

Getting started with X-STM32MP-RBT01 expansion board for the STM32MP157F-DK2 Discovery kit

Introduction

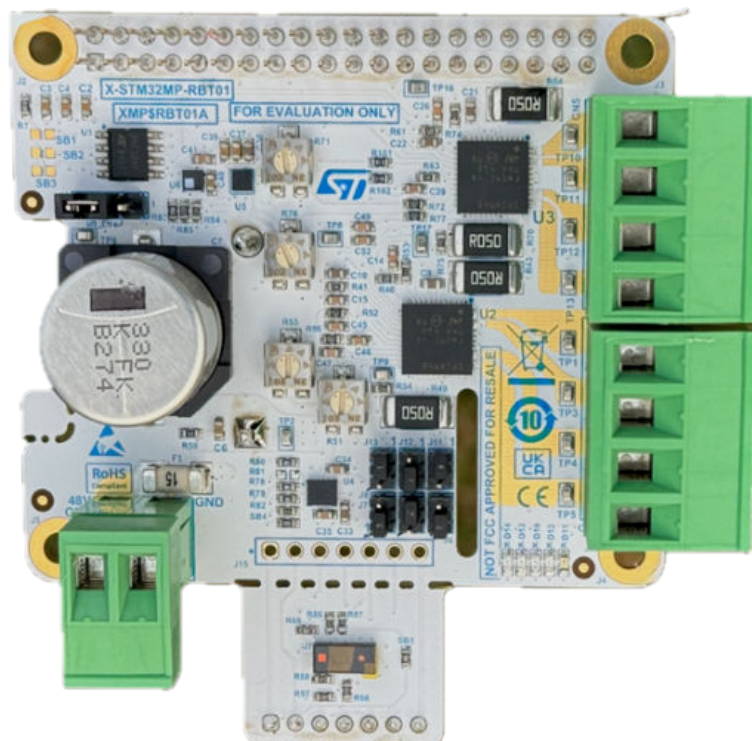
The X-STM32MP-RBT01 is an MPU expansion board which embeds the following devices:

- The STSPIN948 motor driver IC
- The ISM330DHCXTR iNEMO 3-axis accelerometer and 3-axis gyroscope
- The IIS2MDC 3-axis magnetometer
- The LPS22HH pressure sensor
- The VL53L5CX TOF sensor
- M24C32-RMN6TP EEPROM
- User LEDs present

The X-STM32MP-RBT01 interfaces with the STM32MP157F-DK2 microprocessor via a 40-pin GPIO connector, using I²C, UART, PWM and GPIO peripherals.

The X-STM32MP-RBT01 expansion board is compatible with the STM32MP157F-DK2, STM32MP257F-DK and Raspberry Pi GPIO expansion connector layout.

Figure 1. X-STM32MP-RBT01 Expansion board

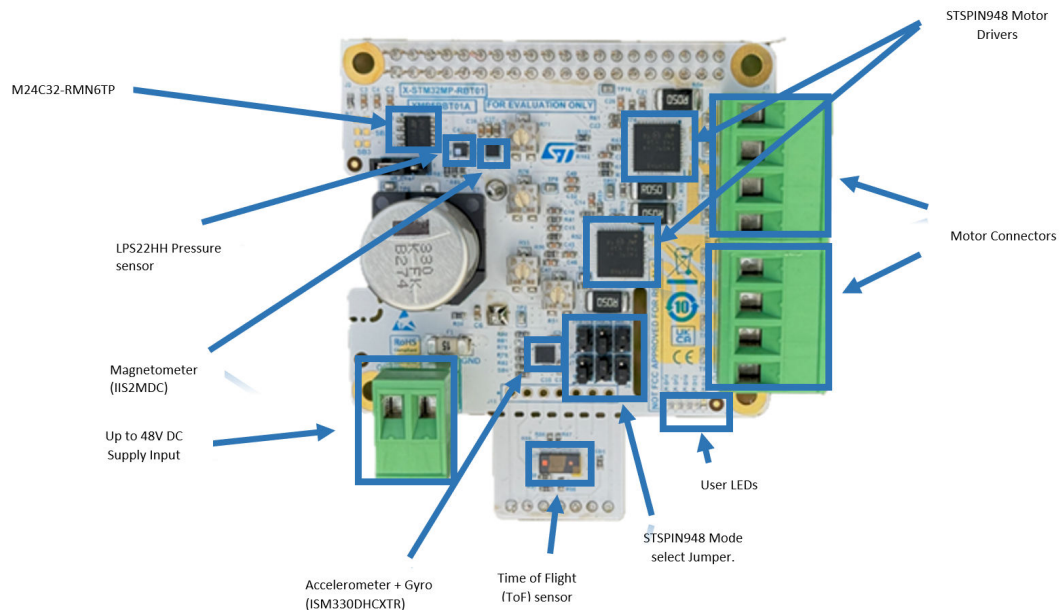


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1 Overview

The **X-STM32MP-RBT01** is powered via a standard 3.3 V supply through the 40 PIN GPIO connector and CN3 is used to power STSPIN948 with up to 48V DC power supply. The figure below shows the component placement on the board.

Figure 2. X-STM32MP-RBT01 component placement details



X-STM32MP-RBT01 is a 40-pin connector expansion board for **STM32MP157F-DK2** Discovery Kit with **STSPIN948** motor driver IC and other MEMS sensors for Robotics applications.

For motion detection, iNEMO inertial module **ISM330DHCXTR** is used which is a 3D digital accelerometer and a 3D digital gyroscope with full-scale acceleration range of $\pm 2/\pm 4/\pm 8/\pm 16$ g and an angular rate range of $\pm 125/\pm 250/\pm 500/\pm 1000/\pm 2000/\pm 4000$ dps.

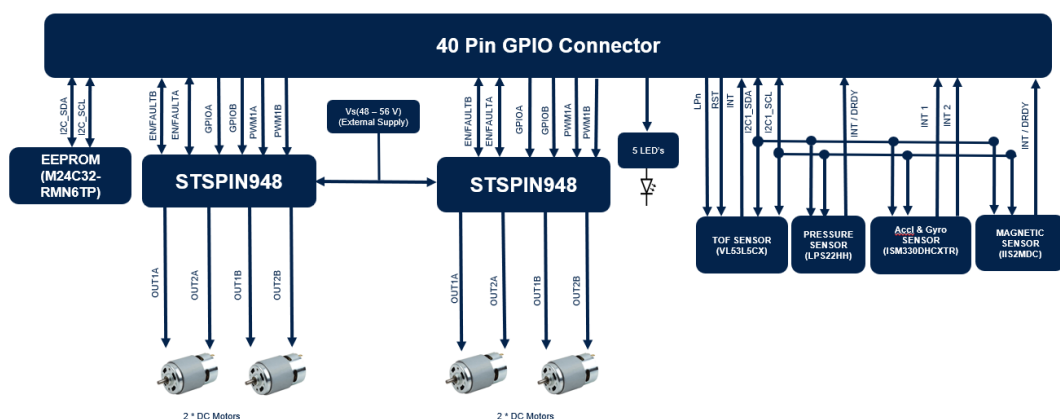
It also has a High-performance MEMS nano pressure sensor: 260-1260 hPa absolute digital output barometer, namely **LPS22HH**.

The **IIS2MDC** is a high-accuracy, ultra-low-power 3-axis digital magnetic sensor having dynamic range up to ± 50 gauss.

VL53L5CX is a Time-of-Flight (ToF) 8x8 multizone ranging sensor with wide field of view.

Power Rating of **X-STM32MP-RBT01** board is 480 W, with the input DC power supply on CN3 up to 48 V and four DC motors can be connected simultaneously with maximum current consumption of 2.5 A per Motor.

Figure 3. System block diagram



2 System requirements

To test the [X-STM32MP-RBT01](#), you need:

- An [X-STM32MP-RBT01](#) expansion board
- An STM32MP157F-DK2/STM32MP257F-DK discovery kit
- A laptop/desktop (with Windows 10 or above)
- 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.
- 48 V DC Power supply
- Up to 48 V DC motors

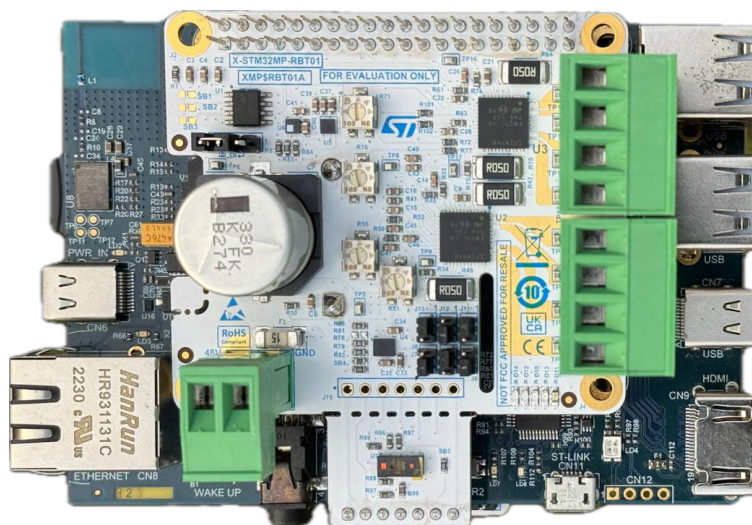
3 Board setup

To set up the board, follow the steps below:

- Step 1.** Check the position of the jumper on the J1 connector. This jumper enables the write operation for the EEPROM, if required.
- Step 2.** Connect the X-STM32MP-RBT01 to the STM32MP157F-DK2 from the top, as shown below. Ensure that pin 1 of the X-STM32MP-RBT01 board matches with pin 1 of the STM32MP157F-DK2 board. Pin 1 can be identified as a rectangular footprint pad on both boards.

Note: Boards can damage if not connected properly.

Figure 4. System block diagram



- Step 3.** Power the STM32MP157F-DK2 using the USB Type-C® cable.
- Step 4.** Connect 48 V DC power supply on CN3 connector of X-STM32MP-RBT01 board.
- Step 5.** Connect DC motors on CN4 and CN5 connectors of X-STM32MP-RBT01 board.
- Step 6.** Program the supported firmware in the microSD™ card of the STM32MP157F-DK2 board. The X-STM32MP-RBT01 board is ready for use.

