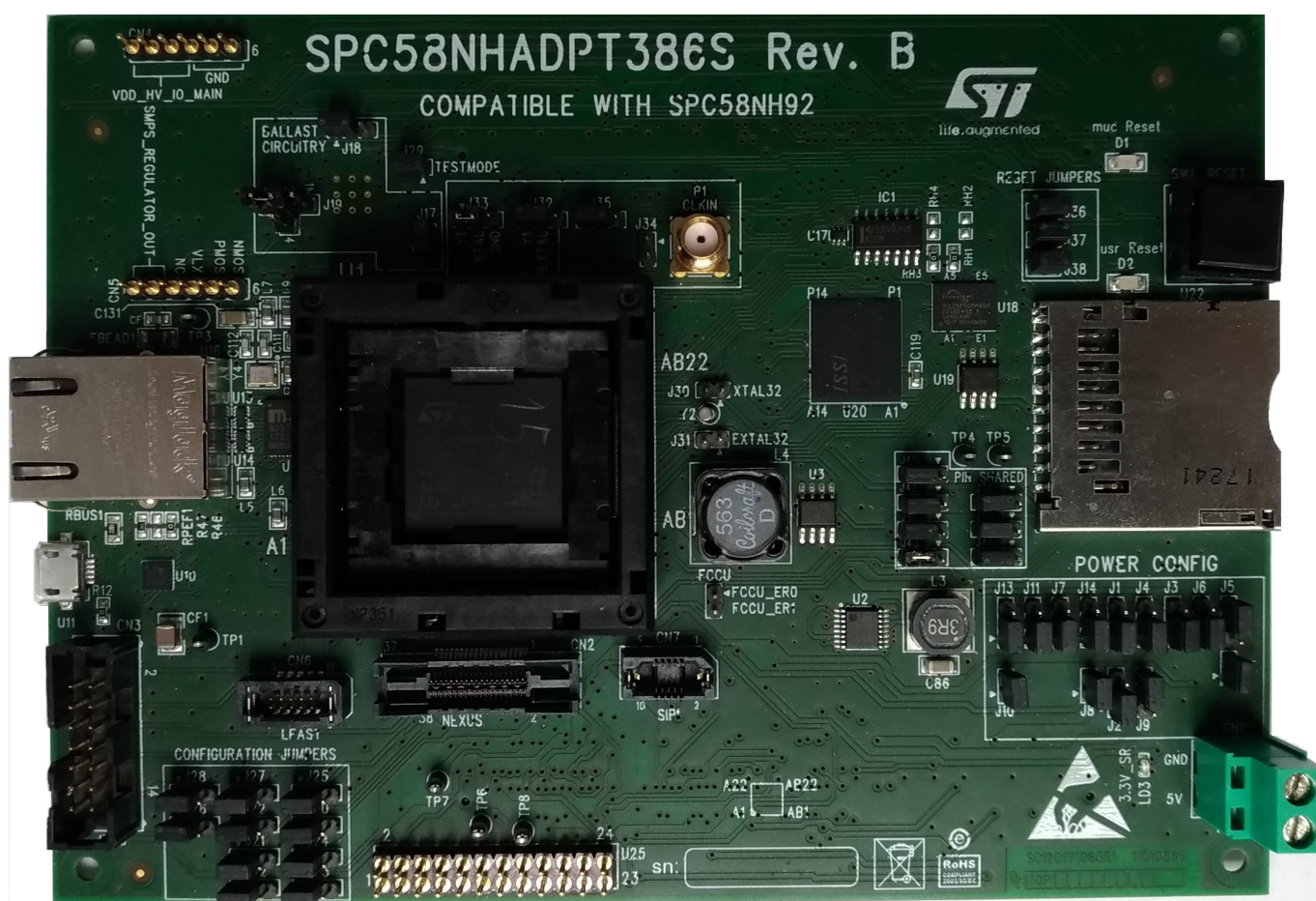


SPC58NHADPT386S Rev.B evaluation board

Introduction

The SPC58NHADPT386S Rev.B evaluation board supports STMicroelectronics SPC58NH92 microcontroller in FPBGA 19x19x1.8 386.

Figure 1. SR6-EVB000 Rev. B



Note: picture is not contractual.

1 Overview

The SPC58NHADPT386S mini module is an evaluation board supporting STMicroelectronics SPC58NH92 microcontroller in FPBGA 19x19x1.8 386 package (FPBGA 19x19x1.8 386 3R22+10+2R14+52 PITCH 0.8 BALL 0.55). This mini module is designed to be connected onto the SPC58xxMB motherboard, offering a mechanism for easy customer evaluation of the supported devices, and to facilitate hardware and software development. The mini module may be used as a stand-alone unit allowing access to the CPU, limited access to the I/O pins as well as any motherboard peripherals.

1.1 Package contents

An SPC58NHADPT386S Rev. B adapter package includes the following items:

- SPC58NHADPT386S Rev. B mini module

The MCU is not included, it must be purchased separately. Please contact your sales representative for more details.

1.2 Supported devices

The SPC58NHADPT386S Rev. B mini module supports the following STMicroelectronics family of microcontrollers in FBGA 19x19x1.8 386:

- SPC58NH92C5xx

2 License agreement

The packaging of this evaluation board was sealed with a seal stating, “by breaking this seal, you agree to the terms and conditions of the evaluation board license agreement, the terms and conditions of which are available at <http://www.st.com/eb1a>”. Upon breaking the seal, you and STMicroelectronics entered into the evaluation board license agreement, a copy of which is also enclosed with the evaluation board for convenience.

Attention: *This evaluation board only offers limited features for evaluating ST products. It has not been tested for use with other products and is not suitable for any safety or other commercial or consumer application. This evaluation board is otherwise provided “AS IS” and STMicroelectronics disclaims all warranties, express or implied, including the implied warranties of merchantability and fitness for a particular purpose.*

3 Handling precautions

Please take care to handle the package contents in a manner such as to prevent electrostatic discharge.
Before the EVB is used or power is applied, please fully read the following sections on how to correctly configure the board. Failure to correctly configure the board may cause irreparable component, MCU or EVB damage.

4 Hardware description

4.1 Hardware features

The SPC58NHADPT386S Rev. B mini module board has the following features:

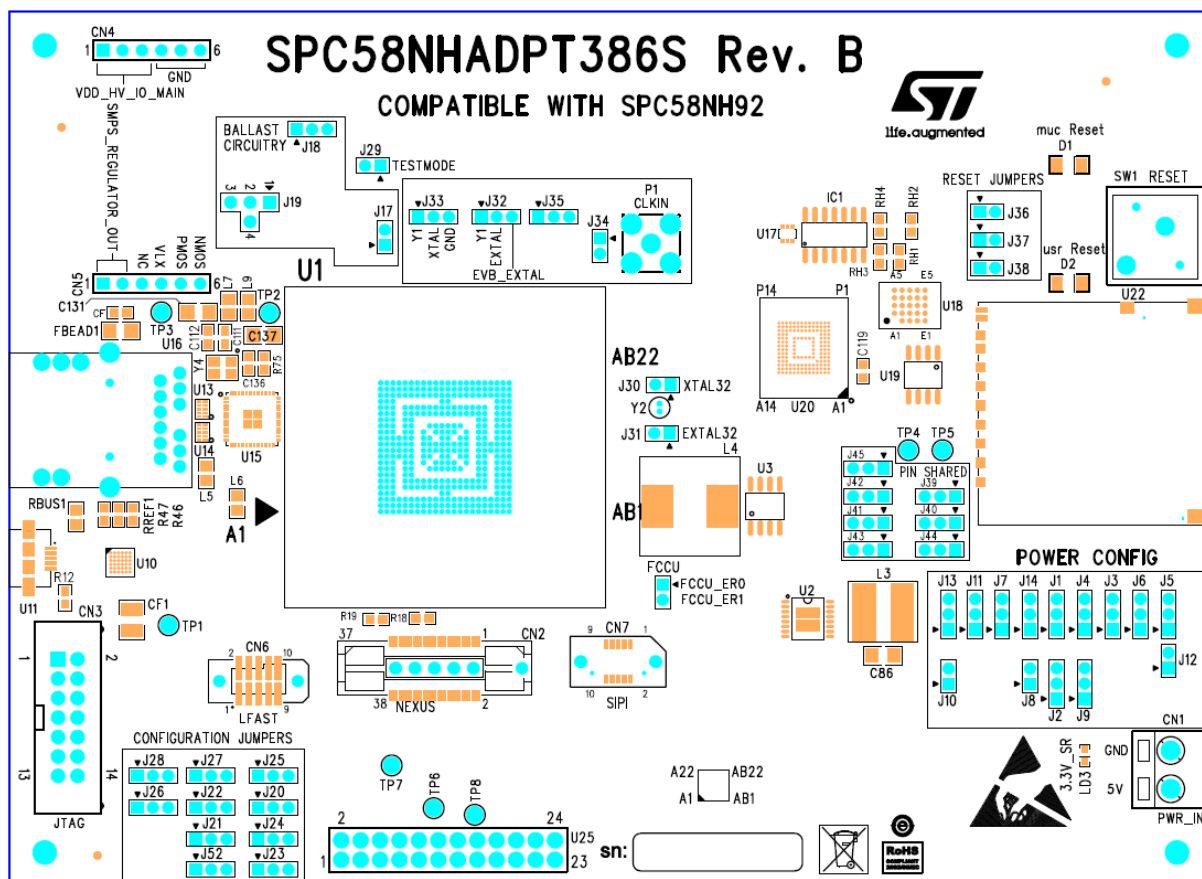
- Connector for external power supplies input (5 V) used in stand-alone mode
- Reset button with driver and led indicator
- Socket for device in FPBGA302 package
- Debug interfaces:
 - 14-pin header connector for JTAG interface
 - 10-pin header connector for JTAG/LFAST LVDS interface
 - 10-pin header connector for SIPI interface
 - 38-pin Nexus parallel debug connector
- 40 MHz crystal main oscillator with jumpers to optionally disconnect it
- 8 MHz oscillator with jumpers to optionally disconnect it
- Clock input through SMA connector with jumper to optionally disconnect it
- 2 X Samtec QSH series, 240-way connector to connect mini module to Motherboard
- 1 Gb/s Ethernet port
- HyperRAM and HyperFlash connected to HyperBUS interface
- Embedded eMMC device
- SD/MMC Card Reader
- 3 x Header connectors 5x2 with 0.1" (CIS, ISU and AI connectors)

4.2 Hardware dimension

The mini module has the following dimension:

- PCB area: 157 mm x 114.3 mm
- Top components height: 19 mm max
- Bottom components height: 3.5 mm max

Figure 2. SPC58NHADPT386S Rev. B top component view



5 Power and system configuration

5.1 Power supplies

The mini module can be powered by providing voltages or supplied externally by the 2-Way PCB Screw Connector (CN1) or supplied by the motherboard.

