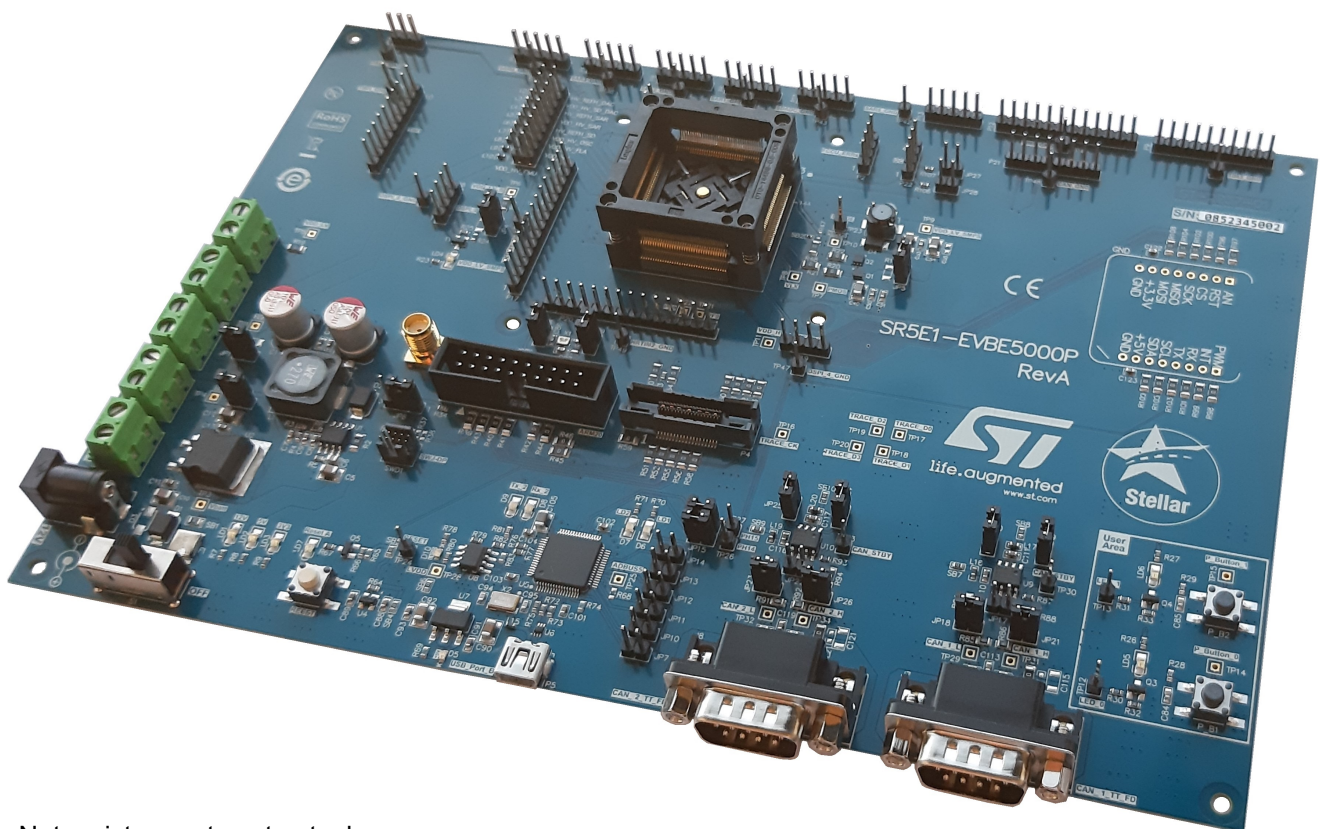


SR5E1-EVBE5000P rev. A evaluation board

Introduction

The SR5E1-EVBE5000P rev. A standalone evaluation board supports STMicroelectronics SR5E1E5 microcontroller in TQFP144.

Figure 1. SR5E1-EVBE5000P rev. A



Note: picture not contractual



1 Overview

The SR5E1-EVBE5000P rev. A standalone evaluation board supports STMicroelectronics SR5E1E5 microcontroller with package TQFP 20x20 144L exposed pad down.

The evaluation board is a standalone unit allowing access to the CPU, access to the I/O pins as well as to any board peripherals. The evaluation board is intended for bench/laboratory use and has been designed using normal temperature specified components.

Figure 2. SR5E1-EVBE5000P rev. A - top overview

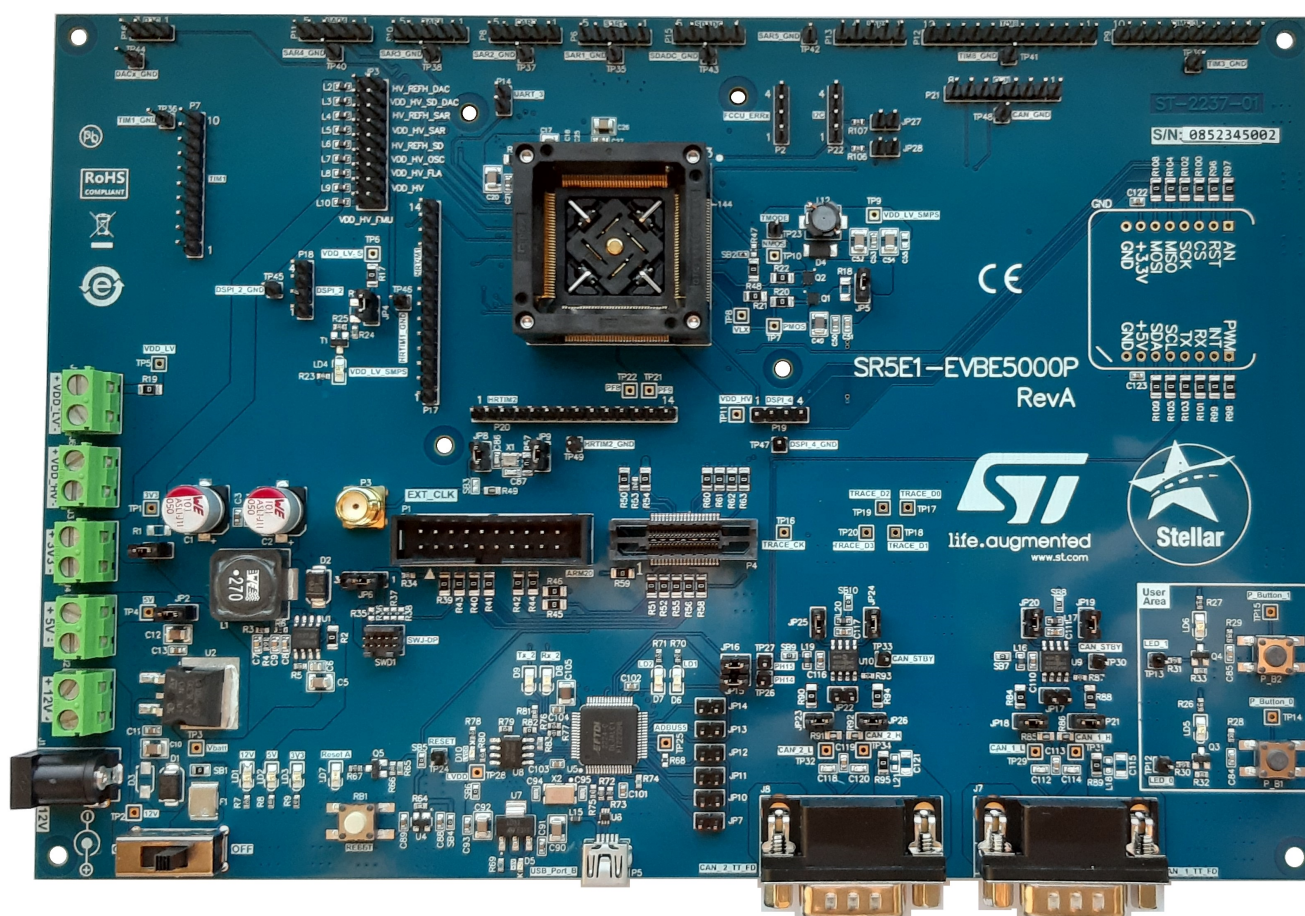
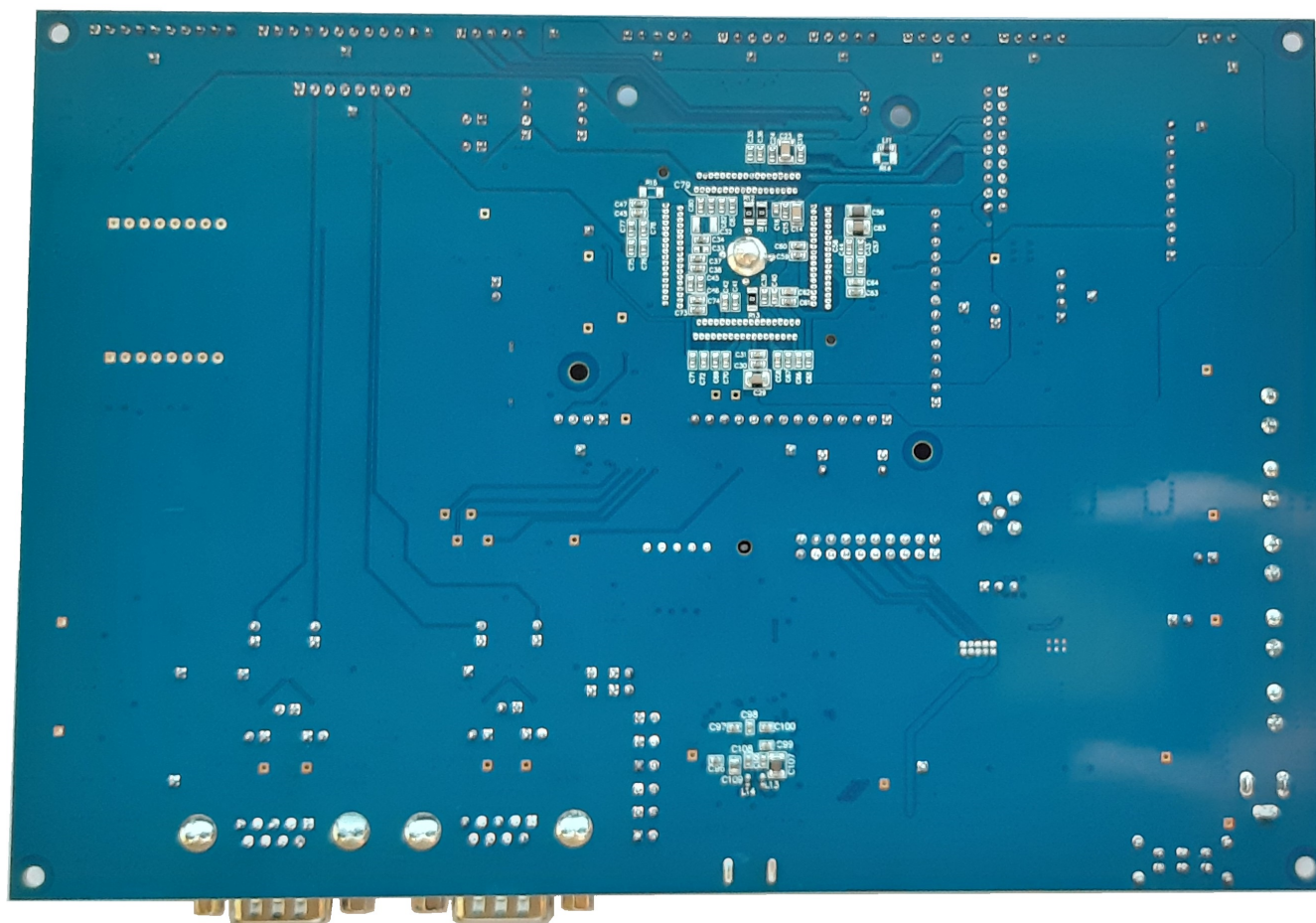


Figure 3. SR5E1-EVBE5000P rev. A - bottom overview



1.1 Supported devices

The SR5E1-EVBE5000P rev. A evaluation board supports the following STMicroelectronics family of microcontrollers in TQFP144 package:

- SR5E1E5

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

Caution: *Handle the package content carefully to prevent electrostatic discharge.*

Before using the EVB or applying power, read the following sections to correctly configure the board. Incorrect configuration may cause irreparable damage to components, the MCU, or the EVB.

4 Hardware description

4.1 Hardware features

The SR5E1-EVBE5000P rev. A evaluation board has the following features:

- 12 V external power supply
- Socketed device
- Reset generation
- Clock generation:
 - 40 MHz external oscillator
 - SMA connector
- External supply connector:
 - 12 V
- UART (USB connector)
- CAN:
 - CAN1 and CAN3 with CAN FD transceivers and DB9 connectors
 - CAN1, CAN3, and CAN4 at GPIO level (header connector)
- 2x SPI (DSPI_2 and DSPI_4)
- 1x I²C
- 5x SAR ADC modules
- 2x SAR CAL modules
- 2x buffered DACs
- 2x advanced control timers:
 - TIM1: 3 channels
 - TIM8: 4 channels
- 1x general purpose timer:
 - TIM3: 4 channels
- 2x high resolution timers:
 - HRTIM1
 - HRTIM2
- JTAG debug connector (Mipi 10-pin + ARM 20-pin)
- User area: external module connector, two LEDs and two push buttons.

4.2 Hardware dimensions

The evaluation board has the following dimensions:

- PCB area: 220 mm x 150 mm
- Top components height: 25 mm
- Bottom components height: 5.0 mm
- PCB thickness 1.546 mm

5 Power and system configuration

5.1 Power supplies

The SR5E1-EVBE5000P rev. A evaluation board requires an external power supply voltage of 12 V DC, minimum 2 A. The single input voltage is regulated on-board using a step-down switching regulator for automotive applications providing the supply voltage of 3.3 V.

5.2 Power supply connectors

The following figure shows 2.1 mm barrel connector:

Figure 4. 2.1 mm power connector



5.3 Power switch, status LEDs and fuse

The main power switch (slide switch S1) can be used to isolate the power supply input from the EVB voltage regulators if required.

When power is applied to the evaluation board, the power LEDs adjacent to the voltage regulators show the presence of the supply voltages as follows:

- LED LD1 - 12 V
- LED LD2 - 5 V
- LED LD3 - 3.3 V
- LED LD4 - VDD_LV_SMPS

If no LED is illuminated when power is applied to the evaluation board and the regulators are correctly enabled using the appropriate jumpers, it is possible that either power switch S1 is in the “OFF” position or that the fuse F1 has blown. The fuse blows also if the power is applied to the evaluation board in reverse bias.

The following jumpers are used to configure the power supply (common for all the supported devices):

Table 1. Power configuration jumpers

Jumper	Description	Default	Position
JP3 pin 1-2	HV_REFH_DAC configuration: • Open: Not connected • Closed: Connected to 3V3	Closed	B1 ⁽¹⁾
JP3 pin 3-4	VDD_HV_SD_DAC voltage configuration: • Open: Not connected • Closed: Connected to 3V3	Closed	B1 ⁽¹⁾
JP3 pin 5-6	HV_REFH_SAR configuration: • Open: Not connected • Closed: Connected to 3V3	Closed	B1 ⁽¹⁾
JP3 pin 7-8	VDD_HV_SAR voltage configuration: • Open: Not connected • Closed: Connected to 3V3	Closed	B1 ⁽¹⁾

Jumper	Description	Default	Position
JP3 pin 9-10	HV_REFH_SD voltage configuration: - Open: Not connected - Closed: Connected to 3V3	Open	B1 ⁽¹⁾
JP3 pin 11-12	VDD_HV_OSC voltage configuration: - Open: Not connected - Closed: Connected to 3V3	Closed	B1 ⁽¹⁾
JP3 pin 13-14	VDD_HV_FLTA voltage configuration: - Open: Not connected - Closed: Connected to 3V3	Closed	B1 ⁽¹⁾
JP3 pin 15-16	VDD_HV_IO voltage configuration: - Open: Not connected - Closed: Connected to 3V3	Closed	B1 ⁽¹⁾
JP3 pin 17-18	VDD_HV_IO_PMU voltage configuration: - Open: Not connected - Closed: Connected to 3V3	Closed	B1 ⁽¹⁾
JP4	VDD_LV voltage configuration: - Open: Not connected - Closed: Connected to VDD_LV_SMPS	Closed	B1 ⁽¹⁾

1. Refer to the [Figure 15. SR5E1-EVBE5000P rev. A - top layer.](#)

5.4 System clock configuration

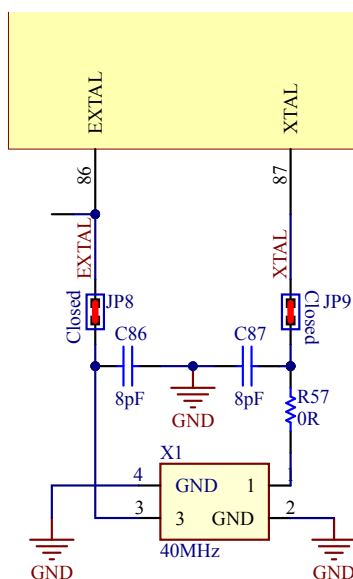
The evaluation board supports the usage of crystal clock sources as well as an external clock source.