4 Jumper settings for STSPIN948 selection

For selecting dual independent full bridge mMode (Fixed OFF time), follow below jumper settings:

Table 1. MODE selection

S.No.	Jumper	Configuration	Comments
1	J6	1-2	MODE 1 LOW
2	J7	2-3	MODE 2 HIGH
3	J8	1-2	MODE 3 LOW
4	J11	1-2	MODE 1 LOW
5	J12	2-3	MODE 2 HIGH
6	J13	1-2	MODE 3 LOW

5 Motor connection

Table 2. DC motor connection

S.No.	Connector PIN	Signal	Motor terminal
1	CN4 PIN1	STSPIN948_1_OUT2A	M1 – T1
2	CN4 PIN2	STSPIN948_1_OUT1A	M1 – T2
3	CN4 PIN3	STSPIN948_1_OUT1B	M2 – T1
4	CN4 PIN4	STSPIN948_1_OUT2B	M2 – T2
5	CN3 PIN1	STSPIN948_2_OUT2A	M3 – T1
6	CN3 PIN2	STSPIN948_2_OUT1A	M3 – T2
7	CN3 PIN3	STSPIN948_2_OUT1B	M4 – T1
8	CN3 PIN4	STSPIN948_2_OUT2B	M4 – T2

6 STSPIN948 slew rate

SW1 and SW2 are used to select the Slew Rate of both STSPIN948 U2 and U3 respectively. Slew Rate depends on the resistance value connected on the SR pin STSPIN948. Refer below table for different Slew Rate settings:

Table 3. Slew rate selection

$R_{SR} (\pm 5\%)$	Output slew rate (typ.) (V/ns)
1 k Ω	2
2.2 k Ω	1.2
5.6 k Ω	0.6
10 k Ω	0.3

7 Component description

7.1 EEPROM section

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

Table 4. M24C32-RMN6TP package details

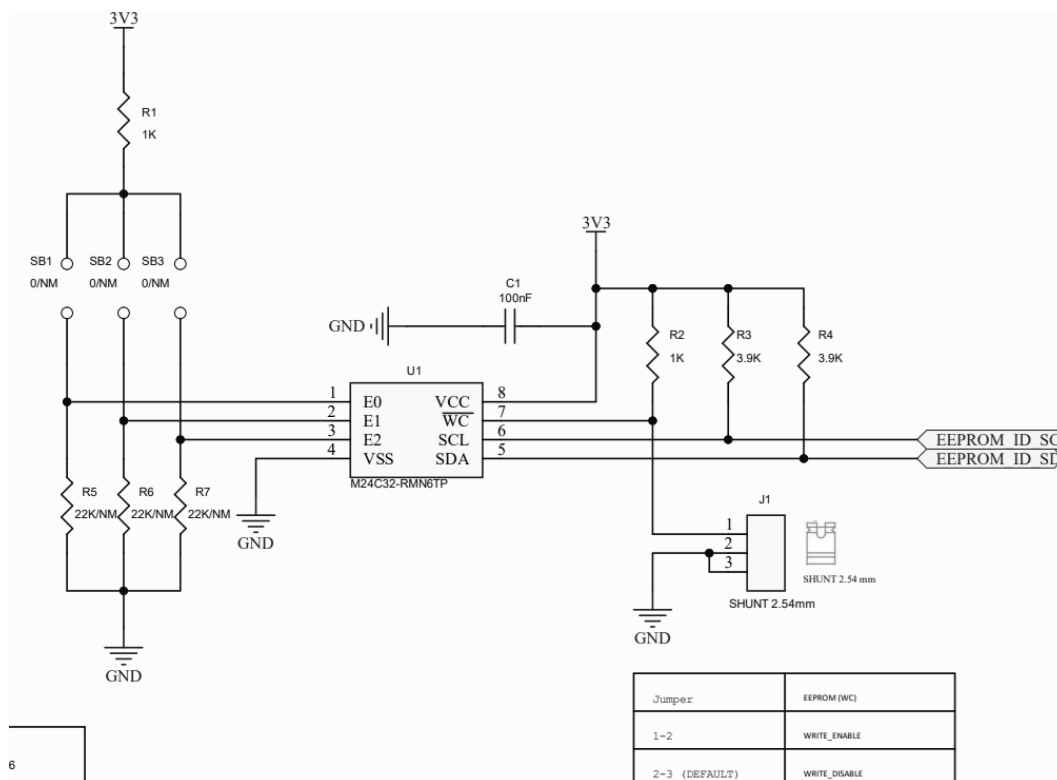
Features	Description
Order code	M24C32-RMN6TP
Package	SO8
Operating voltage	1.8 V to 5.5 V

Onboard jumper J1 can be used to enable or disable the write operation on the EEPROM to prevent unauthorized write operations. This jumper setting details are shown in Table 2.

Table 5. EEPROM jumper details

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

Figure 5. EEPROM Circuit



7.2 STSPIN948 section

The STSPIN948 is a 4.5 A dual full-bridge driver for brushed DC motors or bipolar stepper motors. The power stage is designed with high dynamic performance, allowing to achieve high frequency PWM control with precise duty-cycle.

Each full-bridge is totally independent with a current limiter with adjustable threshold and OFF-time with slow or mixed decay selection. Two amplifiers with fixed amplification factor are available for current sensing (using an external shunt

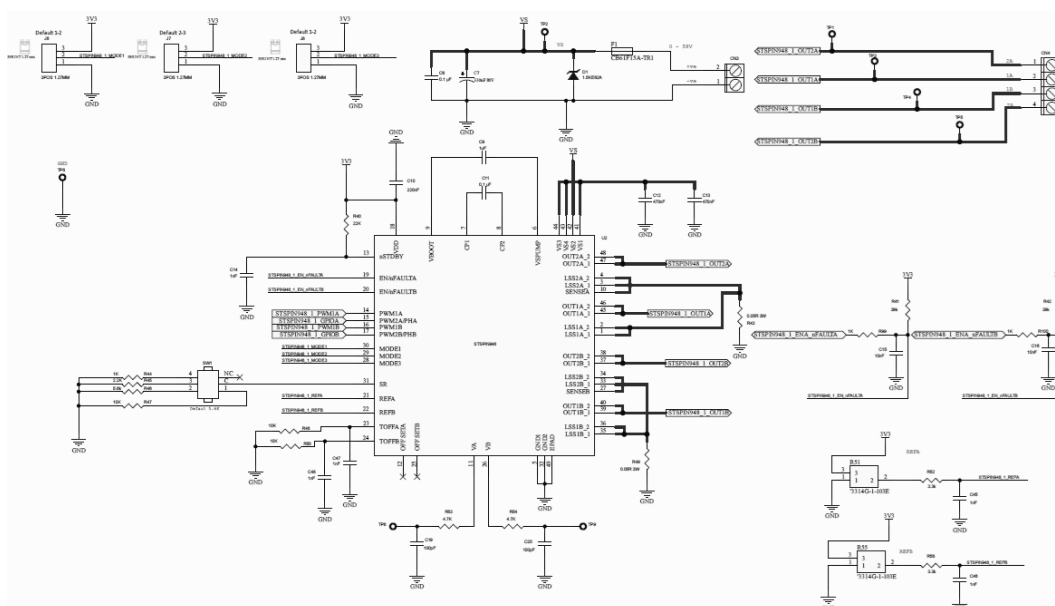
resistor). The adjustable slew-rate guarantees the best trade-off between performances and EMI. Versatile power stage offers several ways of operation for a high level of flexibility.

The device offers a complete set of protection features including overcurrent, overtemperature, and low bus voltage detection.

Table 6. STSPIN948 details

Features	Description
Order code	STSPIN948
Package	VFQFPN48 7 x 7 package
Operating Voltage	Up to 58 V

Figure 6. STSPIN948 circuit



7.3 Accelerometer and gyroscope: ISM330DHCXTR

The ISM330DHCXTR is a system-in-package featuring a high-performance 3D digital accelerometer and 3D digital gyroscope tailored for Industry 4.0 applications. In the ISM330DHCXTR the sensing elements of the accelerometer and of the gyroscope are implemented on the same silicon die, thus guaranteeing superior stability and robustness.

The ISM330DHCXTR has a full-scale acceleration range of $\pm 2/\pm 4/\pm 8/\pm 16$ g and a wide angular rate range of $\pm 125/\pm 250/\pm 500/\pm 1000/\pm 2000/\pm 4000$ dps that enable its usage in a broad range of applications.

All the design aspects and the calibration of the ISM330DHCXTR have been optimized to reach superior accuracy, stability, extremely low noise, and full data synchronization.

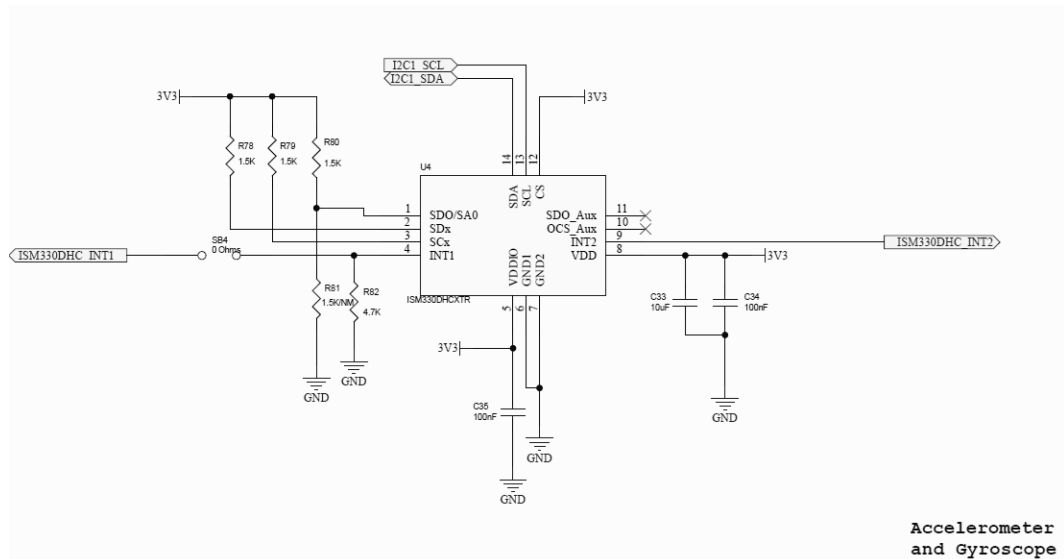
An unmatched set of embedded features (Machine Learning Core, programmable FSM, FIFO, sensor hub, event decoding and interrupts) are enablers for implementing smart and complex sensor nodes which deliver high performance at very low power.

