i.MX8M-MB

Variant: [No Variations]

21.09.2021

SVN Revision: 1504 [Locally Modified]

Supported CPU Modules:

- i.MX8M-CM
- i.MX8M-MINI-CM
- i.MX8M-NANO-CM

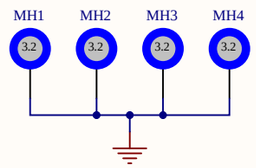
PCB1

PCB
Printed circuits board

Parameter Set
Solder Mask Expansion [Expansion = 0.1mm]

PCB_iMX8M-MB

Mounting Holes



Mounting holes 7.4mm pad 3.2mm drill
BOARD MOUNTING HOLES
ONE IN EACH CORNER

Fiducials

FIDICIALS 4x TOP

FIDICIALS 4x BOTTOM

DESIGN NOTE:
Example text for informational design notes.

DESIGN NOTE:
Example text for critical design notes.

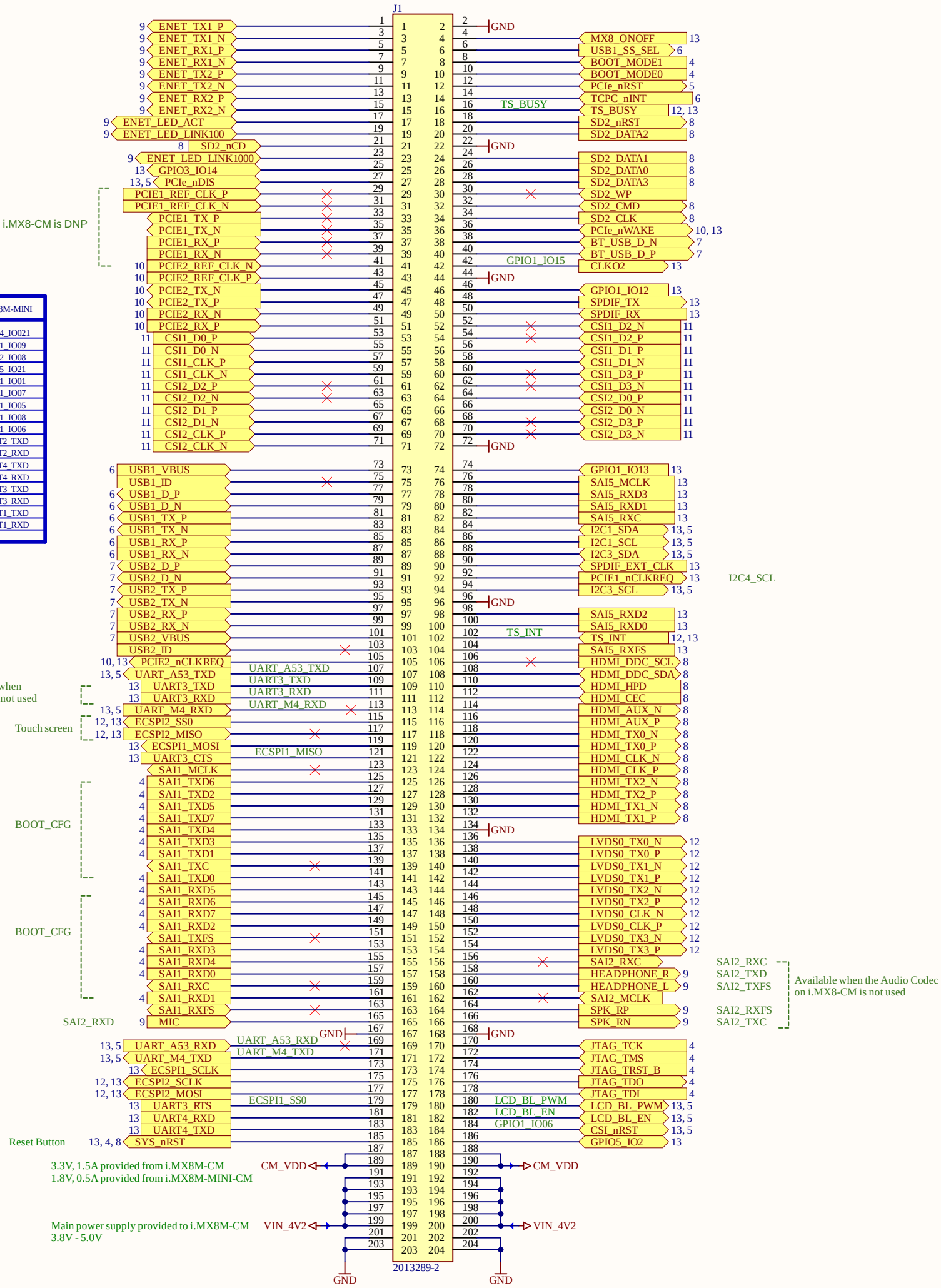
LAYOUT NOTE:
Example text for critical layout guidelines.

Title: *COVER PAGE*			*Ronetix GmbH*
Size: A3	Number: 1	Revision: 2.0	*Hirschstettner Str. 19/Z110*
Date: 21.09.2021	Time: 16:57:30	Sheet 1 of 13	*1220 Vienna*
File: 01_Title Page.SchDoc			*Austria*

RONETIX DEVELOPMENT TOOLS

SODIMM204

Pin	Signal	i.MX8M	i.MX8M-MINI
12	PCIe_nRST	GPIO3_IO11	GPIO4_IO021
27	PCIe_nDIS	GPIO3_IO12	GPIO1_IO09
36	PCIe_nWAKE	GPIO3_IO02	GPIO2_IO08
105	PCIE2_nCLKREQ	GPIO5_IO21	GPIO5_IO21
180	LCD_BL_PWM	GPIO1_IO01	GPIO1_IO01
182	LCD_BL_EN	GPIO1_IO03	GPIO1_IO07
16	TS_BUSY	GPIO1_IO05	GPIO1_IO05
102	TS_INT	GPIO1_IO08	GPIO1_IO08
184	CSI_nRST	GPIO1_IO06	GPIO1_IO06
107	UART_A53_TXD	UART1_TXD	UART2_TXD
169	UART_A53_RXD	UART1_RXD	UART2_RXD
171	UART_M4_TXD	UART2_TXD	UART4_TXD
113	UART_M4_RXD	UART2_RXD	UART4_RXD
109		UART3_TXD	UART3_TXD
111		UART3_RXD	UART3_RXD
183		UART4_TXD	UART1_TXD
182		UART4_RXD	UART1_RXD

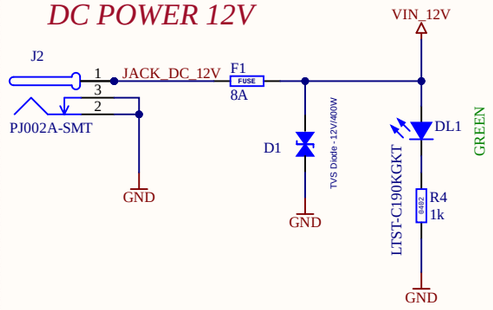


Title	*SODIMM204*		*Ronetix GmbH*
Size: A3	Number: 2	Revision: 2.0	*Hirschstettner Str. 19/Z110*
Date: 21.09.2021	Time: 16:57:30	Sheet 2 of 13	*1220 Vienna*
File: 02_SODIMM204.SchDoc			*Austria*

