iMX Development Baseboard

Variant: Production_iMX

12-Mar-2025
V1I2

RELEASED 12-Mar-2025

Page	Index	Page	Index	Page	Index
1	COVER PAGE	12	ETHERNETS	23	LVDS0 BOE CABLES
2	BLOCK DIAGRAM	13	I2C DEVICES	24	LVDS0 NHD CABLES
3	CONNECTORS	14	UARTS	25	LVDS0 KOE CABLES
4	M.2 KEY B	15	SD CARD	26	MECHANICAL
5	Mini PCIe	16	LEDs and BUTTONs	27	DOC - REVISION HISTORY
6	HDMI / DisplayPort	17	GPIO HEADERS	28	DOC - DESIGN NOTES
7	USB-C	18	CSI CAMERAS	29	STACK-UP
8	USB 3.0	19	SERIAL NOR FLASH	30	ASSEMBLY DRAWING TOP
9	LVDS0 NHD / BOE	20	POWER DCDC	31	ASSEMBLY DRAWING BOTTOM
10	LVDS0 KOE	21	POWER IN		
11	AUDIO	22	BOOT CFG		

DESIGN CONSIDERATIONS

DESIGN NOTE:
Example text for informational design notes.

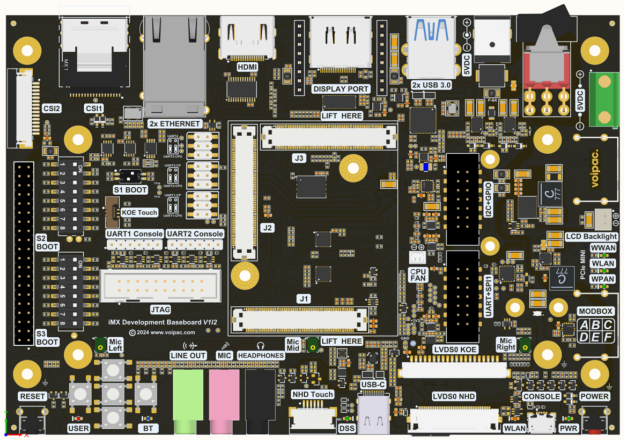
DESIGN NOTE:
Example text for cautionary design notes.

DESIGN NOTE:
Example text for debug notes.

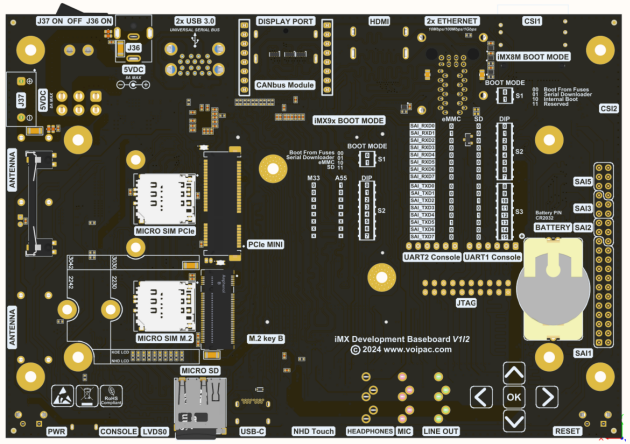
DESIGN NOTE:
Example text for critical design notes.

LAYOUT NOTE:
Example text for critical layout guidelines.

TOP VIEW



BOTTOM VIEW

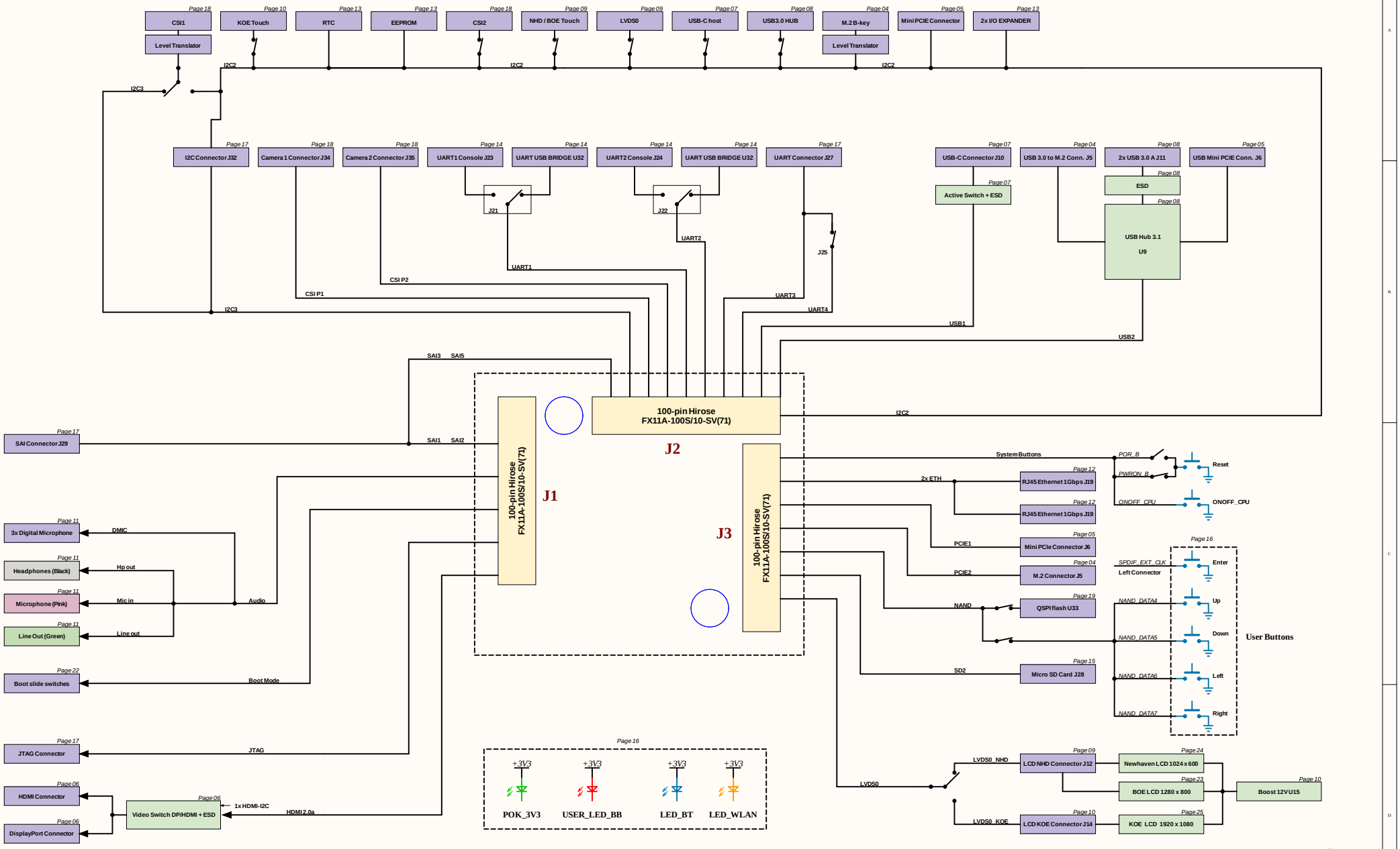


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Page Contents:	[01] - COVER PAGE.SchDoc	Checked by:	
Size:	DWG NO:	Revision:	V1I2
Date:	12-Mar-2025 www.voipac.com	Sheet	1 of 31

iMX DEVELOPMENT BASEBOARD V1I2 BLOCK DIAGRAM



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Scale:	Revision: V1I2
Date: 12-Mar-2025 www.voipac.com	Sheet 2 of 31

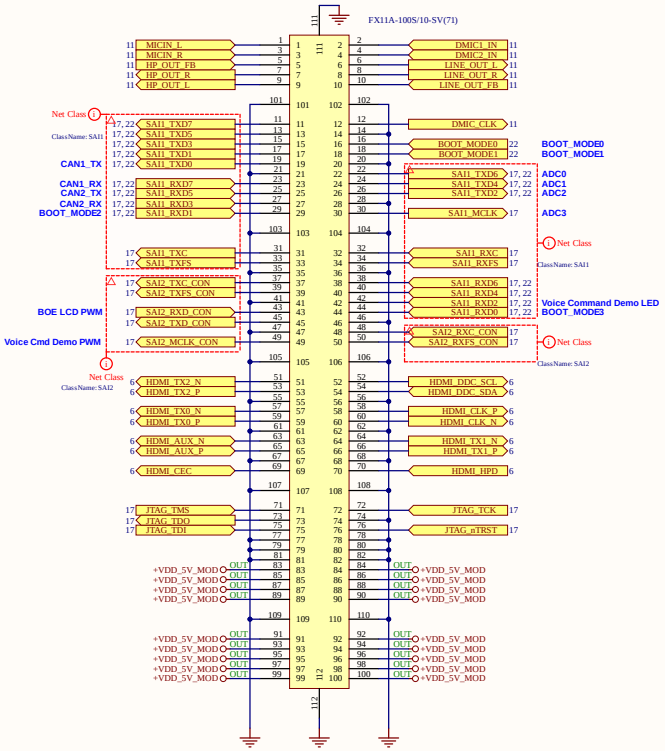
default i.MX 8M

specific i.MX 93

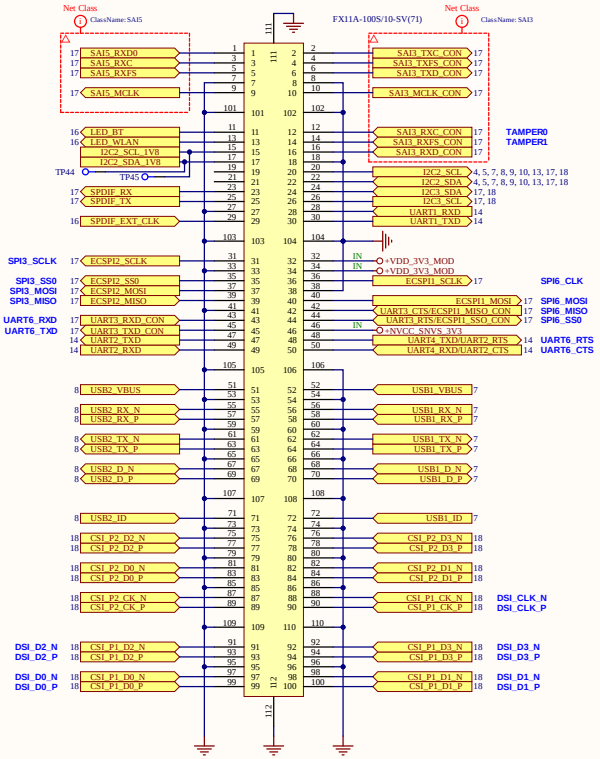
specific i.MX 91

CONNECTORS

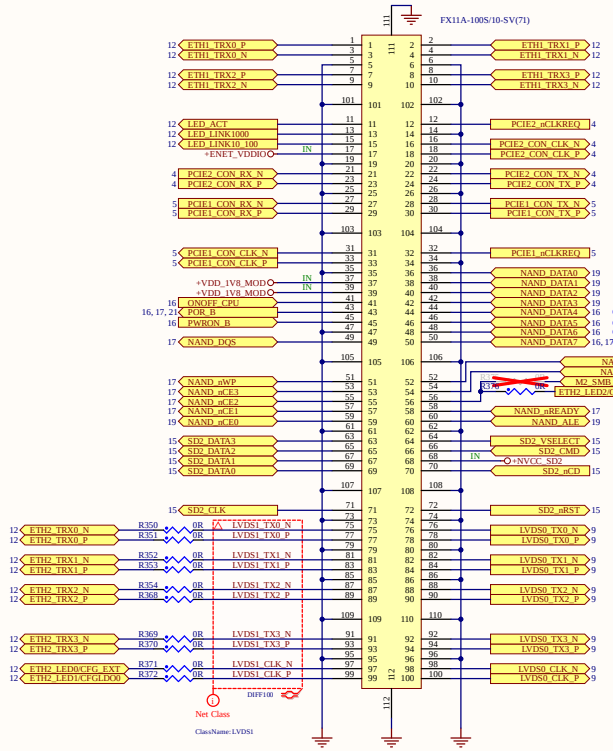
J1



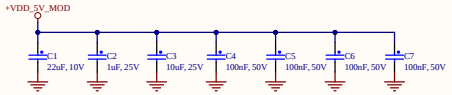
J2

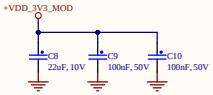


J3



Mating connector on module - FX11A-100P/10-SV0.5(71)



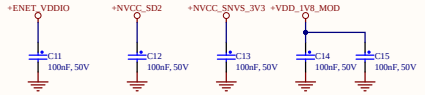


DESIGN NOTE:
3V3 input. Max. 0.6A (Can be used on Base board) Peak current 1A

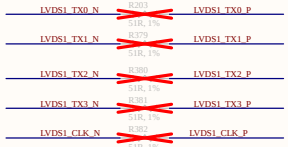
DESIGN NOTE:
+NVCC_SNVS_3V3 input. Max. 5mA (Can be used on Base board)

DESIGN NOTE:
1V8 input. Max. 0.5A (Can be used on Base board) Peak current 1A

DESIGN NOTE:
+ENET_VDDIO_2V5 input. Max. 20mA (Can be used on Base board)



DESIGN NOTE:
LVDS1 termination in case Ethernet port 2 / Upper Row is not supported (iMX8M Industrial Module).



