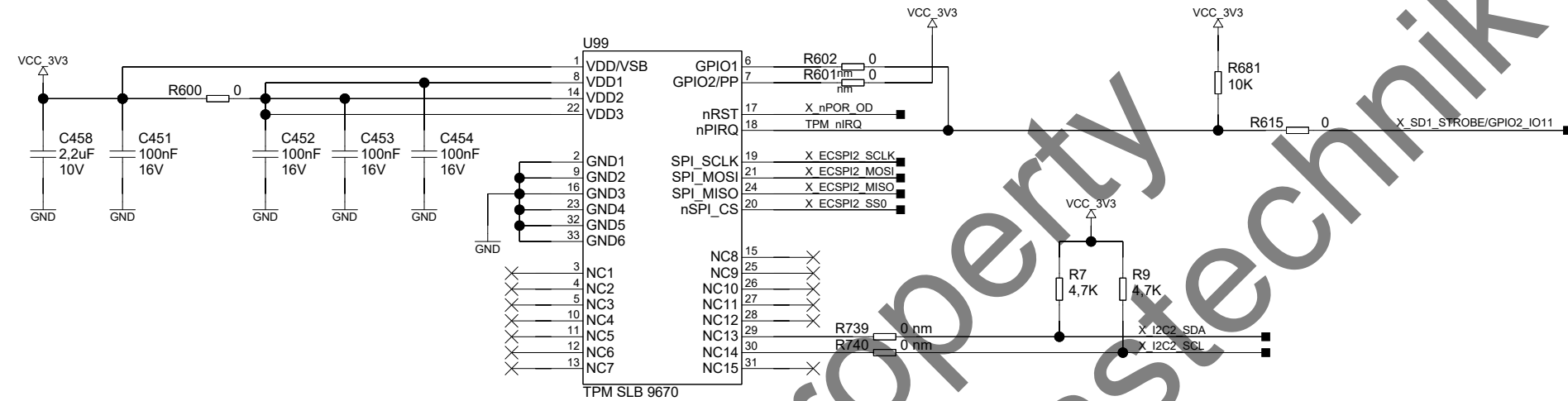


Label D34:
FTDI Enabled

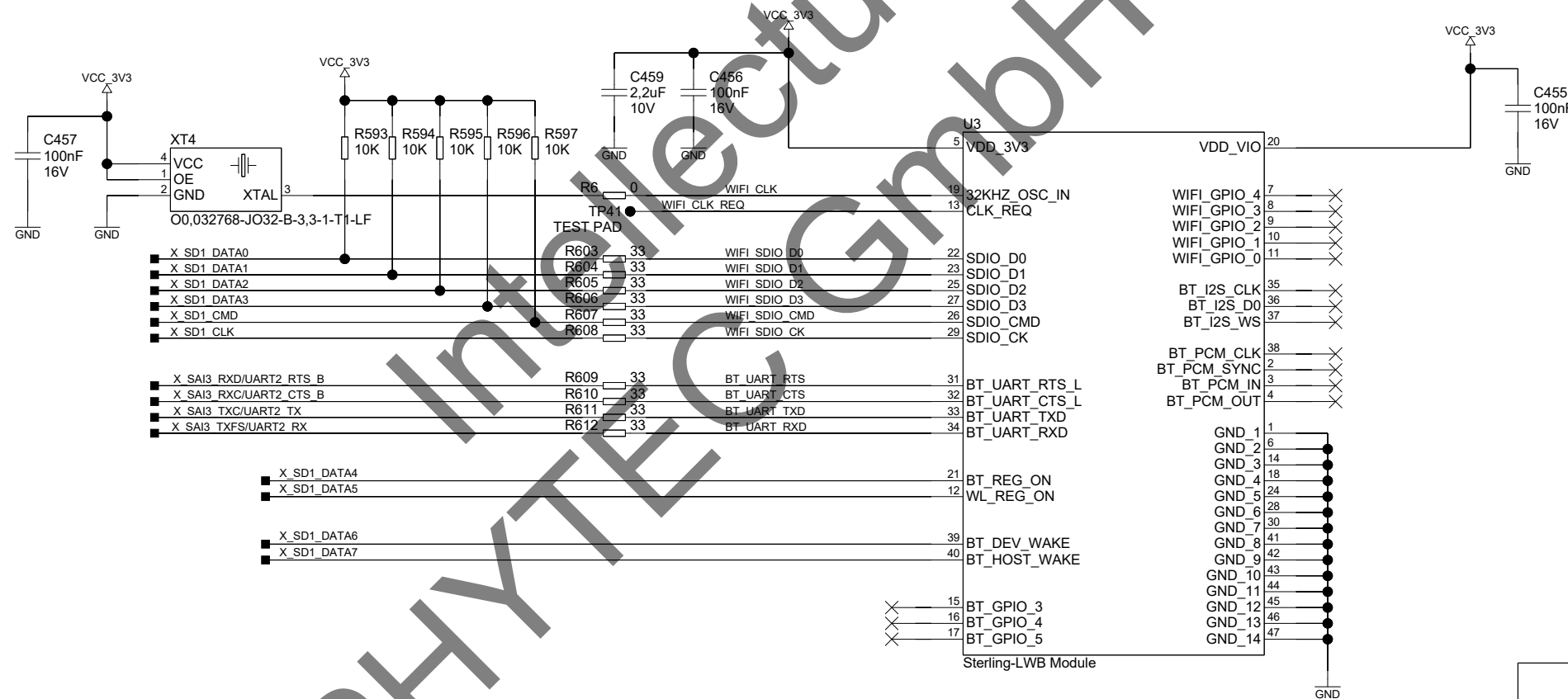
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TPM