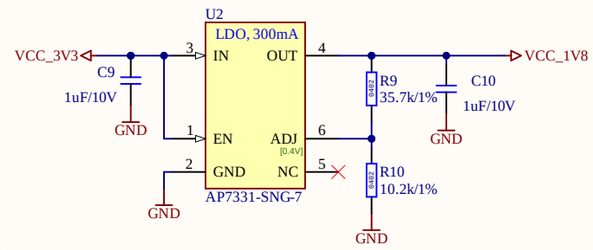
RONETIX DEVELOPMENT TOOLS

Power Supply

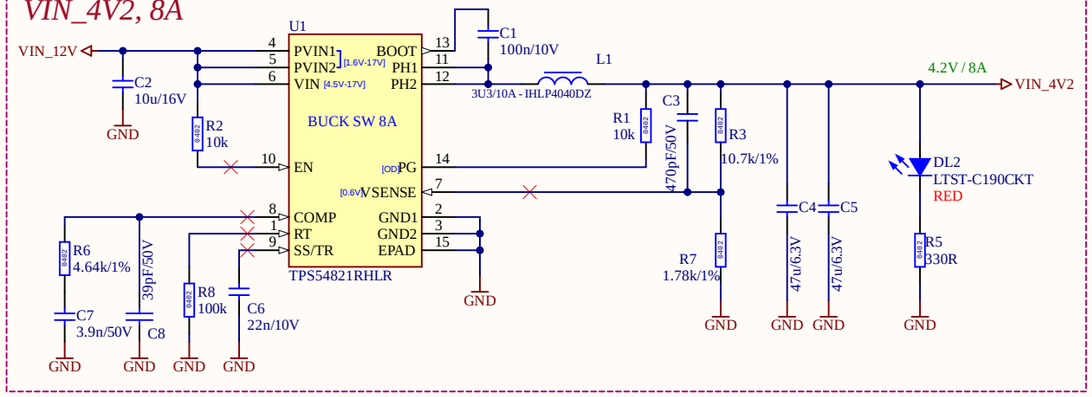
DC POWER 12V



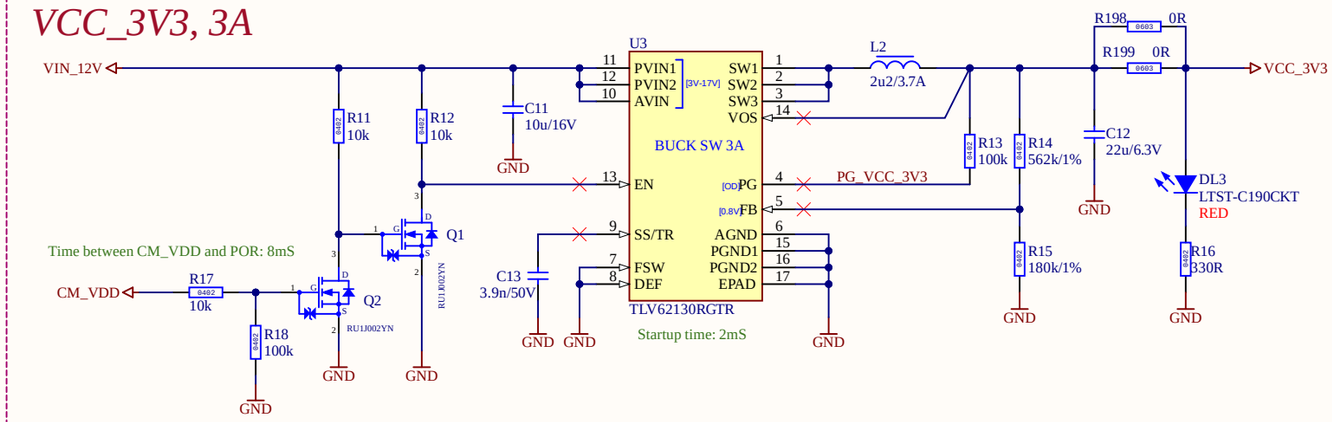
VCC_1V8, 300mA



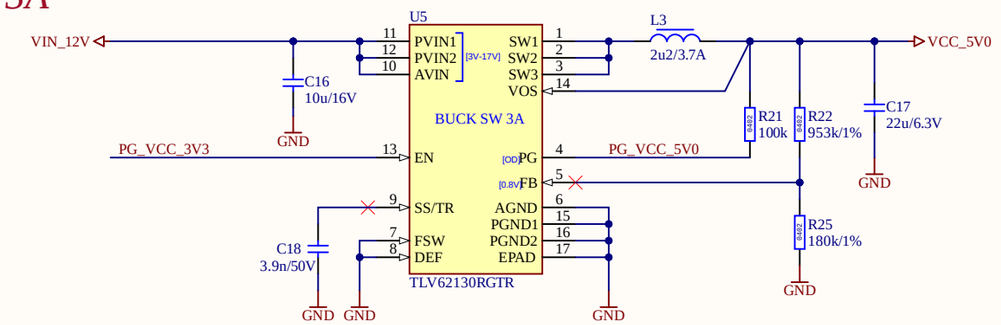
VIN_4V2, 8A



VCC_3V3, 3A



VCC_5V0, 3A



TP3 TP 5000 GND

TP4 TP 5000 GND

Title **Power Supply**		Ronetix GmbH Hirschstettner Str. 19/Z110 1220 Vienna Austria
Size: A3	Number: 3	Revision: 2.0
Date: 21.09.2021 Time: 16:57:30	Sheet 3 of 13	
File: 03_Power.SchDoc		

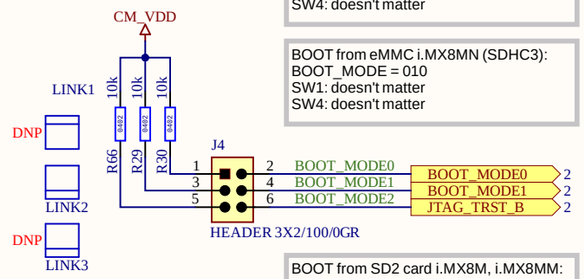
BOOT, JTAG

i.MX8M, i.MX8-MINI: Boot ROM Fuse

i.MX8M: <Default: eMMC BOOT>, QSPI boot is not supported by ROM

Address		7	6	5	4	3	2	1	0
	0x470[15:8]	**BOOT_CFG[15]**	**BOOT_CFG[14]**	**BOOT_CFG[13]**	**BOOT_CFG[12]**	**BOOT_CFG[11]**	**BOOT_CFG[10]**	**BOOT_CFG[9]**	**BOOT_CFG[8]**
	0x470[15:8]	Infinit-Loop (Debug USE only) 0 - Disable 1 - Enable	001 - SD/eSD			Port Select: 00 - eSDHC1 01 - eSDHC2 10 - eSDHC3		SD Power Cycle/eMMC Reset Enable: '0' - Disabled '1' - Enabled	SD Loopback Clock Source Sel (for SDR50 and SDR104 only) '0' - through SD pad '1' - direct
	0x470[15:8]		010 - MMC/eMMC						
	0x470[15:8]		011 - NAND			Pages In Block: 00 - 128 01 - 64 10 - 32 11 - 256		Nand_Row_address_bytes: 00 - 3 01 - 2 10 - 4 11 - 5	
	0x470[15:8]		100 - QSPI			QSPI Instance 0 - QuadSPI0 1 - Reserved	SDR SMP: "000" : Default "001-111"		
	0x470[15:8]		110 - SPI NOR			Port Select: 000 - eCSPI1 001 - eCSPI2 002 - eCSPI3			SPI Addressing: 0 - 3-bytes (24-bit) 1 - 2-bytes (16-bit)
	0x470[15:8]	Others - Reserved for future use							
		BOOT_CFG[7]	**BOOT_CFG[6]**	**BOOT_CFG[5]**	**BOOT_CFG[4]**	**BOOT_CFG[3]**	**BOOT_CFG[2]**	**BOOT_CFG[1]**	**BOOT_CFG[0]**
SD/eSD	0x470[7:0]	Fast Boot: 0 - Regular 1 - Fast Boot	Reserved	Reserved	Bus Width: 0 - 1-bit 1 - 4-bit	Speed 000 - Normal/SDR12 001 - High/SDR25 010 - SDR50 011 - SDR104 101 - Reserved for DDR50 Others - Reserved			Reserved
MMC/eMMC	0x470[7:0]		Bus Width: 000 - 1-bit 001 - 4-bit 010 - 8-bit 101 - 4-bit DDR (MMC 4.4) 110 - 8-bit DDR (MMC 4.4) Else - reserved.			Speed 00 - Normal 01 - High 10 - Reserved for HS200 11 - Reserved		USDHC1 IO VOLTAGE SELECTION 0 - 3.3V 1 - 1.8V	USDHC2 IO VOLTAGE SELECTION 0 - 3.3V 1 - 1.8V
NAND	0x470[7:0]	BT_TOGGLEMODE	BOOT_SEARCH_COUNT: 00 - 2 01 - 2 10 - 4 11 - 8		Toggle Mode 33MHz Preamble Delay, Read Latency: '000' - 16 GPMICLK cycles. '001' - 1 GPMICLK cycles. '010' - 2 GPMICLK cycles. '011' - 3 GPMICLK cycles. '100' - 4 GPMICLK cycles. '101' - 5 GPMICLK cycles. '110' - 6 GPMICLK cycles. '111' - 7 GPMICLK cycles. '1111' - 15 GPMICLK cycles.			Reserved
QSPI	0x470[7:0]	HSPHS: Half Speed Phase Selection 0 : select sampling at non-inverted clock 1: select sampling at inverted clock	HSDLY: Half Speed Delay selection 0 : one clock delay 1: two clock delay	FSPHS: Full Speed Phase Selection 0 : select sampling at non-inverted clock 1: select sampling at inverted clock	FSDLY: Full Speed Delay selection 0 : one clock delay 1: two clock delay	Reserved	Reserved	Reserved	Reserved
SPINOR	0x470[7:0]	CS select (SPI only): 00 - CS#0 (default) 01 - CS#1 10 - CS#2 11 - CS#3		Reserved	Reserved	Reserved	Reserved	Reserved	Reserved

