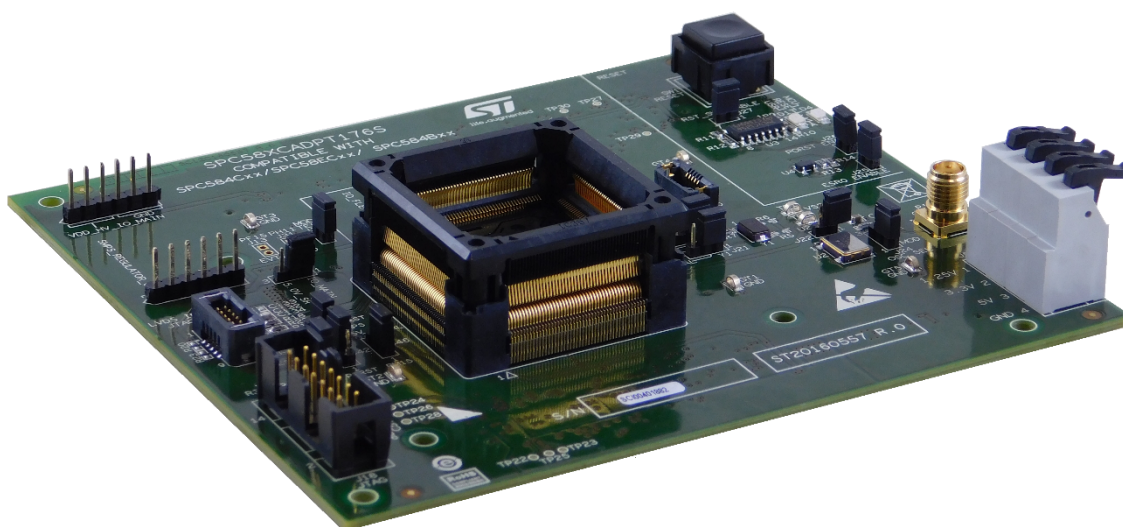


SPC58XCADPT176S evaluation board

Introduction

The SPC58XCADPT176S evaluation board supports STMicroelectronics SPC584BxxE7, SPC584CxxE7 and SPC58ECxxE7 microcontrollers in LQFP 176 package.

Figure 1. SPC58XCADPT176S



Note: picture not contractual

1 Overview

The SPC58XCADPT176S mini module is an evaluation board supporting STMicroelectronics SPC584BxxE7, SPC584CxxE7 and SPC58ECxxE7 microcontrollers in LQFP176 package.

The 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 no access to the I/O pins as any motherboard peripherals.

Figure 2. Overview of SPC58XCADPT176S mini module - top

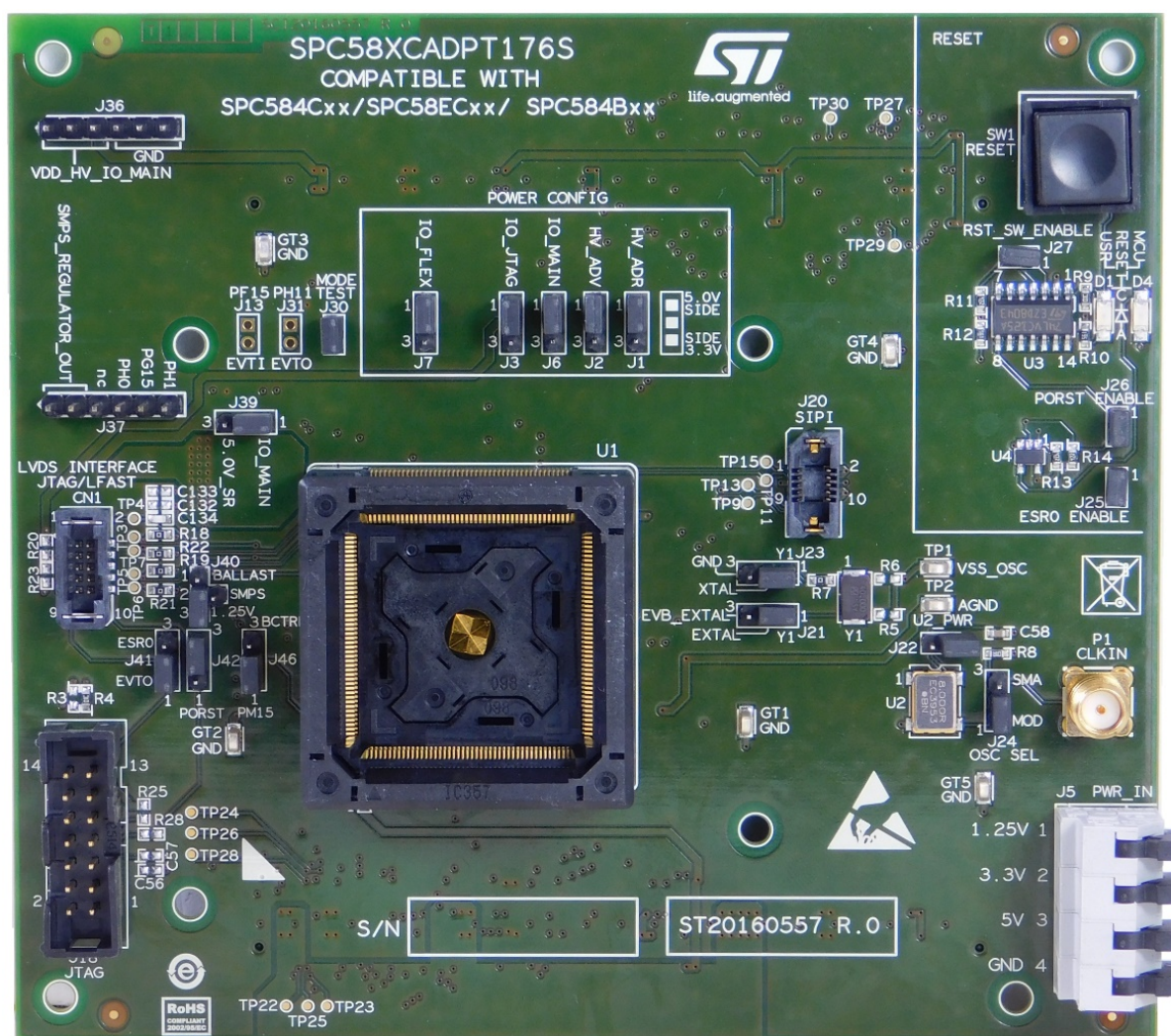
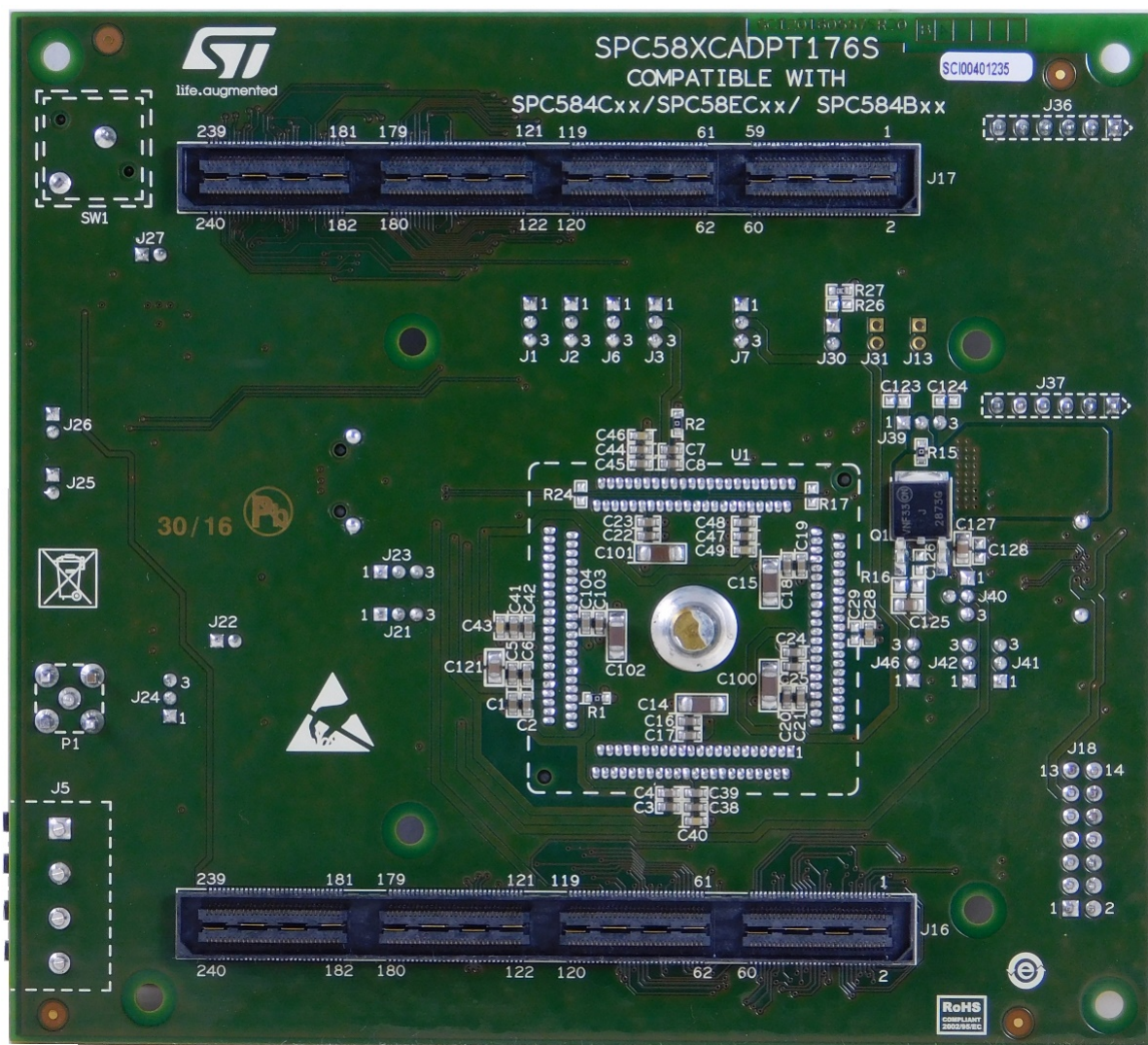


