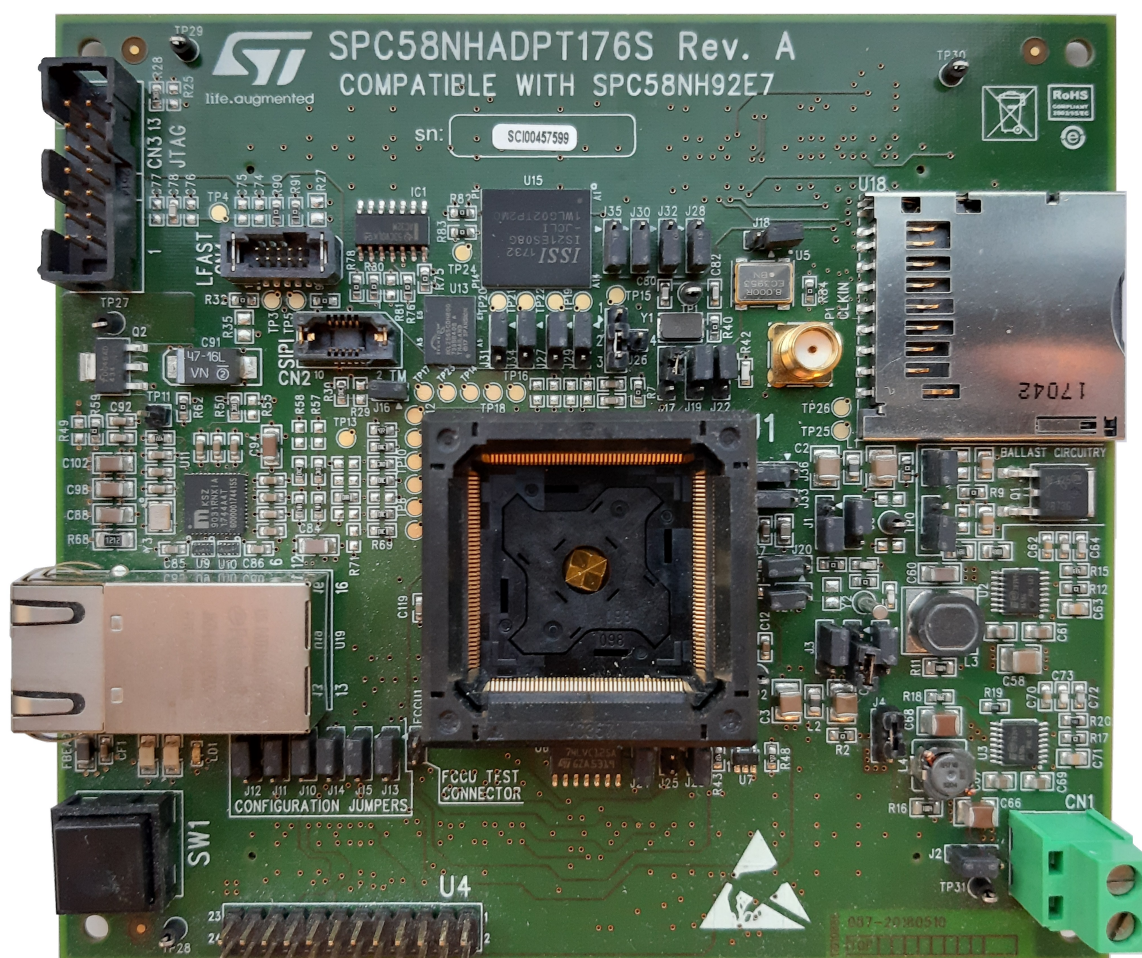


SPC58NHADPT176S Rev.A evaluation board

Introduction

The SPC58NHADPT176S Rev.A evaluation board supports STMicroelectronics SPC58NH92 microcontroller in LQFP 24X24X1.4 176L.

Figure 1. SPC58NHADPT176S Rev.A



Note: picture not contractual

1 Overview

The SPC58NHADPT176S Rev. A mini module is an evaluation board supporting STMicroelectronics SPC58NH92 microcontroller in LQFP 24X24X1.4 176L package (LQFP 24X24X1.4 176L P0.5 EXPOSED PAD).

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, but not access to the I/O pins nor any motherboard peripherals.

1.1 Package contents

A SPC58NHADPT176S Rev. A adapter package includes the following items:

- SPC58NHADPT176S Rev. A mini module

1.2 Supported devices

The SPC58NHADPT176S Rev. A mini module supports the SPC58NH family in LQFP 24X24X1.4 176L package.

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:

https://www.st.com/resource/en/evaluation_board_terms_of_use/evaluationproductlicenseagreement.pdf

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 content in order 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

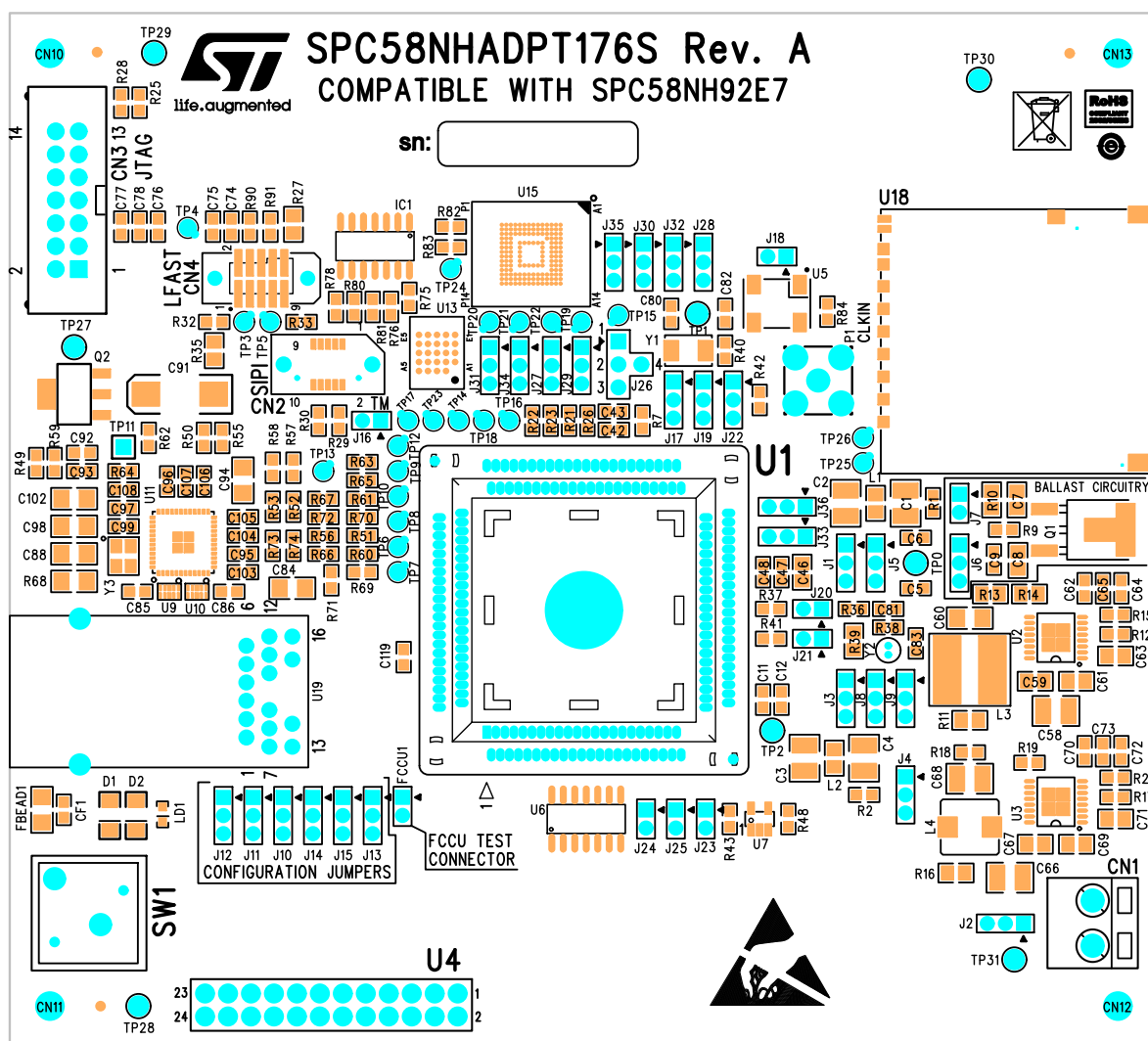
The SPC58NHADPT176S Rev. A mini module board has the following features:

- Connector for external power supplies input (5V) used in stand-alone mode
- Reset button with driver and led indicator
- Socket for device in LQFP 24X24X1.4 176L 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
- 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
- 12x2 I/O connector

The mini module has the following dimensions:

- PCB area: 127 mm x 114.3 mm
- Top components height: 19 mm max
- Bottom components height: 3.5 mm max
- PCB thickness: 1.6 mm

Figure 2. SPC58NHADPT176S Rev. A top component view



5 Power and system configuration

5.1 Power supplies

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

When the mini module is connected to the motherboard (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 **MUST NOT BE USED**.