BMODE[1:0]	i.MX8M i.MX8M-MINI	i.MX8M-NANO
00	Boot From Fuses	Boot From Fuses
01	Serial Downloader	Serial Downloader
10	Internal Boot	uSDHC3, eMMC
11	Reserved	uSDHC2, Micro SD



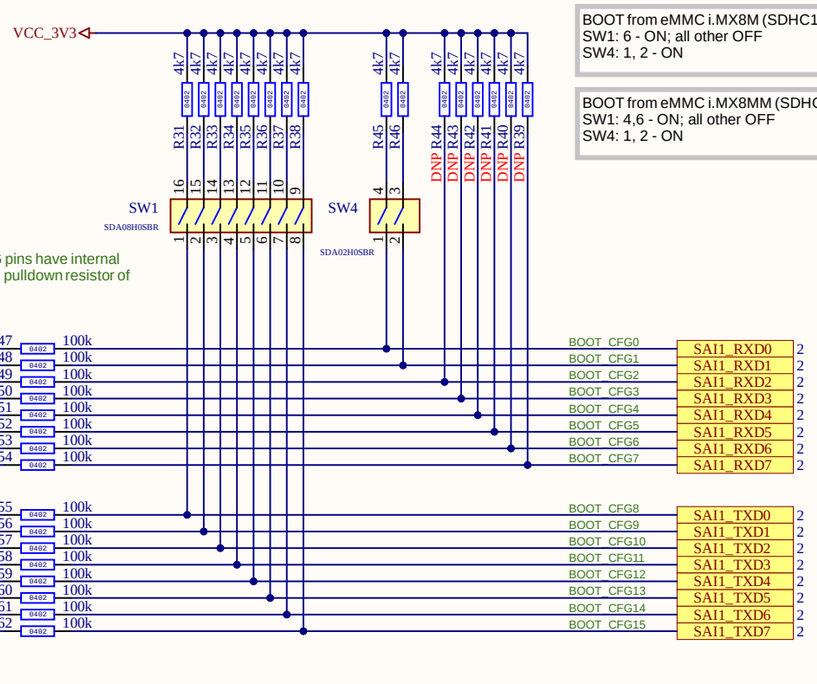
BOOT from SD card i.MX8MN (SDHC2):
BOOT_MODE = 011
SW1: doesn't matter
SW4: doesn't matter

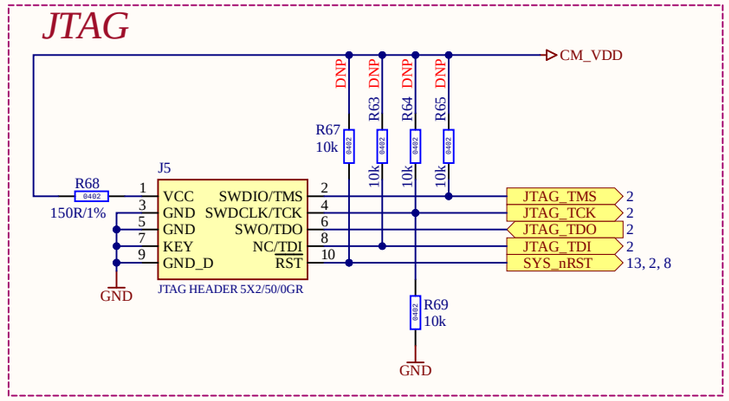
BOOT from eMMC i.MX8MN (SDHC3):
BOOT_MODE = 010
SW1: doesn't matter
SW4: doesn't matter

BOOT from SD2 card i.MX8M, i.MX8MM:
SW1: 3,5 - ON; all other OFF
SW4: 1,2 - ON

BOOT from eMMC i.MX8M (SDHC1):
SW1: 6 - ON; all other OFF
SW4: 1, 2 - ON

BOOT from eMMC i.MX8MM (SDHC3):
SW1: 4,6 - ON; all other OFF
SW4: 1, 2 - ON



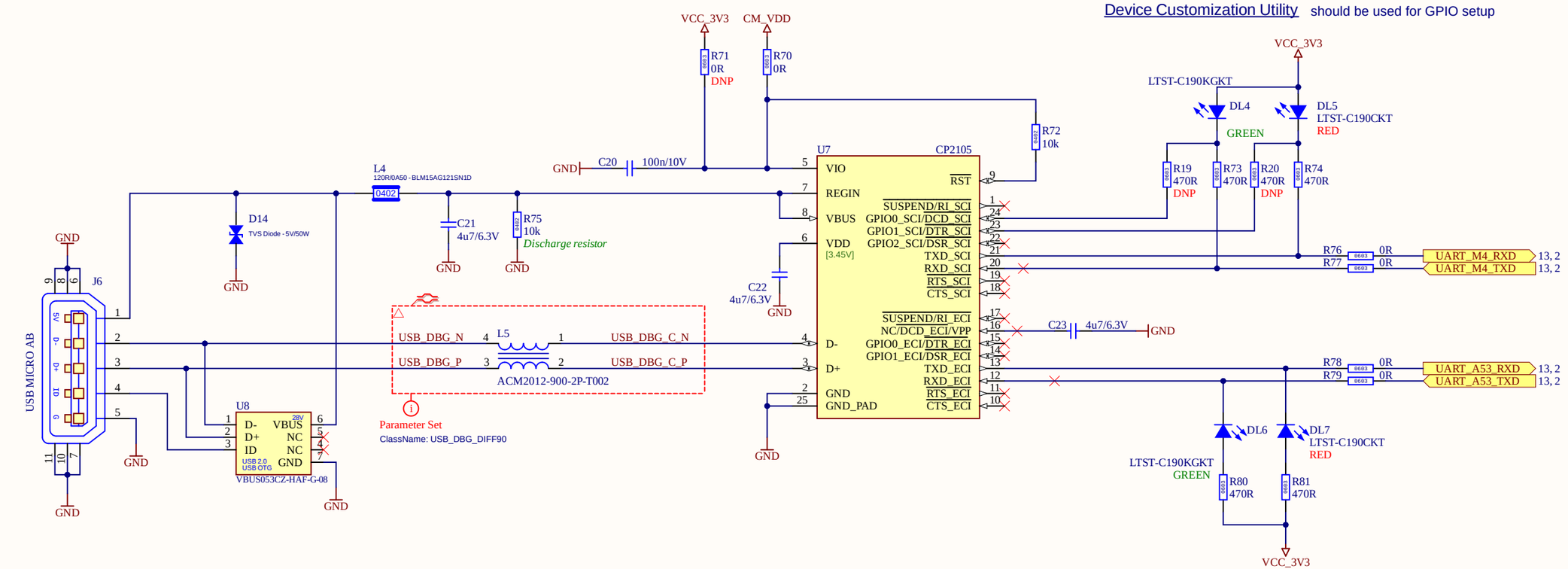


Title: *BOOT, JTAG*			*Ronetix GmbH*
Size: A3	Number: 4	Revision: 2.0	*Hirschstettner Str. 19/Z110*
Date: 21.09.2021	Time: 16:57:30	Sheet 4 of 13	*1220 Vienna*
File: 04_BOOT_JTAG.SchDoc			*Austria*

