Hardware Documentation

SolderCoreBBHD
for HW Revision 1.00

preliminary

Version 001
(2023-03-31)

Elektronik Systeme

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About This Document

This document describes how to use the SolderCoreBBHD baseboard with mechanical and electrical information. The latest version of this document can be found at: http://www.fs-net.de.

This document is written for the variants of the SolderCoreBBHD, listed in the table below.

Related Boards
SolderCoreBBHD Rev.1.00

ESD Requirements

All F&S hardware products are ESD (electrostatic sensitive devices). All products are handled and packaged according to ESD guidelines. Please do not handle or store ESD-sensitive material in ESD-unsafe environments. Negligent handling will harm the product and warranty claims become void.

History

Date	V	Platform	A,M,R	Chapter	Description	Au
29.01.24	001	-	-	All	Initial Version	UK

V	Version
A, M, R	Added, Modified, Removed
Au	Author

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1 Overview

The SolderCoreBBHD is designed for easily testing the F&S CPU board SolderCore8ULP in specific applications. For this, the processors' I/O pads and several control signals are directly accessible via pin headers[a].

There are several extension boards available which can be used as a reference for the own development.

[a] All relevant pin headers are arranged on a 2,54 mm grid.

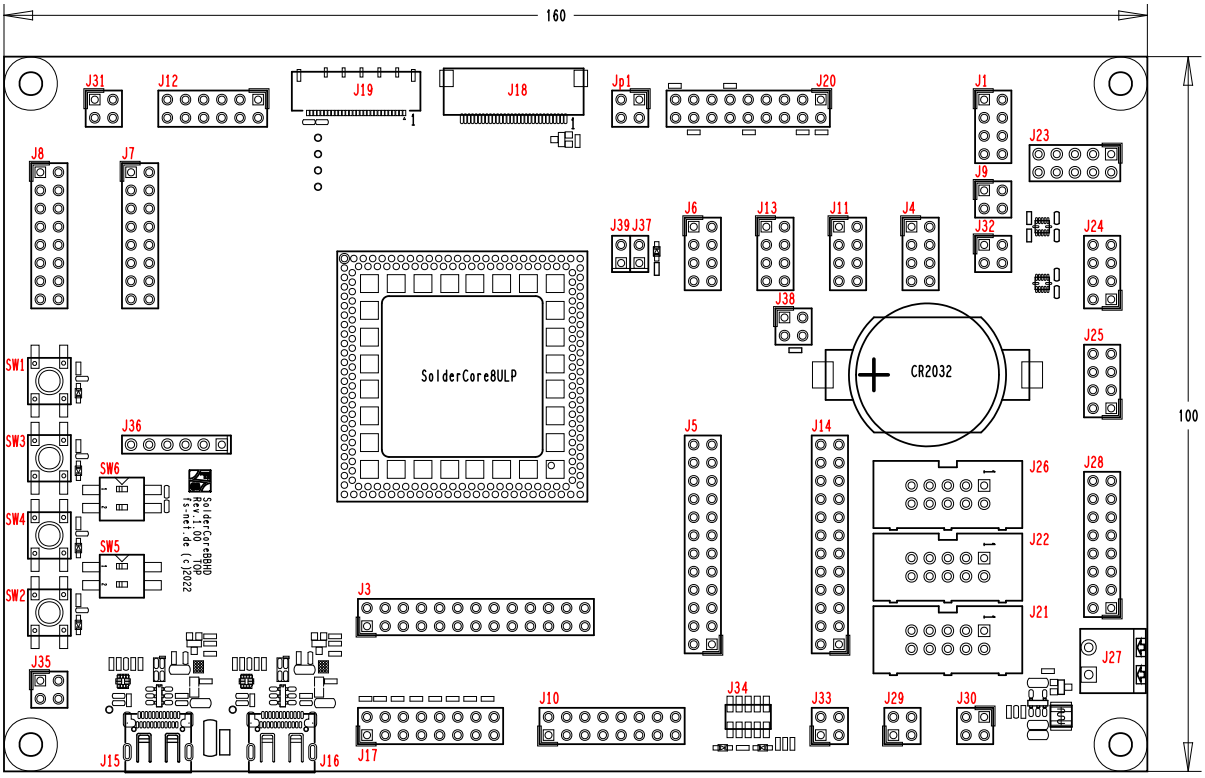

Figure 1: SolderCoreBBHD (top view)

Ref.	Description	I/O	No. of Pins	Connector Type
J1	PTA I/O supply	PWR	8	Pin Header (2.54 mm)
J3	PTA I/O (PTA0…PTA24), 1x GND	I/O	26	Pin Header (2.54 mm)
J4	PTC I/O supply	PWR	8	Pin Header (2.54 mm)
J5	PTC I/O (PTC0…PTC23)	I/O	24	Pin Header (2.54 mm)
J6	PTF I/O supply	PWR	8	Pin Header (2.54 mm)
J7	PTF I/O (PTF0…PTF15)	I/O	16	Pin Header (2.54 mm)
J8	PTF I/O (PTF16…PTF31)	I/O	16	Pin Header (2.54 mm)
J9	PTB I/O supply	PWR	4	Pin Header (2.54 mm)
J10	PTB I/O (PTB0…PTB15)	I/O	16	Pin Header (2.54 mm)
J11	PTD I/O supply	PWR	8	Pin Header (2.54 mm)

J12	PTD I/O (PTD12…PTD23)	I/O	12	Pin Header (2.54 mm)
J13	PTE I/O supply	PWR	8	Pin Header (2.54 mm)
J14	PTE I/O (PTE0…PTE23)	I/O	24	Pin Header (2.54 mm)
J15	USB0 (USB 2.0)	I/O	-	USB Type C
J16	USB1 (USB 2.0)	I/O	-	USB Type C
J17	USB control	I/O	16	Pin Header (2.54 mm)
J18	Display (1x4-lane MIPI-DSI)	I/O	30	FH28D-30S-0.5SH(05)
J19	Camera (1x2-lane MIPI CSI)	I/O	28	FH41-28S-0.5SH(05)
J20	DISP/CAM control	I/O	18	Pin Header (2.54 mm)
J21	RS232 (RX/TX)	I/O	10	Pin Header (2.54 mm)
J22	RS232 (RX/TX)	I/O	10	Pin Header (2.54 mm)
J23	I/O Level Shifter (< 3,3 V)	I/O	10	Pin Header (2.54 mm)
J24	I/O Level Shifter (3,3 V)	I/O	8	Pin Header (2.54 mm)
J25	Serial (3.3 V)	I/O	8	Pin Header (2.54 mm)
J26	RS232 (RX/TX, RTS, CTS)	I/O	10	Pin Header (2.54 mm)
J27	Power IN	PWR	2	MC 1.5/ 2-G-3.81
J28	Power Source Select	PWR	16	Pin Header (2.54 mm)
J29	3V3, 3V3_EN	PWR	4	Pin Header (2.54 mm)
J30	PWR	PWR	4	Pin Header (2.54 mm)
J31	GND	PWR	4	Pin Header (2.54 mm)
J32	GND	PWR	4	Pin Header (2.54 mm)
J33	GND	PWR	4	Pin Header (2.54 mm)
J34	JTAG	I/O	10	Pin Header (1.27 mm)
J35	Digital/Analog (DAC0,1)	O	4	Pin Header (2.54 mm)
J36	System control	I/O	6	Pin Header (2.54 mm)
J37	Battery jumper	PWR	2	Pin Header (2.54 mm)
J38	PMIC control	I/O	4	Pin Header (2.54 mm)
J39	Jumper	PWR	2	Pin Header (2.54 mm)

Table 1: Connector List and Types

Ref.	Description	Type
SW1	System Reset	Button
SW2	Reset0	Button
SW3	Reset1	Button
SW4	ON/OFF	Button
SW5	Boot Mode	Dip Switch
SW6	Tamper	Dip Switch

Table 2: Buttons & Switches

2 Additional Documentation

Due to the fact, that SolderCoreBBHD and SolderCore8ULP are designed to get direct access to the processors pins, it is recommended to read the SolderCore8ULP Documentation in addition.