When the SPC58NHADPT176S Rev. A 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	5.0V source for J3 pin1 (MB_5.0V_LR or 5.0 V_ADC) voltage configuration: 1-2 MB_5.0V_LR 2-3 5.0 V_ADC	2-3 (5.0V_ADC)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C3
J2	5.0V switching voltage configuration: 1-2 5 V EXT (external 5.0V supply) 2-3 MB_5.0V_SR (5.0V from Motherboard)	2-3 (MB_5.0V_SR)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - D4
J3	VDD_HV_ADR_S / VDD_HV_ADV voltage configuration: 1-2 5.0V source from J1 pin2 2-3 3.3 V_ADC source from J4 pin2	1-2 (5.0V_ADV)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C3
J4	3V3 source (3.3V or MB_3.3V_SR) voltage configuration: 1-2 3.3V (3.3V from mini module) 2-3 MB_3.3V_SR	1-2 (3.3V)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - D3
J5	Main MCU supply (VDD_HV_IO_MAIN) voltage configuration: 1-2 5.0V_SR 2-3 3.3 V_SR from J4 pin2	1-2 (5.0V_SR)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - D3
J6	Supply for BALLAST circuit configuration 1-2 VDD_HV_IO_MAIN 2-3 5.0V_SR	1-2 (VDD_HV_IO_MAIN)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - D3
J7	BALLAST CIRCUIT ENABLE - Closed: enable - Open: disable	Closed (enable)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - D2
J8	VDD_LV voltage configuration: 1-2 (1.2V_SR from J9 pin2) 2-3 (BALLAST circuit)	1-2 (1.2V_SR)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C3
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 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - D3

5.2 JTAG/LFAST LVDS interface configuration

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

Table 2. JTAG/LFAST/SIPI Configuration jumpers

Jumper	Description	Default	Position
J10	SIPI pin 3 configuration 1-2: RDY 2-3: PA14	1-2 (RDY)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - A4
J11	TDI_LF configuration 1-2: TDI_LF 2-3: PA8	1-2 (TDI_LF)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - A4
J12	TDO_LF configuration 1-2: TDO_LF 2-3: PA9	1-2 (TDO_LF)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - A4
J13	JTAG pin 13 configuration 1-2: EVTO 2-3: PJ3/PQ4	1-2 (EVTO)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B4
J14	PC1 / ESR0 1-2 ESR0 2-3 PC1	1-2 (ESR0)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B4
J15	EVTO/ESR0 1-2 ESR0 2-3 EVTO	1-2 (ESR0)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B4

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
J20	XTAL32 configuration Close: connect pin 2 of 32.768 KHz crystal (Y2) to XTAL32	Open	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C3
J21	EXTAL32 configuration Close: connect pin 1 of 32.768 KHz crystal (Y2) to EXTAL32	Open	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C3
J17	EXTAL configuration 1-2 connect pin 2 of 40 MHz crystal (Y1) to EXTAL 2-3 connect EVB-EXTAL to EXTAL	1-2 (Y1 pin2 to EXTAL)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C2
J19	XTAL configuration 1-2 connect pin 1 of 40 MHz crystal (Y1) to XTAL 2-3 connect XTAL to GND	1-2 (Y1 pin1 to XTAL)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C2
J18	Enable 8 MHz oscillator power supply - open - power off - closed - power on	Open (power off)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C1
J22	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 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C2

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 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - A4
J24	Connect the external reset to the reset driver for ESR0 and PORST pins	Close	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C4
J23	Connect the external reset to ESR0 pin	Close	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C4
J25	Connect the external reset to PORST pin	Close	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C4

5.5 Other Jumpers

Table 5. Other jumpers

Jumper	Description	Default	Position
J16	TESTMODE settings	Close (10 K Ω down)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B2

5.6 Configuration for pin shared between HyperBus & eMMC

The jumpers described into the following table allow you to configure the pins shared between HyperBus and eMMC.

Table 6. Pin shared between HyperBus & eMMC jumper

Jumper	Description	Default configuration	Position
J27	Data4 - PF9 configuration 1-2 DQ4_HB (HyperBus) 2-3 D4_eMMC (eMMC)	1-2 (HyperBus)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B2
J29	Data5 – PF10 configuration 1-2 DQ5_HB (HyperBus) 2-3 D5_eMMC (eMMC)	1-2 (HyperBus)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B2
J31	Data6 - PF11 configuration 1-2 DQ6_HB (HyperBus) 2-3 D6_eMMC (eMMC)	1-2 (HyperBus)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B2
J34	Data7 - PF12 configuration 1-2 DQ7_HB (HyperBus) 2-3 D7_eMMC (eMMC)	1-2 (HyperBus)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B2

5.7 Configuration for pin shared between eMMC & SD-card reader

The jumpers described into the following table allow you to configure the pins shared between SD-CARD READER and eMMC.

Table 7. Pin shared between eMMC & SD-card reader jumper

Jumper	Description	Default configuration	Position
J30	Data1 - PJ4 configuration 1-2 D1_SD (SD-CARD) 2-3 D1_eMM (eMMC)	1-2 (SD-CARD)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C1/C2
J32	Data2 - PH5 configuration 1-2 D2_SD (SD-CARD) 2-3 D2_eMM (eMMC)	1-2 (SD-CARD)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C1/C2
J35	Data3 - PH6 configuration 1-2 D3_SD (SD-CARD) 2-3 D3_eMM (eMMC)	1-2 (SD-CARD)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C1/C2
J28	CLK - PJ2 configuration 1-2 CLK_SD (SD-CARD) 2-3 CLK_eMM (eMMC)	1-2 (SD-CARD)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C1/C2
J33	FBCLK - PJ0 configuration 1-2 FBCLK_SD (SD-CARD) 2-3 FBCLK_eMM (eMMC)	1-2 (SD-CARD)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C2/C3
J36	CMD - PJ1 configuration 1-2 CMD_SD (SD-CARD) 2-3 CMD_eMM (eMMC)	1-2 (SD-CARD)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C2

6 Hardware description

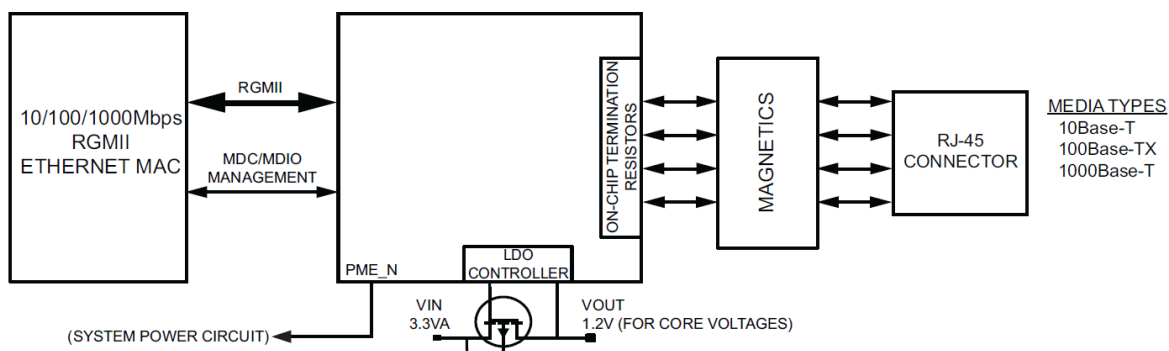
6.1 1 Gb/s ethernet interface

This paragraph describes the 1 Gb/s Ethernet interface present on the mini module.

The Ethernet connector is RJ-45 with integrated magnetics.

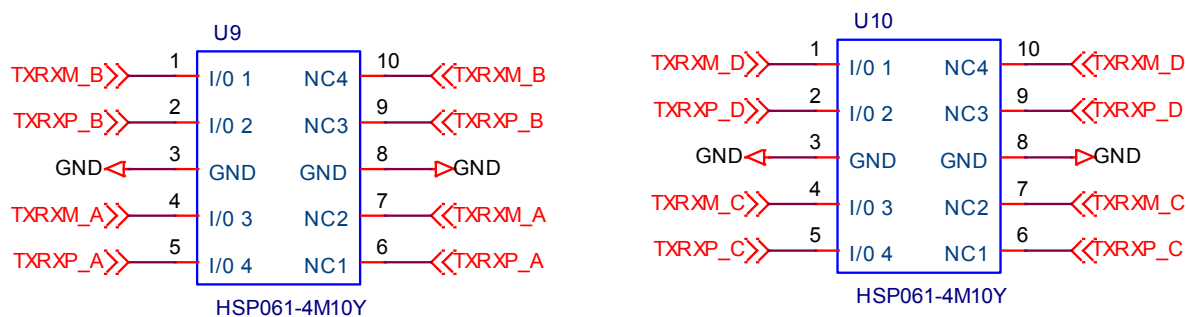
The following figure shows the functional diagram of the Ethernet interface.

Figure 3. 1 Gb/s Ethernet functional diagram



The figure below shows the Ethernet ESD protection schema.

Figure 4. 1 Gb/s Ethernet ESD protection schema



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

Table 8. 1 Gb/s Ethernet interface

Jumper	Description	Position
U9	ESD Protection	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - A3
U10	ESD Protection	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - A3
U11	Ethernet 1-Port GigabitEthernet PHY	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - A2/A3
U19	Ethernet connector	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - A3/B3

6.2 Hyperbus interface

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

The SPC58NHADPT176S contains only one CS (CNS), whereas the memory device contains two CSs lines, one for RAM and one for FLASH.