The ISM330DHCXTR is available in a 14-lead plastic land grid array (LGA) package.

Table 7. ISM330DHCXTR details

Features	Description
Order code	ISM330DHCX, ISM330DHCXTR
Package	LGA-14L
Operating voltage	1.71 V to 3.6 V

Figure 7. ISM330DHCXTR circuit



7.4 Pressure sensor LPS22HHTR

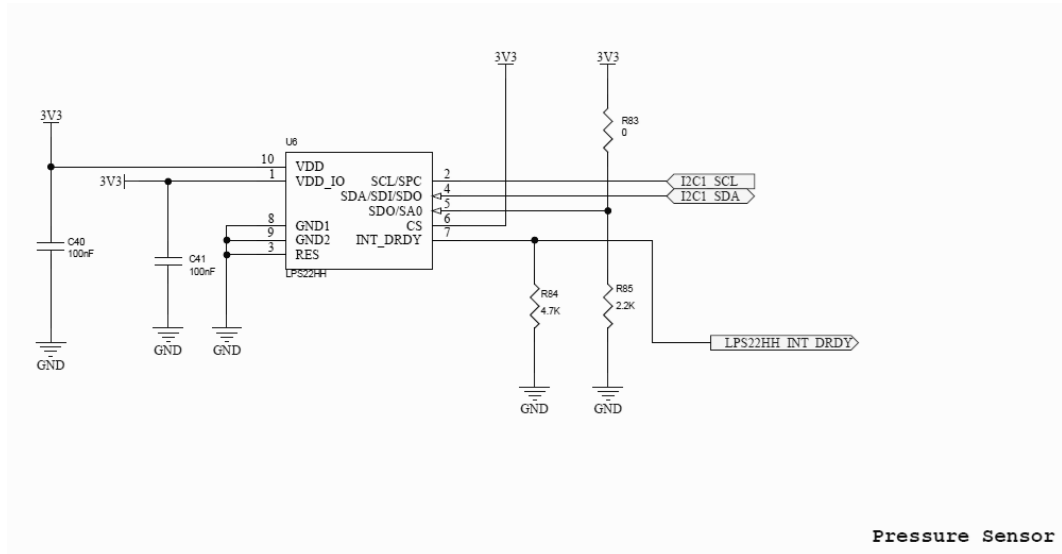
The LPS22HHTR is an ultra-compact piezoresistive absolute pressure sensor which functions as a digital output barometer. The device comprises a sensing element and an IC interface which communicates through I²C, MIPI I3CSM or SPI from the sensing element to the application.

The sensing element, which detects absolute pressure, consists of a suspended membrane manufactured using a dedicated process developed by ST.

The LPS22HH is available in a full-mold, holed LGA package (HLGA). It is guaranteed to operate over a temperature range extending from -40 °C to +85 °C. The package is holed to allow external pressure to reach the sensing element.

Table 8. LPS22HHTR details

Features	Description
Order code	LPS22HHTR
Package	HLGA-10L
Operating voltage	1.7 V to 3.6 V

Figure 8. LPS22HHTR circuit


7.5 Magnetometer sensor IIS2MDC

The IIS2MDC is a high-accuracy, ultra-low-power 3-axis digital magnetic sensor. The IIS2MDC has a magnetic field dynamic range up to ± 50 gauss.

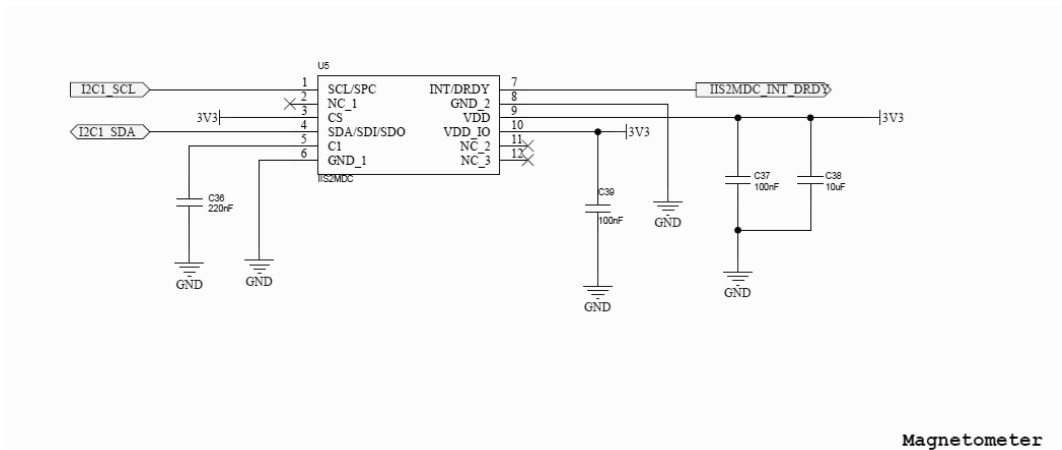
The IIS2MDC includes an I2C serial bus interface that supports standard, fast mode, fast mode plus, and high-speed (100 kHz, 400 kHz, 1 MHz, and 3.4 MHz) and an SPI serial standard interface.

The device can be configured to generate an interrupt signal for magnetic field detection.

The IIS2MDC is available in a plastic land grid array package (LGA) and is guaranteed to operate over an extended temperature range from -40°C to $+85^{\circ}\text{C}$.

Table 9. IIS2MDCTR details

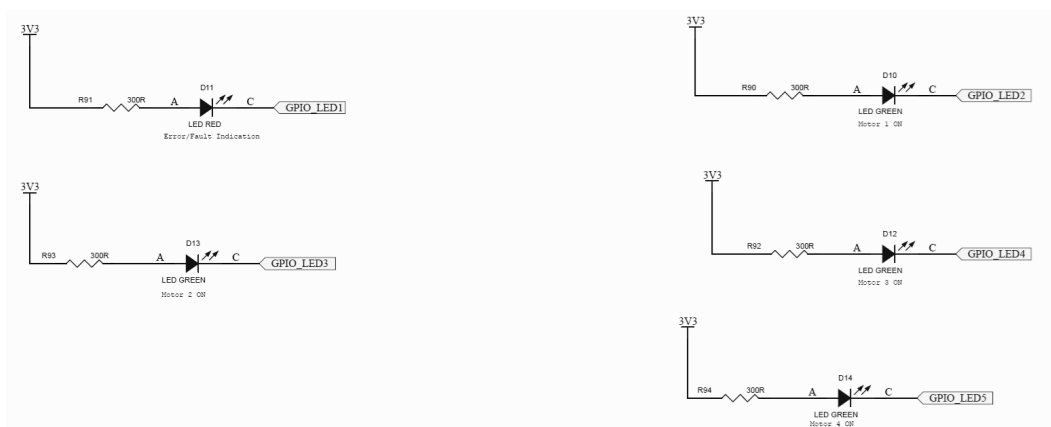
Features	Description
Order code	IIS2MDCTR
Package	12-WFLGA
Operating Voltage	1.71 V to 3.6 V

Figure 9. IIS2MDCTR circuit


7.6 User LEDs

5 LEDs are used as an output to indicate to the user the functioning of the module. Red LED glows constantly indicating adequate power supply is available to the board. Four Green LED blinks continuously to indicate the functioning of 4 DC Motors respectively.

Figure 10. LEDs circuit



7.7 Time of flight ranging sensor VL53L5CX

The VL53L5CX is a state of the art, Time-of-Flight (ToF), multizone ranging sensor enhancing the ST FlightSense product family. Housed in a miniature reflowable package, it integrates a SPAD array, physical infrared filters, and diffractive optical elements (DOE) to achieve the best ranging performance in various ambient lighting conditions with a range of cover glass materials.

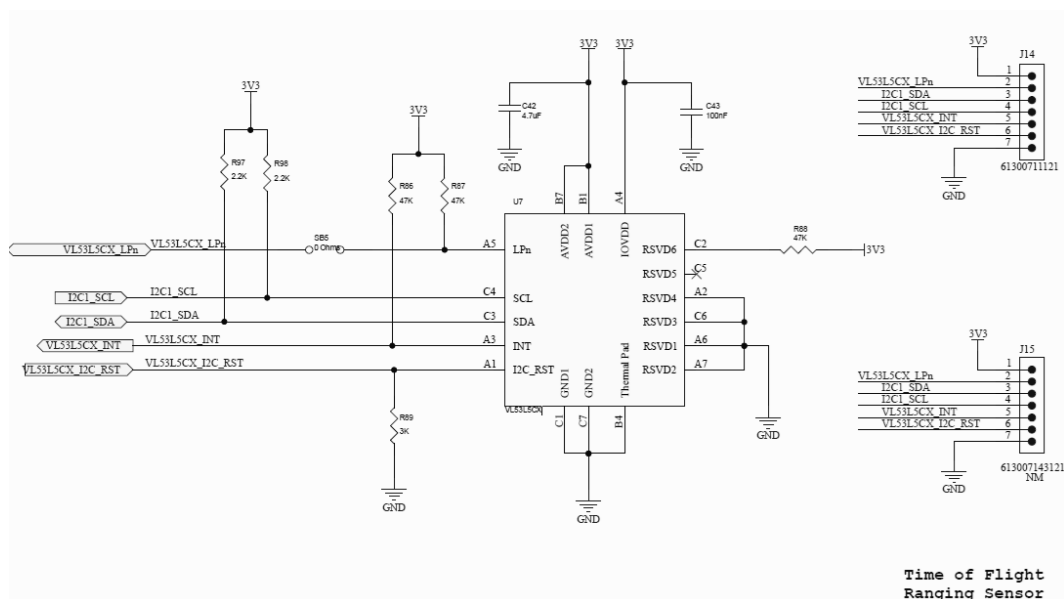
The use of a DOE above the vertical-cavity surface-emitting laser (VCSEL) allows a square FoV to be projected onto the scene. The reflection of this light is focused by the receiver lens onto a SPAD array. Unlike conventional IR sensors, the VL53L5CX uses ST's latest generation, direct ToF technology, which allows absolute distance measurement whatever the target color and reflectance. It provides accurate ranging up to 400 cm and can work at fast speeds (60 Hz), which makes it the fastest, multizone, miniature ToF sensor on the market.