3 Detailed Description

3.1 I/O-pads Connectors

The i.MX 8UL contains the six I/O blocks[a]:

- PTA (J1, J3), PTB (J9, J10), PTC (J4, J5) (Real-Time domain, RTD),
- PTD (J11, J12), PTE (J13, J14), PTF (J6, J7, J8) (Application domain, APD).

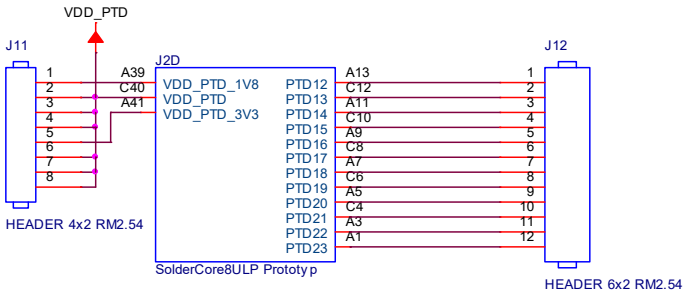

Figure 2: I/O-pads Connectors (example: PTD)

On the SolderCoreBBHD, the I/O supply voltage (VDD_PTx) can be set to 1,8 V or 3,3 V via jumper[b] for each block. VDD_PTx is also available on additional pins of the respective pin header.

The I/O signals themselves are directly routed from the processor to pin headers.

[a] See SolderCore8ULP Documentation for further information.

[b] **Note:** PTB is 1,8 V only.

Pin	Signal Name	I/O	Voltage	Description
1	VDD_PTA_1V8	PWR	1.8V	PTA power OUT (from SC8ULP)
2	VDD_PTA	PWR	1.8V/3.3V	PTA supply (to SC8ULP)
3	VDD_PTA	PWR	1.8V/3.3V	power pin (VDD_PTA)
4	VDD_PTA	PWR	1.8V/3.3V	power pin (VDD_PTA)
5	VDD_PTA_3V3	PWR	3.3V	PTA power OUT (from SC8ULP)
6	VDD_PTA	PWR	1.8V/3.3V	power pin (VDD_PTA)
7	VDD_PTA	PWR	1.8V/3.3V	power pin (VDD_PTA)
8	VDD_PTA	PWR	1.8V/3.3V	power pin (VDD_PTA)

Table 3: PTA I/O Supply Connector (J1) Pin Description

Pin	Signal Name	I/O	Voltage	Description
1	PTA0	I/O	1.8V/3.3V	I/O pad
2	PTA1	I/O	1.8V/3.3V	I/O pad
3	PTA2	I/O	1.8V/3.3V	I/O pad
4	PTA3	I/O	1.8V/3.3V	I/O pad
5	PTA4	I/O	1.8V/3.3V	I/O pad
6	PTA5	I/O	1.8V/3.3V	I/O pad
7	PTA6	I/O	1.8V/3.3V	I/O pad
8	PTA7	I/O	1.8V/3.3V	I/O pad
9	PTA8	I/O	1.8V/3.3V	I/O pad
10	PTA9	I/O	1.8V/3.3V	I/O pad
11	PTA10	I/O	1.8V/3.3V	I/O pad
12	PTA11	I/O	1.8V/3.3V	I/O pad
13	PTA12	I/O	1.8V/3.3V	I/O pad
14	PTA13	I/O	1.8V/3.3V	I/O pad
15	PTA14	I/O	1.8V/3.3V	I/O pad
16	PTA15	I/O	1.8V/3.3V	I/O pad
17	PTA16	I/O	1.8V/3.3V	I/O pad
18	PTA17	I/O	1.8V/3.3V	I/O pad
19	PTA18	I/O	1.8V/3.3V	I/O pad
20	PTA19	I/O	1.8V/3.3V	I/O pad
21	PTA20	I/O	1.8V/3.3V	I/O pad (if JTAG is used: TMS)
22	PTA21	I/O	1.8V/3.3V	I/O pad (if JTAG is used: TCK)
23	PTA22	I/O	1.8V/3.3V	I/O pad (if JTAG is used: TDO)
24	PTA23	I/O	1.8V/3.3V	I/O pad (if JTAG is used: TDI)
25	PTA24	I/O	1.8V/3.3V	I/O pad
26	GND			

Table 4: PTA I/O Connector (J3) Pin Description

Pin	Signal Name	I/O	Voltage	Description
1	VDD_PTB	PWR	1.8V	PTB supply (to SC8ULP)
2	VDD_PTB	PWR	1.8V	power pin (VDD_PTB)
3	VDD_PTB	PWR	1.8V	power pin (VDD_PTB)
4	VDD_PTB	PWR	1.8V	power pin (VDD_PTB)

Table 5: PTB I/O Supply Connector (J9) Pin Description

Pin	Signal Name	I/O	Voltage	Description
1	PTB0	I/O	1.8V	I/O pad
2	PTB1	I/O	1.8V	I/O pad
3	PTB2	I/O	1.8V	I/O pad
4	PTB3	I/O	1.8V	I/O pad
5	PTB4	I/O	1.8V	I/O pad
6	PTB5	I/O	1.8V	I/O pad
7	PTB6	I/O	1.8V	I/O pad
8	PTB7	I/O	1.8V	I/O pad
9	PTB8	I/O	1.8V	I/O pad
10	PTB9	I/O	1.8V	I/O pad
11	PTB10	I/O	1.8V	I/O pad
12	PTB11	I/O	1.8V	I/O pad
13	PTB12	I/O	1.8V	I/O pad
14	PTB13	I/O	1.8V	I/O pad
15	PTB14	I/O	1.8V	I/O pad
16	PTB15	I/O	1.8V	I/O pad

Table 6: PTB I/O Connector (J10) Pin Description

Pin	Signal Name	I/O	Voltage	Description
1	VDD_PTC_1V8	PWR	1.8V	PTC power OUT (from SC8ULP)
2	VDD_PTC	PWR	1.8V/3.3V	PTC supply (to SC8ULP)
3	VDD_PTC	PWR	1.8V/3.3V	power pin (VDD_PTC)
4	VDD_PTC	PWR	1.8V/3.3V	power pin (VDD_PTC)
5	VDD_PTC_3V3	PWR	3.3V	PTC power OUT (from SC8ULP)
6	VDD_PTC	PWR	1.8V/3.3V	power pin (VDD_PTC)
7	VDD_PTC	PWR	1.8V/3.3V	power pin (VDD_PTC)
8	VDD_PTC	PWR	1.8V/3.3V	power pin (VDD_PTC)