Figure 3. Overview of SPC58XCADPT176S mini module - bottom



1.1 Package contents

An SPC58XCADPT176S adapter package includes the following item:

- SPC58XCADPT176S mini module

1.2 Supported devices

The SPC58XCADPT176S mini module supports the following STMicroelectronics family of microcontrollers in LQFP176 package:

- SPC584CxxE7/SPC58ECxxE7
- SPC584BxxE7

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 SPC58XCADPT176S mini module board has the following features:

- Connector for external power supplies input (5 V, 3.3 V, 1.25 V) used in stand-alone mode.
- Reset button with driver and led indicator
- Socket for device in eLQFP176 package with exposed pad down
- Debug ports:
 - 12-pin SAMTEC connector for SIPI interface
 - 14-pin header connector for JTAG port
 - 12-pin header connector for LFAST 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 to optionally disconnect it
- Jumper for boot configuration
- 2 X Samtec QSH series, 240 way connector to connect mini module to motherboard

4.2 Hardware dimension

The mini module has the following dimensions:

- PCB area: 127 mm X 114.3 mm
- Top components height: 19.4 mm max
- Bottom components height: 3.5 mm max
- PCB thickness: 1.6 mm

5 Power and system configuration

5.1 Power supplies

When the mini module is plugged onto the motherboard, power is supplied directly by the motherboard. In this setup, the external power supply input available on the mini module should NOT be used.

When the SPC58XCADPT176S mini module is used as a stand-alone board, external power supplies must be used (5.0 V, 3.3 V, 1.25 V).

The following jumpers are used to configure the power supply:

Table 1. Power configuration jumpers

Jumper	Description	Default	Position
J1	VDD_HV_ADR voltage configuration from 5.0V_LR or 3.3V_SR	1-2 (5.0V_LR)	Figure 4. SPC58XCADPT176S top mini module view - C2
J2	VDD_HV_ADV voltage configuration from 5.0V_LR or 3.3V_SR	1-2 (5.0V_LR)	Figure 4. SPC58XCADPT176S top mini module view - C2
J3	VDD_HV_JTAG voltage configuration from 5.0V_SR or 3.3V_SR	1-2 (5.0V_SR)	Figure 4. SPC58XCADPT176S top mini module view - B2
J6	VDD_HV_IO_MAIN voltage configuration from 5.0V_SR or 3.3V_SR	1-2 (5.0V_SR)	Figure 4. SPC58XCADPT176S top mini module view - B2
J7	VDD_HV_IO_FLEX voltage configuration from 5.0V_SR or 3.3V_SR	1-2 (5.0V_SR)	Figure 4. SPC58XCADPT176S top mini module view - B2
J39	Supply for BALLAST circuit configuration from VDD_HV_IO_MAIN or 5.0V_SR	1-2 (VDD_HV_IO_MAIN)	Figure 4. SPC58XCADPT176S top mini module view - A2
J40	VDD_LV voltage configuration from BALLAST circuit, 1.25V_SR or SMPS_REGULATOR_OUT	2-3 (1.25V_SR)	Figure 4. SPC58XCADPT176S top mini module view - A3

5.2 Microcontroller configuration

The following jumper needs to configure the board for used STMicroelectronics microcontroller SPC584Cxx/SPC58ECxx:

Table 2. Microcontroller SPC584Cxx/SPC58ECxx configuration related jumpers

Jumper	Description	Default	Position
J46	Device pin 153 BCTRL / PM[15] function configuration	Close 2-3 (connect pin as BCTRL with BALLAST circuit)	Figure 4. SPC58XCADPT176S top mini module view - A3

5.3 Port configuration

The following jumper need to configure the ports:

Table 3. Ports related jumpers

Jumper	Description	Default	Position
J30	TESTMODE settings	Close	Figure 4. SPC58XCADPT176S top mini module view - B2
J13	PF[15]/EVTI connection to QSH motherboard connectors	Close	Figure 4. SPC58XCADPT176S top mini module view - A2
J31	PH[11]/EVTO connection to QSH motherboard connectors	Close	Figure 4. SPC58XCADPT176S top mini module view - A2

5.4 System clock configuration

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

Table 4. Clock configuration jumpers

Jumper	Description	Default	Position
J21	40 MHz crystal clock source Enable for pin EXTAL	1-2 (XT1 pin2)	Figure 4. SPC58XCADPT176S top mini module view - C3
J23	40 MHz crystal clock source Enable for pin XTAL	1-2 (XT1 pin1)	Figure 4. SPC58XCADPT176S top mini module view - C3
J22	Enable 8 MHz oscillator power supply	Open	Figure 4. SPC58XCADPT176S top mini module view - D3
J24	External clock source from 8 MHz oscillator or SMA connector	1-2 (8 MHz oscillator)	Figure 4. SPC58XCADPT176S top mini module view - D3

5.5 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 5. Reset configuration jumpers

Jumper	Description	Default	Position
SW1	Reset push button	Open	Figure 4. SPC58XCADPT176S top mini module view - D1
J27	Connect the external reset to the reset driver for ESR0 and PORST pins	Close	Figure 4. SPC58XCADPT176S top mini module view - D1
J25	Connect the external reset to ESR0 pin	Close	Figure 4. SPC58XCADPT176S top mini module view - D2
J26	Connect the external reset to PORST pin	Close	Figure 4. SPC58XCADPT176S top mini module view - D2

5.6 Test points

The mini module has several test points. Below all test point description:

Table 6. Test points

Test Point	Description	Position
TP3	JCOMP_RxDATA_N test point	Figure 4. SPC58XCADPT176S top mini module view - A3
TP4	TCK test point	Figure 4. SPC58XCADPT176S top mini module view - A2
TP5	TMS_TxDATA_P test point	Figure 4. SPC58XCADPT176S top mini module view - A3
TP6	TDI_TxDATA_N test point	Figure 4. SPC58XCADPT176S top mini module view - A3
TP7	TDO_RxDATA_P test point	Figure 4. SPC58XCADPT176S top mini module view - A3
TP9	SIPI_RXN test point	Figure 4. SPC58XCADPT176S top mini module view - C2
TP11	SIPI_TXN test point	Figure 4. SPC58XCADPT176S top mini module view - C2
TP13	SIPI_RXP test point	Figure 4. SPC58XCADPT176S top mini module view - C2
TP15	SIPI_TXP test point	Figure 4. SPC58XCADPT176S top mini module view - C2
TP24	J16A, QSH connector, pin19 (PA14) test point	Figure 4. SPC58XCADPT176S top mini module view - A4
TP22	J16A, QSH connector, pin10 (PA5) test point	Figure 4. SPC58XCADPT176S top mini module view - A4
TP28	J16A, QSH connector, pin11 (PA6) test point	Figure 4. SPC58XCADPT176S top mini module view - A4
TP25	J16A, QSH connector, pin12 (PA7) test point	Figure 4. SPC58XCADPT176S top mini module view - B4
TP26	J16A, QSH connector, pin13 (PA8) test point	Figure 4. SPC58XCADPT176S top mini module view - A4
TP23	J16A, QSH connector, pin14 (PA9) test point	Figure 4. SPC58XCADPT176S top mini module view - B4

5.7 Connectors

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

Table 7. Other connectors

Connectors	Description	Position
J20	12-pin header connector for SIPI interface	Figure 4. SPC58XCADPT176S top mini module view - C2
J18	14-pin header connector for JTAG port	Figure 4. SPC58XCADPT176S top mini module view - A4
CN1	12-pin SAMTEC connector for JTAG/LFAST LVDS interface	Figure 4. SPC58XCADPT176S top mini module view - A3
J36, J37	DC-DC Regulator Module	Figure 4. SPC58XCADPT176S top mini module view - A1/A2
J16, J17	2 X Samtec QSH series, 240 way connector to connect mini module to motherboard	Figure 5. SPC58XCADPT176S bottom mini module view

5.8 Debug configuration jumpers

The mini module has 2 jumpers that can be used for the debug configuration/standard configuration mode described in the following table:

Table 8. Debug configuration jumpers

Connectors	Description	Position
J41	EVTO/ESR0 configuration jumper: - Configuration 1-2 allowed - Configuration 2-3 reserved	Figure 4. SPC58XCADPT176S top mini module view - A3
J42	PORST/ESR0 configuration jumper: - Configuration 1-2 allowed - Configuration 2-3 reserved	Figure 4. SPC58XCADPT176S top mini module view - A3