The following clock sources are supported:

- 40 MHz local crystal oscillator for PLL
- A SMA connector is provided for the external clock input

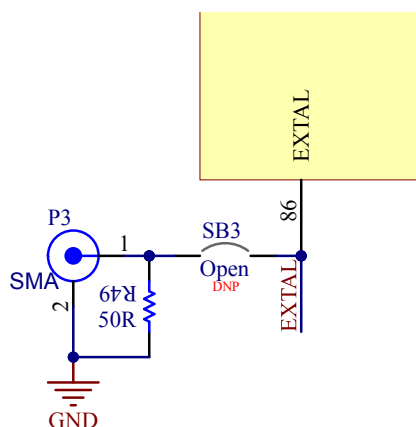
The following figure shows the 40 MHz local crystal oscillator schema:

Figure 5. 40 MHz local crystal oscillator schema



The following figure shows the external clock source schema:

Figure 6. External clock schema



The Table 2 shows the system clock sources configuration setting.

Table 2. System clock configuration

Jumper	Description	Default	Position
JP8	XTAL configuration: - Closed: connect pin 3 of 40 MHz crystal (X1) to XTAL - Open: disconnect the 40 MHz crystal (X1)	Closed	B3 ⁽¹⁾
JP9	EXTAL configuration: - Closed: connect pin 1 of 40 MHz crystal (X1) to EXTAL - Open: disconnect the 40 MHz crystal (X1)	Closed	B3 ⁽¹⁾
SB3	System clock external source: - Open: disconnect SMA connector (P3) from EXTAL - Closed: connect SMA connector (P3) to EXTAL	Open	B3 ⁽¹⁾

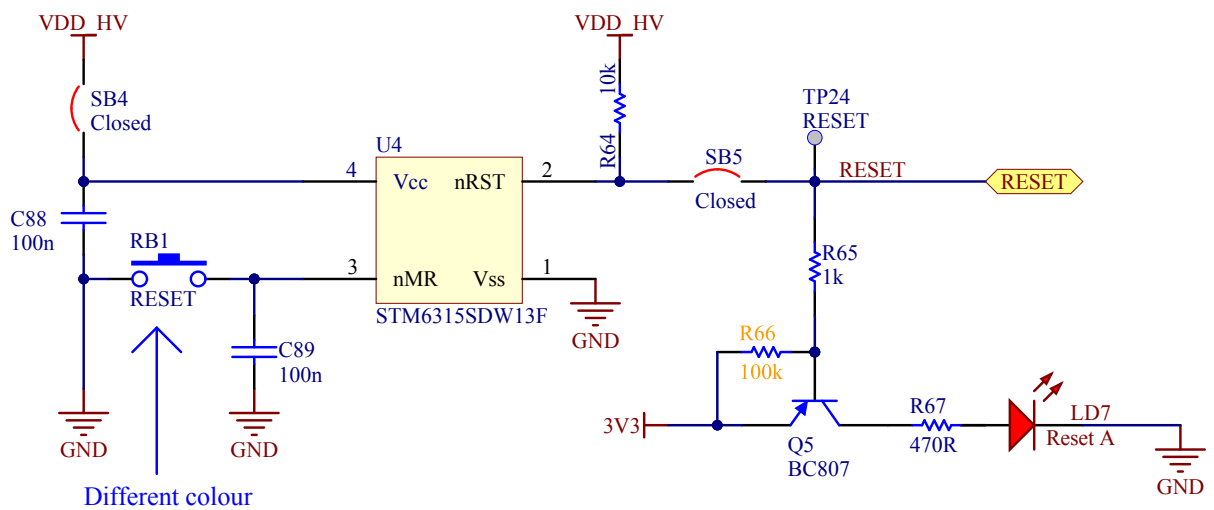
1. Refer to the Figure 15. SR5E1-EVBE5000P rev. A - top layer.

5.5 Reset circuit

The reset circuit is performed using the STM6315 device.

The following picture shows the schema of the evaluation board reset circuit:

Figure 7. Reset circuit schema



To use and perform the reset driving, there are different solder bridges:

Table 3. Reset configuration jumpers

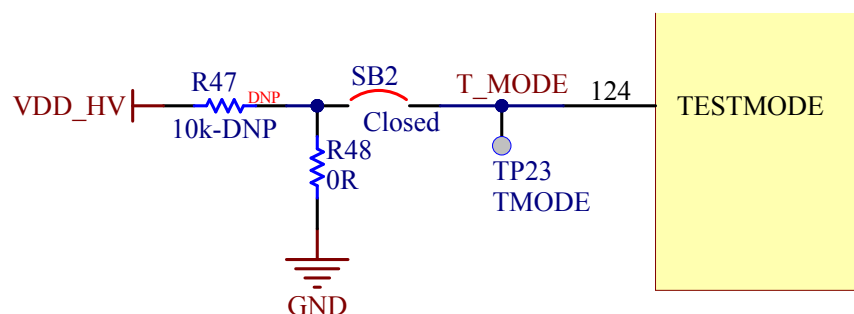
Jumper	Description	Default	Position
RB1	Reset pushbutton	Open	B4 ⁽¹⁾
SB4	- Open: disconnect the V_{CC} of the STM6315 device - Closed: connect the V_{CC} of the STM6315 device to VDD_HV	Closed	B4 ⁽¹⁾
SB5	- Open: disconnect the RESET signal from the Reset out of the STM6315 device - Closed: directly connect the signal to the Reset out of the STM6315 device	Closed	B4 ⁽¹⁾

1. Refer to the [Figure 15. SR5E1-EVBE5000P rev. A - top layer](#).

5.6 TESTMODE configuration

The following picture shows the TESTMODE configuration schema.

Figure 8. TESTMODE configuration schema



The following table shows the TESTMODE configuration setting:

Table 4. TESTMODE configuration schema

Jumper	Description	Default	Position
SB2	TESTMODE settings: - Open: TESTMODE pin is unconnected. - Closed: TESTMODE pin is connected to GND if R48 is populated or is connected to a 10 kΩ pull-up to VDD_HV if R47 is populated	Closed and R48 populated	C2 ⁽¹⁾

1. Refer to the [Figure 15. SR5E1-EVBE5000P rev. A - top layer](#).

6 Hardware description

6.1 CAN interface

The SR5E1-EVBE5000P rev. A has four MCP2542WFD high-speed CAN transceivers by Microchip™, two male standard DB9 connectors, and one 8x1 header connector to provide physical CAN interfaces for the MCU. The following table describes the CAN connectors:

Table 5. CAN connectors

Connectors	Description	Position
J7	CAN_1 FD DB9 connector	D4 ⁽¹⁾
J8	CAN_2 FD DB9 connector	C4 ⁽¹⁾
P21	8x1 header connector	C1/D1 ⁽¹⁾

1. Refer to the [Figure 15. SR5E1-EVBE5000P rev. A - top layer](#).

Table 6. CAN pin mapping

CAN channel	CAN signal (PHY)	Port	CAN signal (transceiver)
CAN 1	CAN1_TX_PHY	PA5	CAN_1_TX
CAN 1	CAN1_RX_PHY	PA4	CAN_1_RX
CAN 3	CAN3_TX_PHY	PH10	CAN_2_TX
CAN 3	CAN3_RX_PHY	PH11	CAN_2_RX

The following table shows the CAN_1 DB9 connector pinout (J7).

Table 7. CAN_1 DB9 connector pinout

Pin number	Signal
1	N.C.
2	CAN_1_L
3	GND
4	N.C.
5	N.C.
6	GND
7	CAN_1_H
8	N.C.
9	N.C.

The following table shows the CAN_2 DB9 connector pinout (J8).

Table 8. CAN_2 DB9 connector pinout

Pin number (DB9)	Signal
1	N.C.
2	CAN_2_L
3	GND

Pin number (DB9)	Signal
4	N.C.
5	N.C.
6	GND
7	CAN_2_H
8	N.C.
9	N.C.

The following table shows the 8x1 header connector pinout (P21).

Table 9. 8x1 header CAN connector pinout

Pin number	Signal	Port
1	CAN_1_RX	PA[4]
2	CAN_1_TX	PA[5]
3	N.C.	
4	N.C.	
5	CAN_3_RX	PH[11]
6	CAN_3_TX	PH[10]
7	CAN_4_RX	PH[13]
8	CAN_4_TX	PH[12]

The jumpers and the solder bridges detailed in the following table are used to configure the CAN interfaces.

Table 10. CAN configuration jumpers and solder bridges

Jumper	Description	Default	Position
JP17	CAN_1_STBY configuration: - Open: disconnect CAN_1_STBY - Closed: connect CAN_1_STBY to VIO pin of CAN transceiver	Open	D4 ⁽¹⁾
JP18	CAN_1_L termination resistor configuration: - Open: disconnect the termination resistor - Closed: connect CAN_1_L to a 60.4 Ω termination resistor	Closed	D4 ⁽¹⁾
JP19	CAN_1_TX configuration: - Open: disconnect PA5 from CAN_1_TX - Closed: connect PA5 to CAN_1_TX	Closed	D3 ⁽¹⁾
JP20	CAN_1_RX configuration: - Open: disconnect PA4 from CAN_1_RX - Closed: connect PA4 to CAN_1_RX	Closed	D3 ⁽¹⁾
JP21	CAN_1_H termination resistor configuration: - Open: disconnect the termination resistor - Closed: connect CAN_1_H to a 60.4 Ω termination resistor	Closed	D4 ⁽¹⁾
JP22	CAN_2_STBY configuration: - Open: disconnect CAN_2_STBY - Closed: connect CAN_2_STBY to VIO pin of CAN transceiver	Open	C4 ⁽¹⁾
JP23	CAN_2_L termination resistor configuration: - Open: disconnect the termination resistor - Closed: connect CAN_2_L to a 60.4 Ω termination resistor	Closed	C4 ⁽¹⁾

Jumper	Description	Default	Position
JP24	CAN_4_TX configuration: - Open: disconnect PH10 from CAN_FD4_TX - Closed: connect PH10 to CAN_FD4_TX	Closed	C3 ⁽¹⁾
JP25	CAN_4_RX configuration: - Open: connect PH11 to CAN_4_RX - Closed: disconnect PH11 to CAN_4_RX	Closed	C3 ⁽¹⁾
JP26	CAN_2_H termination resistor configuration: - Open: disconnect the termination resistor - Closed: connect CAN_2_H to a 60.4 Ω termination resistor	Closed	C4 ⁽¹⁾
SB7	CAN 1 transceiver VIO supply configuration: - Open: disconnect the VDD_HV from the VIO of the U9 CAN transceiver - Closed: connect the VDD_HV to the VIO of the U9 CAN transceiver	Closed	D3 ⁽¹⁾
SB8	CAN 1 transceiver VDD supply configuration: - Open: disconnect the VDD of the U9 CAN transceiver from the 5 V domain. - Closed: connect the VDD of the U9 CAN transceiver to the 5 V domain.	Closed	D3 ⁽¹⁾
SB9	CAN 2 transceiver VIO supply configuration: - Open: disconnect the VDD_HV from the VIO of the U10 CAN transceiver - Closed: connect the VDD_HV to the VIO of the U10 CAN transceiver	Closed	C3 ⁽¹⁾
SB10	CAN 2 transceiver VDD supply configuration: - Open: disconnect the VDD of the U10 CAN transceiver from the 5 V domain. - Closed: connect the VDD of the U10 CAN transceiver to the 5 V domain.	Closed	C3 ⁽¹⁾

1. Refer to the [Figure 15. SR5E1-EVBE5000P rev. A - top layer](#).

6.2 UART interface

The board contains an FT2232HL with a receiver and a driver. It has a USB MINI-B, 5-pin connector and a two-pin header connector.

Each Tx and Rx pin has a jumper allowing the possibility to disconnect the default pin and connect another pin.

The following table lists the UART interface connectors:

Table 11. UART interface connector

Connector	Description	Position
P5	USB port	B4 ⁽¹⁾

1. Refer to the [Figure 15. SR5E1-EVBE5000P rev. A - top layer](#)

The following table shows the UART interface jumpers configuration.

Table 12. UART interface pin configuration

Jumper	Description	Default	Position
JP15	UART_RX connection: - Open: UART_RX not connected - Closed: UART_RX connected to PH14	Closed	C4 ⁽¹⁾
JP16	UART_TX connection: - Open: UART_TX not connected - Closed: UART_TX connected to PH15	Closed	C3 ⁽¹⁾

1. Refer to the [Figure 15. SR5E1-EVBE5000P rev. A - top layer](#).

The following table shows the UART interface LEDs.

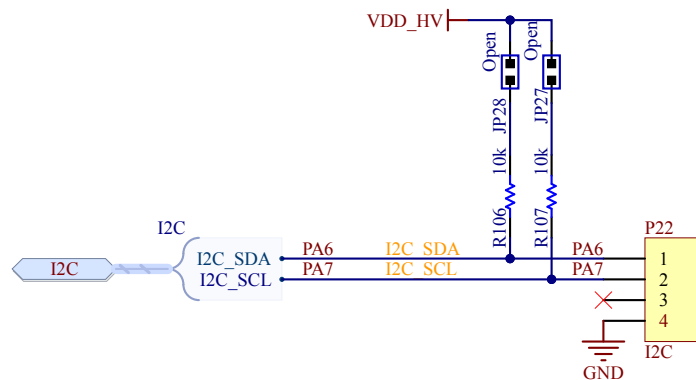
Table 13. UART interface LEDs

LED	Description	Position
LED8	RX_LED	B4 ⁽¹⁾
LED9	TX_LED	B4 ⁽¹⁾

1. Refer to the [Figure 15. SR5E1-EVBE5000P rev. A - top layer](#).

6.3 I²C interface

This paragraph describes the embedded I²C interface present on the board.
The following figure shows the I²C schema.

Figure 9. I²C schema


The following table describes the connector and the jumpers used to configure the interface:

Table 14. I²C connector and jumpers

Component	Description	Default	Position
P22	I ² C connector		C1 ⁽¹⁾
JP27	I ² C SCL pull-up configurator: - Closed: I2C_SCL pull-up inserted (10 kΩ resistor not populated by default) - Open: I2C_SCL pull up not inserted	Open	C1 ⁽¹⁾
JP28	I ² C SDA pull-up configurator: - Closed: I2C_SDA pull-up inserted (10 kΩ resistor not populated by default) - Open: I2C_SDA pull up not inserted	Open	C1 ⁽¹⁾

1. Refer to the [Figure 15. SR5E1-EVBE5000P rev. A - top layer](#).

The following table shows the 1x4 header connector pinout (P22).