The second CS is emulated using one GPIO signal (PA[15]).

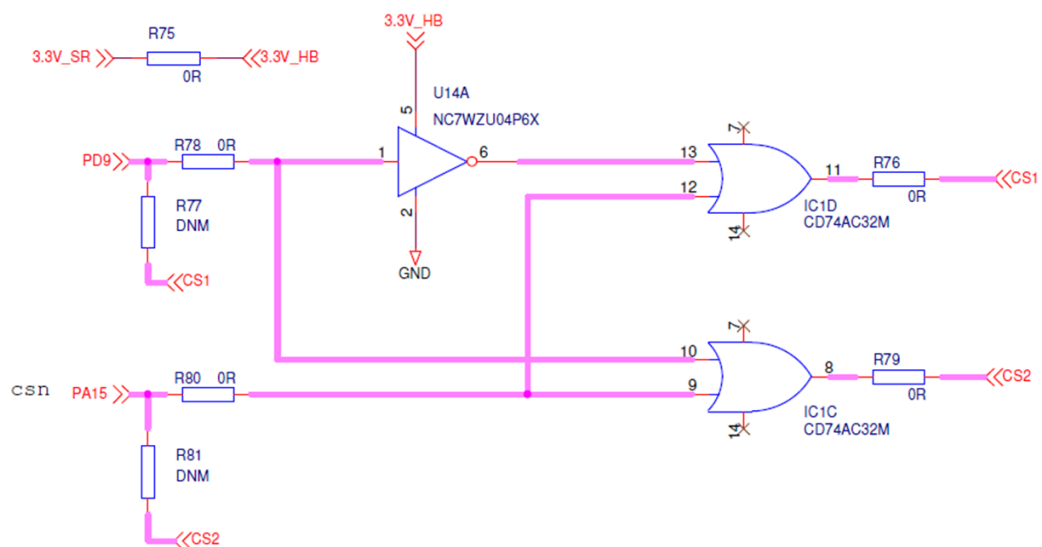
The following table shows the logic between CS/GPIO from SPC58NHADPT176S and CS0/CS1 from HyperRAM/HyperFlash device.

Table 9. 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 realized using the scheme of the figure below.

Figure 5. Hyperbus CS scheme



The following table describes all hardware HyperBus of the mini module, their position on PCB.

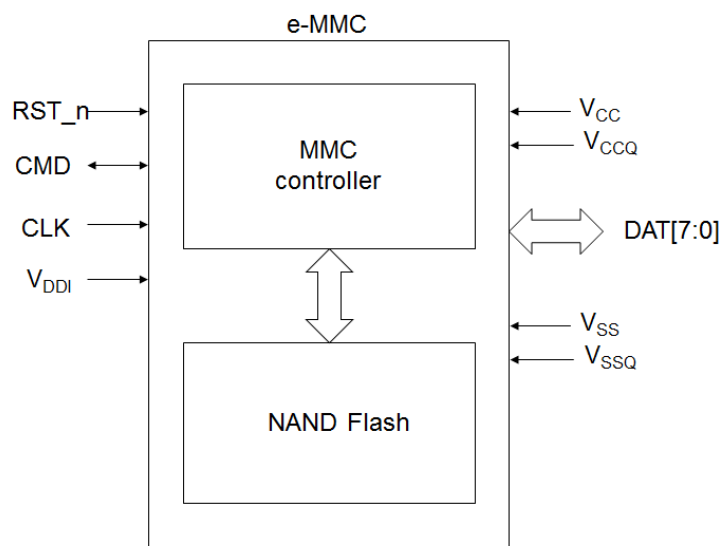
Table 10. Hyperbus interface

Symbol	Description	Position
U14	CMOS inverter	Figure 9. Overview of SPC58NHADPT176S Rev. A mini module - Bottom - C1
IC1	TTL OR gate	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B1
U13	RAM 256 Mbit	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B2

6.3 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 6. eMMC functional diagram



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

Table 11. eMMC interface

Symbol	Description	Position
U15	eMMC Memory 8 GB	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B1

6.4 SD/MMC interface

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

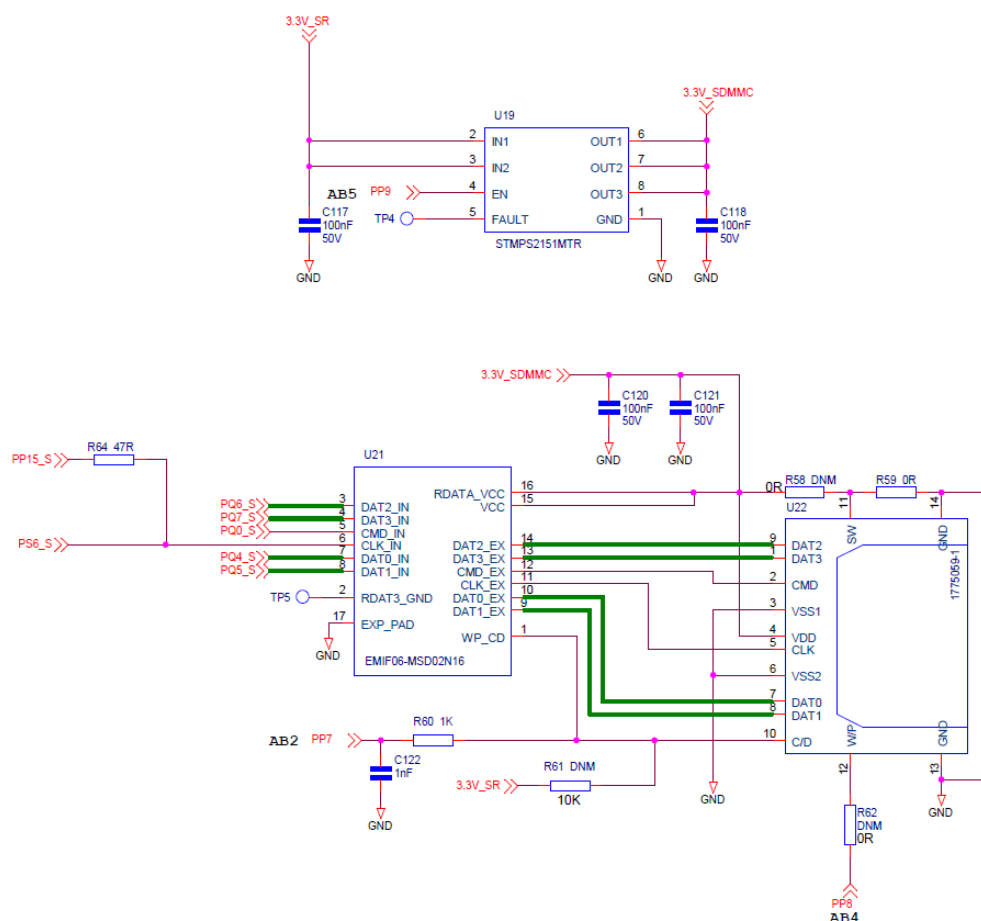
The filter used is EMIF06-MSD02N16 by ST.

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

Use a STMPS2151MTR by ST.

The figure below shows SD/MMC card reader diagram.

Figure 7. SD/MMC card reader diagram



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

Table 12. SD/MMC interface

Symbol	Description	Position
U16	CMOS switch	Figure 9. Overview of SPC58NHADPT176S Rev. A mini module - Bottom - A2
U17	Filter EMI 6-line Micro	Figure 9. Overview of SPC58NHADPT176S Rev. A mini module - Bottom - B2
U18	Connector SD reverse push-push	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - D1/D2

6.5 Test points

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

Table 13. Test points

Test point	Description	Position
TP0	VDD_HV_IO_MAIN	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - D3
TP1	VSS_OSC	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C2
TP2	AGND	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C3
TP3	JCOMP_RxDATA_N/PA[5]	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - A2
TP4	TCK/PA[6]	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - A1
TP5	TMS_TxDATA_P/PA[7]	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - A2
TP6	TXD0	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B3
TP7	TXD1	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B3
TP8	TXD2	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B2
TP9	TXD3	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B2
TP10	GTx_CLK	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B2
TP11	INT_N (on U11)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - A2
TP12	MDC	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B2
TP13	MDIO	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B2
TP14	CK_HB	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B2
TP15	D0_HB	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C2
TP16	D1_HB	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B2
TP17	D2_HB	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B2
TP18	D3_HB	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B2
TP19	D4_HB	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B2
TP20	D5_HB	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B2
TP21	D6_HB	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B2
TP22	D7_HB	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B2
TP23	RWDS_HB	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B2
TP24	CMD_eMM	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - B2
TP25	FAULT (on U16)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C2
TP26	RDAT3_GND (on U17)	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - C2
TP27	1.2V_ETH	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - A2
TP28	GND	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - A4
TP29	GND	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - A1
TP30	GND	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - D1
TP31	GND	Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top - D4

