NEO-M9N-00B

Standard precision GNSS module
Professional grade

Data sheet

Abstract

This data sheet describes the u-blox NEO-M9N-00B GNSS module. NEO-M9N offers ultra-robust meter-level GNSS positioning performance with concurrent reception of up to four GNSS (GPS, GLONASS, BeiDou, Galileo) in a 12.2 x 16.0 mm package.

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This document applies to the following products:

Product name	Type number	FW version	IN/PCN reference	Product status
NEO-M9N	NEO-M9N-00B-00	SPG 4.04	UBX-21029274 UBX-22039049 UBX-23000084	Mass production

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1 Functional description

1.1 Overview

The NEO-M9N-00B GNSS receiver features the u-blox M9 standard precision GNSS platform. It provides exceptional sensitivity and acquisition times for L1 GNSS systems. u-blox M9 receivers are available in different variants to serve automotive and industrial tracking applications, such as navigation, telematics and UAVs.

The NEO-M9N-00B module is available in the NEO form factor, which is a 12.2 x 16.0 mm LCC package.

1.2 Performance

Parameter	Specification	
Receiver type	Multi-constellation GNSS standard precision receiver	
Accuracy of time pulse signal	RMS 99%	30 ns 60 ns
Frequency of time pulse signal		0.25 Hz to 10 MHz (configurable)
Operational limits[1]	Dynamics Altitude Velocity	≤ 4 g 80,000 m 500 m/s
Velocity accuracy[2]		0.05 m/s
Dynamic heading accuracy[2]		0.3 deg

GNSS		GPS+GLO+GAL+BDS	GPS+GLO+GAL	GPS+GLO	GPS+BDS	GPS+GAL
Acquisition[3]	Cold start	24 s	25 s	26 s	28 s	29 s
	Hot start	2 s	2 s	2 s	2 s	2 s
	Aided start[4]	2 s	2 s	2 s	2 s	2 s
Max navigation update rate	PVT	25 Hz	25 Hz	25 Hz	25 Hz	25 Hz
Sensitivity[5]	Tracking and nav.	-167 dBm	-167 dBm	-167 dBm	-166 dBm	-166 dBm
	Reacquisition	-160 dBm	-160 dBm	-160 dBm	-160 dBm	-160 dBm
	Cold start	-148 dBm	-148 dBm	-148 dBm	-148 dBm	-148 dBm
	Hot start	-159 dBm	-159 dBm	-159 dBm	-159 dBm	-159 dBm
Position accuracy	PVT	2.0 m CEP	2.0 m CEP	2.0 m CEP	2.0 m CEP	2.0 m CEP

Table 1: NEO-M9N-00B typical performance in multi-constellation GNSS modes

1 Assuming Airborne 4 g platform

2 50% at 30 m/s for dynamic operation

3 Commanded starts. All satellites at -130 dBm. GPS always in combination with QZSS and SBAS. Measured at room temperature.

4 Dependent on the speed and latency of the aiding data connection, commanded starts.

5 Demonstrated with a good external LNA. Measured at room temperature.

GNSS		GPS	GLONASS	BEIDOU	GALILEO
Acquisition[3]	Cold start	29 s	27 s	32 s	42 s
	Hot start	2 s	2 s	2 s	2 s
	Aided start[4]	2 s	2 s	2 s	5 s
Max navigation update rate	PVT	25 Hz	25 Hz	25 Hz	25 Hz
Sensitivity[5]	Tracking and nav.	-166 dBm	-166 dBm	-160 dBm	-159 dBm
	Reacquisition	-160 dBm	-156 dBm	-158 dBm	-154 dBm
	Cold start	-148 dBm	-145 dBm	-145 dBm	-140 dBm
	Hot start	-159 dBm	-156 dBm	-159 dBm	-154 dBm
Position accuracy	PVT	2.0 m CEP	4.0 m CEP	3.0 m CEP	3.0 m CEP

Table 2: NEO-M9N-00B typical performance in single-GNSS modes

1.3 Supported GNSS constellations

NEO-M9N-00B is a concurrent GNSS receiver which can receive and track multiple GNSS systems. The NEO-M9N-00B receiver can be configured for concurrent GPS, GLONASS, Galileo and BeiDou plus SBAS and QZSS reception. If power consumption is a key factor, then the receiver can be configured for a subset of GNSS constellations.

