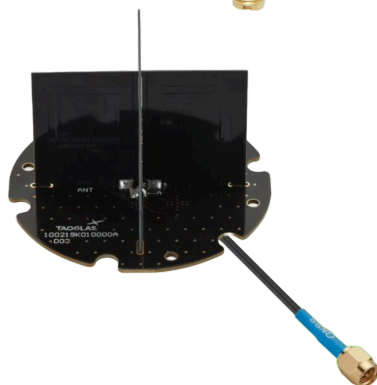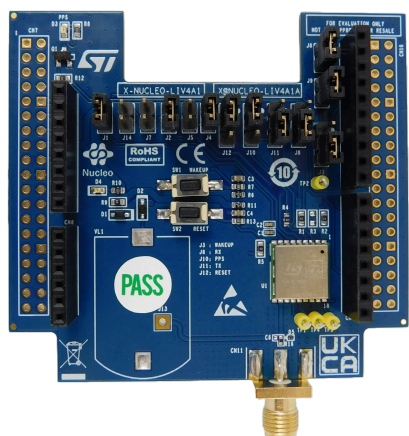# GNSS expansion board based on Teseo-LIV4F module for STM32 Nucleo

Features

- Operating supply voltage: 3.3 - 5 V
- Ambient temperature: +10/+50 °C
- Sensitivity: -162 dBm (tracking mode)
- Interfaces:
  – a UARTport
  – an I²Cport
  – Configurable digital I/O
  – EXTINT input for wakeup
- NMEA protocol
- Assisted GNSS:
  – Autonomous AGNSS
  – Real-timeserver-based
- Simultaneous multi constellation and multi band GNSS
  – GPS
  – Galileo
  – Glonass
  – BeiDou
  – QZSS
- Compatible with STM32 Nucleo boards
- Compatible with the Arduino™ UNO R3 connector
- SMA female antenna connector
- CE Certified
- RoHS and WEEE compliant

Description

The X-NUCLEO-LIV4A1 expansion board is based on the Teseo-LIV4F tiny dual-band GNSS Low power and measurement engine modules.

It represents an affordable, easy-to-use, global navigation satellite system (GNSS) module, embedding TESEO IV single die GNSS receiver IC working simultaneously on multiple constellations GPS/Galileo/ Glonass/BeiDou/QZSS) able to provide positioning (Teseo-LIV4F) in your STM32 Nucleo project.

The Teseo-LIV4F is a compact (9.7 x 10.1 mm) module that provides superior accuracy thanks to the on-board temperature-compensated crystal oscillator (TCXO) and a reduced time-to-first fix (TTFF) with its dedicated real-time clock (RTC) oscillator.

The Teseo-LIV4F module runs the GNSS firmware (X-CUBE-GNSS1) to perform all GNSS operations including acquisition, tracking, navigation, and data output without external memory support.

The X-NUCLEO-LIV4A1 expansion board is compatible with the Arduino® UNO R3 connector and the ST morpho connector, so it can be plugged to the STM32 Nucleo development board and stacked with additional STM32 Nucleo expansion boards

The embedded cross dipole active multiband GNSS antenna is included in the package.

Product summary	
GNSS expansion board based on Teseo-LIV4F module for STM32 Nucleo	X-NUCLEO-LIV4A1
Tiny GNSS dual-bands low power module	Teseo-LIV4F
Global navigation satellite system software expansion for STM32Cube	X-CUBE-GNSS1
Applications	Navigation
	Tracking
	Industrial

1 Schematic diagrams

Figure 1. X-NUCLEO-LIV4A1 circuit schematic (1 of 3)

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Figure 2. X-NUCLEO-LIV4A1 circuit schematic (2 of 3)

NUCLEO CONNECTORS

CN7 — Header 19X2 NM

PC10	1	2	PC11	
PC12	3	4	PD2	
VDD	5	6	E5V	
BOOT0	7	8	GND	
NC/PF6	9	10		
NC/PF7	11	12	IOREF	
PA13	13	14	RESET	
PA14	15	16	+3V3	
PA15	17	18	+5V	
GND	19	20	GND	
PB7	21	22	GND	
PC13	23	24	VIN	
PC14	25	26		
PC15	27	28	PA0	
PH0/PF0/PD0	29	30	PA1	
PH1/PF1/PD1	31	32	PA4	
VLCD/VBAT	33	34	PB0	
PC2	35	36	PC1	
PC3	37	38	PC0	