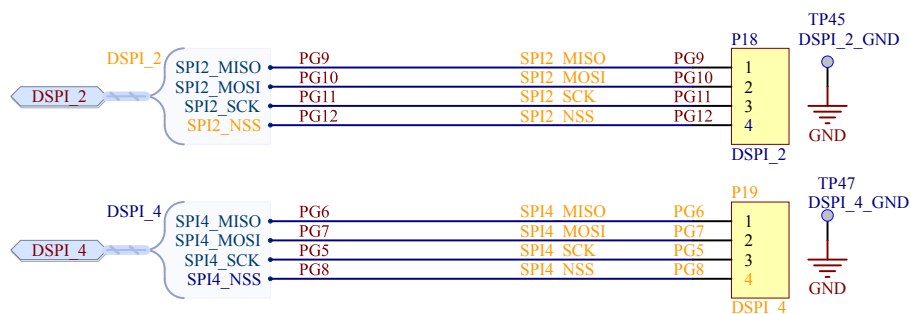
Table 15. I²C header 1x4 pins connector pinout

Pin number	Signal	Port
1	I2C_SDA	PA[6]
2	I2C_SCL	PA[7]
3	N.C	
4	GND	

6.4 DSPI interface

The board has two DSPI connectors: DSPI_2 (P18) and DSPI_4 (P19). The figure below shows the pinout of the header connectors:

Figure 10. DSPI header connectors schema



The following table lists the connectors:

Table 16. DSPI connectors

Connectors	Description	Position
P18	DSPI_2 connector	A2 ⁽¹⁾
P19	DSPI_4 connector	C2 ⁽¹⁾

1. Refer to the Figure 15. SR5E1-EVBE5000P rev. A - top layer.

The following table shows the DSP_2 connector (P18) pin mapping:

Table 17. DSP_2 connector (P18) pin mapping

Pin	Description	Port
1	SPI4_MISO	PG[9]
2	SPI4_MOSI	PG[10]
3	SPI4_SCK	PG[11]
4	SPI4_NSS	PG[12]

The following table shows the DSP_4 connector (P19) pin mapping:

Table 18. DSP_4 connector (P19) pin mapping

Pin	Description	Port
1	SPI4_MISO	PG[6]
2	SPI4_MOSI	PG[7]
3	SPI4_SCK	PG[5]
4	SPI4_NSS	PG[8]

6.5 Analog and timers connectors

The SR5E1-EVBE5000P rev. A evaluation board has some analog and timers connectors indicated in the following table:

Table 19. Analog and timers connectors

Connectors	Description	Position
P6	SAR1_IO connector	B1 ⁽¹⁾
P7	TIM1 connector	A1 ⁽¹⁾
P8	SAR2_IO connector	B1 ⁽¹⁾
P9	TIM3 connector	D1 ⁽¹⁾
P10	SAR3_IO connector	B1 ⁽¹⁾
P11	SAR4_IO connector	A1 ⁽¹⁾
P12	TIM8 connector	C1/D1 ⁽¹⁾
P13	SAR5_IO connector	C1 ⁽¹⁾
P14	SAR_CAL connector	B1 ⁽¹⁾
P15	SDADC connector	B2 ⁽¹⁾
P16	DAC_OUT	A1 ⁽¹⁾
P17	HRTIM1 connector	B1/B2 ⁽¹⁾
P20	HRTIM2 connector	B2 ⁽¹⁾

1. Refer to the [Figure 15. SR5E1-EVBE5000P rev. A - top layer](#).

6.5.1 SAR1_IO ADC module

The following table shows the SAR1_IO connector (P6) pin mapping:

Table 20. SAR1_IO connector pin mapping (P6)

Pin	Description	Port
1	SAR1_1	PB[2]
2	SAR1_2	PB[3]
3	SAR1_3	PB[4]
4	SAR1_4	PB[5]
5	SAR1_5	PB[6]

6.5.2 SAR2_IO ADC module

The following table shows the SAR2_IO connector (P8) pin mapping:

Table 21. SAR2_IO connector (P8) pin mapping

Pin	Description	Port
1	SAR2_1	PB[7]
2	SAR2_2	PB[8]
3	SAR2_3	PB[9]
4	SAR2_4	PB[10]
5	SAR2_5	PB[11]

6.5.3 SAR3_IO ADC module

The following table shows the SAR3_IO connector (P10) pin mapping:

Table 22. SAR3_IO connector (P10) pin mapping

Pin	Description	Port
1	SAR3_1	PB[12]
2	SAR3_2	PB[13]
3	SAR3_3	PB[14]
4	N.C.	
5	N.C.	

6.5.4 SAR4_IO ADC module

The following table shows the SAR4_IO connector (P11) pin mapping:

Table 23. SAR4_IO connector (P11) pin mapping

Pin	Description	Port
1	SAR4_1	PC[3]
2	SAR4_2	PC[4]
3	SAR4_3	PC[6]
4	SAR4_4	PC[7]
5	N.C.	

6.5.5 SAR5_IO ADC module

The following table shows the SAR5_IO connector (P13) pin mapping:

Table 24. SAR5_IO connector (P13) pin mapping

Pin	Description	Port
1	SAR5_1	PC[9]
2	SAR5_2	PC[10]
3	SAR5_3	PC[11]
4	SAR5_4	PC[12]
5	N.C.	

6.5.6 SAR_CAL ADC module

The following table shows the SAR_CAL ADC connector (P14) pin mapping.

Table 25. SAR_CAL ADC connector (P14) pin mapping

Pin	Description	Port
1	SAR_CAL_1	PC[1]
2	SAR_CAL_2	PC[2]

6.5.7 SDADC_CAL module

The following table shows the SDADC connector (P15) pin mapping:

Table 26. SDADC connector (P15) pin mapping

Pin	Description	Port
1	SDADC_1_0	PA[13]
2	SDADC_1_1	PA[14]
3	GND	
4	SDADC_2_0	PA[15]
5	SDADC_2_1	PB[0]

6.5.8 DAC_OUT module

The following table shows the DAC_OUT connector (P16) pin mapping:

Table 27. DAC_OUT connector (P16) pin mapping

Pin	Description	Port
1	DAC_1	PB[1]
2	DAC_2	PC[5]
3	GND	

6.5.9 TIM1 module

The following table shows the TIM1 connector (P7) pin mapping:

Table 28. TIM1 connector (P7) pin mapping

Pin	Description	Port
1	TIM1_CH1	PC[15]
2	TIM1_CH1N	PC[14]
3	TIM1_CH2	PD[1]
4	TIM1_CH2N	PD[0]
5	TIM1_CH3	PD[4]
6	TIM1_CH3N	PD[3]
7	N.C.	
8	N.C.	
9	TIM1_BkIn	PD[2]
10	GND	

6.5.10 TIM3 module

The following table shows the TIM3 connector (P9) pin mapping:

Table 29. TIM2_3 connector (P9) pin mapping

Pin	Description	Port
1	N.C	
2	N.C	
3	N.C	
4	N.C	
5	GND	
6	TIM3_CH1	PG[14]
7	TIM3_CH2	PG[15]
8	TIM3_CH3	PH[0]
9	TIM3_CH4	PH[1]
10	TIM3_ETR	PG[13]

6.5.11 TIM8 module

The following table shows the TIM8 connector (P12) pin mapping:

Table 30. TIM8 connector (P12) pin mapping

Pin	Description	Port
1	TIM8_CH1	PI[0]
2	TIM8_CH1N	PI[1]
3	TIM8_CH2	PI[2]
4	TIM8_CH2N	PI[3]
5	TIM8_CH3	PI[4]
6	TIM8_CH3N	PI[5]
7	TIM8_CH4	PI[6]
8	TIM8_CH4N	PI[7]
9	TIM8_BkIn	PI[8]
10	TIM8_BkIn2	PI[9]
11	TIM8_ETR	PA[3]
12	GND	

6.5.12 HRTIM1 module

The following table shows the HRTIM1 connector (P17) pin mapping:

Table 31. HRTIM1 connector (P17) pin mapping

Pin	Description	Port
1	HRTIM1_CHA1	PE[4]
2	HRTIM1_CHA2	PE[3]
3	HRTIM1_CHB1	PE[2]
4	HRTIM1_CHB2	PE[1]
5	HRTIM1_CHC1	PD[15]
6	HRTIM1_CHC2	PD[14]
7	HRTIM1_CHD1	PD[13]
8	HRTIM1_CHD2	PD[12]
9	HRTIM1_CHE1	PD[11]
10	HRTIM1_CHE2	PD[10]
11	HRTIM1_CHF1	PD[8]
12	HRTIM2_CHF1	PD[7]
13	HRTIM2_EEV2	PD[9]
14	N.C.	

6.5.13 HRTIM2 module

The following table shows the HRTIM2 connector (P20) pin mapping:

Table 32. HRTIM2 connector (P20) pin mapping

Pin	Description	Port
1	HRTIM2_CHA1	PE[9]
2	HRTIM2_CHA2	PE[10]
3	HRTIM2_CHB1	PE[11]
4	HRTIM2_CHB2	PE[12]
5	HRTIM2_CHC1	PE[14]
6	HRTIM2_CHC2	PE[15]
7	N.C.	
8	N.C.	
9	HRTIM2_CHE1	PF[2]
10	HRTIM2_CHE2	PF[3]
11	N.C.	
12	N.C.	
13	N.C.	
14	N.C.	

6.6 Debug connectors

The SR5E1-EVBE5000P rev. A evaluation board has the following debug connectors:

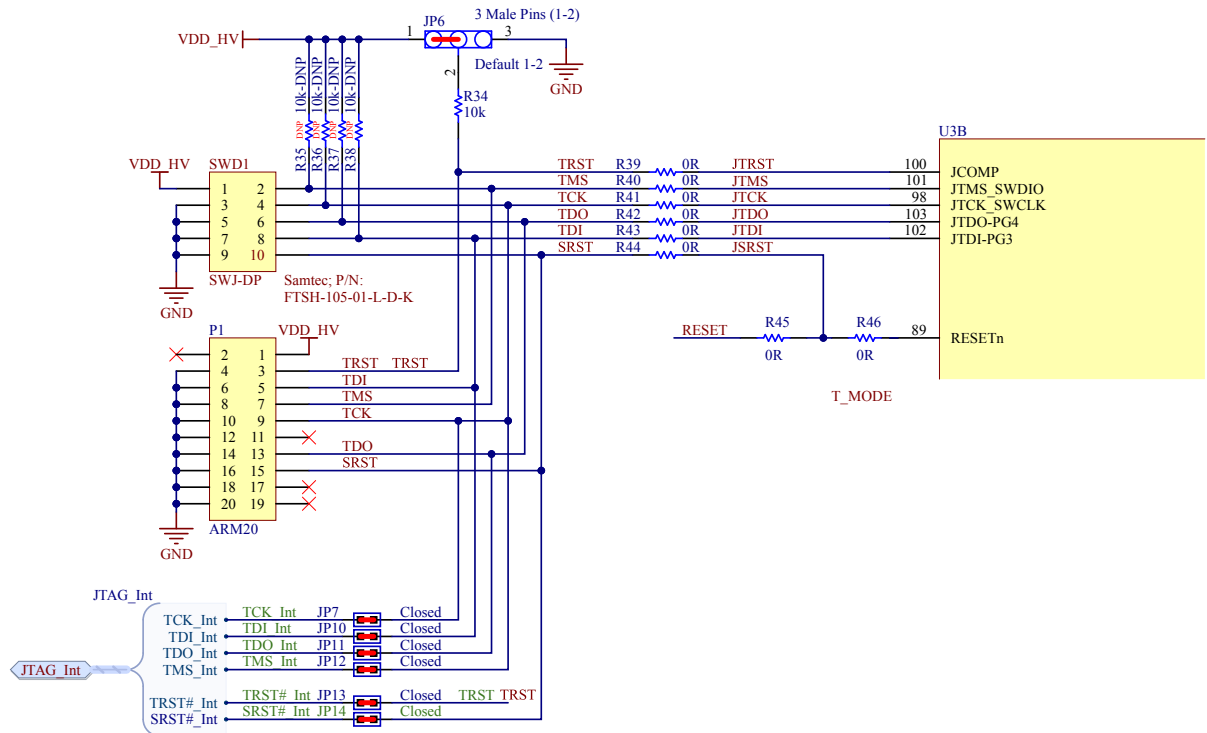
Table 33. Debug connectors

Connectors	Description	Position
SWD1	10-pin header connector for JTAG/SWD interface	B3 ⁽¹⁾
P1	20-pin Arm connector for JTAG interface	B3 ⁽¹⁾
P4	38-pin Mictor Trace connector	B3/B4 ⁽¹⁾

1. Refer to the [Figure 15. SR5E1-EVBE5000P rev. A - top layer](#).

The following figure shows the main DAP connectors.

Figure 11. JTAG/SWD debug ports schema



The following table shows the 2x5 header connector pinout (SWD1):

Table 34. SWJ1 main DAP header 2x5 pins connector pinout

Pin number	Signal
1	VDD_HV
2	TMS/SWDIO
3	GND
4	TCK/SWCLK
5	GND
6	TDO
7	GND
8	TDI
9	GND
10	RESET

The following table shows the ARM20 2x10 header connector pinout (P1):

Table 35. P2 JTAG Header 2x10 pins connector pinout

Pin number	Signal
1	VDD_HV_IO_MAIN
2	N.C.
3	JCOMP
4	GND
5	TDI
6	GND
7	TMS
8	GND
9	TCK
10	GND
11	N.C.
12	GND
13	TDO
14	GND
15	RESET
16	GND
17	N.C.
18	GND
19	N.C.
20	GND

The following table describes all jumpers, all 0R resistors and all solder bridges used to configure the JTAG/SWD ports of the board and their position on PCB.

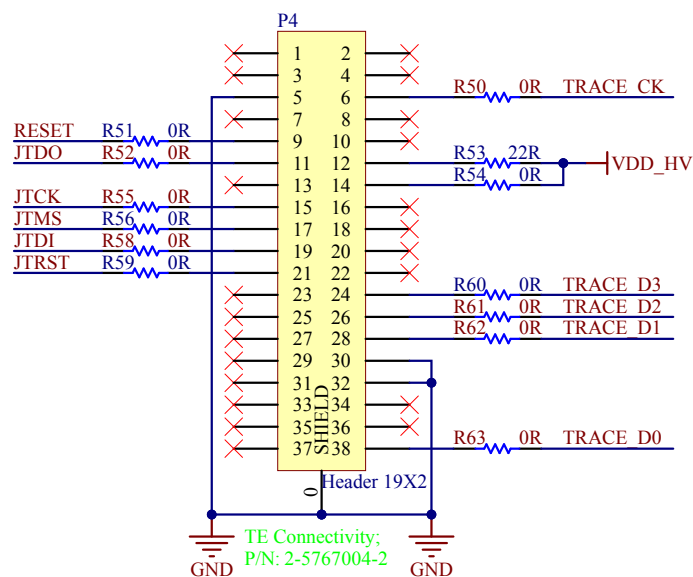
Table 36. JTAG/SWD configuration

Reference	Description	Default	Position
JP6	JCOMP configuration: 1-2: JCOMP connected to a pull-up resistor (10 kΩ). 2-3: JCOMP connected to a pull-down resistor (10 kΩ).	1-2	A3/B3 ⁽¹⁾
R39	JCOMP connection configuration: - Mounted: JCOMP (pin 100) connected to TRST - Not mounted: JCOMP (pin 100) unconnected	Mounted	B3 ⁽¹⁾
R40	TMS configuration: - Mounted: pin 101 connected to TMS - Not mounted: pin 101 not connected to TMS	Mounted	B3 ⁽¹⁾
R41	TCK configuration: - Mounted: pin 98 connected to TCK - Not mounted: pin 98 not connected to TCK	Mounted	B3 ⁽¹⁾
R42	TDO configuration: - Mounted: pin 103 connected to TDO - Not mounted: pin 103 not connected to TDO	Mounted	B3 ⁽¹⁾
R43	TDI configuration: - Mounted: pin 102 connected to TDI - Not mounted: pin 102 not connected to TDI	Mounted	B3 ⁽¹⁾
R44	Reset pin configuration: - Mounted: Reset pin not connected to RESET - Not mounted: Reset pin connected to RESET	Mounted	B3 ⁽¹⁾

1. Refer to the [Figure 15. SR5E1-EVBE5000P rev. A - top layer](#).

The following figure shows the main Mictor 38-pin connectors schema.

Figure 12. Mictor 38-pin debug ports schema



The following table shows the Mictor 38-pin header connector pinout (P4).

Table 37. Mictor 38-pin connector pinout

Pin number	Signal
1	N.C.
2	N.C.
3	N.C.
4	N.C.
5	GND
6	TRACE_CK
7	N.C.
8	N.C.
9	RESET
10	N.C.
11	JTDO
12	VDD_HV
13	N.C.
14	VDD_HV
15	JTCK
16	N.C.
17	JTMS
18	N.C.
19	JTDI
20	N.C.
21	JTRST
22	N.C.
23	N.C.
24	TRACE_D3
25	N.C.
26	TRACE_D2
27	N.C.
28	TRACE_D1
29	N.C.
30	GND
31	N.C.
32	GND
33	N.C.
34	N.C.
35	N.C.
36	N.C.
37	N.C.
38	TRACE_D0

Table 38. Mictor 38-pin connector configuration

Reference	Description	Default	Position
R50 (0 Ω)	TRACE_CK configuration: - Mounted: TRACE_CK connected to P4 pin 6 - Not mounted: TRACE_CK not connected to P4 pin 6	Mounted	B3 ⁽¹⁾
R51 (0 Ω)	RESET configuration: - Mounted: RESET connected to P4 pin 9 - Not mounted: RESET not connected to P4 pin 9	Mounted	B3 ⁽¹⁾
R52 (0 Ω)	JTDO configuration: - Mounted: JTDO connected to P4 pin 11 - Not mounted: JTDO not connected to P4 pin 11	Mounted	B3 ⁽¹⁾
R53 (22 Ω)	VDD_HV configuration: - Mounted: VDD_HV connected to P4 pin 12 - Not mounted: VDD_HV not connected to P4 pin 12	Mounted	B3 ⁽¹⁾
R54 (0 Ω)	VDD_HV configuration: - Mounted: VDD_HV connected to P4 pin 14 - Not mounted: VDD_HV not connected to P4 pin 14	Mounted	B3 ⁽¹⁾
R55 (0 Ω)	JTCK configuration: - Mounted: JTCK connected to P4 pin 15 - Not mounted: JTCK not connected to P4 pin 15	Mounted	B3 ⁽¹⁾
R56 (0 Ω)	JTMS configuration: - Mounted: JTMS connected to P4 pin 17 - Not mounted: JTMS not connected to P4 pin 17	Mounted	B3 ⁽¹⁾
R58 (0 Ω)	JTDI configuration: - Mounted: JTDI connected to P4 pin 19 - Not mounted: JTDI not connected to P4 pin 19	Mounted	C3 ⁽¹⁾
R59 (0 Ω)	JTRST configuration: - Mounted: JTRST connected to P4 pin 21 - Not mounted: JTRST not connected to P4 pin 21	Mounted	B3 ⁽¹⁾
R60 (0 Ω)	TRACE_D3 configuration: - Mounted: TRACE_D3 connected to P4 pin 24 - Not mounted: TRACE_D3 not connected to P4 pin 24	Mounted	C3 ⁽¹⁾
R61 (0 Ω)	TRACE_D2 configuration: - Mounted: TRACE_D2 connected to P4 pin 26 - Not mounted: TRACE_D2 not connected to P4 pin 26	Mounted	C3 ⁽¹⁾
R62 (0 Ω)	TRACE_D1 configuration: - Mounted: TRACE_D1 connected to P4 pin 28 - Not mounted: TRACE_D1 not connected to P4 pin 28	Mounted	C3 ⁽¹⁾
R63 (0 Ω)	TRACE_D0 configuration: - Mounted: TRACE_D0 connected to P4 pin 38 - Not mounted: TRACE_CK not connected to P4 pin 38	Mounted	C3 ⁽¹⁾

1. Refer to the [Figure 15. SR5E1-EVBE5000P rev. A - top layer](#).

6.7 User AREA

The SR5E1-EVBE5000P rev. A has a user area, consisting of the following features:

- 2 LEDs
- 2 pushbuttons
- 1 external module

The following table describes all user area features and their position on the PCB.