When the mini-module is connected to the mother board (MB), 3V3 and 5V0 are supplied by MB connector selecting the associated jumpers. In this setup, the external power supply input available on the mini module should NOT be used.

When the SPC58NHADPT386S Rev. B mini module is used as a stand-alone board, 5V0 voltages must be supplied externally, 3V3 and 1V2 voltages will be generated internally by specific circuit on the mini-module. The following jumpers are used to configure the power supply (common for all supported devices):

Table 1. Power configuration jumpers

Jumper	Description	Default	Position
J1	3.3 V source for J3 pin3 (VDD_HV_ADR_S and VDD_HV_ADV) voltage configuration: 1-2 3.3V_ADC 2-3 3.3V_SR	1-2 (3.3V_ADC)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D3
J2	3.3V_SR Switching voltage configuration: 1-2 3.3V (3V3 generated by mini-module) 2-3 MB_3.3V_SR (3V3 by Mother board)	1-2 (3.3V By mini module)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D4
J3	VDD_HV_ADR_S / VDD_HV_ADV voltage configuration: 1-2 5.0V source from J4 pin2 2-3 3.3V source from J1 pin2	1-2 (5.0V from J4 pin2)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D3
J4	5V source for J3 pin1 (VDD_HV_ADR_S and VDD_HV_ADV) voltage configuration: 1-2 5.0V_ADV 2-3 5.0V_SR	1-2 (5.0V_ADV)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D3
J5	5.0V_SR Switching voltage configuration: 1-2 5.0V_EXT (5V0 externally voltage) 2-3 MB_5.0V_SR (5V0 by Mother board)	2-3 (5.0V_SR by MB)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D3
J6	5.0V_ADV configuration: 1-2 MB_5.0V_LR (5.0V Linear from MB) 2-3 5.0V_ADC (5.0V filtered)	2-3 (5.0V_ADC)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D3
J7	VDD_HV_FL_A voltage configuration: 1-2 5.0V_SR 2-3 3.3V_SR	1-2 (5.0V_SR)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D3
J8	VDD_HV_IO_EMMC voltage enable: Closed: Connect 3.3V_SR to VDD_HV_IO_EMMC pins	Closed (Connect 3.3V_SR to VDD_HV_IO_EMMC pins)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D4
J9	1.2V_SR Switching configuration: 1-2 MB_1.25V_SR (1.25V from MB) 2-3 1.2V (1.2V from Mini module)	2-3 (1.2V from Mini module)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D4

Jumper	Description	Default	Position
J10	VDD_HV_IO_ETH1 voltage enable: Closed: connect 3.3V_SR to VDD_HV_IO_ETH1 pins	Closed (Connect 3.3V_SR to VDD_HV_IO_ETH1 pins)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D4
J11	VDD_HV_IO_ETH0 voltage configuration: 1-2 5.0V_SR 2-3 3.3V_SR	1-2 (5.0V_SR)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D3
J12	5.0V_ADC filtered voltage enable: Closed: connect the 5.0V_EXT to 5.0V_ADC trough the filter circuit.	Closed (5.0V_ADC)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D3
J13	VDD_HV_IO_MAIN voltage configuration: 1-2 5.0V_SR 2-3 3.3V_SR	1-2 (5.0V_SR)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D3
J14	VDD_HV_OSC voltage configuration: 1-2 5.0V_SR 2-3 3.3V_SR	1-2 (5.0V_SR)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D3
J17	BALLAST CIRCUIT ENABLE - Closed: enabled - Open: disable	Closed (enable)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - B1
J18	Supply for BALLAST circuit configuration 1-2 VDD_HV_IO_MAIN 2-3 5.0V_SR	1-2 (VDD_HV_IO_MAIN)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - B1
J19	VDD_LV voltage configuration: 2-1 (BALLAST circuit) 2-3 (1.2V_SR) 2-4 (SMPS regulator module)	2-3 (1.2V_SR)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - A1

5.2 JTAG/LFAST LVDS/ SIPI interface configuration

The following jumpers need to configure the JTAG/LFAST LVDS/SIPI:

Table 2. JTAG/LFAST/SIPI configuration jumpers

Jumper	Description	Default	Position
J20	JTAG/LFAST LVDS pin 7 configuration 1-2: EVTI 2-3: PK10	1-2 (EVTI)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - A4
J21	SIPI pin 3 configuration 1-2: RDY 2-3: PA14	1-2 (RDY)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - A4
J22	JTAG pin 1/ LFAST LVDS pin 6 configuration 1-2: TDI 2-3: PA8	1-2 (TDI)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - A4
J23	JTAG pin 3/ LFAST LVDS pin 4 configuration 1-2: TDO 2-3: PA9	1-2 (TDO)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - A4
J24	JTAG pin 13 configuration 1-2: EVTO 2-3: PJ3	1-2 (EVTO)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - A4
J25	PC1 / ESR0 1-2 ESR0 2-3 PC1	1-2 (ESR0)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - A4
J26	EVTO/ESR0 1-2 ESR0 2-3 EVTO	1-2 (ESR0)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - A4
J52	PE3 / CLKOUT 1-2 CLKOUT 2-3 PE3	1-2 (CLKOUT)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - A4

5.3 System clock configuration

The mini module supports the usage of crystal clock sources as well as external clock source:

Table 3. Clock configuration jumpers

Jumper	Description	Default	Position
J30	XTAL32 configuration Close: connect pin 2 of 32.768KHz crystal (Y2) to XTAL32	Open	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - C2
J31	EXTAL32 configuration Close: connect pin 1 of 32.768KHz crystal (Y2) to EXTAL32	Open	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - C2
J32	EXTAL configuration 1-2 connect pin 2 of 40MHz crystal (Y1) to EXTAL 2-3 EVB-EXTAL	1-2 (XT1 pin2)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - B1
J33	XTAL configuration 1-2 connect pin 1 of 40MHz crystal (Y1) to XTAL 2-3 GND	1-2 (XT1 pin1)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - B1
J34	Enable 8MHz oscillator power supply - Open - power off - Closed - power on	Open (Power off)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - B2
J35	External 8 MHz clock source 1-2 OSC-MOD (from oscillator) 2-3 EXTAL-SMA (from SMA connector)	1-2 (8 MHz from oscillator)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - B1

5.4 Reset circuit

The mini module supports different ways to reset the microcontroller. To use and perform the reset driving there are different jumpers and switches:

Table 4. Reset configuration jumpers

Jumper	Description	Default	Position
SW1	Reset push button	Open	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D1
J36	Connect the external reset to the reset driver for ESR0 and PORST pins	Close	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D1
J37	Connect the external reset to ESR0 pin	Close	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D2
J38	Connect the external reset to PORST pin	Close	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D2

5.5 Configuration for pin shared between eMMC & SD card reader (default configuration)

The following jumpers need to configure the pin shared between eMMC & SD-CARD READER set the jumpers described in the table below.

Table 5. Pin shared between eMMC & SD card reader Jumper

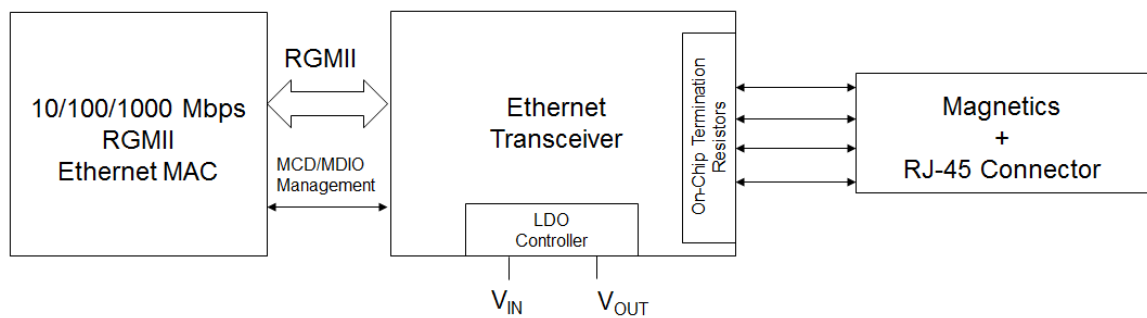
Jumper	Description	Default	Position
J39	PQ4 configuration • 1-2 PQ4_S (SD-CARD) • 2-3 PQ4_E (eMMC)	1-2 (SD-CARD)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D3
J40	PQ5 configuration • 1-2 PQ5_S (SD-CARD) • 2-3 PQ5_E (eMMC)	1-2 (SD-CARD)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D3
J41	PQ6 configuration • 1-2 PQ6_S (SD-CARD) • 2-3 PQ6_E (eMMC)	1-2 (SD-CARD)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - C3
J42	PQ7 configuration • 1-2 PQ7_S (SD-CARD) • 2-3 PQ7_E (eMMC)	1-2 (SD-CARD)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - C3
J43	PS6 configuration • 1-2 PS6_S (SD-CARD) • 2-3 PS6_E (eMMC)	1-2 (SD-CARD)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - C3
J44	PP15 configuration • 1-2 PP15_S (SD-CARD) • 2-3 PP15_E (eMMC)	1-2 (SD-CARD)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D3
J45	PQ0 configuration • 1-2 PQ0_S (SD-CARD) • 2-3 PQ0_E (eMMC)	1-2 (SD-CARD)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - C3

6 Hardware description

6.1 1 Gb/s Ethernet interface

This paragraph describes the 1Gb/s Ethernet interface present on the mini-module.
The Ethernet connector is RJ-45 with integrated magnetics.
It shows the functional diagram of the Ethernet interface.

Figure 3. 1 Gb/s Ethernet functional diagram



Here below the Ethernet ESD protection schema.

Figure 4. 1 Gb/s Ethernet ESD protection schema



The following table describes all hardware the 1Gb/s Ethernet interface of the mini module, their position on pcb.

Table 6. 1 Gb/s Ethernet interface

Symbol	Description	Position
U13	ESD Protection	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - A2
U14	ESD Protection	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - A2
U15	Ethernet 1-Port GigabitEthernet Ethernet PHY	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - A2
U16	Ethernet connector	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - A2

6.2 Hyperbus interface

This paragraph describes the Hyperbus interface present on the mini module.