Supported GNSS systems and their signals are:

GPS / QZSS	GLONASS	Galileo	BeiDou
L1C/A (1575.42 MHz)	L1OF (1602 MHz + k*562.5 kHz, k = –7,..., 5, 6)	E1-B/C (1575.42 MHz)	B1I (1561.098 MHz)

Table 3: Supported GNSS systems and signals

The following GNSS assistance services can be activated:

AssistNow™ Live Orbits	AssistNow™ Predictive Orbits	AssistNow™ Autonomous
Supported	Supported	Supported[6]

Table 4: Supported assisted GNSS (A-GNSS) services

NEO-M9N-00B supports the following augmentation systems:

SBAS	QZSS	IMES	Differential GNSS
EGNOS, GAGAN, MSAS and WAAS supported	L1S supported	Not supported	RTCM 3.3

Table 5: Supported augmentation systems

☞ The SBAS and QZSS augmentation systems can be enabled only if GPS operation is also enabled.

1.4 Supported protocols

NEO-M9N-00B supports the following protocols:

Protocol	Type
UBX	Input/output, binary, u-blox proprietary
NMEA 4.10 (default), 4.0, 2.3, and 2.1	Input/output, ASCII
RTCM 3.3	Input, binary

Table 6: Supported protocols

6 AssistNow Autonomous is enabled by default.

For specification of the protocols, see the Interface description [1].

1.5 Firmware features

Feature	Description
Assisted GNSS	AssistNow Live Orbits, AssistNow Predictive Orbits and AssistNow Autonomous supported
Backup modes	Hardware backup mode, software backup mode
Data batching	Autonomous tracking up to 5 min.
Data-logger	Position, velocity, time, and odometer data
Geofencing	Up to 4 circular areas
Power save modes	On/off, cyclic
Odometer	Measure traveled distance with support for different user profiles
Upgradeable firmware	Firmware in flash memory can be upgraded

Table 7: Firmware features

Feature	Description
Anti-jamming	RF interference and jamming detection and reporting; Active GNSS in-band filtering
Anti-spoofing	Spoofing detection and reporting
Configuration lockdown	Receiver configuration can be locked by command
Message integrity	All messages signed with SHA-256
Secure boot	Only signed FW images executed
JTAG debug port	Locked by default

Table 8: Security features

2 System description

2.1 Block diagram

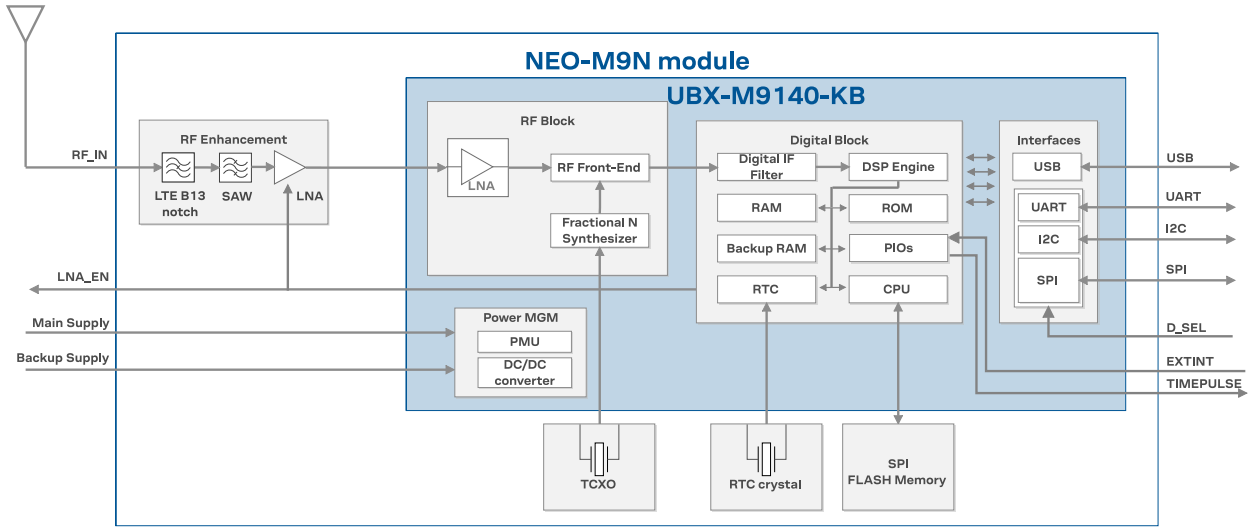


Figure 1: NEO-M9N-00B block diagram

3 Pin definition

3.1 Pin assignment

The pin assignment of the NEO-M9N-00B module is shown in Figure 2. The defined configuration of the PIOs is listed in Table 9.