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WLAN



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Project:	PBA-CD-15 phyBOARD Polis i.MX 8M Mini/Nano
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Department : F&E
Author: A. Merrath, T. Metz

08.11.2022

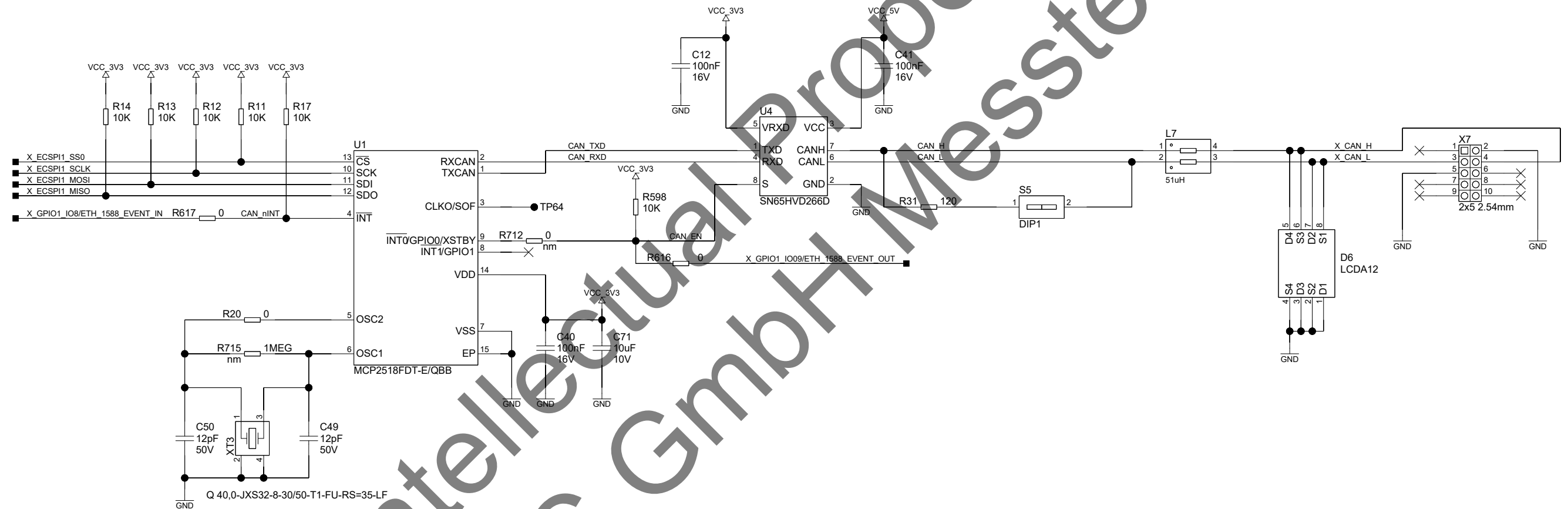
PCB-No.:	1532.3
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CAN FD