Table 39. User area description

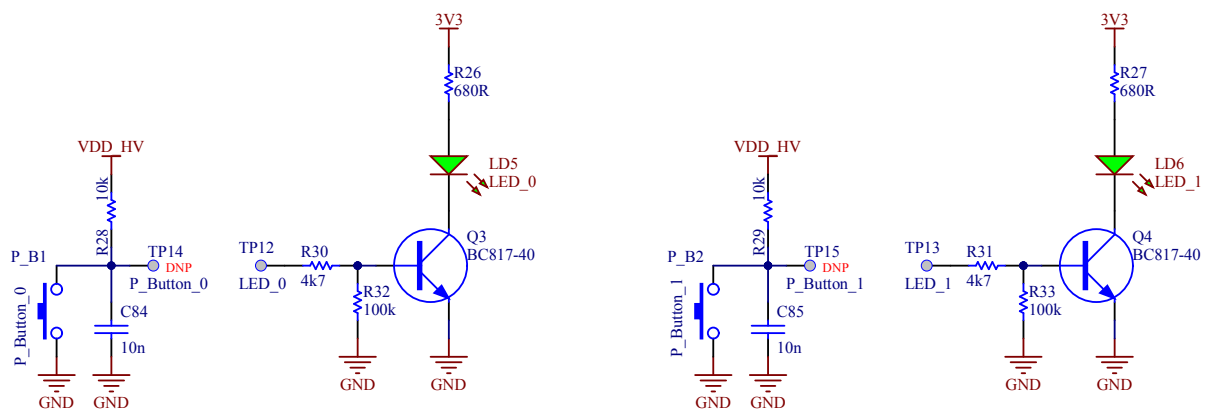
Reference	Description	Position
LED_0	User LED 0	D4 ⁽¹⁾
LED_1	User LED 1	D3 ⁽¹⁾
P_Button 0	Push button 0	D4 ⁽¹⁾
P_Button 1	Push button 1	D3 ⁽¹⁾
ExtCN1	External Module	D1/D2 ⁽¹⁾

1. Refer to the Figure 15. SR5E1-EVBE5000P rev. A - top layer.

There are two active low user LEDs: LD5 and LD6. The LED inputs are pulled to VDD through 680 Ω resistors. There are two active high pushbuttons: PB_1 and PB_2, which drive VDD_HV onto the respective test point when pressed. The switch outputs are pulled to GND via 10 k Ω .

The following figure shows the schema of the LEDs and the push buttons.

Figure 13. User area LEDs and the push buttons schema



User

The following figure shows the user area external module schema.

Figure 14. User area External Module schema

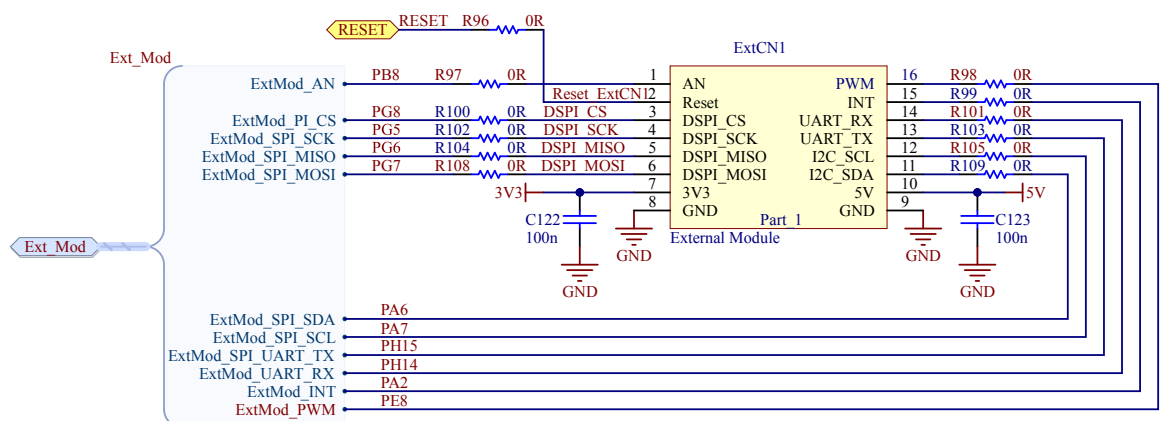


Table 40. External module connector pinout

Pin number	Signal	Port
1	ExtMod_AN	PB[8]
2	Reset	
3	ExtMod_SPI_CS	PG[8]
4	ExtMod_SPI_SCK	PG[5]
5	ExtMod_SPI_MISO	PG[6]
6	ExtMod_SPI_MOSI	PG[7]
7	3.3 V	
8	GND	
9	GND	
10	5 V	
11	ExtMod_SPI_SDA	PA[6]
12	ExtMod_SPI_SCL	PA[7]
13	ExtMod_UART_TX	PH[15]
14	ExtMod_UART_RX	PH[14]
15	ExtMod_INT	PA[2]
16	ExtMod_PWM	PE[8]

6.8

Test points

Several test points of different shape and functionality are scattered around the SR5E1-EVBE5000P rev. A to allow easy access to MCU and reference signals. This chapter summarizes and describes the available test points. Test points are listed and detailed in the following table.

Table 41. Test points

Test point	Description	Position
TP1	3.3 V	A3 ⁽¹⁾
TP2	12 V	A4 ⁽¹⁾
TP3	VBatt	A4 ⁽¹⁾
TP4	5 V	A3 ⁽¹⁾
TP5	VDD_LV	A2 ⁽¹⁾
TP6	VDD_LV_S	B2 ⁽¹⁾
TP7	SMPS_P MOS	C2 ⁽¹⁾
TP8	SMPS_V LX	C2 ⁽¹⁾
TP9	VDD_LV_SMPS	C1 ⁽¹⁾
TP10	SMPS_N MOS	C2 ⁽¹⁾
TP11	VDD_HV	C2 ⁽¹⁾
TP12	LED_0	D4 ⁽¹⁾
TP13	LED_1	D4 ⁽¹⁾
TP14	P_Button_0	D4 ⁽¹⁾
TP15	P_Button_1	D3 ⁽¹⁾
TP16	TRACE_CK	C3 ⁽¹⁾

Test point	Description	Position
TP17	TRACE_D0	C3 ⁽¹⁾
TP18	TRACE_D1	C3 ⁽¹⁾
TP19	TRACE_D2	C3 ⁽¹⁾
TP20	TRACE_D3	C3 ⁽¹⁾
TP21	TRACE_D5	B2 ⁽¹⁾
TP22	TRACE_D6	B2 ⁽¹⁾
TP23	TESTMODE	C2 ⁽¹⁾
TP24	RESET	B4 ⁽¹⁾
TP25	RTCK I (FTDI)	B4 ⁽¹⁾
TP26	UART_RX	C4 ⁽¹⁾
TP27	UART_TX	C3 ⁽¹⁾
TP28	LVDD	B4 ⁽¹⁾
TP29	CAN_1_L	D4 ⁽¹⁾
TP30	CAN_1_STBY	D3 ⁽¹⁾
TP31	CAN_1_H	D4 ⁽¹⁾
TP32	CAN_2_L	C4 ⁽¹⁾
TP33	CAN_2_STBY	C3 ⁽¹⁾
TP34	CAN_2_H	C4 ⁽¹⁾
TP35	SAR1_GND	B1 ⁽¹⁾
TP36	TIM1_GND	A1 ⁽¹⁾
TP37	SAR2_GND	B1 ⁽¹⁾
TP38	SAR3_GND	B1 ⁽¹⁾
TP39	TIM3_GND	D1 ⁽¹⁾
TP40	SAR4_GND	A1 ⁽¹⁾
TP41	TIM8_GND	D1 ⁽¹⁾
TP42	SAR5_GND	C1 ⁽¹⁾
TP43	SDADC_GND	C1 ⁽¹⁾
TP44	DACx_GND	A1 ⁽¹⁾
TP45	DSPI_2_GND	A2 ⁽¹⁾
TP46	HRTIM1_GND	B2 ⁽¹⁾
TP47	DSPI_4_GND	C3 ⁽¹⁾
TP48	CAN_GND	D1 ⁽¹⁾
TP49	HRTIM2_GND	B3 ⁽¹⁾

1. Refer to the [Figure 15. SR5E1-EVBE5000P rev. A - top layer.](#)

7 Layout overview

Figure 15. SR5E1-EVBE5000P rev. A - top layer

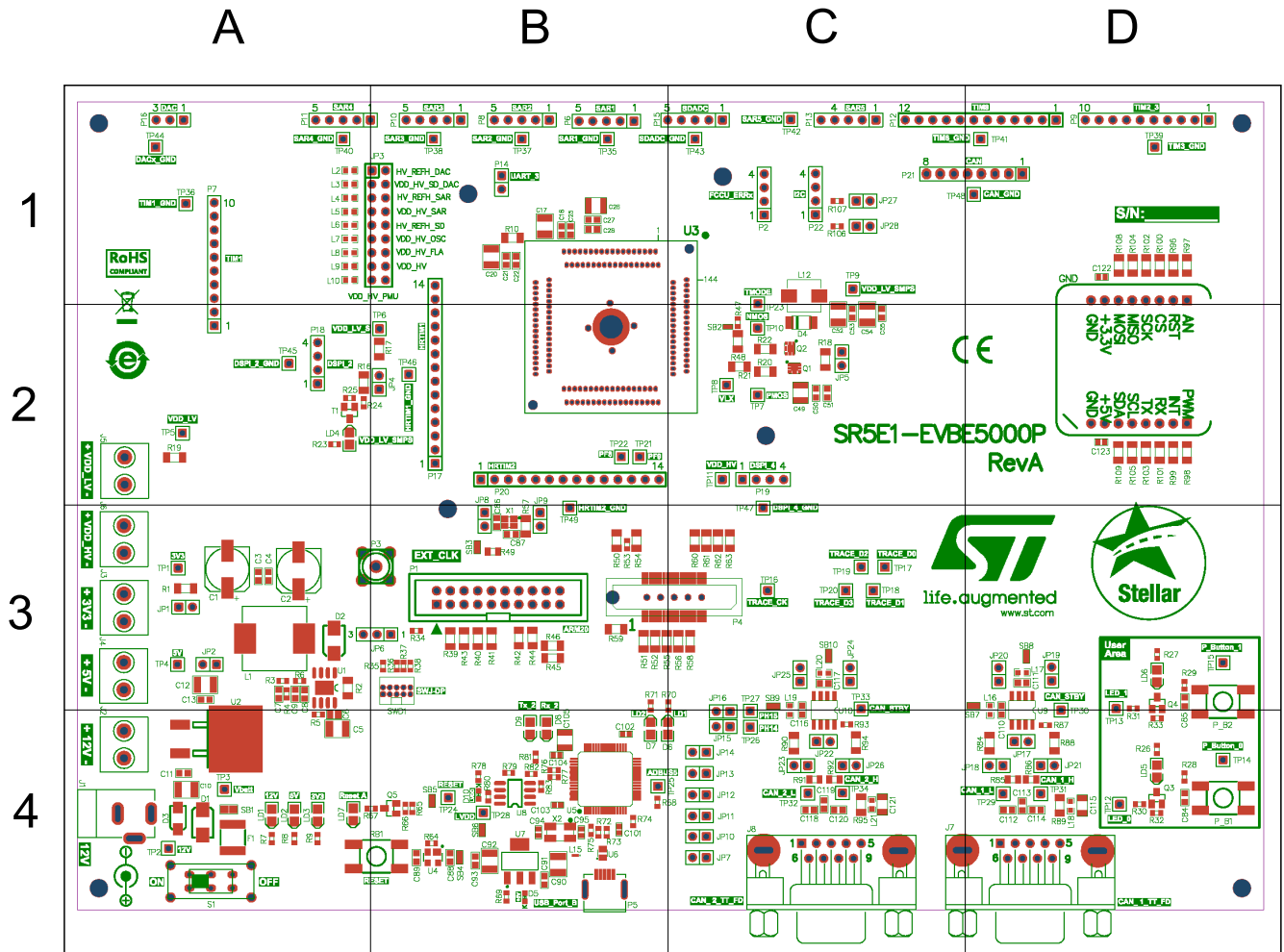


Figure 16. SR5E1-EVBE5000P rev. A - bottom layer

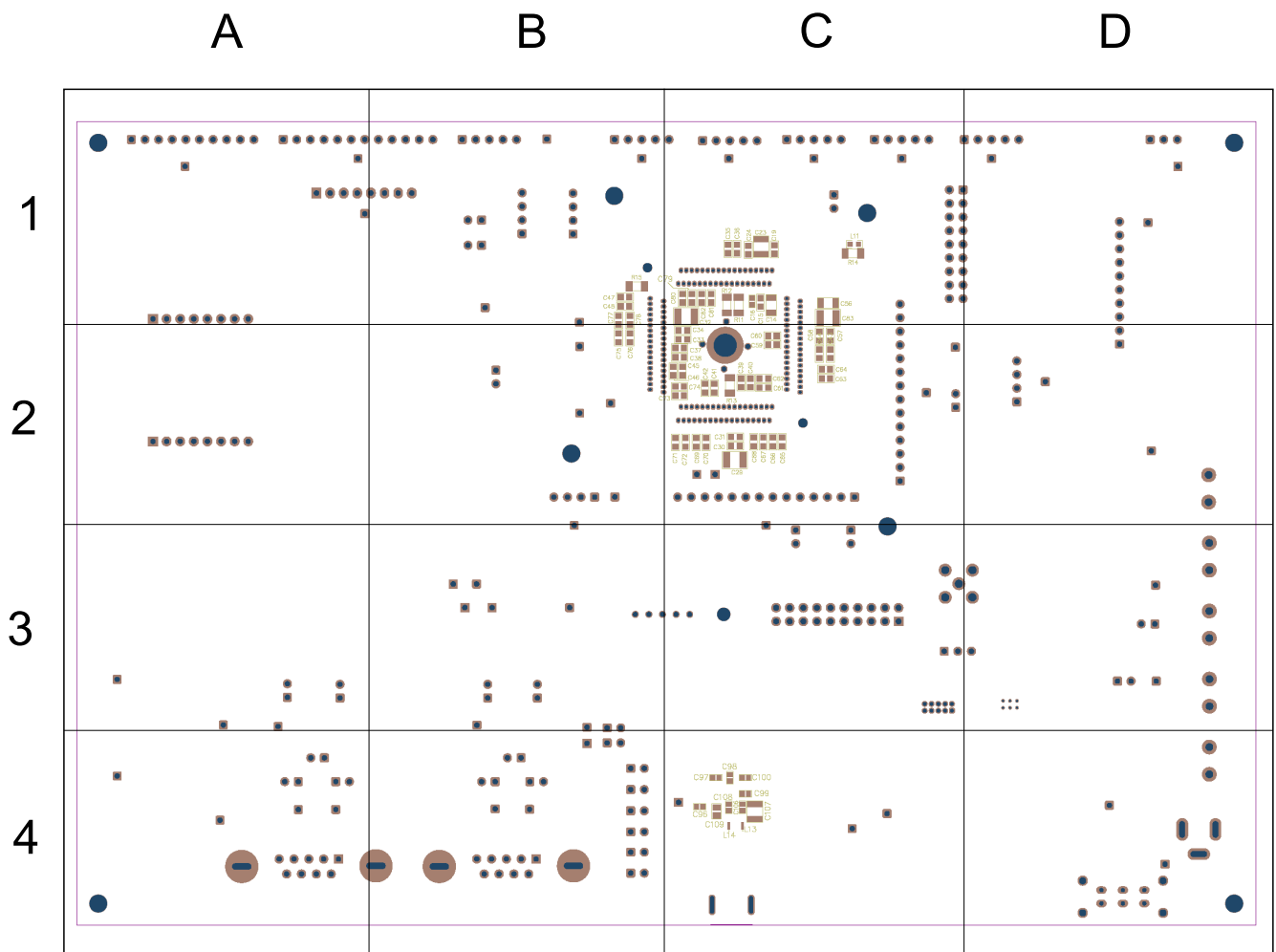


Table 42. Bill of material

#	Item	Quantity	Reference	Value	Footprint	Description	Ass. Opt.	Manufacturer	Manufacturer part number
1	C1, C2	2	Generic Cap. Pol.	100 μ F	CAP. 8.3 X 10.2 - SMD	Polarized Capacitor			
2	C3, C4, C11, C13, C15, C18, C21, C24, C27, C34, C50, C88, C89, C110, C111, C116, C117	17	CAP_SMD_X7R	100 nF	C0603-B	Capacitor Ceramic, 0.1 μ F, 50V, X7R, 0603, FULL REEL, SMD Multilayer Ceramic Cap. Automotive		TDK	CGA3E2X7R1H104K080AA
3	C5, C10, C12, C17, C20, C29, C32, C52, C54, C83, C90, C92	12	CAP_SMD_X7R	10 μ F	C1210-B	C1206C106K3RACAUTO, SMD, AEC-Q200, 10 μ F, 25 V, 1206 [Metrisch 3216], $\pm$ 10%, X7R, SMD Multilayer Ceramic Cap.	DNP	KEMET	
4	C6	1	CAP_SMD_X7R	220 nF	C0805-C	Capacitor X7R		KEMET	
5	C7	1	CAP_SMD_X7R	22 nF	C0603-B	Capacitor X7R		KEMET	
6	C8	1	CAP_SMD_X7R	1 nF	C0603-B	Capacitor X7R		KEMET	
7	C9	1	CAP_SMD_X7R	82 nF	C0603-B	Capacitor Ceramic 8200PF 50V X7R 0603 AUTO		KEMET	
8	C14	1	CAP_SMD_X7R	1 μ F	C1206-C	Capacitor Ceramic 1 μ F 16V X7R 10% SMD 1206 Plastic T/R		KEMET	
9	C16	1	CAP_SMD_X7R	10 nF	C0603-C	SMD Multilayer Ceramic Capacitor Automotive		MURATA	

