
EV-SPC582B easy board

Introduction

The EV-SPC582B is a low-cost development board to evaluate and develop applications with the microcontroller SPC582B60E1 in eTQFP 64-pin package.

This document describes the hardware architecture of the EV-SPC582B easy board and in which way the jumpers can be set to enable specific functions.

1 EV-SPC582B easy board with SPC582B60E1 ---

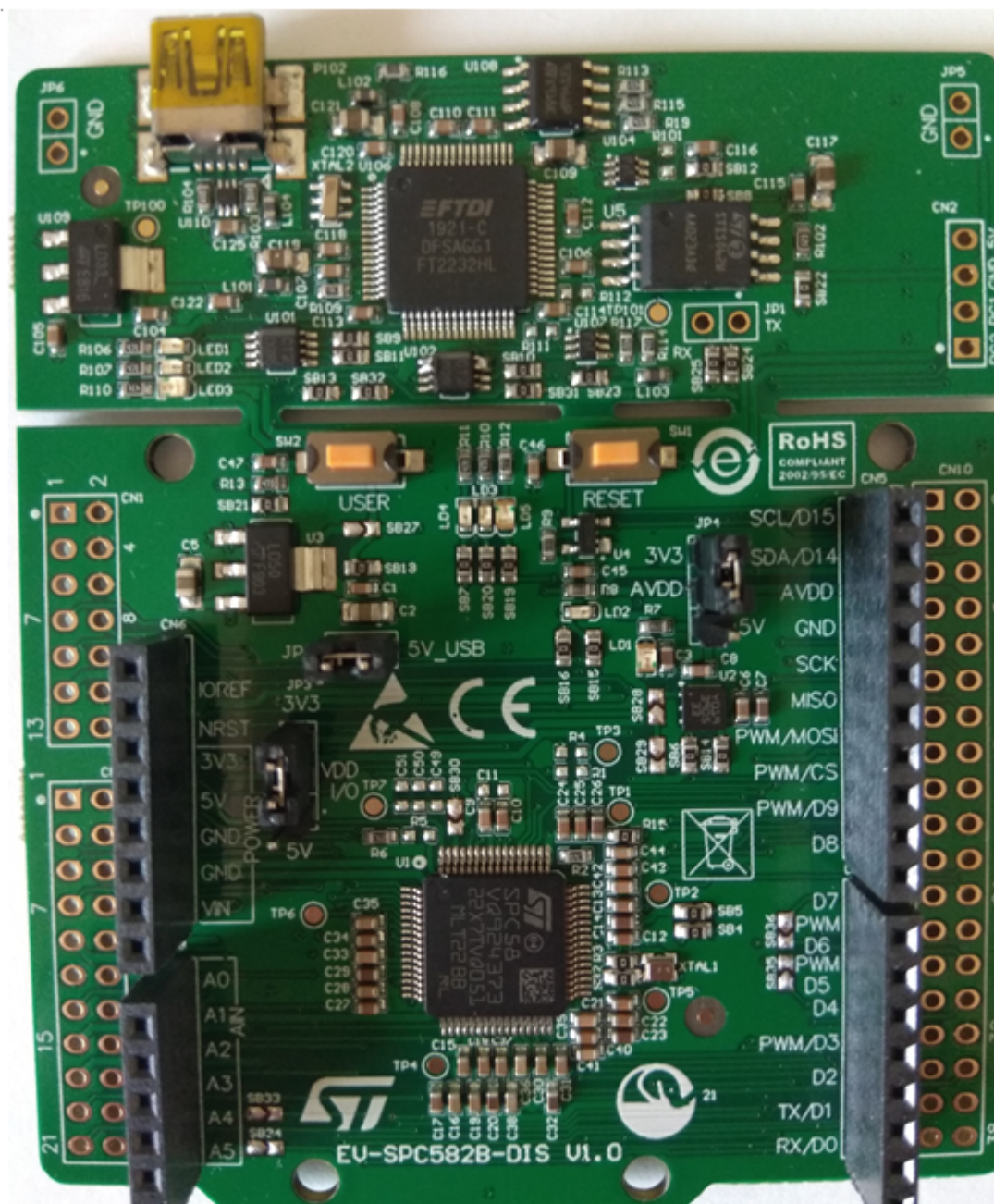
1.1 EV-SPC582B easy board

The EV-SPC582B easy board is an evaluation tool supporting STMicroelectronics SPC582B60E1, a high performance e200z2 single core 32-bit Power Architecture technology CPU 80 MHz, 1088 KB (1024 KB code flash + 64 KB data flash) 96 KB SRAM in an eTQFP64 package.

The EV-SPC582B allows full access to peripherals such as DSPI, LINFlexD, ISO CAN-FD.

The new features satisfy the ASIL-B requirements.

Figure 1. EV-SPC582B



The board integrates a PLS programmer/debugger that allows debugging and programming the microcontroller via USB cable. In addition, it allows enabling a USART communication channel (USB Virtual COM port).

Dedicated connectors allow plugging shields Arduino UNO-compatible; this feature makes it easy to expand the functionality of the EV-SPC582B.

All CPUs pins are connected to two-pin arrays; this solution simplifies the debug activity as well as it reduces the effort to connect the EV-SPC582B to the final user application board.

A standard 2x7pin JTAG port is available to program and debug the microcontroller by using third part tools.

Note: the male connector (2 x 7 pins) is not assembled.

2 Hardware overview

2.1 Power supply section

EV-SPC582B can be supplied by using some DC sources, setting some jumpers properly:

- by the host PC through the USB cable (+5 V; this is the default configuration)
- by an external source connected to VIN pin (CN6 pin 8, CN7 pin 8) (from 7 to 12 V)

Note: The maximum input voltage level is limited by the thermal dissipation of the linear regulators; the input voltage level must be selected and limited according to the microcontroller current absorption.