Multizone distance measurements are possible up to 8x8 zones with a wide 65° diagonal FoV, which can be reduced by software. Thanks to ST histogram patented algorithms, the VL53L5CX is able to detect different objects within the FoV. The histogram also provides immunity to cover glass crosstalk beyond 60 cm.

Table 10. VL53L5CX details

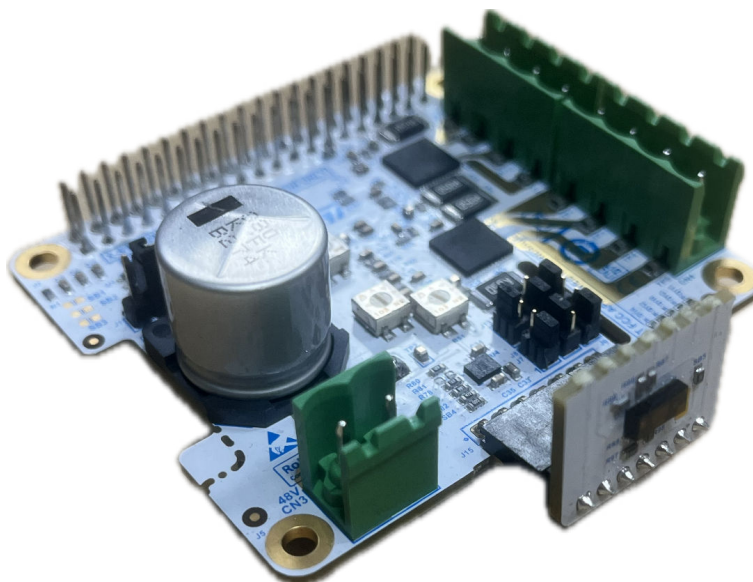
Features	Description
Order code	VL53L5CXV0GC/1
Package	Refer to DS13754
Operating Voltage	Single 3.3 V or 2.8 V operation, or combination of either 3.3 V or 2.8 V AVDD with 1.8 V IOVDD

Figure 11. VL53L5CX circuit



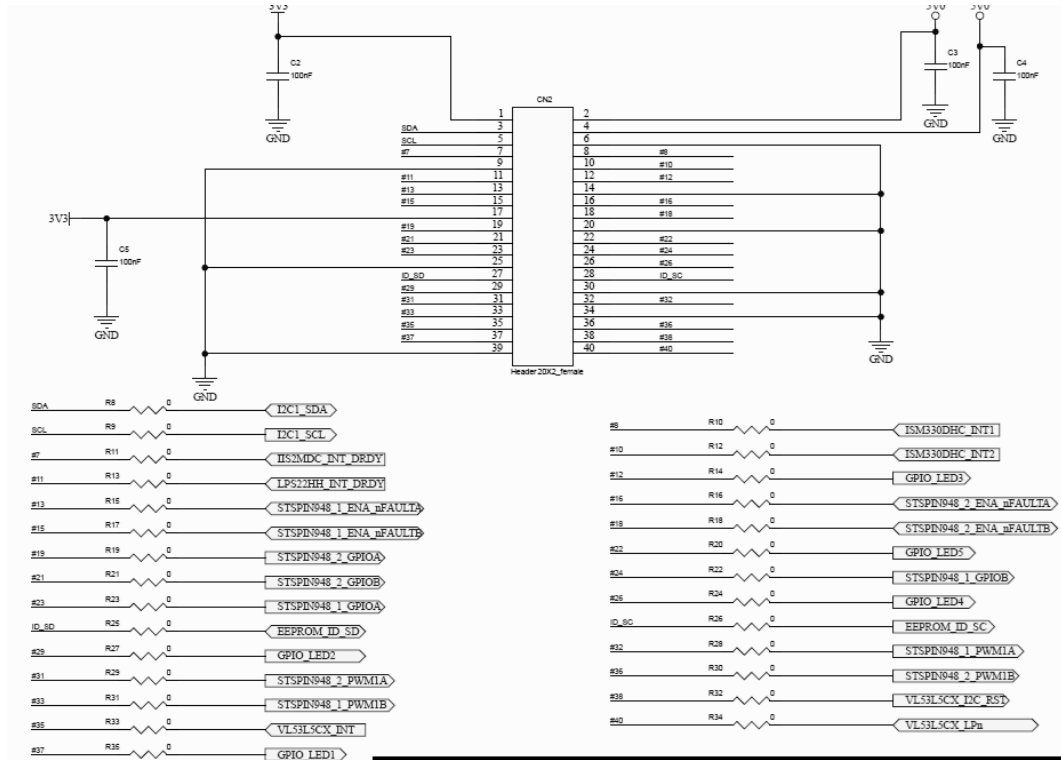
Note: The VL53L5CX ToF sensor is placed on a breakout board on X-STM32MP-RBT01 board. This is done to enable users to use ToF in both horizontal and vertical orientation. By default, the ToF is in horizontal position, to change its orientation to vertical break out the ToF section and insert J14 pin header into J15 socket header as below.

Figure 12. ToF section in vertical orientation



7.8 40 PIN GPIO connector

The on-board devices will be controlled through the main board using various peripheral pins available on the GPIO connector. The series resistors are used to isolate the pins of GPIO connector.

Figure 13. GPIO connector

Table 11. 40 PIN GPIO connector pin configuration

Pin No	Name	STM32MP157F-DK2 Signal	Pin No	Name	STM32MP157F-DK2 Signal
1	3V3	3V	2	5V0	5V
3	I2C1_SDA	I2C5_SDA	4	5V0	5V
5	I2C1_SCL	I2C5_SCL	6	GND	GND
7	IIS2MDC_INT_DRDY	-	8	ISM330DHC_INT1	-
9	GND	GND	10	ISM330DHC_INT2	-
11	LPS22HH_INT_DRDY	-	12	GPIO_LED3	-
13	STSPIN948_1_ENA_nFAULTA	-	14	GND	GND
15	STSPIN948_1_ENA_nFAULTB	-	16	STSPIN948_2_ENA_nFAULTA	-
17	3V3	3V	18	STSPIN948_2_ENA_nFAULTB	-
19	STSPIN948_2_GPIOA	-	20	GND	GND
21	STSPIN948_2_GPIOB	-	22	GPIO_LED5	-
23	STSPIN948_1_GPIOA	-	24	STSPIN948_1_GPIOB	-
25	GND	GND	26	GPIO_LED4	-
27	EEPROM_ID_SD	I2C1_SDA	28	EEPROM_ID_SC	I2C1_SCL
29	GPIO_LED2	-	30	GND	GND
31	STSPIN948_2_PWM1A	TIM5_CH2	32	STSPIN948_1_PWM1A	TIM4_CH2
33	STSPIN948_1_PWM1B	TIM3_CH2	34	GND	GND
35	VL53L5CX_INT	-	36	STSPIN948_2_PWM1B	TIM1_CH1N
37	GPIO_LED1	-	38	VL53L5CX_I2C_RST	-
39	GND	GND	40	VL53L5CX_LPN	-

8

Schematic diagrams

Figure 14. X-STM32MP-RBT01 circuit schematics (1 of 10)

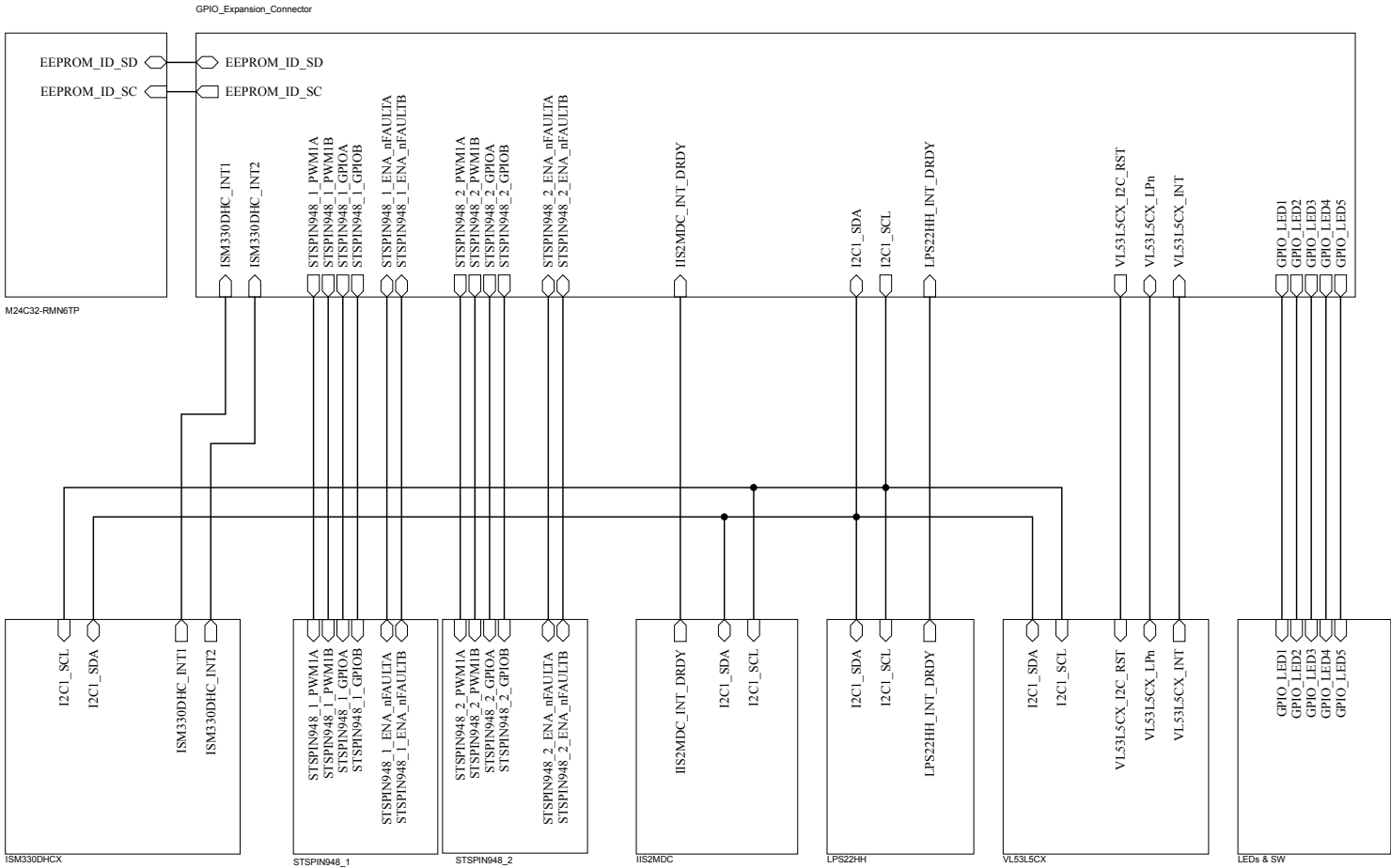


Figure 15. X-STM32MP-RBT01 circuit schematics (2 of 10)