6.6 Connectors

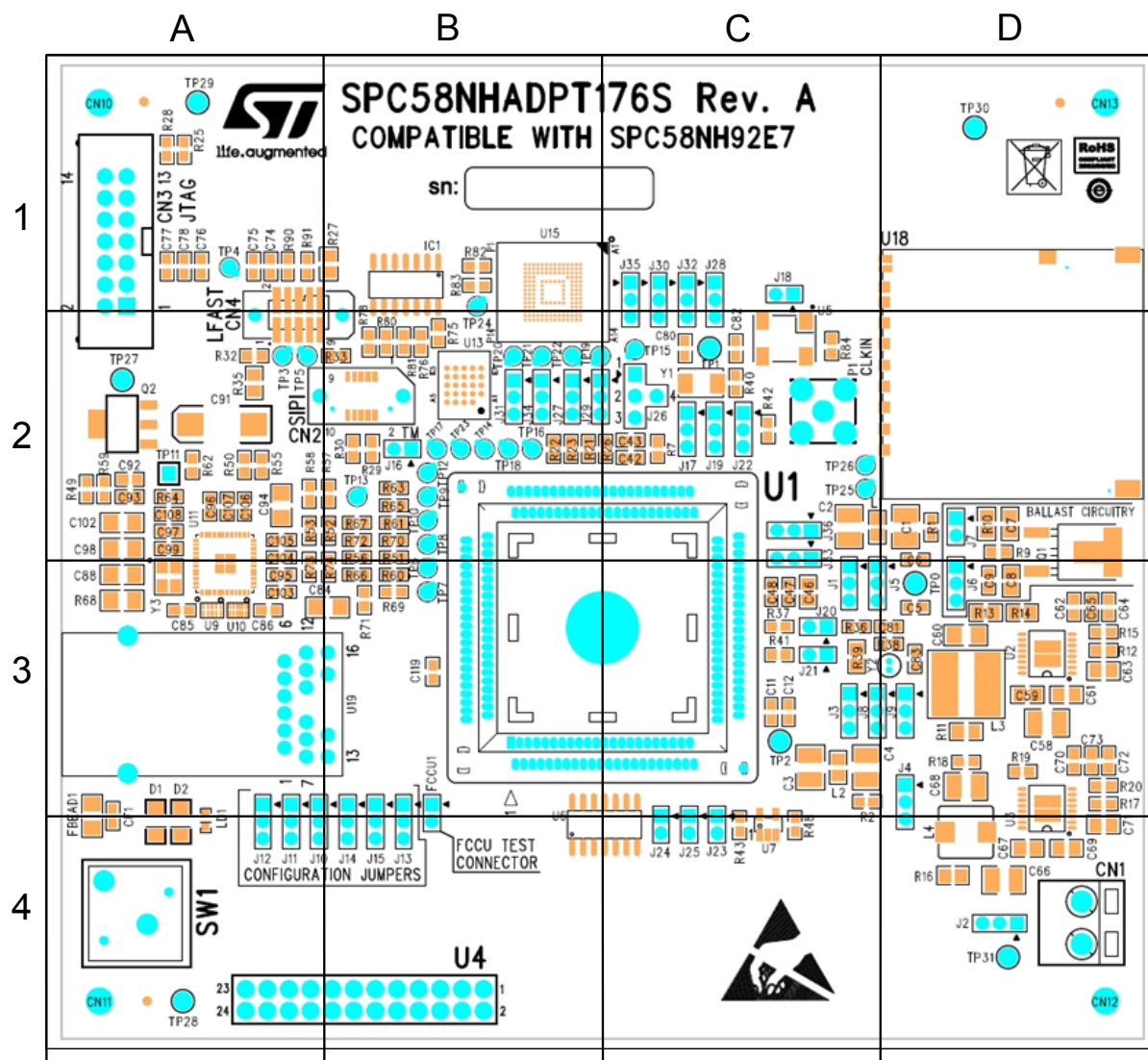
The mini module has other connectors described in the table below:

Table 14. Other connectors

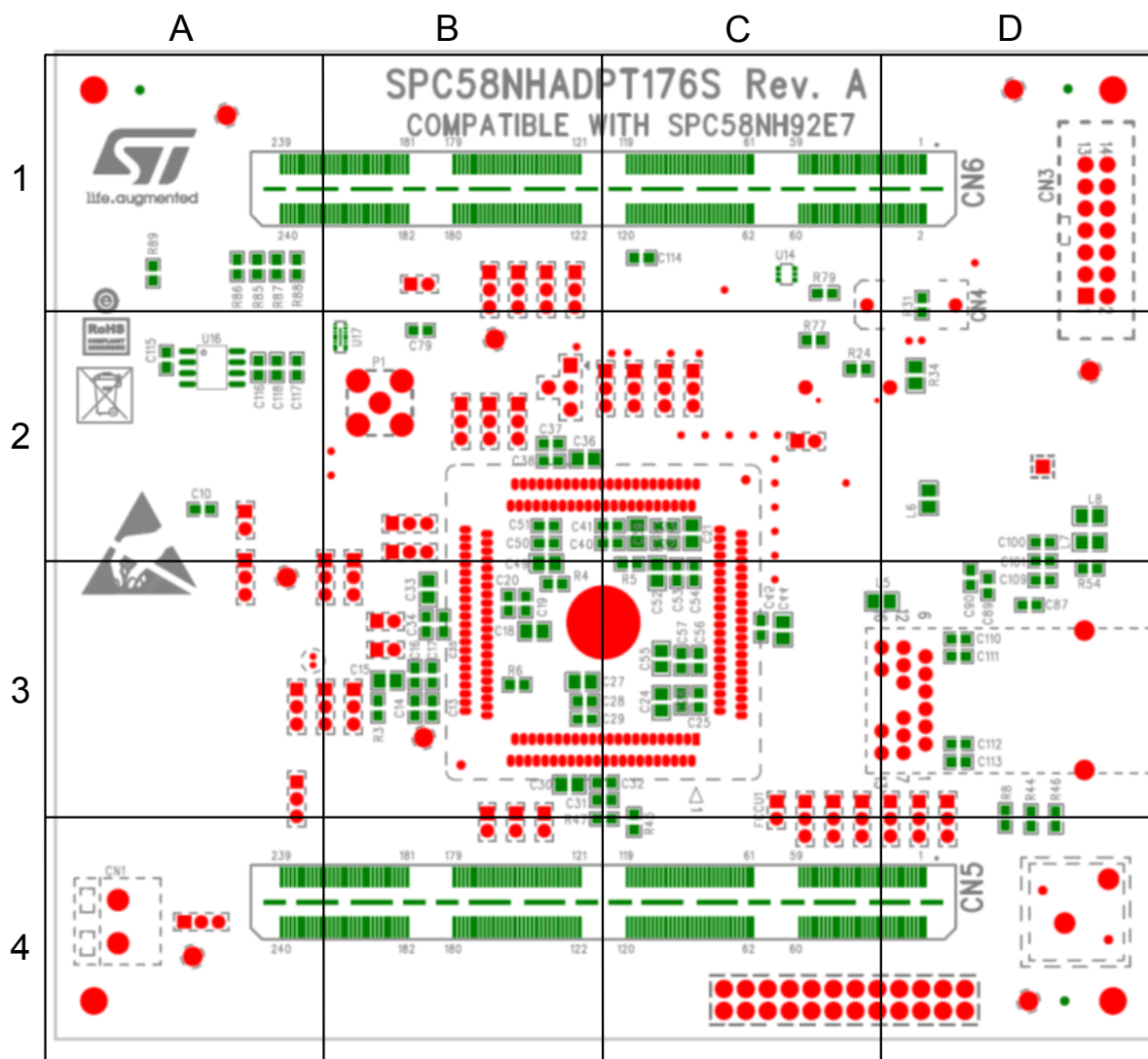
Connectors	Description
CN3	14-pin header connector for JTAG interface
CN4	10-pin header connector for JTAG/LFAST LVDS interface
CN2	10-pin header connector for SIPI interface
CN5, CN6	2 X SAMTEC QSH series, 240-way connector to connect mini module to Motherboard
CN1	External power supplies input (5V)
P1	SMA connector for external clock input
U18	SD revers connector
FCCU1	FCCU TEST CONNECTOR

7 Layout overview

Figure 8. Overview of SPC58NHADPT176S Rev. A mini module - Top



A B C D



8 BOM

Table 15. BOM

Item	Qty	Ref. designator	Value	Description	Manufacturer	Manufcode
1	39	CF1, C11, C12, C16, C19, C22, C25, C28, C42, C47, C50, C53, C56, C79, C85, C86, C87, C89, C90, C92, C95, C96, C97, C99, C103, C104, C105, C106, C107, C108, C110, C111, C112, C113, C114, C115, C116, C117, C118	100 nF	Mult. cer. cap.	Murata	GCM188R71H104KA57D
2	1	CN1	2V1P	Screw terminal block, 1 row (N4)		
3	1	CN2	ERF8-005-05.0-L-DV-L-TR	Conn rugged female 10 pin, high speed	Samtec	ERF8-005-05.0-L-DV-L-TR
4	1	CN3	N2514-6002RB	Conn flat male 14 pin, 180°	3M	N2514-6002RB
5	1	CN4	Samtec TFM-105-02-L-D-WT	Conn TFM 10 pin, with weld tabs	Samtec	TFM-105-02-L-D-WT
6	2	CN5, CN6	SAMTEC QSH-120-01-L-D-A	Female conn 240 pin, 2 row	Samtec	QSH-120-01-L-D-A
7	4	C1, C2, C3, C4	4.7 uF	Mult. cer. cap.	Murata	GRM32ER71H475KA88L
8	8	C5, C6, C9, C10, C74, C75, C76, C77	DNM	Mult. cer. cap. - not mounted		
9	7	C7, C8, C15, C30, C33, C36, C39	2.2 uF	Mult. cer. cap.	Murata	GCM21BR71C225KA64L
10	19	C13, C14, C17, C20, C23, C26, C29, C32, C35, C38, C41, C43, C45, C48, C51, C54, C57, C93, C100	10 nF	Mult. cer. cap.	Murata	GCM188R71H103KA37D
11	8	C18, C21, C24, C27, C46, C49, C52, C55	4.7 uF	Mult. cer. cap.	Murata	GCM21BR71C475KA73
12	4	C31, C34, C37, C40	47 nF	Mult. cer. cap.	Murata	GCM188R71H473KA55D

