

Getting started with the X-STM32MP-IGTW1 expansion board for the STM32MP157F-DK2 discovery kit

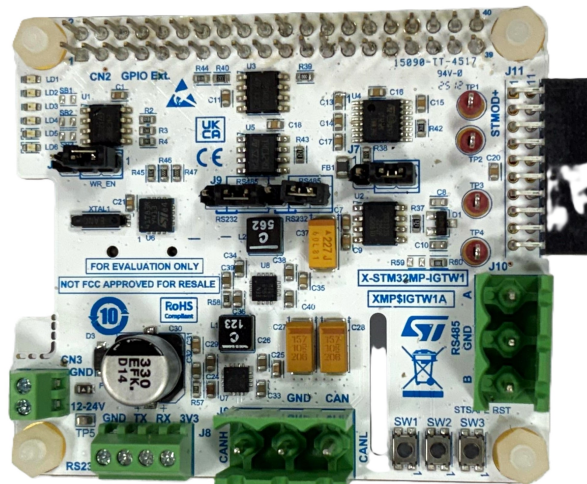
Introduction

X-STM32MP-IGTW1 is an MPU expansion board designed to augment STM32MP257 with industrial gateway capabilities. It embeds the following devices: ST4E1240, ST3232C, M41T83, STSAFE-A110, XR31235ED, M24C32-R, L6983, User LEDs and switches.

X-STM32MP-IGTW1 interfaces with the STM32MP157F-DK2 microprocessor via a 40-pin GPIO connector, using I²C, UART, FDCAN, and GPIO peripherals.

The X-STM32MP-IGTW1 expansion board is compatible with the GPIO expansion connector layout of the STM32MP257F-DK and Raspberry Pi , except for the FDCAN interface.

Figure 1. X-STM32MP-IGTW1 expansion board

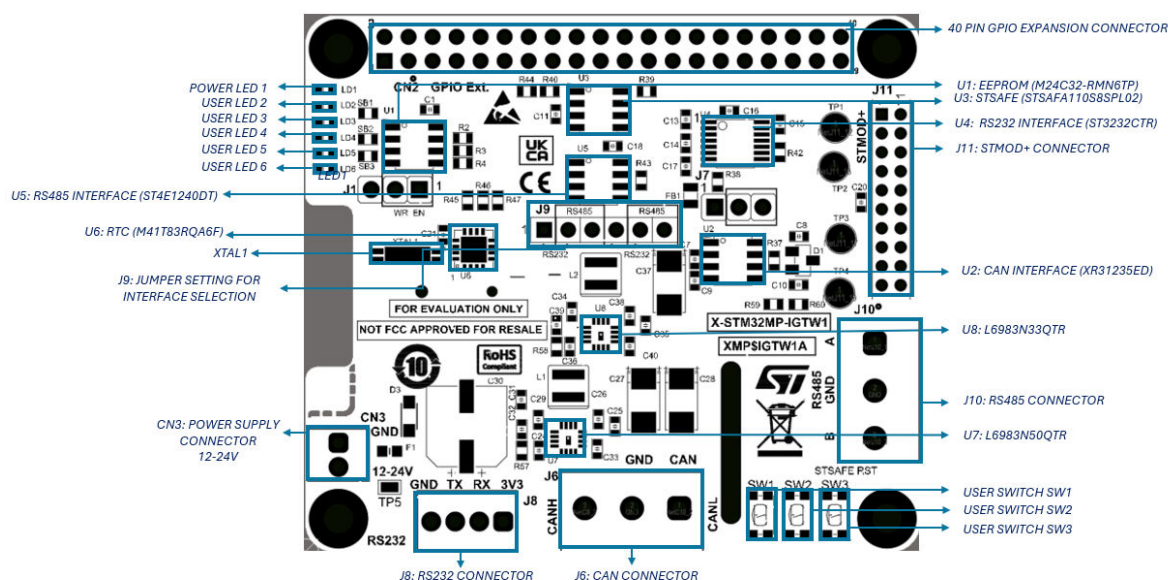


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1 Overview

X-STM32MP-IGTW1 is powered via a standard 3.3 V supply through the 40-pin GPIO connector and the CN3 power connector is used to power X-STM32MP-IGTW1 and back-power STM32MP257F-DK with up to 24 V. The figure below shows the component placement on the board.

Figure 2. X-STM32MP-IGTW1 component placement details



X-STM32MP-IGTW1 is an MPU expansion board designed for industrial IoT gateway applications, featuring a range of wired communication interfaces. It operates with a power supply between 12 and 24 V and interfaces with the STM32MP microprocessor via a 40-pin GPIO connector using I²C, UART, FDCAN, and GPIO connections. The board is compatible with the STM32MP257F-DK connector layout.

The expansion board consists of **ST4E1240**, which is a high-speed RS485 transceiver capable of data rates up to 20 Mbps. It operates within a voltage range of 3.0 V to 5.5 V and is optimized for low-power consumption, drawing only 1.5 mA during active operation and less than 1 μ A in shutdown mode. The device integrates robust ESD protection and fail-safe features, ensuring reliable communication in a demanding industrial environment.

The board also includes **ST3232C**, a dual RS232 transceiver that supports data rates up to 400 kbps. Operating from 3.0 V to 5.5 V, it features integrated charge pump capacitors to generate the necessary voltage levels and maintains low-power consumption, with only 1 μ A in shutdown mode.

For serial communication over CAN networks, the expansion board incorporates a high-speed CAN transceiver designed for automotive and industrial applications. It supports data rates up to 1 Mbps and offers robust data transmission with low-power reception. The transceiver is equipped with ± 36 VBUS fault tolerance, excellent noise immunity, and an autobaud loopback feature to enhance communication reliability.

Timekeeping is managed by the **M41T83** real-time clock (RTC), which includes a built-in battery backup to maintain accurate time even during power loss. This RTC operates from 1.8 V to 5.5 V and consumes only 1 μ A in battery mode. It provides programmable alarms, a watchdog timer, and a precise 32.768 kHz output, making it suitable for a wide range of embedded timing applications.

Security is addressed by the **STSAFE-A110** secure element, which delivers hardware-based authentication and cryptographic services. This component ensures data integrity and confidentiality, protecting IoT devices and peripherals from unauthorized access and tampering.

The board also features **M24C32-R**, a 32-kbit EEPROM with I²C interface, providing nonvolatile memory for data storage, ideal for industrial applications requiring reliable data retention and straightforward integration.

Figure 3. Block diagram

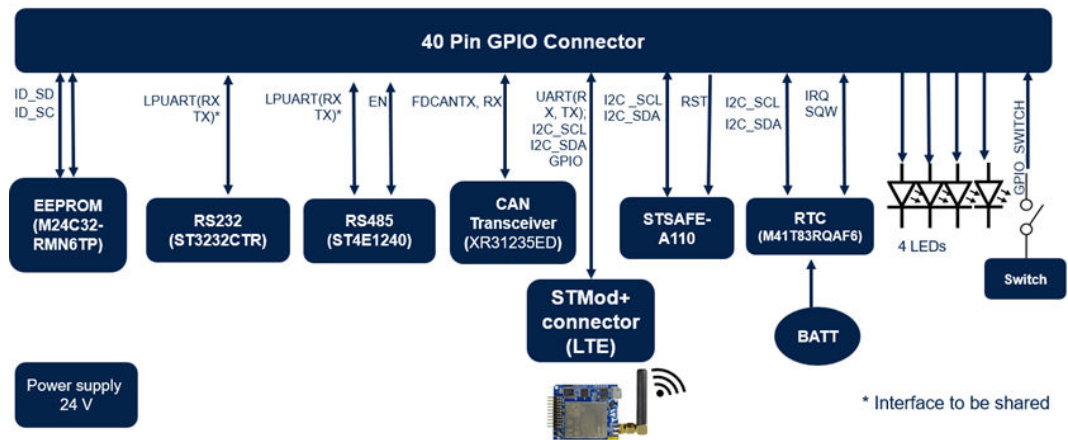
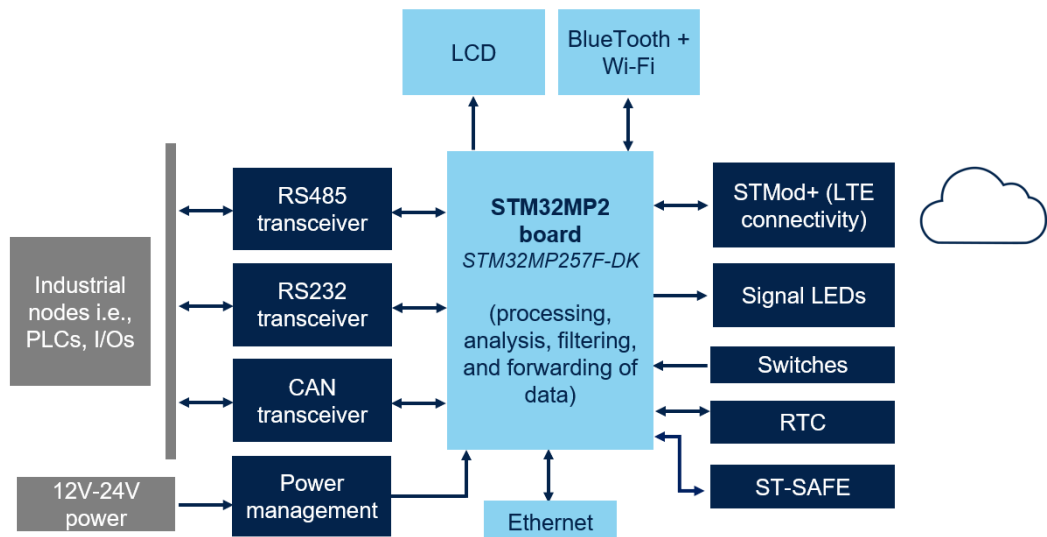


Figure 4. System block diagram



2 System requirements

To test X-STM32MP-IGTW1, you need:

- An X-STM32MP-IGTW1 expansion board.
- An STM32MP257F-DK discovery kit.
- A laptop or desktop computer running Windows 10 or later.
- A USB Type A to micro-B USB cable (for connection as a virtual serial device, if required).
- A USB PD compliant 5 V, 3 A power supply with a USB Type-C® to Type-C® cable.
- A power supply from 12 to 24 V_{DC} (if you want to back-power STM32MP257F-DK using X-STM32MP-IGTW1).

Note: STM32MP257F-DK can be powered either directly via USB or back-powered from the expansion board, but not by both simultaneously.

- Respective communication nodes to connect to RS232, RS485, and CAN connectors.
- A STEVAL-STMODLTE board to connect to the STMod+ connector.

3 Board setup

To set up the board, follow the steps below:

1. Check the position of the jumper on the J1 connector. This jumper enables the write operation for EEPROM, if required, using the jumper setting as highlighted in [Table 1](#).

Table 1. Jumper settings on X-STM32MP-IGTW1 for EEPROM write enable pin

Jumper	EEPROM (WC PIN)
1 - 2	WRITE_ENABLE
2 - 3 (default)	WRITE_DISABLE

2. Check the position of the jumper on the J7 connector. This jumper enables the autobaud loopback mode, if required, using the jumper setting as highlighted in [Table 2](#).

Table 2. Jumper settings on X-STM32MP-IGTW1 for CAN autobaud loopback enable pin

Jumper	CAN (AB PIN)
1 - 2	AB_LOOPBACK_ENABLE
2 - 3 (default)	AB_LOOPBACK_DISABLE

3. Check the position of the jumper on the J9 connector. This jumper allows the user to select between the RS232 and RS485 communication interfaces, if required, using the jumper setting as highlighted in [Table 3](#).

Note: Due to pin constraints on the 40-pin connector, only one communication node, either RS232 or RS485, can be connected at a time. The default communication node is RS485.