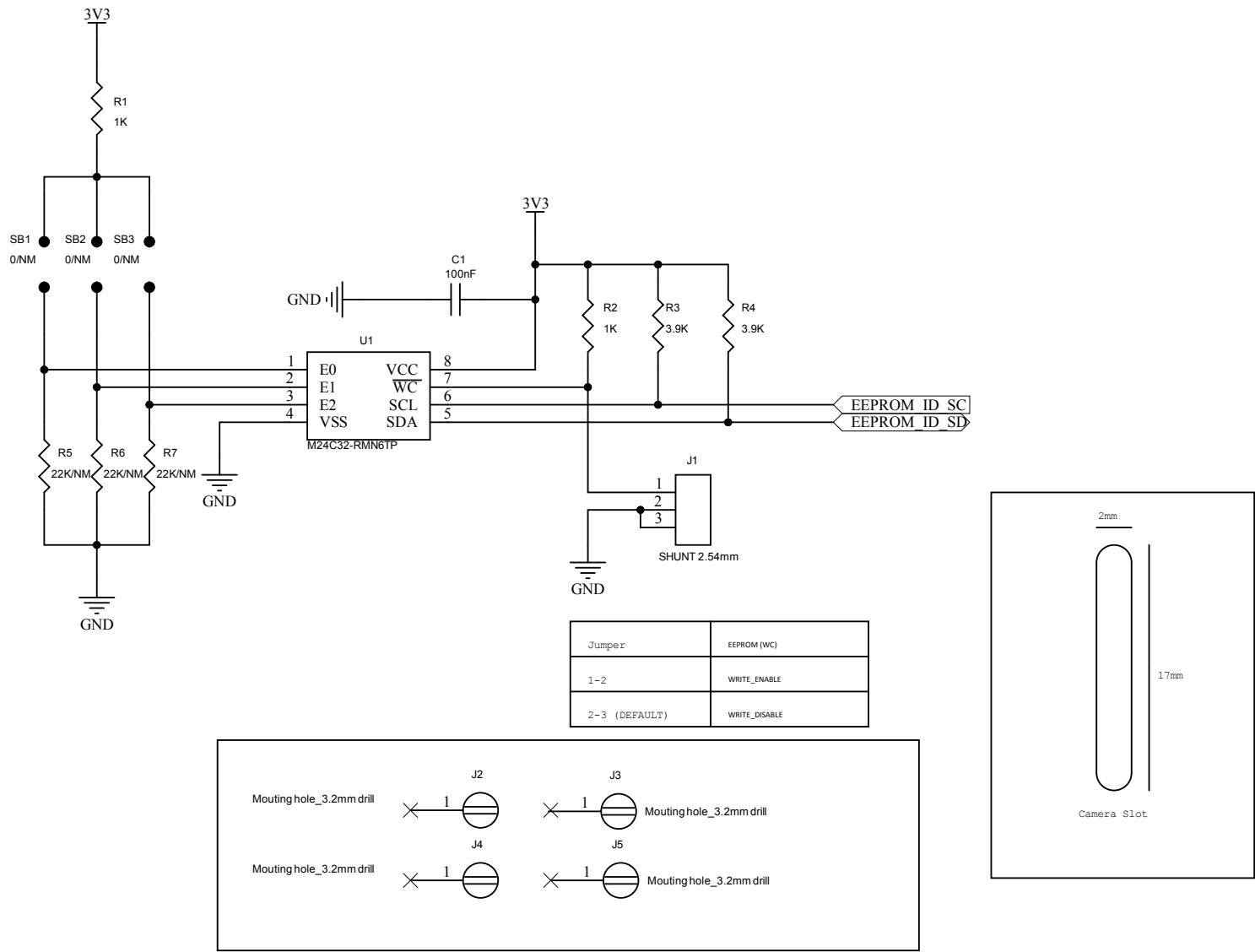


Figure 16. X-STM32MP-RBT01 circuit schematics (3 of 10)

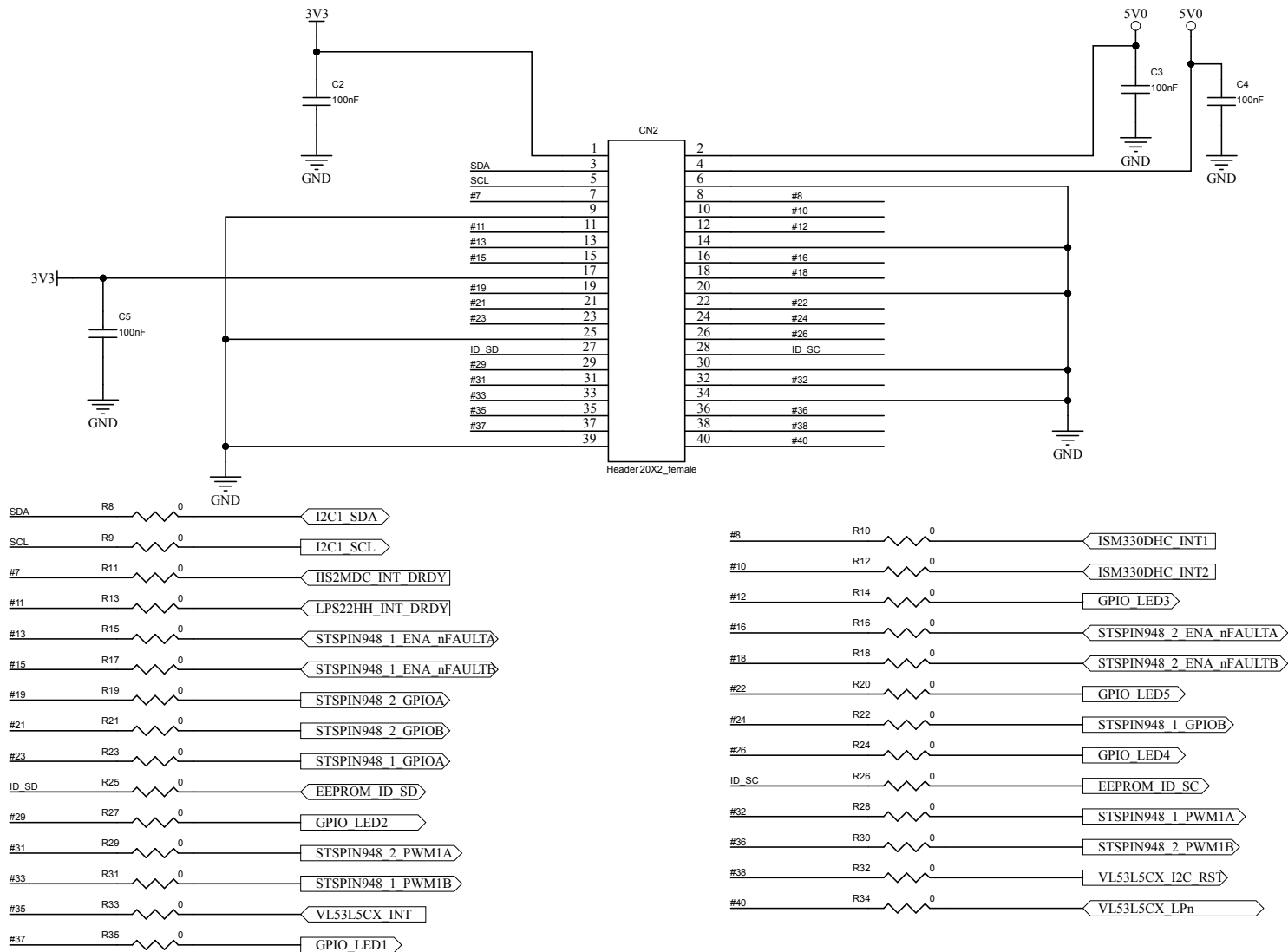


Figure 17. X-STM32MP-RBT01 circuit schematics (4 of 10)