- by an external source connected to E5V (CN6 pin 5, CN7 pin 17 and CN10 pin 8)
- by an external source connected both to E3V3 (CN6 pin4 and CN7 pin 15) and to E5V

The external source can be a PSU, or the user application. The external sources or the PSUs connected to the board must be SELV compliant, self-protected and with limited current capability.

Note: “SELV” means “Safety Extra- Low Voltage”.

2.2 Jumpers configuration cable

Table 1. Power source and jumpers configuration

-	Jumper configuration				
	+5 V		+3.3 V	E5V	E3V3
Power source					
Jumper	JP2	SB27	SB14	SB18	SB6
PCB- USB cable	Close	Open	Close	Close	Close
External source- VIN	Open	Close	Close	Close	Close
External source- E5V	Open	Open	Close	Close	Close
External source- E3V3 and E5V	Open	Open	Open	Close	Close

2.3 Voltage regulators and jumpers

This paragraph depicts the power supply section and how to configure the jumpers.

LD1 monitors the +5 V supply. U2 and U3 are linear regulators; the output voltage is 3.3 V and 5 V respectively.

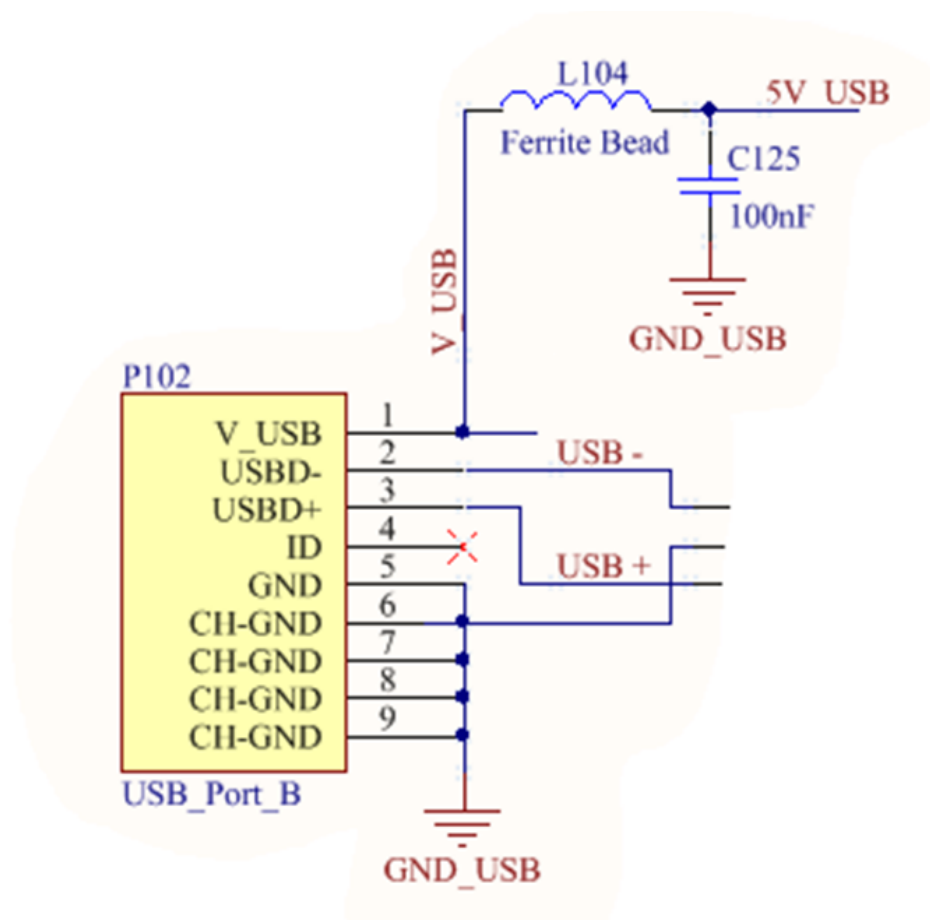
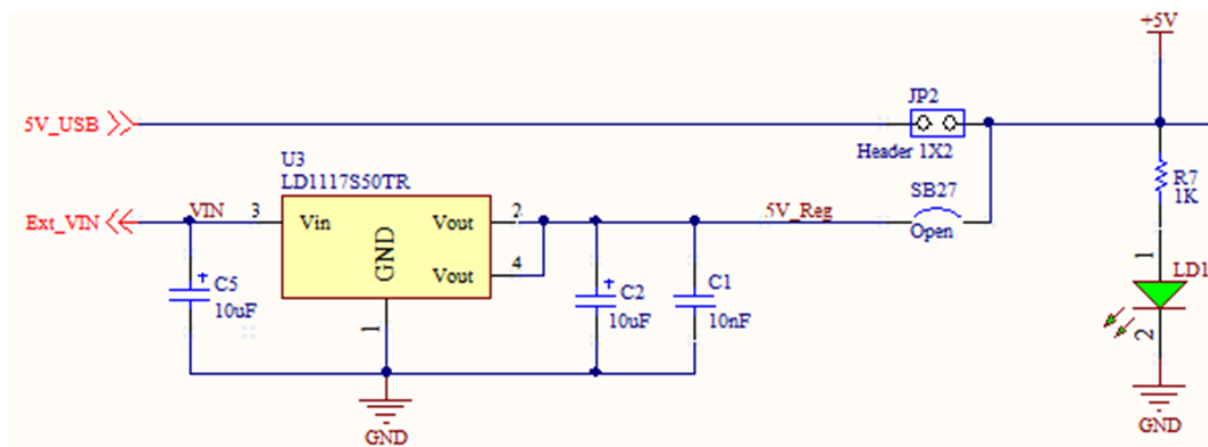
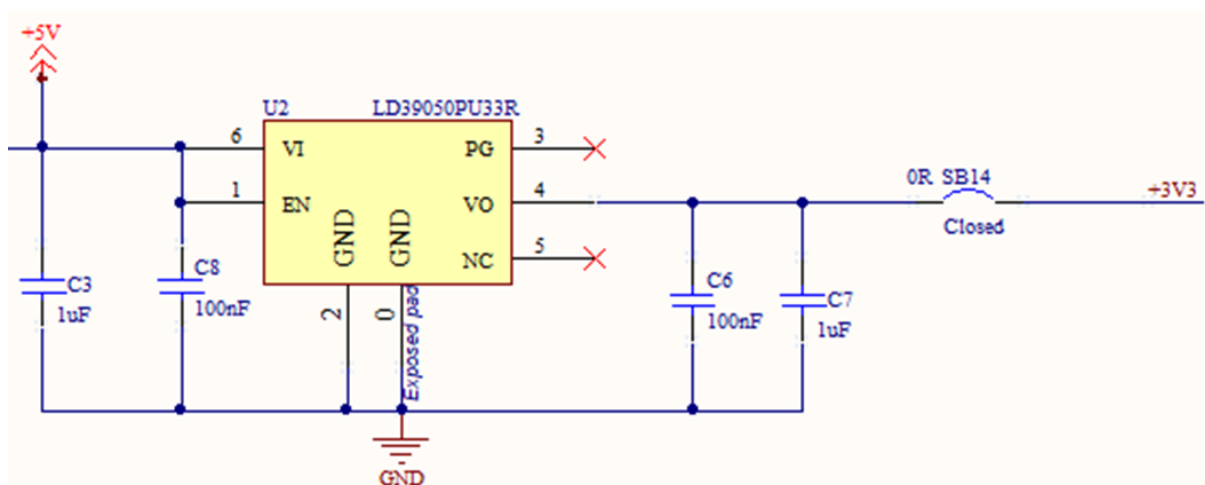
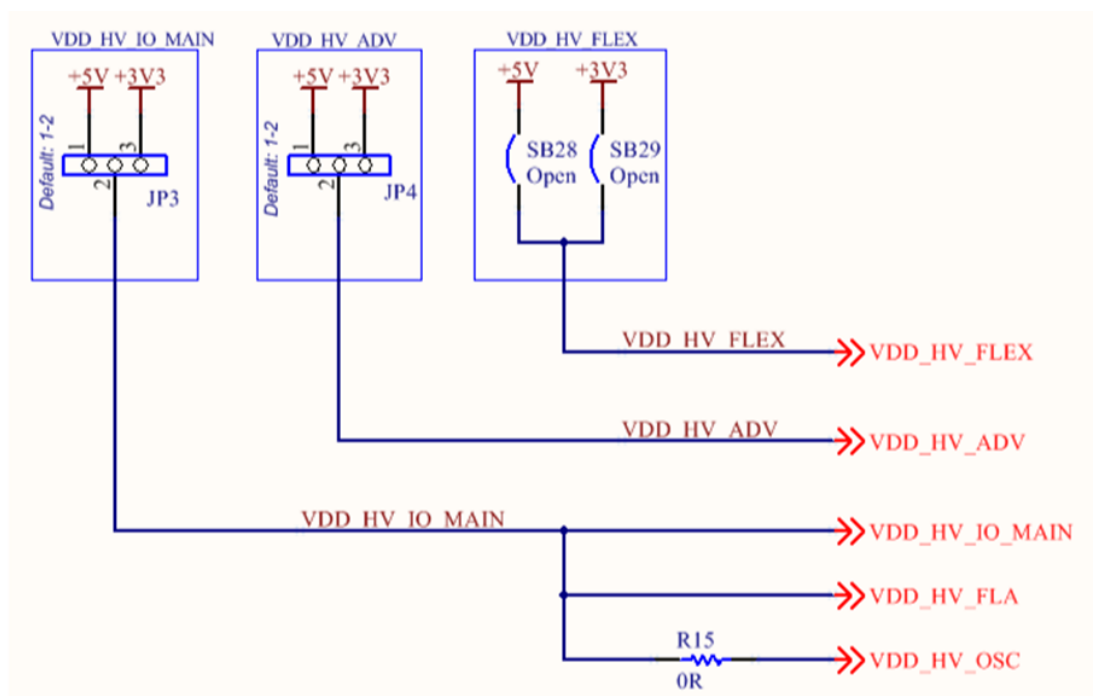
Figure 2. USB Port - 5 V input

Figure 3. +5 V regulator (external PSU) and 5 V selector (JP2-SB27)


Figure 4. +3.3 V voltage regulator and +3.3 V selector (SB14)


2.4 Microcontroller power management

JP3 and JP4 set the supply voltage levels of VDD_HV_IO_MAIN and VDD_HV_ADV.

Figure 5. Microcontroller power management-jumper setting


2.5 Integrated Programmer/Debugger

The integrated programmer/debugger allows the user to program the microcontroller and debug the software applications; it is based on the UDE PLS software.

The debugger serial number is reported on the label applied on the board (bottom side).

The integrated debugger is accessible via free debugger software and to activate the license refer to the PLS website.

A JTAG port allows connecting further HW/SW tools to program and debug the microcontroller.

Note: the JTAG connector (2x7 male pin array) is not assembled.

U106 can be configured to establish a serial communication port; pin 38 (Tx), pin 39 (Rx) and a dual channel digital isolator implement this function showing how to set the jumpers.

Note: the board comes with the integrated programmer enabled.