The SPC58NHADPT386S contains only one CS (CNS), instead the memory device contains two CSs lines, one for RAM and one for FLASH.

The second CS is emulated using one GPIO signal (GPIO84 – PF[4]).

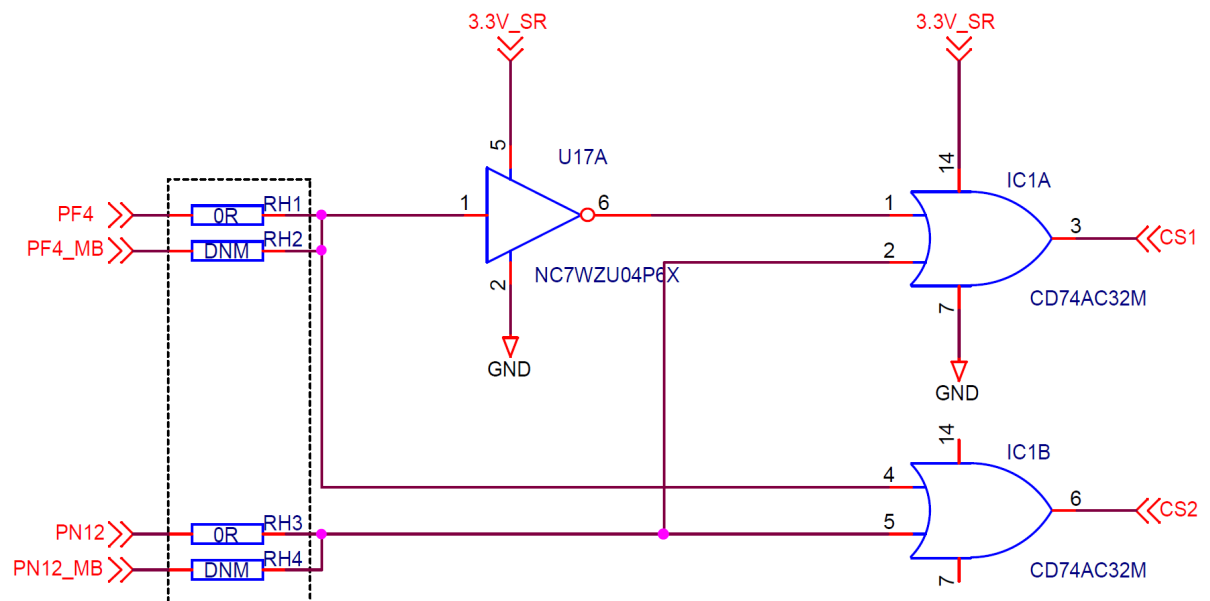
The table below shows the logic between CS/GPIO from SPC58NHADPT386S and CS0/CS1 from HyperRAM/HyperFlash device.

Table 7. Hyperbus CS Truth table

CSN	GPIO	CS0	CS1
0	0	1	0
0	1	0	1
1	0	1	1
1	1	0	1

The logic can be done using the scheme of the figure below.

Figure 5. Hyperbus CS scheme



The following table describes all hardware the 1Gb/s Ethernet interface of the mini module, their position on pcb.

Table 8. Hyperbus interface

Symbol	Description	Position
U17	CMOS Inverter	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - C1
IC1	TTL OR Gate	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - C2
U18	RAM 256Mbit	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D2

6.3 USB Port

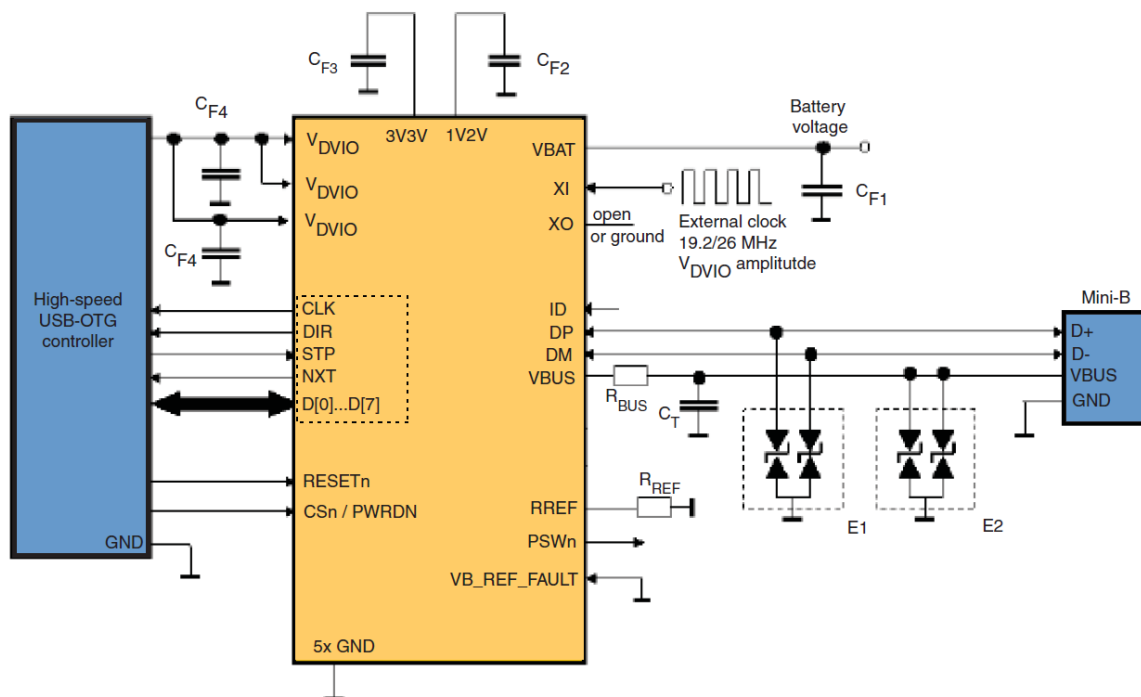
This paragraph describes the USB interface present on the mini-module.

The USB transceiver used is the STULPI01 high-speed USB 2.0 transceiver.

The USB connector is mini-USB.

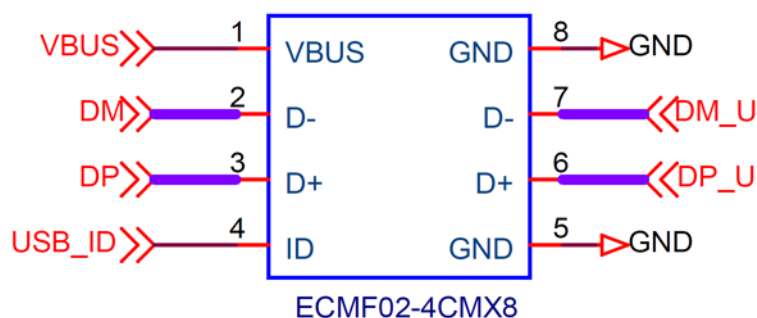
Figure 6. USB functional diagram shows the functional diagram of the USB interface.

Figure 6. USB functional diagram



The figure below shows the USB ESD protection schema.

Figure 7. USB ESD protection schema



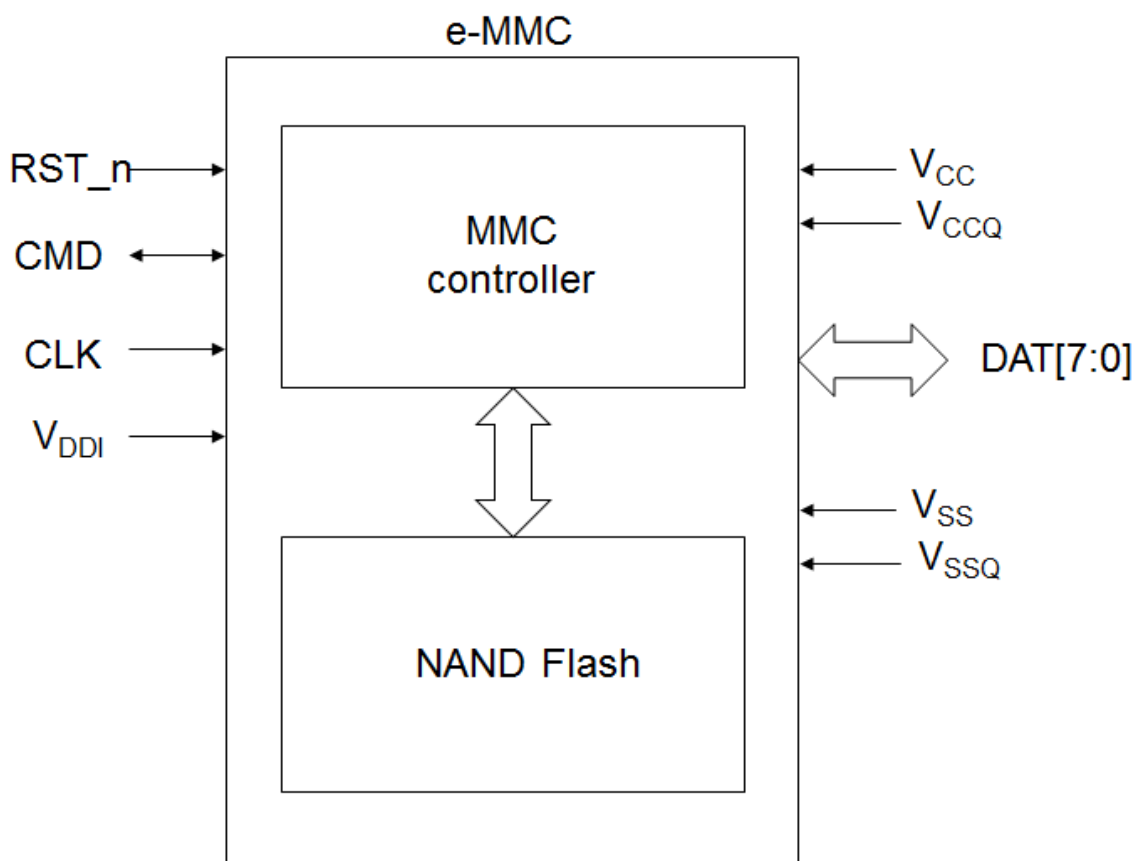
The following table describes all hardware the USB Port of the mini module, their position on pcb.