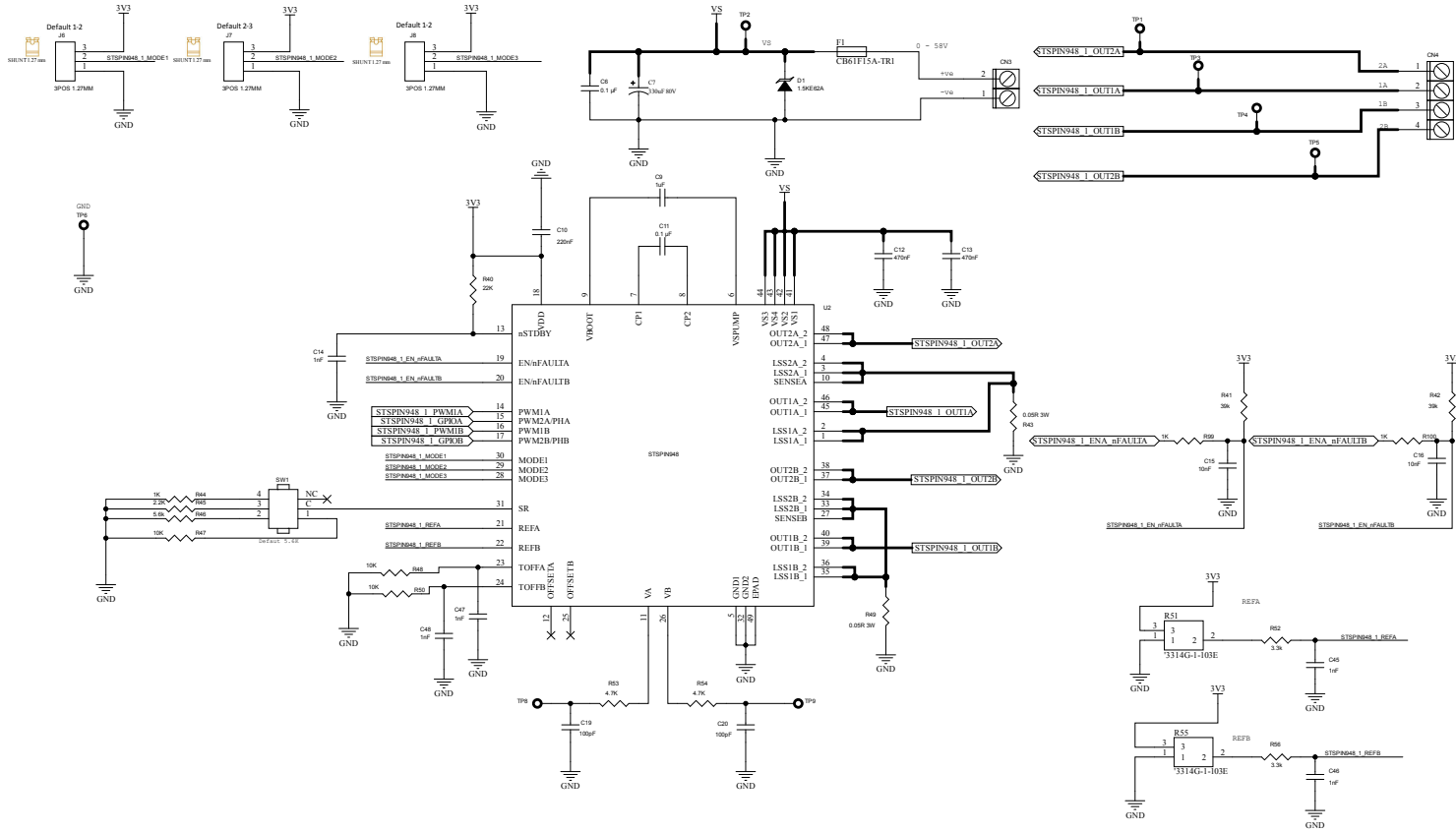
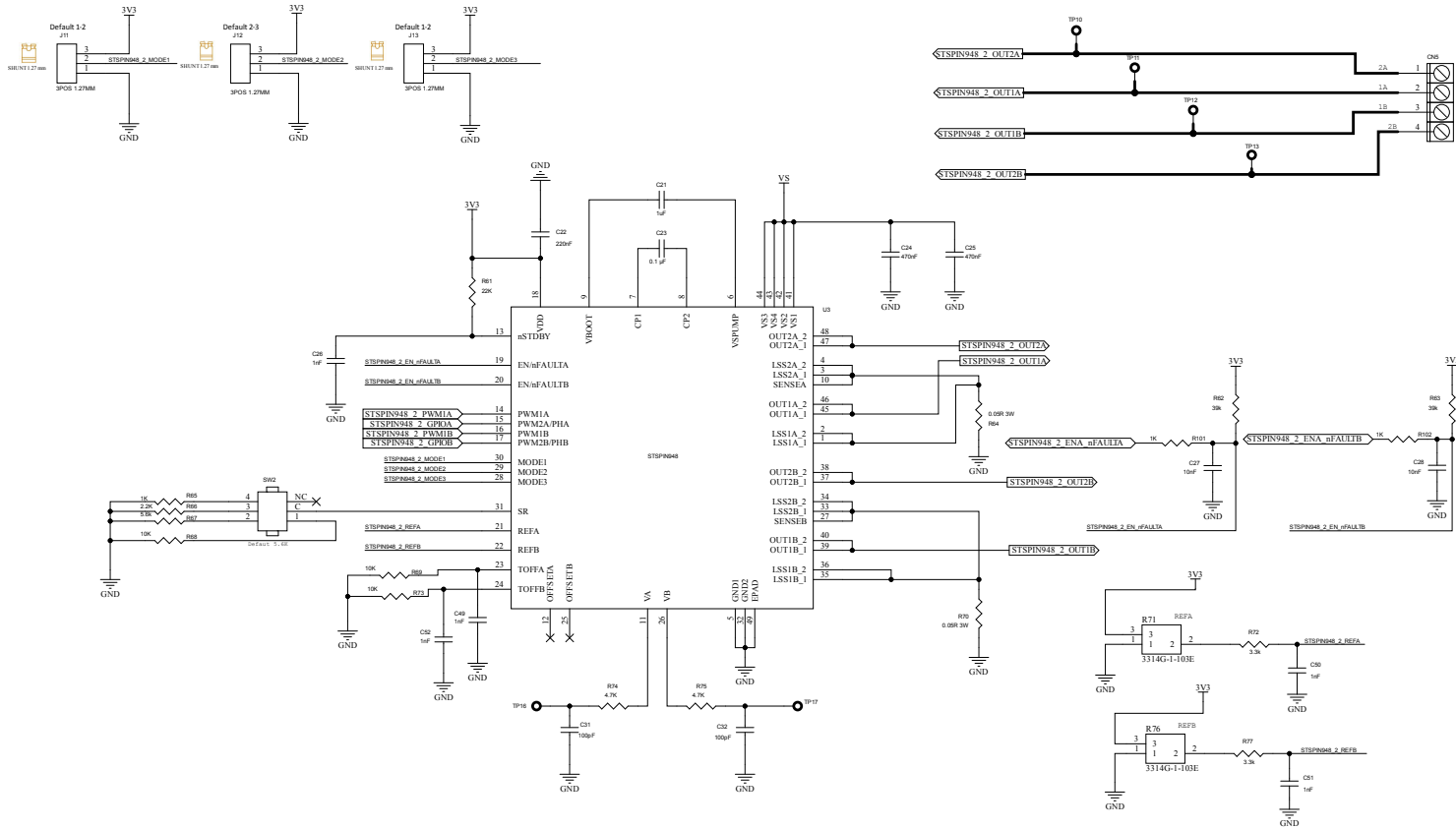
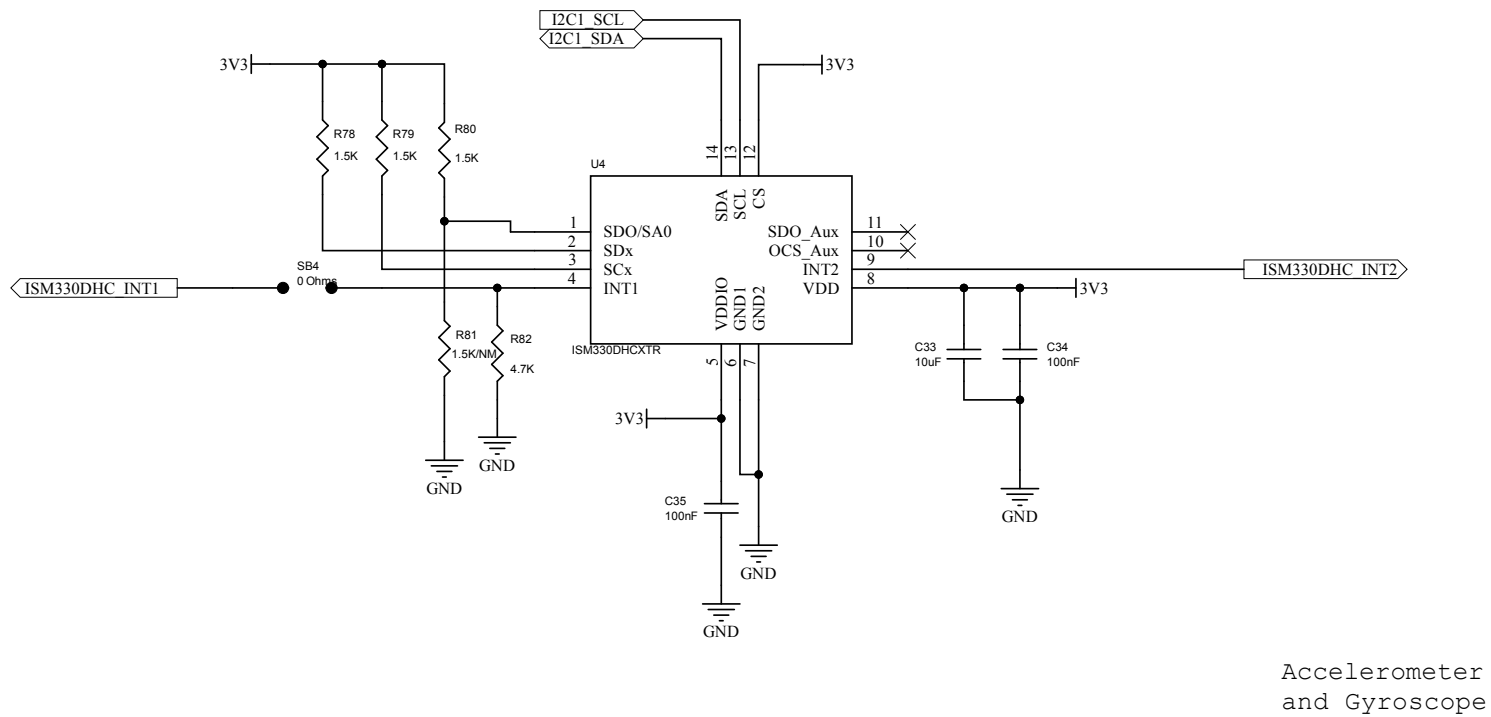