DESIGN NOTE:
Connectors:
On the Module: FX11A-100P/10-SV0.5
On the Baseboard: FX11A-100S/10-SV

(Input voltage for Module)
+VSYS = 3.4 ~ 5.5V

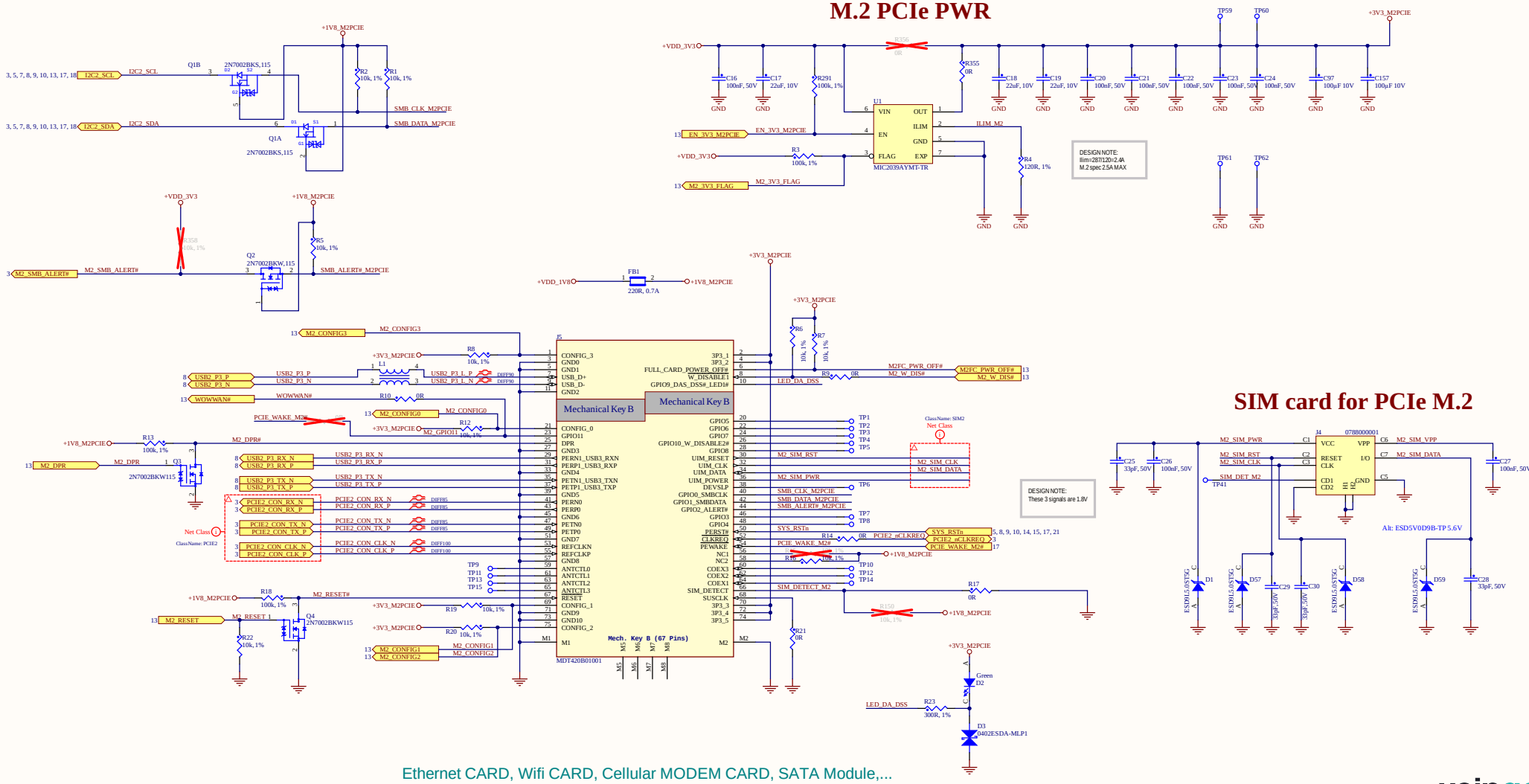
DESIGN NOTE:
Maximum Input Power: 15-30W (with LCD Display)

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Variant:	Production_iMX
Page Contents:	[03] - CONNECTORS.SchDoc
Checked by:	
Size:	
DWG NO:	
Revision:	V1I2
Date:	12-Mar-2025 www.voipac.com
Sheet	3 of 31

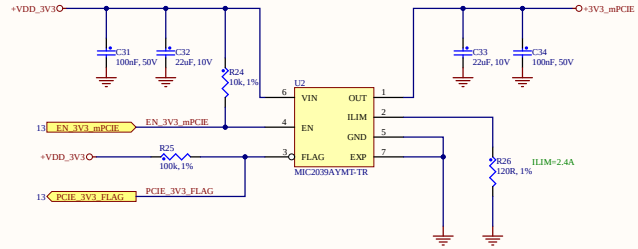
M.2 KEY B

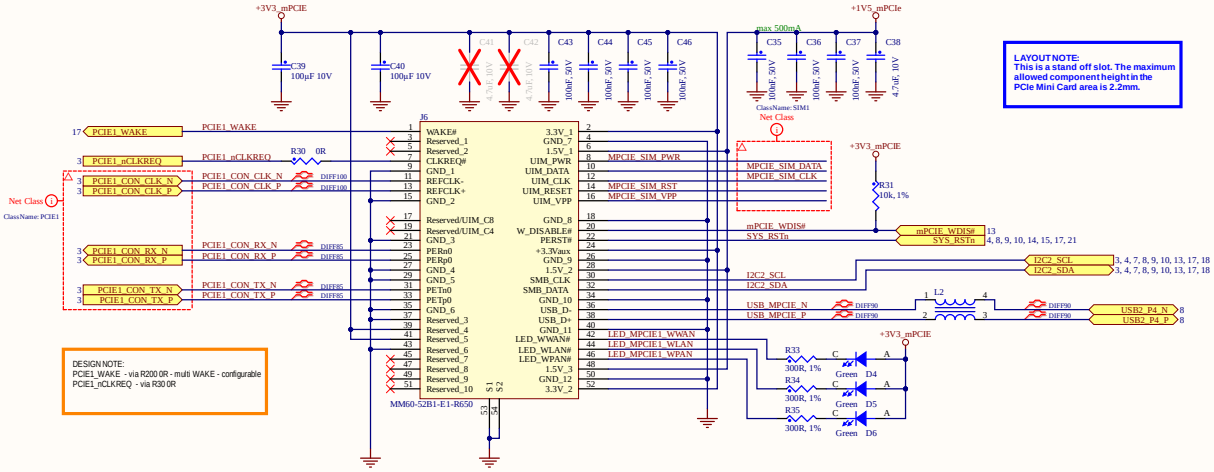


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Variant:	Production_iMX
Page Contents:	[04] - M2 KEY B.SchDoc
Checked by:	
Size:	
DWG NO:	
Revision:	V1I2
Date:	12-Mar-2025 www.voipac.com
Sheet	4 of 31

Mini PCIe

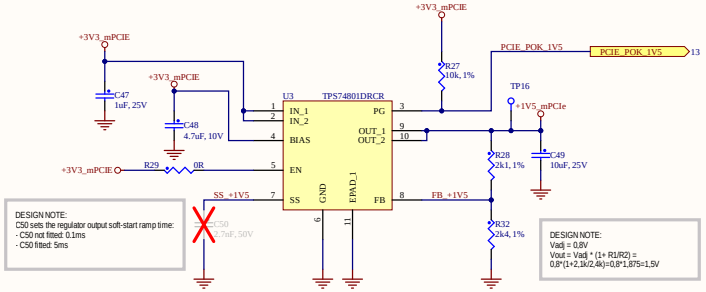




DESIGN NOTE:
PCIE1_WAKE - via R200 0R - multi WAKE - configurable
PCIE1_nCLKREQ - via R30 0R

LAYOUT NOTE:
This is a stand off slot. The maximum allowed component height in the PCIe Mini Card area is 2.2mm.

PCIe Mini +1V5 power



DESIGN NOTE:
C50 sets the regulator output soft-start ramp time:
- C50 not fitted: 0.1ms
- C50 fitted: 5ms

DESIGN NOTE:
Vadj = 0.8V
Vout = Vadj * (1+ R1/R2) =
0,8*(1+2,1k/2,4k)=0,8*1,875=1,5V

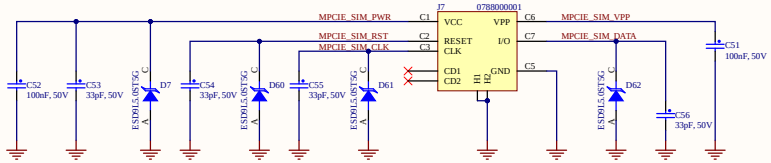
PCIe Mini Card Latch Full size

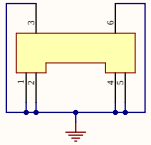


PCIe Mini Card Latch Half size



SIM card for Mini PCIe





LAYOUT NOTE:
Distance between PCIe Mini connector and latch (hole to hole - the bigger ones):
X = 50.3mm
Y = 0.4mm

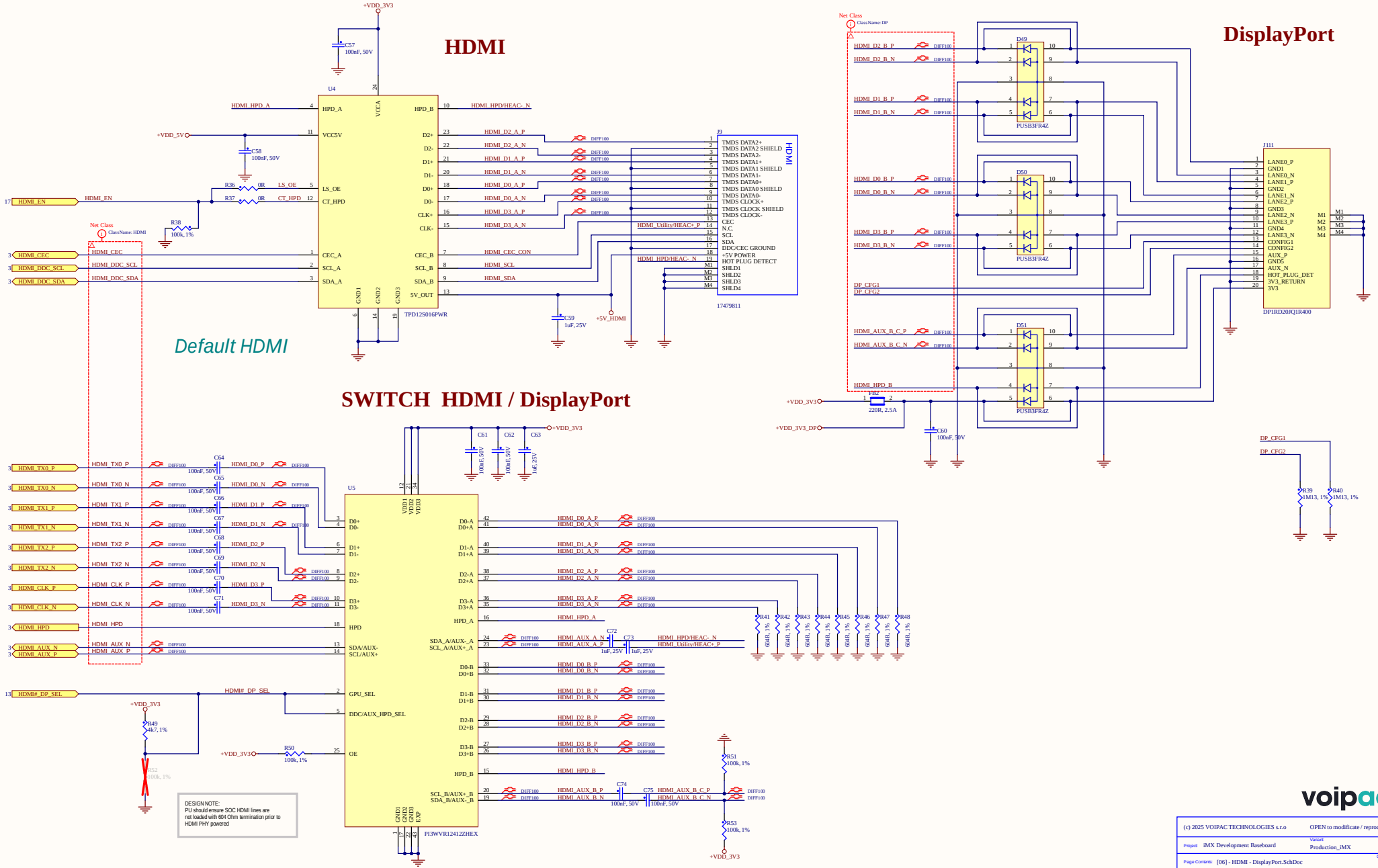
See also:
https://downloads.voipac.com/files/iMX93_Industrial_Development_Kitbaseboard/documents/iMX_Development_Baseboard-PCI_Express_Mini_Card.pdf

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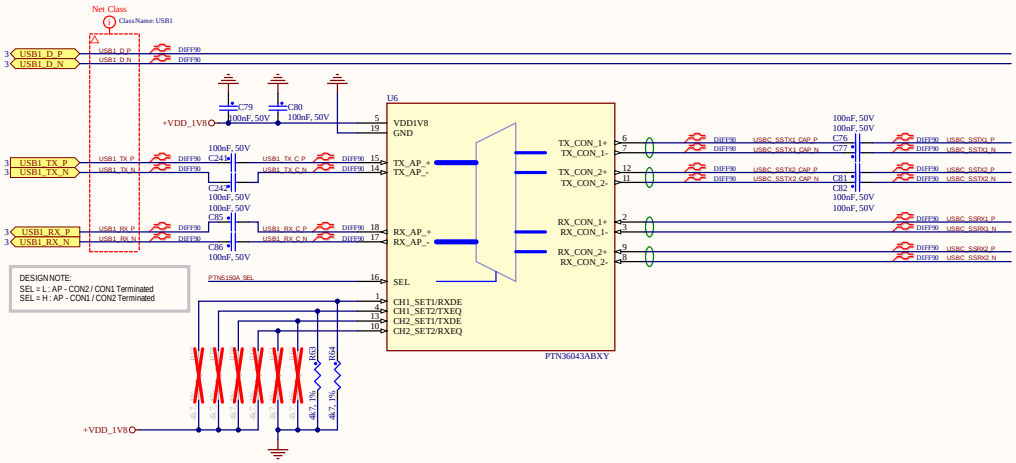
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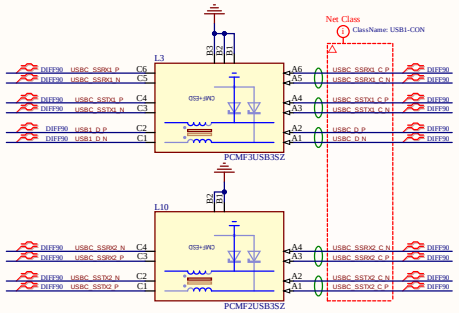
Project: iMX Development Baseboard	Variant: Production_iMX
Page Contents: [05] - Mini PCIe.SchDoc	Checked by:
Size:	DWG NO: Revision: V1I2
Date: 12-Mar-2025 www.voipac.com	Sheet 5 of 31