IOREF +3V3

CN6 — CONN RCPT 8POS

1	NC	
2	IOREF	
3	RESET	
4	3V3	
5	5V	
6	GND	
7	GND_1	
8	VIN	

GND

CN8 — CONN RCPT 6POS

A0	1	A0
A1	2	A1
A2	3	A2
A3	4	A3
A4	5	A4
A5	6	A5

CN5 — CONN RCPT 10POS

SCL	10	D15/SCL	
SDA	9	D14/SDA	
AREF	8	AVDD	
GND	7	GND	
	6	D13/SCK	
SCK/D13	5	D12/MISO	
MISO/D12	4	D11/MOSI/PWM	
MOSI/PWM/D11	3	D10/CS/PWM	
PWM/D10	2	D9/PWM	
PWM/D9	1	D8	
D8			

CN9 — CONN RCPT 8POS

D7	8	D7	
D6	7	D6/PWM	
D5	6	D5/PWM	
D4	5	D4	
D3	4	D3/PWM	
D2	3	D2	
TXD/D1	2	D1/RX	
RXD/D0	1	D0/TX	

CN10 — Header 19X2 NM

PC9	1	2	PC8	
PB8	3	4	PC6	
PB9	5	6	PC5	
AVDD	7	8	U5V	
GND	9	10	PD8	
PA5	11	12	PA12	
PA6	13	14	PA11	
PA7	15	16	PB12	
PB6	17	18	PB11/NC	
PC7	19	20	GND	
PA9	21	22	PB2	
PA8	23	24	PB1	
PB10	25	26	PB15	
PB4	27	28	PB14	
PB5	29	30	PB13	
PB3	31	32	AGND	
PA10	33	34	PC4	
PA2	35	36	NC/PF5	
PA3	37	38	NC/PF4	

JR4 — SHUNT 2.54 mm.

J4 HEADER1x2 — Closed
J5 HEADER1x2 — Open — PRG → PRG
J7 HEADER1x2 — Open — WAKEUP
J14 HEADER1x2 — Open — D4
GND

J3 HEADER1x3
JR3 SHUNT 2.54 mm. {2:3} {Default}
D4 — D13/SCK
WAKEUP → WAKEUP

J8 HEADER1x3
JR6 SHUNT 2.54 mm. {2:3} {Default}
D8 — D1/RX
RX → RX
{D8 = PA9: STM32 USART1_TX}

J11 HEADER1x3
JR9 SHUNT 2.54 mm. {2:3} {Default}
D0/TX — D2 {D2 = PA10: STM32 USART1_RX}
TX → TX