Figure 18. X-STM32MP-RBT01 circuit schematics (5 of 10)



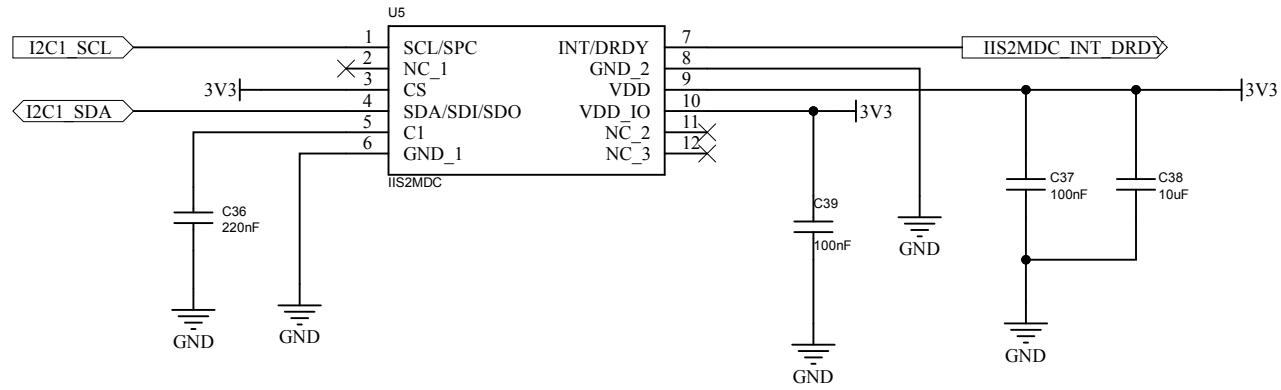
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Schematic diagrams



Accelerometer and Gyroscope

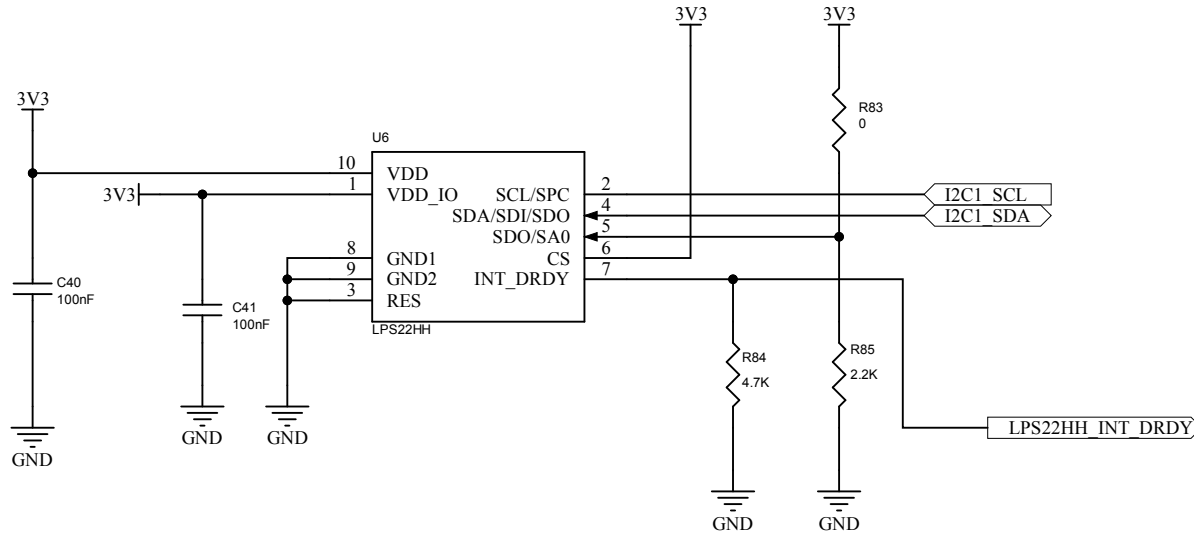
Figure 20. X-STM32MP-RBT01 circuit schematics (7 of 10)



Magnetometer

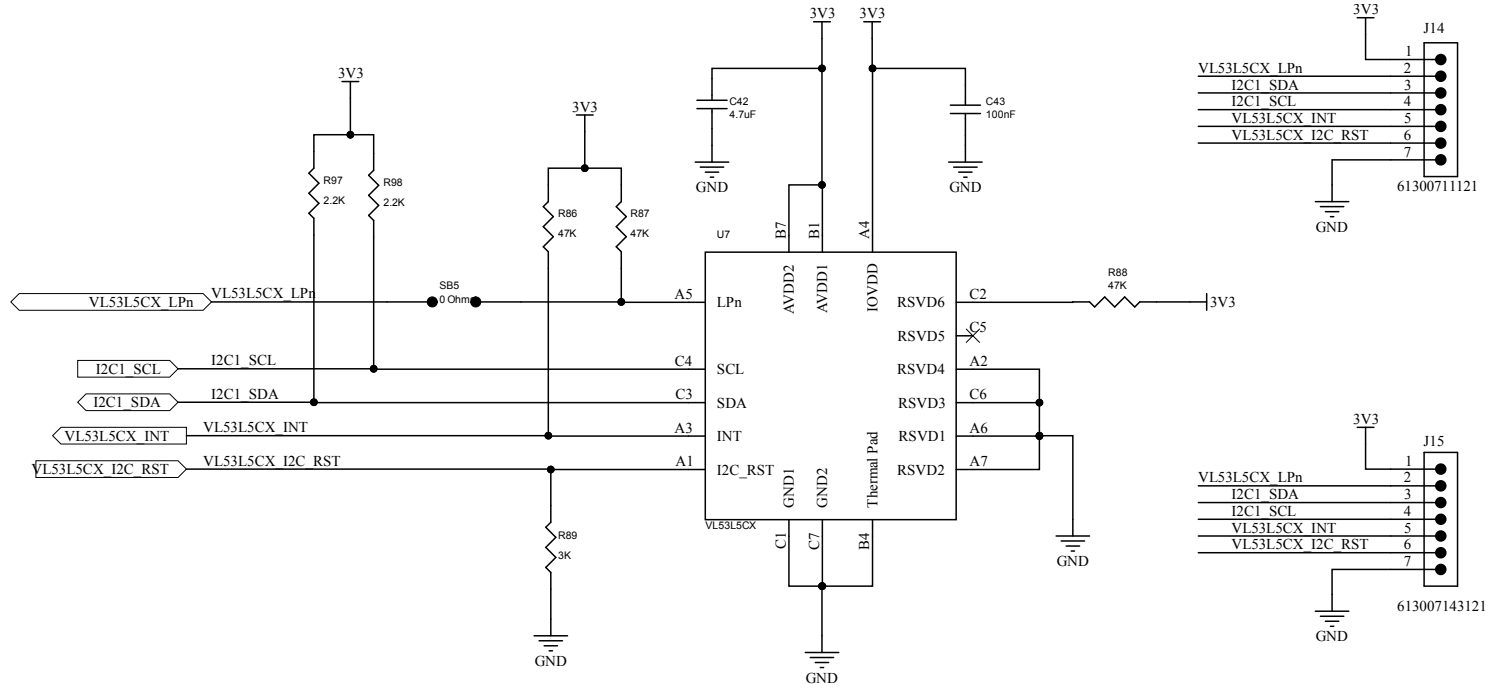


Figure 21. X-STM32MP-RBT01 circuit schematics (8 of 10)



Pressure Sensor

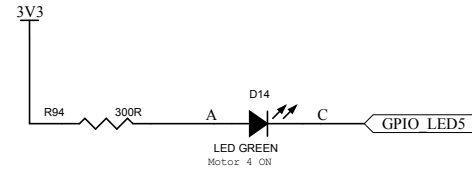
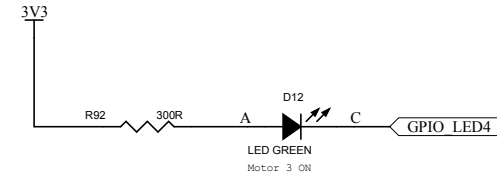
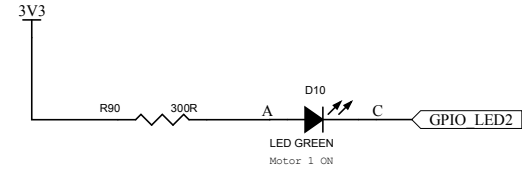
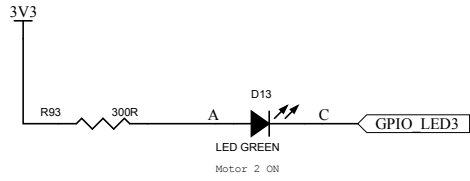
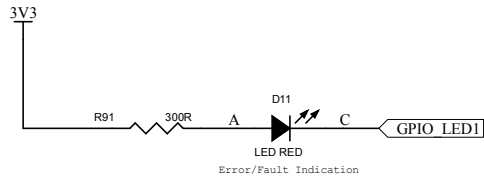
Figure 22. X-STM32MP-RBT01 circuit schematics (9 of 10)



Time of Flight
Ranging Sensor



Figure 23. X-STM32MP-RBT01 circuit schematics (10 of 10)