6 Layout overview

Figure 4. SPC58XCADPT176S top mini module view

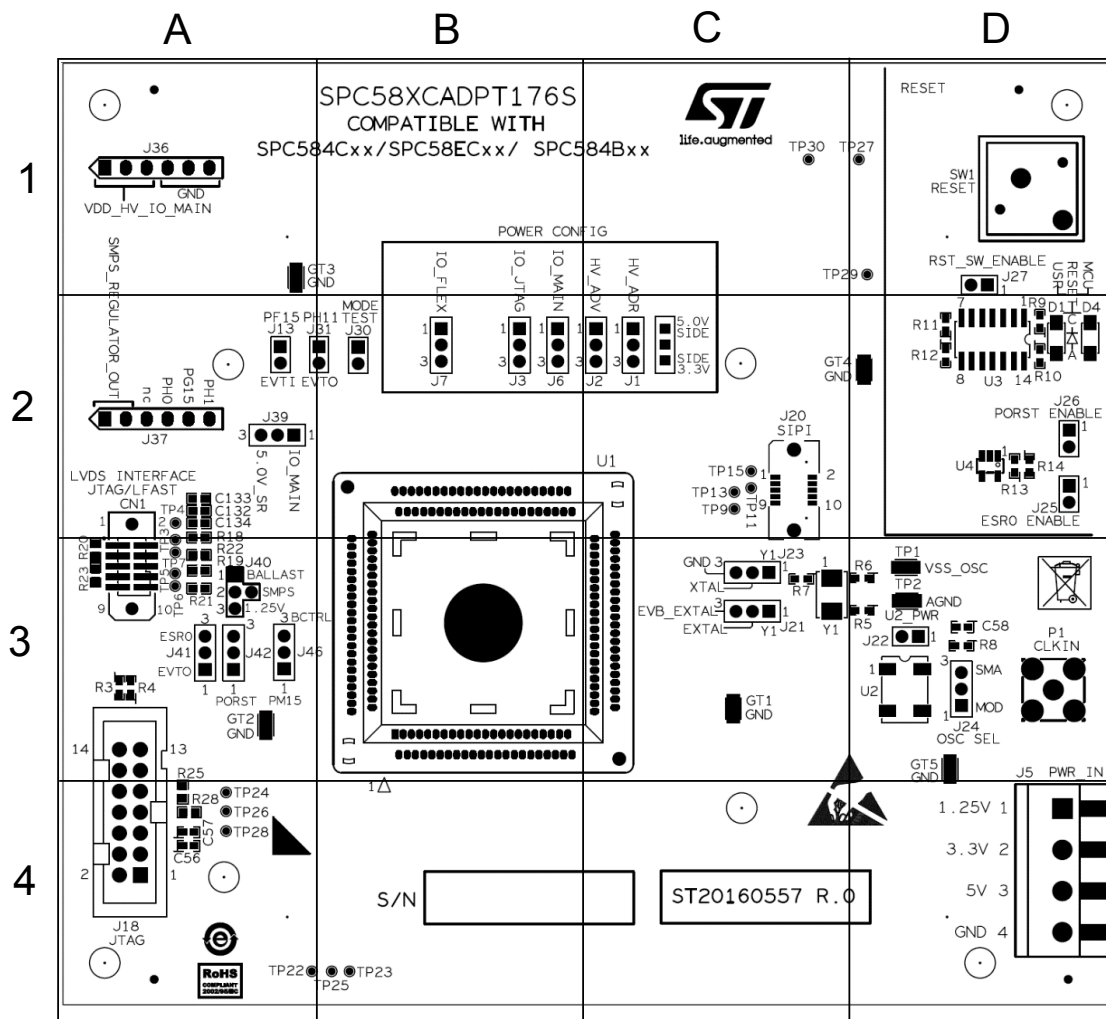
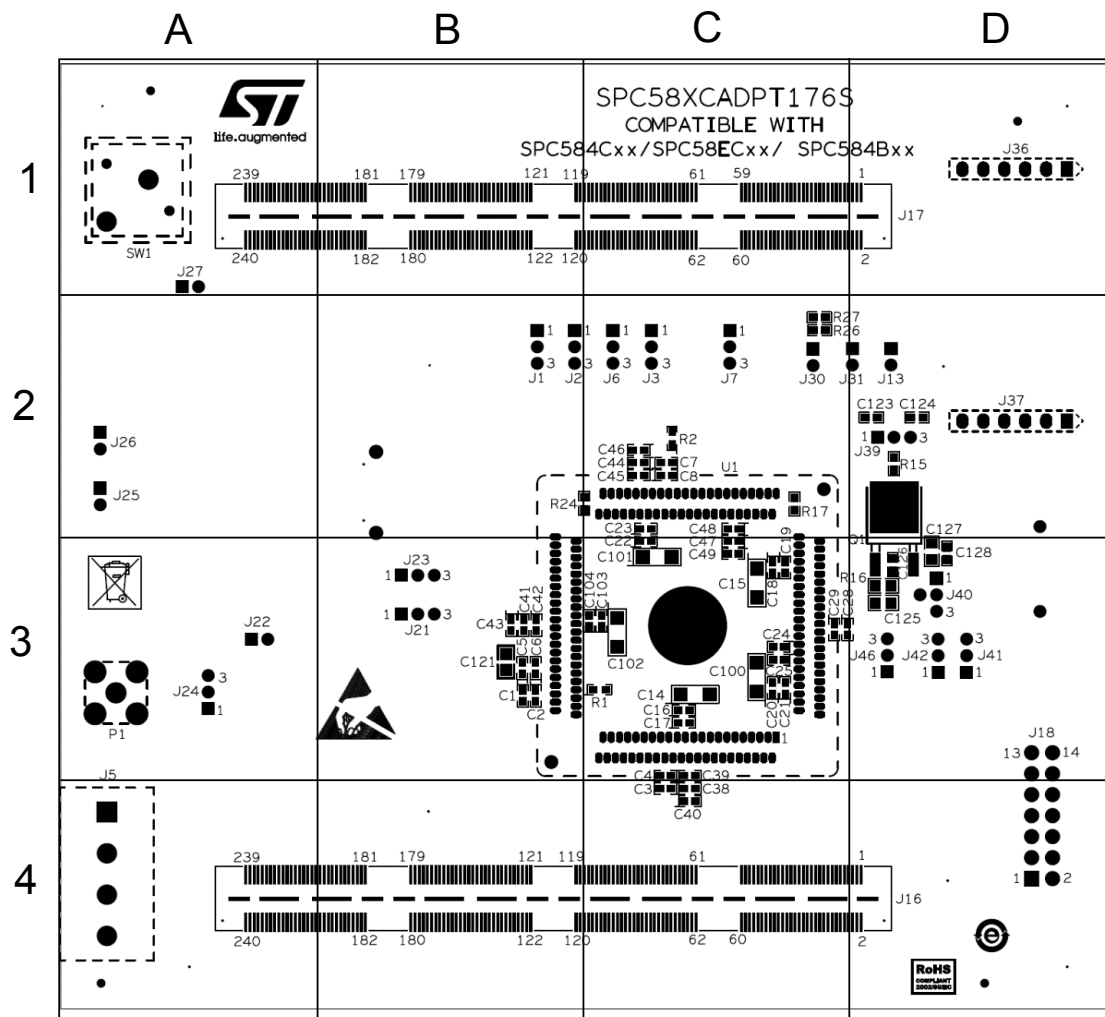