Table 7: PTC I/O Supply Connector (J4) Pin Description

Pin	Signal Name	I/O	Voltage	Description
1	PTC0	I/O	1.8V/3.3V	I/O pad
2	PTC1	I/O	1.8V/3.3V	I/O pad
3	PTC2	I/O	1.8V/3.3V	I/O pad
4	PTC3	I/O	1.8V/3.3V	I/O pad
5	PTC4	I/O	1.8V/3.3V	I/O pad
6	PTC5	I/O	1.8V/3.3V	I/O pad
7	PTC6	I/O	1.8V/3.3V	I/O pad
8	PTC7	I/O	1.8V/3.3V	I/O pad
9	PTC8	I/O	1.8V/3.3V	I/O pad
10	PTC9	I/O	1.8V/3.3V	I/O pad
11	PTC10	I/O	1.8V/3.3V	I/O pad
12	PTC11	I/O	1.8V/3.3V	I/O pad
13	PTC12	I/O	1.8V/3.3V	I/O pad
14	PTC13	I/O	1.8V/3.3V	I/O pad
15	PTC14	I/O	1.8V/3.3V	I/O pad
16	PTC15	I/O	1.8V/3.3V	I/O pad
17	PTC16	I/O	1.8V/3.3V	I/O pad
18	PTC17	I/O	1.8V/3.3V	I/O pad
19	PTC18	I/O	1.8V/3.3V	I/O pad
20	PTC19	I/O	1.8V/3.3V	I/O pad
21	PTC20	I/O	1.8V/3.3V	I/O pad
22	PTC21	I/O	1.8V/3.3V	I/O pad
23	PTC22	I/O	1.8V/3.3V	I/O pad
24	PTC23	I/O	1.8V/3.3V	I/O pad

Table 8: PTC I/O Connector (J5) Pin Description

Pin	Signal Name	I/O	Voltage	Description
1	VDD_PTD_1V8	PWR	1.8V	PTD power OUT (from SC8ULP)
2	VDD_PTD [a]	PWR	1.8V/3.3V	PTD supply (to SC8ULP)
3	VDD_PTD	PWR	1.8V/3.3V	power pin (VDD_PTD)
4	VDD_PTD	PWR	1.8V/3.3V	power pin (VDD_PTD)
5	VDD_PTD_3V3	PWR	3.3V	PTD power OUT (from SC8ULP)
6	VDD_PTD	PWR	1.8V/3.3V	power pin (VDD_PTD)
7	VDD_PTD	PWR	1.8V/3.3V	power pin (VDD_PTD)
8	VDD_PTD	PWR	1.8V/3.3V	power pin (VDD_PTD)

Table 9: PTD I/O Supply Connector (J11) Pin Description

[a] HS mode for eMMC is not supported if 3.3V is used.

Pin	Signal Name	I/O	Voltage	Description
1	PTD12	I/O	1.8V/3.3V	I/O pad
2	PTD13	I/O	1.8V/3.3V	I/O pad
3	PTD14	I/O	1.8V/3.3V	I/O pad
4	PTD15	I/O	1.8V/3.3V	I/O pad
5	PTD16	I/O	1.8V/3.3V	I/O pad
6	PTD17	I/O	1.8V/3.3V	I/O pad
7	PTD18	I/O	1.8V/3.3V	I/O pad
8	PTD19	I/O	1.8V/3.3V	I/O pad
9	PTD20	I/O	1.8V/3.3V	I/O pad
10	PTD21	I/O	1.8V/3.3V	I/O pad
11	PTD22	I/O	1.8V/3.3V	I/O pad
12	PTD23	I/O	1.8V/3.3V	I/O pad

Table 10: PTD I/O Connector (J12) Pin Description

Pin	Signal Name	I/O	Voltage	Description
1	VDD_PTE_1V8	PWR	1.8V	PTE power OUT (from SC8ULP)
2	VDD_PTE	PWR	1.8V/3.3V	PTE supply (to SC8ULP)
3	VDD_PTE	PWR	1.8V/3.3V	power pin (VDD_PTE)
4	VDD_PTE	PWR	1.8V/3.3V	power pin (VDD_PTE)
5	VDD_PTE_3V3	PWR	3.3V	PTE power OUT (from SC8ULP)
6	VDD_PTE	PWR	1.8V/3.3V	power pin (VDD_PTE)
7	VDD_PTE	PWR	1.8V/3.3V	power pin (VDD_PTE)
8	VDD_PTE	PWR	1.8V/3.3V	power pin (VDD_PTE)

Table 11: PTE I/O Supply Connector (J13) Pin Description

Pin	Signal Name	I/O	Voltage	Description
1	PTE0	I/O	1.8V/3.3V	I/O pad
2	PTE1	I/O	1.8V/3.3V	I/O pad
3	PTE2	I/O	1.8V/3.3V	I/O pad
4	PTE3	I/O	1.8V/3.3V	I/O pad
5	PTE4	I/O	1.8V/3.3V	I/O pad
6	PTE5	I/O	1.8V/3.3V	I/O pad
7	PTE6	I/O	1.8V/3.3V	I/O pad
8	PTE7	I/O	1.8V/3.3V	I/O pad
9	PTE8	I/O	1.8V/3.3V	I/O pad
10	PTE9	I/O	1.8V/3.3V	I/O pad
11	PTE10	I/O	1.8V/3.3V	I/O pad
12	PTE11	I/O	1.8V/3.3V	I/O pad
13	PTE12	I/O	1.8V/3.3V	I/O pad
14	PTE13	I/O	1.8V/3.3V	I/O pad
15	PTE14	I/O	1.8V/3.3V	I/O pad
16	PTE15	I/O	1.8V/3.3V	I/O pad
17	PTE16	I/O	1.8V/3.3V	I/O pad
18	PTE17	I/O	1.8V/3.3V	I/O pad
19	PTE18	I/O	1.8V/3.3V	I/O pad
20	PTE19	I/O	1.8V/3.3V	I/O pad
21	PTE20	I/O	1.8V/3.3V	I/O pad
22	PTE21	I/O	1.8V/3.3V	I/O pad
23	PTE22	I/O	1.8V/3.3V	I/O pad
24	PTE23	I/O	1.8V/3.3V	I/O pad

Table 12: PTE I/O Connector (J14) Pin Description

Pin	Signal Name	I/O	Voltage	Description
1	VDD_PTF_1V8	PWR	1.8V	PTF power OUT (from SC8ULP)
2	VDD_PTF	PWR	1.8V/3.3V	PTF supply (to SC8ULP)
3	VDD_PTF	PWR	1.8V/3.3V	power pin (VDD_PTF)
4	VDD_PTF	PWR	1.8V/3.3V	power pin (VDD_PTF)
5	VDD_PTF_3V3	PWR	3.3V	PTF power OUT (from SC8ULP)
6	VDD_PTF	PWR	1.8V/3.3V	power pin (VDD_PTF)
7	VDD_PTF	PWR	1.8V/3.3V	power pin (VDD_PTF)
8	VDD_PTF	PWR	1.8V/3.3V	power pin (VDD_PTF)