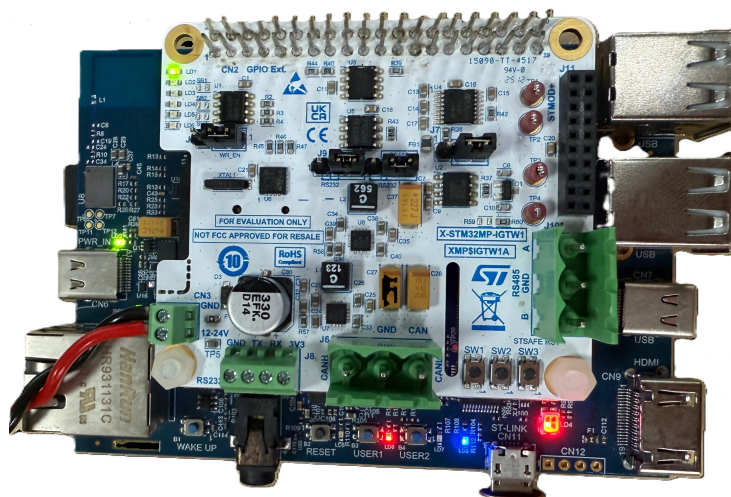
Table 3. Jumper settings on X-STM32MP-IGTW1 for selection between RS232 and RS485 interfaces

Jumper	RS232 / RS485 selection
1 - 2	RS232 RX
4 - 5	RS232 TX
2 - 3 (default)	RS485 RX
5 - 6 (default)	RS485 TX

4. Connect X-STM32MP-IGTW1 to the STM32MP157F-DK2 board from the top, ensuring that pin 1 on the X-STM32MP-IGTW1 aligns with pin 1 on the STM32MP157F-DK2.

Caution: Boards can become damaged if not connected properly.

Figure 5. X-STM32MP-IGTW1 connected to STM32MP257F-DK2



5. Power STM32MP157F-DK2 using the USB Type-C® cable.
6. Connect the STEVAL-STMODLTE board to the STMod+ connector and connect other communication nodes respectively to connectors RS485 and CAN.
7. Program the supported firmware in the microSD™ card of the STM32MP157F-DK2 board. The X-STM32MP-IGTW1 board is ready for use.

4 Component description

4.1 EEPROM

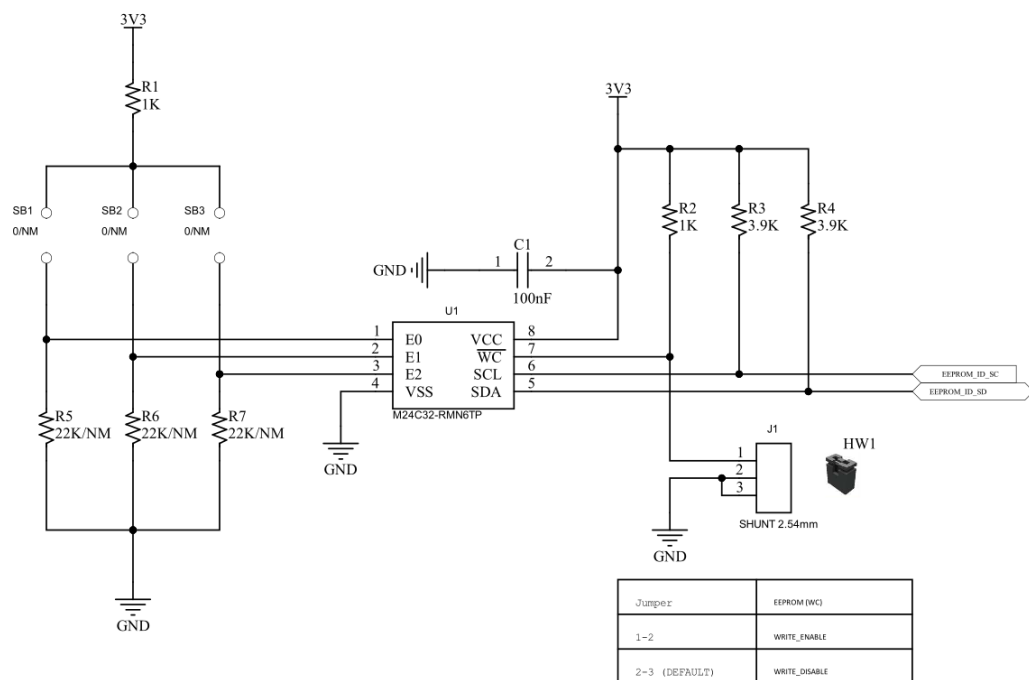
M24C32-R is a 32-Kbit I²C-compatible electrically erasable programmable memory (EEPROM) organized as 4 K × 8 bits.

Table 4. M24C32-R package details

Features	Description
Order code	M24C32-RMN6TP
Package	SO8
Operating voltage	From 1.8 to 5.5 V

Onboard jumper J1 can be used to enable or disable the write operation on EEPROM to prevent unauthorized write operations. This jumper setting details are shown in Table 1.

Figure 6. EEPROM circuit



4.2 RS232: ST3232C

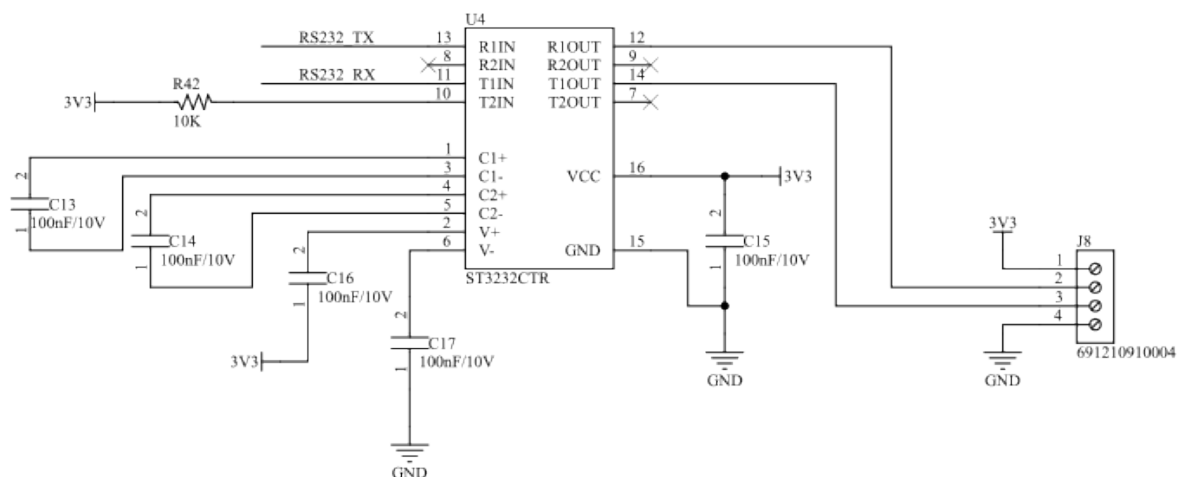
The RS232 interface circuit employs the ST3232C transceiver, a low-power 3 V powered device compliant with EIA/TIA-232 and V.28/V.24 standards. It supports data rates up to 300 kbps and features a proprietary low dropout transmitter output stage, enabling true RS232 signal levels from a 3.3 V supply. The device contains two drivers and two receivers, facilitating full-duplex serial communication. Four external 0.1 μF capacitors are used to internally generate the required voltage levels, ensuring reliable signal conversion between the microcontroller's UART logic levels and the RS232 voltage levels used by external serial devices.

The circuit includes a 10 kΩ pull-up resistor on the RS232_TX line for signal conditioning and multiple decoupling capacitors to stabilize power supply and reduce noise. The RS232 signals (TX and RX) are routed through the J8 dedicated connector for easy interfacing with external RS232 devices. Additionally, jumper J9 allows selection between RS232 and RS485 interfaces, providing flexibility for different communication protocols, as briefly explained in Table 3.

Table 5. ST3232C details

Features	Description
Order code	ST3232CTR
Package	TSSOP-16
Operating voltage	From 3 to 5.5 V

Figure 7. ST3232C circuit



4.3 High-speed RS485: ST4E1240

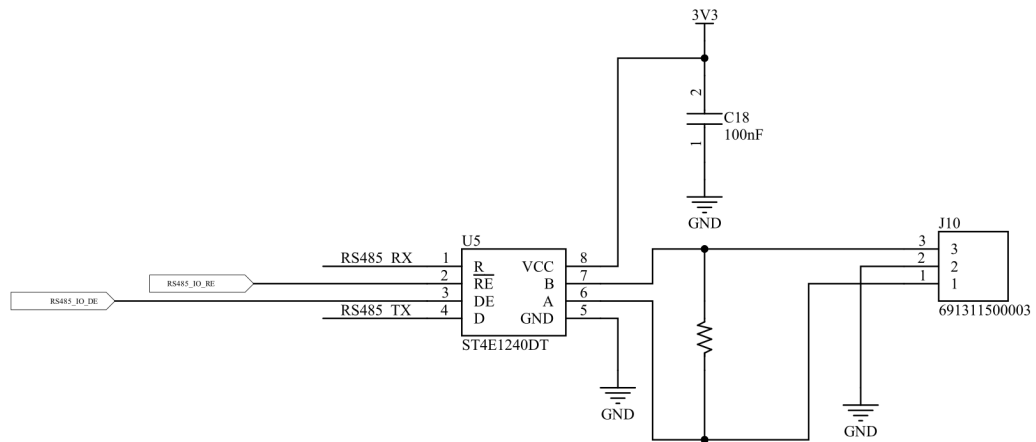
The RS485 interface circuit utilizes the [ST4E1240](#) differential line transceiver, designed for robust half-duplex communication compliant with TIA/EIA-485A standard. Operating over a wide voltage range from 3 V to 5.5 V, it supports high data rates up to 40 Mbps and is well suited for multipoint networks with up to 100 nodes. The transceiver's differential signaling on the A and B lines provides excellent noise immunity and reliable data transmission across long cable distances. Built-in protections, such as ± 12 kV ESD tolerance, thermal shutdown, fail-safe receiver, and hot-swap capability, ensure dependable operations in demanding industrial environments.

In this circuit, a 120 Ω resistor is placed between the A and B lines to provide proper bus termination, reducing signal reflections and maintaining communication integrity. A 100 nF capacitor is used for power supply decoupling to enhance stability. Signals transmitted and received by RS485 are accessible via the J10 dedicated connector and jumper settings enable easy switching between RS232 and RS485 modes, offering versatile connectivity options, as briefly explained in [Table 3](#).

Table 6. ST4E1240 details

Features	Description
Order code	ST4E1240DT
Package	8-SOIC
Operating voltage	From 3 to 5.5 V

Figure 8. ST4E1240 circuit



4.4 CAN transceiver

The CAN interface circuit uses the XR31235 CAN transceiver, which complies with ISO 11898 standard, to enable reliable communication over the controller area network (CAN) bus at speeds up to 1 Mbps. This transceiver converts the microcontroller's digital CAN signals – CAN_TX (transmit) and CAN_RX (receive) – into differential signals on the CAN bus lines – CAN high (CANH) and CAN low (CANL) – and vice versa. The differential signaling on CANH and CANL enhances noise immunity and ensures robust data exchange even in electrically noisy and harsh industrial environments.

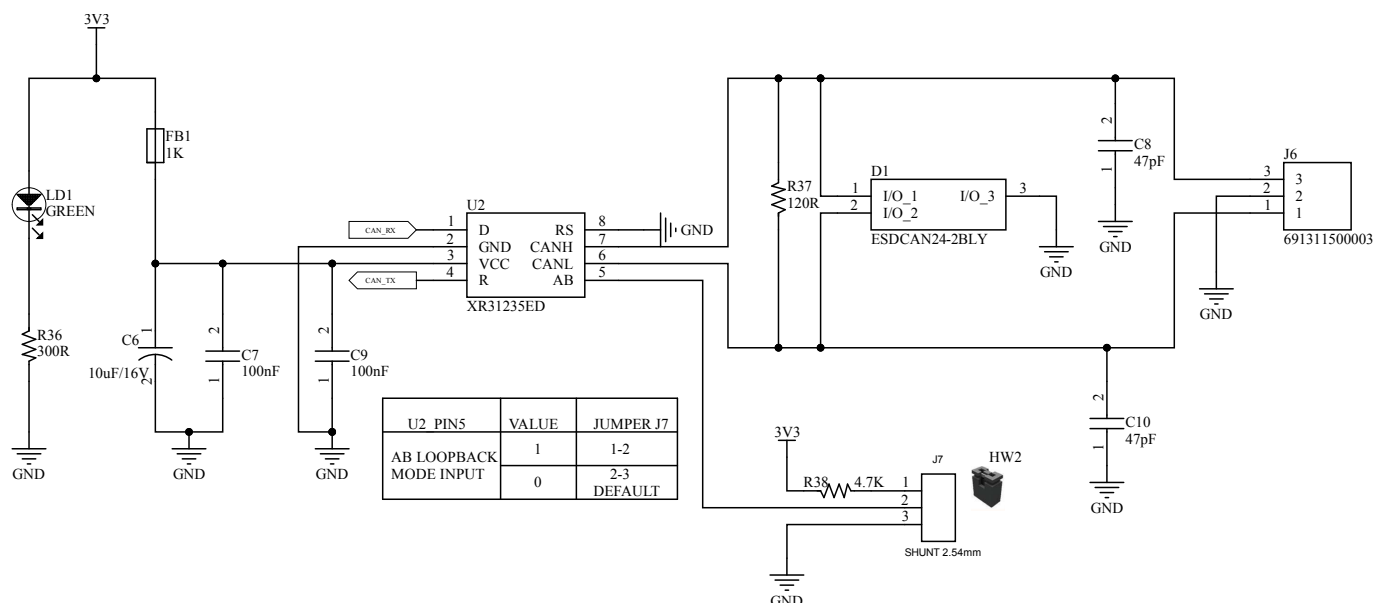
The CAN interface section includes essential components, such as power supply filtering capacitors, to ensure stable operation and a green LED indicator to show power status. A 120 Ω termination resistor is integrated to match the CAN bus impedance, minimizing signal reflections and preserving communication quality. Electrostatic discharge (ESD) protection diodes safeguard the transceiver and connected devices from voltage spikes and electrical disturbances commonly encountered in industrial settings. Additionally, a jumper allows enabling a loopback mode for internal testing and diagnostics without requiring a physical CAN bus connection. The details about the jumper setting are mentioned in [Table 3](#).