For detailed information on pin functions and characteristics, see the integration manual [3].

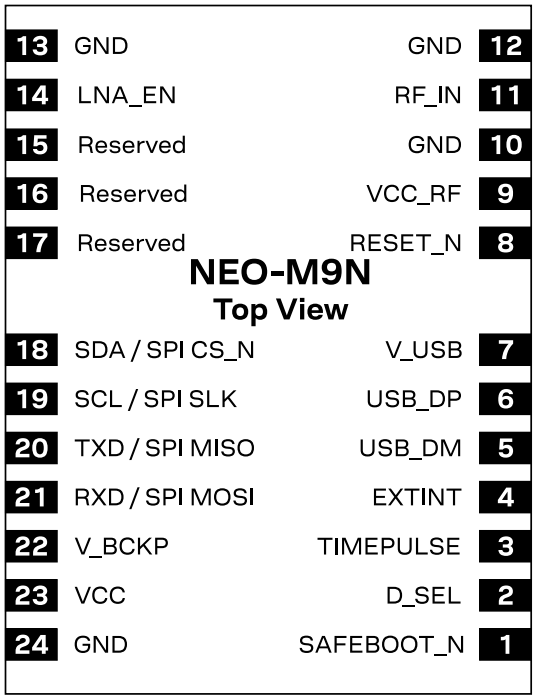


Figure 2: NEO-M9N-00B pin assignment

Pin no.	Name	I/O	Description
1	SAFEBOOT_N	I	SAFEBOOT_N (used for FW updates and reconfiguration, leave open)
2	D_SEL	I	Interface select (open or VCC = UART + I2C; GND = SPI)
3	TIMEPULSE	O	TIMEPULSE (1 PPS)
4	EXTINT	I	EXTINT (PIO 7)
5	USB_DM	I/O	USB data (DM)
6	USB_DP	I/O	USB data (DP)
7	V_USB	I	USB supply
8	RESET_N	I	RESET (active low)
9	VCC_RF	O	Voltage for external LNA
10	GND	I	Ground
11	RF_IN	I	GNSS signal input
12	GND	I	Ground
13	GND	I	Ground
14	LNA_EN	O	Antenna/LNA control
15	Reserved	-	Reserved
16	Reserved	-	Reserved

Pin no.	Name	I/O	Description
17	Reserved	-	Reserved
18	SDA / SPI CS_N	I/O	I2C data if D_SEL = VCC (or open); SPI chip select if D_SEL = GND
19	SCL / SPI SLK	I/O	I2C clock if D_SEL = VCC (or open); SPI clock if D_SEL = GND
20	TXD / SPI SDO	O	UART output if D_SEL = VCC (or open); SPI SDO if D_SEL = GND
21	RXD / SPI SDI	I	UART input if D_SEL = VCC (or open); SPI SDI if D_SEL = GND
22	V_BCKP	I	Backup voltage supply
23	VCC	I	Supply voltage
24	GND	I	Ground

Table 9: NEO-M9N-00B pin assignment

☞ For detailed information on the pin functions and characteristics see the Integration manual [3].

4 Electrical specifications

☞ For detailed information on the device integration, see the Integration manual [3].

4.1 Absolute maximum ratings

⚠ CAUTION. Risk of device damage. Exceeding the absolute maximum ratings may affect the lifetime and reliability of the device or permanently damage it. Do not exceed the absolute maximum ratings.

⚠ This product is not protected against overvoltage or reversed voltages. Use appropriate protection to avoid device damage from voltage spikes exceeding the specified boundaries.