9 Bill of materials

Table 12. X-STM32MP-RBT01 bill of materials

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
1	12	C1, C2, C3, C4, C5, C34, C35, C37, C39, C40, C41, C43	100nF	CAP CER 0.1UF 16V X7R 0603	KEMET	C0603C104K4RACTU
2	3	C6, C11, C23	0.1 µF	CAP CER 0.1UF 50V X7R 0603	YAGEO	AC0603KRX7R9BB104
3	1	C7	330uF 80V	Aluminium Electrolytic Capacitors - SMD 80VDC 330uF 20% SMD	Panasonic	EEEFK1K331AM
4	2	C9, C21	1uF	CAP CER 1UF 50V X7R 0603	Würth Elektronik	885012206126
5	3	C10, C22, C36	220nF	CAP CER 0.22UF 50V X7R 0603, CAP CER 0.22UF 16V X7R 0603	YAGEO, Walsin Technology Corporation	AC0603KRX7R9BB224, 0603B224K160CT
6	4	C12, C13, C24, C25	470nF	CAP CER 0.47UF 50V X7R 0805	Würth Elektronik	885012207102
7	10	C14, C26, C45, C46, C47, C48, C49, C50, C51, C52	1nF	CAP CER 1000PF 50V X7R 0603	Würth Elektronik	885012206083
8	4	C15, C16, C27, C28	10nF	CAP CER 10000PF 50V X7R 0603	Würth Elektronik	885012206089
9	4	C19, C20, C31, C32	100pF	CAP CER 100PF 50V X7R 0603	Würth Elektronik	885012206077
10	2	C33, C38	10uF	CAP CER 10UF 16V X5R 0603	Murata Electronics	ZRB18AR61C106ME01L
11	1	C42	4.7uF	CAP CER 4.7UF 16V X5R 0603	Murata Electronics	GRM188R61C475ME11D
12	1	CN2	Header 20X2_female	CONN RCPT 40POS 0.1 TIN PCB	Samtec Inc.	SSQ-120-03-T-D
13	1	CN3	MORSV-508-2P_screw	TERM BLOCK HDR 2POS VERT 5.08MM	Würth Elektronik	691311500002
14	2	CN4, CN5	MORSV-508-4P_screw	TERM BLOCK HDR 4POS VERT 5.08MM	Würth Elektronik	691311500004
15	1	D1	1.5KE62A, DO-201AA	TVS D5.4X7.5 300V 1500W UNIDIR	ST	1.5KE62A
16	4	D10, D12, D13, D14	LED GREEN	LED GREEN CLEAR 0603 SMD	Würth Elektronik	150060GS75000

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
17	1	D11	LED RED	LED RED CLEAR 0603 SMD	Würth Elektronik	150060RS75000
18	1	F1	CB61F15A-TR1	Surface Mount Fuses 125Vac 15A FA SMD Brick	Eaton	CB61F15A-TR1
19	1	J1	SHUNT 2.54mm	CONN HEADER VERT 3POS 2.54MM	Samtec Inc.	TSW-103-07-F-S
20	4	J2, J3, J4, J5	Mouting hole_3.2mm drill	Hex Standoff Threaded M3x0.5 Nylon 0.472" (12.00mm) Natural	Essentra	36M30MF012
21	6	J6, J7, J8, J11, J12, J13	3POS 1.27MM	CONN HEADER VERT 3POS 1.27MM	Samtec Inc.	TMS-103-01-G-S
22	1	J14	61300711121	WR-PHD Pin Header, THT, Vertical, pitch 2.54mm, 1 Row, 7P	Würth Elektronik	61300711121
23	1	J15	613007143121	WR-PHD Pin Header, THT, Right Angle pitch 2.54mm, 1 Row, 7P	Würth Elektronik	613007143121
24	8	R1, R2, R44, R65, R99, R100, R101, R102	1K	RES SMD 1K OHM 1% 1/10W 0603, RES SMD 1K OHM 0.1% 1/10W 0603	Vishay Dale, YAGEO	CRCW06031K00FKEA, RT0603BRB071KL
25	2	R3, R4	3.9K	RES SMD 3.9K OHM 1% 1/10W 0603	YAGEO	RT0603FRE073K9L
26	3	R5, R6, R7	22K/NM	RES SMD 22K OHM 5% 1/10W 0603 (not mounted)	Vishay Dale	CRCW060322K0JNEA
27	29	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, R83	0	RES SMD 0 OHM JUMPER 1/10W 0603	TE Connectivity Passive Product	CRG0603ZR
28	2	R40, R61	22K	RES SMD 22K OHM 1% 1/10W 0603	Bourns Inc.	CR0603-FX-2202ELF
29	4	R41, R42, R62, R63	39k	RES SMD 39K OHM 1% 1/10W 0603	YAGEO	RT0603FRE0739KL

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
30	4	R43, R49, R64, R70	0.05R 3W	RES 0.05 OHM 1% 3W 2512	Bourns Inc.	CRA2512-FZ-R050ELF
31	5	R45, R66, R85, R97, R98	2.2K	RES 2.2K OHM 0.5% 1/10W 0603, RES 2.2K OHM 1% 1/10W 0603, SMD 2.2k Ohms 100mW 0603 0.5%	YAGEO, Stackpole Electronics Inc	RT0603DRE102K2L, RMCF0603FT2K20, Yageo
32	2	R46, R67	5.6k	RES SMD 5.6K OHM 0.1% 1/10W 0603	YAGEO	RT0603BRC075K6L
33	6	R47, R48, R50, R68, R69, R73	10K	RES SMD 10K OHM 1% 1/10W 0603	Bourns Inc.	CR0603-FX-1002ELF
34	4	R51, R55, R71, R76	3314G-1-103E	Resistor	Bourns Inc.	3314G-1-103E
35	4	R52, R56, R72, R77	3.3k	RES 3.3K OHM 0.1% 1/10W 0603	YAGEO	RP0603BRD073K3L
36	6	R53, R54, R74, R75, R82, R84	4.7K	RES 4.7K OHM 5% 1/10W 0603, RES 4.7K OHM 1% 1/10W 0603	YAGEO	RC0603JR-074K7L, RC0603FR-074K7P
37	3	R78, R79, R80	1.5K	RES SMD 1.5K OHM 1% 1/10W 0603	TE Connectivity Passive Product	CRG0603F1K5, TE Connectivity Passive Product
38	1	R81	1.5K/NM	RES SMD 1.5K OHM 1% 1/10W 0603 (not mounted)	TE Connectivity Passive Product	CRG0603F1K5
39	3	R86, R87, R88	47K	RES 47K OHM 1% 1/10W 0603	Yageo	RC0603FR-0747KL
40	1	R89	3K	RES 3K OHM 1% 1/10W 0603	YAGEO	RC0603FR-073KL
41	5	R90, R91, R92, R93, R94	300R	RES SMD 300 OHM 1% 1/16W 0402	YAGEO	AC0402FR-07300RL
42	3	SB1, SB2, SB3	0/NM	RES 0 OHM JUMPER 1/10W 0603 (not mounted)	Rohm Semiconductor	SFR03EZPJ000
43	2	SB4, SB5	0 Ohms	RES 0 OHM JUMPER 1/10W 0603	Rohm Semiconductor	SFR03EZPJ000
44	2	SW1, SW2	ROT-SWITCH	SWITCH ROTARY DIP SP4T 100MA 16V	Nidec Components Corporation	CS-4-14NTB
45	14	TP1, TP2, TP3, TP4, TP5, TP6, TP8, TP9, TP10, TP11, TP12, TP13, TP16, TP17	TP-SMD-S2761-46R	PC TEST POINT NATURAL	HARWIN	S2761-46R

Item	Q.ty	Ref.	Part/value	Description	Manufacturer	Order code
46	1	U1	M24C32-RMN6TP, 8-SOIC	IC EEPROM 32KBIT I2C 1MHZ 8SOIC	ST	M24C32-RMN6TP
47	2	U2, U3	STSPIN948, VFQFPN 7 x 7 x 1 – 48 L	Scalable 4.5 A dual full-bridge driver for brushed DC motors	ST	STSPIN948
48	1	U4	ISM330DHCXTR, 14-VFLGA Module	INEMO INERTIAL MODULE: ALWAYS-ON	ST	ISM330DHCXTR
49	1	U5	IIS2MDC, 12-WFLGA	SENSOR MR I2C/SPI 12LGA	ST	IIS2MDCTR
50	1	U6	LPS22HH, 10-WFLGA	SENSOR 18.27PSIA 24BIT 10HLGA	ST	LPS22HHTR
51	1	U7	VL53L5CX, Optical LGA16	SENSOR OPTICAL 4M I2C	ST	VL53L5CXV0GC/1
52	6	JR1	1.27 mm	JUMPER	Harwin Inc.	M50-1900005
53	1	JR1	2.54 mm	JUMPER	Würth Elektronik	60900213421
54	4	Nut		M3x0.5 Hex Nut 0.217" (5.50mm) Nylon	Würth Elektronik	709940300
55	2	TERM BLOCK PLUG 4POS 5.08MM	5.08mm	4 Position Terminal Block Plug, Female Sockets 0.200" (5.08mm) 180° Free Hanging (In-Line)	Würth Elektronik	691351500004
56	1	TERM BLOCK PLUG 2POS 5.08MM	5.08mm	2 Position Terminal Block Plug, Female Sockets 0.200" (5.08mm) 180° Free Hanging (In-Line)	Würth Elektronik	691351500002
57	4	Spacer		Hex Standoff Threaded M3x0.5 Nylon 0.472" (12.00mm) Natural	Essentra	36M30MF012

10 Board versions

Table 13. X-STM32MP-RBT01 versions

Finished good	Schematic diagrams	Bill of materials
XMP\$RBT01A ⁽¹⁾	XMP\$RBT01A schematic diagrams	XMP\$RBT01A bill of materials

1. This code identifies the X-STM32MP-RBT01 evaluation board first version.

11 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)

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).

12 Laser safety considerations

This product contains a laser emitter and corresponding drive circuitry. The laser output is designed to meet Class 1 laser safety limits under all reasonably foreseeable conditions including single faults in compliance with IEC 60825-1:2014. Do not increase the laser output power by any means. Do not use any optics to focus the laser beam.

Note: Use of controls or adjustments, or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Figure 24. Class 1 laser product label



This product complies with:

- IEC 60825-1:2014
- 21 CFR 1040.10 and 1040.11, except for conformance with IEC 60825-1:2014 as described in the laser notice number 56, dated May 8, 2019
- EN 60825-1:2014 including EN 60825-1:2014/A11:2021
- EN 50689:2021, however STMicroelectronics does not guarantee compliance with the requirement of clause 5 from EN50689 regarding child appealing products. If designing a child appealing product, contact STMicroelectronics' technical application support.

Revision history

Table 14. Document revision history

Date	Revision	Changes
12-Mar-2025	1	Initial release.

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