The CAN signals are accessible through the J6 dedicated connector, allowing easy connection of external CAN nodes.

Table 7. High speed CAN interface details

Features	Description
Order code	XR31235ED
Package	SOIC-8
Operating voltage	From 3.0 to 3.6 V

Figure 9. CAN transceiver circuit



4.5 Secure element: STSAFE-A110

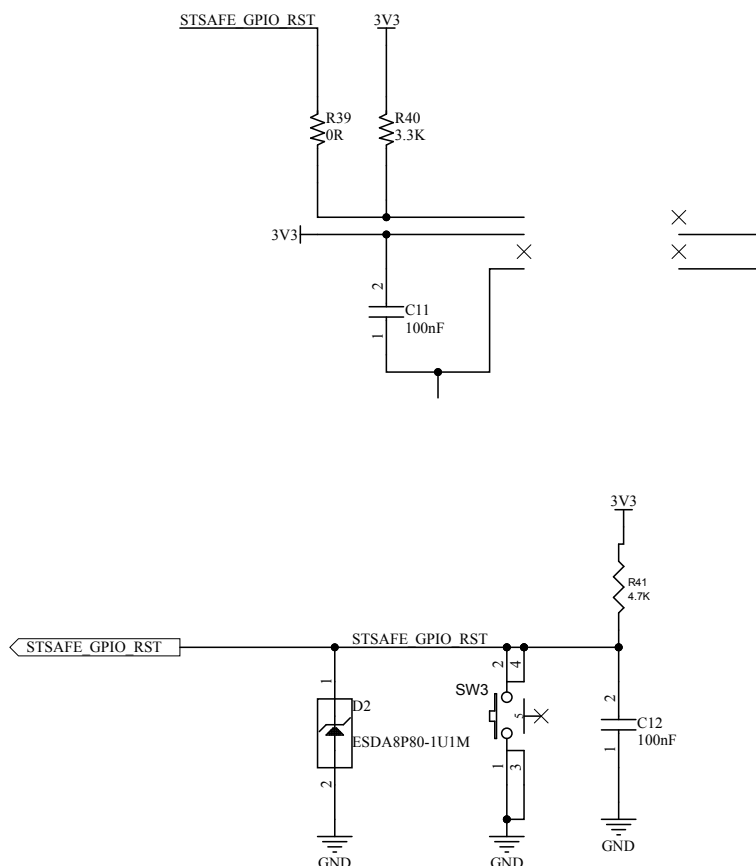
STSAFE-A110 is a highly secure solution that acts as a secure element providing authentication and secure data management services to a local or remote host. It consists of a full turnkey solution with a secure operating system running on the latest generation of secure microcontrollers.

STSAFE-A110 can be integrated in Internet of Things (IoT) devices, smart-home, smart-city and industrial applications, consumer electronics devices, consumables, and accessories.

Table 8. STSAFE-A110 details

Features	Description
Order code	STSAFA110S8SPL02
Package	SO8N
Operating voltage	From 1.62 to 5.5 V

Onboard switch SW3 can be used to control the RESET pin of STSAFE-A110. This switch input signal is used to reset STSAFE-A110. The RESET pin is pull-down by default, meaning that the device is reset if connected to ground or if the pin is floating. The device is active if the RESET pin is tied high.

Figure 10. STSAFE-A110 circuit


4.6

STMod+ connector

This connector enables the use of low-cost and small-form-factor daughterboards in STM32 board ecosystems. The principle is to provide a set of standard interfaces, such as UART and I²C, and other functions, such as RESET, INTERRUPT, and general purpose I/Os.

All signals are multiplexed on a low-cost family of interface connectors. The connector pitch is 2 mm.

The host side (microcontroller of the main board) provides a female connector with 20 pins (2 rows × 10 pins). The daughterboard side is equipped with the corresponding male connector.

By using this connector, we can connect to the [STEVAL-STMODLTE](#) LTE connectivity expansion board. It embeds an LTE cellular modem and an eSIM with worldwide coverage. It embeds Embedded Quectel BG96 FCC and IC certified LTE module (FCC ID: XMR201707BG96 and IC: 10224A-201709BG96).

Note: To connect the STEVAL-STMODLTE board to the [X-STM32MP-IGTW1](#) board, place a 20-pin right angle connector SQT-110-01-F-D-RA on the J8 connector, then insert the CN3 header on the STEVAL-STMODLTE board on the SQT-110-01-F-D-RA female side.

Table 9. STMod+ connector details

Features	Description
Order code	62002021821
Package	20-position socket connector 0.079" (2.00 mm) through hole gold
Operating voltage	NA

Figure 11. STMOD+ connector circuit

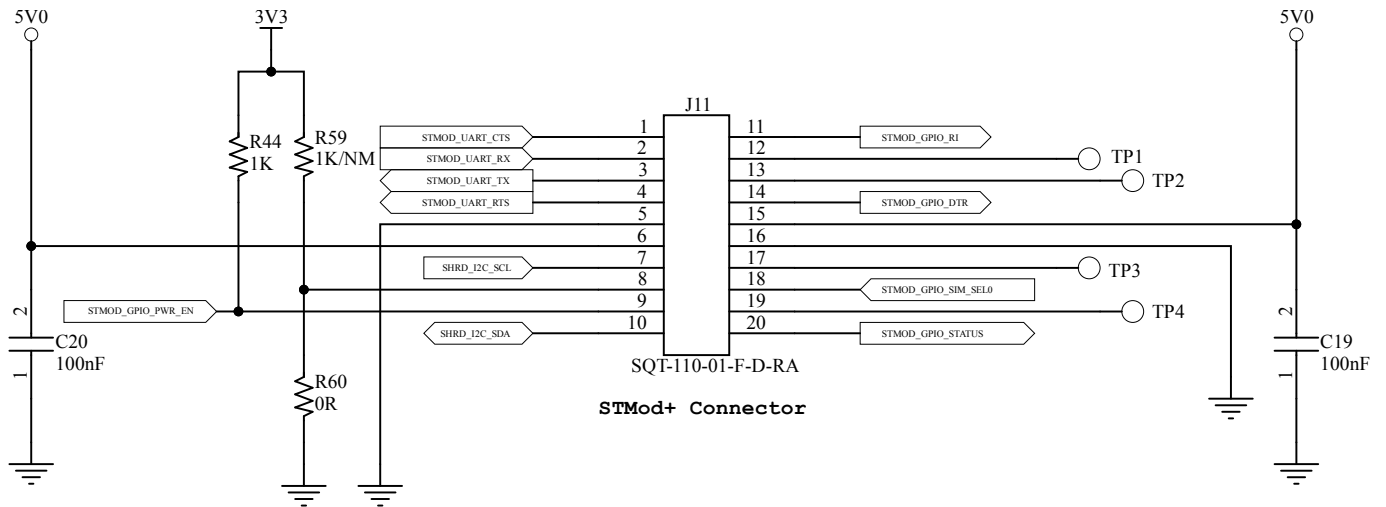


Table 10. STMod+ connector description

Pin no	Pin name	MPU function	Description
1	CTSS	STMOD_UART_CTS	Modem UART CTS
2	RXDS	STMOD_UART_RX	Modem UART RXD
3	TXDS	STMOD_UART_TX	Modem UART TXD
4	RTSS	STMOD_UART_RTS	Modem UART RTS
5	GND	-	Ground
6	VCC	-	+5 V
7	STMod+ IO7	SHRD_I2C_SCL	I ² C clock for EEPROM
8	Sim_select1	-	SIM selection IO1
9	PWRen	STMOD_GPIO_PWR_EN	Modem power enable
10	I2C_SDA	SHRD_I2C_SDA	I ² C data for EEPROM
11	RIS	STMOD_GPIO_RI	Modem ring indicator RI
12	RST	-	Modem reset
13	Sim_CLK	-	SIM clock
14	DTRS	STMOD_DTRS	Modem wake-up
15	VCC	-	+5 V
16	GND	-	Ground
17	Sim_RST	-	SIM reset
18	Sim_select0	STMOD_GPIO_SIM_SEL0	SIM selection IO0: 0 for external SIM and 1 for embedded SIM
19	Sim_DATA	-	SIM data
20	STAS	STMOD_GPIO_STATUS	Modem status

4.7 Real-time clock: M41T83

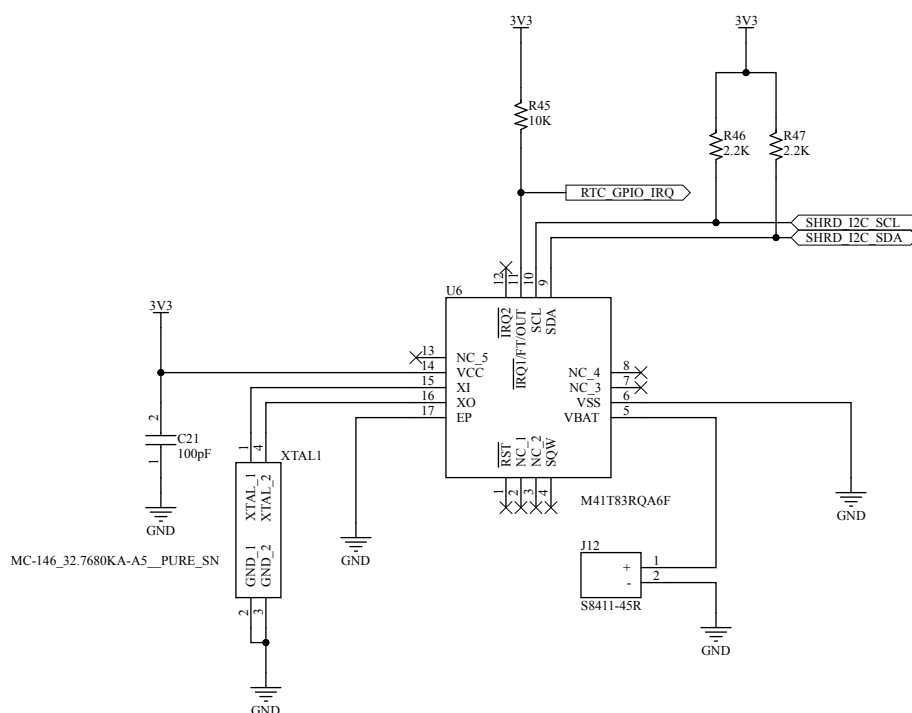
The real-time clock (RTC) circuit is based on **M41T83**, a low-power device consuming only 1 μA in battery mode. It is an I²C-controlled RTC with an integrated 32.768 kHz crystal oscillator that provides precise timekeeping. The clock registers use the binary-coded decimal (BCD) format to represent seconds, minutes, hours, day, date, month, year, and century, with automatic adjustments for leap years and varying month lengths. The device offers two programmable alarms, a watchdog timer, an 8-bit counter, and a square wave output, making it highly versatile for managing time-based events in embedded systems. Communication with the RTC is via a standard two-wire I²C interface, facilitating seamless integration with the main processor.