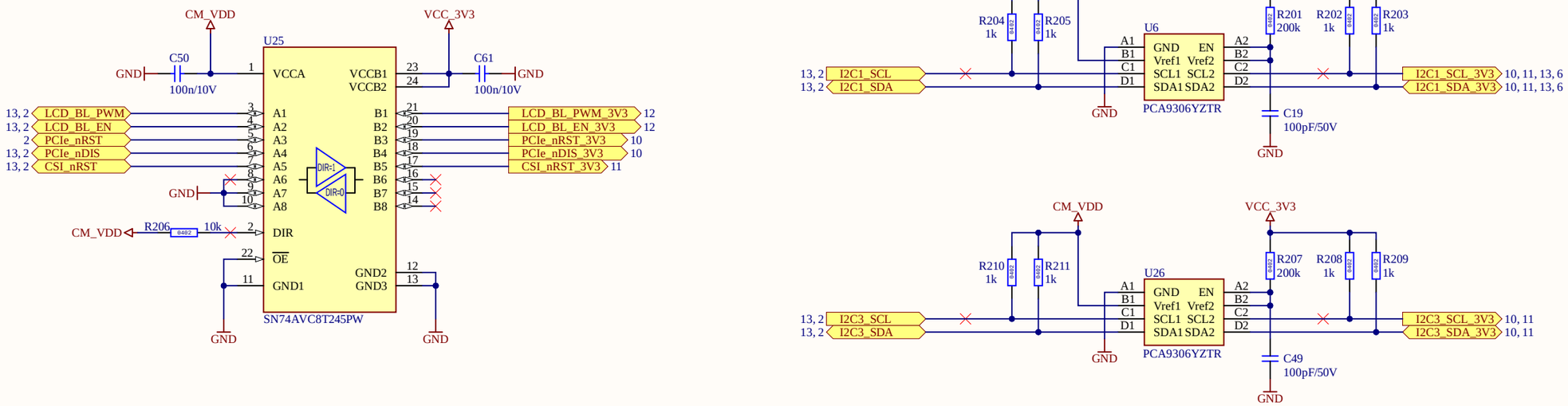
RONETIX DEVELOPMENT TOOLS

Debug UART and Voltage translators

Device Customization Utility should be used for GPIO setup



I2C Voltage-Level Translator



Title: Debug UART and Voltage translators			Ronetix GmbH Hirschstettner Str. 19/Z110 1220 Vienna Austria
Size: A3	Number: 5	Revision: 2.0	
Date: 21.09.2021	Time: 16:57:31	Sheet 5 of 13	
File: 05_Debug_UART.SchDoc			

USB 3.0 Type C

USB 3.0 Type C

ClassName: USB1_DIFF90
Parameter Set

USB1_D_P
USB1_D_N

VCC_1V8
C24 100n/10V
C25 4u7/6.3V
GND

U9 PTN36043BX
USB Type-C SuperSpeed active switch
VDD1V8
GND
TX_AP_+
TX_AP_-
RX_AP_+
RX_AP_-
SEL
CH1_SET1/RXDE
CH1_SET2/TXEQ
CH2_SET1/TXDE
CH2_SET2/RXEQ
Active DEMUX
TX_CON_1+
TX_CON_1-
TX_CON_2+
TX_CON_2-
RX_CON_1+
RX_CON_1-
RX_CON_2+
RX_CON_2-
Max 113mA

USB1_TX_P C29 100n/10V USB1_TX_C_P
USB1_TX_N C31 100n/10V USB1_TX_C_N
USB1_RX_P C32 100n/10V USB1_RX_C_P
USB1_RX_N C33 100n/10V USB1_RX_C_N
USB1_SS_SEL
D5 SDM03U40
R82 10k
R83 2k2
R84 2k2
R85 2k2
R86 2k2
R87 2k2 DNP
R88 2k2 DNP
R89 2k2 DNP
R90 2k2 DNP

ClassName: USB1_DIFF90
Parameter Set
USB1_TX1_M_P C26 100n/10V USB1_TX1_MC_P
USB1_TX1_M_N C27 100n/10V USB1_TX1_MC_N
USB1_TX2_M_P C28 100n/10V USB1_TX2_MC_P
USB1_TX2_M_N C30 100n/10V USB1_TX2_MC_N
USB1_RX1_M_P
USB1_RX1_M_N
USB1_RX2_M_P
USB1_RX2_M_N

PCMF3USB3S U10
PCMF3USB3S U11
C1,3,5
C2,4,6
CMF+ESD
B1,B2,B3
A1,3,5
A2,4,6

USB1_VBUS_CONN 5V - 20V
D4 TVS Diode - 24V/200W
GND

ClassName: USB1_DIFF90
Parameter Set
USB1_D_F_P
USB1_D_F_N
USB1_TX1_F_P
USB1_TX1_F_N
USB1_RX1_F_P
USB1_RX1_F_N
USB1_CC1
USB1_CC2
USB1_TX2_F_P
USB1_TX2_F_N
USB1_RX2_F_P
USB1_RX2_F_N
Parameter Set
ClassName: USB1_DIFF90

D6 D7 TVS Diode - 5V/50W

J7
USB-C 3.1 Gen 2, Superspeed+
VBUS1 VBUS2 VBUS3 VBUS4
DP1 DN1 DP2 DN2
SSTXP1 SSTXN1 SSRXP1 SSRXN1
CC1 CC2
SBU1 SBU2
SSTXP2 SSTXN2 SSRXP2 SSRXN2
GND1 GND2 GND3 GND4
SH1 SH2 SH3 SH4
Molex 1054500101

VCC_5V0
R91 100k
R92 10k
USB1_VBUS
Q3 MMBT3904
Q4 MMBT3904
5V - 20V
USB1_VBUS_CONN
R94 100k
R95 100k

VCC_3V3
R93 10k
U12 NX5P3290
VCP3 VCP2 VCP1
VIN1 VIN2 CAP GND1 GND2 GND3
VBUS1 VBUS2 VBUS3 FLT FO ILIM EN
R96 10k
C34 4u7/25V
C36 47u/6.3V
C35 1n/10V

U13 PTN5110DHQ
5V - 20V
USB1_VBUS_CONN
C37 2.2u/10V
PTN51_1V8
C38 4u7/6.3V
C39 100n/10V
VBUS LDO
1.8V
INTERNAL LDO
VBAT LDO
BYPASS RAIL - 1.8V
VDD
VCONN_IN
VBUS BYPASS VDD GND
EN_SRC EN_SNK1 FRS_EN FAULT_N DBG_ACC ILIM_5V_VBUS SLV_ADDR
[OD] ALERT_N
I2C_SCL I2C_SDA
Current limit: 1A, 2A
R97 53.6k/1%
R98 53.6k/1%
Q5 RU1J002YN
PTN51_SLV_ADDR
TP1
TCPC_nINT
I2C1_SCL_3V3
I2C1_SDA_3V3
10, 11, 13, 5
I2C address (0x050<<1)+RW