JR5 SHUNT 2.54 mm.
J6 HEADER1x2
D15/SCL — I2C_CLOCK
Closed {Default}

JR7 SHUNT 2.54 mm.
J9 HEADER1x2
D14/SDA — I2C_DATA
Closed {Default}

J10 HEADER1x3
JR8 SHUNT 2.54 mm. {1:2} {Default}
D6/PWM — D2
SYS_PPS → SYS_PPS

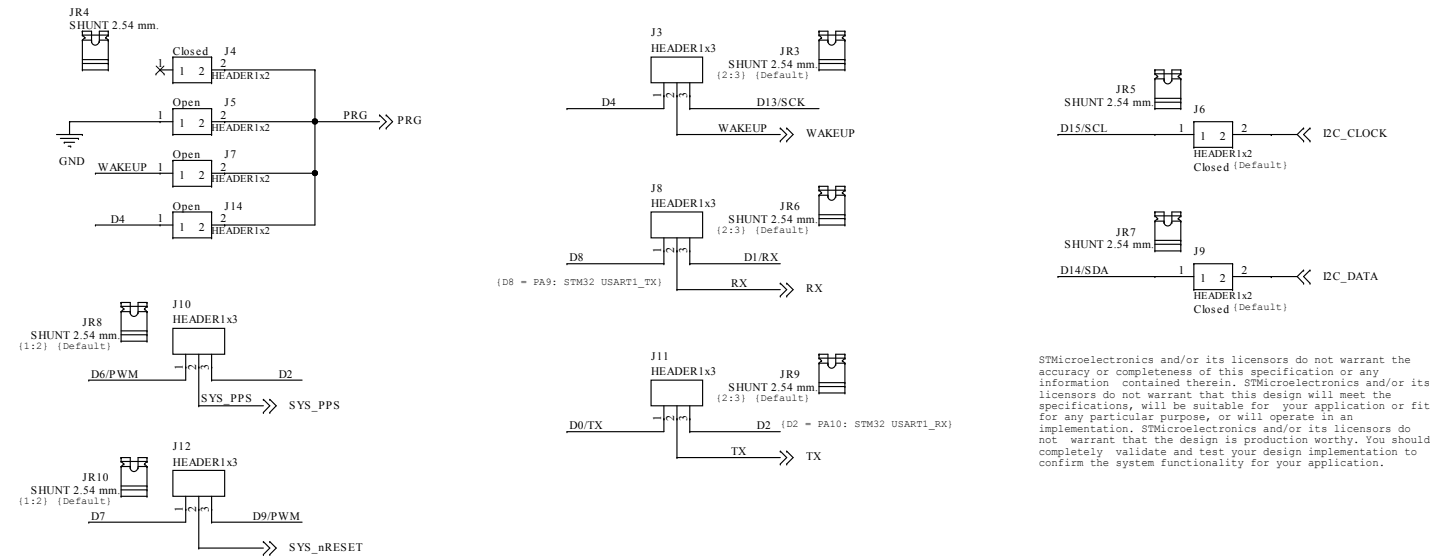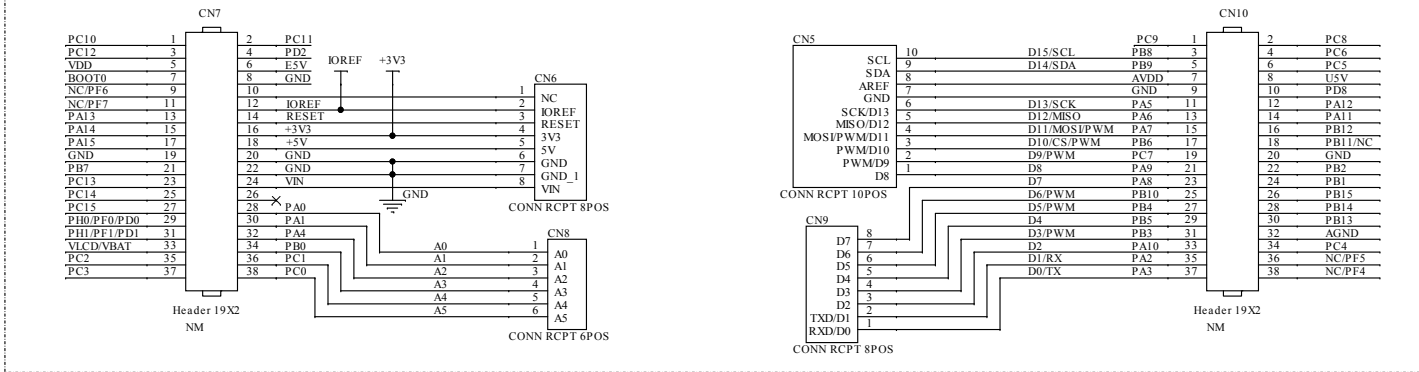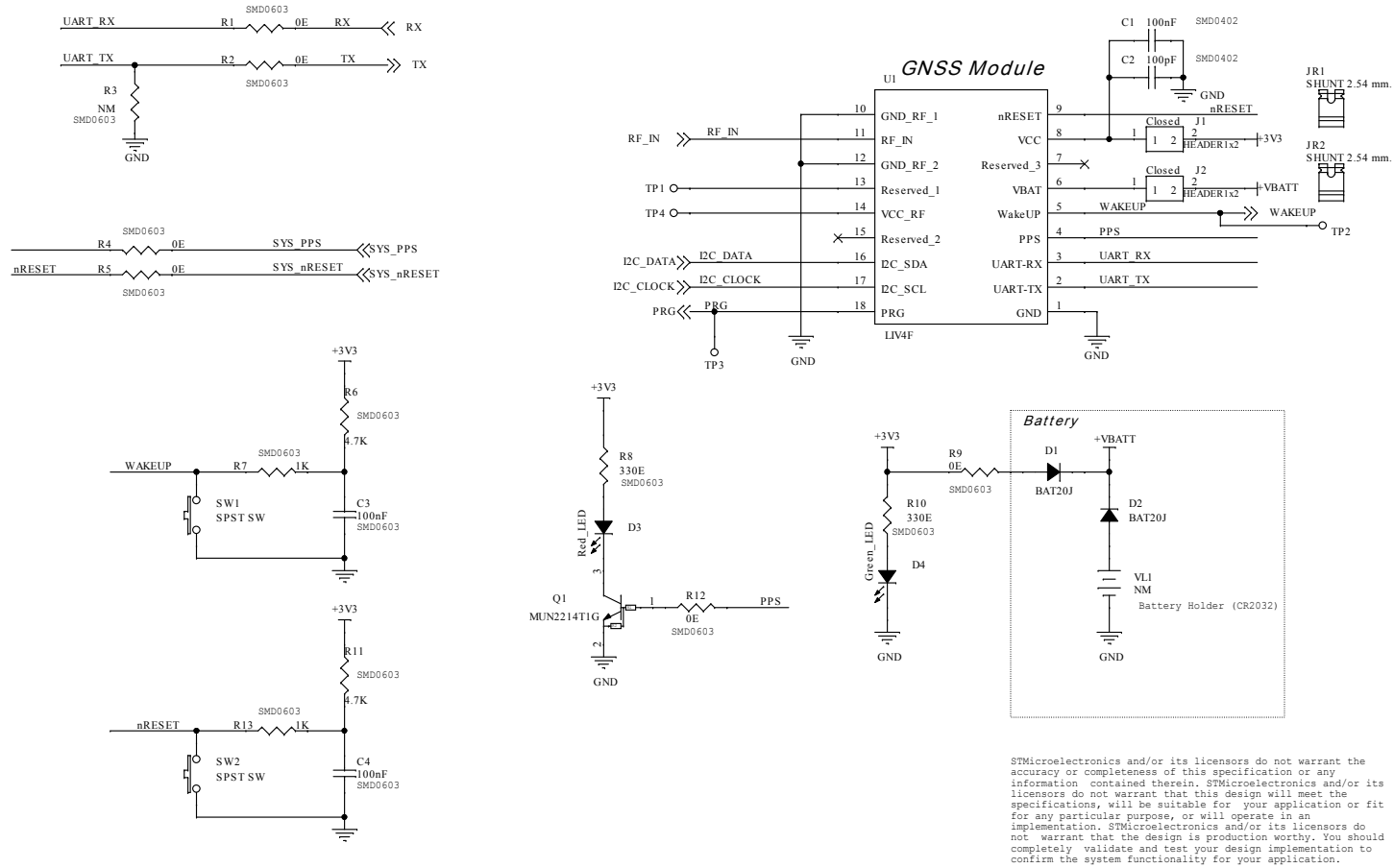J12 HEADER1x3
JR10 SHUNT 2.54 mm. {1:2} {Default}
D7 — D9/PWM
SYS_nRESET →

Figure 3. X-NUCLEO-LIV4A1 circuit schematic (3 of 3)

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2 Board versions

Table 1. X-NUCLEO-LIV4A1 versions

Finished good	Schematic diagrams	Bill of materials
X$NUCLEO-LIV4A1A [1]	X$NUCLEO-LIV4A1A schematic diagrams	X$NUCLEO-LIV4A1A bill of materials

1. This code identifies the X-NUCLEO-LIV4A1 evaluation board first version.

Revision history

Table 2. Document revision history

Date	Revision	Changes
12-Feb-2024	1	Initial release.
30-Jul-2024	2	Updated Description.

IMPORTANT NOTICE – READ CAREFULLY