HDMI / DisplayPort

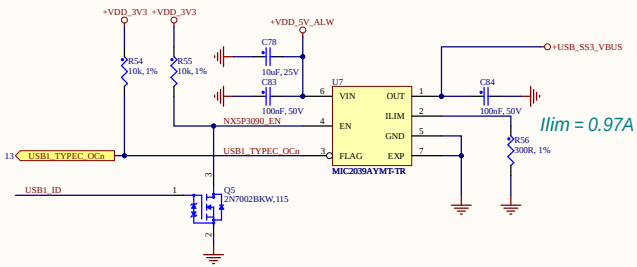


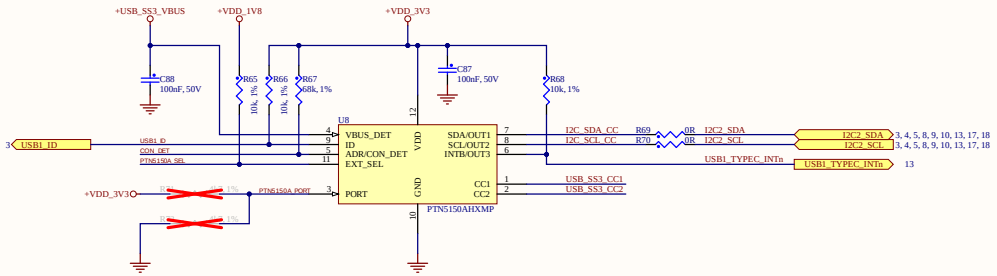
USB-C



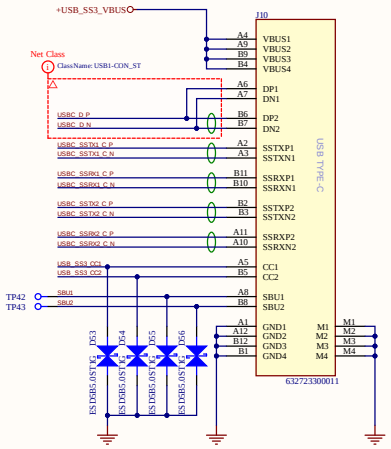


5V Source Load Switch

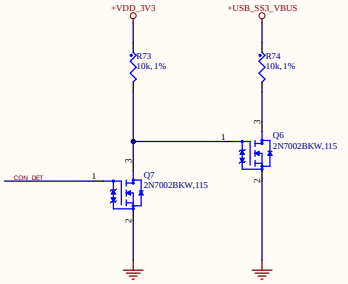


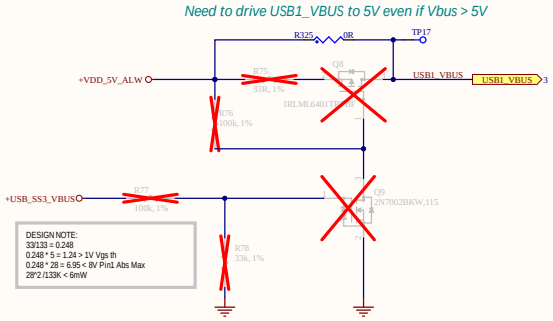


USB-C type connector



VBUS DISCHARGE



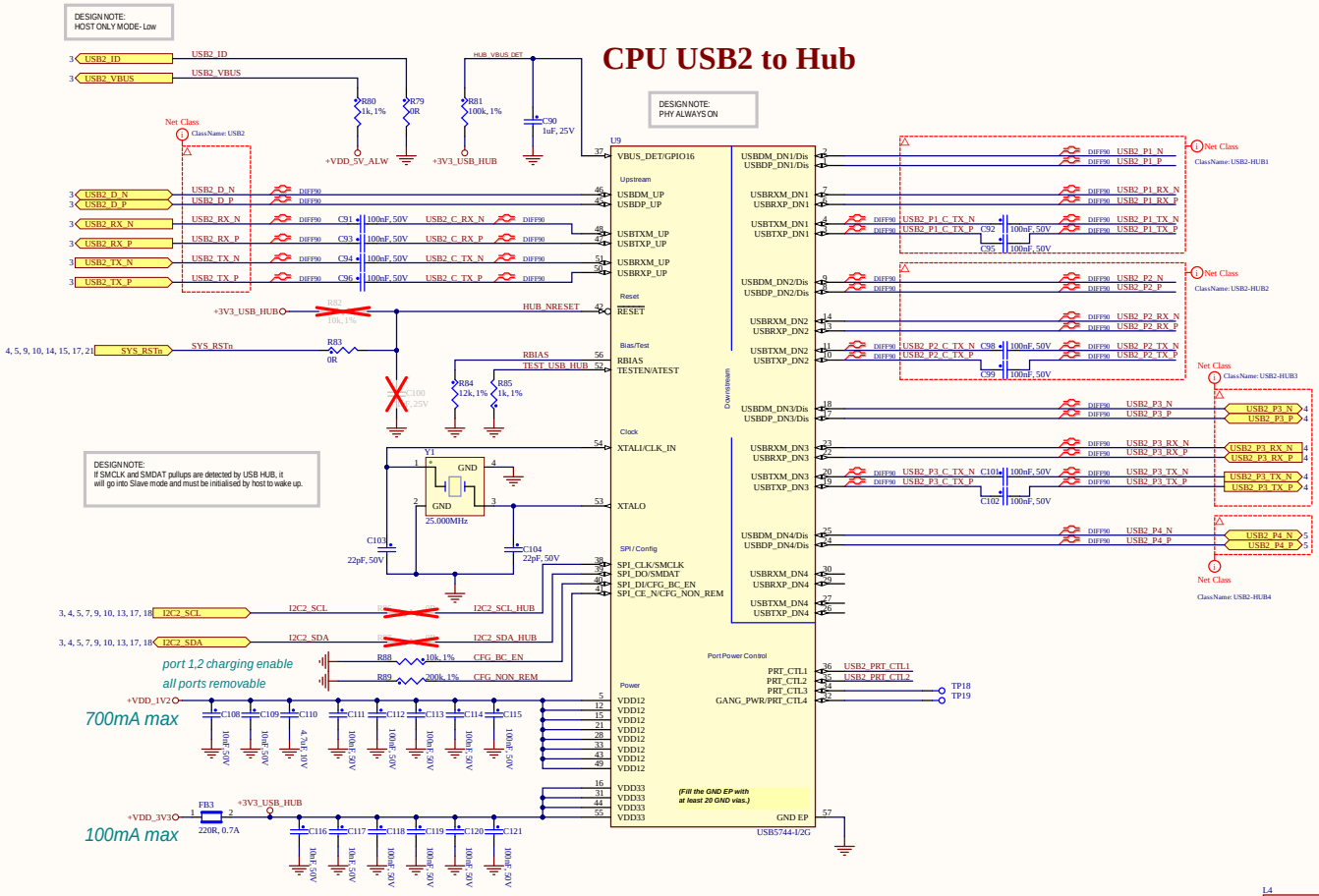


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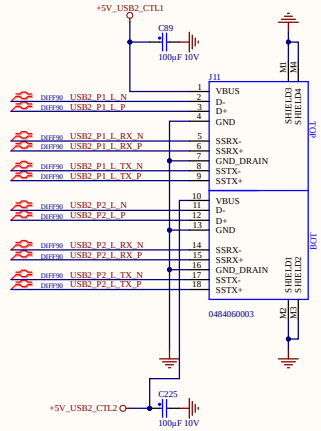
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Page Contents: [07] - USB-C.SchDoc	Checked by:
Size:	DWG NO: Revision: V1I2
Date: 12-Mar-2025 www.voipac.com	Sheet 7 of 31

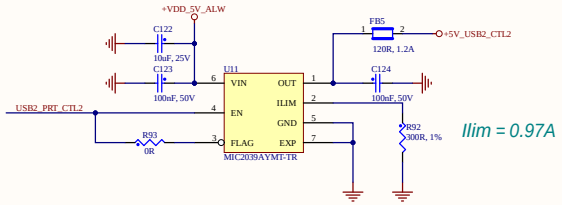
USB 3.0

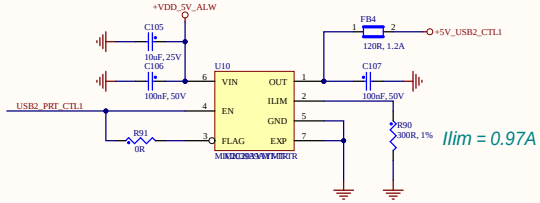
CPU USB2 to Hub

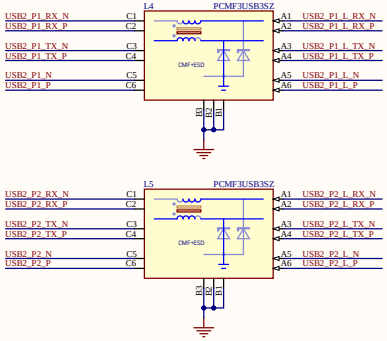


2x USB 3.0 A-type









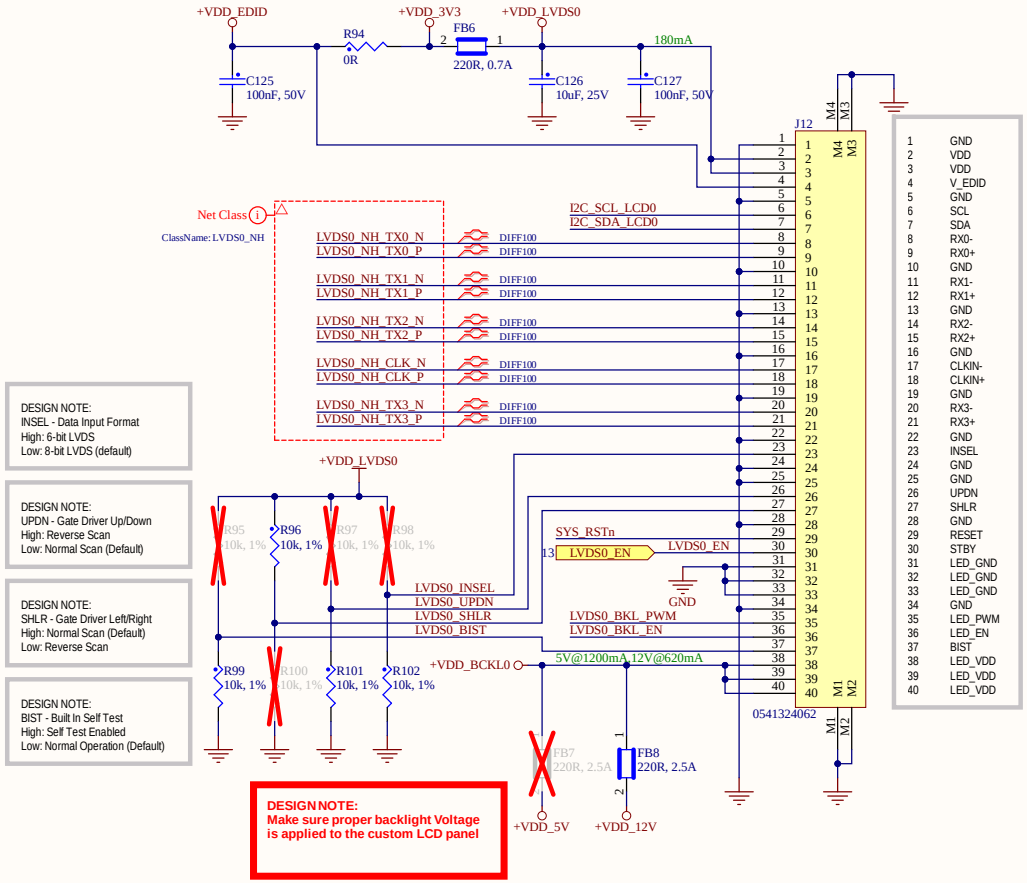
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Project:	iMX Development Baseboard
Variant:	Production_iMX
Page Contents:	[08] - USB 3.0.SchDoc
Checked by:	
Size:	
DWG NO:	
Revision:	V1I2
Date:	12-Mar-2025 www.voipac.com
Sheet	8 of 31

LVDS0 NHD / BOE

LVDS0 NHD / BOE FFC Connector



DESIGN NOTE:
INSEL - Data Input Format
High: 6-bit LVDS
Low: 8-bit LVDS (default)

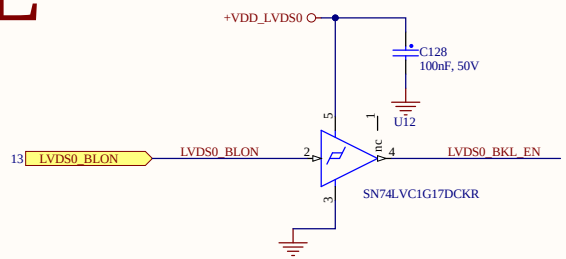
DESIGN NOTE:
UPDN - Gate Driver Up/Down
High: Reverse Scan
Low: Normal Scan (Default)

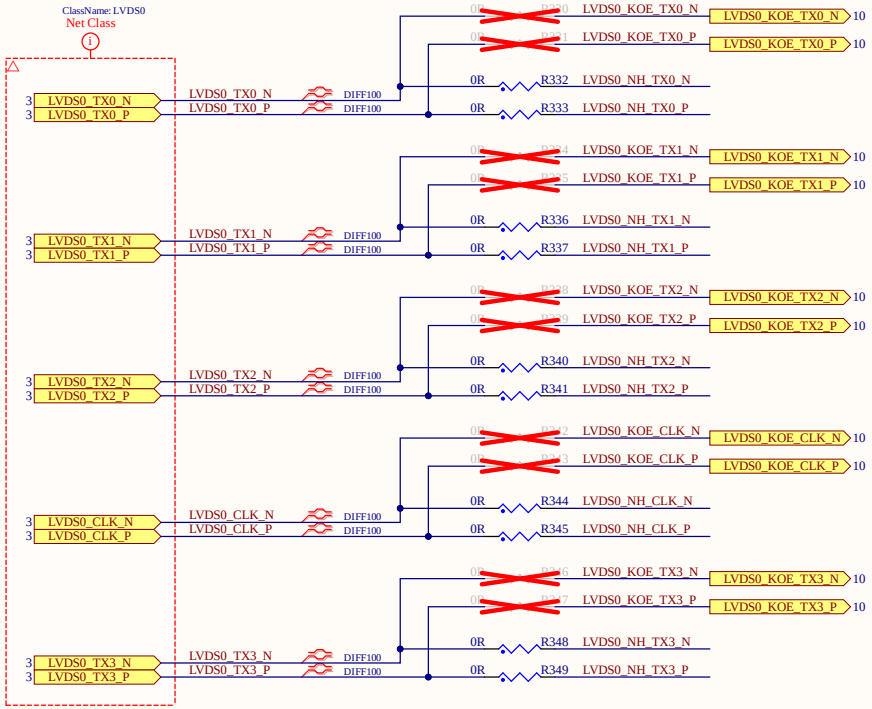
DESIGN NOTE:
SHLR - Gate Driver Left/Right
High: Normal Scan (Default)
Low: Reverse Scan

DESIGN NOTE:
BIST - Built In Self Test
High: Self Test Enabled
Low: Normal Operation (Default)

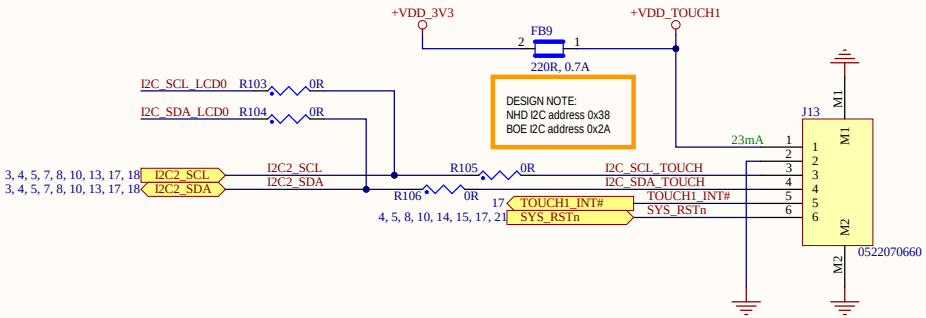
DESIGN NOTE:
Make sure proper backlight Voltage is applied to the custom LCD panel

Backlight enable

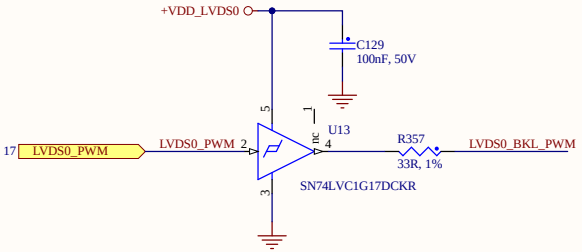




NHD / BOE TouchScreen FFC Connector



Backlight adjustment



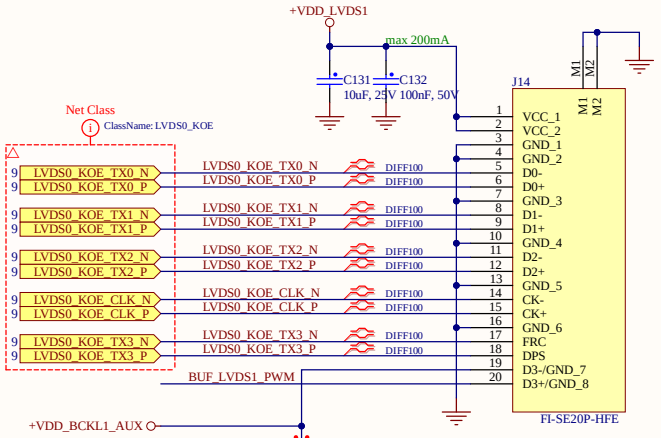
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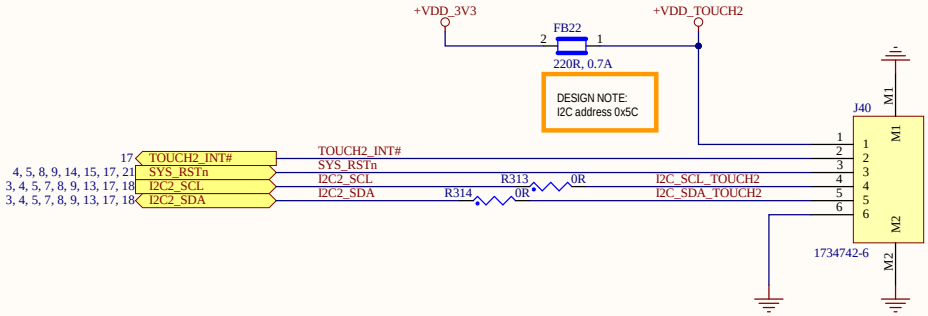
Project: iMX Development Baseboard	Variant: Production_iMX
Page Contents: [09] - LVDS0 NHD-BOE.SchDoc	Checked by:
Size:	DWG NO: / Revision: V1I2
Date: 12-Mar-2025 www.voipac.com	Sheet 9 of 31