Item	Qty	Ref. designator	Value	Description	Manufacturer	Manufcode
13	1	C44	1 uF	Mult. cer. cap.	Murata	GRM21BR71H105KA12L
14	1	C58	22 uF	Mult. cer. cap.	Murata	GRM32ER71E226KE15L
15	4	C59, C61, C67, C69	470 nF	Mult. cer. cap.	Murata	GRM21BR71H474KA88L
16	6	C60, C84, C88, C94, C98, C102	47 uF	Mult. cer. cap.	KEMET	C1206C476M8PACTU
17	2	C62, C70	8.2 nF	Mult. cer. cap.	Phycomp	2238 586 15635
18	2	C63, C71	68 nF	Mult. cer. cap.	MultiComp	MCCA000383
19	1	C64	390 pF	Mult. cer. cap.	Murata	GRM1885C1H391JA01
20	3	C65, C101, C109	22 pF	Mult. cer. cap.	AVX	06035A220JAT2A
21	2	C66, C68	15 uF	Mult. cer. cap.	TDK	C3225X7R1C156M
22	1	C72	470 pF	Mult. cer. cap.	AVX	06035A471JAT2A
23	1	C73	27 pF	Mult. cer. cap.	KEMET	C0603C270J5GAC
24	1	C78	27 pF	Mult. cer. cap.	Murata	GCM1885C1H270JA16D
25	2	C80, C82	8 pF	Mult. cer. cap.	KEMET	CBR06C809B5GAC
26	2	C81, C83	10 pF	Mult. cer. cap.	AVX	06035A100JAT2A
27	1	C91	47 uF	Tantalum cap.	KEMET	T491D476K016AS
28	1	C119	1 nF	Mult. cer. cap.	Murata	GCM188R72A102KA37D
29	1	D1	Yellow	Led diode yellow	Agilent	HSMY-C150
30	1	D2	Red	Led diode red	Agilent	HSMS-C150
31	1	FBEAD1	100R	Multilayer ferrite	Laird-Signal Integrity Products	HI1206N101R-10
32	1	IC1	CD74AC32M	TTL OR gate	Texas Instruments	CD74AC32M
33		FCCU1, J18, J20, J21, J1, J2, J9, J3, J4, J5, J6, J8, J10, J11, J12, J13, J14, J15, J17, J19, J22, J27, J28, J29, J30, J31, J32, J33, J34, J35, J36, J7, J16, J23, J24, J25		Strip male 20 pin, 1 row, 180° (see mech part)	HARWIN	M22-2512005
34	1	J26	STRIP3+1PM	Strip male 3+1 pin (A1) - see mech part		
35	1	LD1	Green	Led diode green	Kingbright	
36	2	L1, L2	220R	Multilayer ferrite bead	TDK	MPZ2012S221A
37	1	L3	3.9 uH	Inductor	Würth Elektronik	744787039
38	1	L4	4.7 uH	Inductor	TDK	CLF6045NIT-4R7N-D
39	4	L5, L6, L7, L8	220R	Multilayer ferrite	Murata	BLM21PG221SN1D
40	1	P1	SMA-FEM-180	Coax conn female 5 pin, 180°	Samtec	SMA-J-P-H-ST-TH1
41	1	Q1	NJD2873T4G	Trans. NPN plastic power	ON Semiconductor	NJD2873T4G

Item	Qty	Ref. designator	Value	Description	Manufacturer	Manufcode
42	1	Q2	FDT434P	Trans. Mos P-ch	ON Semiconductor	FDT434P
43	27	R1, R2, R3, R4, R5, R6, R7, R9, R12, R17, R32, R33, R36, R38, R40, R54, R59, R62, R75, R76, R78, R79, R80, R82, R86, R90, R91	0R	Resistor	ON Semiconductor	
44	3	R8, R73, R74	180R	Resistor		
45	5	R10, R27, R34, R35, R39	DNM	Resistor - not mounted		
46	2	R11, R16	1 M	Resistor	MultiComp	
47	1	R13	180 K	Resistor	MultiComp	
48	1	R14	430 K	Resistor	MultiComp	
49	1	R15	51 K	Resistor		
50	1	R18	249 K	Resistor	Vishay	CRCW0603249RFKEA
51	1	R19	86K6	Resistor		
52	1	R20	43 K	Resistor	Vishay	CRCW060343K0FKEA
53	24	R21, R22, R23, R24, R25, R26, R29, R31, R37, R41, R49, R51, R55, R57, R58, R66, R67, R71, R72, R77, R81, R85, R88, R89	DNM	Resistor - not mounted		
54	11	R28, R30, R45, R50, R52, R53, R60, R61, R65, R69, R70	10 K	Resistor	Mini-Reel	CR1J10KF-MR
55	1	R42	50 R	Resistor		
56	5	R43, R47, R48, R63, R64	4K7	Resistor	Neohm	
57	2	R44, R46	560 R	Resistor	Vishay	CRCW0603560RFKEA
58	2	R56, R87	1 K	Resistor		
59	1	R68	12K1	Resistor		FCR0FT-1212
60	2	R83, R84	47 R	Resistor	Neohm	
61	1	SW1	Pushbutton	Pushbutton NO B6110-0 (N2)	Delta Elettronica	B6110-0
62	8	TP1, TP2, TP27, TP28, TP29, TP30, TP31, TP0	TESTPOINT	PCB test point 1 pin - black		

Item	Qty	Ref. designator	Value	Description	Manufacturer	Manufcode
63	24	TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21, TP22, TP23, TP24, TP25, TP26	TP SMD	Test point - ignore		
64	1	U1	Socket QFP	Socket 176 QFP OPEN TOP Yamaichi IC357-1764-168P-2	Yamaichi	IC357-1764-168P-2
65	2	U2, U3	A6986	Volt. reg	STMicroelectronics	
66	1	U4	STRIP2x36PMD	Strip male 72 pin, 2 row, 180° (N1)	Toptek	PH1S25-240GB60/30-L
67	1	U5	8 MHz	Clock oscillator	ECS	ECS-3953M-080-BN-TR
68	1	U6	74LVC125AMTR	HCMOS buffer	STMicroelectronics	74LVC125AMTR
69	1	U7	74V1G08STR	CMOS AND gate	STMicroelectronics	74V1G08STR
70	2	U9, U10	HSP061-4M10Y	ESD protection	STMicroelectronics	HSP061-4M10Y
71	1	U11	KSZ9031RNXIA	Ethernet 1-port GigabitEthrt Ethernet PHY	STMicroelectronics	KSZ9031RNXIA
72	1	U13	S71KL256SC0BHB000	RAM 256 Mbit	Cypress	S71KL256SC0BHB000
73	1	U14	NC7WZU04P6X	CMOS inverter	ON Semiconductor	NC7WZU04P6X
74	1	U15	IS21ES08G-JCLI	eMMC Memory 8 GB 3.3 V 200 Mhz eMMC NAND flash	ISSI	IS21ES08G-JCLI
75	1	U16	STMPS2151MTR	CMOS Switch	STMicroelectronics	STMPS2151MTR
76	1	U17	EMIF06-MSD02N16	Filter EMI 6-line Micro	STMicroelectronics	EMIF06-MSD02N16
77	1	U18	1775059-1	Connector SD reverse push-push	TE Connectivity	1775059-1
78	1	U19	JK0-0136NL	Ethernet connector	Pulse Electronic	JK0-0136NL
79	1	Y1	40 MHz	Quartz	NDK	NX5032GA
80	1	Y2	32.768 KHz	Quartz	Citizen Finitech Miyota	CFS206-32.768-KDZF-UB
81	1	Y3	25 MHZ	Quartz	Epson	X1E0000210132 TSX-3225 25 MHZ 9.0PF
82	1	PCB		PCB FR4 1.6 mm; 127 mm X 114,3 mm 10Layers		
83	5	FCCU1, J18, J20, J21	STRIP20PMD-2MM	Strip male 20 pin, 1 row, 180° (N3)	Harwin	M22-2512005
84	36	J30, J31, J34, FCCU		Bridge shunt 2 pins female 2 mm black	Toptek	MJ2P-CGB-L
85	1	J26		Bridge female 2 pin	Amtek	MJ1B-BGB-L
86	1	Antistatic bag	Antistatic bag 210 x 260 mm			

itm	Qty	Ref. designator	Value	Description	Manufacturer	Manufcode
87	1	Box	Cartoon KIT			