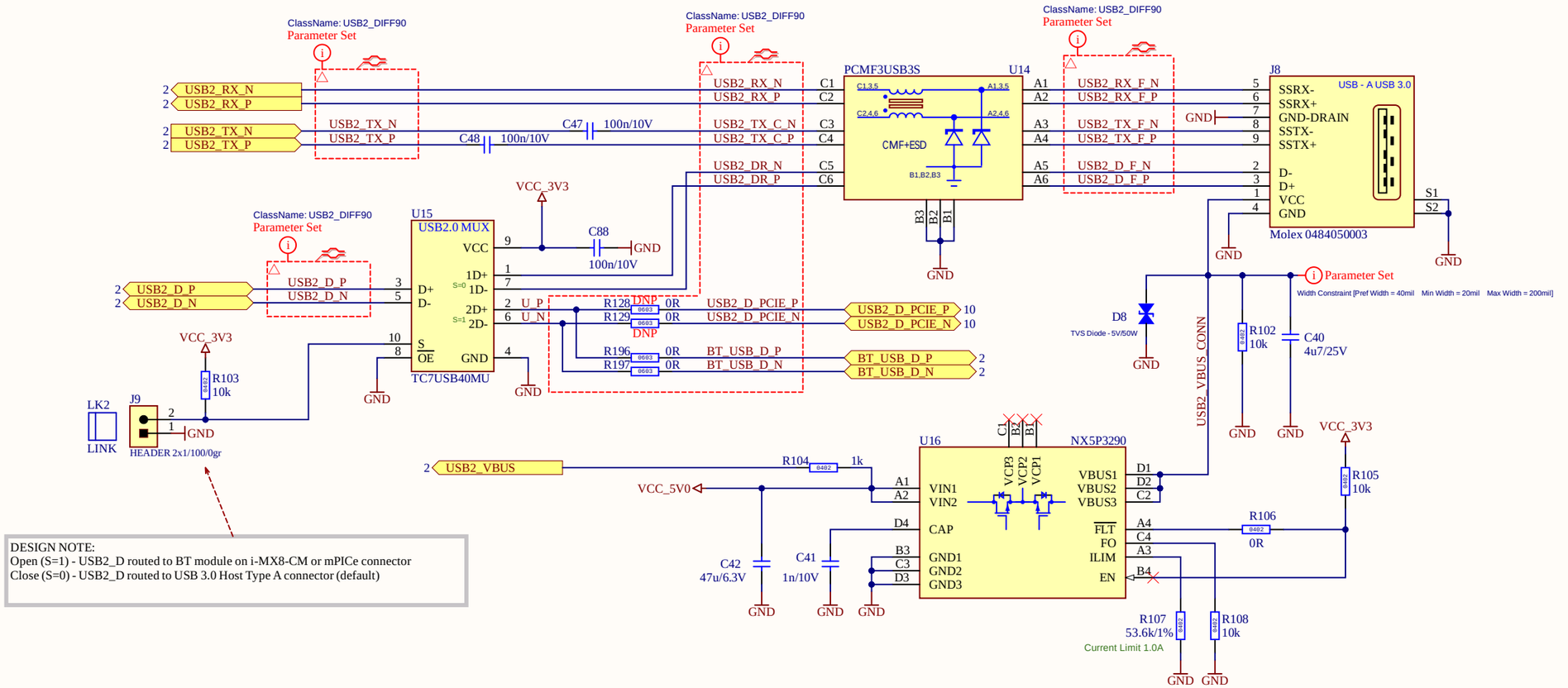
DESIGN NOTE:
SLV_ADDR pin select the I2C address
GND - (0x50 << 1) + RW (default)
10k - (0x51 << 1) + RW
NC - (0x52 << 1) + RW
100k - (0x53 << 1) + RW

PTN51_1V8
R99 10k DNP
R100 100k DNP
R101 0R
PTN51_SLV_ADDR

Title	*USB 3.0 Type C*		*Ronetix GmbH*
Size: A3	Number: 6	Revision: 2.0	*Hirschstettner Str. 19/Z110*
Date: 21.09.2021	Time: 16:57:31	Sheet 6 of 13	*1220 Vienna*
File: 06_USB3_Type_C.SchDoc			*Austria*

RONETIX DEVELOPMENT TOOLS

USB 3.0 Host Type A

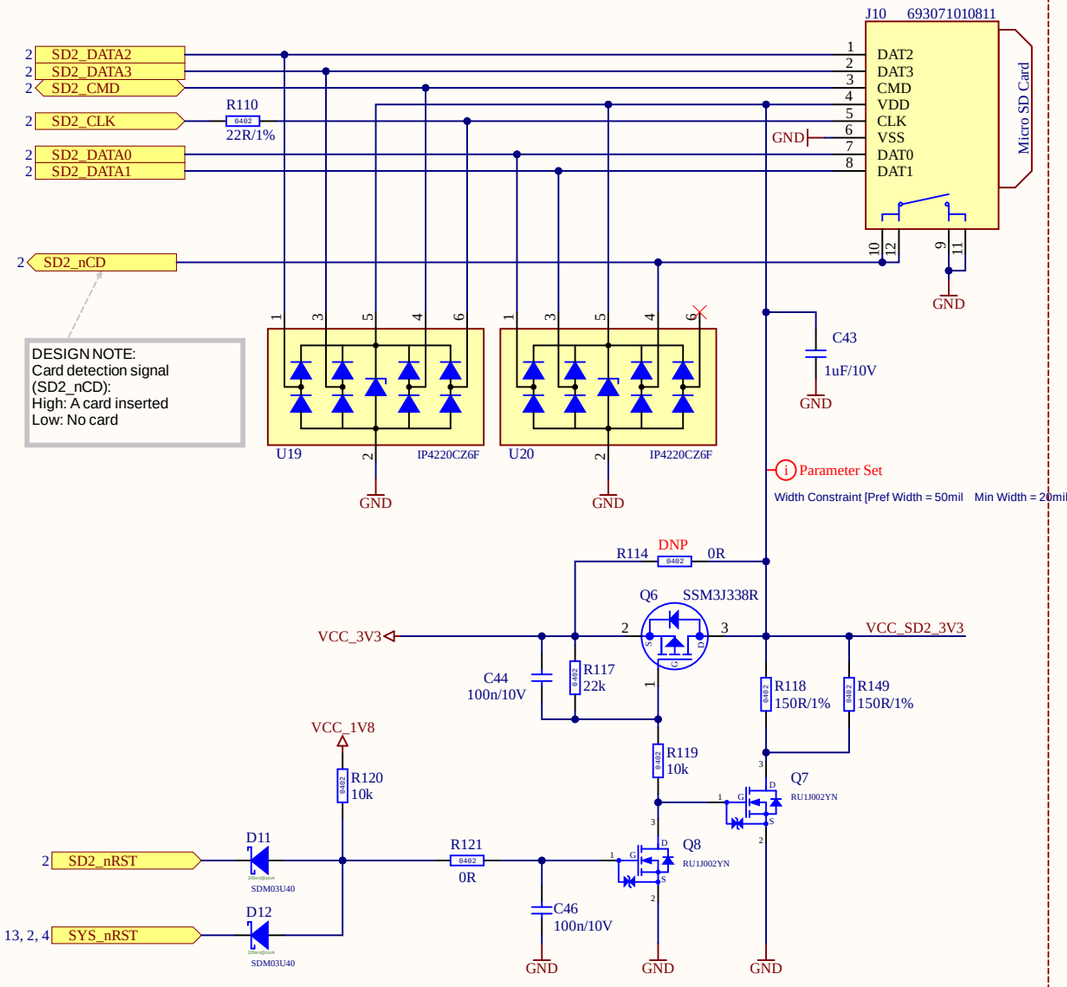


Title	*USB 3.0 Host Type A*		*Ronetix GmbH*
Size: A3	Number: 7	Revision: 2.0	*Hirschstettner Str. 19/Z110*
Date: 21.09.2021	Time: 16:57:31	Sheet 7 of 13	*1220 Vienna*
File: 07_USB3_Type_A.SchDoc			*Austria*