Parameter	Symbol	Condition	Min	Max	Units
Power supply voltage	VCC		–0.5	3.6	V
Voltage ramp on VCC[7]			20	8000	µs/V
Backup battery voltage	V_BCKP		–0.5	3.6	V
Input pin voltage	Vin	VCC ≤ 3.1 V	–0.5	VCC + 0.5	V
		VCC > 3.1 V	–0.5	3.6	V
VCC_RF output current	ICC_RF			200	mA
Supply voltage USB	V_USB		–0.5	3.6	V
USB signals	USB_DM, USB_DP		–0.5	V_USB + 0.5	V
Input power at RF_IN	Prfin	Source impedance = 50 Ω, continuous wave		13[8]	dBm
Storage temperature	Tstg		–40	+85	°C

Table 10: Absolute maximum ratings

4.2 Operating conditions

☞ Extreme operating temperatures can significantly impact the specified values. If an application operates near the min or max temperature limits, ensure the specified values are not exceeded.

Parameter	Symbol	Min	Typical	Max	Units	Condition
Power supply voltage	VCC	2.7	3.0	3.6	V	
Supply voltage for USB interface	V_USB	3.0		3.6	V	
V_USB current	I_USB		2.0		mA	
Backup battery voltage	V_BCKP	1.65		3.6	V	
Backup battery current[9, 10]	I_BCKP		45		µA	V_BCKP = 3 V, VCC = 0 V
SW backup current[10]	I_SWBCKP		0.36		mA	
Input pin voltage range	Vin	0		VCC	V	
Digital IO pin low level input voltage	Vil			0.4	V	
Digital IO pin high level input voltage	Vih	0.8 * VCC			V	

7 Exceeding the ramp speed may permanently damage the device

8 +13 dBm for outband; 0 dBm for inband

9 To measure the I_BCKP, the receiver should first be switched on, i.e. VCC and V_BCKP is available. Then set VCC to 0 V while the V_BCKP remains available. Afterward, measure the current consumption at the V_BCKP.

10 The value has been characterized at 25 °C ambient temperature.

Parameter	Symbol	Min	Typical	Max	Units	Condition
Digital IO pin low level output voltage	Vol			0.4	V	Iol = 2 mA[11]
Digital IO pin high level output voltage	Voh	VCC – 0.4			V	Ioh = 2 mA[11]
DC current through any digital I/O pin (except supplies)	Ipin			5	mA	
Pull-up resistance for SCL, SDA	R_{pu}	7	15	30	kΩ	
Pull-up resistance for D_SEL, RXD, TXD, SAFEBOOT_N, EXTINT	R_{pu}	30	75	130	kΩ	
Pull-up resistance for RESET_N	R_{pu}	7	10	13	kΩ	
Voltage at USB pins	V_USBIO	0		V_USB	V	
VCC_RF voltage	VCC_RF		VCC – 0.1		V	
VCC_RF output current	ICC_RF			50	mA	
Input impedance at RF_IN	Z_{in}		50		Ω	
Receiver chain noise figure[12]	NFtot		3.5		dB	
External gain (at RF_IN)	Ext_gain			30	dB	
Operating temperature	Topr	–40	+25	+85	°C	

Table 11: Operating conditions

4.3 Indicative power requirements

Table 12 provides examples of typical current requirements when using a cold start command. The given values are total system supply current for a possible application including RF and baseband sections.

All values in Table 12 have been measured at 25 °C ambient temperature. SBAS and QZSS were activated in all measurements.

☞ The actual power requirements vary depending on the FW version used, external circuitry, number of satellites tracked, signal strength, type and time of start, duration, and conditions of test.

Symbol	Parameter	Conditions	GPS+GLO+GAL+BDS	GPS+GLO	GPS	Unit
I_{PEAK}	Peak current	Acquisition	100	100	100	mA
I_{VCC}[13, 14]	VCC current	Acquisition	50	43	36	mA
		Tracking (Continuous mode)	36	32	28	mA
		Tracking (Power save mode)[15]	21	20	19	mA

Table 12: Currents to calculate the indicative power requirements

11 TIMEPULSE has 4 mA current drive/sink capability

12 Only valid for GPS

13 Simulated signal, current measured at 3.0 V

14 Navigation update rate 1 Hz

15 Cyclic tracking operation

5 Communications interfaces

NEO-M9N-00B has several communications interfaces[16], including UART, SPI, I2C and USB.

All the inputs have internal pull-up resistors in normal operation and can be left open if not used. All the PIOs are supplied by VCC, therefore all the voltage levels of the PIO pins are related to VCC supply voltage.