The circuit includes an external 32.768 kHz crystal and load capacitors to ensure stable oscillator operation. Pull-up resistors on the I²C clock (SCL) and data (SDA) lines maintain proper bus signaling levels. M41T83 features a power-fail detection circuit that automatically switches to a backup battery supply, preserving accurate timekeeping during main power outages. An interrupt output (RTC_GPIO_IRQ) is provided for alarm or event notifications to the host processor. This RTC solution delivers reliable, low-power, and precise timekeeping essential for industrial IoT and automation applications.

Table 11. M41T83 details

Features	Description
Order code	M41T83RQA6F
Package	16QFN
Operating voltage	From 2.70 to 5.5 V

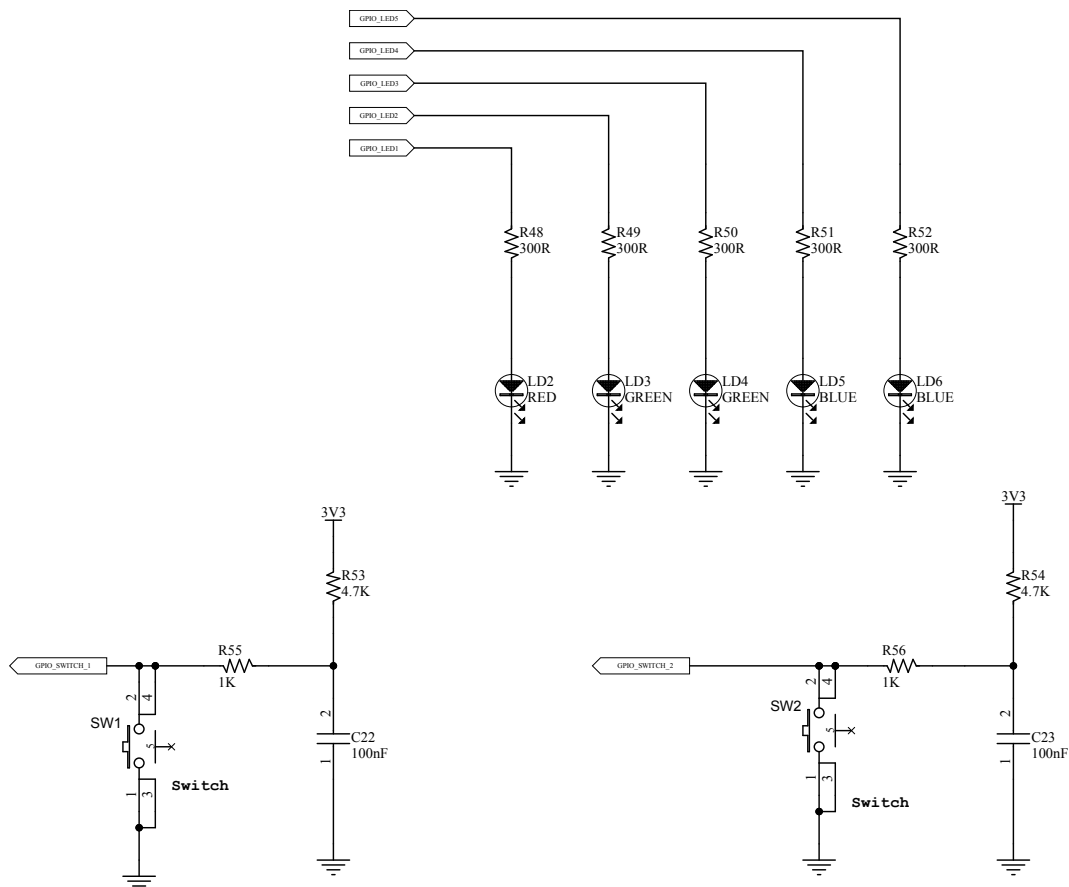
Figure 12. M41T83 circuit



4.8 LEDs and switches

One red, two green and two blue LEDs are used as an output to indicate the functioning of the board to the user. One dedicated green LED glows constantly, indicating adequate power supply is available to the board. Two push button switches (SW1, SW2) are available to take GPIO based input from the user.

Figure 13. LEDs and switches circuit



4.9 40-pin GPIO connector

The on-board devices are controlled by the main board through various peripheral pins available on the GPIO connector. The 0 Ω series resistors are used to isolate the pins of the GPIO connector.

Figure 14. GPIO connector

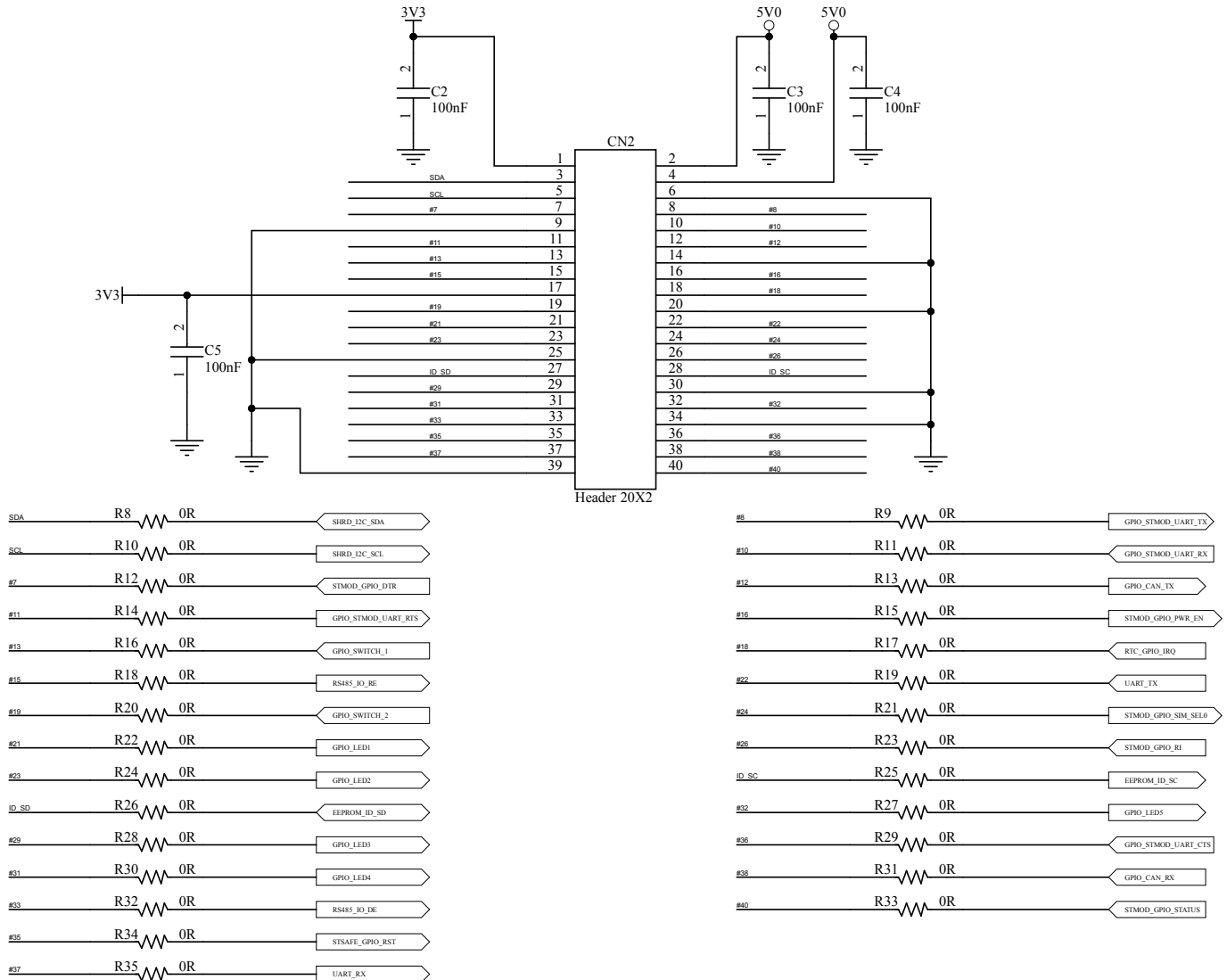


Table 12. 40-pin GPIO connector configuration

Pin No	Name	STM32MP157F-DK2 signal	Pin No	Name	STM32MP157F-DK2 signal
1	3V3	3 V	2	5V0	5 V
3	SHRD_I2C_SDA	I2C8_SDA	4	5V0	5 V
5	SHRD_I2C_SCL	I2C8_SCL	6	GND	GND
7	STMOD_GPIO_DTR	-	8	GPIO_STMOD_UART_TX	USART6_TX
9	GND	GND	10	GPIO_STMOD_UART_RX	USART6_RX
11	STMOD_UART_RTS	-	12	GPIO_CAN_TX	FDCAN3_TX
13	GPIO_SWITCH_1	-	14	GND	GND
15	RS485_IO_RE	-	16	STMOD_GPIO_PWR_EN	-

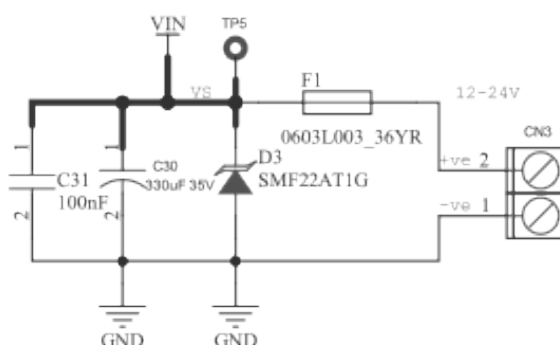
Pin No	Name	STM32MP157F-DK2 signal	Pin No	Name	STM32MP157F-DK2 signal
17	3V3	3 V	18	RTC_GPIO_IRQ	-
19	GPIO_SWITCH_2	-	20	GND	GND
21	GPIO_LED1	-	22	UART_TX	LPUART1_TX
23	GPIO_LED2	-	24	STMOD_GPIO_SIM_SEL0	-
25	GND	GND	26	STMOD_GPIO_RI	-
27	EEPROM_ID_SD	I2C2_SDA	28	EEPROM_ID_SC	I2C2_SCL
29	GPIO_LED3	TIM8_CH4	30	GND	GND
31	GPIO_LED4	TIM5_CH1	32	GPIO_LED5	TIM2_CH4
33	RS485_IO_DE	TIM4_CH2	34	GND	GND
35	STSAFE_GPIO_RST	-	36	STMOD_UART_CTS	USART6_CTS
37	UART_RX	LPUART1_RX	38	GPIO_CAN_RX	FDCAN3_RX
39	GND	GND	40	STMOD_GPIO_STATUS	-

4.10 Power supply

The CN3 connector serves as the primary power input for the **X-STM32MP-IGTW1** board, supporting an input voltage range of 12 to 24 V_{DC}. Unlike typical X-STM32MP boards, which receive power through the STM32 MPU board, this design includes a provision to back-power the MPU, allowing flexible power sourcing options, which are essential for diverse industrial environments. This flexibility ensures the gateway can be powered reliably from various power sources commonly found in factory automation settings.

To protect the system from electrical faults, the CN3 input line includes a fuse (F1) for overcurrent protection and a diode (D3) for reverse polarity protection. These protective components are essential in industrial settings where power supply irregularities and wiring errors can occur. They prevent damage and enhance system robustness. Additionally, bulk and decoupling capacitors stabilize the supply voltage and filter noise, which helps maintain system performance and communication integrity.