Table 13: PTF I/O Supply Connector (J6) Pin Description

Pin	Signal Name	I/O	Voltage	Description
1	PTF0	I/O	1.8V/3.3V	I/O pad
2	PTF1	I/O	1.8V/3.3V	I/O pad
3	PTF2	I/O	1.8V/3.3V	I/O pad
4	PTF3	I/O	1.8V/3.3V	I/O pad
5	PTF4	I/O	1.8V/3.3V	I/O pad
6	PTF5	I/O	1.8V/3.3V	I/O pad
7	PTF6	I/O	1.8V/3.3V	I/O pad
8	PTF7	I/O	1.8V/3.3V	I/O pad
9	PTF8	I/O	1.8V/3.3V	I/O pad
10	PTF9	I/O	1.8V/3.3V	I/O pad
11	PTF10	I/O	1.8V/3.3V	I/O pad
12	PTF11	I/O	1.8V/3.3V	I/O pad
13	PTF12	I/O	1.8V/3.3V	I/O pad
14	PTF13	I/O	1.8V/3.3V	I/O pad
15	PTF14	I/O	1.8V/3.3V	I/O pad
16	PTF15	I/O	1.8V/3.3V	I/O pad

Table 14: PTF I/O Connector 1 (J7) Pin Description

Pin	Signal Name	I/O	Voltage	Description
1	PTF16	I/O	1.8V/3.3V	I/O pad
2	PTF17	I/O	1.8V/3.3V	I/O pad
3	PTF18	I/O	1.8V/3.3V	I/O pad
4	PTF19	I/O	1.8V/3.3V	I/O pad
5	PTF20	I/O	1.8V/3.3V	I/O pad
6	PTF21	I/O	1.8V/3.3V	I/O pad
7	PTF22	I/O	1.8V/3.3V	I/O pad
8	PTF23	I/O	1.8V/3.3V	I/O pad
9	PTF24	I/O	1.8V/3.3V	I/O pad
10	PTF25	I/O	1.8V/3.3V	I/O pad
11	PTF26	I/O	1.8V/3.3V	I/O pad
12	PTF27	I/O	1.8V/3.3V	I/O pad
13	PTF28	I/O	1.8V/3.3V	I/O pad
14	PTF29	I/O	1.8V/3.3V	I/O pad
15	PTF30	I/O	1.8V/3.3V	I/O pad
16	PTF31	I/O	1.8V/3.3V	I/O pad

Table 15: PTF I/O Connector 2 (J8) Pin Description

3.2 USB Interfaces

The SolderCoreBBHD contains two USB 2.0 ports (USB0, USB1), routed to two USB type C connectors (J15, J16).

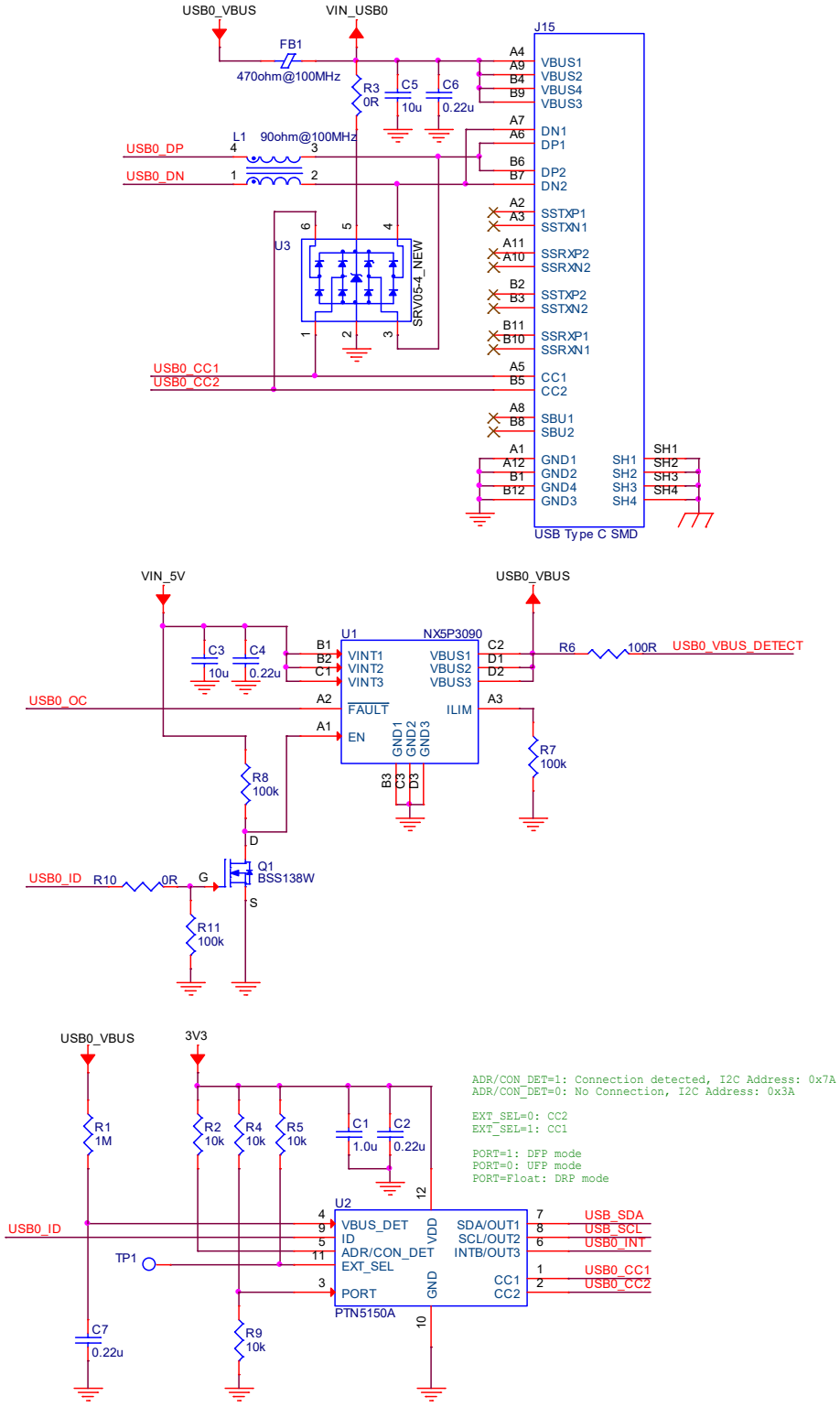

Figure 3: USB Interfaces (example: USB0)

Pin	Signal Name	I/O	Voltage	Description
A1/B1	GND			
A2/B2	N.C.	X		not connected
A3/B3	N.C.	X		not connected
A4/B4	USBx_VBUS	PWR	5 V	BUS power
A5	USBx_CC1			configuration channel
B5	USBx_CC2			configuration channel
A6/B6	USBx_DP	I/O		USB 2.0 differential pair, positive
A7/B7	USBx_DN	I/O		USB 2.0 differential pair, negative
A8/B8	N.C.	X		not connected
A9/B9	USBx_VBUS	PWR	5V	BUS power
A10/B10	N.C.	X		not connected
A11/B11	N.C.	X		not connected
A12/B12	GND			
SH1	shield			
SH2	shield			
SH3	shield			
SH4	shield			

Table 16: USB Connectors (J15, J16) Pin Description

The USB control signals are accessible via the USB control connector (J17).