Table 9. USB Port

Symbol	Description	Position
U10	Transceiver	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - A3
U11	Connector Micro USB 5 Pin	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - A3
U23	Oscillator	Figure 11. Overview of SPC58NHADPT386S Rev. B mini module - bottom - D3
U24	ESD Protection	Figure 11. Overview of SPC58NHADPT386S Rev. B mini module - bottom - D3

6.4 eMMC interface

This paragraph describes the embedded eMMC device present on the mini module.
The figure below shows the functional diagram of the eMMC interface.

Figure 8. eMMC functional diagram


The following table describes all hardware the eMMC interface of the mini module, their position on pcb.

Table 10. eMMC interface

Symbol	Description	Position
U20	eMMC Memory 8GB	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - C2

6.5 SD/MMC interface

This paragraph describes the card reader JEDED/MMC standard version 5.0 compliant.

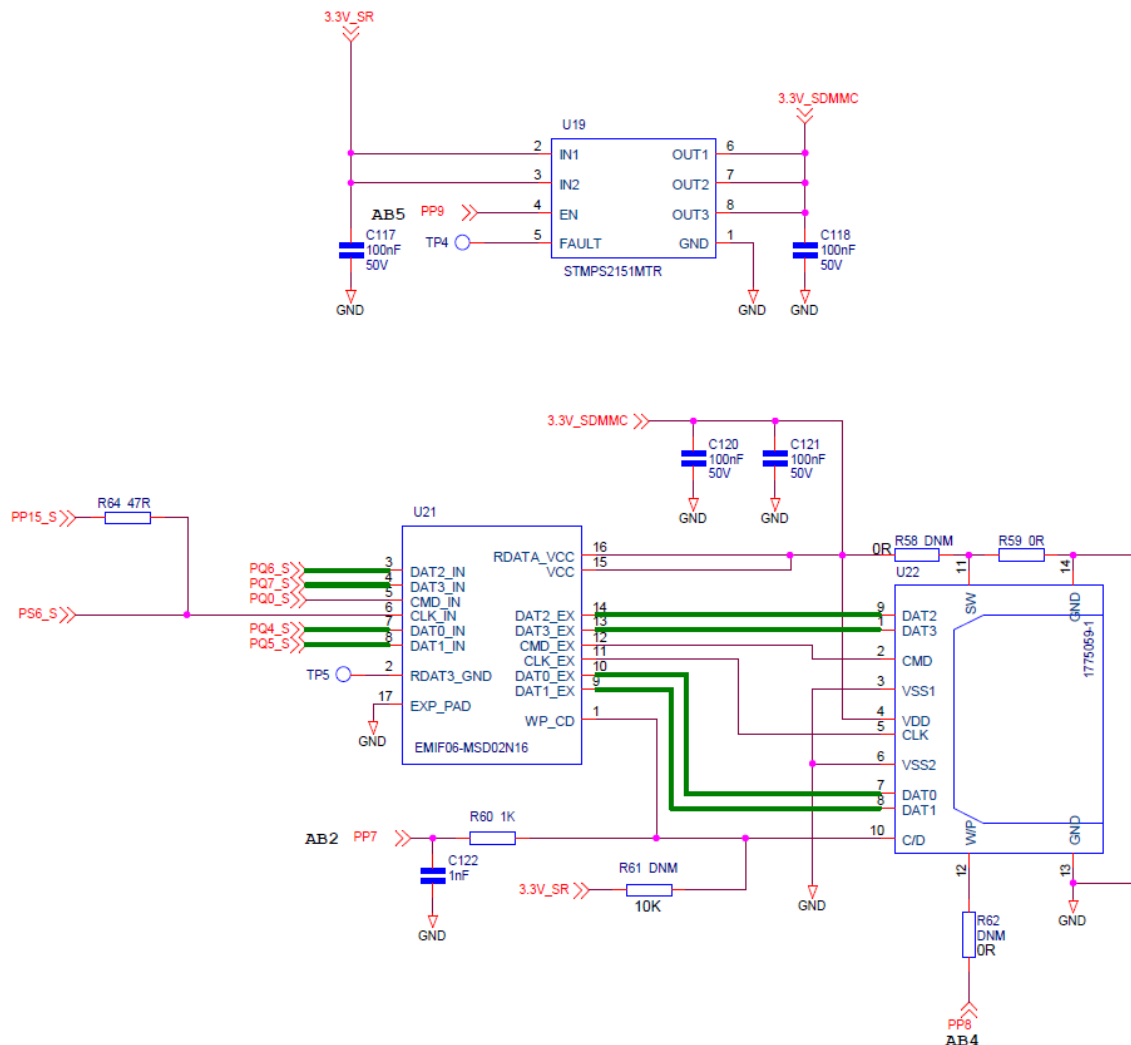
The filter used is EMIF06-MSD02N16 by ST.

The SD/MMC Card reader need to use a power switch to limits the output current to a safe level in case the output load exceeds the current limits threshold or a short is present.

Use an STMPS2151MTR by ST.

The figure below shows SD/MMC Card reader diagram.

Figure 9. SD/MMC Card reader diagram



The following table describes all hardware the SD/MMC interface of the mini module, their position on PCB.

Table 11. SD/MMC interface

Symbol	Description	Position
U19	CMOS Switch	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D2
U21	Filter EMI 6-line Micro	Figure 11. Overview of SPC58NHADPT386S Rev. B mini module - bottom - A2
U22	Connector SD reverse push-push	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D2

6.6 Test points

The mini module has several test points, described in the table below.

Table 12. Test points

Test Point	Description	Position
TP1	PSWN (on U10)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - A3
TP2	INT_N (on U15)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - A2
TP3	LDO_O (on U15)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - A2
TP4	FAULT (on U19)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - C3
TP5	RDAT3_GND (on U21)	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - D3
TP6	JCOMP_RxDATA_N/PA[5]	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - B4
TP7	TCK/PA[6]	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - B4
TP8	TMS_TxDATA_P/PA[7]	Figure 10. Overview of SPC58NHADPT386S Rev. B mini module - top - B4

6.7 Connectors

The mini module has the following connectors:

Table 13. Connectors

Connectors	Description
CN3	14-pin header connector for JTAG interface
CN6	10-pin header connector for JTAG/LFAST LVDS interface
CN7	10-pin header connector for SIPI interface
CN4, CN5	SMPS regulator module
CN8, CN9	2 X SAMTEC QSH series, 240 way connector to connect mini module to Motherboard
CN1	External power supplies input (5V)
P1	SMA Connector for External Clock Input
U11	Connector mini-USB 2.0
U22	SD Revers Connector
FCCU	FCCU TEST CONNECTOR

7 BOM

Table 14. BOM

Item	Qty	Ref. designator	Value	Description	Manufacturer	Manufcode
1	43	C1, C2, C6, C8, C18, C19, C20, C25, C28, C34, C37, C39, C42, C45, C48, C98, C99, C105, C113, C114, C115, C116, C117, C118, C119, C120, C121, C124, C118, C119, C120, C121, C124, C125, C126, C128, C129, C130, C132, C133, C135, C138, C139, C140, C141, C142, C143, CF	100 nF	Mult.cer. cap.	Murata	GCM188R71H104KA57D
2	6	CT1, CF1, C71, C72, C73, C74	4.7 uF	Mult. cer. cap.	Murata	GRM32ER71H475KA88L
3	6	CF2, CF3, CF4, CF5, C10, C12	1 uF	Mult. cer. cap.	Murata	GRM21BR71H105KA12L
4	1	CN1	2V1P	Screw terminal block, 1 row		
5	1	CN2	5767054-1	Connfemale 38 pin, 180°, MICTOR - GND	Tyco Electronics	5767054-1
6	1	CN3	N2514-6002RB	Conn flat male 14 pin, 180°	3M	N2514-6002RB
7	2	CN4, CN5	STRIP36PMD	Strip male 36 pin, 180° (N1)		
8	1	CN6	SAMTEC TFM-105-02-L-D-WT	Conn TFM 10 pin, with weld tabs	Samtec	TFM-105-02-L-D-WT
9	1	CN7	ERF8-005-05.0-L-DV-L-TR	Conn rugged female 10 pin, high speed	Samtec	ERF8-005-05.0-L-DV-L-TR
10	2	CN8, CN9	Samtec QSH-120-01-L-D-A	Conn socket, 240 pin, high speed	Samtec	QSH-120-01-L-D-A
11	27	C3, C4, C7, C9, C11, C13, C16, C21, C26, C29, C30, C32, C35, C38, C40, C43, C46, C49, C52, C55, C58, C61, C64, C67, C70, C83, C136	10 nF	Mult. cer. cap.	Murata	GCM188R71H103KA37D

Item	Qty	Ref. designator	Value	Description	Manufacturer	Manufcode
12	12	C5, C14, C50, C53, C56, C59, C62, C65, C68, C77, C78, C81	2.2 uF	Mult. cer. cap.	Murata	GCM21BR71C225KA64L
13	9	C15, C51, C54, C57, C60, C63, C66, C69, C82	47 nF	Mult. cer. cap.	Murata	GCM188R71H473KA55D
14	11	C17, C22, C23, C24, C27, C31, C33, C36, C41, C44, C47	4.7 uF	Mult. cer. cap.	Murata	GCM21BR71C475KA73
15	8	C75, C76, C79, C80, C100, C101, C102, C103	DNM	Mult. cer. cap. - not mounted		
16	2	C84, C87	470 nF	Mult. cer. cap.	Murata	GRM21BR71H474KA88L
17	1	C85	22 uF	Mult. cer. cap.	Murata	GRM32ER71E226KE15L
18	6	C86, C123, C127, C131, C134, C137	47 uF	Mult. cer. cap.	KEMET	C1206C476M8PACTU
19	1	C88	8.2 nF	Mult. cer. cap.	Phycomp	2238 586 15635
20	1	C89	68 nF	Mult. cer. cap.	Multicomp	MCCA000383
21	1	C90	390 pF	Mult. cer. cap.	Murata	GRM1885C1H391JA01
22	3	C91, C111, C112	22 pF	Mult. cer. cap.	AVX	06035A220JAT2A
23	1	C92	1.5 uF	Mult. cer. cap.	Murata	GRM21BR71E155KA88L
24	1	C93	47 uF	Mult. cer. cap.	Murata	GRM32ER61C476KE15
25	1	C94	100 pF	Mult. cer. cap.	AVX	06035A101JAT2A
26	1	C95	18 nF	Mult. cer. cap.	Murata	GRM188R71H183KA01D
27	1	C104	27 pF	Mult. cer. cap.	Murata	GCM1885C1H270JA16D
28	2	C106, C107	10 pF	Mult. cer. cap.	AVX	06035A100JAT2A
29	1	C122	1 nF	Mult. cer. cap.	Murata	GCM188R72A102KA37D
30	1	DS1	STPS2L25U	Power Schottky Rectifier	STMicroelectronics	STPS2L25U
31	1	D1	Red	Led Diode Red	Agilent	HSMS-C150
32	1	D2	Yellow	Led diode yellow	Agilent	HSMY-C150
33	1	FBEAD1	100R	Multilayer ferrite	Laird-signal integrity products	HI1206N101R-10
34	1	FB1	0R	Resistor	TTI	YAG RC0805JR-070RL
35	1	IC1	CD74AC32M	TTL OR Gate	Texas Instruments	CD74AC32M
36	7	J1, J2, J3, J4, J5, J6, J7, J8, J9, J10, J11, J12, J13, J14, J18, J20, J21, J22, J23, J24, J25, J26, J27, J28, J29, J30, J31, J32, J33, J34, J35, J36, J37, J38, J39, J40, J41, J42,	STRIP20PMD-2MM	Strip male 3 pin, 1 row, 180° - see mech part (N2)	Harwin	M22-2512005