#	Item	Quantity	Reference	Value	Footprint	Description	Ass. Opt.	Manufacturer	Manufacturer part number
10	C19, C22, C25, C28, C31, C36, C38, C40, C42, C44, C46, C48, C51, C58, C60, C62, C64, C66, C68, C70, C72, C74, C76, C78, C80, C82, C84, C85	28	CAP_SMD_X7R	10 nF	C0603-B	SMD Multilayer Ceramic Capacitor Automotive		MURATA	
11	C23, C26	2	CAP_SMD_X7R	1 μ F	C1210-C	Capacitor Ceramic 1 μ F 16V X7R 10% SMD 1206 Plastic T/R		KEMET	
12	C30, C33, C35, C37, C39, C41, C43, C45, C47, C53, C55, C57, C59, C61, C63, C65, C67, C69,	24	CAP_SMD_X7R	47 nF	C0603-B	SMD Multilayer Ceramic Capacitor Automotive	DNP	MURATA	

#	Item	Quantity	Reference	Value	Footprint	Description	Ass. Opt.	Manufacturer	Manufacturer part number
	C71, C73, C75, C77, C79, C81								
13	C49, C105, C107	3	CAP_SMD_X7R, Capacitor_ST	4.7 μ F	C1210-C	1206 C 4.7 μ F Ceramic Multilayer Capacitor; 16 VDC; +125degC; X7R Dielec; +/-10%, Capacitor X7R - 0603		KEMET, Any	
14	C56	1	CAP_SMD_X7R	4.7 μ F	C1206-C	1206 C 4.7 μ F Ceramic Multilayer Capacitor; 16 VDC; +125degC; X7R Dielec; +/-10%		KEMET	
15	C86, C87	2	CAP_SMD_X7R	8 pF	C0603-B	SMD Multilayer Ceramic Capacitor		SAMSUNG	
16	C91, C93	2	CAP_SMD_X7R	100 nF	C0603-B	SMD Multilayer Ceramic Capacitor Automotive		KEMET	
17	C94, C95	2	Cap	18 pF	C0603-C	Capacitor Ceramic 12 pF 50V C0G 5% Pad SMD 0603 125°C Extreme Low ESR Bag		TDK, KEMET	
18	C96, C97, C98, C99, C100, C101, C102, C103, C104, C106, C108	11	Capacitor_ST	100 nF	C0603-C	Capacitor X7R - 0603		Any	
19	C109	1	Capacitor_ST	4.7 μ F	C0805-C	Capacitor X7R - 0603			
20	C112, C114, C118, C120	4	CAP_SMD_X7R	47 pF	C0603-B	SMD Multilayer Ceramic Cap.		AVX Corporation	
21	C113, C119	2	CAP_SMD_X7R	4.7 nF	C0603-B	SMD Multilayer Ceramic Cap. Automotive		TDK	
22	C115, C121	2	CAP_SMD_X7R	1 nF	C1206-C	SMD Multilayer Ceramic Capacitor	DNP	KEMET	
23	C122, C123	2	CAP_SMD_X7R	100 nF	C0603-C	SMD Multilayer Ceramic Capacitor Automotive		TDK	

#	Item	Quantity	Reference	Value	Footprint	Description	Ass. Opt.	Manufacturer	Manufacturer part number
24	D1	1	D Schottky	STPS340U	DO-214AA	Schottky Diode		STMicroelectronics	
25	D2	1	D Schottky	STPS2L25U	DO-214AA	Rectifier Schottky, 25 V, 2 A, Único, DO-214AA (SMB), 2 Pines, 450 mV		STMicroelectronics	STPS2L25U
26	D3	1	D Schottky	SMAJ24A_DNP	DO-214AC	Schottky Diode	DNP	STMicroelectronics	
27	D4	1	Diode 10TQ035	PMEG3030EP	SOD-128	SMD 3A low Vf MEGA Schottky barrier rectifier		NXP Semiconductors	
28	D5	1	LED2	+5V	0603 LED	LED Green		Kingbright	KP-1608SGC
29	D6	1	LED2	LD1	0805 LED	SMD Micro LED®		Kingbright	
30	D7	1	LED2	LD2	0805 LED	SMD Micro LED®		Kingbright	
31	D8	1	LED2	Rx_2	0805 LED	SMD Micro LED®		Kingbright	
32	D9	1	LED2	Tx_2	0805 LED	SMD Micro LED®		Kingbright	
33	D10	1	LED2	LVDD	0603 LED	LED Green		Kingbright	KP-1608SGC
34	F1	1	Fuse 2	2 A	2018 (5045)	PTC Resettable Fuse 0.8A(hold) 2A(trip) 16VDC 70A 1.5W 9s 0.13Ohm SMD Solder Pad 2018 T/R		Littelfuse	
35	J1	1	PJ202A	DC-10A	CON DC10A			CLIFF Electronic Component	DC-10A (FC68148)
36	J2	1	ARK_2	12 V	CON2	Screw Conn. Term., single row, 5.00 pitch, 9 depth, 12.6 height, AWG 14-26, 16A		WURTH	691101710002
37	J3, J4, J5, J6	4	ARK_2	ARK_2	CON2	Screw Conn. Term., single row, 5.00 pitch, 9 depth, 12.6 height, AWG 14-26, 16A		WURTH	691101710002
38	J7	1	2BCONNECTPG00211	CAN_ 1_TT_FD	DB9M SLOT	Conn DB9 Male 90°		MULTICOMP	
39	J8	1	2BCONNECTPG00211	CAN_ 2_TT_FD	DB9M SLOT	Conn DB9 Male 90°		MULTICOMP	
40	JP1, JP2, JP4, JP5, JP7, JP8, JP9, JP10, JP11, JP12, JP13, JP14,	22	Jumper 2.54_Closed	Closed	SIP2	Male Strip, Single row, 2 poles, p=2,54mm (See Mech Parts) - Closed, Conn Unshrouded Header HDR 2 POS 1.27mm Solder ST Top Entry Thru-Hole	Closed	TE Connectivity, Sullins	



#	Item	Quantity	Reference	Value	Footprint	Description	Ass. Opt.	Manufacturer	Manufacturer part number
	JP15, JP16, JP18, JP19, JP20, JP21, JP23, JP24, JP25, JP26								
41	JP3	1	HEADER 9X2	HEADER 9X2	HEADER 9X2	Header 9X2 PASSO 2,54MM			
42	JP6	1	JUMP3	3 Male Pins (1-2)	SIP3	JUMP3	Closed 1-2		
43	JP17, JP22, JP27, JP28	4	Jumper 2.54_Open	Open	SIP2	Conn Unshrouded Header HDR 2 POS 2.54mm Solder ST Thru-Hole Automotive Carton	Open	TE Connectivity	
44	L1	1	Inductor	27uH	WE-PD	Surface Mount Power Inductor, WE-PD Series, 27 H, 2.97 A, 3.55 A, Shielded, 0.051 ohm		Würth Elektronik	744771127
45	L2, L3, L4, L5, L6, L7, L8, L9, L10, L11, L16, L17, L19, L20	14	Inductor	60Ω@100MHz	F0603	SMD Multilayer Ferrite		Würth Electronics	
46	L12	1	Inductor	10 uH	CLF6045NIT	Fixed Inductors 10uH AEC-Q200 (150C)		TDK	
47	L13, L14, L15	3	Inductor	Ferrite Bead	0603	Ferrite Bead 0603 60Ohm 500mA		Würth Elektronik	74279267
48	L18, L21	2	Inductor	60Ω@100MHz	F0603	SMD Multilayer Ferrite	DNP	Würth Electronics	
49	LD1	1	LED2	12 V	0805 LED	LED GREEN CLEAR CHIP SMD		Kingbright	
50	LD2	1	LED2	5 V	0805 LED	LED GREEN CLEAR CHIP SMD		Kingbright	
51	LD3	1	LED2	3.3 V	0805 LED	LED GREEN CLEAR CHIP SMD		Kingbright	
52	LD4	1	LED2	VDD_LV_SMPS	0805 LED	LED GREEN CLEAR CHIP SMD		Kingbright	
53	LD5	1	LED2	LED_0	0805 LED	LED GREEN CLEAR CHIP SMD		Kingbright	
54	LD6	1	LED2	LED_1	0805 LED	LED GREEN CLEAR CHIP SMD		Kingbright	

#	Item	Quantity	Reference	Value	Footprint	Description	Ass. Opt.	Manufacturer	Manufacturer part number
55	LD7	1	LED2	Reset A	0805 LED	SMD Led Diode Red - Standard Bright		Kingbright	
56	P1	1	Header 10X2	ARM20	IDC20	Conn Flat Male 20 pins, straight low profile		AMPHENOL	
57	P2	1	Header 4	FCCU_ERRx	SIP4	CONN HEADER VERT 4POS 2.54MM		TE Connectivity	
58	P3	1	2BCONCOAXPG00008	SMA	SMA DRITTO - 200X200	Female RF SMA 180°		TE Connectivity	
59	P4	1	Header 19X2	Header 19X2	MICTOR MALE 767004-2	Conn High Speed Fine Pitch Connector RCP 38 POS 2.54mm/0.64mm Solder ST Thru-Hole/SMD Tube		AMP - TE CONNECTIVITY	
60	P5	1	USB_Port	USB_Port_B	UX60SC-MB-5S8	USB-MINI_B		Hirose	UX60SC-MB-5S8
71	P6	1	Header 5	SAR1	SIP5	Conn Unshrouded Header HDR 5 POS 2.54mm Solder ST Thru-Hole		TE Connectivity	
72	P7	1	Header 10	TIM1	SIP10	10P AMPMODU II STIFT LEI		TE Connectivity	
73	P8	1	Header 5	SAR2	SIP5	Conn Unshrouded Header HDR 5 POS 2.54mm Solder ST Thru-Hole		TE Connectivity	
74	P9	1	Header 10	TIM2_3	SIP10	10P AMPMODU II STIFT LEI		TE Connectivity	
75	P10	1	Header 5	SAR3	SIP5	Conn Unshrouded Header HDR 5 POS 2.54mm Solder ST Thru-Hole		TE Connectivity	
76	P11	1	Header 5	SAR4	SIP5	Conn Unshrouded Header HDR 5 POS 2.54mm Solder ST Thru-Hole		TE Connectivity	
77	P12	1	Header 12	TIM8	SIP12	Header, 12-Pin			
78	P13	1	Header 5	SAR5	SIP5	Conn Unshrouded Header HDR 5 POS 2.54mm Solder ST Thru-Hole		TE Connectivity	
79	P14	1	Header 2	UART_3	SIP2	Conn Unshrouded Header HDR 2 POS 2.54mm Solder ST Thru-Hole Automotive Carton		TE Connectivity	
80	P15	1	Header 5	SDADC	SIP5	Conn Unshrouded Header HDR 5 POS 2.54mm Solder ST Thru-Hole		TE Connectivity	
81	P16	1	Header 3	DAC	SIP3	Header, 3-Pin			



#	Item	Quantity	Reference	Value	Footprint	Description	Ass. Opt.	Manufacturer	Manufacturer part number
82	P17	1	Header 14	HRTIM1	SIP14	CONN HEADER VERT 14POS .100 TIN		TE Connectivity	
83	P18	1	Header 4	DSPI_2	SIP4	CONN HEADER VERT 4POS 2.54MM		TE Connectivity	
84	P19	1	Header 4	DSPI_4	SIP4	CONN HEADER VERT 4POS 2.54MM		TE Connectivity	
85	P20	1	Header 14	HRTIM2	SIP14	CONN HEADER VERT 14POS .100 TIN		TE Connectivity	
86	P21	1	Header 8	CAN	SIP8 - MALE	TE Connectivity AMPMODU Series, 2.54mm Pitch 8 Way 1 Row Straight PCB Header, Solder Termination, 3A		TE Connectivity	
87	P22	1	Header 4	I2C	SIP4	CONN HEADER VERT 4POS 2.54MM		TE Connectivity	
88	P_B1	1	KTH55150KA	P_Button_0	KTH55150KA	SWITCH, TACTILE, SMD, h=5mm		KANGHONG ELECTRONIC	KTH55150KA
89	P_B2	1	KTH55150KA	P_Button_1	KTH55150KA	SWITCH, TACTILE, SMD, h=5mm		KANGHONG ELECTRONIC	KTH55150KA
90	Q1	1	PMPB100XPEAX	PMPB100XPEAX	DFN2020MD (SOT1220)				
91	Q2	1	PMPB55XNEAX	PMPB55XNEAX	DFN2020MD (SOT1220)				
92	Q3, Q4	2	BC817-40	BC817-40	SOT-23-RS	Bipolar (BJT) Single Transistor, NPN, 45 V, 170 MHz, 300 mW, 500 mA, 250		MULTICOMP	BC817-40
93	Q5	1	PNP	BC807	SOT-23-RS	Bipolar (BJT) Single Transistor, PNP, -45 V, 100 MHz, 225 mW, -500 mA, 160 hFE		ON Semiconductor	BC807-25LT1G
94	R1, R14, R16, R18	4	Resistor_SMD	0R_DNP	R1206-RS	SMD Resistor Automotive, SMD Resistor	DNP	VISHAY, Yageo	
95	R2, R10, R11, R12, R13, R15, R17, R19, R20, R21, R22,	51	Resistor_SMD	0 Ω	R1206-RS	SMD Resistor, SMD Resistor Automotive	DNP	Yageo, VISHAY	



#	Item	Quantity	Reference	Value	Footprint	Description	Ass. Opt.	Manufacturer	Manufacturer part number
	R39, R40, R41, R42, R43, R44, R45, R46, R48, R50, R51, R52, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R84, R88, R89, R90, R94, R95, R96, R97, R98, R99, R100, R101, R102, R103, R104, R105, R108, R109								