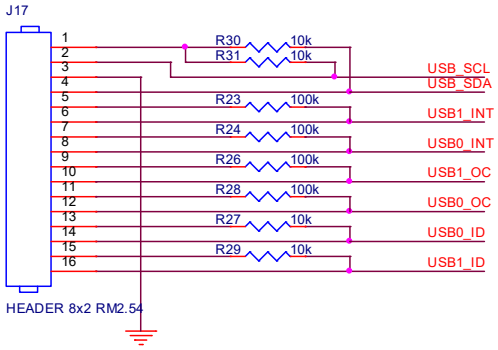

Figure 4: USB Control Connector

Pin	Signal Name	I/O	Voltage	Description
1	-	PWR	1.8V/3.3V	PU voltage (USB I2C)
2	USB_SCL	O	1.8V/3.3V	USB I2C clock
3	GND			
4	USB_ SDA	I/O	1.8V/3.3V	USB I2C serial data
5	-	PWR	1.8V/3.3V	PU voltage (USB1_INT)
6	USB1_INT	O	1.8V/3.3V	USB1 Interrupt Request
7	-	PWR	1.8V/3.3V	PU voltage (USB0_INT)
8	USB0_INT	O	1.8V/3.3V	USB0 Interrupt Request
9	-	PWR	1.8V/3.3V	PU voltage (USB1_OC)
10	USB1_OC	O	1.8V/3.3V	USB1 overcurrent indicator signal
11	-	PWR	1.8V/3.3V	PU voltage (USB0_OC)
12	USB0_OC	O	1.8V/3.3V	USB0 overcurrent indicator signal
13	-	PWR	1.8V/3.3V	PU voltage (USB0_ID)
14	USB0_ID	O	1.8V/3.3V	USB0 ID signal (OTG device insertion)
15	-	PWR	1.8V/3.3V	PU voltage (USB1_ID)
16	USB1_ID	O	1.8V/3.3V	USB1 ID signal (OTG device insertion)

Table 17: USB Control Connector (J17) Pin Description

3.3 Display / Camera Interfaces

3.3.1 Display (DSI)

The SolderCoreBBHD provides a 1x4-lane MIPI DSI interface and a connection for a touch controller (communication via I2C, J18).

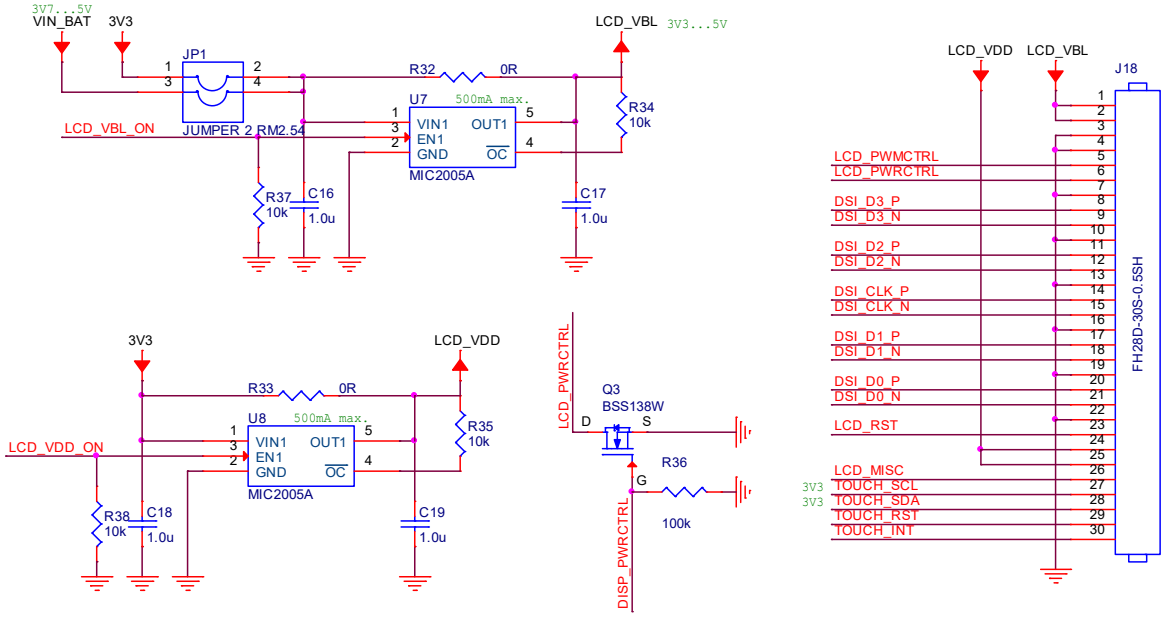

Figure 5: MIPI DSI Interface

Pin	Signal Name	I/O	Voltage	Description
1	LCD_VBL	PWR	3.3V / 5V	Backlight supply voltage
2	LCD_VBL	PWR	3.3V / 5V	Backlight supply voltage
3	GND			
4	GND			
5	LCD_PWMCTRL	O	1.8V/3.3V	Backlight PWM
6	LCD_PWRCTRL	O	1.8V/3.3V	Backlight enable
7	GND			
8	DSI_D3_P	O	220mV	DSI data lane3, positive
9	DSI_D3_N	O	220mV	DSI data lane3, negative
10	GND			
11	DSI_D2_P	O	220mV	DSI data lane2, positive
12	DSI_D2_N	O	220mV	DSI data lane2, negative
13	GND			
14	DSI_CLK_P	O	220mV	DSI clock signal, positive
15	DSI_CLK_N	O	220mV	DSI clock signal, negative
16	GND			
17	DSI_D1_P	O	220mV	DSI data lane1, positive
18	DSI_D1_N	O	220mV	DSI data lane1, negative
19	GND			
20	DSI_D0_P	O	220mV	DSI data lane0, positive
21	DSI_D0_N	O	220mV	DSI data lane0, negative
22	GND			
23	LCD_RST	O	1.8V/3.3V	LCD reset
24	LCD_VDD	PWR	3.3V	LCD supply voltage
25	LCD_VDD	PWR	3.3V	LCD supply voltage
26	LCD_MISC	O	1.8V/3.3V	LCD standby signal (EE0350ET: n. u.)
27	TOUCH_SCL	O		Touch I2C clock
28	TOUCH_SDA	I/O		Touch I2C serial data
29	TOUCH_RST	O		Touch reset
30	TOUCH_INT	I		Touch Interrupt Request

Table 18: Display Connector (J18) Pin Description

3.3.2 Camera (CSI)

The SolderCoreBBHD provides a 1x2-lane MIPI CSI interface (J19).