Figure 5. SPC58XCADPT176S bottom mini module view



7 BOM

Table 9. BOM

Item	Qty	Reference	Part name	Part description
1	1	CN1	Samtec TFM-105-02-L-D-WT	Samtec 5x2 TFM connector - 1.27 mm pitch - with weld tabs
2	11	C1, C3, C5, C7, C16, C18, C20, C22, C24, C58, C103	100 nF	Mult. cer. cap. 50V 0603
3	14	C2, C4, C6, C8, C17, C19, C21, C23, C25, C39, C42, C45, C48, C104	10 nF	Mult. cer. cap. 50V 0603 (automotive series)
4	5	C14, C15, C100, C101, C102	4.7 uF	Mult. cer. cap. 50V 1206
5	1	C28	1 uF	Mult. cer. cap. 25V 0603
6	1	C29	10 nF	Mult. cer. cap. 50V 0603 (automotive series) - Not mounted
7	4	C38, C41, C44, C47	47 nF	Mult. cer. cap. 50V 0603
8	4	C40, C43 C46, C49	2.2 uF	Mult. cer. cap. 16V 0603
9	2	C56, C57	47 nF	Mult. cer. cap. 50V 0603 - Not mounted
10	3	C121,C125,C127	2.2 uF	Mult. cer. cap. 16V 0805 - Automotive series
11	4	C123, C124, C126, C128	DNM	Mult. cer. cap. 50V 0603 - Do not mount
12	2	C132, C133	DNP	Mult. cer. cap. 50V 0603 - Not mounted
13	1	C134	27 pF	Mult. cer. cap. 50V 0603
14	1	D1	Yellow	Led diodeyellow 1206
15	1	D4	Red	Led diode red 1206
16	7	TP1, GT1, TP2, GT2, GT3, GT4, GT5	TEST POINT	SMD PCB test point
17	2	J1, J2, J3, J6, J7 J21, J23, J24, J39, J41, J46	STRIP 2 mm	Male strip 3 poles, single row, vertical, golden, pitch 2 mm - closed 1-2 - see mech parts
18	1	J5	AST0250404	Conn 4 pin, 90°, AST board mount screwless
19	2	J13, J31	STRIP 2 mm	Male strip 2 poles, single row, vertical, golden, pitch 2 mm - do not mount
20	2	J16, J17	SAMTEC QSH-120-01-L-D-A	Samtec 0.5 mm pitch high speed socket
21	1	J18	N2514-6002RB	3M conn flat male 14 pins, straight - pitch 2.54 mm
22	1	J20	ERF8-005-05.0-L-DV-L-TR	Samtec 0.8 mm pitch rugged high speed female connector
23		J22	STRIP 2 mm	Male strip 2 poles, single row, vertical, golden, pitch 2mm - OPEN a bandiera - see mech parts
24		J25, J26, J27, J30	STRIP 2 mm	Male strip 2 poles, single row, vertical, golden, pitch 2 mm - CLOSED - Seemech parts
25	2	J36, J37	STRIP	Male strip 36 pins pitch 2.54 180°
26		J40	STRIP 2 mm	Male strip 4 poles, single row, vertical, golden, pitch 2 mm - closed 2-3 - seemech parts
27		J42	STRIP 2 mm	Male strip 3 poles, single row, vertical, golden, pitch 2 mm - closed 2-3 - see mech parts
28	1	P1	CON 1 SMA	Female RF SMA 180°
29	1	Q1	NJD2873	NPN plastic power transistor DPAK

Item	Qty	Reference	Part name	Part description
30	8	R1, R2, R7, R15, R18, R19, R21, R22	0R	Resistor 1/10W 1% 0603
31	2	R3, R26	10K	Resistor 1/10W 1% 0603 - Not mounted
32	3	R4, R9, R27	10K	Resistor 1/10W 1% 0603
33	2	R5, R6	DNP	Resistor 1/10W 1% 0603 Not mounted
34	1	R8	100R	Resistor 1/10W 1% 0603
35	2	R10, R12	560R	Resistor 1/10W 1% 0603
36	3	R11, R13, R14	4K7	Resistor 1/10W 1% 0603
37	1	R16	DNM	Resistor 1/10W 1% 0805 - Do not mount!
38	2	R17, R24	100R	Resistor 1/10W 1% 0603 - Not mounted
39	4	R20, R23, R25, R28	DNP	Resistor 1/10W 1% 0603 - Not mounted
40	1	SW1	Pushbutton	Pushbutton, No low profile for pcb
41	18	TP3, TP4, TP5, TP6, TP7, TP9, TP11, TP13, TP15, TP22, TP23, TP24, TP25, TP26, TP27, TP28, TP29, TP30	TEST POINT	Testpoinr SMD - ignore
42	1	U1	SPC58NE84_176ELQFP	Eiger - eQFP176(A0A4) - Yamaichi IC357-1764-168P-2
43	1	U2	8 MHz	Hybrid quartz osc ECS 3953M
44	1	U3	74LVC125AMTR	I.C. low voltage CMOS quad bus buffers - SO14
45	1	U4	MC74HC1G08DTT1G	CMOS single 2-input AND gate
46	1	Y1	40MHZ	Quartz 40 MHz NX5032GA XTAL NDK
47	1	CSSG20160557 R.0	MINIMODULE	SPC58XCADPT176S EVB for Chorus 4M eTQFP176(A0A4)
48	18	J1, J2, J3, J6 ,J7, J21, J23, J24, J39, J41, J46, J22, J25, J26, J27, J30, J40, J42		Bridge 2 pins female 2 mm pitch