Table 2. Programmer/Debugger-jumpers setting

-	SB23	SB8	SB9	SB10	SB11	SB12	SB13	SB31	SB32
PLS integrated programmer	Close	Close	Close	Close	Close	Close	Close	Close	Close
External JTAG programmer	Open	Open	Open	Open	Open	Open	Open	Open	Open

Figure 6. PLS Integrated Programmer/Debugger (part I)

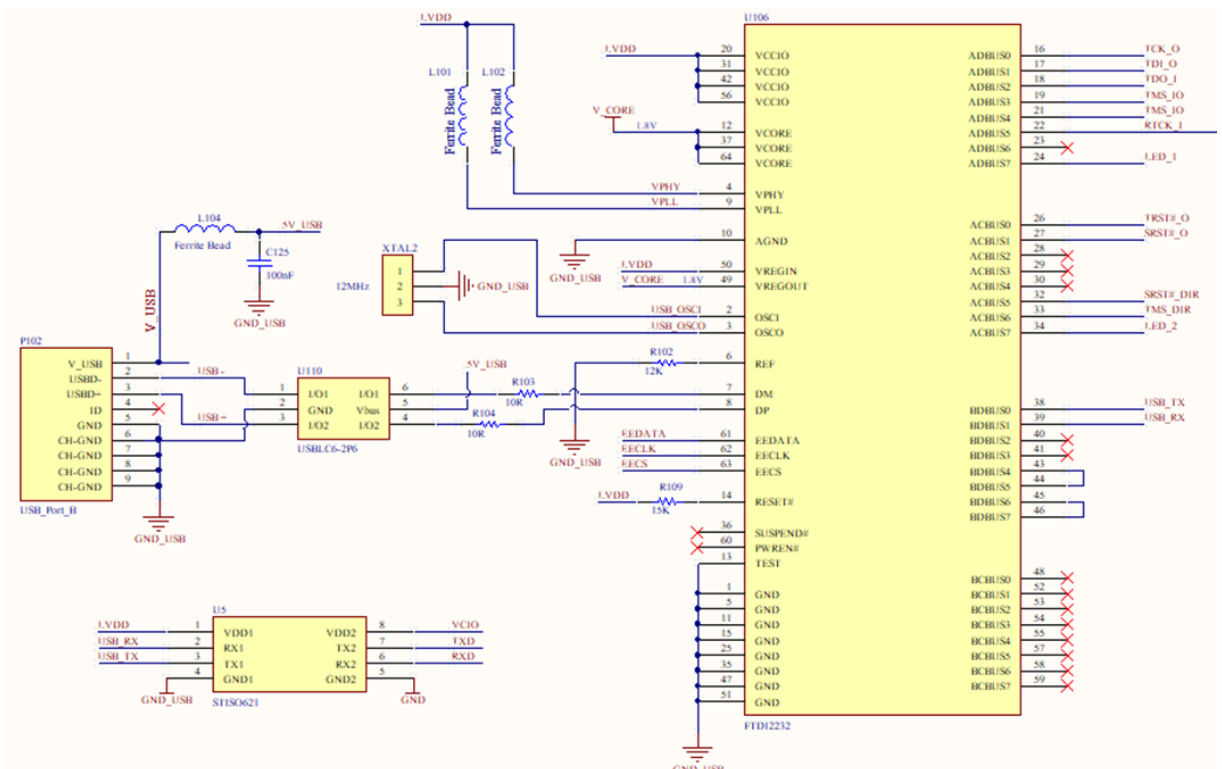
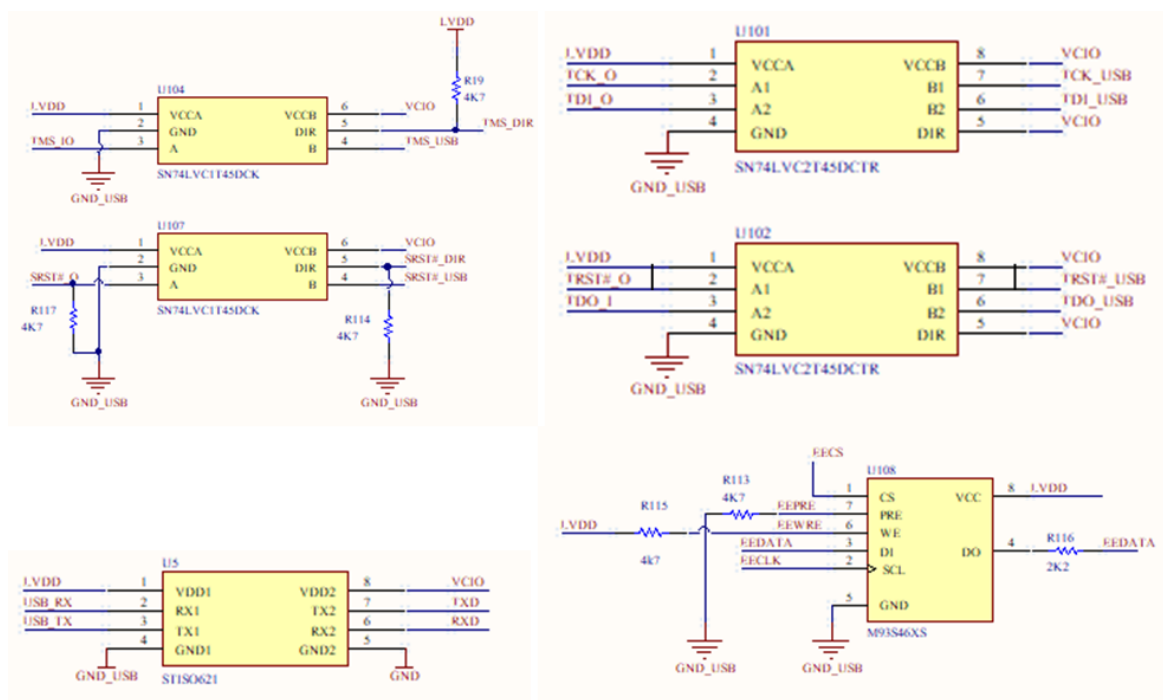
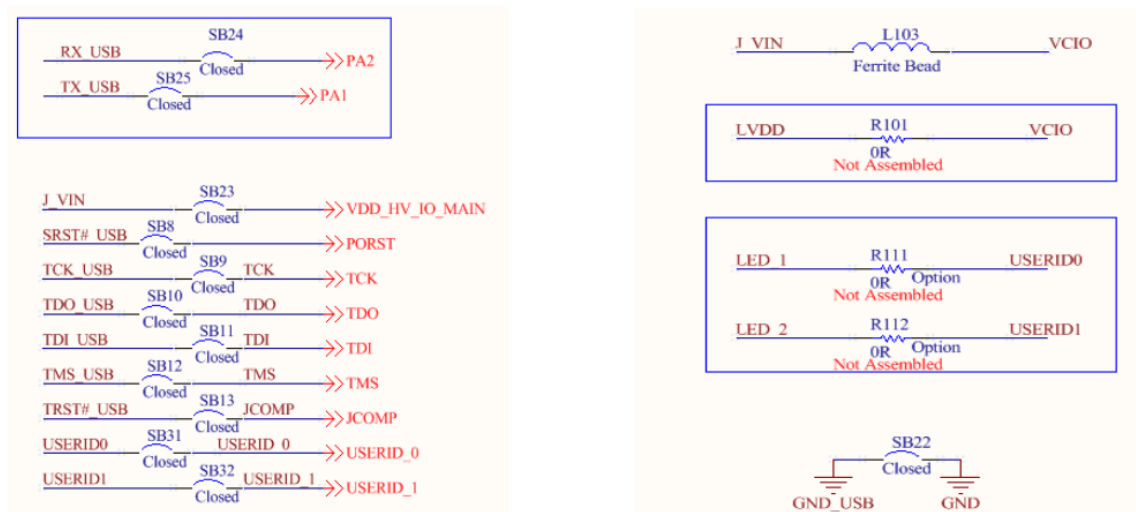
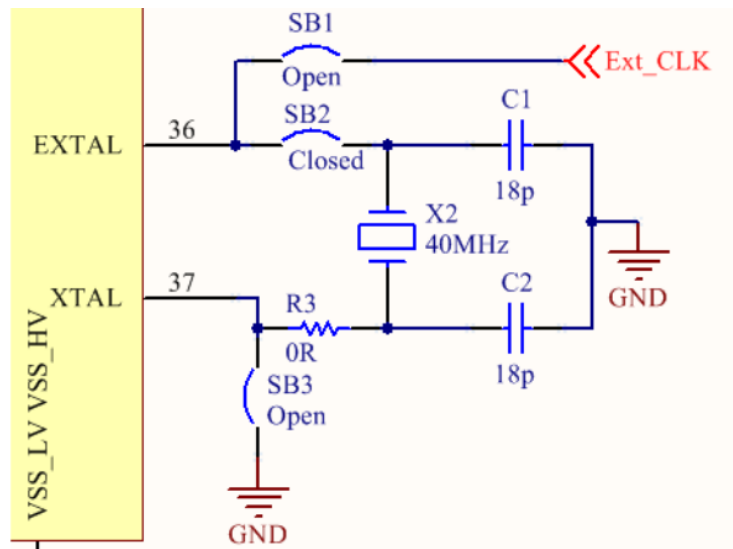