Figure 15. Power supply (from 12 to 24 V) circuit



5 Ordering information

Table 13. Device summary

Order code	Device / Component	Description
ST4E1240DT	RS485 transceiver	High-speed RS485 transceiver IC
ST3232CTR	RS232 transceiver	RS232 transceiver IC
M41T83RQA6F	Real-time clock (RTC)	On-board RTC with built-in battery backup
STSAFE-A110	Security module	Authentication and advanced security for peripherals and IoT devices
XR31235ED	CAN transceiver	High-speed CAN transceiver
M24C32-RMN6TP	EEPROM	Non-volatile memory for configuration storage
L6983N50QTR	DC-DC converter	Steps down input voltage from between 12 to 24 V to 5 V
L6983N33QTR	DC-DC converter	Steps down 5 V output to 3.3 V
-	User interface	LEDs and switches for user interaction

6 Schematic diagrams

Figure 16. X-STM32MP-IGTW1 circuit schematic (1 of 10)

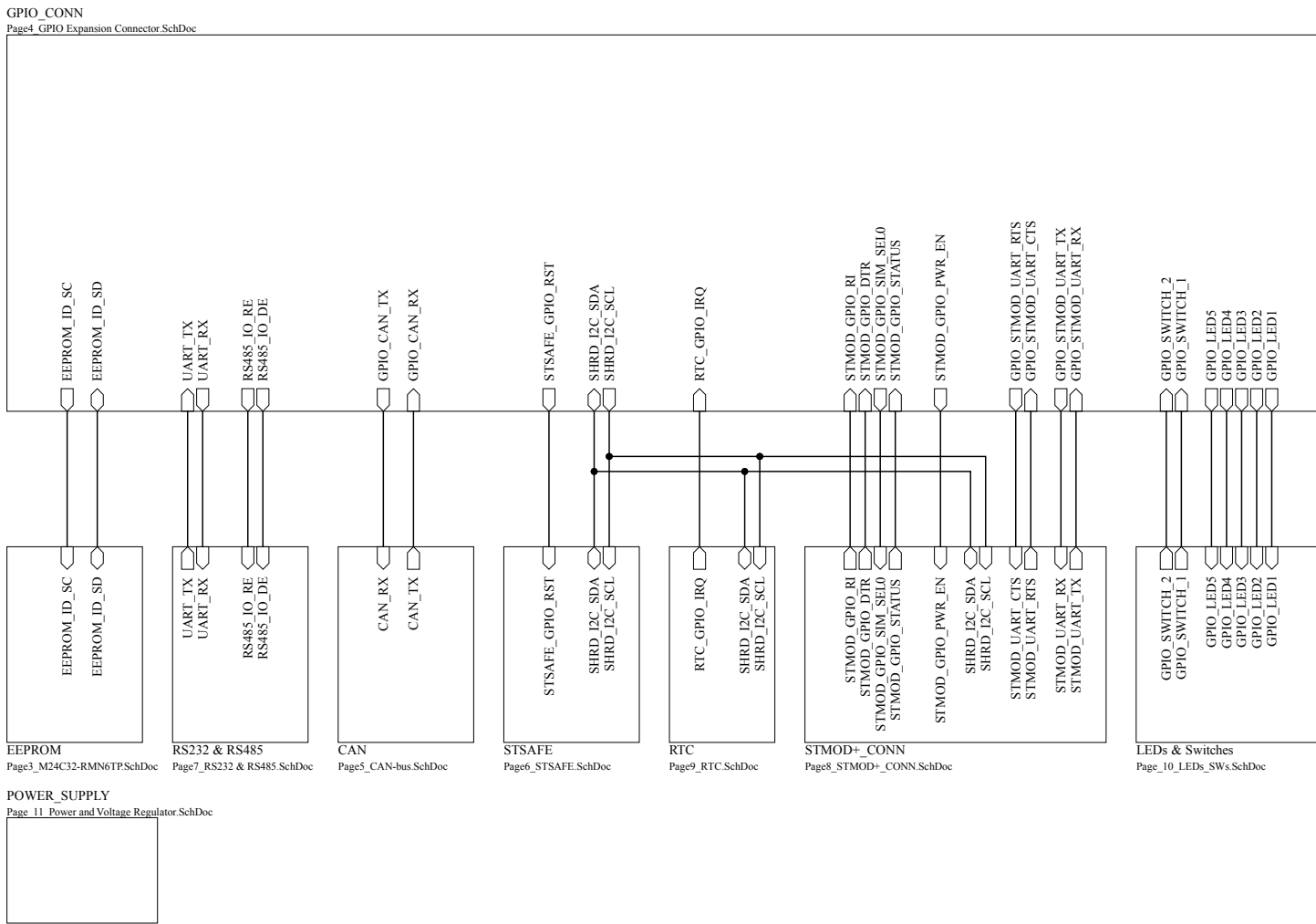


Figure 17. X-STM32MP-IGTW1 circuit schematic (2 of 10)

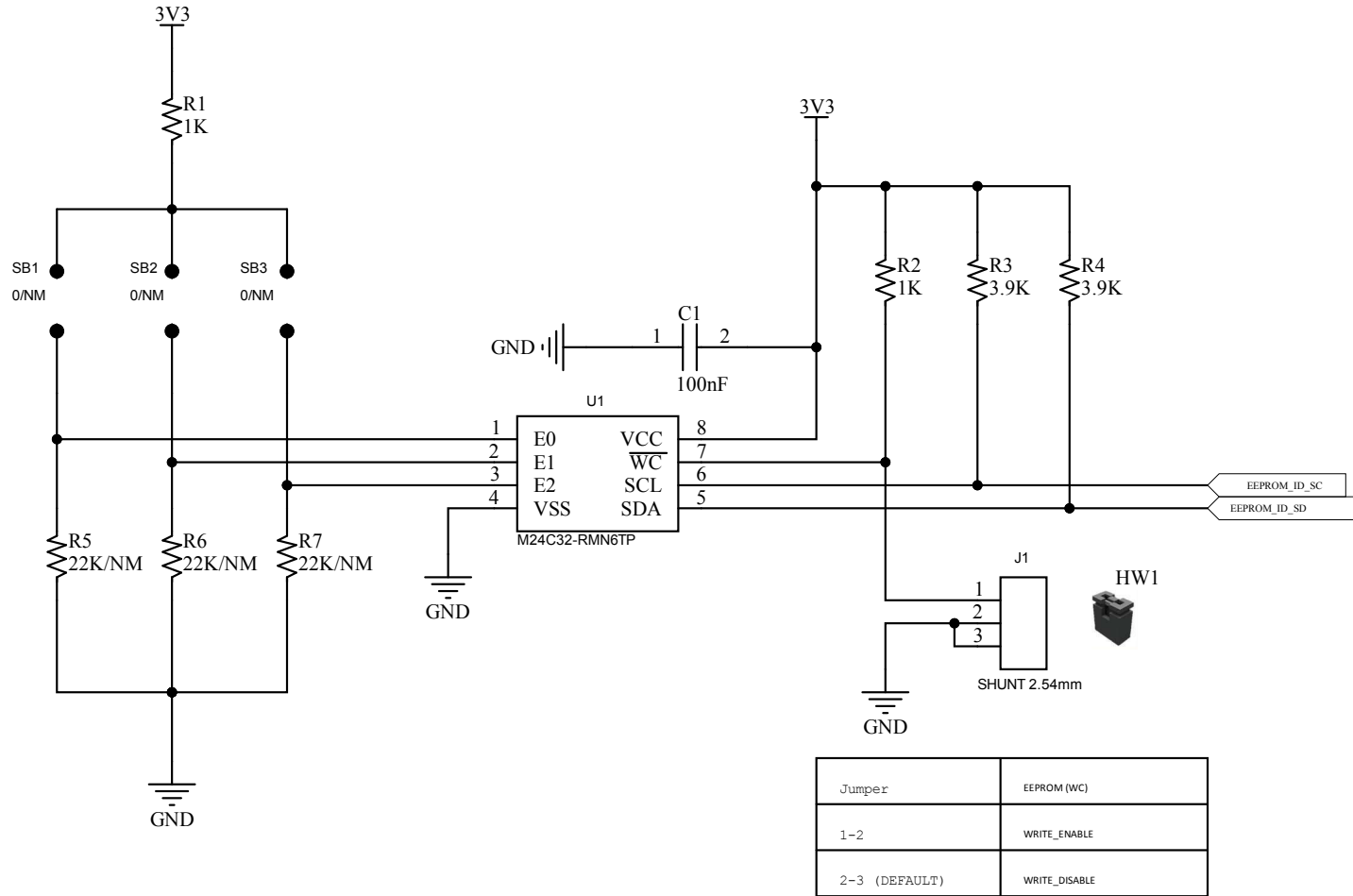


Figure 18. X-STM32MP-IGTW1 circuit schematic (3 of 10)

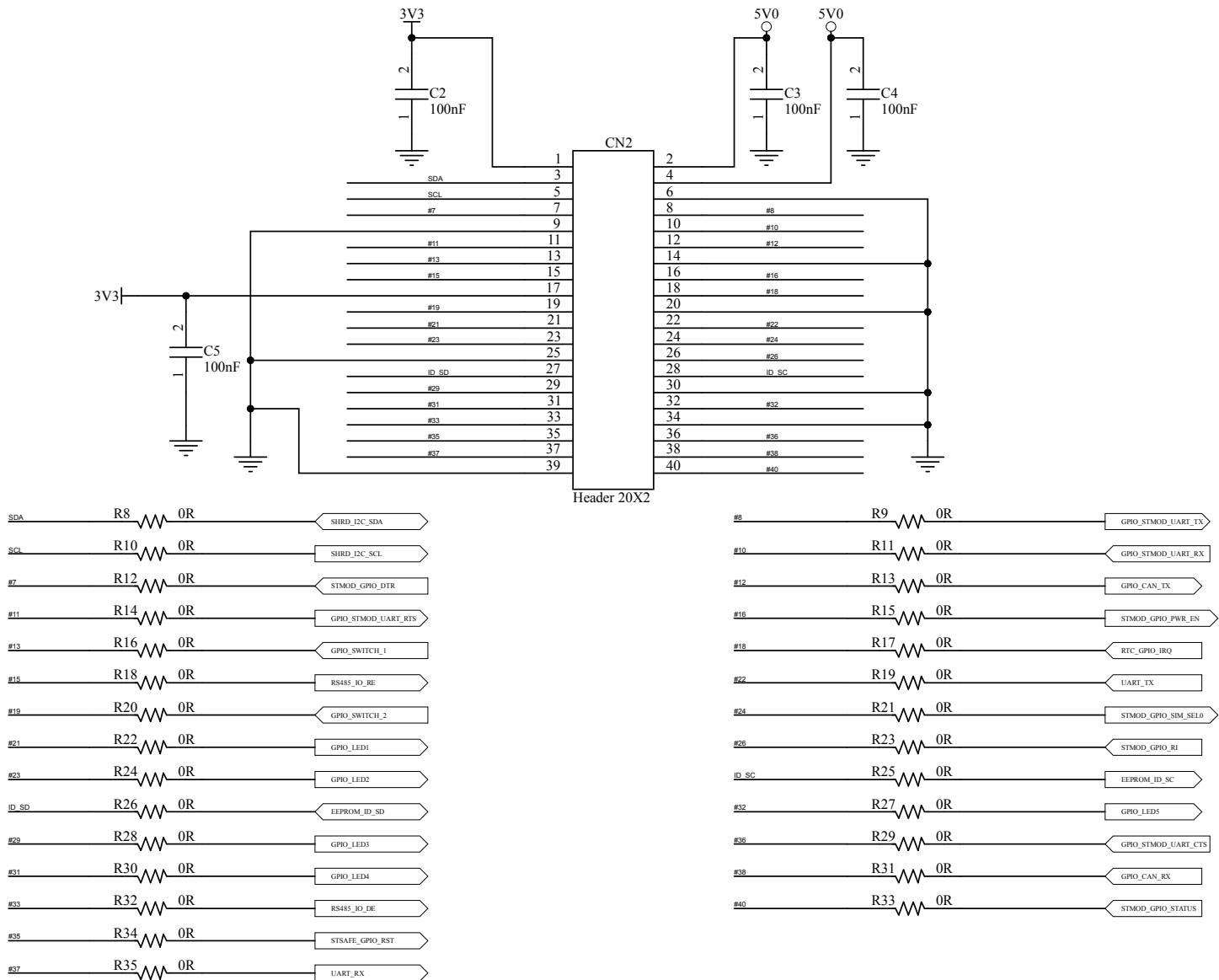


Figure 19. X-STM32MP-IGTW1 circuit schematic (4 of 10)