5.1 UART

NEO-M9N-00B has one UART interface which supports configurable baud rates. See the Integration manual [3].

Hardware flow control is not supported.

The UART1 is enabled if D_SEL pin of the module is left open or "high".

Symbol	Parameter	Min	Max	Unit
R_u	Baud rate	4800	921600	bit/s
Δ_{Tx}	Tx baud rate accuracy	-1%	+1%	-
Δ_{Rx}	Rx baud rate tolerance	-2.5%	+2.5%	-

Table 13: NEO-M9N-00B UART specifications

5.2 SPI

The SPI interface is disabled by default. The SPI interface shares pins with UART and I2C and can be selected by setting D_SEL = 0. The SPI interface can be operated in peripheral mode only. The maximum transfer rate using SPI is 125 kB/s and the maximum SPI clock frequency is 5.5 MHz.

The SPI timing parameters for peripheral operation are defined in Figure 3. Default SPI configuration is CPOL = 0 and CPHA = 0.

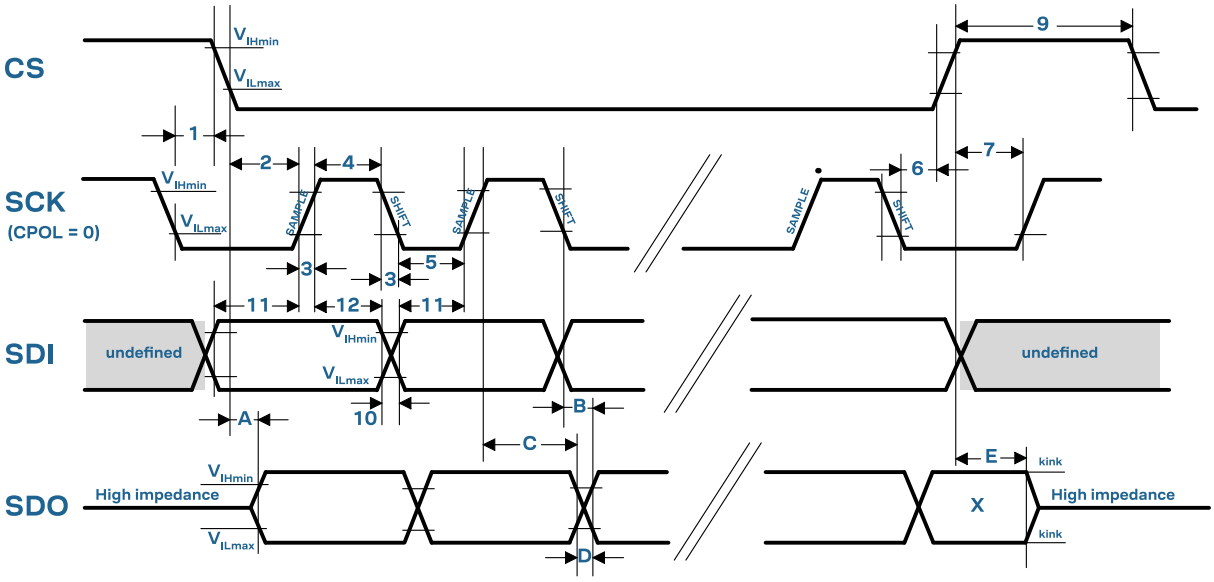


Figure 3: NEO-M9N-00B SPI specification mode 1: CPHA=0 SCK = 5.33 MHz

16 The signal names and related terms have been replaced with new terminology in this document.

Symbol	Parameter	Min	Max	Unit
1	CS deassertion hold time	23	-	ns
2	Chip select time (CS to SCK)	20	-	ns
3	SCK rise/fall time	-	7	ns
4	SCK high time	24	-	ns
5	SCK low time	24	-	ns
6	Chip deselect time (SCK falling to CS)	30	-	ns
7	Chip deselect time (CS to SCK)	30	-	ns
9	CS high time	32	-	ns
10	SDI transition time	-	7	ns
11	SDI setup time	16	-	ns
12	SDI hold time	24	-	ns