LVDS0 KOE

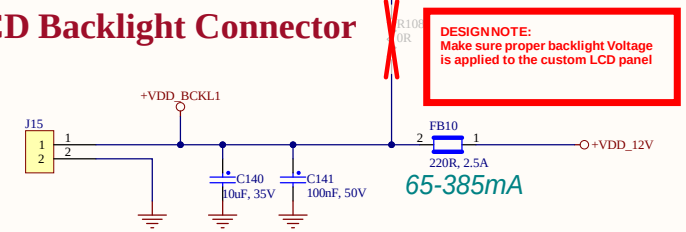
LVDS0 KOE Connector



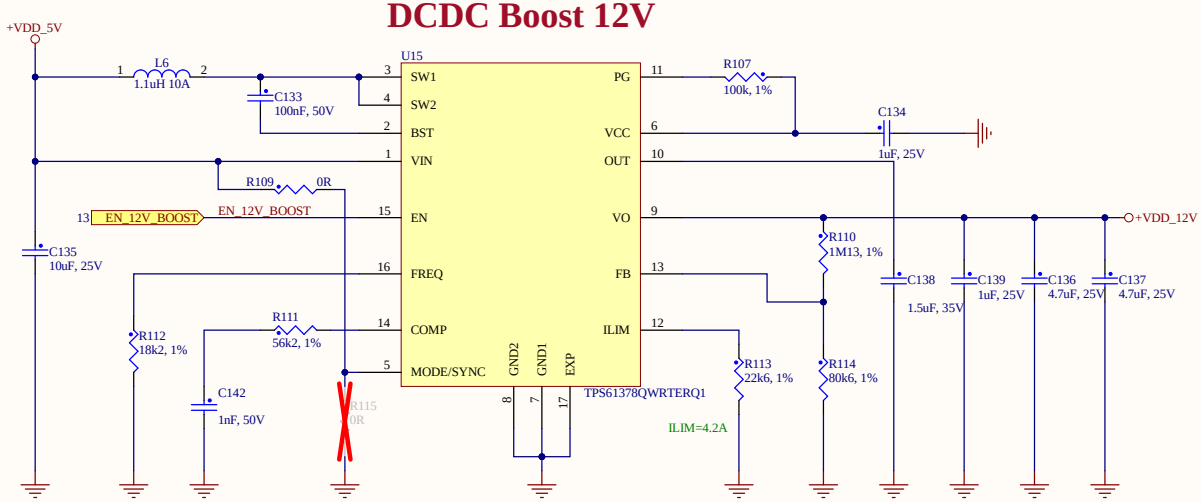
KOE TouchScreen



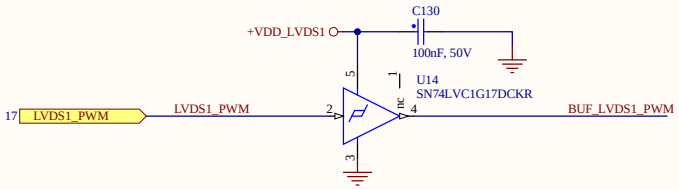
LCD Backlight Connector



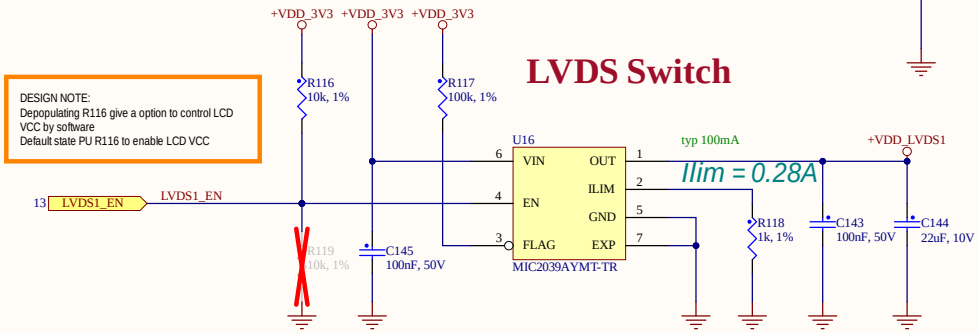
DCDC Boost 12V



LVDS Backlight PWM



LVDS Switch



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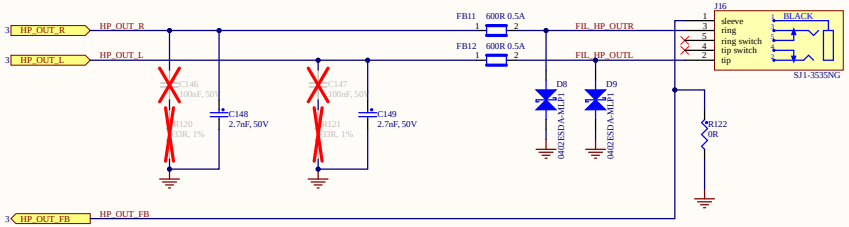
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Project:	iMX Development Baseboard
Variant:	Production_iMX
Page Contents:	[10] - LVDS0 KOE.SchDoc
Checked by:	
Size:	
DWG NO:	
Revision:	V1I2
Date:	12-Mar-2025 www.voipac.com
Sheet	10 of 31

AUDIO

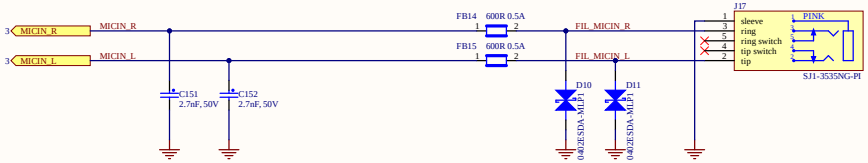
Headphones

Headphones (Black)



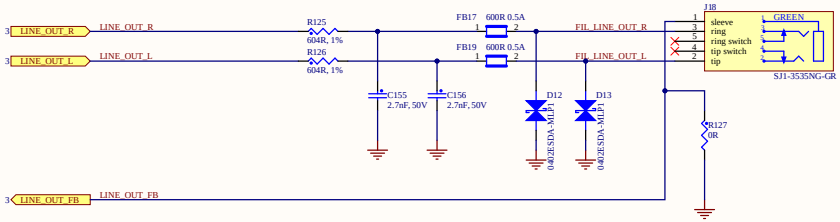
Mic In (could be Line In, if BIAS on module removed)

Microphone (Pink)

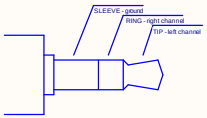


Line Out

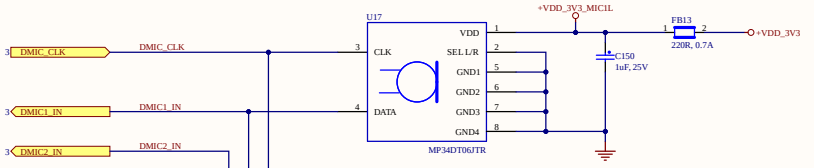
Line Out (Green)



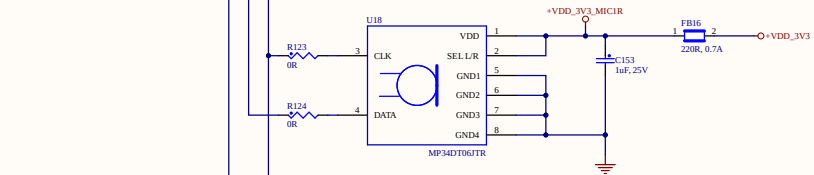
3.5mm jack reference



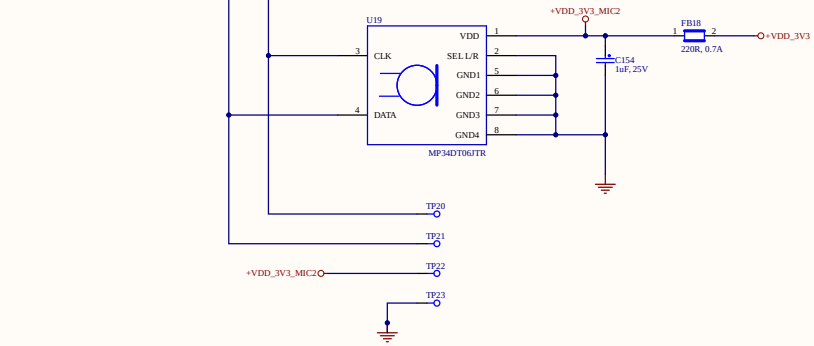
Digital Microphone Left (Line 1)



Digital Microphone Right (Line 1)



Digital Microphone Middle (Line 2)

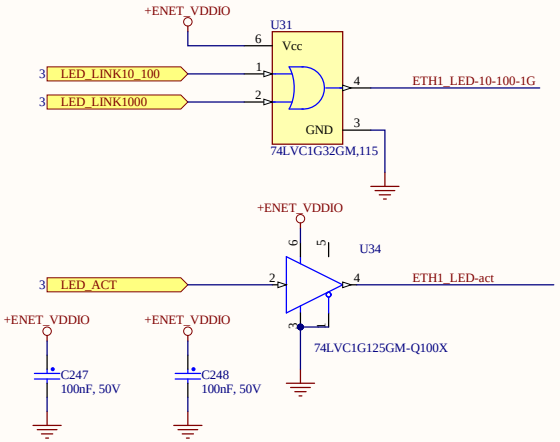


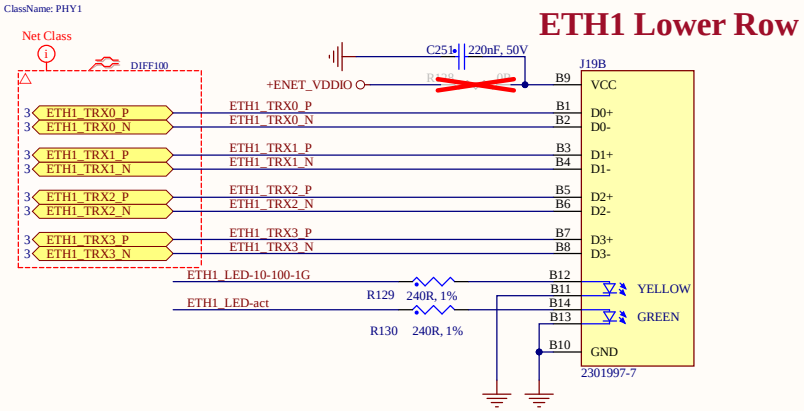
voipac.

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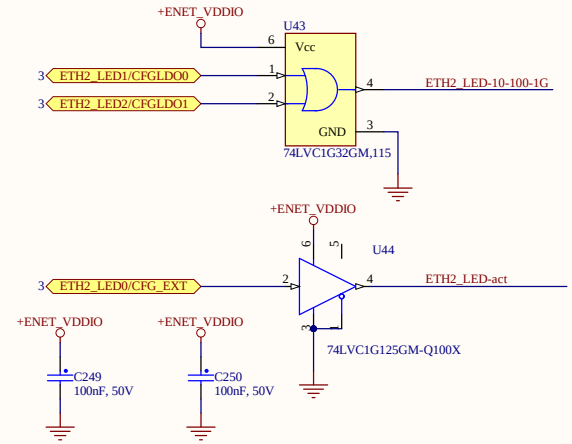
Project:	iMX Development Baseboard
Variant:	Production_iMX
Page Contents:	[11] - AUDIO.SchDoc
Checked by:	
Size:	
DWG NO:	
Revision:	V1I2
Date:	12-Mar-2025 www.voipac.com
Sheet	11 of 31

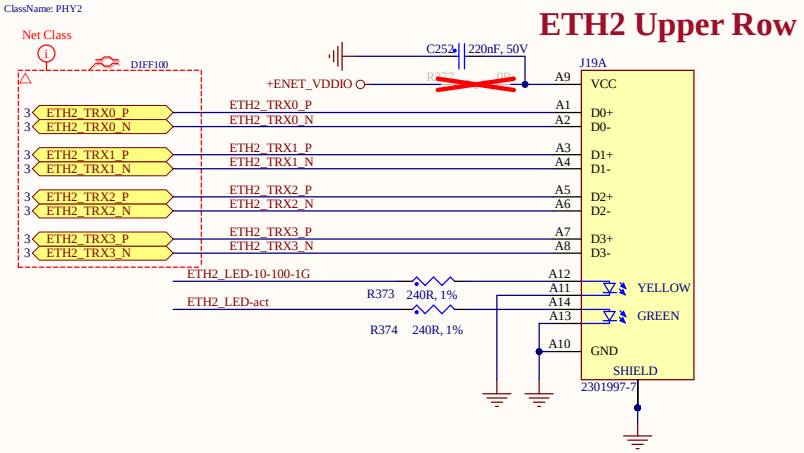
ETHERNETS





ETH1 Lower Row





ETH2 Upper Row

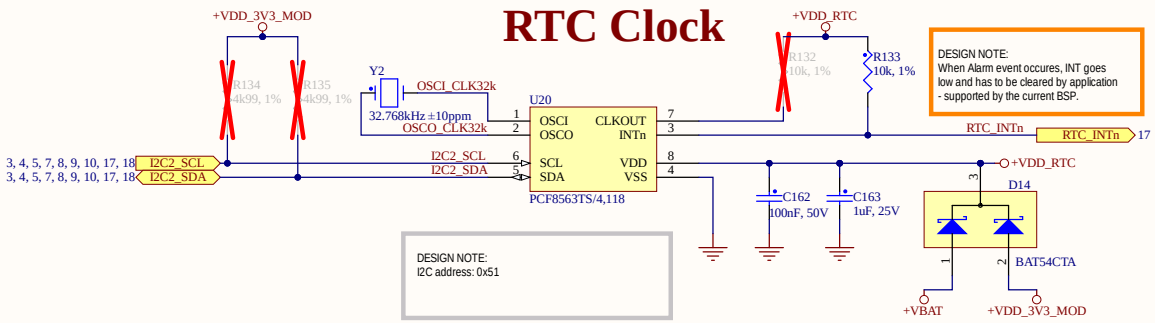
voipac.