Figure 10. uC supply

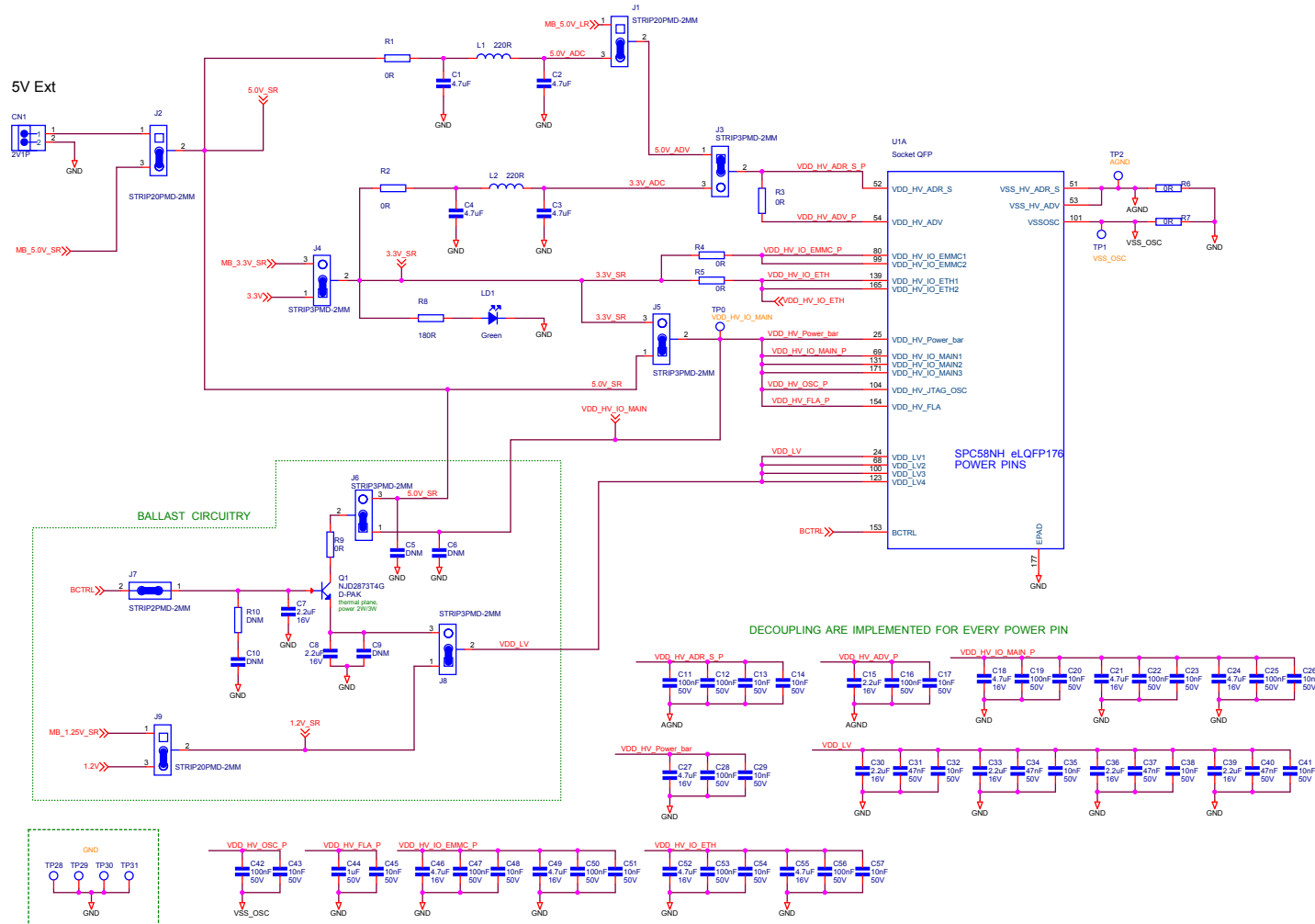
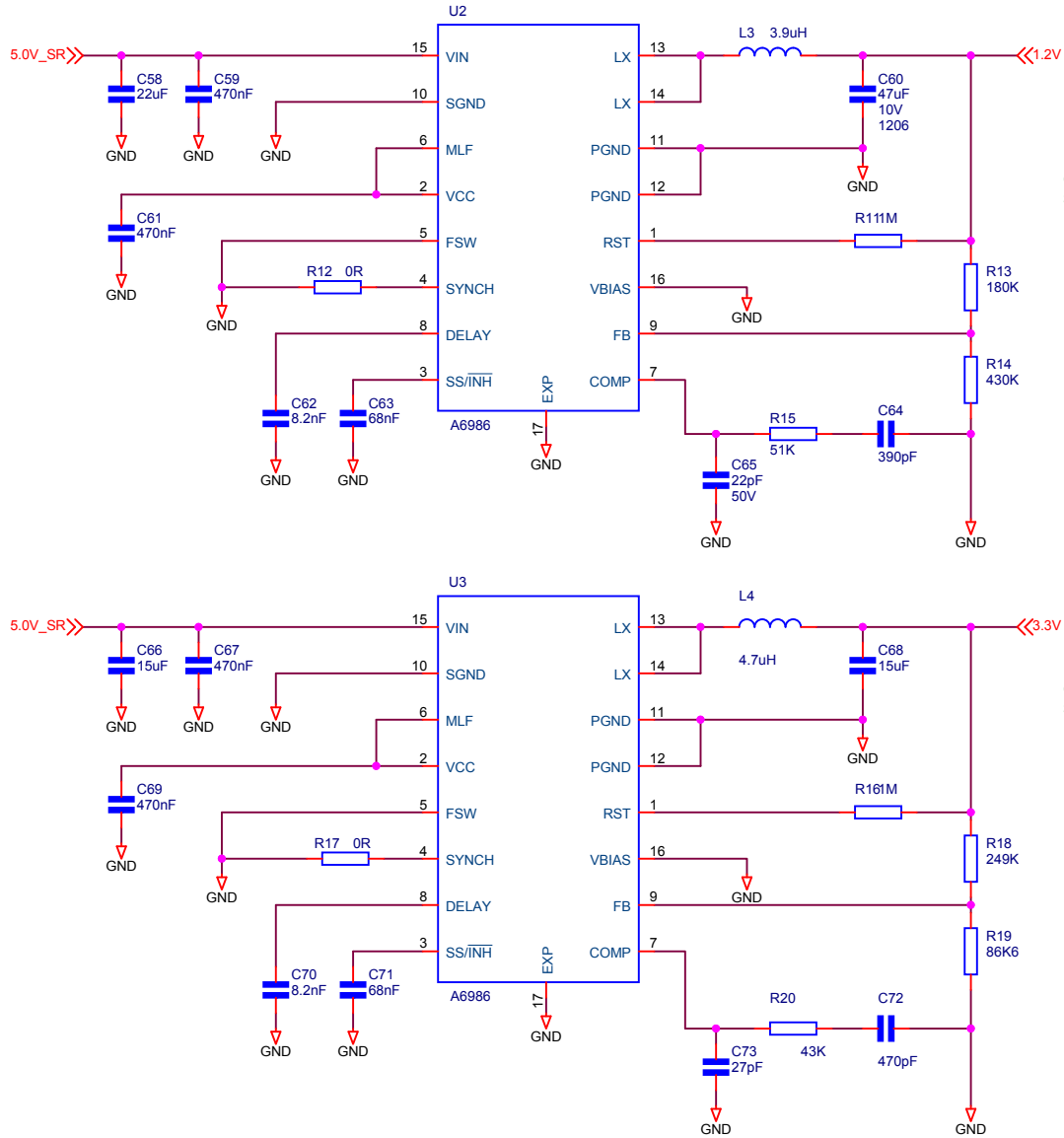