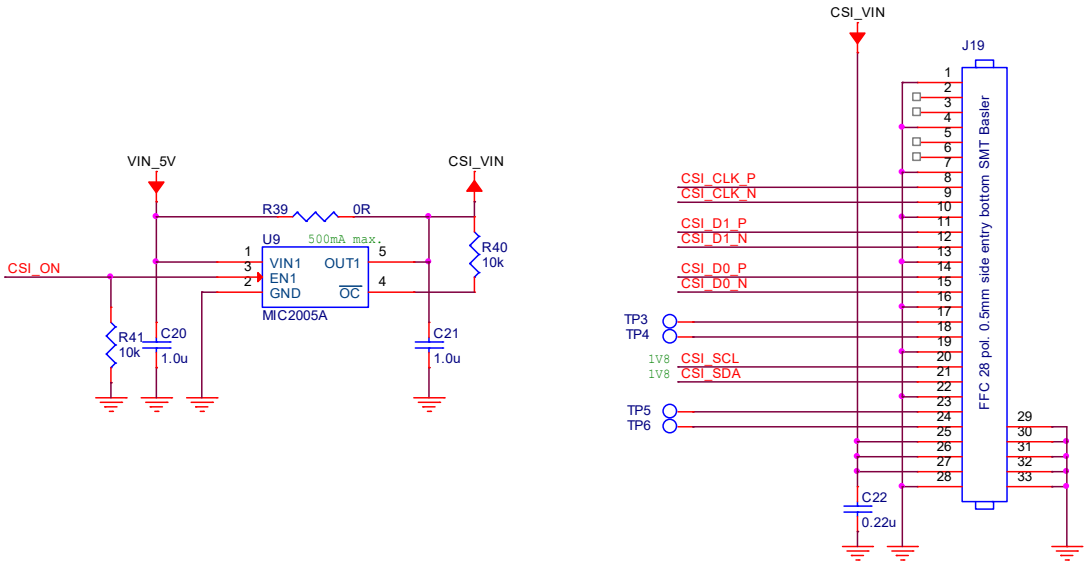

Figure 6: MIPI CSI Interface

Pin	Signal Name	I/O	Voltage	Description
1			GND	
2	N.C.	X		not connected
3	N.C.	X		not connected
4			GND	
5	N.C.	X		not connected
6	N.C.	X		not connected
7			GND	
8	CSI_CLK_P		220mV	CSI clock signal, positive
9	CSI_CLK_N		220mV	CSI clock signal, negative
10			GND	
11	CSI_D1_P		220mV	CSI data lane1, positive
12	CSI_D1_N		220mV	CSI data lane1, negative
13			GND	
14	CSI_D0_P		220mV	CSI data lane0, positive
15	CSI_D0_P		220mV	CSI data lane0, negative
16			GND	
17	TP			testpoint
18	TP			testpoint
19			GND	
20	CSI_SCL	O		CSI I2C clock
21	CSI_SDA	I/O		CSI I2C serial data

22	GND			
23	TP			testpoint
24	TP			testpoint
25	CSI_VIN		5V	Camera supply voltage
26	CSI_VIN		5V	Camera supply voltage
27	CSI_VIN		5V	Camera supply voltage
28	GND			
29	GND (mounting pad)			
30	GND (mounting pad)			
31	GND (mounting pad)			
32	GND (mounting pad)			
33	GND (mounting pad)			

Table 19: Camera Connector (J19) Pin Description

3.3.3 Display / Camera Control Connector

The display / camera control signals are accessible via the control connector (J20).

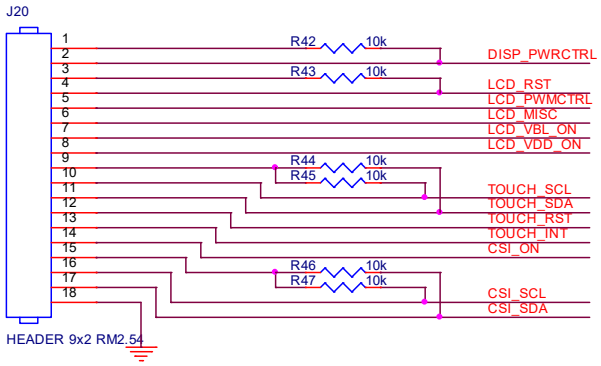

Figure 7: Display / Camera Control Connector

Pin	Signal Name	I/O	Voltage	Description
1	-	PWR	1.8V/3.3V	PU voltage (DISP_PWRCTRL)
2	DISP_PWRCTRL	I	1.8V/3.3V	Backlight enable
3	-	PWR	1.8V/3.3V	PU voltage (LCD_RST)
4	LCD_RST	I	1.8V/3.3V	LCD reset
5	LCD_PWMCTRL	I	1.8V/3.3V	Backlight PWM
6	LCD_MISC	I	1.8V/3.3V	LCD standby signal (EE0350ET: n. u.)
7	LCD_VBL_ON	I	1.8V/3.3V	Backlight supply voltage enable
8	LCD_VDD_ON	I	1.8V/3.3V	LCD supply voltage enable
9	-	PWR	1.8V/3.3V	PU voltage (Touch I2C)
10	TOUCH_SCL	I	1.8V/3.3V	Touch I2C clock
11	TOUCH_SDA	I/O	1.8V/3.3V	Touch I2C serial data

12	TOUCH_RST	I	1.8V/3.3V	Touch reset
13	TOUCH_INT	O	1.8V/3.3V	Touch Interrupt Request
14	CSI_ON	I	1.8V/3.3V	Camera supply voltage enable
15	-	PWR	1.8V/3.3V	PU voltage (CSI I2C)
16	CSI_SCL	I	1.8V/3.3V	CSI I2C clock
17	CSI_SDA	I/O	1.8V/3.3V	CSI I2C serial data
18	GND			

Table 20: Display / Camera Control Connector (J20) Pin Description

3.4 Serial Interface

The SolderCoreBBHD contains two RS232 transceivers, routed to the pin headers J21, J22, J26.