#	Item	Quantity	Reference	Value	Footprint	Description	Ass. Opt.	Manufacturer	Manufacturer part number
96	R3	1	Resistor_SMD	220 Ω	R0603-RS	THICK FILM RESISTOR, 220 OHM, 100mW, 1%; Product Range:RC Series; Resistance:220ohm; Power Rating:100mW; Resistance Tolerance: 1%; Voltage Rating:50V; Resistor Case Style:0603 [1608 Metric]; Packaging:Cut Tape; MSL:-; No. of Pins:2 ;RoHS Compliant: Yes		Yageo	
97	R4, R30, R31, R79, R80	5	Resistor_SMD, Res1	4.7 k Ω	R0603-RS	RES SMD 4.7K OHM 1% 1/10W 0603, Resistor 0603		Yageo, Any	
98	R5	1	Resistor_SMD	1.05 k Ω	R0603-RS	RC Series 0603 0.1 W 1.05 kOhms 1% $\pm$ 100 ppm/ $^{\circ}$ C SMT Thick Film Chip Resistor		Yageo	
99	R6	1	Resistor_SMD	1.3 k Ω	R0603-RS	RES SMD 1.3K OHM 1% 1/10W 0603		Yageo	
100	R7	1	Resistor_SMD	5.1 k Ω	R0603-RS	RES SMD 5.1K OHM 1% 1/10W 0603		Yageo	
101	R8, R23	2	Resistor_SMD	1.5 k Ω	R0603-RS	Res Thick Film 0603 1.5K Ohm 1% 1/5W $\pm$ 200ppm/ $^{\circ}$ C Molded SMD, SMD Resistor		Yageo	RC0603FR-071K5L
102	R9, R26, R27	3	Resistor_SMD	680 Ω	R0603-RS	YAGEO - RC0603FR-07680RL - SMD Chip Resistor, 0603 [1608 Metric], 680 ohm, RC Series, 50 V, Thick Film, 100 mW, SMD Resistor		Yageo	RC0603FR-07680RL
103	R24, R65, R69, R74	4	Resistor_SMD, Res1	1 k Ω	R0603-RS	SMD Resistor, RES SMD 1K OHM 1% 1/10W 0603, Resistor 0603		YAGEO, Any	
104	R25, R32, R33, R66	4	Resistor_SMD	100 k Ω	R0603-RS	SMD Resistor, Res Thick Film 1.6 x 0.8 mm 100K Ohm 1% 0.1W(1/10W) 100ppm/ $^{\circ}$ C Molded SMD Paper T/R		TE Connectivity, Yageo	



#	Item	Quantity	Reference	Value	Footprint	Description	Ass. Opt.	Manufacturer	Manufacturer part number
105	R28, R29, R34, R64, R81, R106, R107	7	Resistor_SMD, Res1	10 kΩ	R0603-RS	SMD Resistor, Resistor 0603		YAGEO, Any	
106	R35, R36, R37, R38, R47	5	Resistor_SMD	10 kΩ	R0603-RS	SMD Resistor	DNP	YAGEO	
107	R49	1	Resistor_SMD	50 Ω	R0805-RS	SMD Resistor Automotive		Vishay Dale	
108	R53	1	Resistor_SMD	22 Ω	R0603-RS	Res Thick Film 0603 22 Ohm 1% 0.1W(1/10W) ±100ppm/C Pad SMD T/R		Yageo	
109	R67, R76, R77	3	Resistor_SMD	470 Ω	R0603-RS	SMD Resistor, Res Thick Film 0603 470 Ohm 1% 1/4W ±100ppm/°C Molded SMD SMD Paper T/R		YAGEO, Rohm	
110	R68	1	Res1	0 Ω	R0603-RS	Resistor 0603	DNP	Any	
111	R70, R71, R78	3	Res1	470 Ω	R0603-RS	Resistor 0603		Any	
112	R72, R73	2	Res1	10 Ω	R0603-RS	Resistor 0603		Any	
113	R75	1	Res1	12 kΩ	R0603-RS	Resistor 0603		Any	
114	R82	1	Res1	0 Ω	R0603-RS	Resistor 0603		Any	
115	R83	1	Res1	2.2 kΩ	R0603-RS	Resistor 0603		Any	
116	R85, R86, R91, R92	4	Resistor_SMD	60.4 Ω	R0805-RS	SMD Resistor		Yageo	
117	R87, R93	2	Resistor_SMD	47 kΩ	R0603-RS	SMD Resistor		Yageo	
118	RB1	1	KTH55150KA	RESET	KTH55150KA	SWITCH, TACTILE, SMD, h=5mm		KANGHONG ELECTRONIC	KTH55150KA
119	S1	1	SPDT - SLITTA	SPDT - SLITTA	SWITCH C.S. MFP211N	SPDT - SLITTA p. 4,00mm		KNITTER SWITCH	MFP211N



#	Item	Quantity	Reference	Value	Footprint	Description	Ass. Opt.	Manufacturer	Manufacturer part number
120	SB1	1	Circuit Breaker_Closed	Closed	JUMP A SALDARE - 0805	Circuit Breaker	Closed	YAGEO	
121	SB2	1	Circuit Breaker_Closed	Closed	JUMP A SALDARE - 0402	Circuit Breaker	Closed	YAGEO	
122	SB3	1	Circuit Breaker_Open	Open	JUMP A SALDARE - 0603	Circuit Breaker	DNP	YAGEO	RC0603JR-070RL
123	SB4, SB5, SB6, SB7, SB8, SB9, SB10	7	Circuit Breaker_Closed	Closed	JUMP A SALDARE - 0603	Circuit Breaker	Closed	YAGEO	
124	SWD1	1	Header 5X2	SWJ-DP	FTSH-105-01- L-D-K	Debug Connector 5x2 1.27mm		Samtec	
125	T1	1	NPN	BC848	SOT-23-RS	NPN Bipolar Transistor		ON Semiconductor	BC848BLT3G
126	TP1	1	Test Point	3V3	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		
127	TP2	1	Test Point	12V	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		
128	TP3	1	Test Point	Vbatt	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		
129	TP4	1	Test Point	5V	SIP1	PCB ring test point - Red (drill 1.32mm)	DNP		
130	TP5	1	Test Point	VDD_LV	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		
131	TP6	1	Test Point	VDD_LV_S	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		
132	TP7	1	Test Point	PMOS	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		
133	TP8	1	Test Point	VLX	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		
134	TP9	1	Test Point	VDD_LV_SMPS	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		
135	TP10	1	Test Point	NMOS	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		



#	Item	Quantity	Reference	Value	Footprint	Description	Ass. Opt.	Manufacturer	Manufacturer part number
136	TP11	1	Test Point	VDD_HV	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		
137	TP12	1	Test Point	LED_0	SIP1	PCB ring test point - White (drill 1.32mm)			
138	TP13	1	Test Point	LED_1	SIP1	PCB ring test point - White (drill 1.32mm)			
139	TP14	1	Test Point	P_Button_0	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		
140	TP15	1	Test Point	P_Button_1	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		
141	TP16	1	Test Point	TRACE_CK	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		
142	TP17	1	Test Point	TRACE_D0	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		
143	TP18	1	Test Point	TRACE_D1	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		
144	TP19	1	Test Point	TRACE_D2	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		
145	TP20	1	Test Point	TRACE_D3	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		
146	TP21	1	Test Point	PF9	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		
147	TP22	1	Test Point	PF8	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		
148	TP23	1	Test Point	TMODE	SIP1	PCB ring test point - White (drill 1.32mm)			
149	TP24	1	Test Point	RESET	SIP1	PCB ring test point - White (drill 1.32mm)			
150	TP25	1	Test Point	ADBUS5	SIP1	Headers & Wire Housings C-Grid SR Vt Pn 6.75 .75/2.90mm Au-F 1Ckt	DNP		
151	TP26	1	Test Point	PH14	SIP1	PCB ring test point - White (drill 1.32mm)			
152	TP27	1	Test Point	PH15	SIP1	PCB ring test point - White (drill 1.32mm)			
153	TP28	1	Test Point	LVDD	SIP1	Headers & Wire Housings C-Grid SR Vt Pn 6.75 .75/2.90mm Au-F 1Ckt	DNP		



#	Item	Quantity	Reference	Value	Footprint	Description	Ass. Opt.	Manufacturer	Manufacturer part number
154	TP29	1	Test Point	CAN_1_L	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		
155	TP30, TP33	2	Test Point	CAN_STBY	SIP1	PCB ring test point - White (drill 1.32mm)			
156	TP31	1	Test Point	CAN_1_H	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		
157	TP32	1	Test Point	CAN_2_L	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		
158	TP34	1	Test Point	CAN_2_H	SIP1	PCB ring test point - White (drill 1.32mm)	DNP		
159	TP35	1	Test Point	SAR1_GND	SIP1	PCB ring test point - White (drill 1.32mm)			
160	TP36	1	Test Point	TIM1_GND	SIP1	PCB ring test point - White (drill 1.32mm)			
171	TP37	1	Test Point	SAR2_GND	SIP1	PCB ring test point - White (drill 1.32mm)			
172	TP38	1	Test Point	SAR3_GND	SIP1	PCB ring test point - White (drill 1.32mm)			
173	TP39	1	Test Point	TIM3_GND	SIP1	PCB ring test point - White (drill 1.32mm)			
174	TP40	1	Test Point	SAR4_GND	SIP1	PCB ring test point - White (drill 1.32mm)			