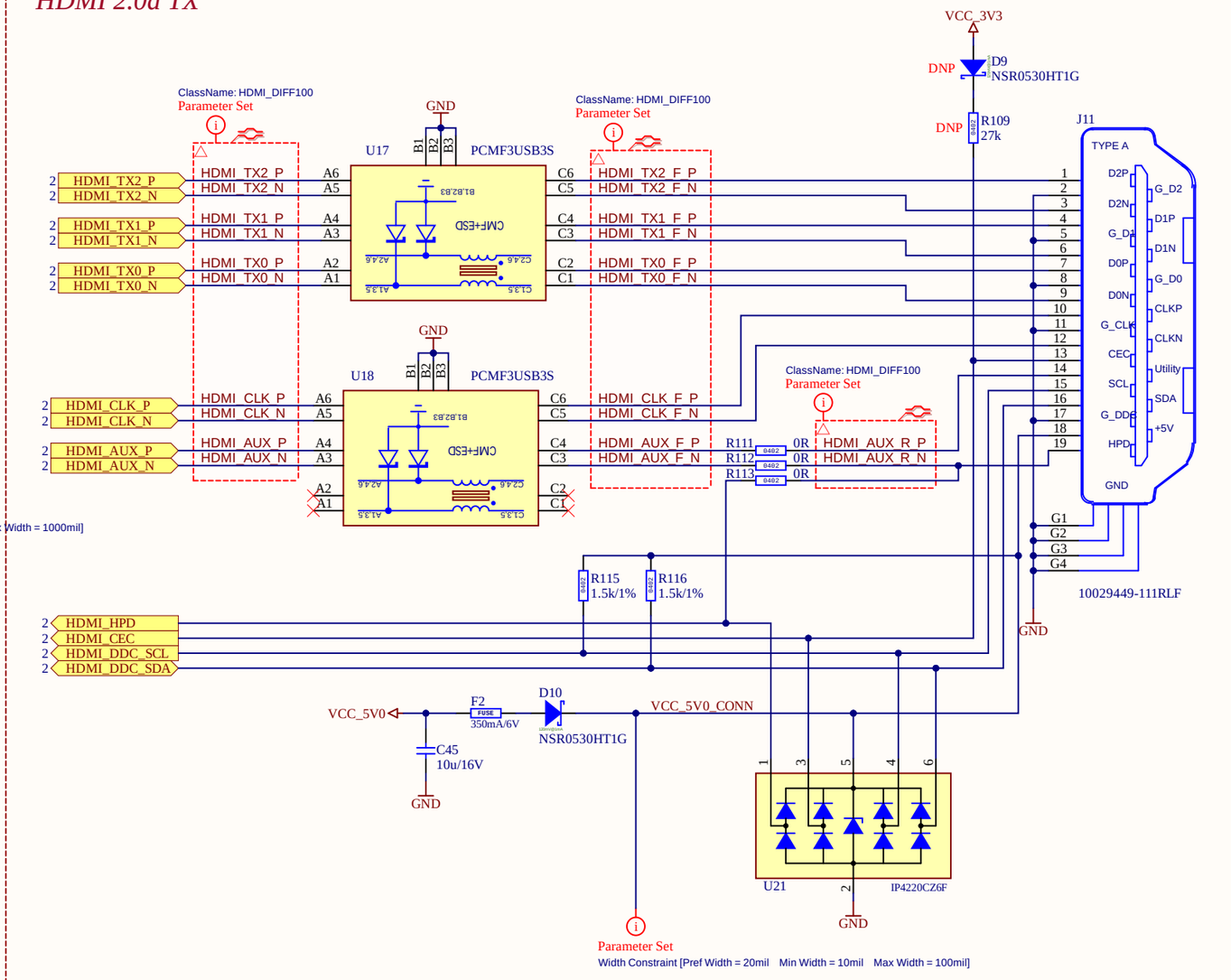
RONETIX DEVELOPMENT TOOLS

MicroSD, HDMI

Micro SD card



HDMI 2.0a TX

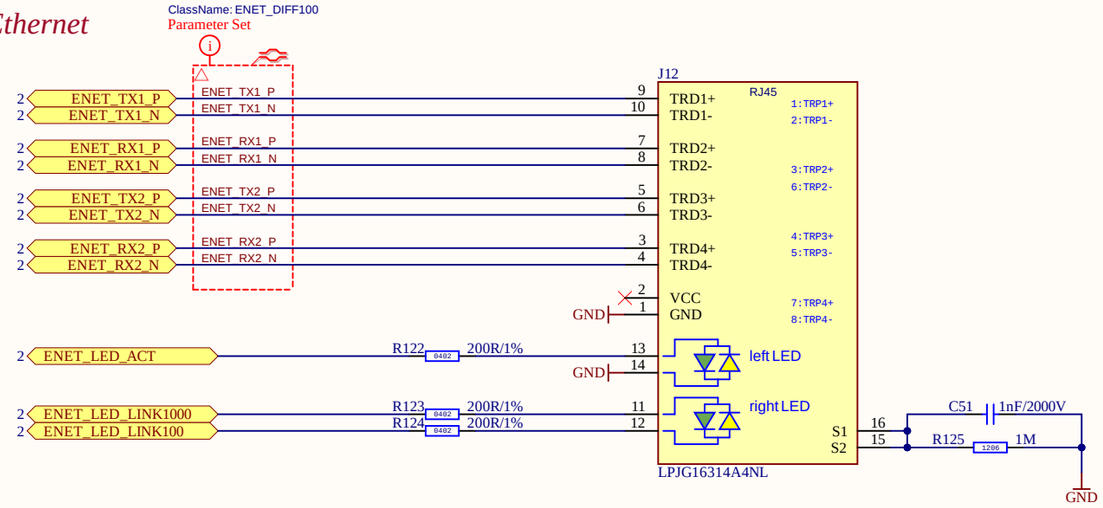


Title	*MicroSD, HDMI*		*Ronetix GmbH*
Size: A3	Number: 8	Revision: 2.0	*Hirschstettner Str. 19/Z110*
Date: 21.09.2021	Time: 16:57:31	Sheet 8 of 13	*1220 Vienna*
File: 08_MicroSD_HDMI.SchDoc			*Austria*

RONETIX DEVELOPMENT TOOLS

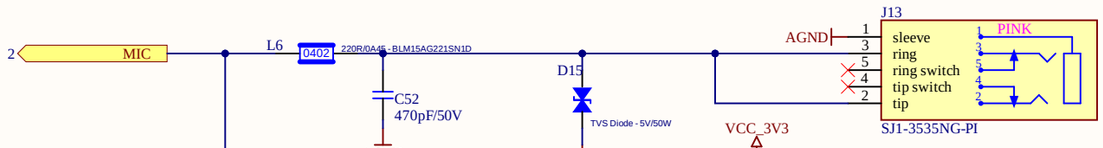
ETHERNET, AUDIO

Ethernet

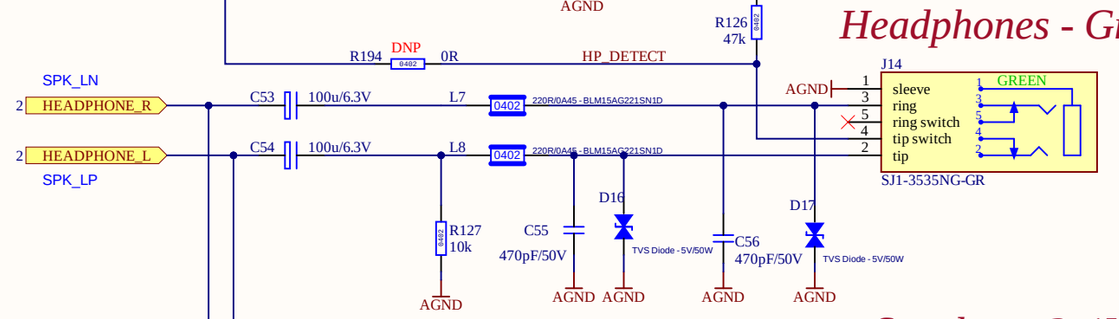


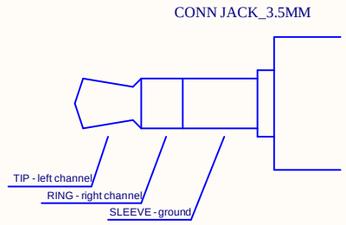
Audio

Microphone - Pink



Headphones - Green





Speakers, 2x1W, 8 Ohm

Title: ETHERNET, AUDIO			Ronetix GmbH Hirschstettner Str. 19/Z110 1220 Vienna Austria
Size: A3	Number: 9	Revision: 2.0	
Date: 21.09.2021	Time: 16:57:31	Sheet 9 of 13	
File: 09_ETH_Audio.SchDoc			