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PHYTEC

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Project:
PBA-CD-15 phyBOARD Polis i.MX 8M Mini/Nano

Department : F&E
Author: A. Merrath, T. Metz

08.11.2022

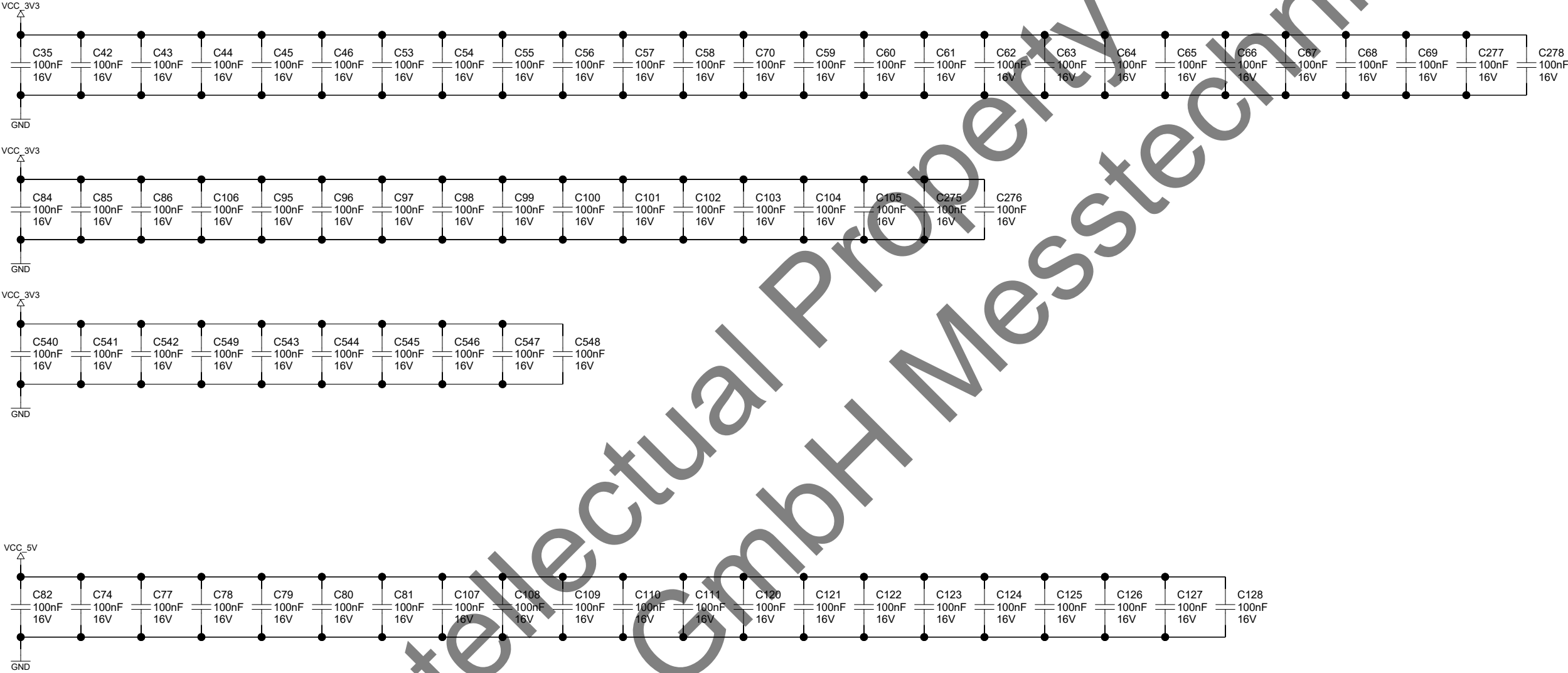
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Capacitors

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