Figure 7. PLS Integrated Programmer/Debugger (part II- level shifters and EEPROM)

Figure 8. PLS Integrated Programmer/Debugger (part III- jumper configuration)


2.6

Crystal oscillator

The board accepts different clock sources. In the default HW configuration a 40 MHz crystal (X2) is connected to the microcontroller oscillator pins.

Figure 9. Crystal oscillator (default configuration)


The jumpers SB1, SB2 and SB3 allow enabling further input clock as described in the following table.

Table 3. Crystal oscillator - jumper configuration

	SB1	SB2	SB3
Crystal (40 MHz)	Open	Close	Open
Ext clock	Close	Open	Open

2.7 Reset circuit

The following figure shows the reset circuit; it generates a sharp signal to reset the microcontroller when the push button SW1 is pushed.

SW1 activates the STM6315RB- 2.63 V and it generates reset pulse (active low signal); D2 is turned on when the reset pulse is generated. The SB16 solder jumper allows the user to disconnect PORST and NRST signals (in the default configuration it is closed). The internal reset generator can be disabled and the reset signal can be provided by an external source connected to CN6 pin3; to implement this configuration SB15 should be removed.

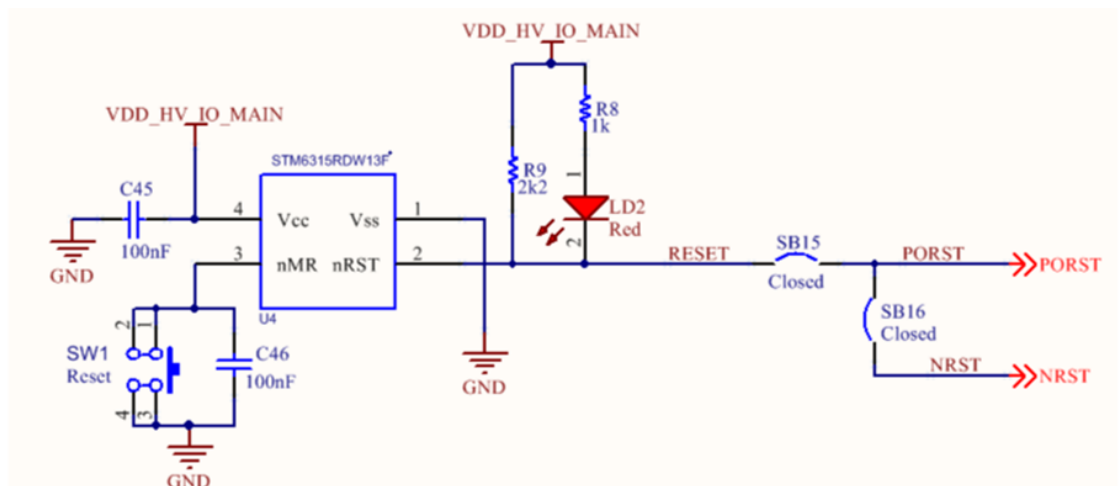
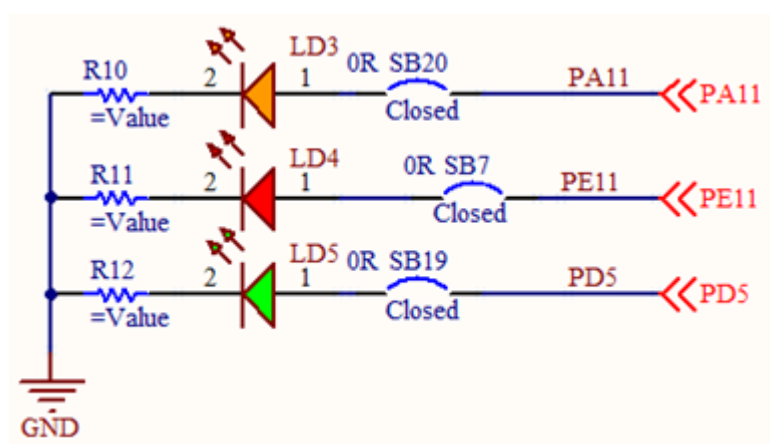
Figure 10. Reset circuit


Table 4. Reset circuit - jumpers configuration

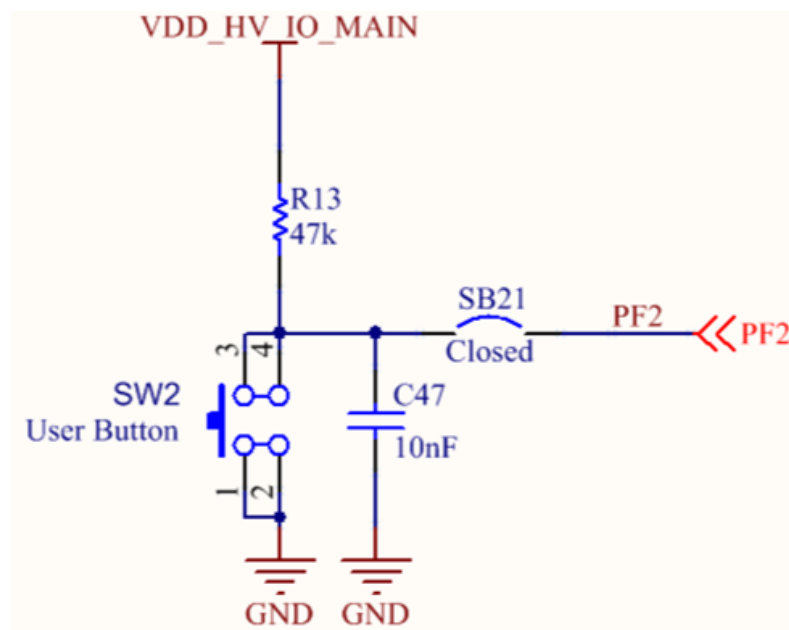
-	SB15	SB16
Internal reset circuit	Close	Close
External reset circuit	Open	Close

2.8 User LEDs, user button

In the EV-SPC582B board three LEDs are available for user purposes (see the following figure). The jumpers SB7, SB19 and SB20 allow disconnecting the anode of each LED and then let the user reserve these pins for a different purpose.

Figure 11. User LEDs


The push button SW2 is reserved for user purpose (see the following figure). If the jumper SB21 is left open, PF2 port is available for a different purpose.

Figure 12. User push-button


2.9 Connectors

2.9.1 Arduino connectors

Table 5. CN6- Arduino UNO-R3 power

Arduino UNO-R3 Analog In	Connector CN6	
	CN6 pin	Function / Signal
-	1	-
IOREF (3V3)	2	VDD_HV_IO_MAIN (3 V 3)
NRST	3	NRST
3V3	4	E3V3
5 V	5	E5V
GND	6	GND
GND	7	GND
VIN	8	VIN

Table 6. CN8- Arduino UNO-R3 analog input

Arduino UNO-R3 Analog In	Connector CN8					
	CN8 pin	µC port	µC pin	Function	Alternate function (1)	Alternate function (2)
A0	1	PE3	10	AN[17]	UC16	CLKOUT0
A1	2	PD12	8	AN[15]	UC14	SIN
A2	3	PD13	9	AN[16]	UC15	SCK
A3	4	PE2	7	AN[13]	UC13	SOUT
A4	5	PI7	18	AN[50]	-	-
A5	6	PI6	17	AN[49]	-	-

Table 7. CN5- Arduino UNO-R3 digital PWM (D15÷D8)