M.2 PCI Express

J3 MDT420E01001
M.2 / NGFF
KEY E
Pin-Out on Platform

LAYOUT NOTE:
Place close to the M.2 connector

ClassName: PCIE_DIFF85
Parameter Set

ClassName: PCIE_CLK_DIFF100
Parameter Set

U22 9FGV0241AKLF
100MHz
Max 18mA

DESIGN NOTE:
I2C address:
SADDR = 0 -> (0x68<<1)+RW
SADDR = 1 -> (0x6A<<1)+RW

DESIGN NOTE:
This component share PCB package
When use 9FGV0241 - PIN5 = GND; PIN3,7,16 = 1.8V
When use PI6CFGL201BZDIEX - PIN5 = 1.8V; PIN3,7,16 = 3.3V

LAYOUT NOTE:
Standoff for M.2 cards
The position is described in M4 layer of the footprint

MH5 3.8 Wurth 9774025151R

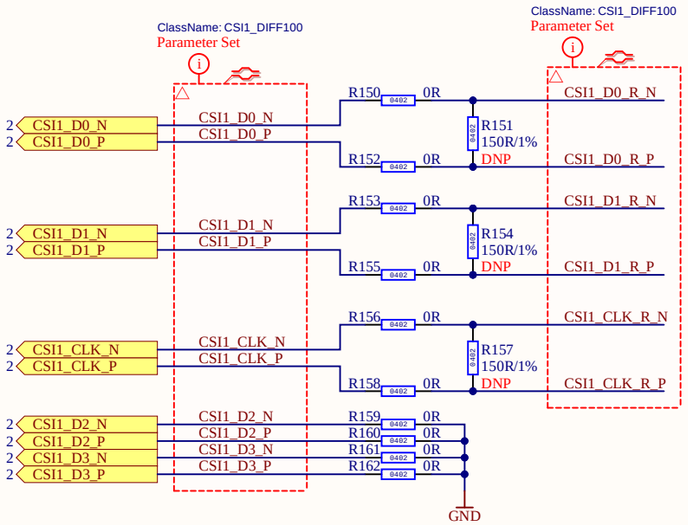
Title	M.2 PCI Express		
Size: A3	Number: 10	Revision: 2.0	
Date: 21.09.2021	Time: 16:57:31	Sheet 10 of 13	
File: 10_PCIe_M.2.SchDoc			

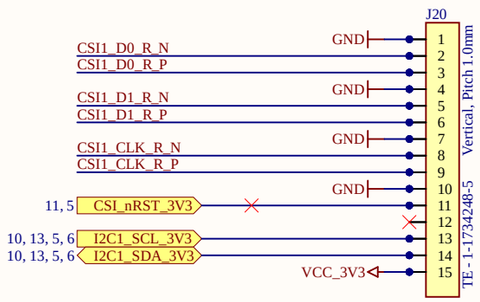
Ronetix GmbH
Hirschstettner Str. 19/Z110
1220 Vienna
Austria

RONETIX DEVELOPMENT TOOLS

Camera

DESIGN NOTE:
i.MX8M - CSI1 and CS2 available
i.MX8M-MINI - only CSI1 available
i.MX8M-NANO - only CSI1 available

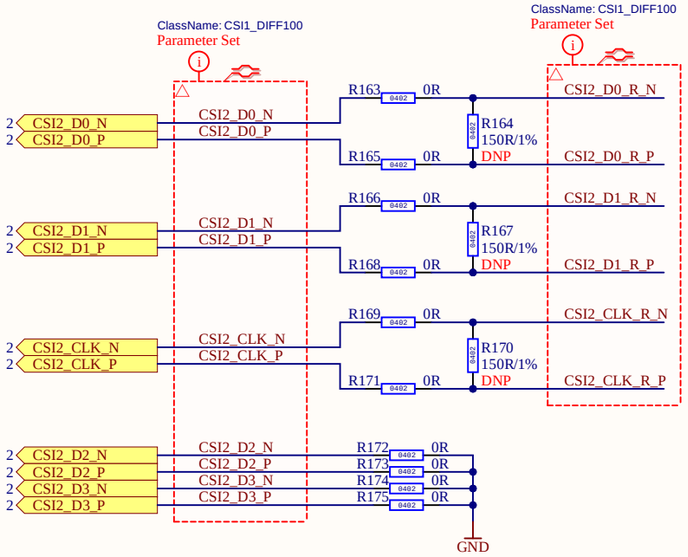


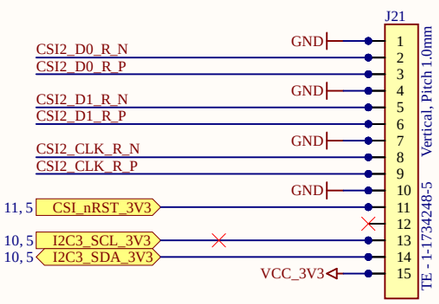


DESIGN NOTE:
PCAM 5C: 5 MP CAMERA MODULE
OV5640 Camera sensor

I2C address: (0x03C<<1)+RW

DESIGN NOTE:
PCAM 5C uses 12MHz XVCLK instaed of typical 24MHz





DESIGN NOTE:
PCAM 5C: 5 MP CAMERA MODULE
OV5640 Camera sensor

I2C address: (0x03C<<1)+RW

DESIGN NOTE:
PCAM 5C uses 12MHz XVCLK instaed of typical 24MHz

Title: *Camera*			*Ronetix GmbH*
Size: A3	Number: 11	Revision: 2.0	*Hirschstettner Str. 19/Z110*
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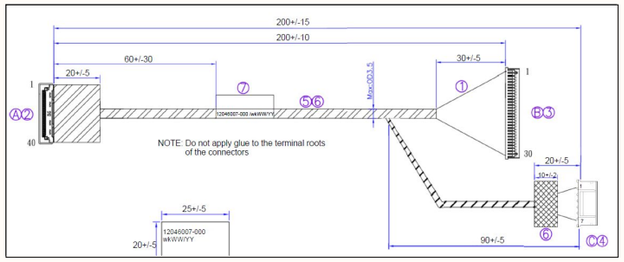
File: 11_Camera.SchDoc			*Austria*

RONETIX DEVELOPMENT TOOLS

LVDS Display, Touchscreen

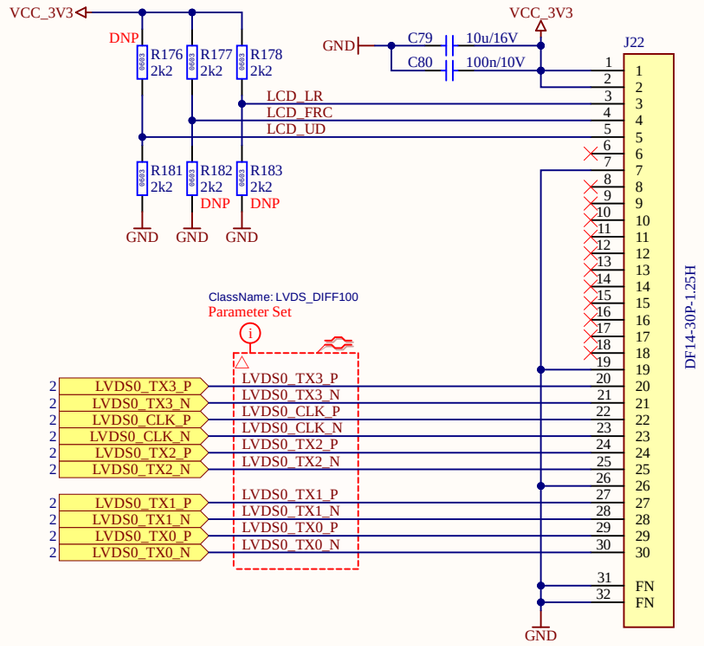
DISPLAY - G101ICE-L01, 10.1", 1280x800, 75MHz