Item	Qty	Ref. designator	Value	Description	Manufacturer	Manufcode
		J43, J44, J45, J52, FCCU				
37	1	J19	STRIP3+1PM	Strip male 3+1 pin (A1) - see mech part		
38	1	LD3	Green	Led diode green	Kingbright	
39	2	L1,L2	220R	Multilayer ferrite bead	TDK	MPZ2012S221A
40	1	L3	3.9 uH	Inductor	Würth Electronics	744787039
41	1	L4	56 uH	Inductor	Coilcraft	MSS1260-563MLD
42	5	L5, L6, L7, L8, L9	220R	Multilayer ferrite	Murata	BLM21PG221SN1D
43	1	P1	SMA-FEM-180	Coax conn female 5 pin, 180°	Samtec	SMA-J-P-H-ST-TH1
44	1	Q1	NJD2873T4G	Trans. NPN plastic power	ON Semiconductor	NJD2873T4G
45	16	RH1, R1, R2, RH3, R3, R12, R22, R23, R30, R31, R34, R46, R59, R63, R65, R75	0R	Resistor	Neohm	
46	18	RH2, RH4, R14, R16, R21, R28, R29, R33, R47, R58, R61, R62, R68, R69, R71, R72, R73, R74	DNM	Resistor - not mounted		
47	1	RREF1	12K	Resistor	Vishay	CRCW060312K0FKEA
48	1	Rbus1	2K2	Resistor	Multicomp	
49	5	R4, R17, R24, R27, R32	DNM	Resistor - not mounted		
50	1	R5	1M	Resistor	MultiComp	
51	1	R6	180K	Resistor	MultiComp	
52	1	R7	430K	Resistor	MultiComp	
53	1	R8	51K	Resistor		
54	1	R9	9K1	Resistor	MultiComp	
55	1	R10	6K2	Resistor	MultiComp	
56	1	R11	5K49	Resistor	Yageo	RC0603FR-075K49L
57	10	R15, R18, R19, R20, R38, R49, R50, R51, R52, R67	10K	Resistor	Mini-Reel	CR1J10KF-MR
58	1	R35	50R	Resistor		
59	4	R36,R40,R41,R48	4K7	Resistor	Neohm	
60	2	R37, R39	560R	Resistor	Vishay	CRCW0603560RFKEA
61	1	R54	12K1	Resistor		FCR0FT-1212
62	3	R55, R56, R66	180R	Resistor		

Item	Qty	Ref. designator	Value	Description	Manufacturer	Manufcode
63	2	R57, R64	47R	Resistor	Neohm	
64	1	R60	1K	Resistor		
65	1	SW1	Pushbutton	Pushbutton NO B6110-0 (N5)	Delta Elettronica	B6110-0
66	8	TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8	TESTPOINT	PCB test point 1 pin - Black		
67	1	U1	Socket FBGA	Socket FPBGA 386P NP351-386-761 Yamaichi	Yamaichi	NP351-386-761
68	1	U2	A6986	Volt. reg	STMicroelectronics	
69	1	U3	L5970AD	Volt. reg	STMicroelectronics	
70	1	U6	8 MHz	Clock Oscillator	ECS	ECS-3953M-080-BN-TR
71	1	U8	74V1G08STR	CMOS AND Gate	STMicroelectronics	74V1G08STR
72	1	U9	74LVC125AMTR	HCMOS Buffer	STMicroelectronics	74LVC125AMTR
73	1	U10	STULPI01BTBR	Transceiver	STMicroelectronics	STULPI01BTBR
74	1	U11	10104111	Conn FCI micro AB USB 5 pin	FCI	10104111
75	2	U13,U14	HSP061-4M10Y	ESD Protection	STMicroelectronics	HSP061-4M10Y
76	1	U15	KSZ9031RNXIA	Ethernet 1-Port GigabitEthernet PHY	STMicroelectronics	KSZ9031RNXIA
77	1	U16	L829-1J1T-43	Ethernet connector	BEL FUSE	L829-1J1T-43
78	1	U17	NC7WZU04P6X	CMOS Inverter	ON Semiconductor	NC7WZU04P6X
79	1	U18	S71KL256SC0BHB000	RAM 256Mbit	Cypress	S71KL256SC0BHB000
80	1	U19	STMP2151MTR	CMOS Switch	STMicroelectronics	STMP2151MTR
81	1	U20	IS21ES08G-JCLI	eMMC Memory 8GB 3.3V 200Mhz eMMC NAND Flash	ISSI	IS21ES08G-JCLI
82	1	U21	EMIF06-MSD02N16	Filter EMI 6-line Micro	STMicroelectronics	EMIF06-MSD02N16
83	1	U22	1775059-1	Connector SD reverse push-push	TE Connectivity	1775059-1
84	1	U23	26MHZ	Oscillator	Epson	X1G004171003412
85	1	U24	ECMF02-4CMX8	ESD Protection	STMicroelectronics	ECMF02-4CMX8
86	1	U25	STRIP2x36PMD	Strip male 72 pin, 2 row, 180° (N4)		
87	1	Y1	40MHz	Quartz	NDK	NX5032GA
88	1	Y2	32.768 KHz	Quartz	Citizen Finitech Miyota	CFS206-32.768-KDZF-UB
89	1	Y4	25 MHZ	Quartz	Epson	X1E0000210132
						TSX-3225 25 MHZ 9.0PF