Arduino UNO-R3 Digital PWM (part 2)		Connector CN5						
		CN5 pin	µC port pin	Function	Alternate function (1)	Alternate function (2)	Alternate function (3)	-
-	D8	1	PA11	53	UC1	M_CAN_2_RX	M_CAN_1_RX	LinFlexD 2 RX
PWM	D9	2	PA10	52	UC15	M_CAN_2_TX	M_CAN_1_TX	LINFlexD_2 TX
PWM/C S	D10	3	PB11	29	CS0-DSPI0	UC24	-	-
PWM/M OSI	D11	4	PG12	25	SOUT-DSPI0	UC20	AN[58]	-
MSO	D12	5	PD11	26	SIN-DSPI0	UC21	AN[63]	-
SCK (LED)	D13	6	PG11	24	SCK-DSPI0	UC19	AN[57]	-
I2C SDA	D14	9	PB9	31	I2C-SDA	UC26	-	-
I2C SCL	D15	10	PB8	32	I2C- SCL	UC27	-	-

Table 8. CN9 - Arduino UNO-R3 digital PWM (D7÷D0)

Arduino UNO-R3 Digital PWM (part 1)		Connector CN9						
		CN9 pin	µC port pin	Function	Alternate function (1)	Alternate function (2)	Alternate function (3)	-
RX	D0	1	PC3	4	LINFlex1 RXD	UC7	-	-
TX	D1	2	PC4	3	LINFlex1 TXD	UC6	-	-
-	D2	3	PA1	51	LINFlex2 RXD	UC11	INT19	-
PWM	D3	4	PA2	50	LINFlex2 TXD	UC10	INT18	-
-	D4	5	PC13	61	UC28	SIN-DSPI1	M_CAN_1_TX	-
PWM	D5	6	PE10	54	UC17	SIN -DSPI1	LINFlex0 - RXD	-
PWM	D6	7	PB10	30	UC25	SOUT-DSPI2	LINFlex0-TXD	INT3
-	D7	8	PF3	63	UC2	CS1-DSPI1	LINFlex2-TXD	INT9

2.9.2 Extended connectors (I/O Headers)

Table 9. CN7- extended connectors (I/O Headers)

Signal	Connector CN7					
	CN7 pin	µC port	µC pin	Function	Alternate function (1)	Alternate function (2)
-	1	PA11	53	SCK-DSPI_3	UC16	M_CAN_2_RX
-	2	PD14	1	M_CAN_0_TX	-	-
-	3	PE11	55	SOUT-DSPI_3	UC18	LINFlexD0 TXD
-	4	PD15	2	M_CAN_0_RX	UC0	-
-	5	PC14	60	UC27	SCK -DSPI_1	-
GND	6	-	-	-	-	-
User button	7	PF2	64	UC20	LINFlexD2-XD	-
VIN	8	-	-	-	-	-
VDD_HV_IO	9	-	-	-	-	-
AVDD	10	-	-	-	-	-
GND	11	-	-	-	-	-
A0 (CN8)	12	-	-	-	-	-
Ext Clock	13	-	-	-	-	-
A1 (CN8)	14	PD12	8	AN[15]	UC14	SIN -DSPI_3
E3V3	15	-	-	-	-	-
A2 (CN8)	16	PD13	9	AN[16]	UC15	SCK -DSPI_3
E5V	17	-	-	-	-	-

Signal	Connector CN7					
	CN7 pin	µC port	µC pin	Function	Alternate function (1)	Alternate function (2)
A3 (CN8)	18	PE2	-	-	-	-
-	19	PI3	15	AN[39]	-	-
A4 (CN8)	20	PI7	-	AN[50]	-	-
-	21	PI4	16	AN[40]	-	-
A5 (CN8)	22	PI6	17	AN[49]	-	-

Table 10. CN10- extended connectors (I/O Headers)

Signal	Connector CN10						
	CN10 pin	µC port	µC pin	Function	Alternate function (1)	Alternate function (2)	Alternate function (3)
nc	2	-	-	-	-	-	-
D15 (CN5)	3	PB8	32	SCL-I2C	UC27	SCK-DSPI_2	-
-	4	PH4	56	UC19	CS1 -DSPI_3	-	-
D14 (CN5)	5	PB9	31	SDA-I2C	UC26	SDI-DSPI_2	-
-	6	PC12	62	UC13	CS1 -DSPI_3	M_CAN_1_RX	-
AVDD (CN5)	7	-	-	-	-	-	-
E5V	8	-	-	-	-	-	-
GND	9	-	-	-	-	-	-
GND	10	-	-	-	-	-	-
D13 (CN5)	11	PG11	24	SCK -DSPI_0	UC19	AN[57]	-
-	12	PC1	6	LINFlexD1 5 RXD	UC9	-	-
D12 (CN5)	13	PD11	26	SIN -DSPI_0	UC21	AN[63]	-
-	14	PC2	-	LINFlexD1 5 TXD	UC8	-	-
D11 (CN5)	15	PG12	25	SOUT-DSPI_0	UC20	AN[58]	-
nc	16	-	-	-	-	-	-
D10 (CN5)	17	PB11	29	CS0-DSPI_0	UC24	-	-
nc	18	-	-	-	-	-	-
D9 (CN5)	19	PA10	52	UC15	M_CAN_2_TX	M_CAN_1_TX	LINFlex2 TXD
GND	20	-	-	-	-	-	-
D8 (CN5)	21	PA11	53	UC16	M_CAN_2_RX	M_CAN_1_RX	LINFlex2 RXD
-	22	PM14	46	M_CAN_1_RX	REQ7	-	-
D7 (CN9)	23	PF3	63	UC2	CS1-DSPI_1	LINFlex2 TXD	INT9
-	24	PC15	59	UC26	-	-	-
D6 (CN9)	25	PB10	30	UC25	SOUT -DSPI_2	LINFlex0 TXD	INT3