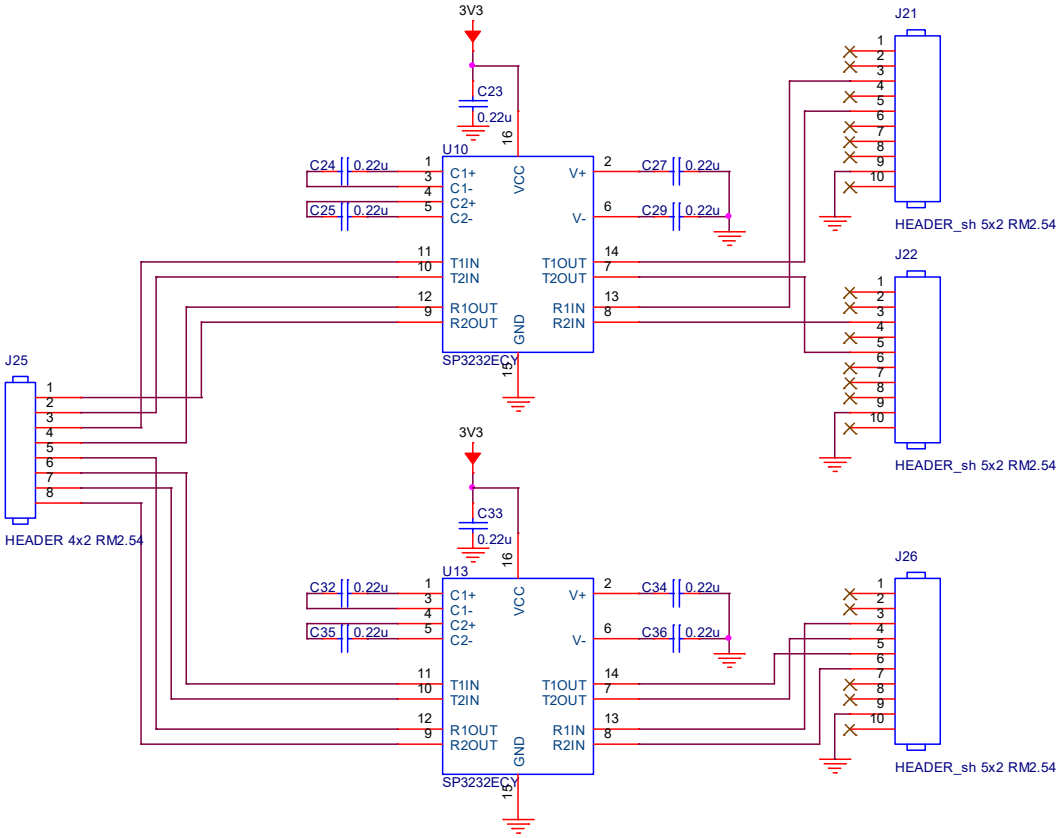

Figure 8: Serial Interfaces

Pin	Signal Name	I/O	Voltage	Description
1	N.C.	X		not connected
2	N.C.	X		not connected
3	RS232_1_RX	I		RS232_1 received signal
4	N.C.	X		not connected
5	RS232_1_TX	O		RS232_1 transmitted signal
6	N.C.	X		not connected
7	N.C.	X		not connected
8	N.C.	X		not connected
9	GND			
10	N.C.	X		not connected

Table 21: RS232 Connector 1 (J21) Pin Description

Pin	Signal Name	I/O	Voltage	Description
1	N.C.	X		not connected
2	N.C.	X		not connected
3	RS232_2_RX	I		RS232_2 received signal
4	N.C.	X		not connected
5	RS232_2_TX	O		RS232_2 transmitted signal
6	N.C.	X		not connected
7	N.C.	X		not connected
8	N.C.	X		not connected
9	GND			
10	N.C.	X		not connected

Table 22: RS232 Connector 2 (J22) Pin Description

Pin	Signal Name	I/O	Voltage	Description
1	N.C.	X		not connected
2	N.C.	X		not connected
3	RS232_3_RX	I		RS232_3 received signal
4	RS232_3_RTS	O		RS232_3 Ready to Receive
5	RS232_3_TX	O		RS232_3 transmitted signal
6	RS232_3_CTS	I		RS232_3 Clear to Send
7	N.C.	X		not connected
8	N.C.	X		not connected
9	GND			
10	N.C.	X		not connected

Table 23: RS232 Connector 3 (J26) Pin Description

J25 is the CPUs side connection of the serial interface.

3.5 Level Shifters

The SolderCoreBBHD contains two level shifters[a], routed to the pin headers J23, J24.

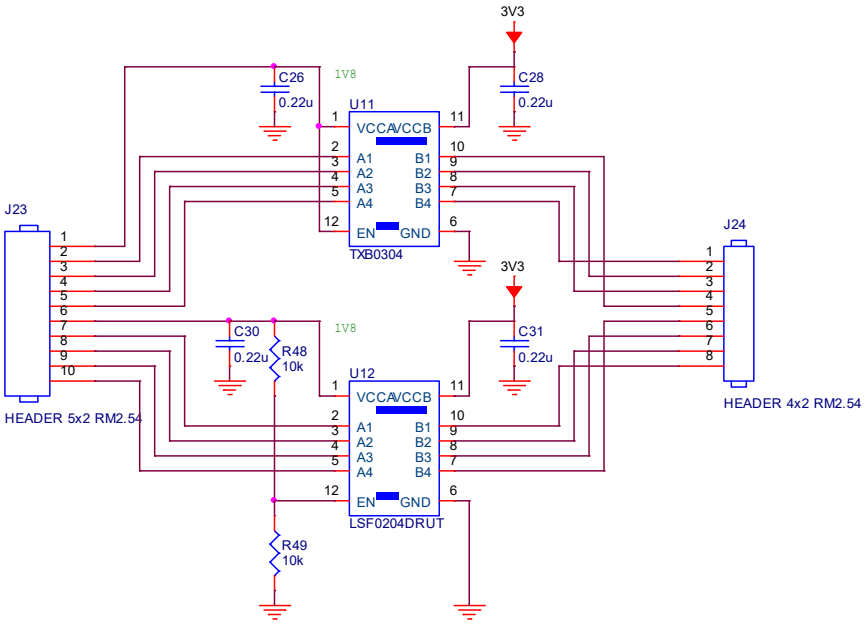

Figure 9: Level Shifters

[a] U11 is only suitable for push-pull applications.
U12 is suitable for open-drain or push-pull applications.
Make sure that VCCA < VCCB in all cases.

3.6 DAC

The SolderCoreBBHD contains two DAC-connections (J35) for general purposes.

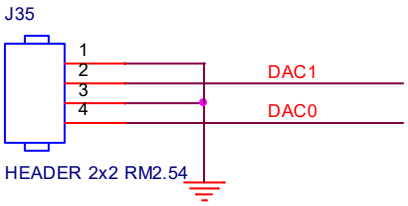

Figure 10: DACs

Pin	Signal Name	I/O	Voltage	Description
1			GND	
2	DAC1	O	1.8V	analog output
3			GND	
4	DAC0	O	1.8V	analog output

Table 24: DAC Connector (J35) Pin Description

3.7 System Control

The system & PMIC control signals[a] are accessible via pin headers (J36, J38), buttons and switches.

[a] See also SolderCore8ULP Documentation for further information.