Figure 12. uC supply

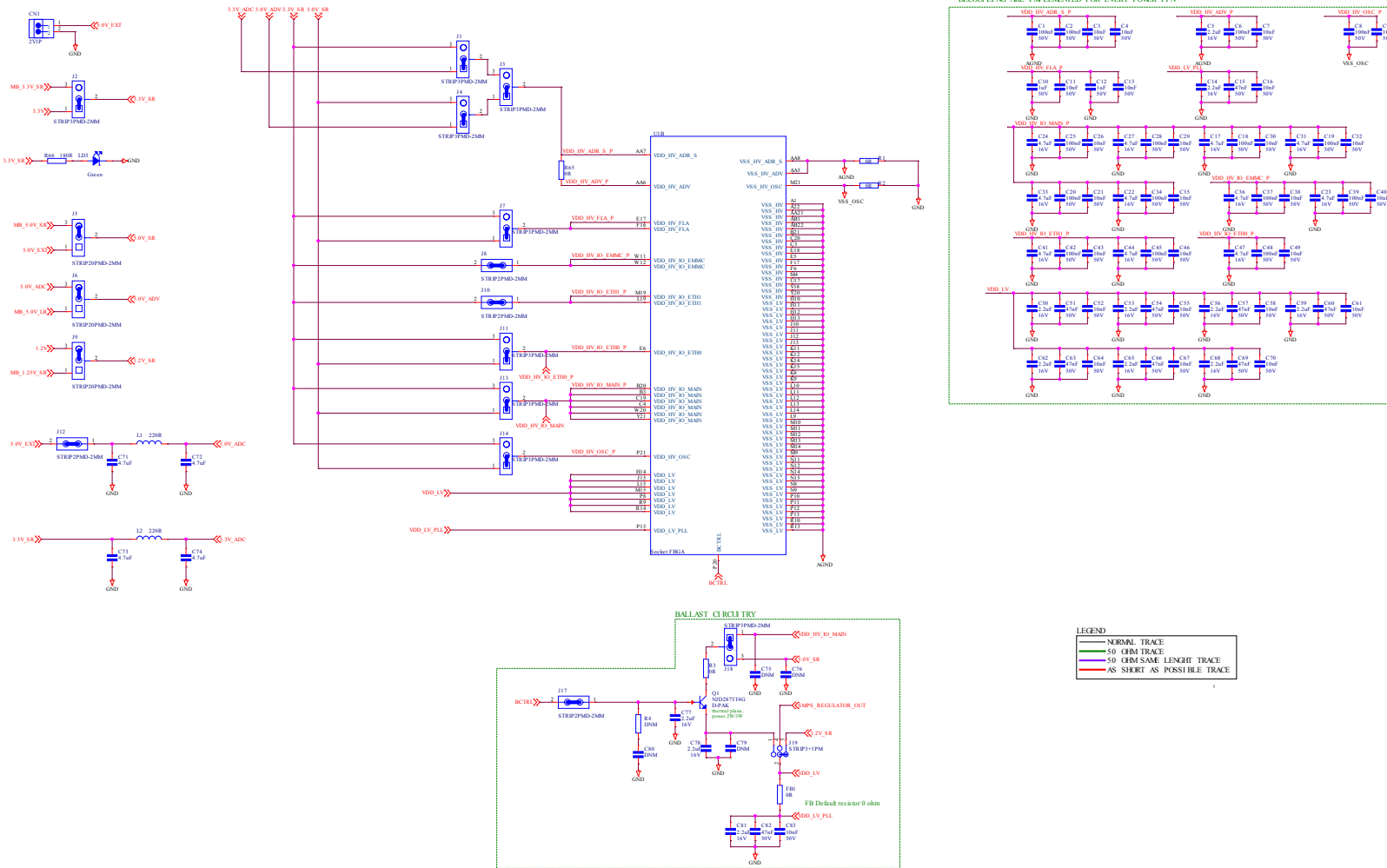


Figure 13. Voltage regulators

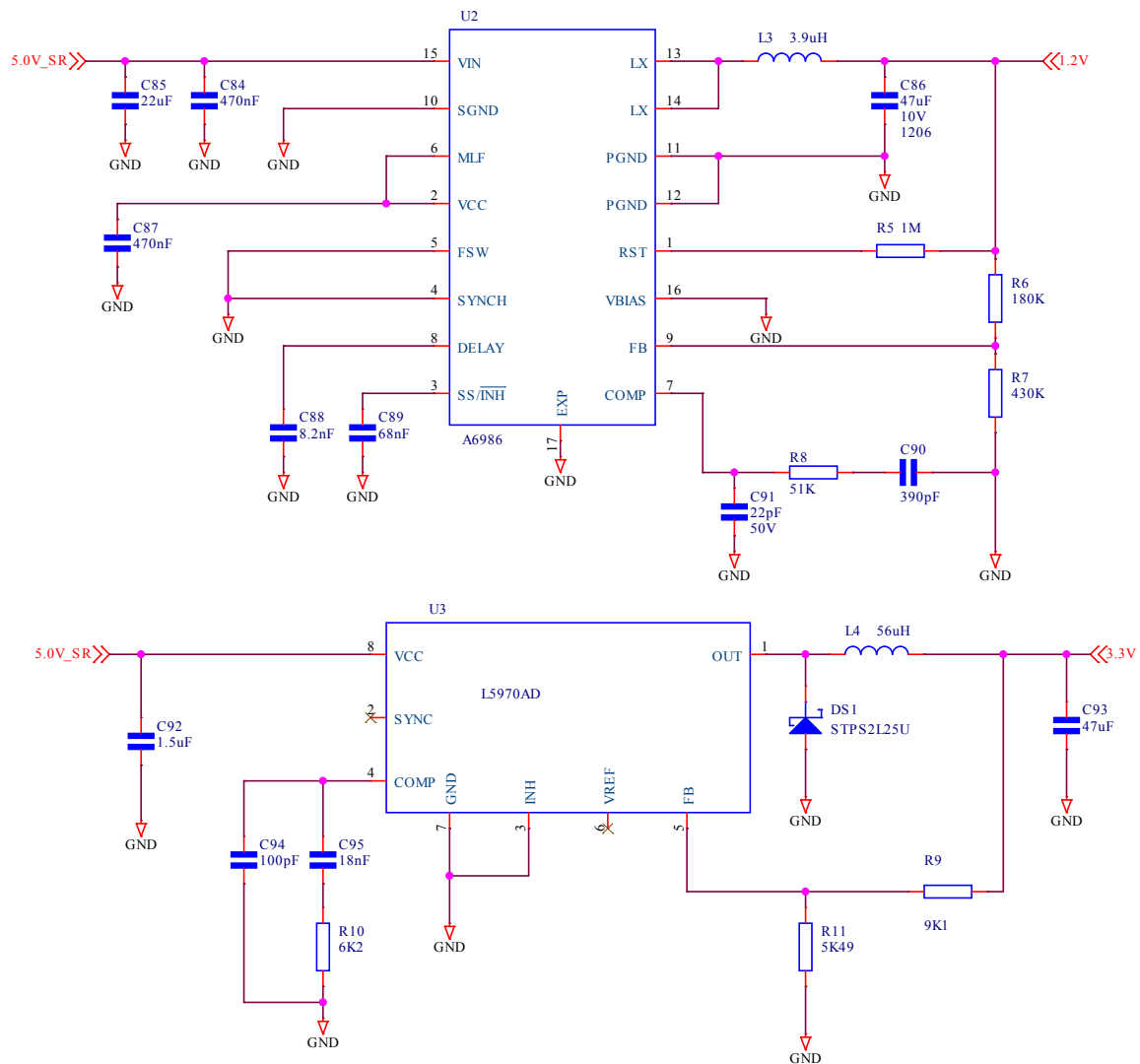


Figure 14. uC - GPIO

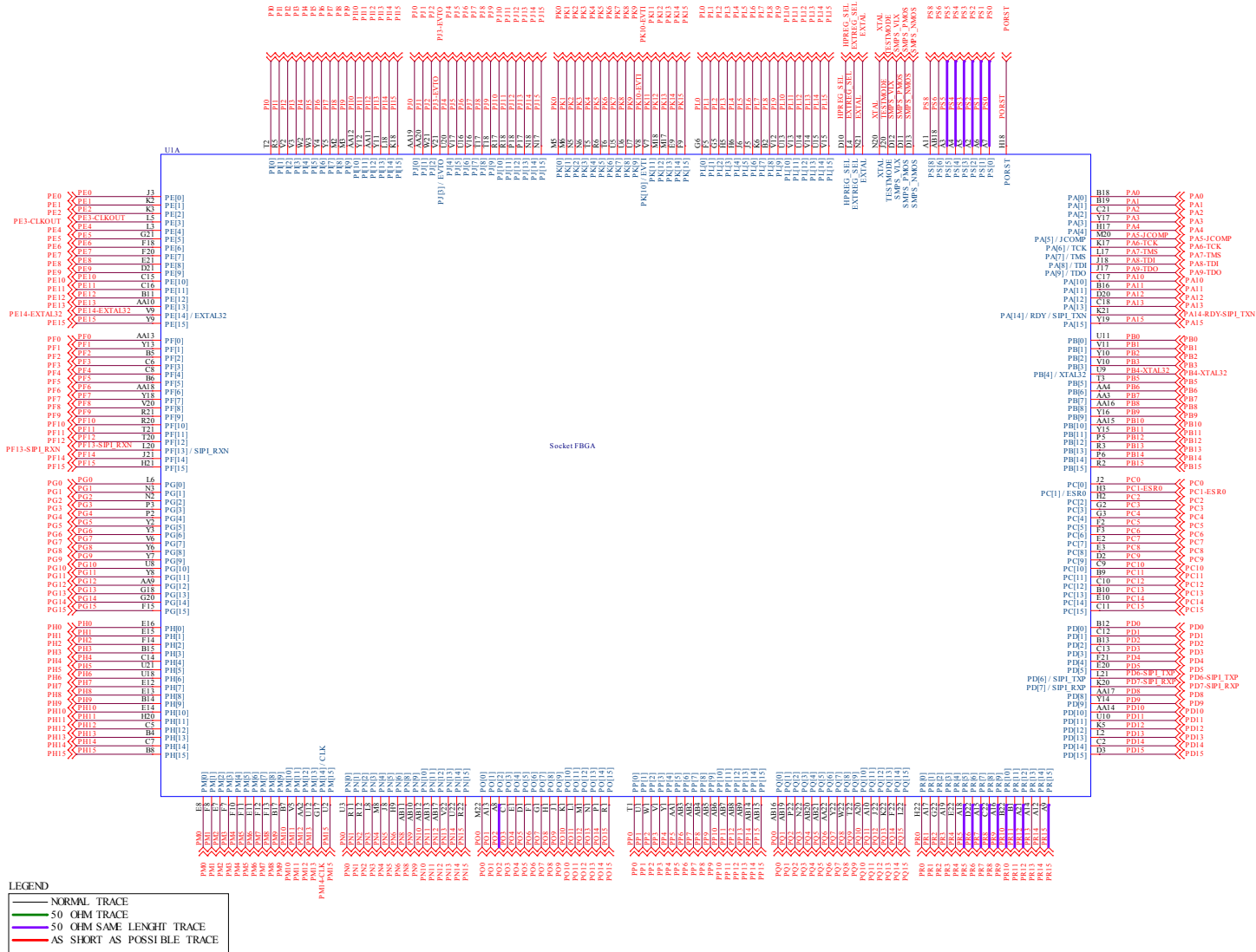


Figure 15. Debug connectors

JTAG, NEXUS & LFAST

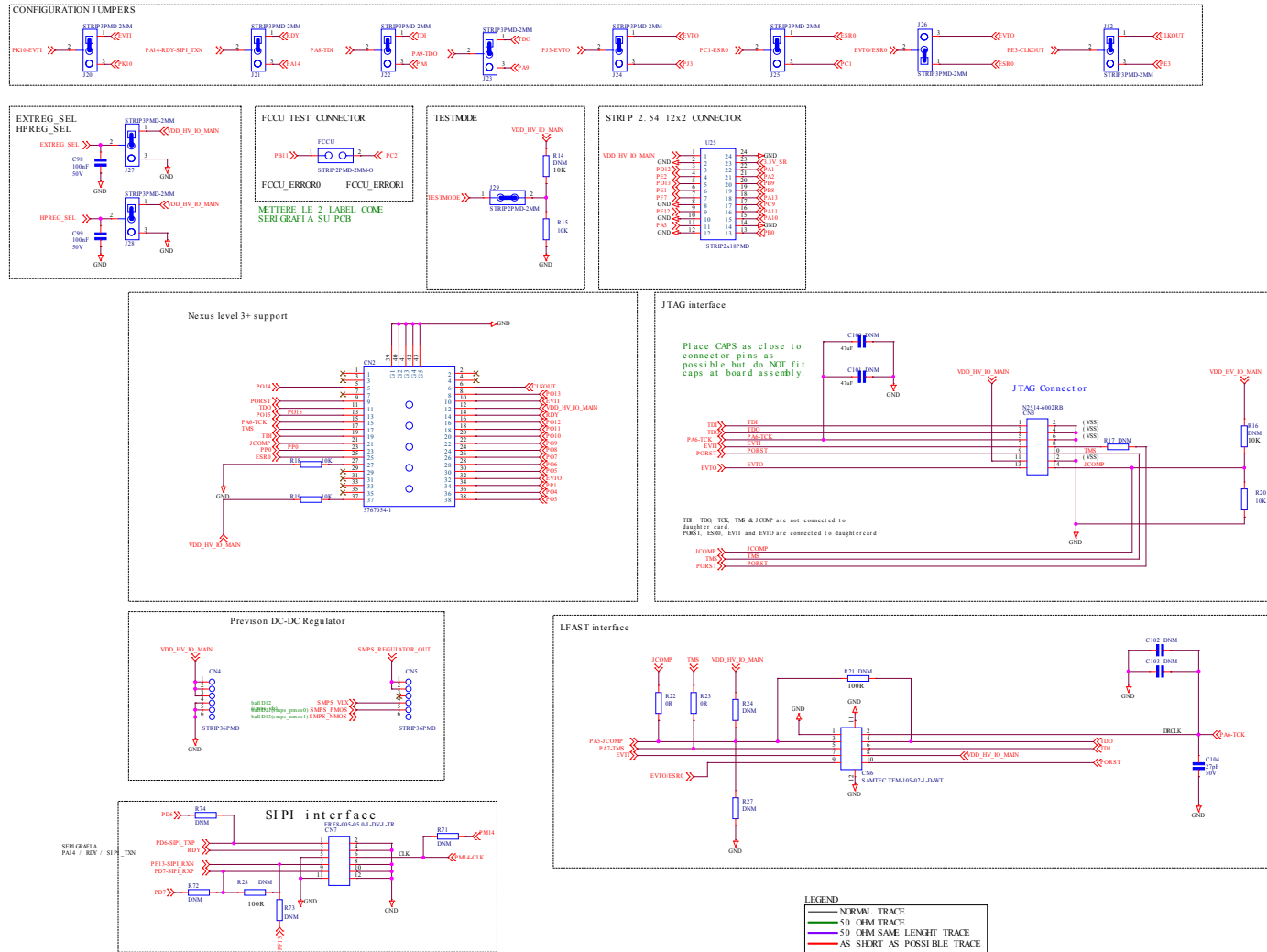


Figure 16. Oscillators and reset