8 Schematics



Figure 6. Microcontroller power

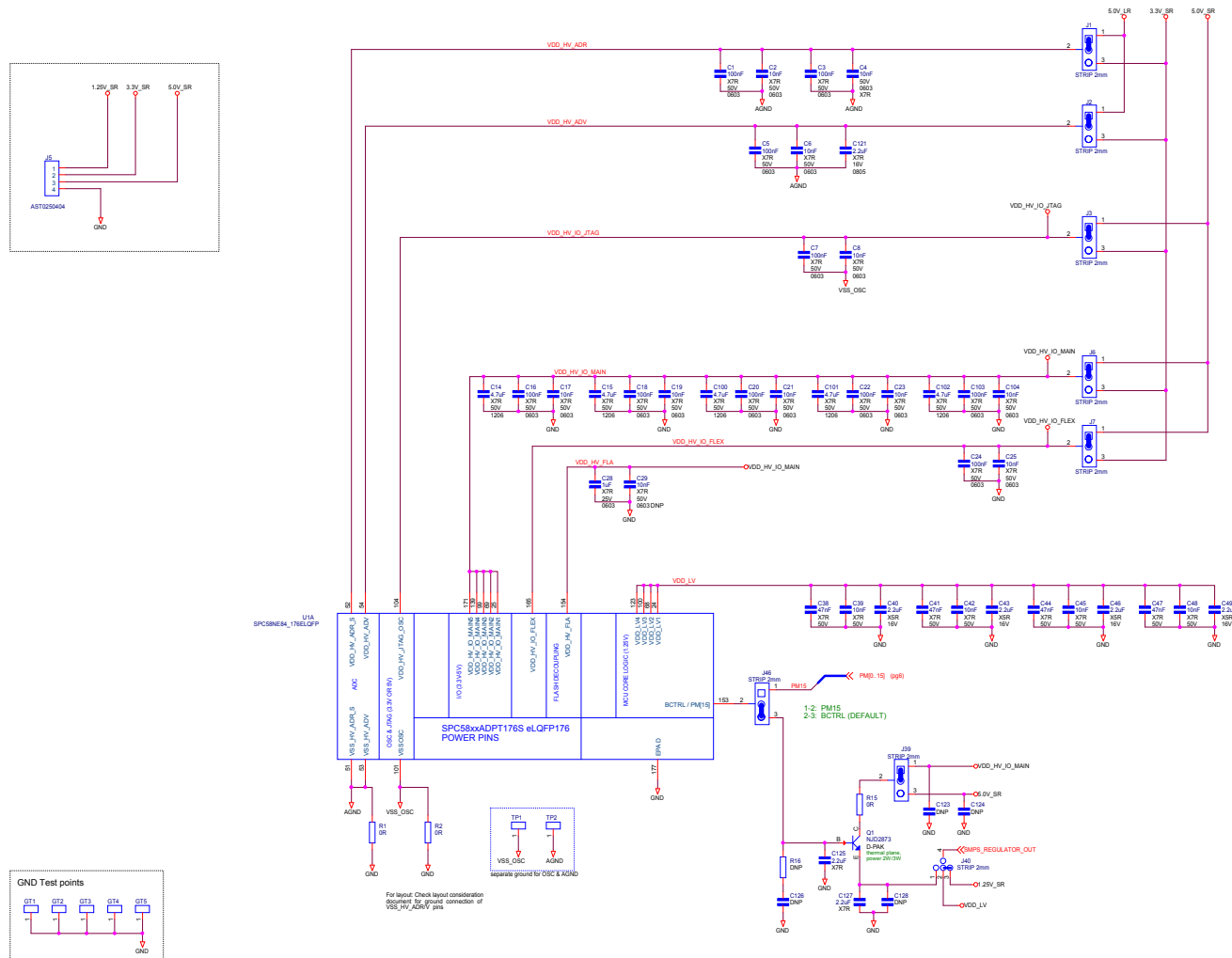
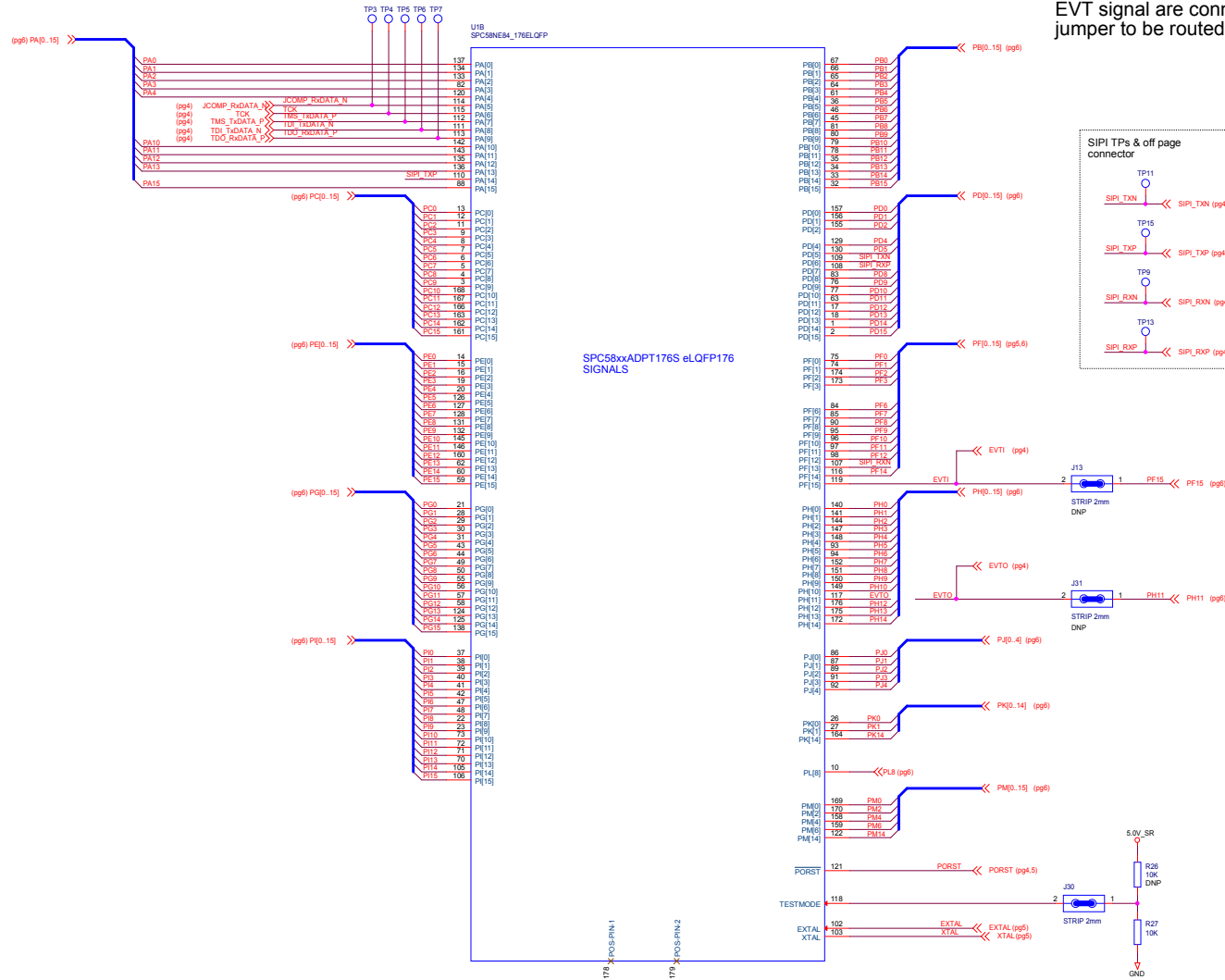


Figure 7. Microcontroller I/O



Port pins and reset signal are routed to motherboard. High speed signals are not routed to mother board, but have test points to connect to test on mother board connector EVT signal are connected to optional jumper to be routed to mother board.