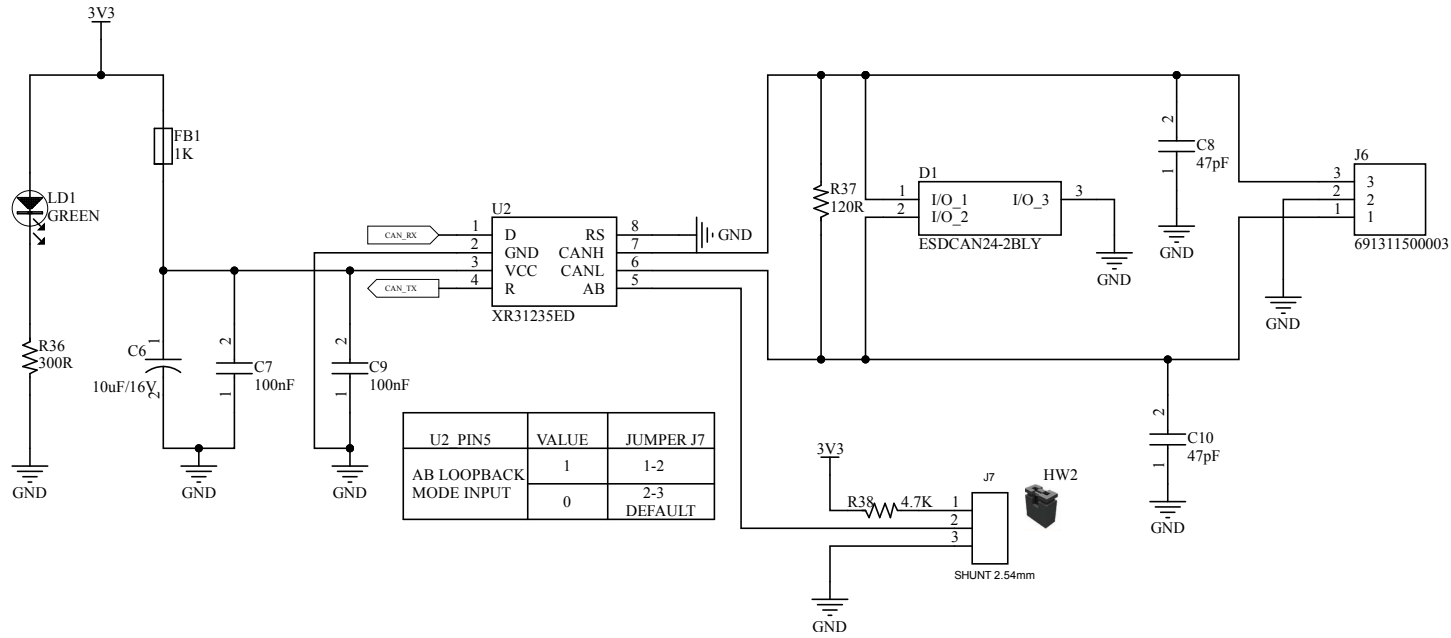


Figure 20. X-STM32MP-IGTW1 circuit schematic (5 of 10)

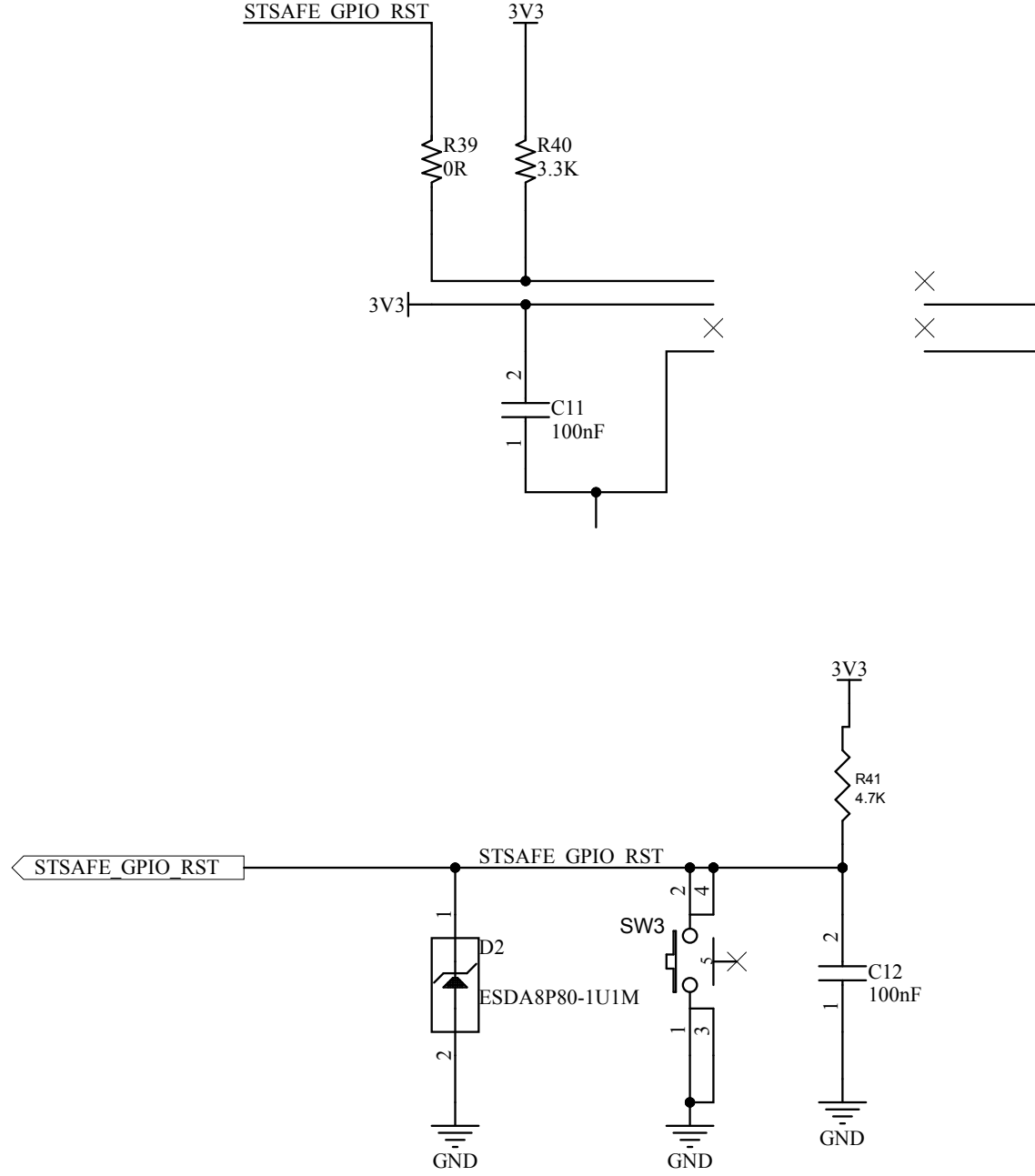
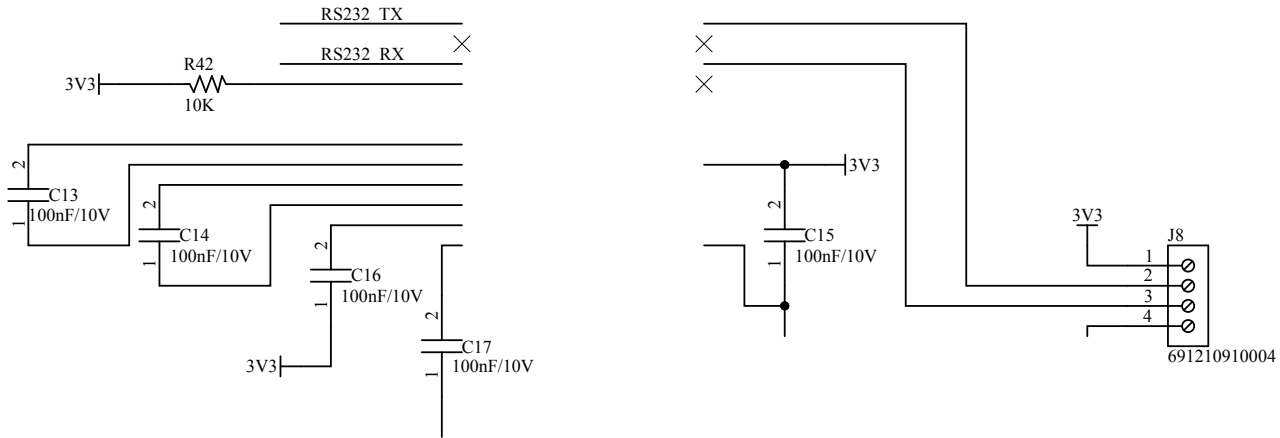


Figure 21. X-STM32MP-IGTW1 circuit schematic (6 of 10)



Jumper setting to select RS232 or RS485 interface

JUMPER (J9)	PIN
1-2	RS232_RX
4-5	RS232_TX
2-3	RS485_RX
DEFAULT	RS485_RX
5-6	RS485_TX
DEFAULT	RS485_TX

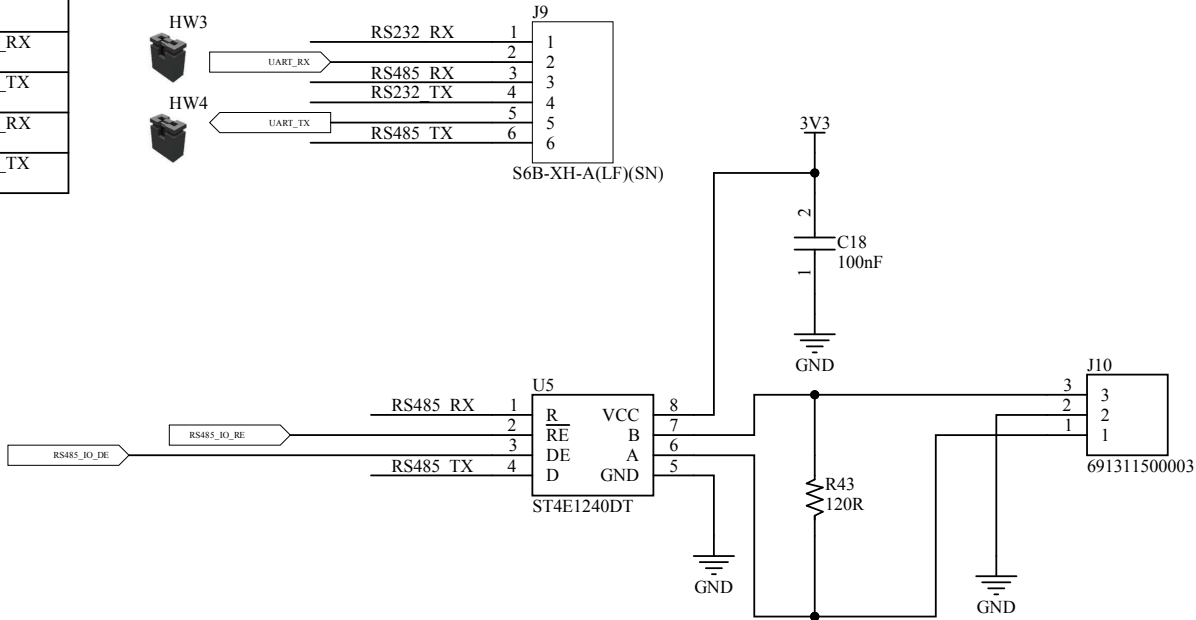


Figure 22. X-STM32MP-IGTW1 circuit schematic (7 of 10)