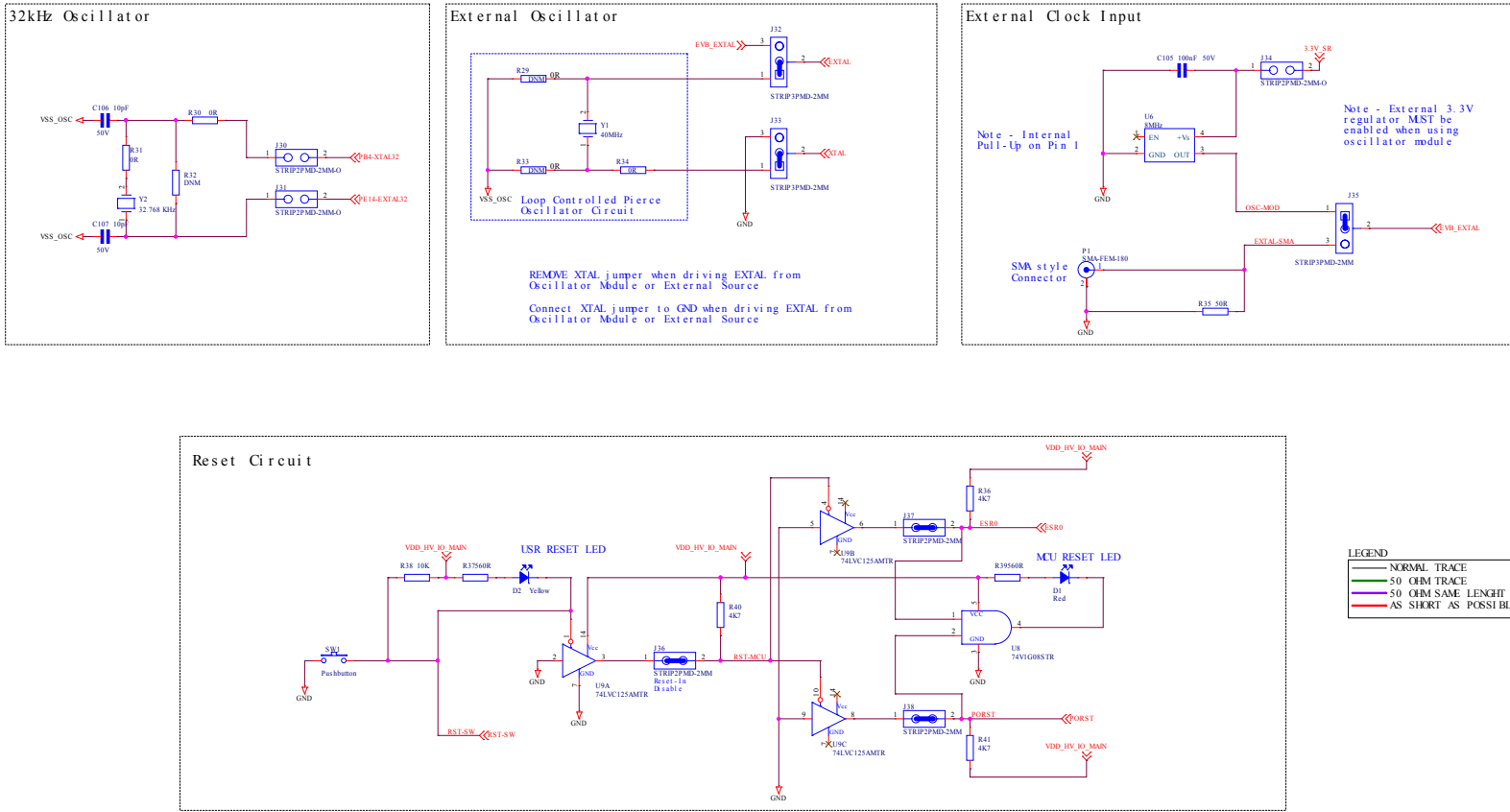


Figure 17. USB interface

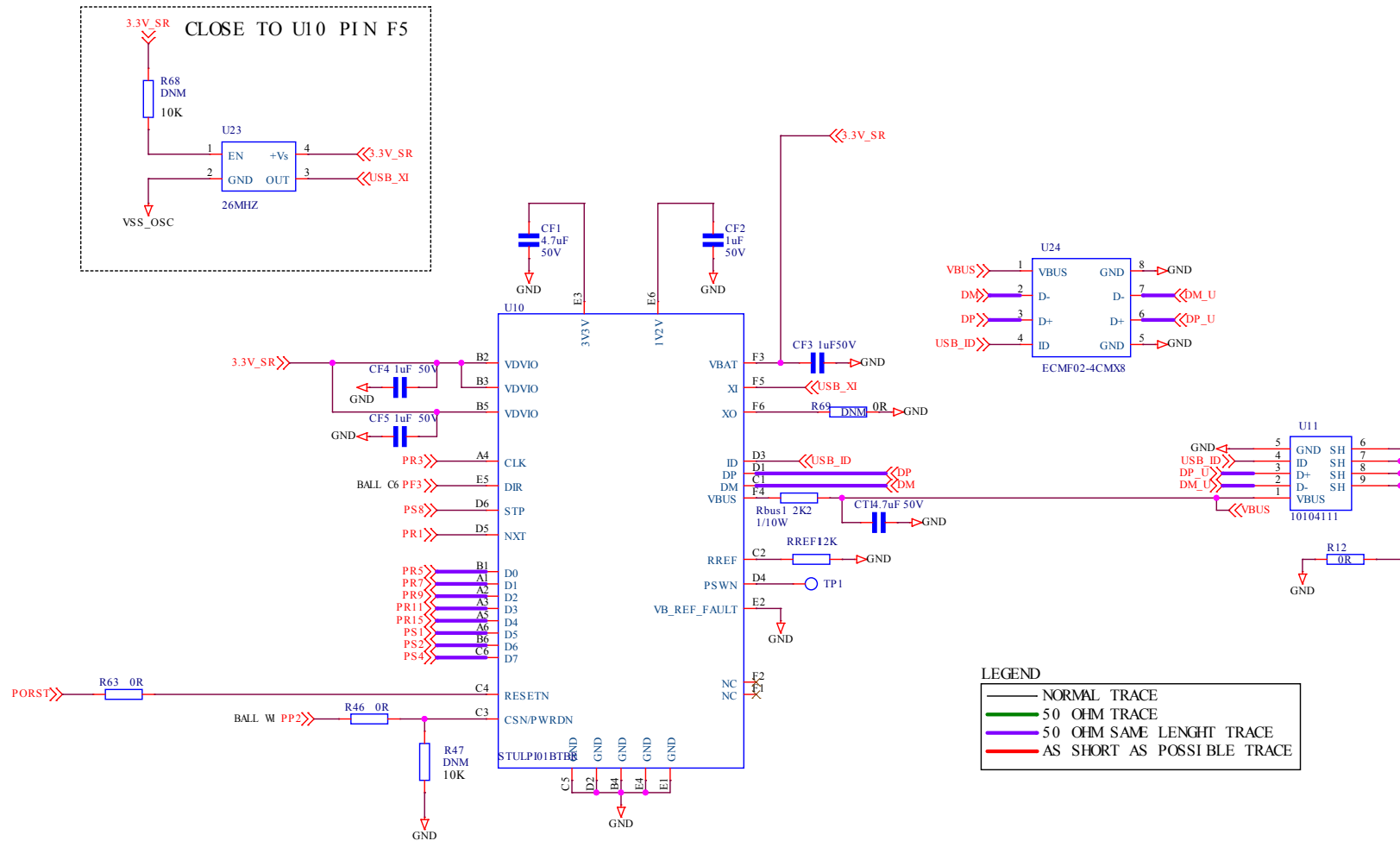


Figure 18. Ethernet interface

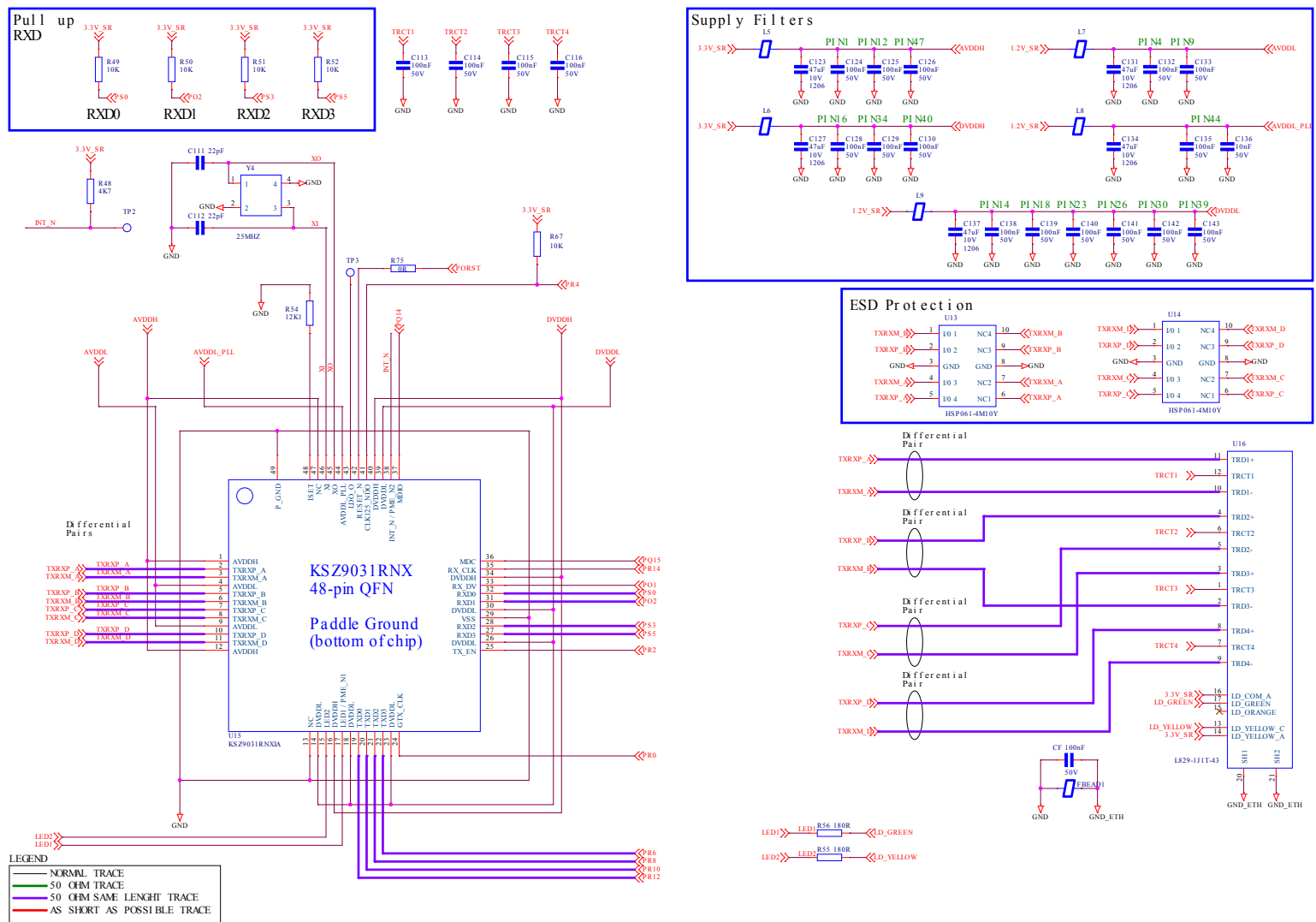


Figure 19. Hyperbus, eMMC and SD card reader

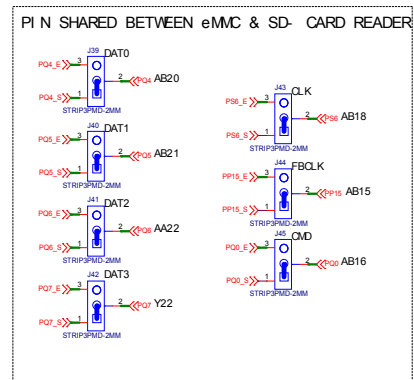
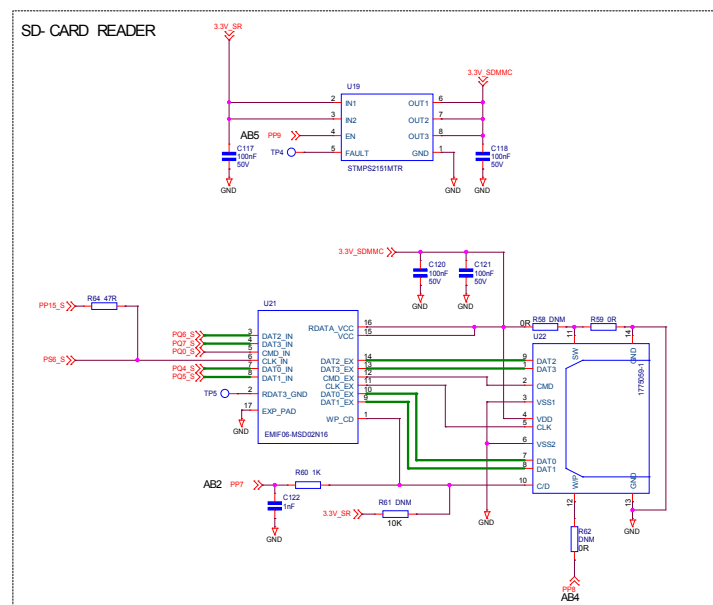
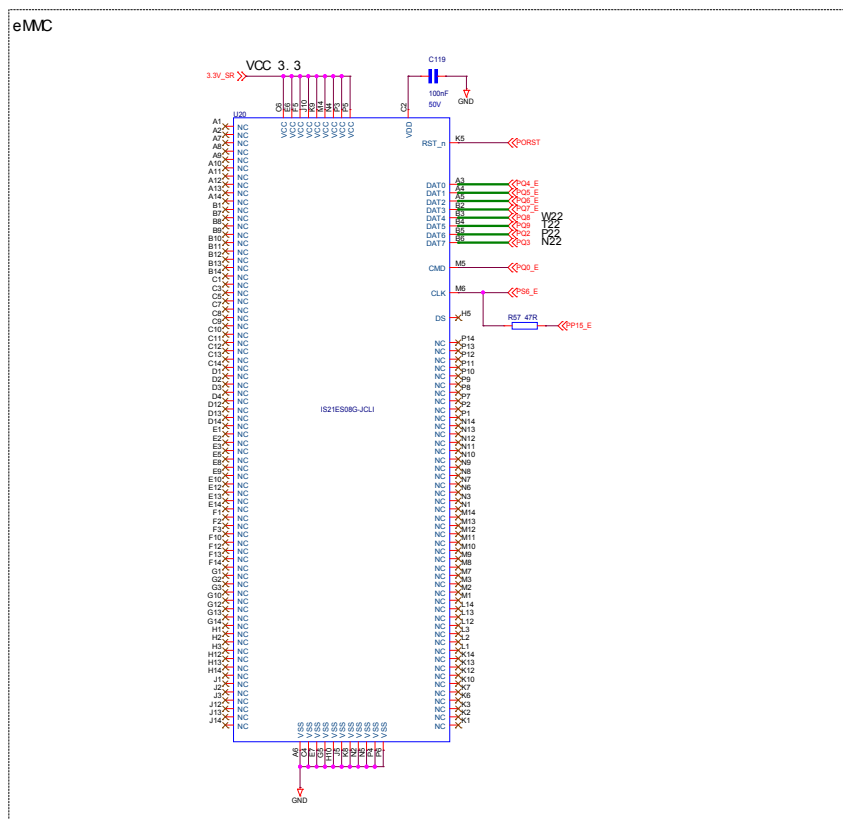