Figure 8. JTAG, JTAG LFAST & SIPI

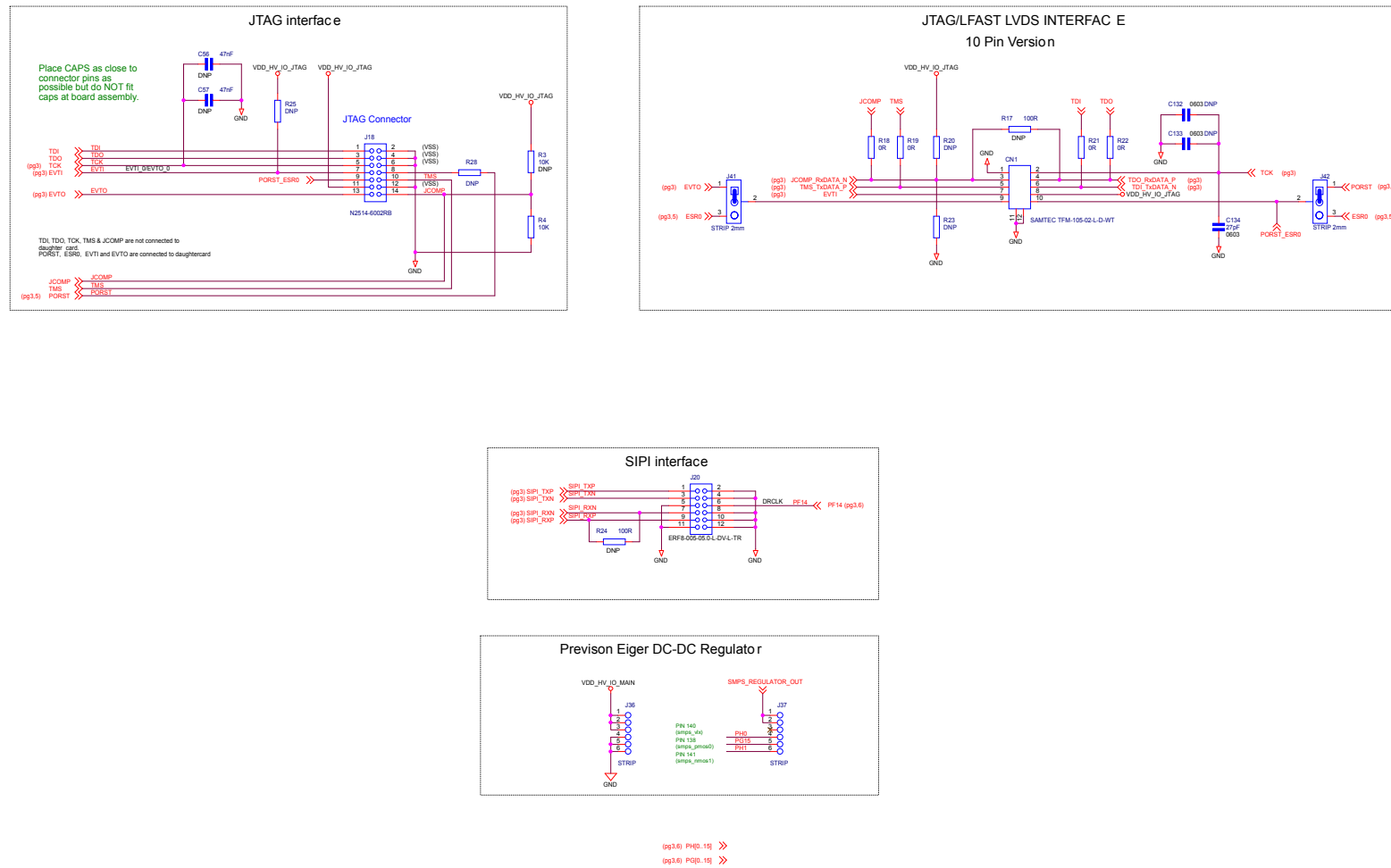


Figure 9. Clock and reset circuit

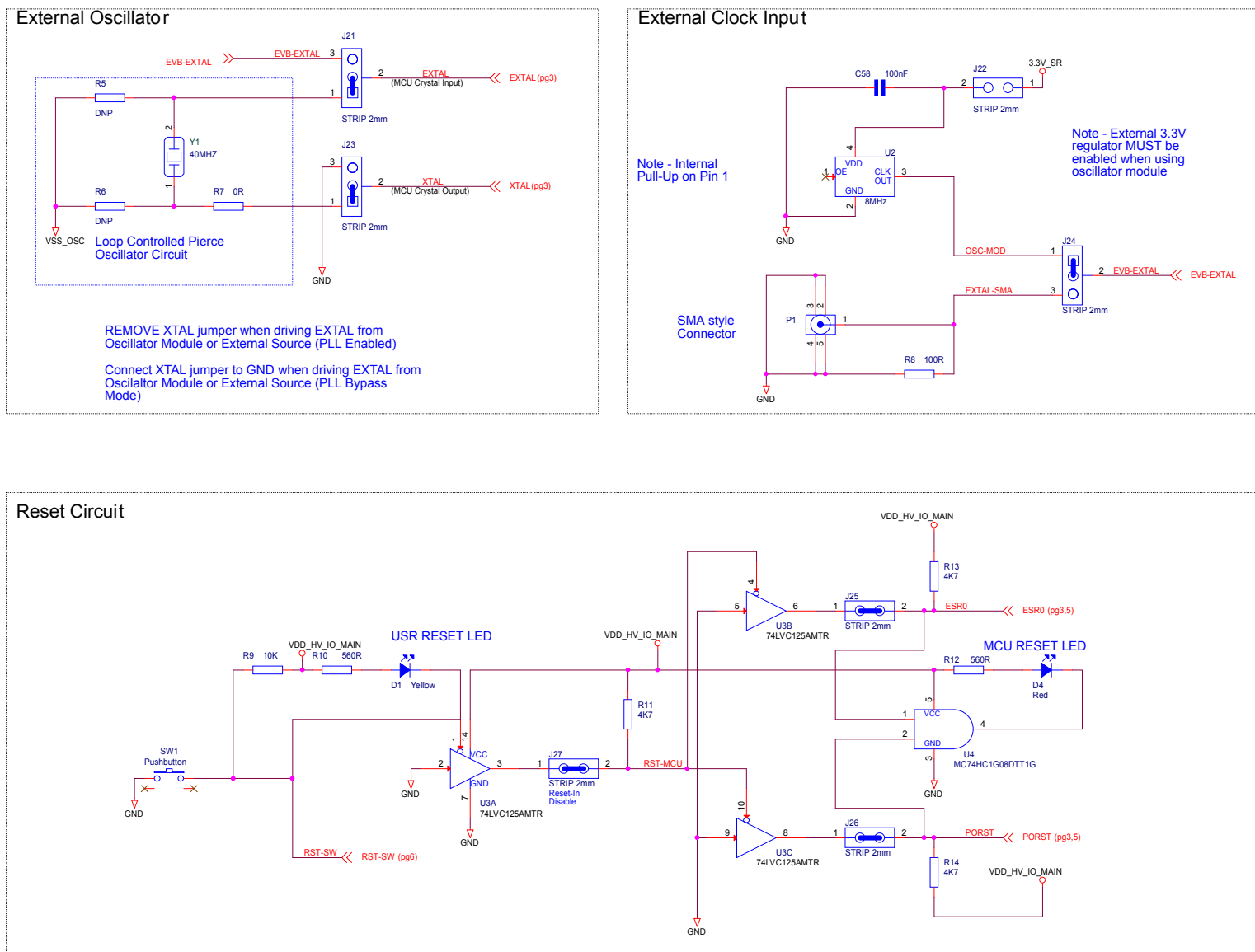
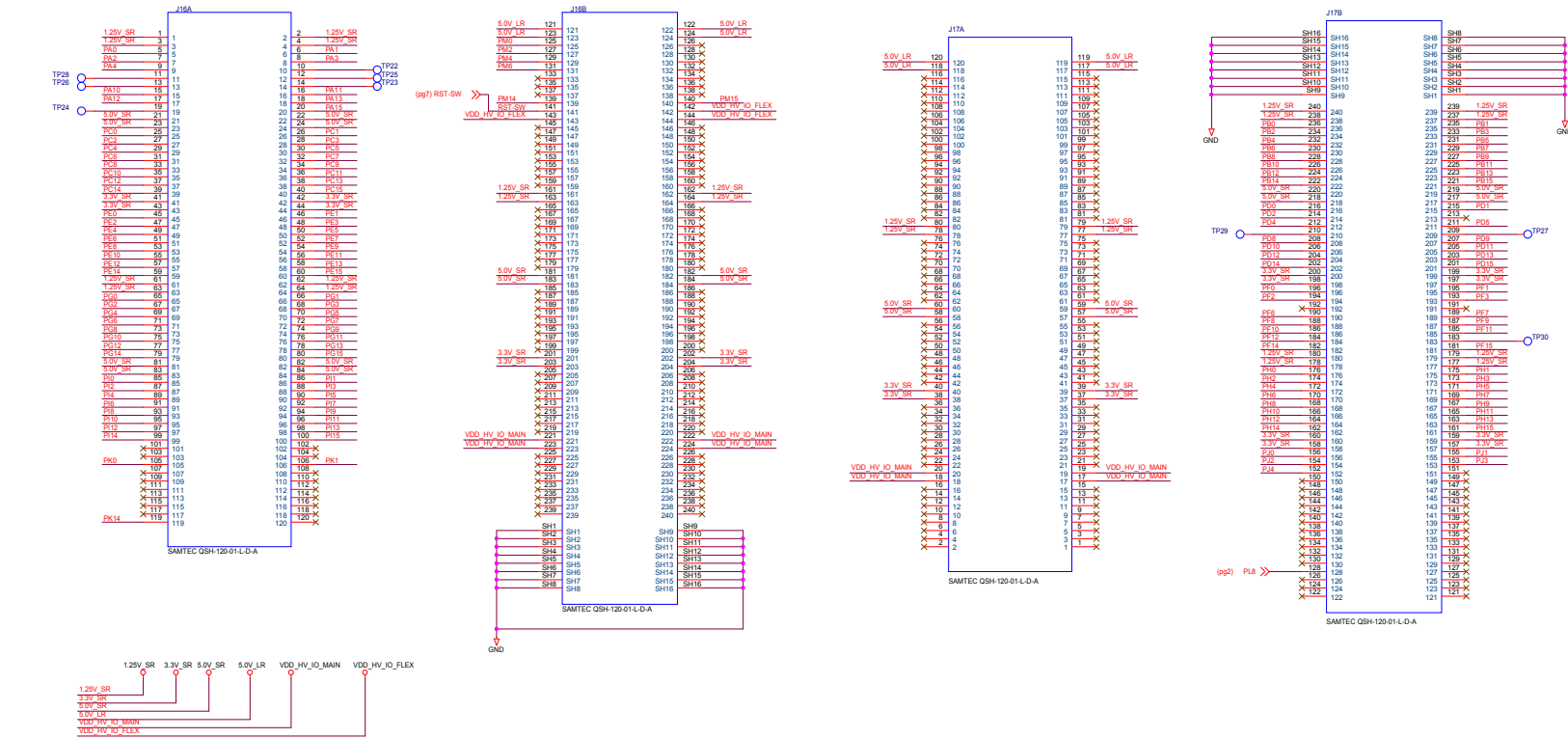
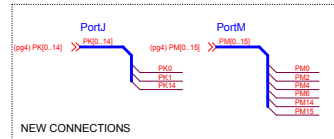
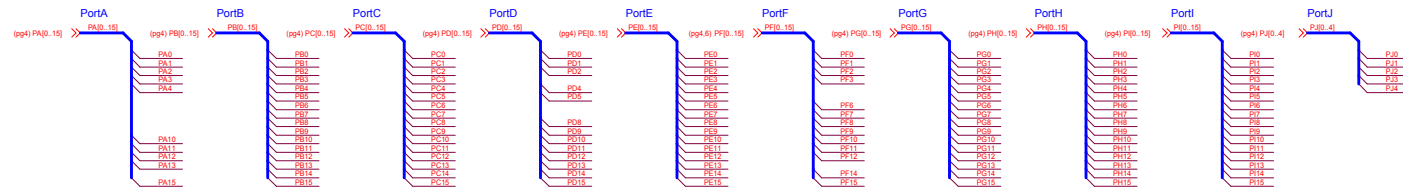


Figure 10. Board connector



Revision history

Table 10. Document revision history

Date	Version	Changes
04-Sep-2020	1	Initial release.

Contents

1	Overview	2
1.1	Package Contents	3
1.2	Supported Devices	3
2	License agreement	4
3	Handling precautions	5
4	Features	6
4.1	Hardware features	6
4.2	Hardware dimension	6
5	Power and system configuration	7
5.1	Power supplies	7
5.2	Microcontroller configuration	7
5.3	Port configuration	8
5.4	System clock configuration	8
5.5	Reset circuit	8
5.6	Test points	9
5.7	Connectors	9
5.8	Debug configuration jumpers	10
6	Layout overview	11
7	BOM	13
8	Schematics	15
	Revision history	20

List of tables

Table 1.	Power configuration jumpers	7
Table 2.	Microcontroller SPC584Cxx/SPC58ECxx configuration related jumpers	7
Table 3.	Ports related jumpers	8
Table 4.	Clock configuration jumpers	8
Table 5.	Reset configuration jumpers	8
Table 6.	Test points	9
Table 7.	Other connectors	9
Table 8.	Debug configuration jumpers	10
Table 9.	BOM	13
Table 10.	Document revision history	20

List of figures

Figure 1.	SPC58XCADPT176S	1
Figure 2.	Overview of SPC58XCADPT176S mini module - top	2
Figure 3.	Overview of SPC58XCADPT176S mini module - bottom	3
Figure 4.	SPC58XCADPT176S top mini module view	11
Figure 5.	SPC58XCADPT176S bottom mini module view	12
Figure 6.	Microcontroller power	15
Figure 7.	Microcontroller I/O.	16
Figure 8.	JTAG, JTAG LFAST & SIPI.	17
Figure 9.	Clock and reset circuit	18
Figure 10.	Board connector	19

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