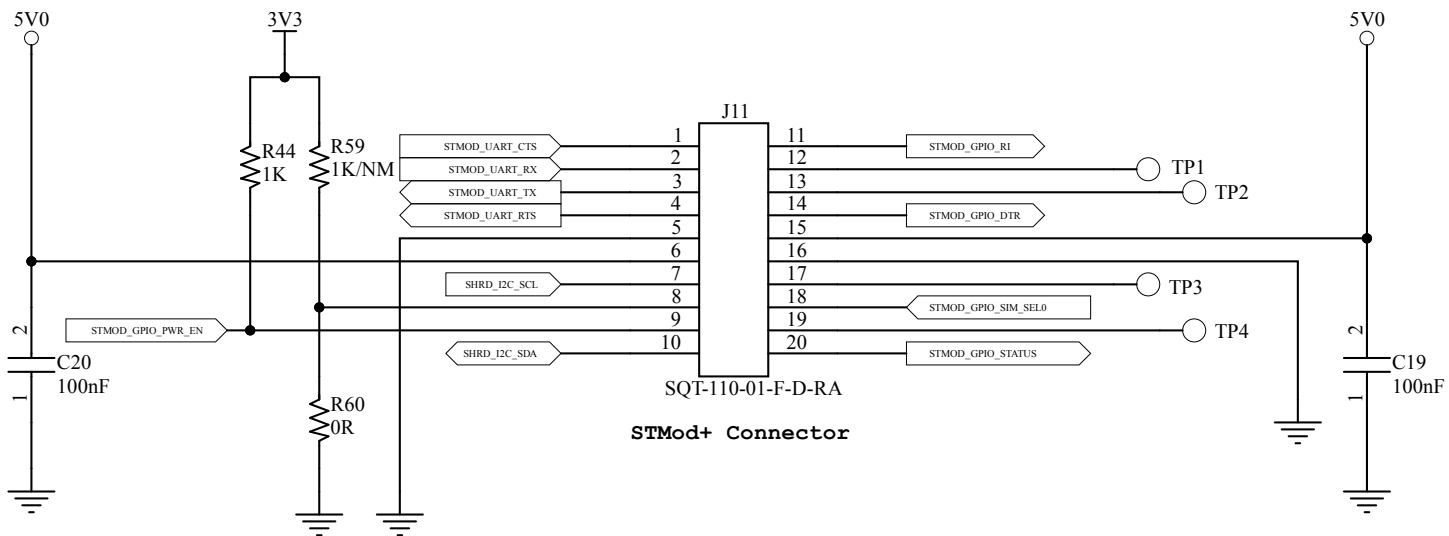


Figure 23. X-STM32MP-IGTW1 circuit schematic (8 of 10)

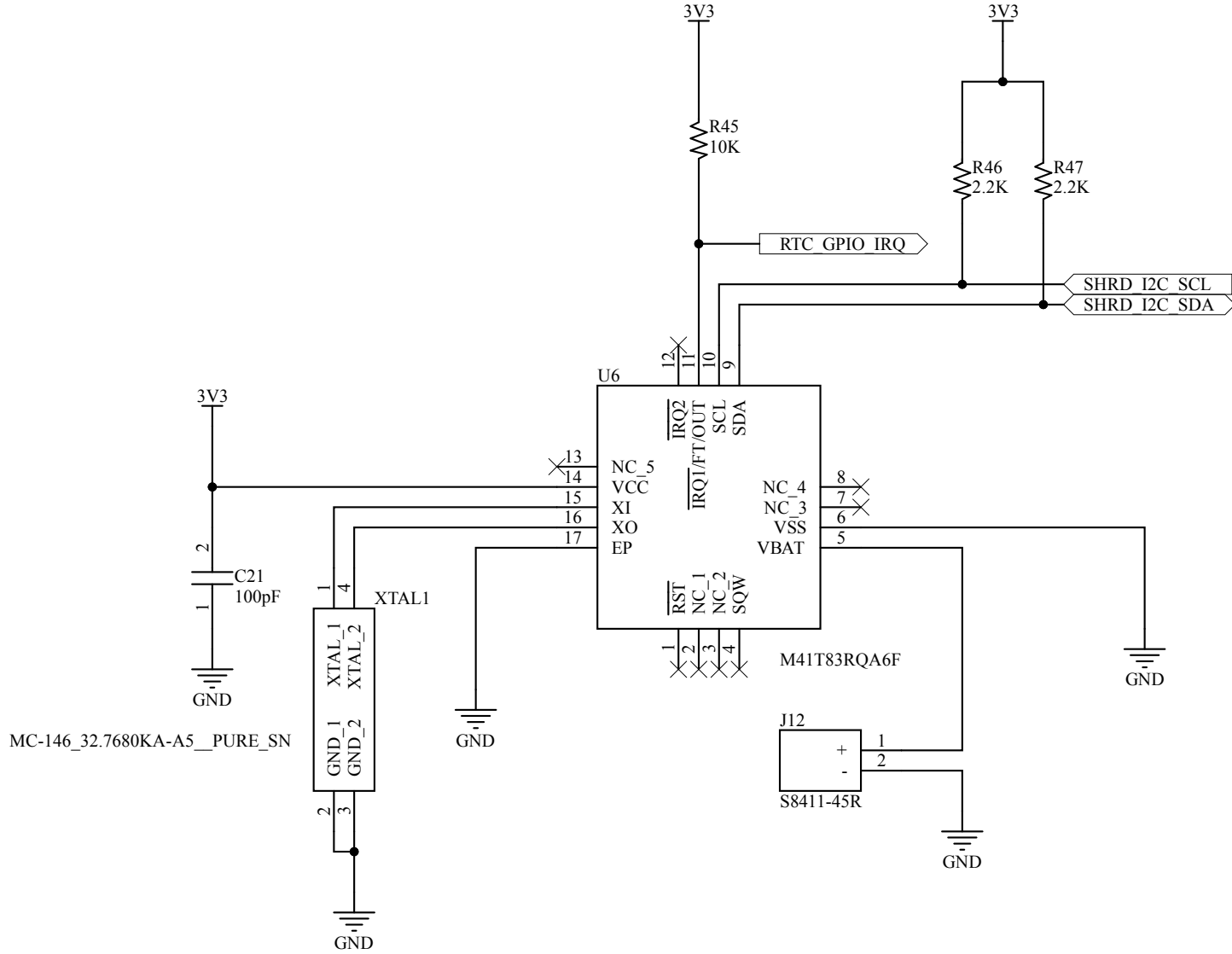


Figure 24. X-STM32MP-IGTW1 circuit schematic (9 of 10)

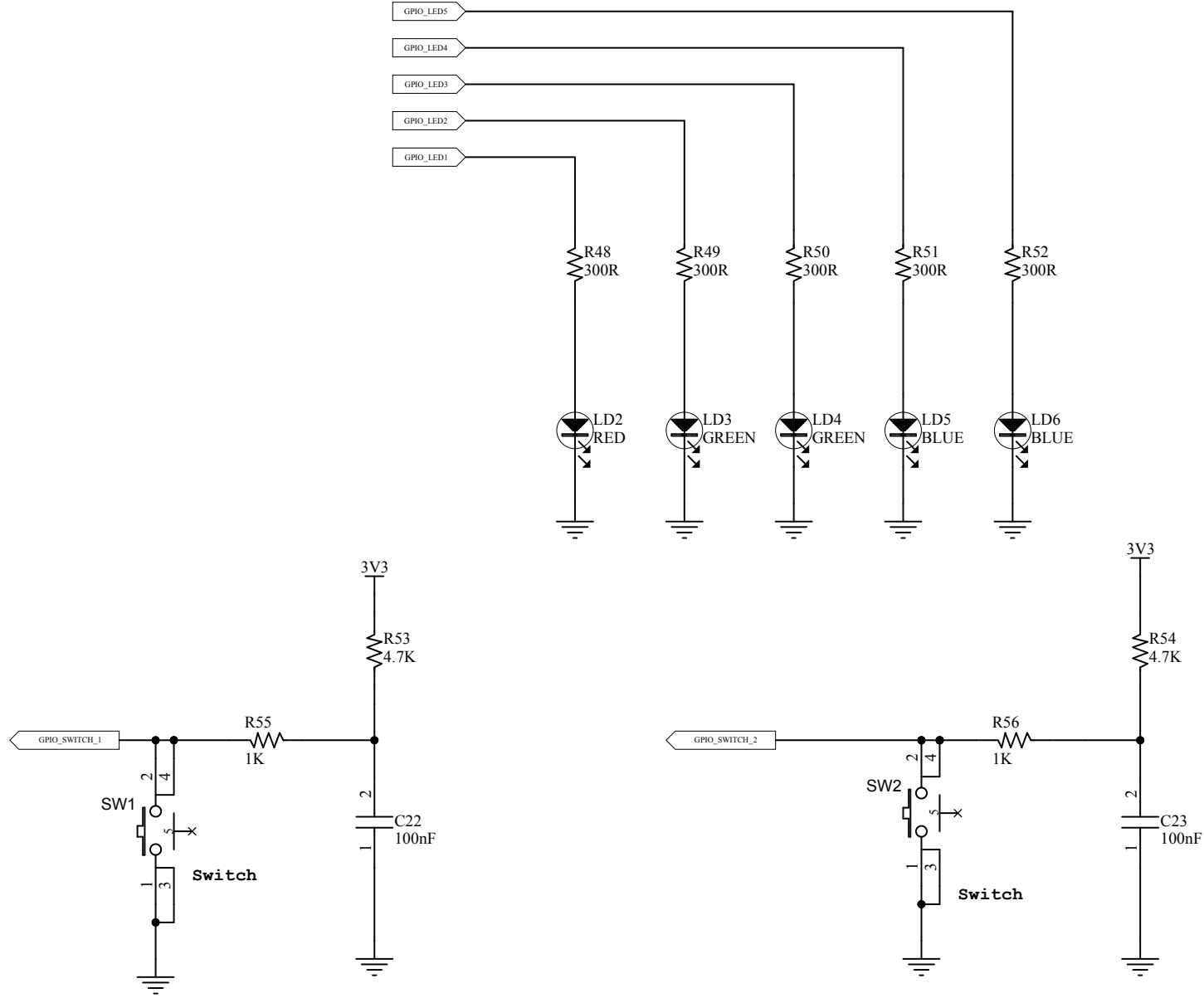
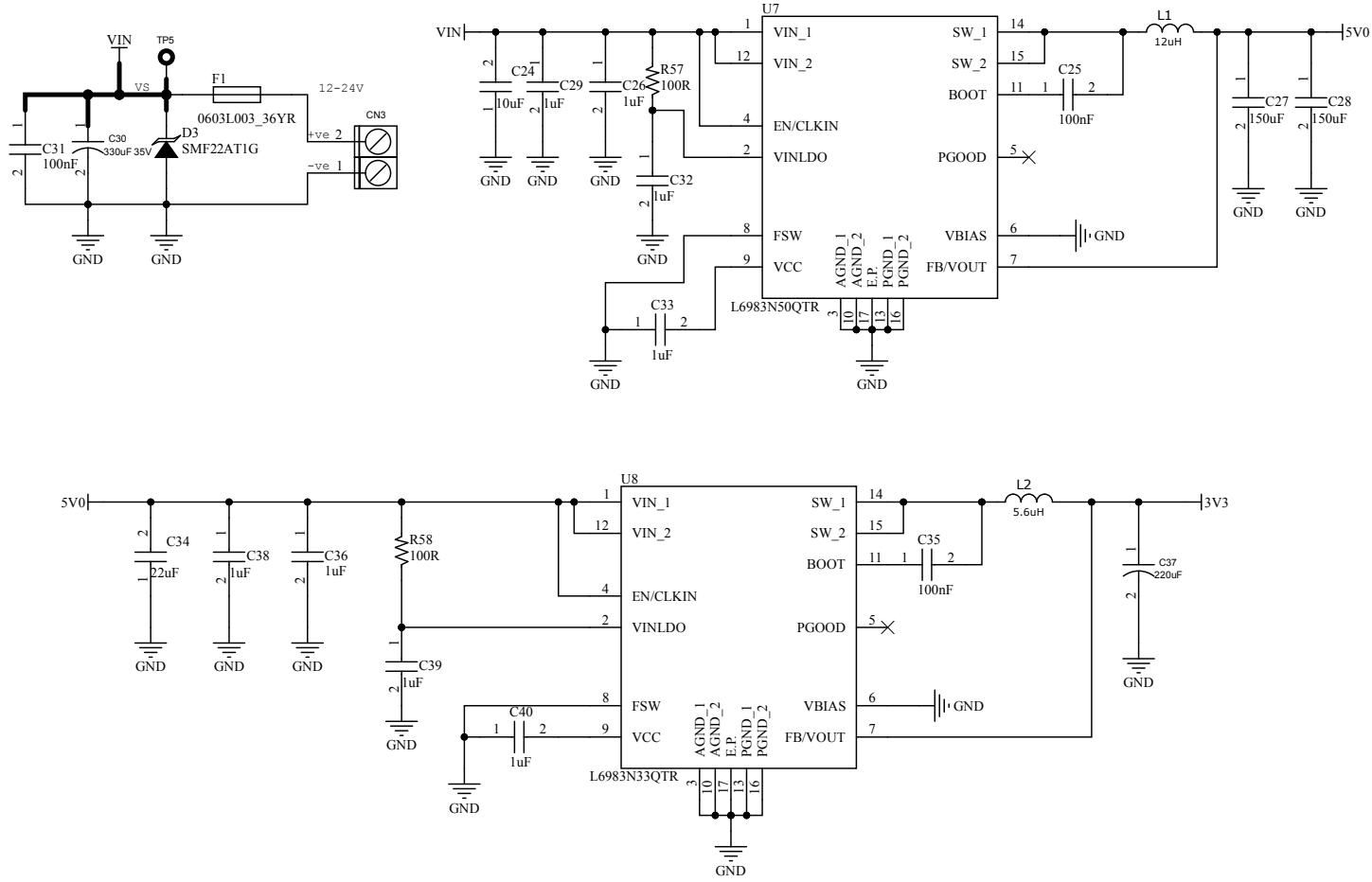