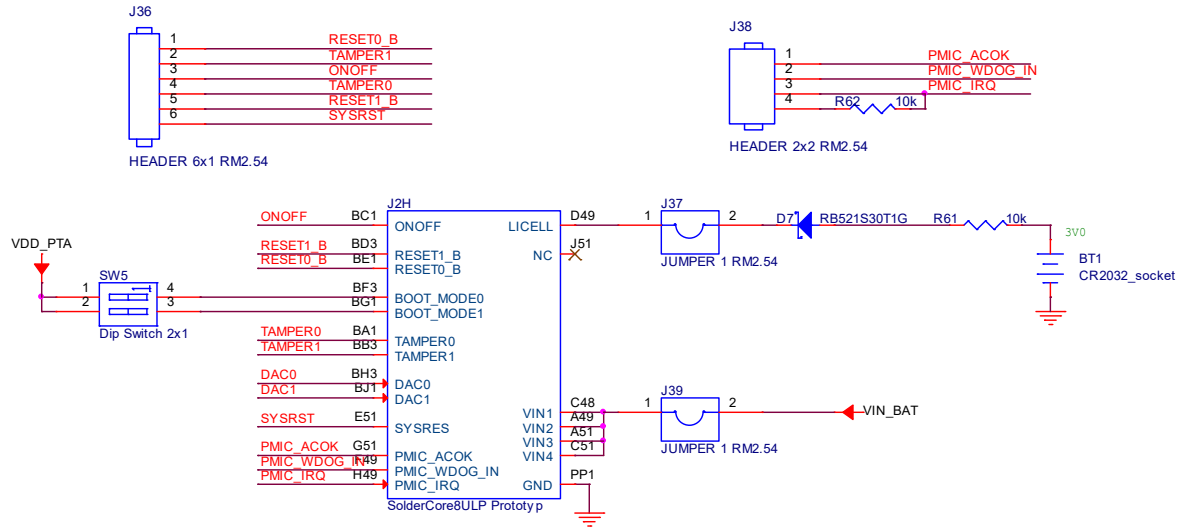

Figure 11: Control Signals

Pin	Signal Name	I/O	Voltage	Description
1	RESET0_B	I	1.8V	M33 reset signal (low active, may be pushed to GND via SW2)
2	TAMPER1	I	1.8V	Tamper detection pin (may be switched to GND via SW6)
3	ONOFF	I	1.8V	Power Button (may be pushed to GND via SW4)
4	TAMPER0	I	1.8V	Tamper detection pin (may be switched to GND via SW6)
5	RESET1_B	I	1.8V	A35 reset signal (low active, may be pushed to GND via SW3)
6	SYSRST	I	[b]	PMIC reset (low active, may be pushed to GND via SW1)

Table 25: Control Signals (J36) Pin Description

Pin	Signal Name	I/O	Voltage	Description
1	PMIC_ACOK	I	[b]	PMIC ACOK IN
2	PMIC_WDOG_IN	I	[c]	PMIC Watchdog IN
3	PMIC_IRQ	O	[d]	PMIC Interrupt Request
4	-	PWR	1.8V/3.3V	PU (PMIC_IRQ)

Table 26: Control Signals (J38) Pin Description

[b] 100k Pull-Up to VSYS on SolderCore8ULP

[c] Input High Level > 1.4V, max. voltage: VSYS

[d] Open-Drain, max. voltage: VSYS

3.8 JTAG

The SolderCoreBBHD contains a JATG connector for debug purposes, J34.

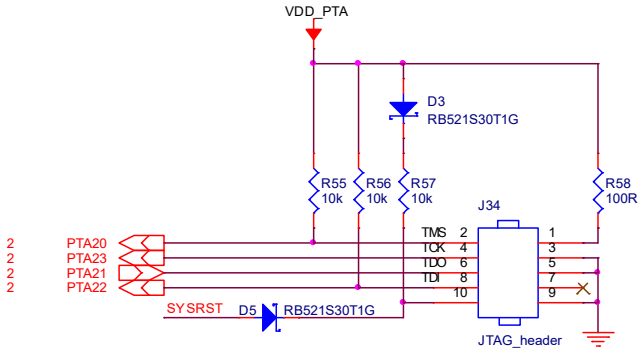

Figure 12: JTAG Connector

3.9 Power

The SolderCoreBBHD can be powered from various types of sources:

- Terminal block (J27, jumper on J28),
- USB0 or USB1 (J15 or J16, jumper on J28),
- Direct connection on J28,
- Battery (in general: circuit connected on pin header)

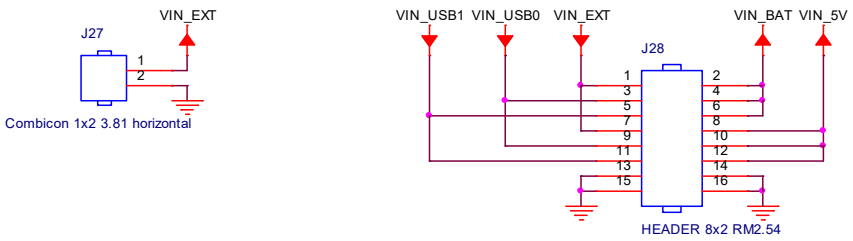

Figure 13: Power Entry

The power supply rail for the SolderCore8ULP is VIN_BAT. 3V3 on the baseboard is also generated out of VIN-BAT.

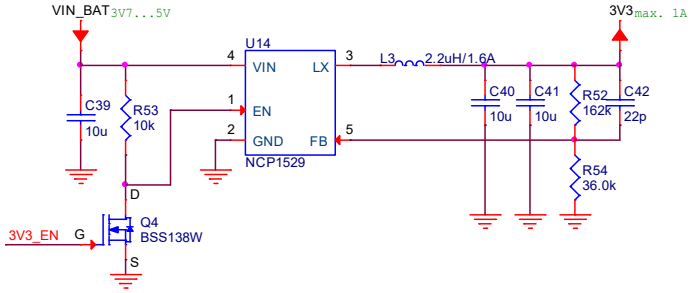

Figure 14: DC/DC (VIN_BAT –> 3V3)

4 Electrical Characteristics

4.1 Absolute Maximum Ratings

Parameter.	Description	Min	Max	Unit
VIN_BAT	Main Power Supply	-0.5	6.0	V
LICELL	Backup Battery	-0.3	4.5	V
USBx_VBUS_DETECT	USB Voltage detection	-0.3	5.6	V
SYSRST PMIC-WDOG_IN PMIC_ACOK PMIC_IRQ		-0.5	VSYS+0.5	V

Table 27: Absolute Maximum Ratings

4.2 Recommended Operating Conditions

Parameter.	Description	Min	Typ.	Max	Unit
VIN_BAT	Main Power Supply	3.7	5.0	5.5	V
LICELL	Backup Battery	2.4	3.0	4.5	V

Table 28: Recommended Operation Conditions

5 ESD and EMI Implementation

The connectors do not have any ESD protection. We highly recommend using the adapter board with wires as short as possible.

A helpful guide is available from TI; just search for slva680 at ti.com.

6 Second source rules

F&S qualifies their second sources for parts autonomously, as long as this does not touch the technical characteristics of the product. This is necessary to guarantee delivery times and product life. A setup of release samples with released second sources is not possible.

F&S does not use broker components without the consent of the customer.

7 Storage conditions

Maximum storage on room temperature with non-condensing humidity: 6 months
Maximum storage on controlled conditions 25 ±5 °C, max. 60% humidity: 12 months
For longer storage, we recommend vacuum dry packs.

8 ROHS and REACH statement

All F&S designs are created from lead-free components and are completely ROHS compliant.

The products we supply do not contain any substance on the latest candidate list published by the European Chemicals Agency according to Article 59(1,10) of Regulation (EC) 1907/2006 (REACH) in a concentration above 0.1 mass %.
Consequently, the obligations in No. 1 and 2 paragraphs in Annex are not relevant here.
Please understand that F&S is not performing any chemical analysis on its products to testify REACH compliance and is therefore not able to fill out any detailed inquiry forms.

9 Packaging

All F&S ESD-sensitive products will shipping either in trays or in bags.

10 Matrix Code Sticker

All F&S hardware will ship with a matrix code sticker including the serial number. Enter your serial number here https://www.fs-net.de/en/support/serial-number-info-and-rma/ to get information on shipping date and type of board.

Figure 15: Matrix Code Sticker

11 Appendix

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12 Content