Figure 11. Voltage regulators



Piano di gnd per i componenti dello stesso regolatore

Piano di gnd per i componenti dello stesso regolatore

Figure 12. uC I/O

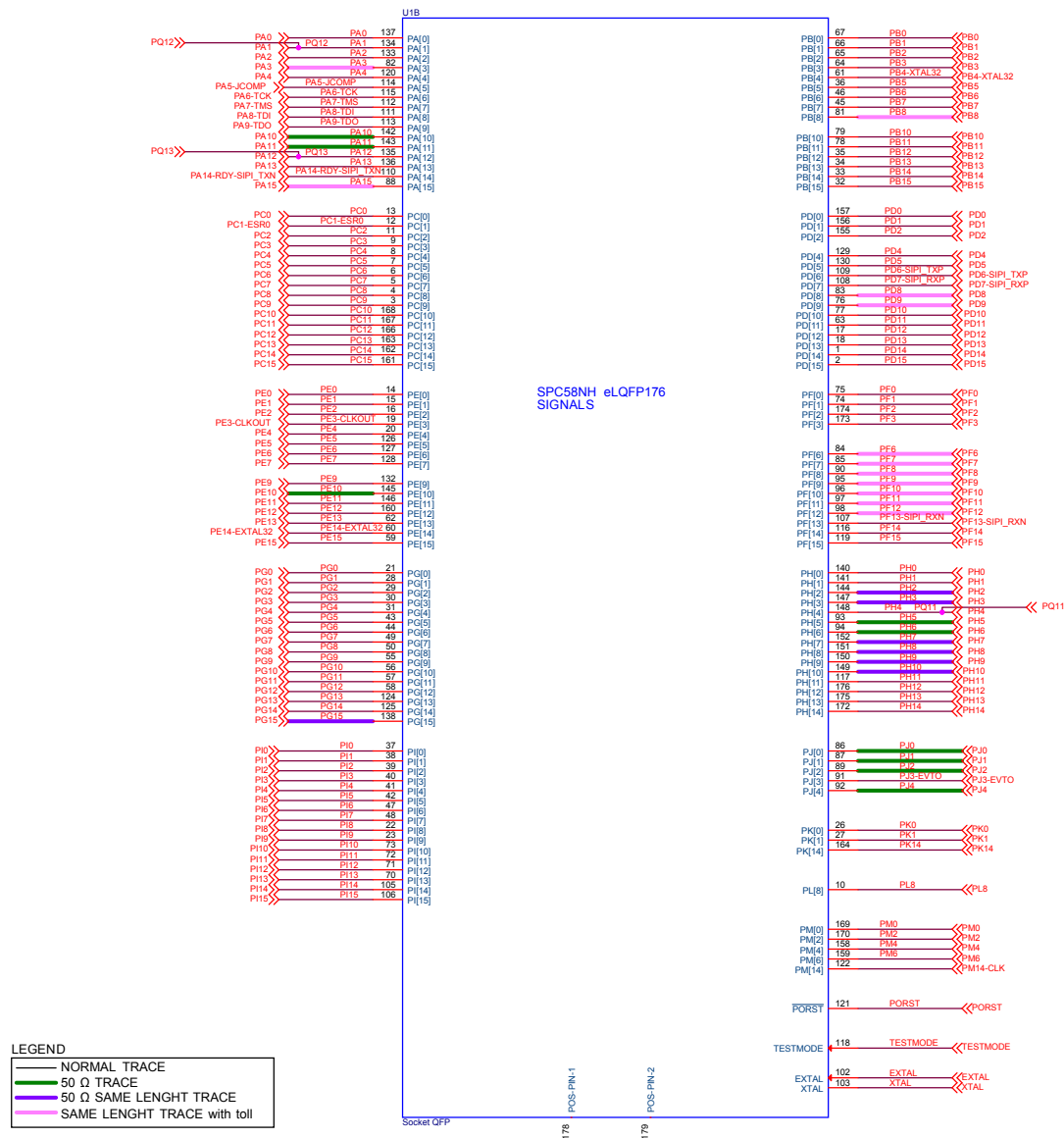


Figure 13. Debug connectors

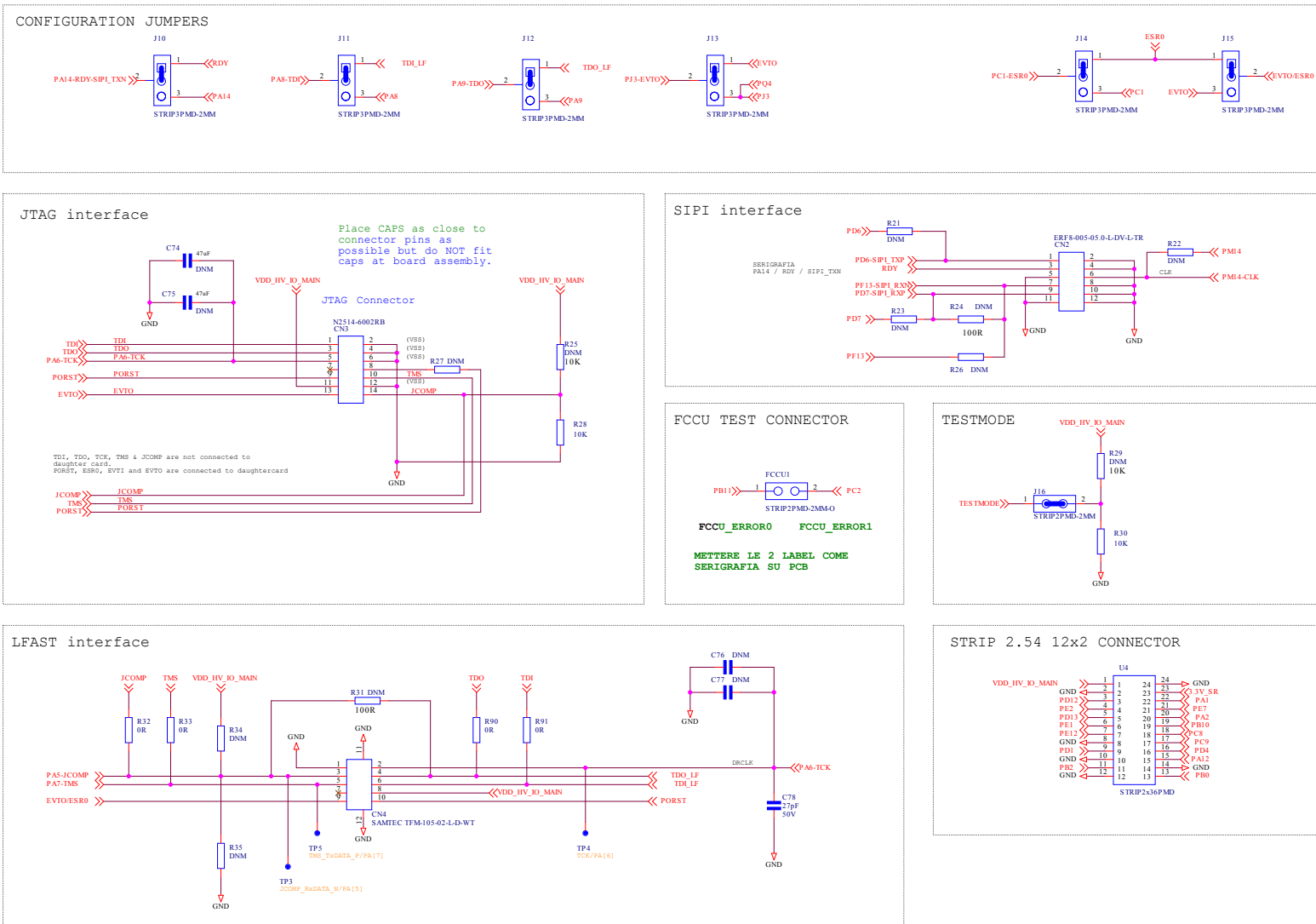


Figure 14. Clock and reset



Clock and Reset Circuitry

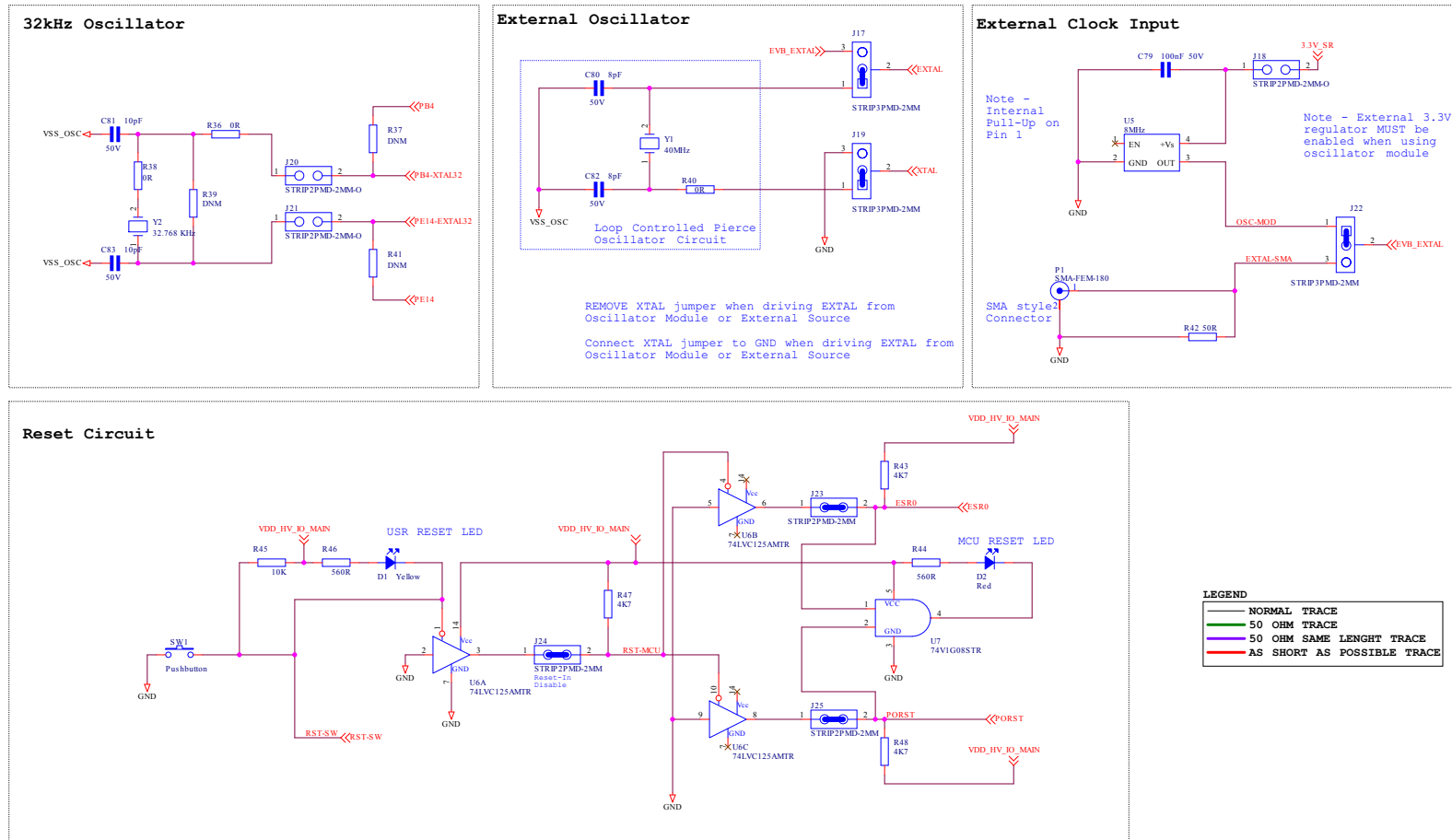