DESIGN NOTE:
Display Cable Data-Module: 12037186

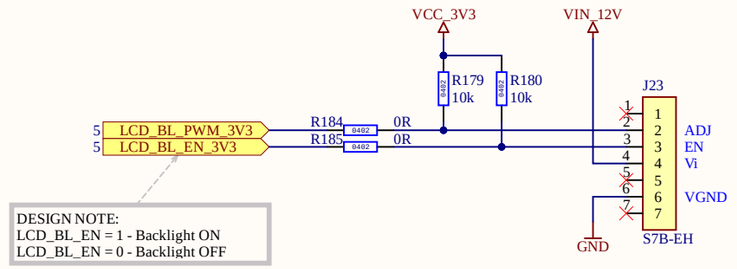


Pin assignment

Signal	Connector A (display)		Connector B (eMotion)	Signal	Connector A (display)		Connector C (eMotion)	Remark
VCCS	1			LED_GND	29,30		7	
VCCS	2		2	LED_GND	31,32		6	
VCCS	3		1	LED_GND	33			
LV0N	8		18	NC	34,35			
LV0P	9		17	LED_PWM	27		2	
GND	10		19	LED_EN	28		3	
LV1N	11		16	LED_VCC	36,37		4	
LV1P	12		15	LED_VCC	38,39		5	
GND	13		14	LED_VCC	40			
LV2N	14		13					
LV2P	15		12					
GND	16							
LVCLKN	17		11					
LVCLKP	18		10					
GND	19							
LV3N	20		9					
LV3P	21		8					
GND	22		7					



BACK LIGHT

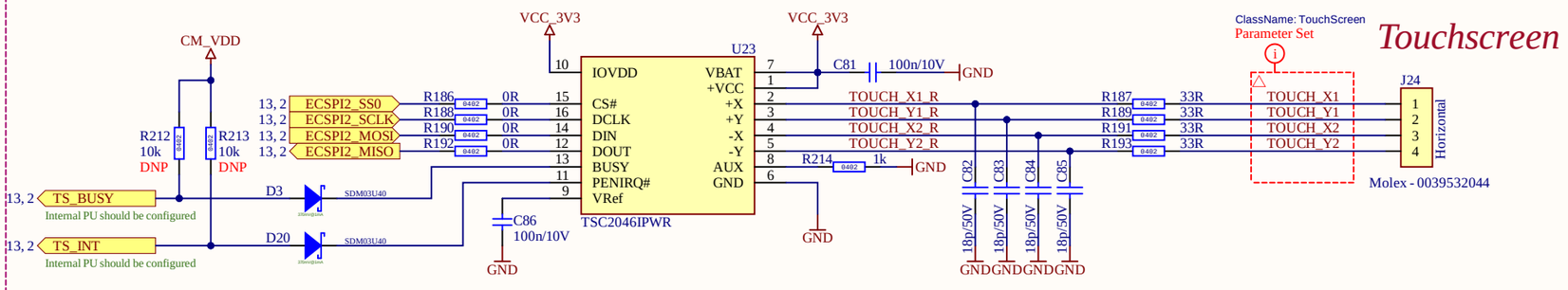


DESIGN NOTE:
LCD_BL_EN = 1 - Backlight ON
LCD_BL_EN = 0 - Backlight OFF

DESIGN NOTE:
Invertor Cabel eMotion G2 -> G101ICE-L01

Board	LCD
4	1 Vi (Yellow)
2	2 ADJ (BLUE)
3	3 EN (RED)
6	4 VGND(BLK)

Touchscreen Controller



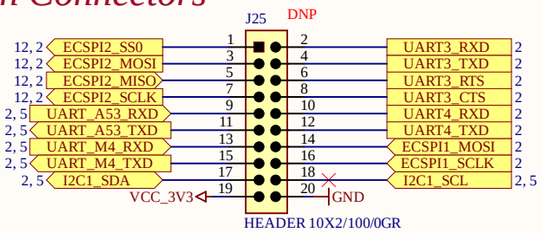
Touchscreen

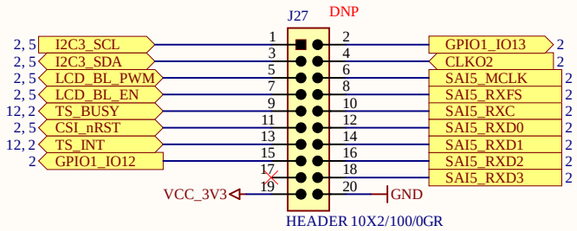
Title	*LVDS Display, Touchscreen*		*Ronetix GmbH*
Size: A3	Number: 12	Revision: 2.0	*Hirschstettner Str. 19/Z110*
Date: 21.09.2021	Time: 16:57:31	Sheet 12 of 13	*1220 Vienna*
File: 12_LVDS_Display.SchDoc			*Austria*

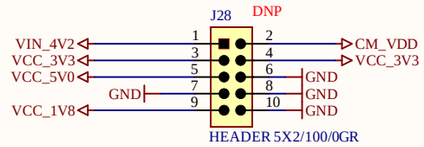
RONETIX DEVELOPMENT TOOLS

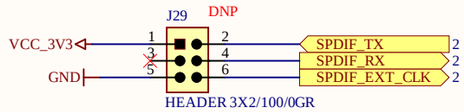
GPIO, RTC, BUTTONS

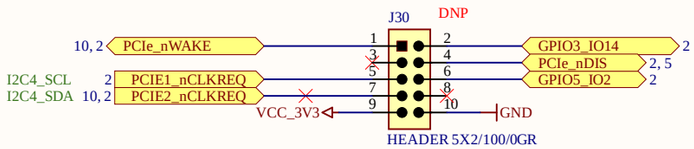
Expansion Connectors



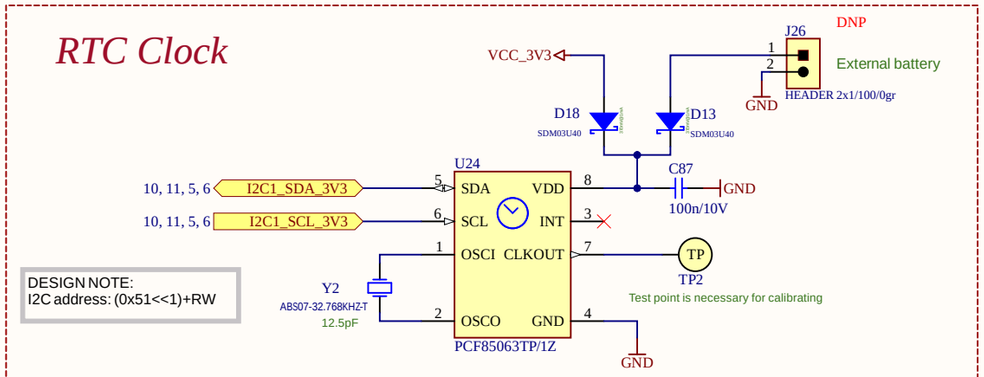




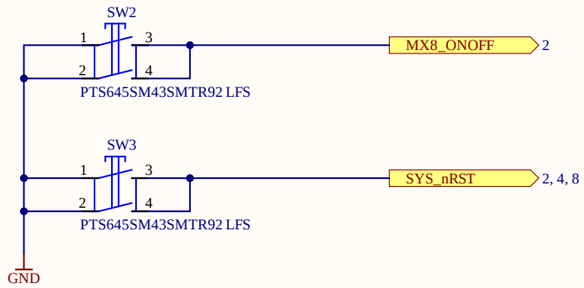




RTC Clock



Buttons



Title: GPIO, RTC, BUTTONS			Ronetix GmbH Hirschstettner Str. 19/Z110 1220 Vienna Austria
Size: A3	Number: 13	Revision: 2.0	
Date: 21.09.2021	Time: 16:57:32	Sheet 13 of 13	
File: 13_GPIO.SchDoc			