Signal	Connector CN10						
	CN10 pin	µC port	µC pin	Function	Alternate function (1)	Alternate function (2)	Alternate function (3)
-	26	PI2	14	M_CAN_3_RX	UC5	-	-
D5 (CN9)	27	PE10	30	UC17	SIN -DSPI_3	LINFlex0 RXD	-
-	28	PI1	13	M_CAN_3_7X	UC4	-	-
D4 (CN9)	29	PC13	61	UC28	SIN - DSPI_1	M_CAN_1_TX	-
-	30	PD0	58	SCK -DSPI_2	UC22	REQ4	-
D3 (CN9)	31	PA2	50	LINFlex1 TXD	UC10	INT18	-
AGND	32	-	-	-	-	-	-
D2 (CN9)	33	PA1	53	LINFlex1 RXD	UC11	INT19	-
-	34	PG10	23	AN[55]	-	-	-
D1 (CN9)	35	PC4	3	LINFlex2 TXD	UC6	-	-
nc	36	-	-	-	-	-	-
D0 (CN9)	37	PC3	4	LINFlex2 RXD	UC7	-	-
nc	38	-	-	-	-	-	-

2.10 BT module connector

Table 11. CN2- BT module connector

Signal	CN2 connector				
	CN2 pin	µC port	µC pin	Function	Alternate function (1)
TXD	1	PC2	5	LINFlexD15 TXD	UC8
RXD	2	PC1	6	LINFlexD15 RXD	UC9
GND	3	-	-	-	-
E5V	4	-	-	-	-

3 JTAG connector

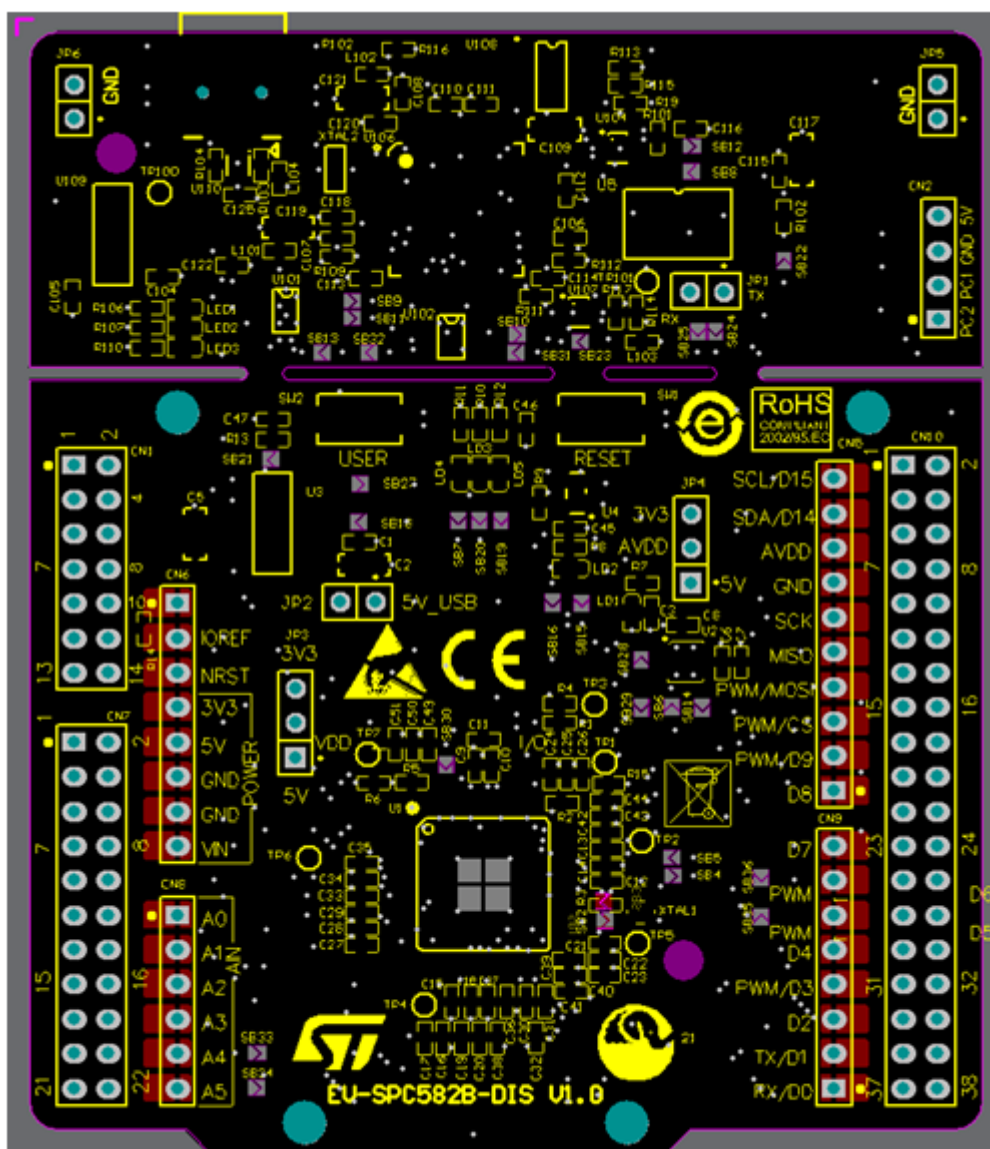
Table 12. CN1- JTAG connector

CN1 connector		
CN1 pin	μC pin	Function
1	38	TDI
2	-	GND
3	41	TDO
4	-	GND
5	43	TCK
6	-	GND
7	-	NC
8	-	NC
9	45	PORST
10	40	TMS
11	12	VDD_HV_IO
12	-	GND
13	-	NC
14	42	JCOMP

Appendix A Board layout

A.1 PCB layout

Figure 13. PCB layout- top side



Revision history

Table 13. Document revision history

Date	Version	Changes
29-Oct-2021	1	Initial release.

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