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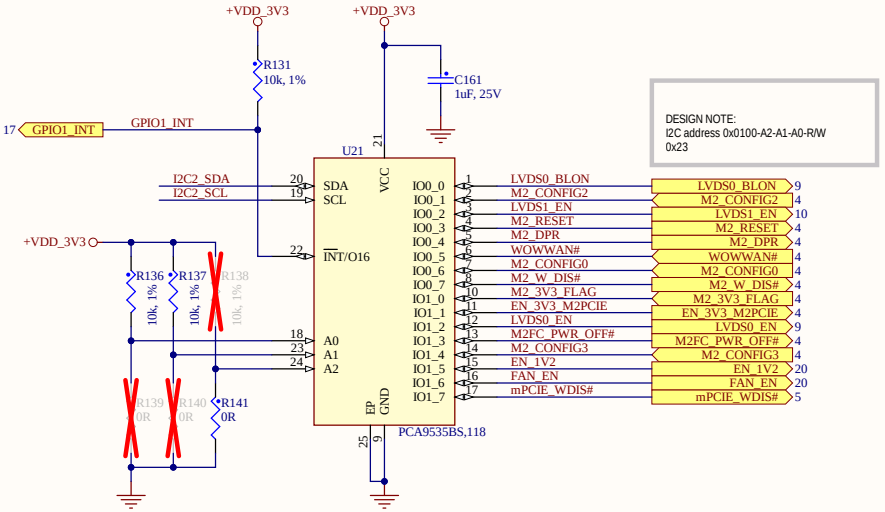
Project: iMX Development Baseboard	Variant: Production_iMX	
Page Contents: [12] - ETHERNETS.SchDoc		Checked by:
Size:	DWG NO:	Revision: V1I2
Date: 12-Mar-2025 www.voipac.com	Sheet 12 of 31	

I2C DEVICES

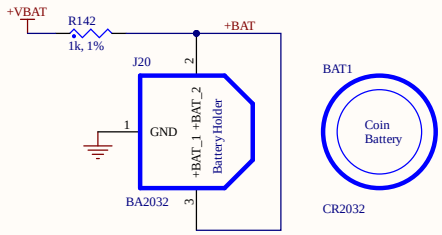
RTC Clock



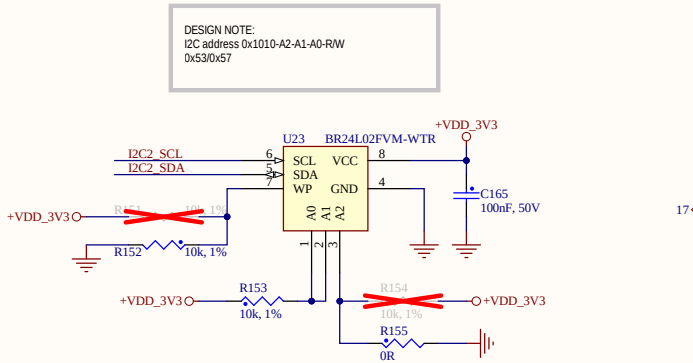
I2C GPIO Expander 1

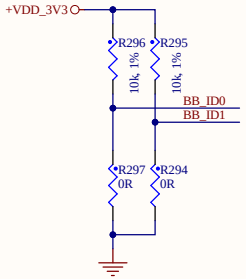


RTC Battery

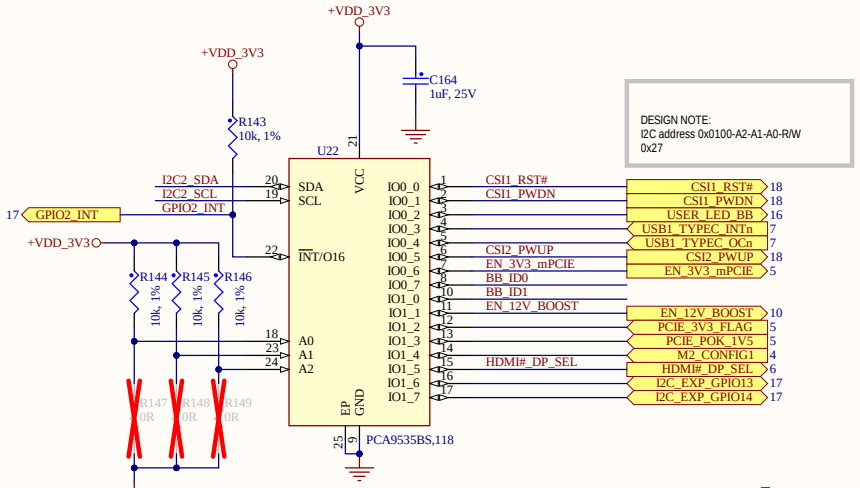


EEPROM





I2C GPIO Expander 2



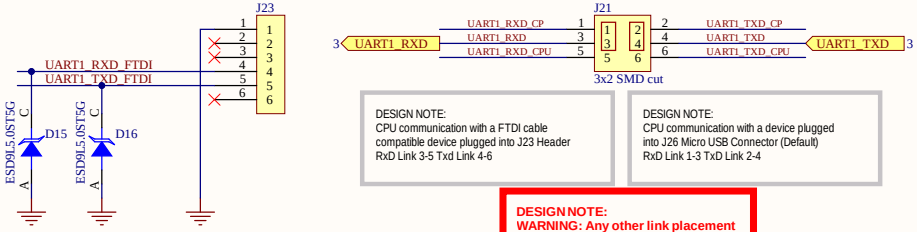
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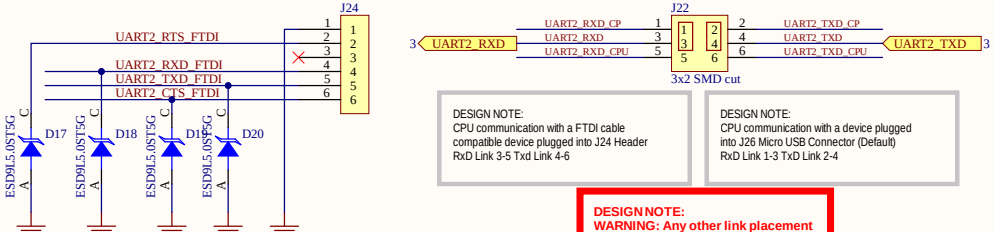
Project: iMX Development Baseboard	Variant: Production_iMX
Page Contents: [13] - I2C DEVICES.SchDoc	Checked by:
Size:	DWG NO: Revision: V1I2
Date: 12-Mar-2025 www.voipac.com	Sheet 13 of 31

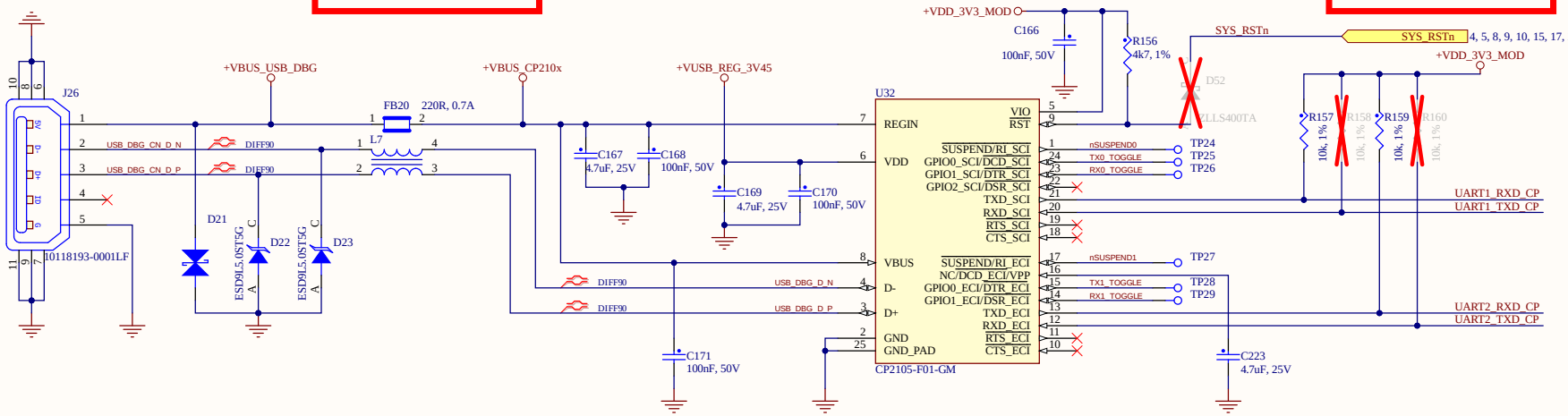
UARTS

UART 1 - Console (+3V3)

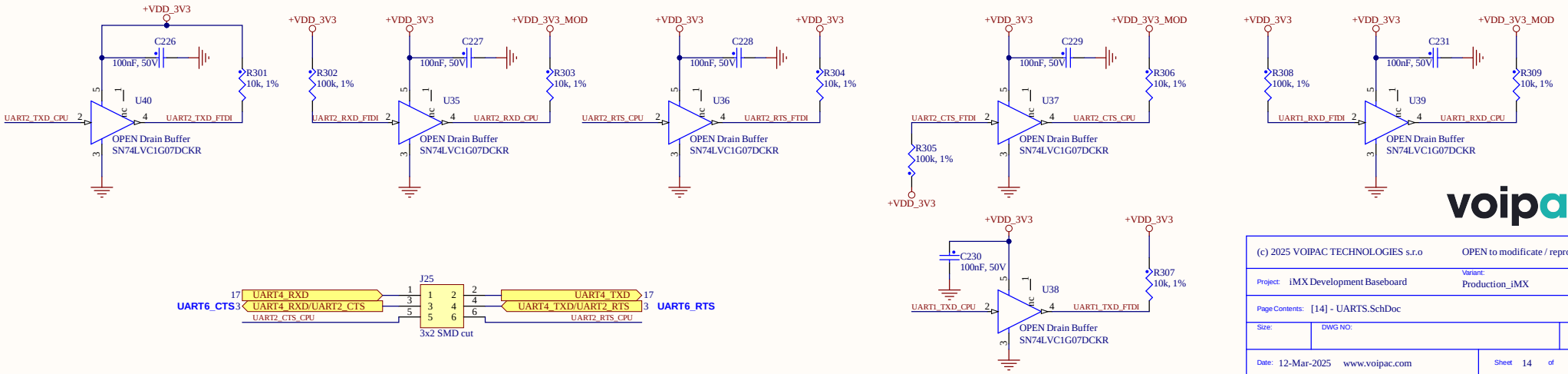


UART 2 - Console (+3V3)





UART 1, 2 buffers

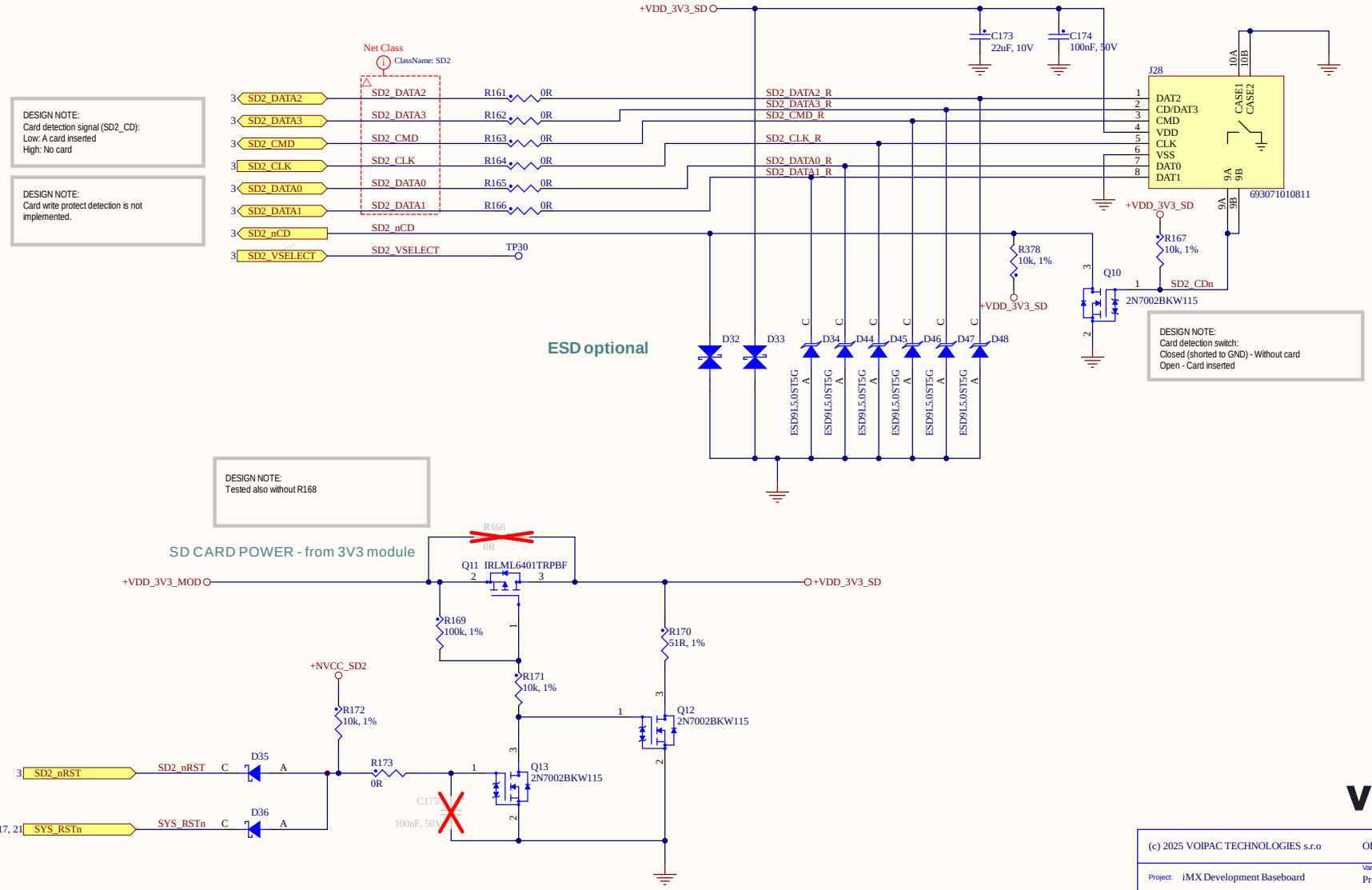


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Project: iMX Development Baseboard	Variant: Production_iMX
Page Contents: [14] - UARTS.SchDoc	Checked by:
Size:	DWG NO: / Revision: V1I2
Date: 12-Mar-2025 www.voipac.com	Sheet 14 of 31

SD CARD



voipac.

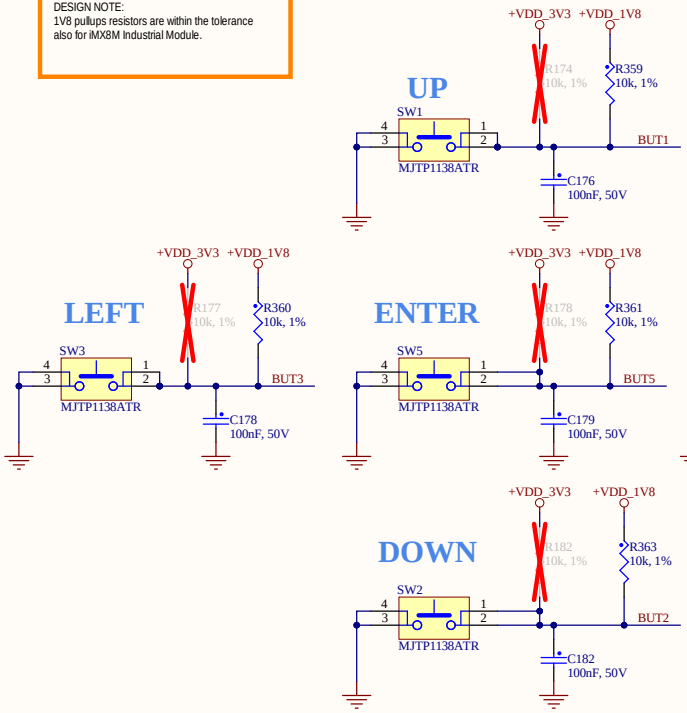
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Project: iMX Development Baseboard	Variant: Production_iMX
Page Contents: [15] - SD CARD.SchDoc	Checked by:
Size:	DWG NO: / Revision: V1I2
Date: 12-Mar-2025 www.voipac.com	Sheet 15 of 31

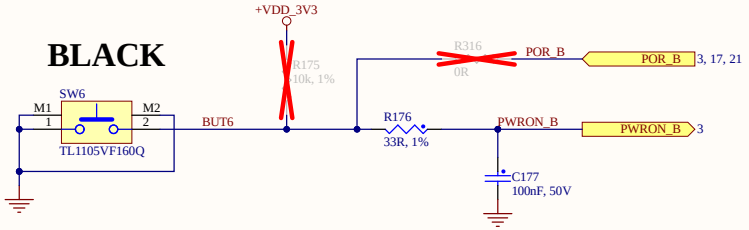
LEDs and BUTTONs

DESIGN NOTE:
1V8 pullups resistors are within the tolerance also for iMX8M Industrial Module.