Figure 17. Main

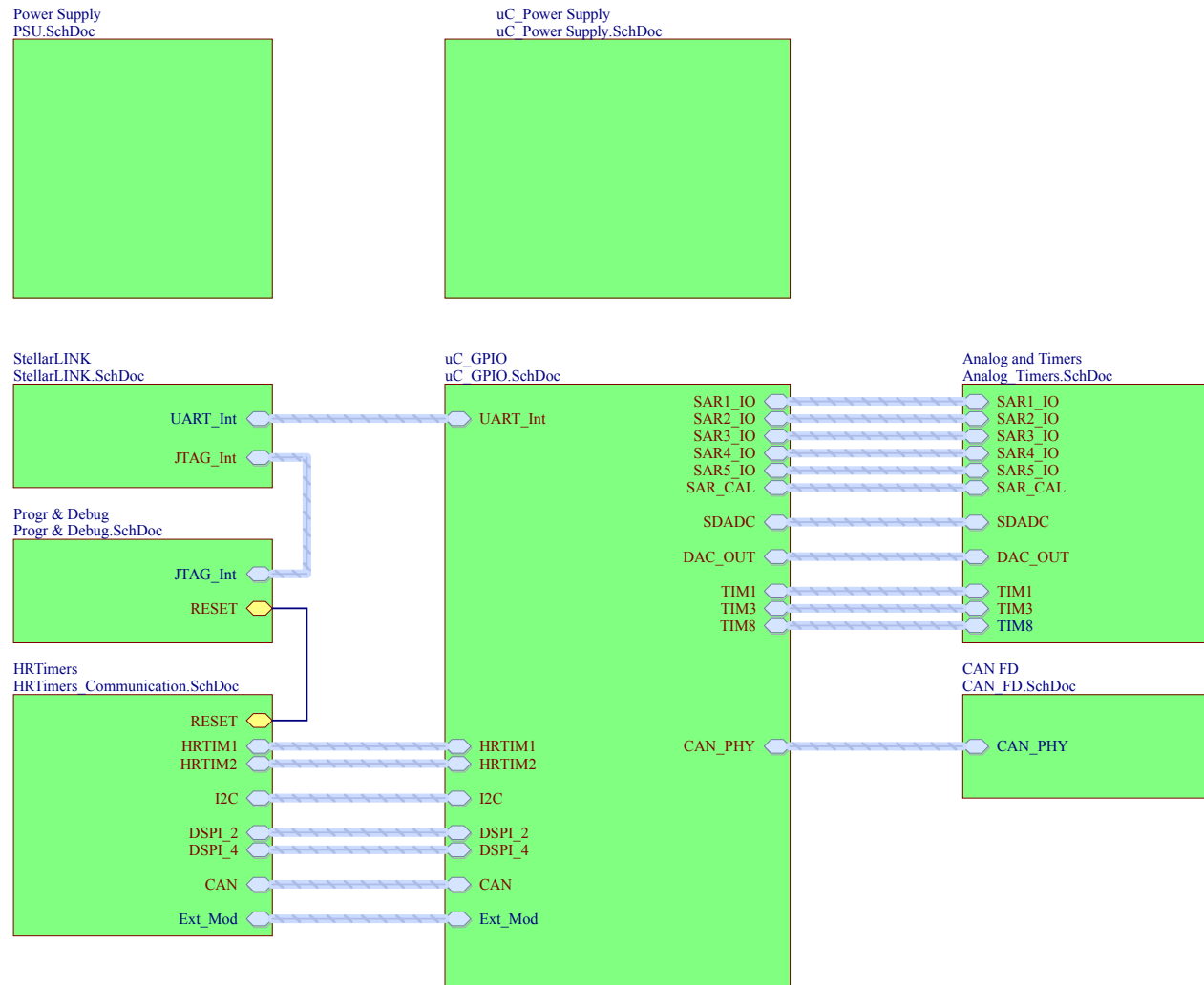


Figure 18. Power supply

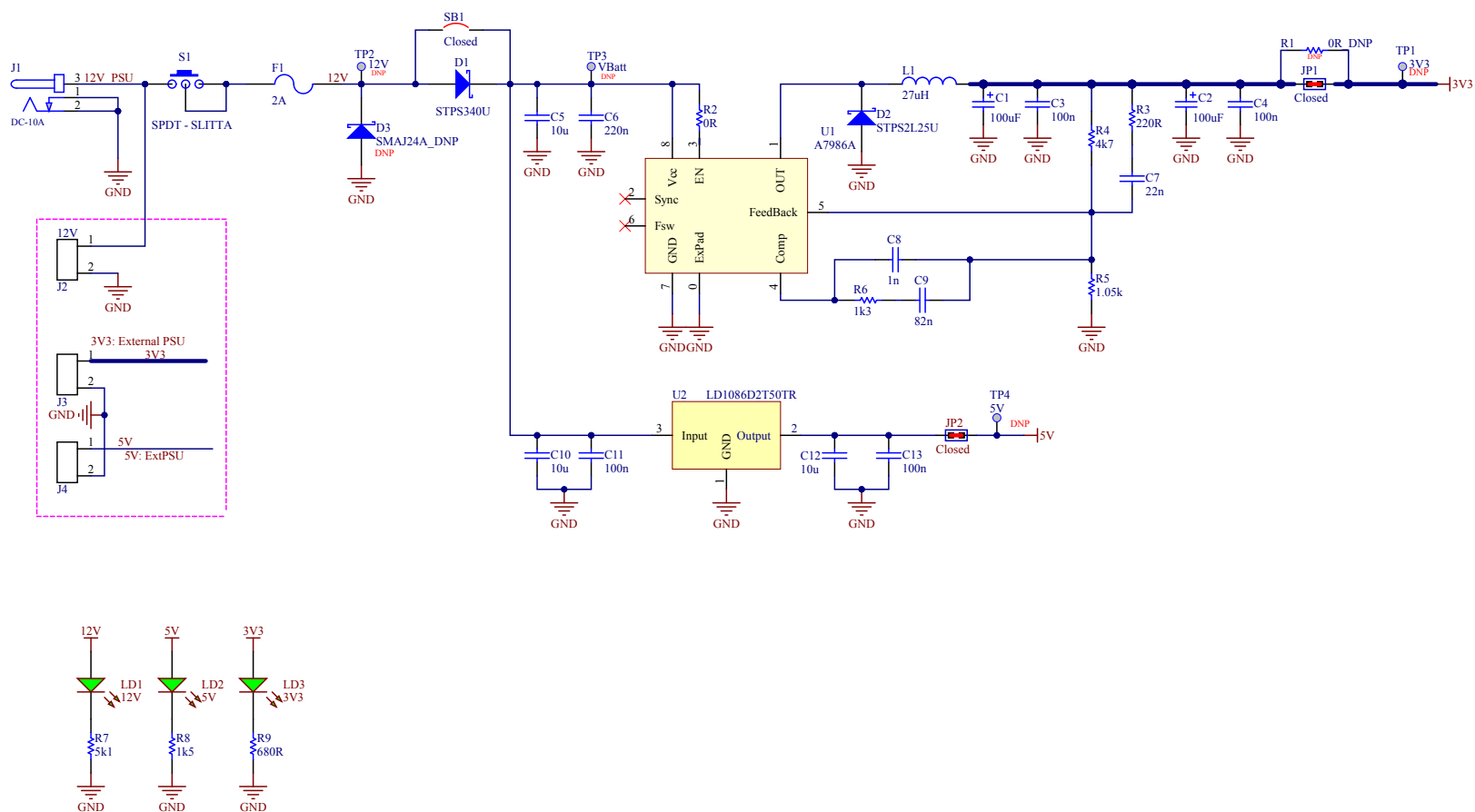


Figure 19. uC PSU

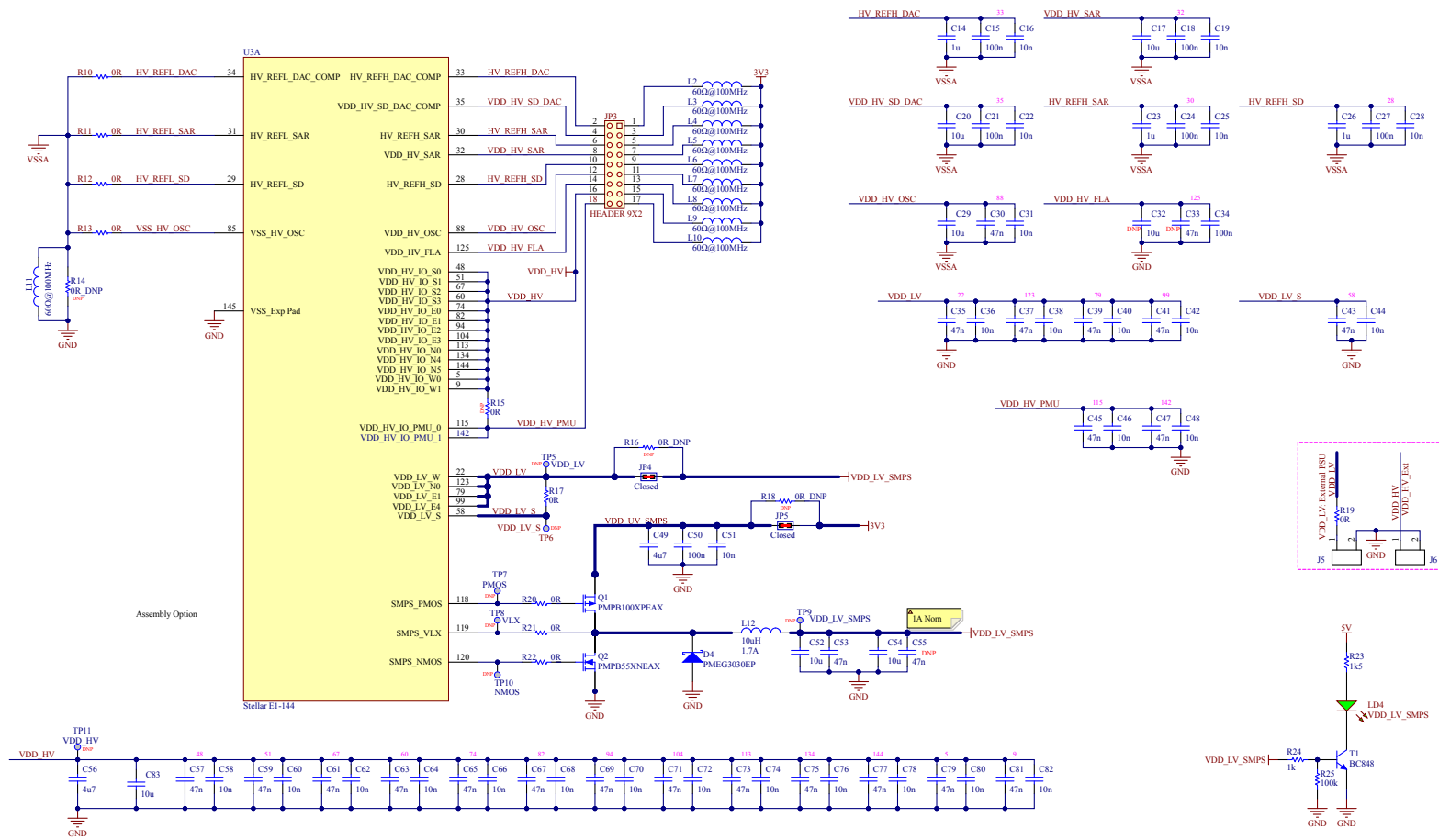


Figure 20. uC GPIO

U3C					
PA2	3	PA2 - TIM16_BkIn	PE1	70	PE1
PA3	4	PA3 - TIM8_PWM_ETR	PE2	71	PE2
PA4	1	PA4 - CAN1_RX	PE3	72	PE3
PA5	2	PA5 - CAN1_TX	PE4	73	PE4
PA6	6	PA6 - I2C1_SDA	PE5	74	PE5
PA7	7	PA7 - I2C1_SCL	PE6	75	PE6
PA13	10	PA13 - SDADC1_IN0	PE7	76	PE7
PA14	11	PA14 - SDADC1_IN1	PE8	77	PE8
PA15	12	PA15 - SDADC2_IN0	PE9	78	PE9
			PE10	79	PE10
			PE11	80	PE11
			PE12	81	PE12
			PE13	82	PE13
			PE14	83	PE14
			PE15	84	PE15
PB0	13	PB0 - SDADC2_IN1			
PB1	46	PB1 - B-DAC1_OUT			
PB2	14	PB2 - SAR1_IN1			
PB3	15	PB3 - SAR1_IN2			
PB4	16	PB4 - SAR1_IN3			
PB5	17	PB5 - SAR1_IN4			
PB6	18	PB6 - SAR1_IN5			
PB7	19	PB7 - SAR2_IN1			
PB8	20	PB8 - SAR2_IN2			
PB9	21	PB9 - SAR2_IN3			
PB10	23	PB10 - SAR2_IN4			
PB11	24	PB11 - SAR2_IN5			
PB12	25	PB12 - SAR3_IN1			
PB13	26	PB13 - SAR3_IN2			
PB14	27	PB14 - SAR3_IN3			
PC1	36	PC1 - SAR_CAL1			
PC2	37	PC2 - SAR_CAL2			
PC3	38	PC3 - SAR4_IN1			
PC4	39	PC4 - SAR4_IN2			
PC5	40	PC5 - B-DAC2_OUT			
PC6	41	PC6 - SAR4_IN3			
PC7	42	PC7 - SAR4_IN4			
PC8	43	PC8 - SAR4_IN5			
PC9	44	PC9 - SAR5_IN1			
PC10	45	PC10 - SAR5_IN2			
PC11	46	PC11 - SAR5_IN3			
PC12	47	PC12 - SAR5_IN4			
PC13	48	PC13 - SAR5_IN5			
PC14	49	PC14 - TIM1_PWM_CH1N			
PC15	50	PC15 - TIM1_PWM_CH1			
PD0	55	PD0 - TIM1_PWM_CH2N			
PD1	56	PD1 - TIM1_PWM_CH2			
PD2	57	PD2 - TIM1_PWM_CH3N			
PD3	58	PD3 - TIM1_PWM_CH3			
PD4	59	PD4 - TIM1_PWM_CH4N			
PD5	60	PD5 - TIM1_PWM_CH4			
PD6	61	PD6 - HRTIM1_CH2			
PD7	62	PD7 - HRTIM1_CH1			
PD8	63	PD8 - HRTIM1_EEV2			
PD9	64	PD9 - HRTIM1_CH2			
PD10	65	PD10 - HRTIM1_CH1			
PD11	66	PD11 - HRTIM1_CH2			
PD12	67	PD12 - HRTIM1_CH1			
PD13	68	PD13 - HRTIM1_CH2			
PD14	69	PD14 - HRTIM1_CH1			
PD15	70	PD15 - HRTIM1_CH2			

Stellar L1-144

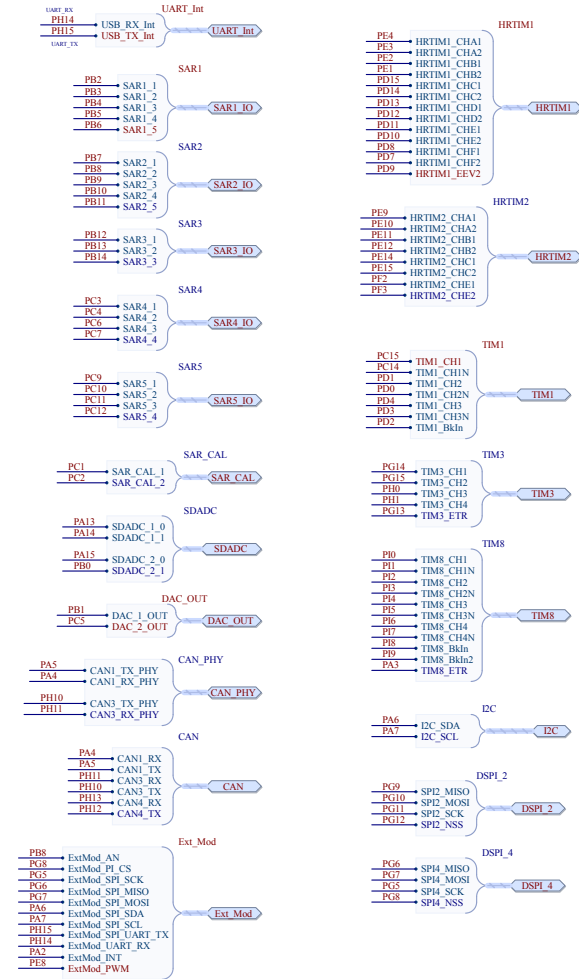
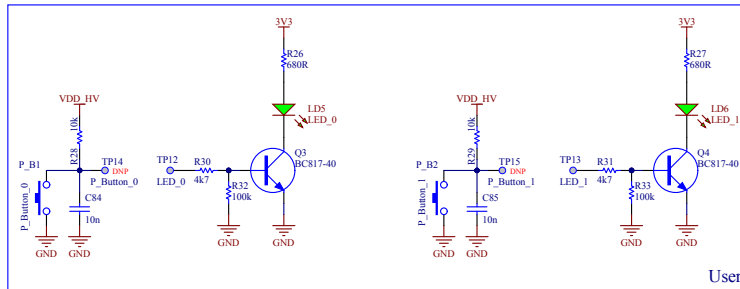