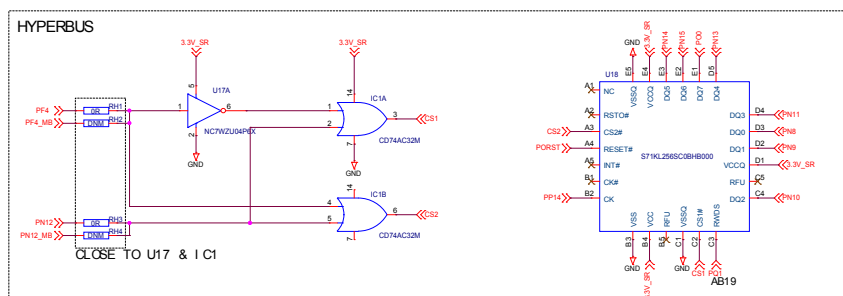
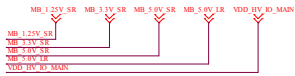
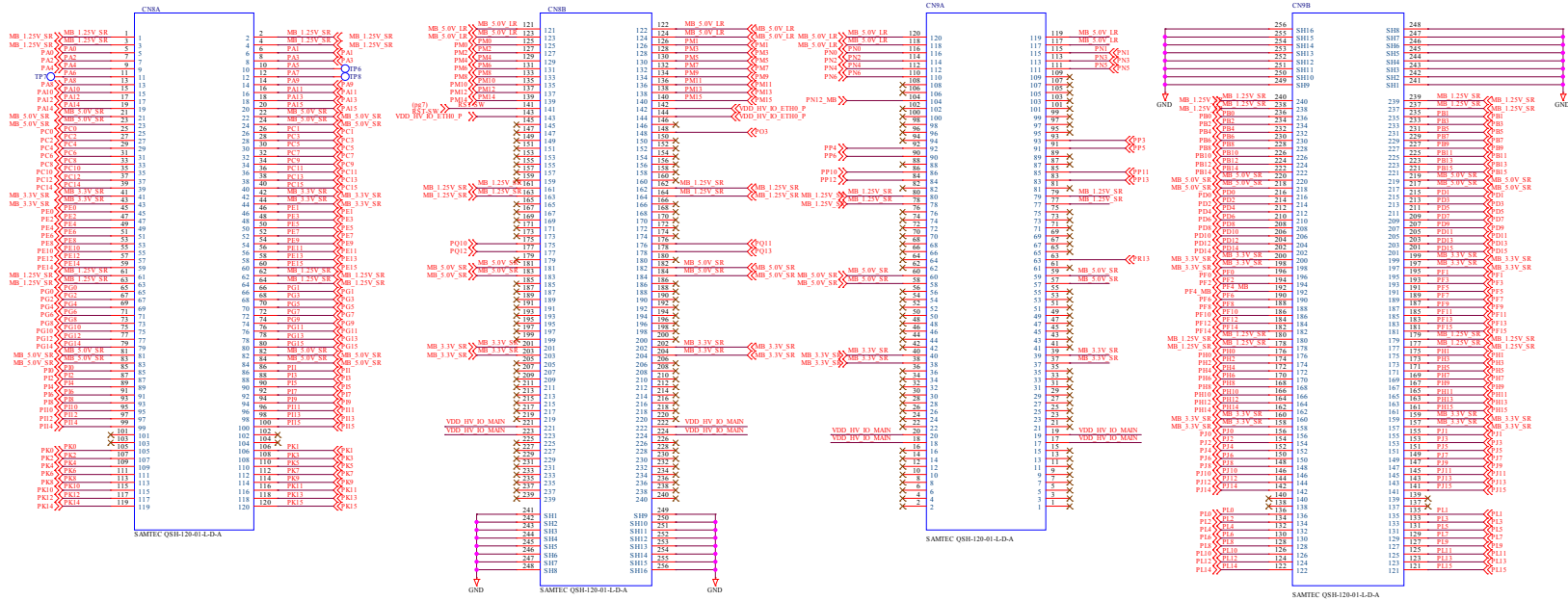


Figure 20. Motherboard connectors



Revision history

Table 15. Document revision history

Date	Version	Changes
21-Jul-2020	1	Initial release.

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