Figure 16. eMMC and SD card

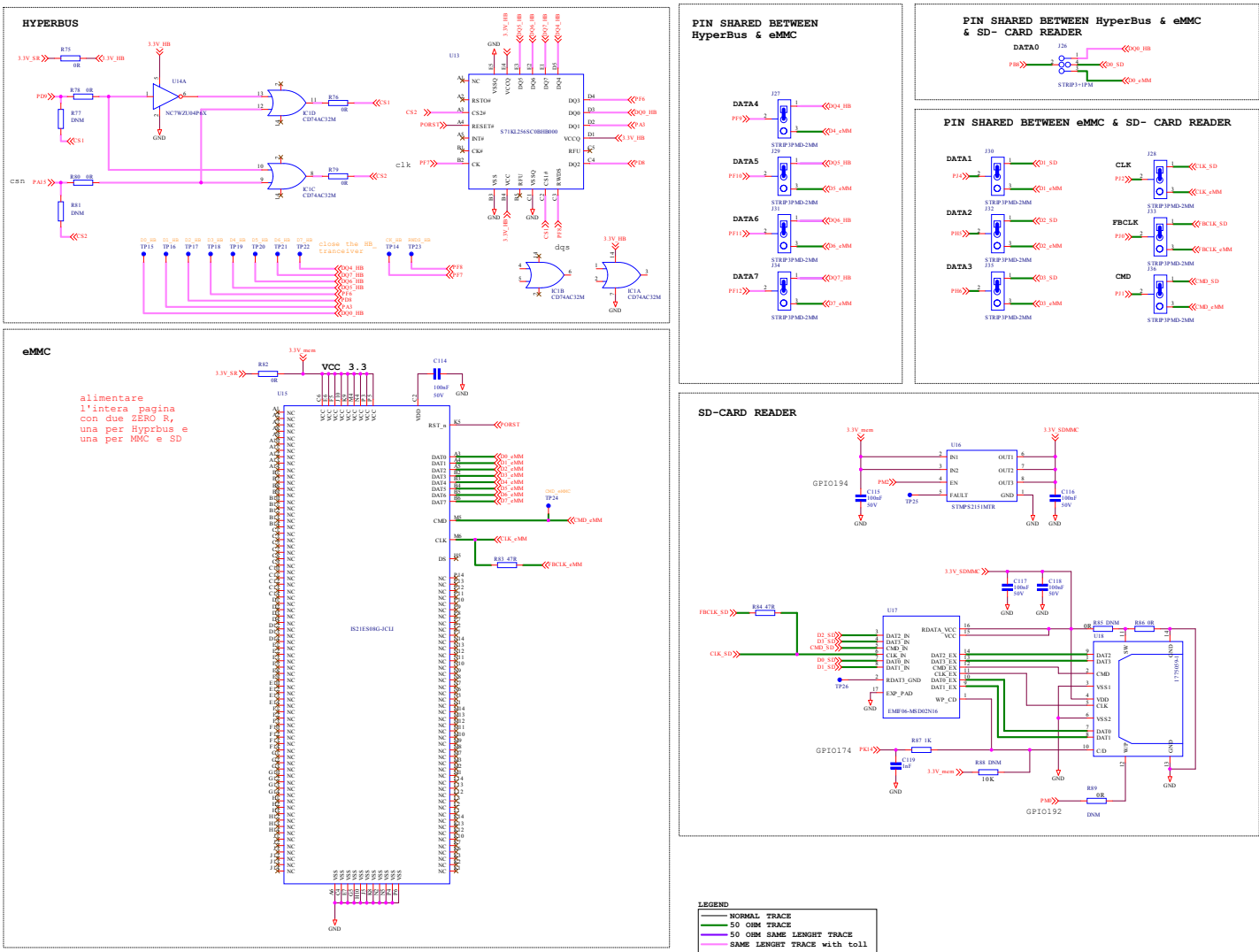
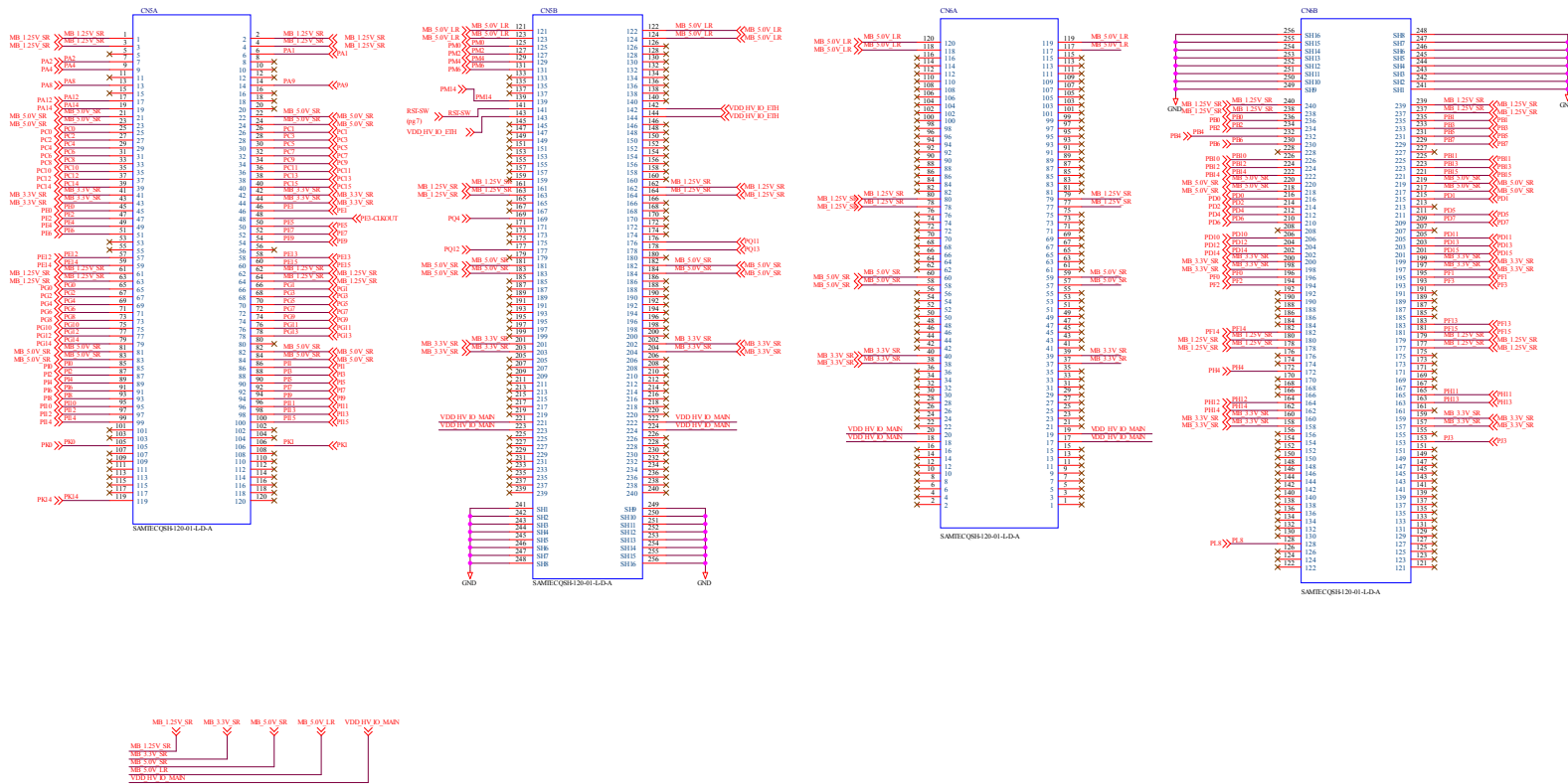


Figure 17. Motherboard connectors



Revision history

Table 16. Document revision history

Date	Version	Changes
01-Sep-2020	1	Initial release.
13-Apr-2021	2	Removed SPC57XXMB reference.

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