Figure 21. Program and debug

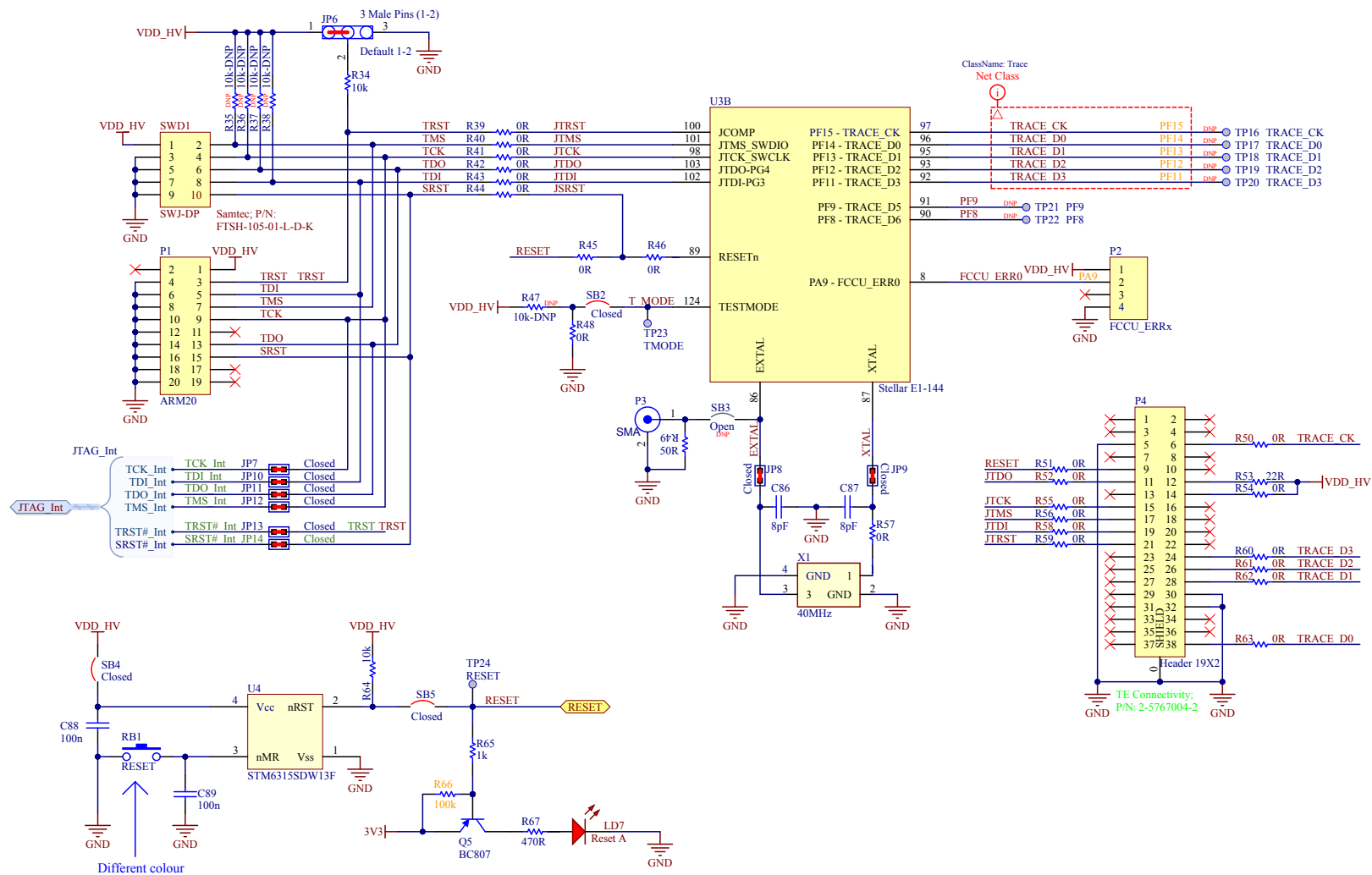


Figure 22. USB to UART

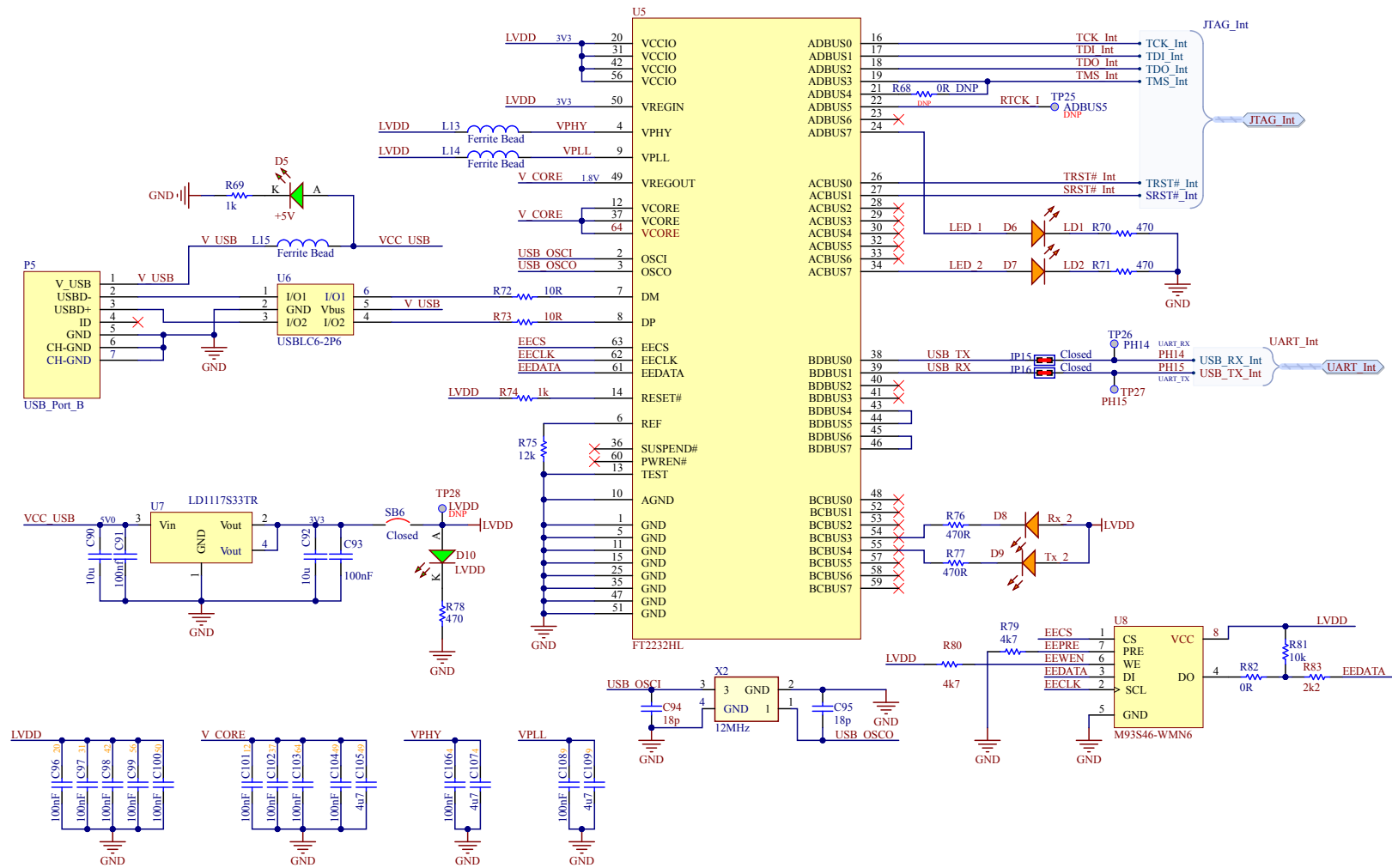


Figure 23. CAN FD

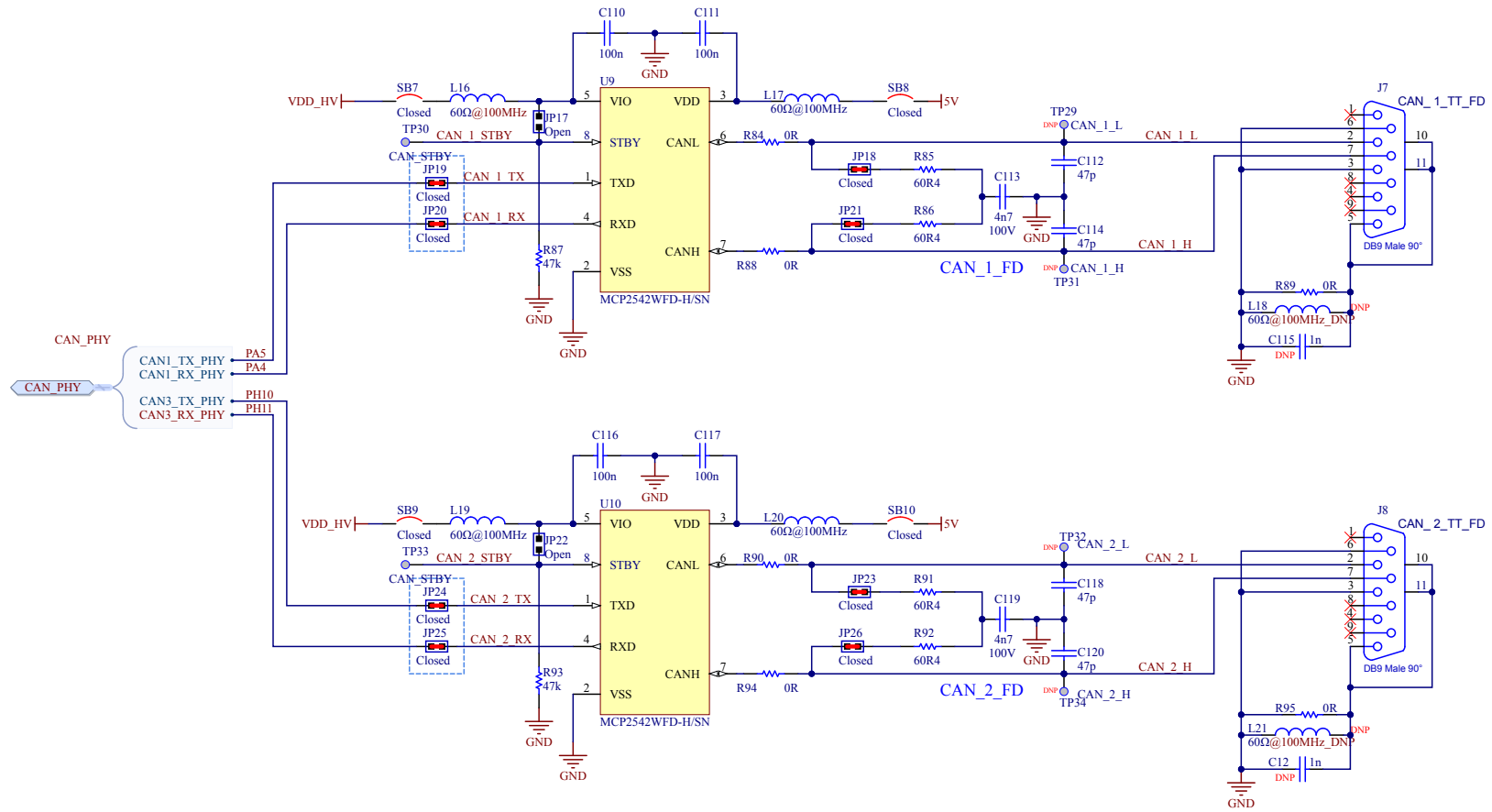


Figure 24. Analog and timers

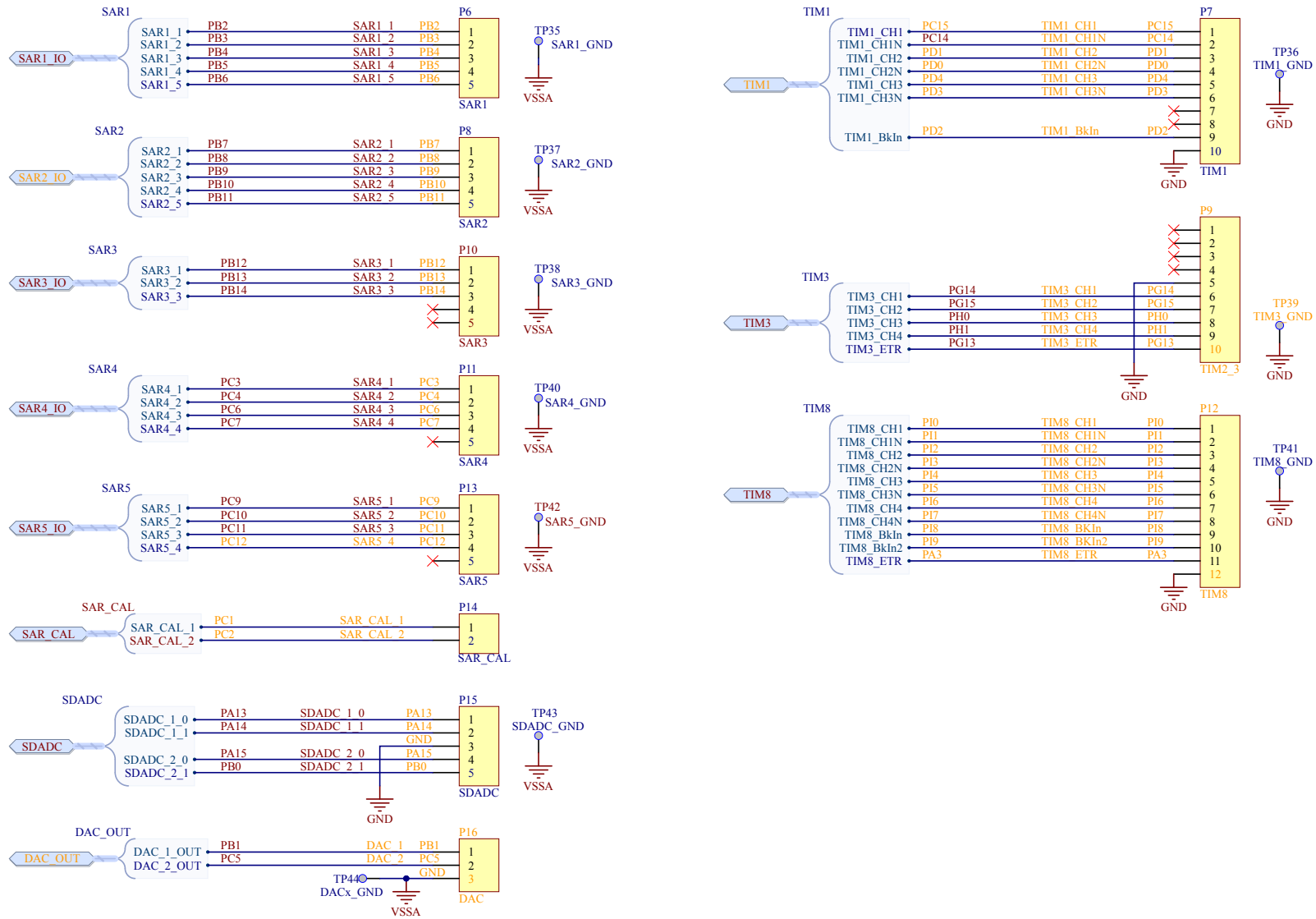
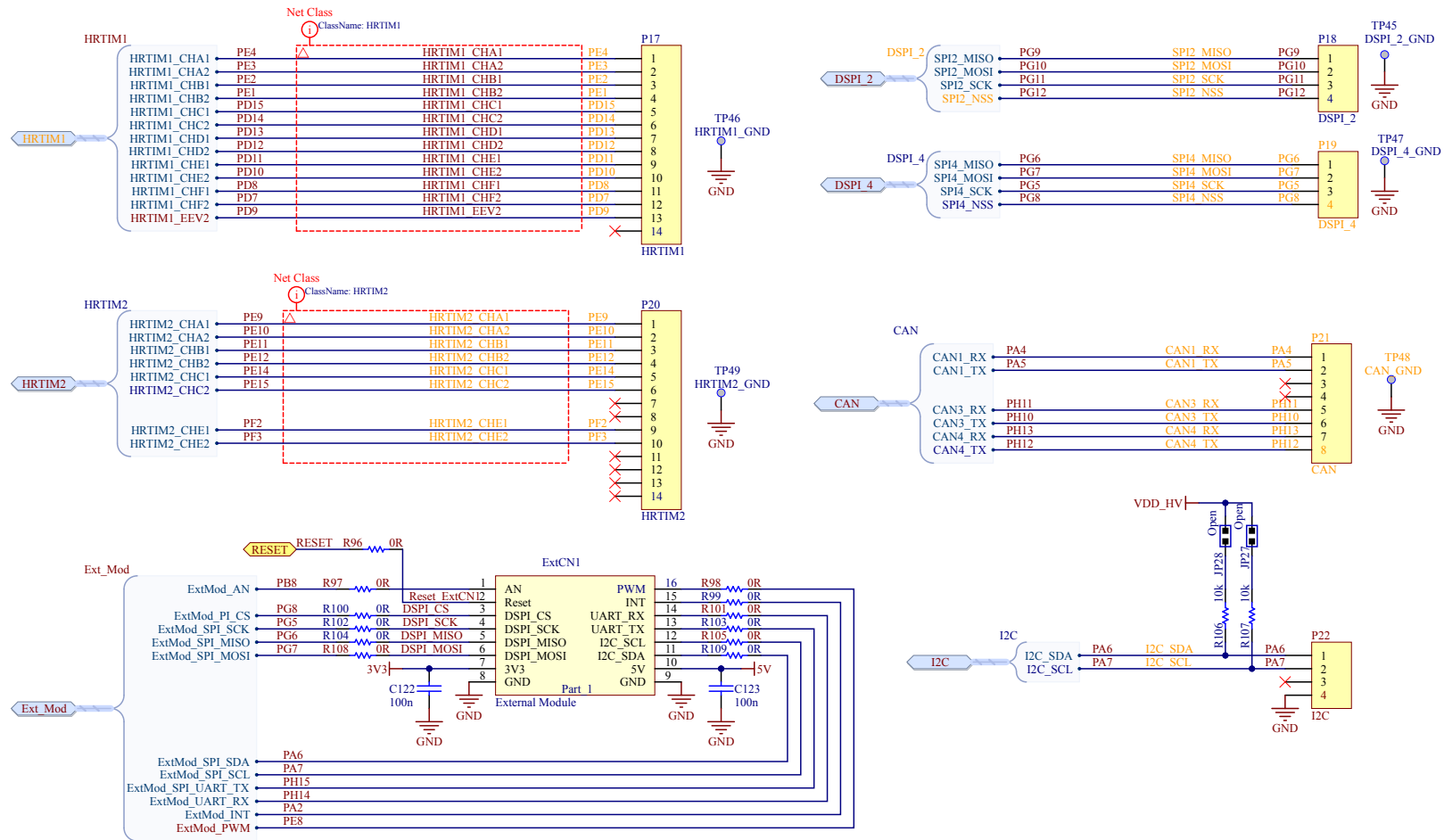


Figure 25. HR timers and communication



Revision history

Table 43. Document revision history

Date	Revision	Changes
23-Jan-2024	1	Initial release.
08-Jul-2024	2	Updated <i>Section 6.1: CAN interface</i> . Added <i>Table 6. CAN pin mapping</i> . Updated <i>Figure 24. Analog and timers</i> .
09-Jul-2025	3	Removed "ST restricted" watermark. Updated <i>Section 3: Handling precautions</i> .

Contents

1	Overview	2
1.1	Supported devices	3
2	License agreement	4
3	Handling precautions	5
4	Hardware description	6
4.1	Hardware features	6
4.2	Hardware dimensions	6
5	Power and system configuration	7
5.1	Power supplies	7
5.2	Power supply connectors	7
5.3	Power switch, status LEDs and fuse	7
5.4	System clock configuration	9
5.5	Reset circuit	10
5.6	TESTMODE configuration	11
6	Hardware description	12
6.1	CAN interface	12
6.2	UART interface	14
6.3	I ² C interface	15
6.4	DSPI interface	16
6.5	Analog and timers connectors	17
6.5.1	SAR1_IO ADC module	17
6.5.2	SAR2_IO ADC module	18
6.5.3	SAR3_IO ADC module	18
6.5.4	SAR4_IO ADC module	18
6.5.5	SAR5_IO ADC module	18
6.5.6	SAR_CAL ADC module	19
6.5.7	SDADC_CAL module	19
6.5.8	DAC_OUT module	19
6.5.9	TIM1 module	19
6.5.10	TIM3 module	20
6.5.11	TIM8 module	20
6.5.12	HRTIM1 module	21
6.5.13	HRTIM2 module	21
6.6	Debug connectors	22
6.7	User AREA	26

6.8	Test points	28
7	Layout overview	30
8	BOM.....	32
9	Schematics.....	45
	Revision history	54

List of tables

Table 1.	Power configuration jumpers	7
Table 2.	System clock configuration	10
Table 3.	Reset configuration jumpers	11
Table 4.	TESTMODE configuration schema	11
Table 5.	CAN connectors	12
Table 6.	CAN pin mapping.	12
Table 7.	CAN_1 DB9 connector pinout	12
Table 8.	CAN_2 DB9 connector pinout	12
Table 9.	8x1 header CAN connector pinout	13
Table 10.	CAN configuration jumpers and solder bridges.	13
Table 11.	UART interface connector	14
Table 12.	UART interface pin configuration	14
Table 13.	UART interface LEDs	15
Table 14.	I ² C connector and jumpers	15
Table 15.	I ² C header 1x4 pins connector pinout	15
Table 16.	DSPI connectors	16
Table 17.	DSP_2 connector (P18) pin mapping	16
Table 18.	DSP_4 connector (P19) pin mapping	16
Table 19.	Analog and timers connectors	17
Table 20.	SAR1_IO connector pin mapping (P6)	17
Table 21.	SAR2_IO connector (P8) pin mapping	18
Table 22.	SAR3_IO connector (P10) pin mapping	18
Table 23.	SAR4_IO connector (P11) pin mapping.	18
Table 24.	SAR5_IO connector (P13) pin mapping	18
Table 25.	SAR_CAL ADC connector (P14) pin mapping	19
Table 26.	SDADC connector (P15) pin mapping.	19
Table 27.	DAC_OUT connector (P16) pin mapping.	19
Table 28.	TIM1 connector (P7) pin mapping	19
Table 29.	TIM2_3 connector (P9) pin mapping.	20
Table 30.	TIM8 connector (P12) pin mapping.	20
Table 31.	HRTIM1 connector (P17) pin mapping	21
Table 32.	HRTIM2 connector (P20) pin mapping	21
Table 33.	Debug connectors	22
Table 34.	SWJ1 main DAP header 2x5 pins connector pinout	23
Table 35.	P2 JTAG Header 2x10 pins connector pinout.	23
Table 36.	JTAG/SWD configuration	24
Table 37.	Mictor 38-pin connector pinout.	25
Table 38.	Mictor 38-pin connector configuration	26
Table 39.	User area description	27
Table 40.	External module connector pinout	28
Table 41.	Test points	28
Table 42.	Bill of material	32
Table 43.	Document revision history	54

List of figures

Figure 1.	SR5E1-EVBE5000P rev. A	1
Figure 2.	SR5E1-EVBE5000P rev. A - top overview	2
Figure 3.	SR5E1-EVBE5000P rev. A - bottom overview	3
Figure 4.	2.1 mm power connector	7
Figure 5.	40 MHz local crystal oscillator schema	9
Figure 6.	External clock schema	9
Figure 7.	Reset circuit schema	10
Figure 8.	TESTMODE configuration schema	11
Figure 9.	I ² C schema	15
Figure 10.	DSPI header connectors schema	16
Figure 11.	JTAG/SWD debug ports schema	22
Figure 12.	Mictor 38-pin debug ports schema	24
Figure 13.	User area LEDs and the push buttons schema	27
Figure 14.	User area External Module schema	27
Figure 15.	SR5E1-EVBE5000P rev. A - top layer	30
Figure 16.	SR5E1-EVBE5000P rev. A - bottom layer	31
Figure 17.	Main	45
Figure 18.	Power supply	46
Figure 19.	uC PSU	47
Figure 20.	uC GPIO	48
Figure 21.	Program and debug	49
Figure 22.	USB to UART	50
Figure 23.	CAN FD	51
Figure 24.	Analog and timers	52
Figure 25.	HR timers and communication	53

IMPORTANT NOTICE – READ CAREFULLY

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice.

In the event of any conflict between the provisions of this document and the provisions of any contractual arrangement in force between the purchasers and ST, the provisions of such contractual arrangement shall prevail.

The purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgment.

The purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of the purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

If the purchasers identify an ST product that meets their functional and performance requirements but that is not designated for the purchasers' market segment, the purchasers shall contact ST for more information.

ST and the ST logo are trademarks of ST. For additional information about ST trademarks, refer to www.st.com/trademarks. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2025 STMicroelectronics – All rights reserved