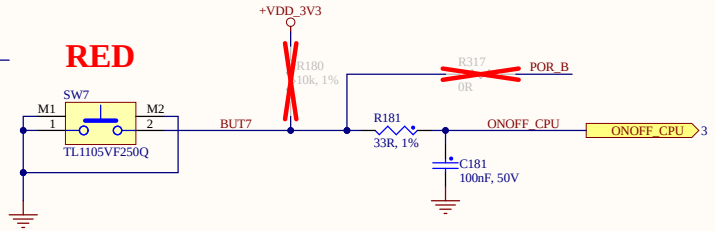
User Buttons

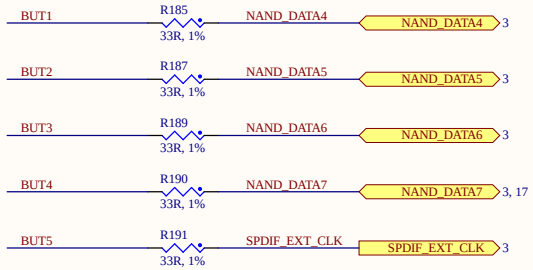


Reset Button



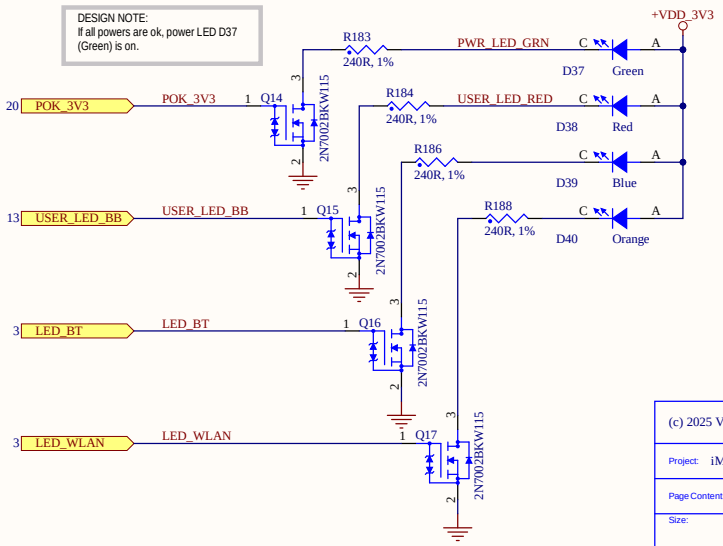
ON/OFF button





Power, User, BT, WLAN LEDs

DESIGN NOTE:
If all powers are ok, power LED D37 (Green) is on.



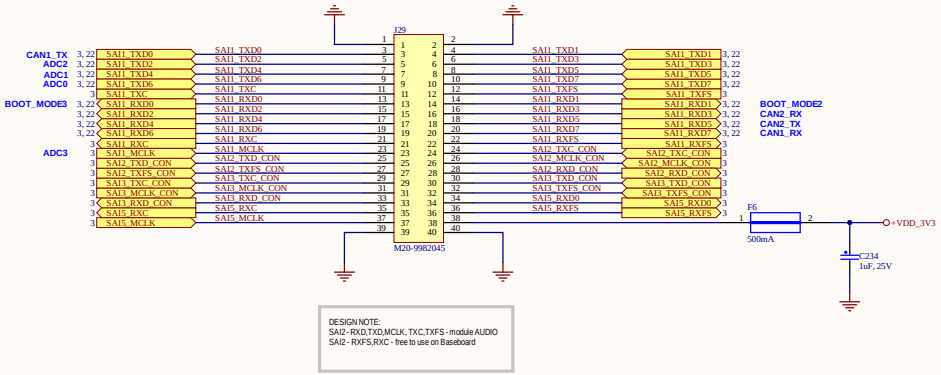
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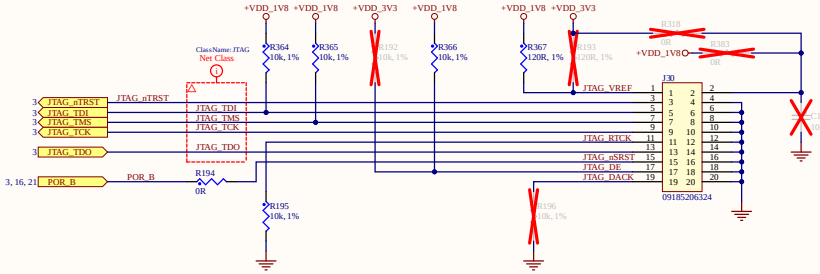
Project: iMX Development Baseboard	Variant: Production_iMX
Page Contents: [16] - LEDs and BUTTONs.SchDoc	Checked by:
Size:	DWG NO: / Revision: V1I2
Date: 12-Mar-2025 www.voipac.com	Sheet 16 of 31

GPIO HEADERS

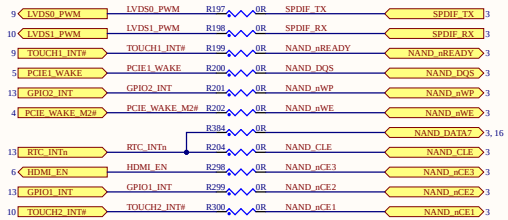
SAI1, 2, 3, 5



JTAG, 20-pin



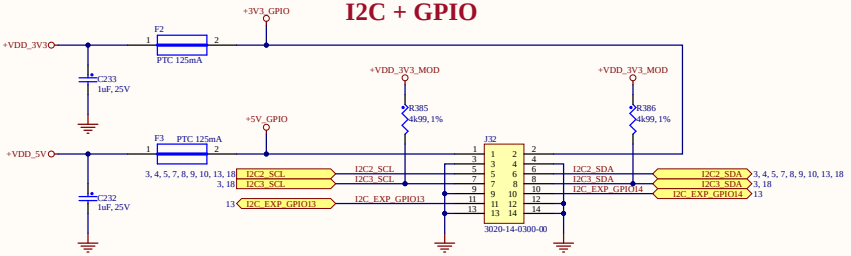
GPIOs across the whole board



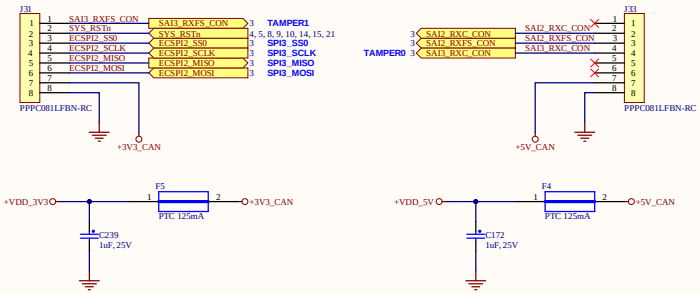
Signals are divided between CPU GPIOs and I2C GPIOs.

Both types of GPIOs are supported in software.

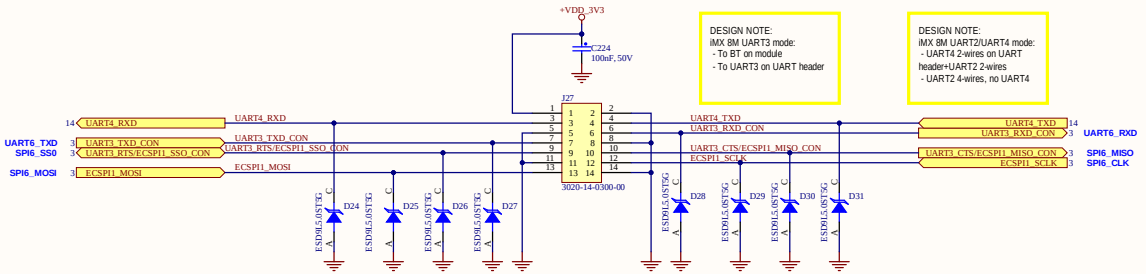
I2C + GPIO



CAN-MIKROE-3060



UART Header (UART3+UART4+SPI1)



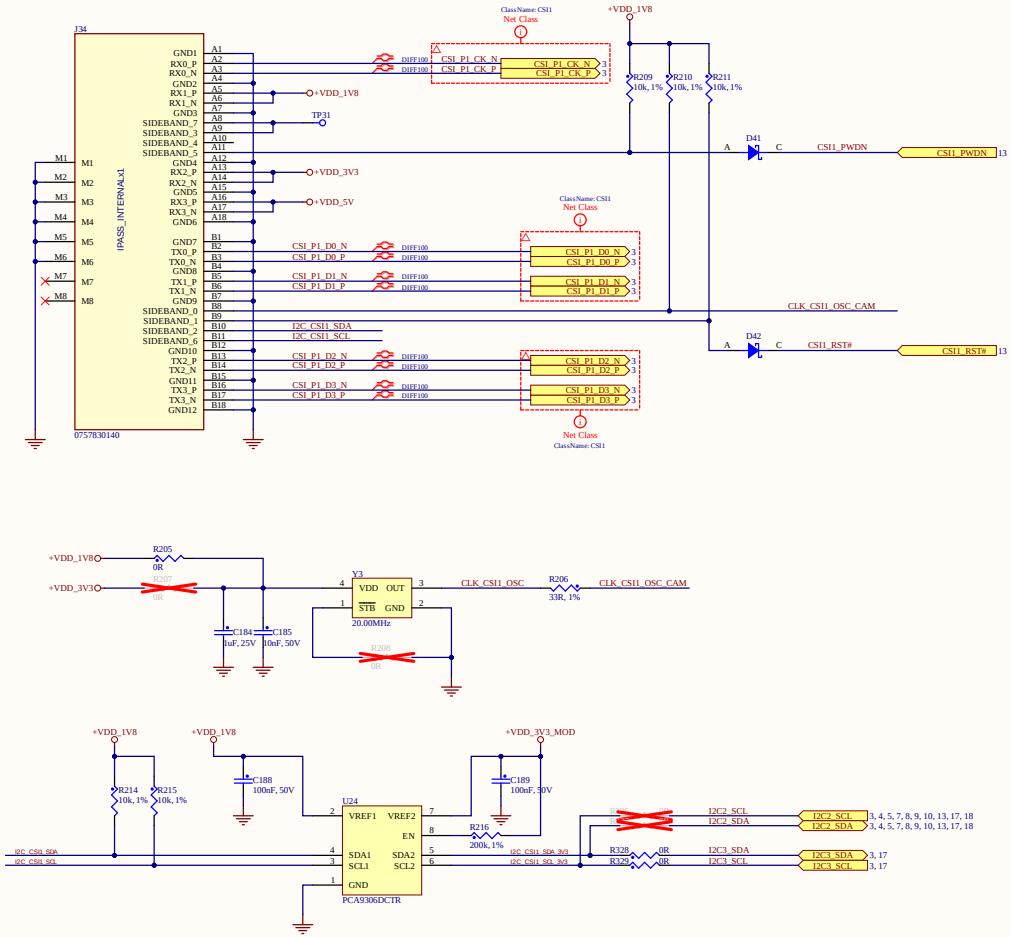
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Project: iMX Development Baseboard	Variant: Production_iMX
Page Contents: [17] - GPIO HEADERS.SchDoc	Checked by:
Size:	DWG NO: Revision: V1I2
Date: 12-Mar-2025 www.voipac.com	Sheet 17 of 31

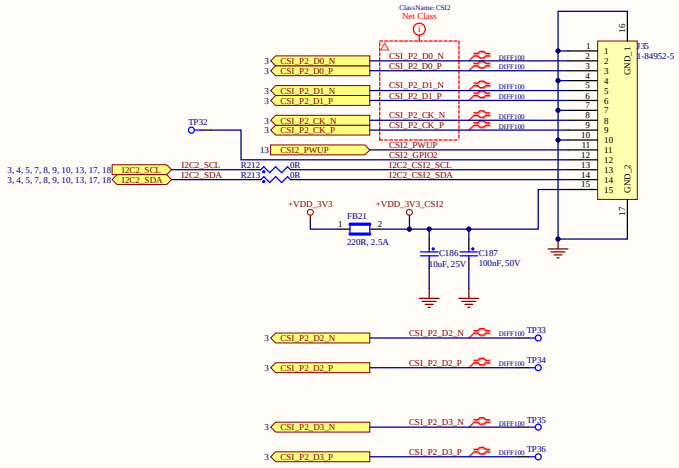
CSI CAMERAS

NXP MIPI-CSI1 Camera



Digilent MIPI-CSI2 Camera

(Raspberry Pi compatible)



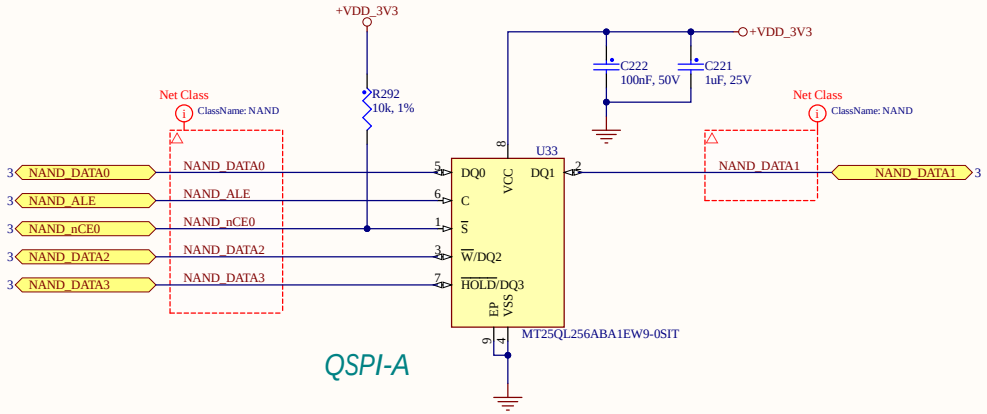
Lanes D2 and D3 not used

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Project: iMX Development Baseboard	Variant: Production_iMX
Page Contents: [18] - CSI CAMERAS.SchDoc	Checked by:
Size:	DWG NO: Revision: V1I2
Date: 12-Mar-2025 www.voipac.com	Sheet 18 of 31