Figure 25. X-STM32MP-IGTW1 circuit schematic (10 of 10)



7 Bill of materials

Table 14. X-STM32MP-IGTW1 bill of materials

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
1	17	C1, C2, C3, C4, C5, C7, C9, C11, C12, C18, C19, C20, C22, C23, C25, C31, C35	100nF	CAP CER 0.1UF 50V X7R 0603	Würth Elektronik	885012206095
2	1	C6	10uF/16V	CAP TANT 10UF 10% 16V 1206	KEMET	T491A106K016AT
3	2	C8, C10	47pF	CAP CER 47pF 50V X7R 0603	KEMET	C0603C104K5RACTU
4	5	C13, C14, C15, C16, C17	100nF/10V	CAP CER 0.1UF 50V X7R 0603	Würth Elektronik	885012206020
5	1	C21	100pF	100 pF ±10% 100V Ceramic Capacitor X7R 0603 (1608 Metric)	Würth Elektronik	885012206102
6	1	C24	10uF	CAP CER 10UF 35V X5R 0603	Murata Electronics	GRM188R6YA106MA73D
7	8	C26, C29, C32, C33, C36, C38, C39, C40	1uF	1 µF ±10% 16V Ceramic Capacitor X7R 0603 (1608 Metric)	Würth Elektronik	885012206052
8	2	C27, C28	150uF	CAP TANT 150UF 10% 10V 2312	KEMET	T494C157K010AT
9	1	C30	330uF 35V	Aluminium Electrolytic Capacitors - SMD 35VDC 330uF 20% SMD AEC	Panasonic	EEEFK1V331GP
10	1	C34	22uF	CAP CER 22UF 35V X7R 0603	Würth Elektronik	885012106032
11	1	C37	220uF	CAP CER 220uF	Panasonic	ECE-A1AKS221I
12	1	CN2	Header 20x2	Double Row_Vertical_1 00" _Extended Tail Connector	Samtec	SSQ-120-03-T-D
13	1	CN3	691210910002	TERM BLOCK 4P HORIZON 2.54MM PCB	Würth Elektronik	691210910002
14	1	D1	ESDCAN24-2B LY, SOT23-3L	TVS Diode Array Bi- Directional ESDCAN24-2B LY Dual 40V, 230W, SOT23-3L 3-Pin	ST	ESDCAN24-2BLY

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
15	1	D2	ESD-TRANSIL, QFN-2L	Unidirectional high power transient voltage suppressor 6V3	ST	ESDA25P35-1U1M
16	1	D3	SMF22AT1G	200 W Transient Voltage Suppressor SOD-123 Flat Lead Package	Onsemi	SMF22AT1G
17	1	F1	0603L003_36Y R	Polymeric PTC Resettable Fuse 36V 30 mA 1h Surface Mount 0603 (1608 Metric), Concave	LITTELFUSE	0603L003/36YR
18	1	FB1	1K	500 Ω at 100MHz 1 Ferrite Bead 0805 (2012 Metric) 500mA 300m Ω	Abracon	ACML-0805-501-T
19	4	HW1, HW2, HW3, HW4	Shunt Black 2.54mm	SHUNT 2.54mm BLACK	SAMTEC	SNT-100-BK-G
20	2	J1, J7	SHUNT 2.54mm	CONN HEADER VERT 3POS 2.54MM	Samtec Inc.	TSW-103-07-F-S
21	4	J2, J3, J4, J5	Mounting hole_3.2mm drill	Hex Standoff Threaded M3x0.5 Nylon 0.472" (12.00mm) Natural	Essentra	36M30MF012
22	2	J6, J10	691311500003	Würth Elektronik 311 Series 5.08mm Pitch Straight Pluggable Terminal Block, PCB Header, Through Hole, 3 Way	Würth Elektronik	691311500003
23	1	J8	691210910004	WR-TBL Series 2109 Horizontal Entry, THT, pitch 2.54mm, 04p	Würth Elektronik	691210910004
24	1	J9	S6B-XH-A(LF) (SN)	6 Pins, 1 Row 2.54mm Pitch, right angle Connector, male	JST	S6B-XH-A(LF)(SN)
25	1	J11	SQT-110-01-F- D-RA	Rugged PCB Sockets, 2.00mm pitch	Samtec	SQT-110-01-F-D-RA
26	1	J12	S8411-45R	Connector	Harwin	S8411-45R

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
27	1	L1	12uH	12 μ H Unshielded Drum Core, Wirewound Inductor 210 mA 1.82 Ω Max 0806 (2016 Metric)	Coilcraft	XGL4030-123MEC
28	1	L2	5.6uH	5.6 μ H Unshielded Drum Core, Wirewound Inductor 280 mA 1.17 Ω Max 0806 (2016 Metric)	Coilcraft	XGL4030-562MEC
29	3	LD1, LD3, LD4	LED_green	LED Green, 0603 SMD, Fw Voltage = 2.8V - 3.6V	VISHAY	VLMTG1300-GS08
30	1	LD2	LED_red	LED Red, 0603 SMD, 2V Forward Voltage	VISHAY	VLMS1300-GS08
31	2	LD5, LD6	LED_blue	LED Blue, 0603 SMD, 3.3 V Forward Voltage	VISHAY	VLMB1300-GS08
32	5	R1, R2, R44, R55, R56	1K	1 k Ω $\pm$ 1% 0.1W, 1/10W Chip Resistor 0603 (1608 Metric), 1K $\pm$ 1% 0.1W, 1/10W Chip Resistor 0603 (1608 Metric)	Würth Elektronik	560112116014
33	2	R3, R4	3.9K	RES 3.9K Ω 1% 1/10W 0603	Würth Elektronik	560112116021
34	3	R5, R6, R7	22K/NM	RES 22K Ω 1% 1/10W 0603	Walsin	WR06X2202FTL
35	30	R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R39, R60	0R	RES 0 Ω JUMPER 1/10W 0603	Würth Elektronik	560112116001
36	6	R36, R48, R49, R50, R51, R52	300R	RES 300 Ω 1% 1/10W 0603	Würth Elektronik	560112116082
37	2	R37, R43	120R	RES 120 Ω 1% 1/10W 0603	Würth Elektronik	560112116119
38	4	R38, R41, R53, R54	4.7K	RES 4.7K Ω 1% 1/10W 0603	Würth Elektronik	560112116006
39	1	R40	3.3K	3.3 k Ω $\pm$ 1% 0.1W, 1/10W Chip Resistor 0603 (1608 Metric)	Würth Elektronik	560112116047

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
40	2	R42, R45	10K	RES 10K Ω 1% 1/10W 0603	Würth Elektronik	560112116005
41	2	R46, R47	2.2K	RES 2.2K Ω 1% 1/10W 0603	Würth Elektronik	560112116098
42	2	R57, R58	100R	RES 100 Ω 1% 1/10W 0603	Walsin	WR06X1000FTL
43	1	R59	1K/NM	1K $\pm$ 1% 0.1W, 1/10W Chip Resistor 0603 (1608 Metric)	Walsin	WR06X1001FTL
44	3	SB1, SB2, SB3	0/NM	RES 0 Ω Jumper 1/10W 0603	Rohm Semiconductor	SFR03EZPJ000
45	3	SW1, SW2, SW3	SW-PUSH- CMS_KMR2_B LACK	Microminiature Tact Switch for SMT - KMR 2 Series - 1.9 mm height	C&K	KMR231GLFS
46	4	TP1, TP2, TP3, TP4	TP	TEST POINT PC MINI .040"D RED	Keystone Electronics	5000
47	1	TP5	TP-SMD- S2761-46R	PC TEST POINT NATURAL	HARWIN	S2761-46R
48	1	U1	M24C32- RMN6TP, SO8	IC EEPROM 32KBIT I2C 1MHZ 8SOIC	ST	M24C32-RMN6TP
49	1	U2	XR31235ED	CAN Interface IC 3.3V CAN Bus XCVR Autobaud LB Mode	MaxLinear, Inc.	XR31235ED
50	1	U3	STSAFA110S8 SPL02, SO-8	Authentication, state-of-the-art security for peripherals and IoT devices	ST	STSAFE-A110S8SPL02
51	1	U4	ST3232CTR, TSSOP-16L	ST3232CTR, Line Transceiver, EIA/TIA-232, RS-232, V.24, V.28 2-TX 2-RX 2-TRX, 3.3, 5V, 16-Pin TSSOP	ST	ST3232CTR
52	1	U5	ST4E1240DT, SO-8	High-speed 3.3 V / 5 V RS485 transceiver with $\pm$ 12 kV IEC 61000-4-2 contact ESD protection	ST	ST4E1240DT
53	1	U6	M41T83RQA6F, VFQFPN 16 4x4x1.0	Serial I2C bus real-time clock (RTC) with battery switchover	ST	M41T83RQA6F

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
54	1	U7	L6983N50QTR, QFPN 3X3X0.80 16L PITCH 0.50	Switching Voltage Regulators power management	ST	L6983N50QTR
55	1	U8	L6983N33QTR, QFPN 3X3X0.80 16L PITCH 0.50	Switching Voltage Regulators power management	ST	L6983N33QTR
56	1	XTAL1	MC-146_32.768 0KA- A5__PURE__SN	Crystal or Oscillator	Epson Timing	MC-146 32.7680KA-A5: PURE SN
57	4	Nut	-	M3x0.5 Hex Nut 0.217" (5.50mm) Nylon	Würth Elektronik	709940300
58	4	Spacer	-	Hex Standoff Threaded M3x0.5 Nylon 0.472" (12.00mm) Natural	Essentra	36M30MF012
59	1	HW1	Shunt Black 2.54mm	Shunt 2.54mm Black	Würth Elektronik	60900213421
60	1	HW2	Shunt Black 2.54mm	shunt 2.54mm black	Würth Elektronik	60900213421
61	1	HW3	Shunt Black 2.54mm	shunt 2.54mm black	Würth Elektronik	60900213421
62	1	HW4	Shunt Black 2.54mm	Shunt 2.54mm Black	Würth Elektronik	60900213421
63	2	Terminal Block plug	5.08mm Pitch_TH	3 Position Terminal Block Plug, Female Sockets 0.200" (5.08mm) 90° Free Hanging (In-Line)	Würth Elektronik	691352510003

8 Board versions

Table 15. X-STM32MP-IGTW1 versions

PCB version	Schematic diagrams	Bill of materials
XMP\$IGTW1A ⁽¹⁾	XMP\$IGTW1A schematic diagrams	XMP\$IGTW1A bill of materials

1. This code identifies the X-STM32MP-IGTW1 evaluation board first version. It is printed on the board PCB.

9 Regulatory compliance information

Notice for US Federal Communication Commission (FCC)

For evaluation only; not FCC approved for resale

FCC NOTICE - This kit is designed to allow:

(1) Product developers to evaluate electronic components, circuitry, or software associated with the kit to determine

whether to incorporate such items in a finished product and

(2) Software developers to write software applications for use with the end product.

This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of this chapter, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter 3.1.2.

Notice for Innovation, Science and Economic Development Canada (ISED)

For evaluation purposes only. This kit generates, uses, and can radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to Industry Canada (IC) rules.

À des fins d'évaluation uniquement. Ce kit génère, utilise et peut émettre de l'énergie radiofréquence et n'a pas été testé pour sa conformité aux limites des appareils informatiques conformément aux règles d'Industrie Canada (IC).

Notice for the European Union

This device is in conformity with the essential requirements of the Directive 2014/30/EU (EMC) and of the Directive 2015/863/EU (RoHS).

Notice for the United Kingdom

This device is in compliance with the UK Electromagnetic Compatibility Regulations 2016 (UK S.I. 2016 No. 1091) and with the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 (UK S.I. 2012 No. 3032).

Revision history

Table 16. Document revision history

Date	Revision	Changes
14-Oct-2025	1	Initial release.

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