SERIAL NOR FLASH



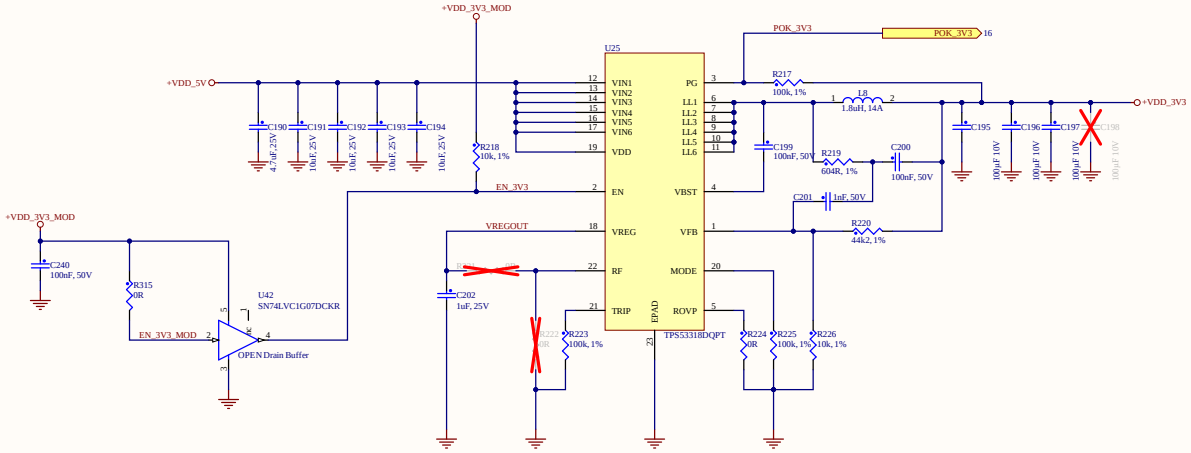
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Project: iMX Development Baseboard	Variant: Production_iMX
Page Contents: [19] - SERIAL NOR FLASH.SchDoc	Checked by:
Size:	DWG NO: / Revision: V1I2
Date: 12-Mar-2025 www.voipac.com	Sheet 19 of 31

POWER DCDC

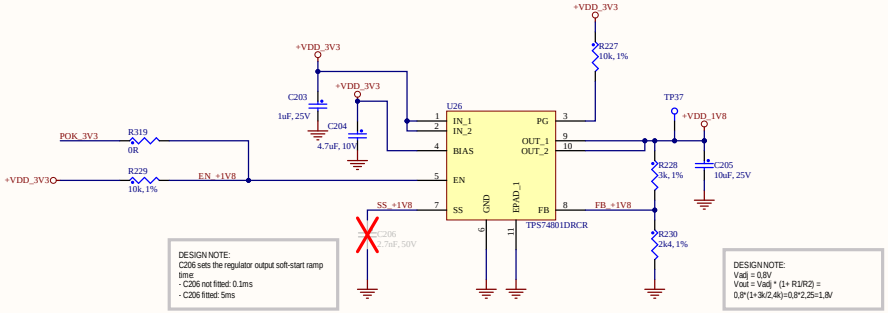
+3V3 DCDC 6A



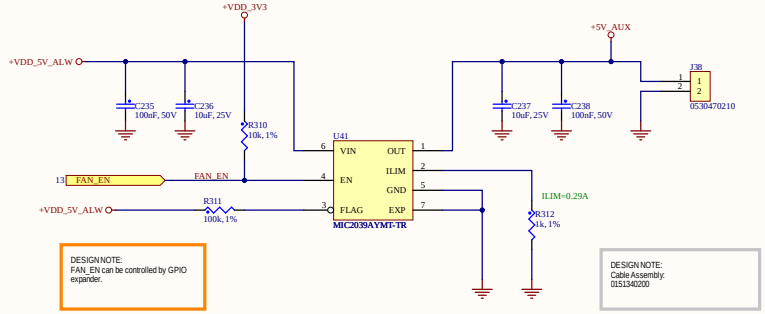
OCP Threshold 8.45A

Rmode 105k
tss=1.5ms Auto Skip mode
Rmode 100k
tss=1.4ms Auto Skip mode

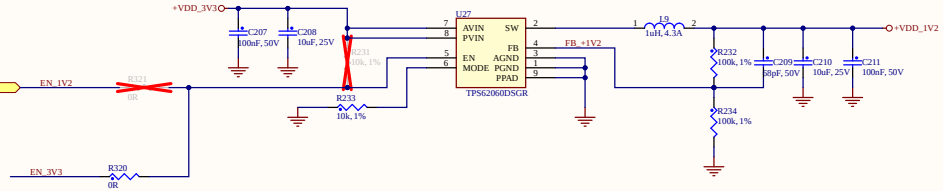
+1V8 LDO 0.5A



CPU Fan / 5V Connector



+1V2 DCDC 1A



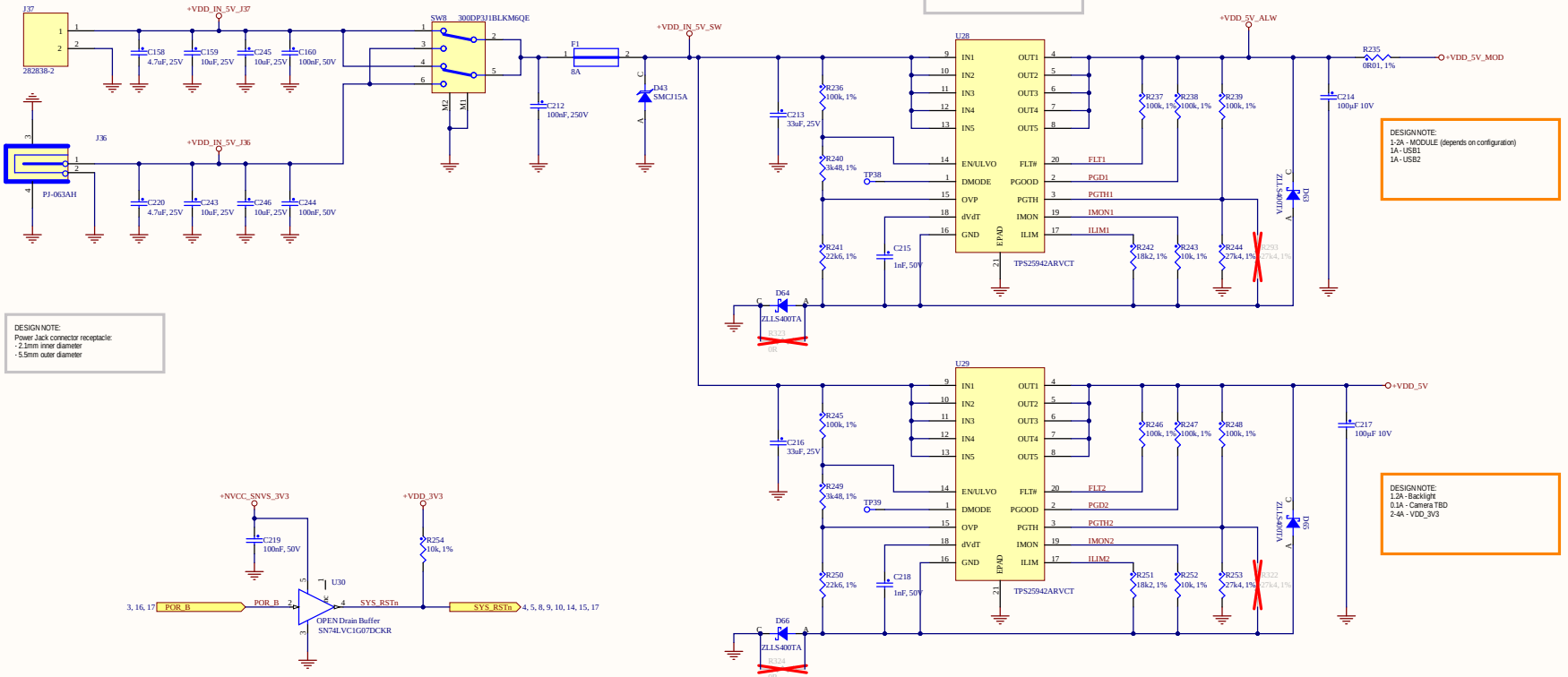
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Project: iMX Development Baseboard	Variant: Production_iMX
Page Contents: [20] - POWER DCDC.SchDoc	Checked by:
Size:	DWG NO: / Revision: V1I2
Date: 12-Mar-2025 www.voipac.com	Sheet 20 of 31

POWER IN

(Input voltage)
+VSYS = 5.0 ~ 5.3V

Built in option



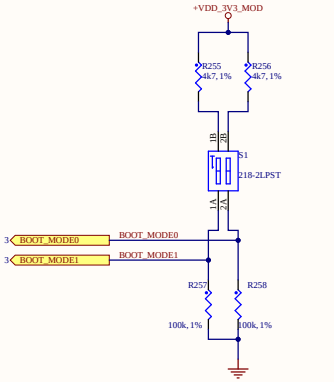
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Project: iMX Development Baseboard		Variant: Production_iMX
Page Contents: [21] - POWER IN.SchDoc		Checked by:
Size:	DWG NO:	Revision: V1I2
Date: 12-Mar-2025 www.voipac.com	Sheet 21 of 31	

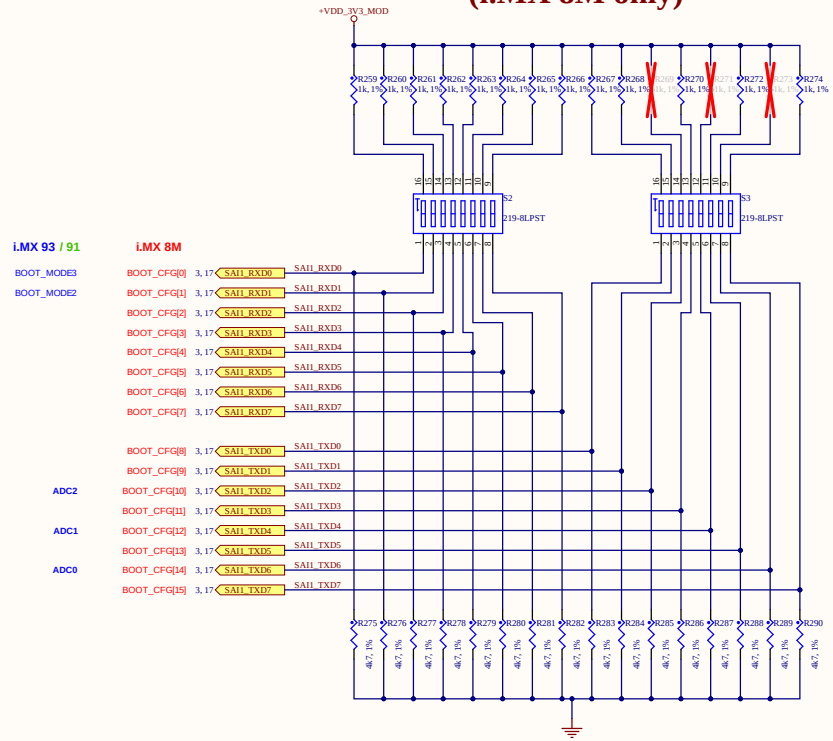
BOOT CFG

BOOT MODE SELECTION



DESIGN NOTE:
i.MX 93 / 91 uses 4 signals to configure its boot mode and boot device. To test all the boot modes, e.g. Low Power Boot (LPB), the remaining two signals are available:
- BOOT_MODE2: S2 DIP Switch 2 (signal SAI1_RXD1)
- BOOT_MODE3: S2 DIP Switch 1 (signal SAI1_RXD0)

BOOT DEVICE SELECTION (i.MX 8M only)



DESIGN NOTE:
For i.MX 93 / 91 do not populate R269, R271, R273 (ADC0, ADC1, ADC2)

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Project: iMX Development Baseboard	Variant: Production_iMX	
Page Contents: [22] - BOOT CFG.SchDoc		Checked by:
Size:	DWG NO:	Revision: V1I2
Date: 12-Mar-2025 www.voipac.com	Sheet 22 of 31	

LVDS0 BOE CABLES

CB2

CABLE FFC 40

05-40-D-0050-A-4-06-4-T

CB3

CABLE FFC 6

10-06-D-0050-C-4-08-4-T

PCB3

PCB

BOE LVDS Display Adapter V1I2

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Project: iMX Development Baseboard

Variant: Production_iMX

Page Contents: [23] - LVDS0 BOE CABLES.SchDoc

Checked by:

Size:

DWG NO:

Revision: V1I2

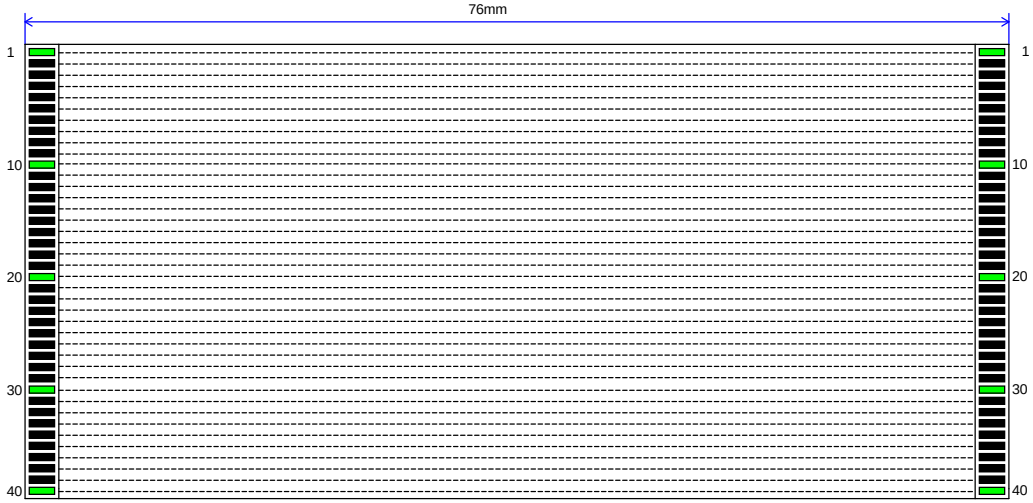
Date: 12-Mar-2025 www.voipac.com

LVDS0 NHD CABLES

LCD NHD FFC Cable

J12 iMX8M	J2 LCD LVDS	FUNCTION
1	1	GND
2	2	VDD
3	3	VDD
4	4	V_EDID
5	5	GND
6	6	SCL
7	7	SDA
8	8	RX0-
9	9	RX0+
10	10	GND
11	11	RX1-
12	12	RX1+
13	13	GND
14	14	RX2-
15	15	RX2+
16	16	GND
17	17	CLKIN-
18	18	CLKIN+
19	19	GND
20	20	RX3-

J12
BB
SIDE



J2
LCD
SIDE

J12 iMX8M	J2 LCD LVDS	FUNCTION
21	21	RX3+
22	22	GND
23	23	INSEL
24	24	GND
25	25	GND
26	26	UPDN
27	27	SHLR
28	28	GND
29	29	RESET
30	30	STBY
31	31	LED_GND
32	32	LED_GND
33	33	LED_GND
34	34	GND
35	35	LED_PWM
36	36	LED_EN
37	37	BIST
38	38	LED_VDD
39	39	LED_VDD
40	40	LED_VDD

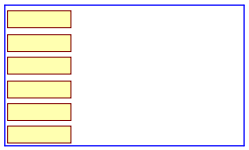
Touchscreen NHD FFC Cable

CB1

CABLE FFC 40

15166-0429

6 RESET
5 INT
4 SDA
3 SCl
2 GND
1 VDD



Bottom View

Contacts on bottom side

Stiffener on top side

Connector FPC 6 pol. 1mm pitch

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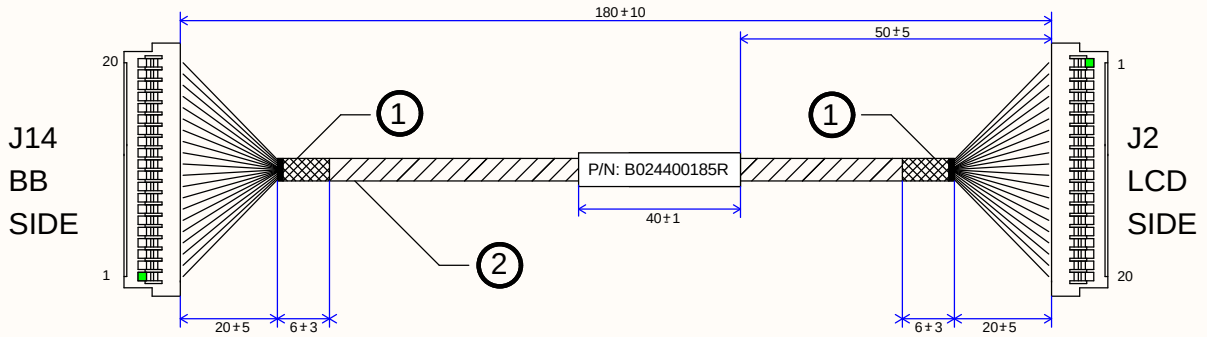
Project:	iMX Development Baseboard
Variant:	Production_iMX
Page Contents:	[24] - LVDS0 NHD CABLES.SchDoc
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DWG NO:	
Revision:	V1I2
Date:	12-Mar-2025 www.voipac.com
Sheet	24 of 31

LVDS0 KOE CABLES

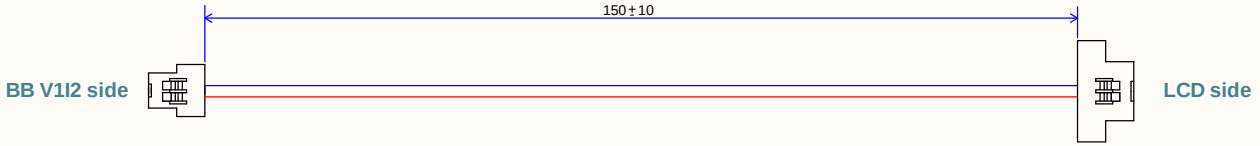
J1	J2	FUNCTION	COLOR
1	20	VCC	RED
2	19	VCC	RED
3	18	GND	BLACK
4	17	GND	BLACK
5 *	16	D0-	WHITE
6 *	15	D0+	BLUE
7	14	GND	BLACK
8 *	13	D1-	WHITE
9 *	12	D1+	BLUE
10	11	GDN	BLACK
11 *	10	D2-	WHITE
12 *	9	D2+	BLUE
13	8	GND	BLACK
14 *	7	CK-	WHITE
15 *	6	CK+	BLUE
16	5	GND	BLACK
17 *	4	FRC	WHITE
18 *	3	DPS	BLUE
19	2	DIM	BROWN
20	1	OPT	ORANGE

* Twisted pair

KOE LVDS Cable



KOE LCD Backlight Cable



1x Housing P/N: 440129-2
2x Socket Contact P/N: 1735801-1

1x Housing P/N: BHR-02(8.0)VS-1N
2x Socket Contact P/N: SBH-001T-P0.5

RoHS Compliant

NOTE:
Units of length mm
ELECTRICAL TEST:
(1) 100% CONDUCTIVITY TEST PASSED, NO OPEN, SHORT, MIS-WIRE
(2) CONTACT RESISTANCE: 3Ω MAX
(3) INSULATION RESISTANCE: 10MΩ MIN
(4) CONTACT VOLTAGE: DC 300V

ITEM	PART	SPECIFICATION	Q'TY
1	H.S.TUBE	TBD BLACK	2 PCS
2	BRAID	168C/0.12T	1 PCS
3	MASKING TAPE	W=18	2 PCS
4	TERMINAL	WL1258-G-P OR EQUIV	40 PCS
5	HOUSING	FI-S20S OR WL1258HS-20P(FI-S) 1.25PITCH OR EQUIV	2 PCS
6	WIRE	UL1571 28AWG 0.6	20 PCS

KOE Touch Pinout



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Project: iMX Development Baseboard
Variant: Production_iMX
Page Contents: [25] - LVDS0 KOE CABLES.SchDoc
Checked by:
Size:
DWG NO:
Revision: V1I2
Date: 12-Mar-2025 www.voipac.com
Sheet 25 of 31

MECHANICAL

GND TESTPOINT

TP40

PCBA

PCB1

PCBA

M1 M2

M1 M2 iMX93 Industrial Module V1I2

PCB

PCB2

PCB

iMX Development Baseboard V1I2

HEX STANDOFFs

ST1 ST2 ST3 ST4

98952A407 98952A407 98952A407 98952A407

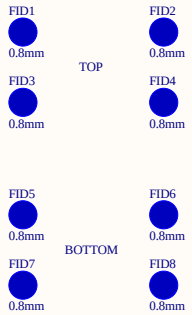
Alt P/N: 971300321

ST5 ST6 ST7 ST8

98952A400 98952A400 98952A400 98952A400

Alt P/N: 971350321

FIDUCIALS



LCDs

LCD1
DY1212W-4856

LCD2
NHD-10.1-1024600MB-LSXV-CTP

LCD3
TX18D200VM0EAA

LCD

M1 M2 M3 M4

ANTENNAS

A1 ANTENNA MAF94051

A2 ANTENNA MAF94051

ANTENNA CABLES

A3 ANTENNA CABLE CSJ-RGFB-200-MHF4

A4 ANTENNA CABLE CSJ-RGFB-200-MHF4 i.MX 8M

A5 ANTENNA CABLE MAF94118

A6 ANTENNA CABLE MAF94118 i.MX 93 i.MX 91

BRACKETS SMA

BR1 Bracket M1 M2 M3 M4 Bracket-SMA

BR2 Bracket M1 M2 M3 M4 Bracket-SMA

CAN MODULE

CR3 MIKROE-3060

MIKROE-3060

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Project: iMX Development Baseboard	Variant: Production_iMX
Page Contents: [26] - MECHANICAL.SchDoc	Checked by:
Size:	DWG NO: Revision: V1I2
Date: 12-Mar-2025 www.voipac.com	Sheet 26 of 31

DOC - REVISION HISTORY

Revision	Date	By	Description
V1I1	20-DEC-2023	PS, RF, PG, MV, MM, MB	Release production PCB V1I1
V1I2	2-AUG-2024	PS, RF, PG, MV, MM, MB	Release production PCB V1I2

Disclaimer:
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Schematics are subject to change without prior notice.

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Variant: Production_iMX
Page Contents: [27] - DOC - REVISION HISTORY.SchDoc
Checked by:
Size:
DWG NO:
Revision: V1I2
Date: 12-Mar-2025 www.voipac.com
Sheet 27 of 31

DOC - DESIGN NOTES

NOTES:

I2C1 Addresses Module

i.MX 8M	PMIC	0x48, 0x49, 0x4A, 0x4B
i.MX 93 / 91	PMIC	0x25
	EEPROM	0x50, 0x51 (1 0 1 0 A2 A1 A16 RW)
i.MX 8M	PCIe CLK	0x68, 0x6A
	AUDIO	0x1C, 0x1D
i.MX 8M	LVDS DSI bridge	0x2C, 0x2D

I2C2 & I2C3 Addresses Accessories

NXP MIPI-CSI	0x3C (I2C3)
DIGILENT MIPI-CSI	0x3C (I2C2)
LCD KOE TOUCH	0x5C
LCD NHD TOUCH	0x38
LCD BOE TOUCH	0x2A

I2C2 Addresses Baseboard

GPIO Expander 1	0x23
GPIO Expander 2	0x27
RTC	0x51
EEPROM	0x53, 0x57 (1 0 1 0 A2 A1 A16 RW)
USB-C CC	0x7A

Track impedance recomendations

Signal group	Impedance	PCB manufacturer tolerance (+/-)
All single-ended signals, unless specified	50 Ω Single-ended	10%
PCIe TX/RX data pairs	85 Ω Differential	10%
USB differential signals	90 Ω Differential	10%
Differential signals, including Ethernet, PCIe clocks, HDMI, MIPI (CSI and DSI)	100 Ω Differential	10%

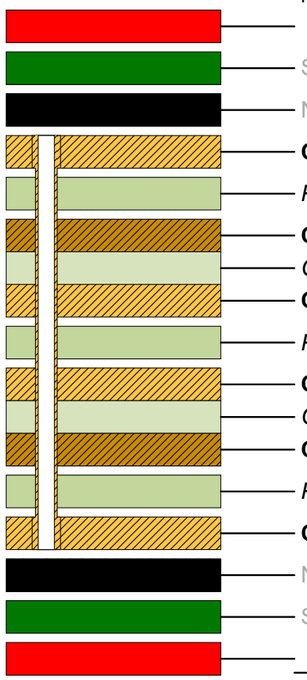
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Project: iMX Development Baseboard
Variant: Production_iMX
Page Contents: [28] - DOC - DESIGN NOTES.SchDoc
Checked by:
Size:
DWG NO:
Revision: V1I2
Date: 12-Mar-2025 www.voipac.com
Sheet 28 of 31

STACK-UP

Layer Stack Legend



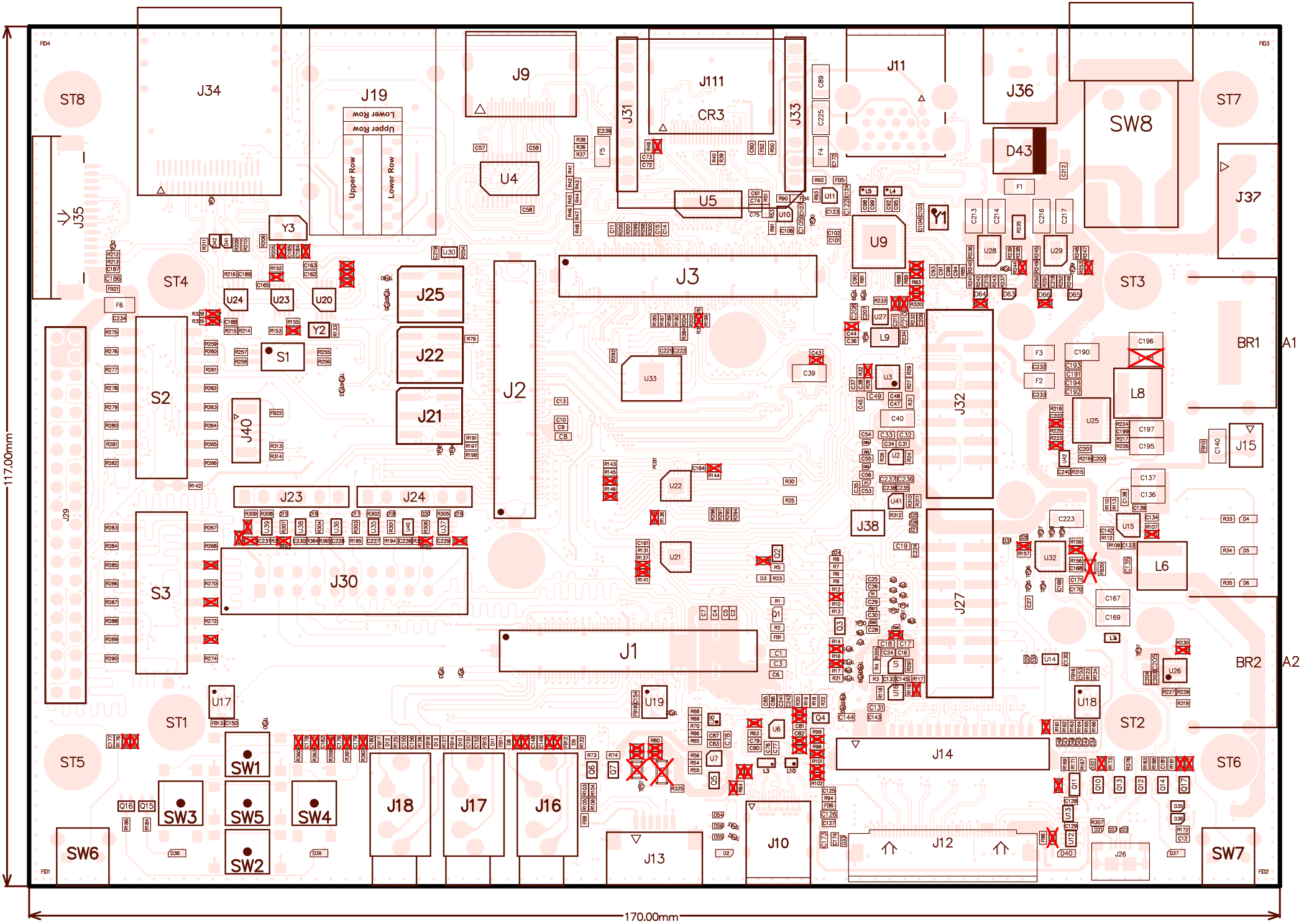
Material	Layer	Thickness	Dielectric Material	Type	Gerber
	Top Overlay			Legend	GTO
Surface Material	Top Solder	0.03mm	SM-001	Solder Mask	GTS
Nickel, Gold	Top Surface Finish	0.00mm		Surface Finish	
CF-004	**L1**	**0.03mm**		**Signal**	**GTL**
Prepreg		*0.12mm*	*PP-017*	*Dielectric*	
CF-004	**L2**	**0.02mm**		**Internal Plane**	**GP1**
Core		*0.14mm*	*PP-006*	*Dielectric*	
CF-004	**L3**	**0.02mm**		**Signal**	**G1**
Prepreg		*0.89mm*	*Core-039*	*Dielectric*	
CF-004	**L4 (PWR)**	**0.02mm**		**Signal**	**G2**
Core		*0.14mm*	*PP-006*	*Dielectric*	
CF-004	**L5**	**0.02mm**		**Internal Plane**	**GP2**
Prepreg		*0.12mm*	*PP-017*	*Dielectric*	
CF-004	**L6**	**0.03mm**		**Signal**	**GBL**
Nickel, Gold	Bottom Surface Finish	0.00mm		Surface Finish	
Surface Material	Bottom Solder	0.03mm	SM-001	Solder Mask	GBS
	Bottom Overlay			Legend	GBO

Total thickness: 1.60mm

Drill Table

Symbol	Count	Hole Size	Plated	Hole Tolerance
	3087	0.20mm	Plated	
	14	0.40mm	Plated	
G	2	0.50mm	Plated	
	10	0.60mm	Plated	
A	18	0.70mm	Plated	
I	10	0.80mm	Plated	
	3	0.90mm	Non-Plated	
H	50	0.90mm	Plated	
	3	1.00mm	Non-Plated	
F	51	1.00mm	Plated	
	1	1.05mm	Non-Plated	
	2	1.10mm	Non-Plated	
	30	1.10mm	Plated	
M	8	1.20mm	Plated	
S	4	1.30mm	Plated	
Q	1	1.40mm	Non-Plated	
J	3	1.55mm	Non-Plated	
C	4	1.57mm	Plated	
	3	1.60mm	Non-Plated	
	15	1.60mm	Plated	
T	8	1.85mm	Plated	
	4	2.30mm	Plated	
V	4	2.70mm	Plated	
B	10	3.10mm	Plated	
	2	3.25mm	Non-Plated	
	3347 Total			

iMX Development Baseboard V1I2 Assembly Drawings Top



iMX Development Baseboard V1I2 Assembly Drawings Bottom