Table 14: SPI peripheral input timing parameters 1 - 12

Symbol	Parameter	Min	Max	Unit
A	SDO data valid time (CS)	12	40	ns
B	SDO data valid time (SCK), weak driver mode	15	40	ns
C	SDO data hold time	100	140	ns
D	SDO rise/fall time, weak driver mode	0	5	ns
E	SDO data disable lag time	15	35	ns

Table 15: SPI peripheral timing parameters A - E, 2 pF load capacitance

Symbol	Parameter	Min	Max	Unit
A	SDO data valid time (CS)	16	55	ns
B	SDO data valid time (SCK), weak driver mode	20	55	ns
C	SDO data hold time	100	150	ns
D	SDO rise/fall time, weak driver mode	3	20	ns
E	SDO data disable lag time	15	35	ns

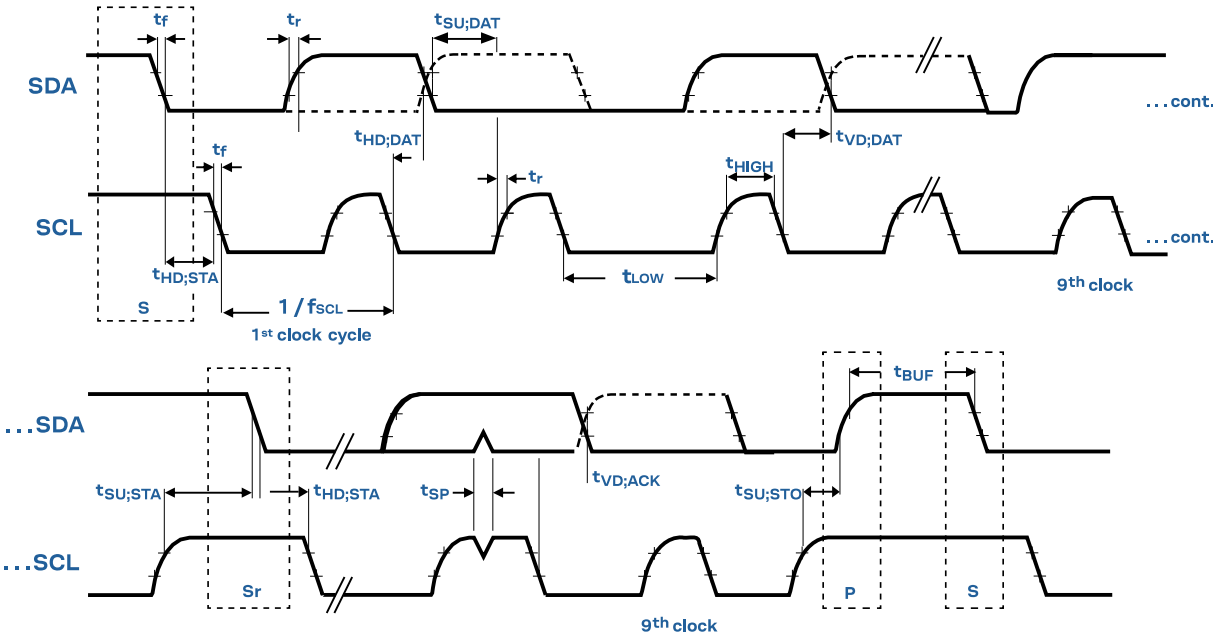
Table 16: SPI peripheral timing parameters A - E, 20 pF load capacitance

Symbol	Parameter	Min	Max	Unit
A	SDO data valid time (CS)	26	85	ns
B	SDO data valid time (SCK), weak driver mode	30	85	ns
C	SDO data hold time	110	160	ns
D	SDO rise/fall time, weak driver mode	13	45	ns
E	SDO data disable lag time	15	35	ns

Table 17: SPI peripheral timing parameters A - E, 60 pF load capacitance

5.3 I2C

An I2C interface is available for communication with an external host CPU in I2C Fast-mode. Backwards compatibility with Standard-mode I2C bus operation is not supported. The interface can be operated only in peripheral mode with a maximum bit rate of 400 kbit/s. The interface can make use of clock stretching by holding the SCL line LOW to pause a transaction. In this case, the bit transfer rate is reduced. The maximum clock stretching time is 20 ms.



$V_{IL} = 0.3\ V_{DD}$
$V_{IH} = 0.7\ V_{DD}$

Figure 4: NEO-M9N-00B I2C peripheral specification

		I2C Fast-mode		
Symbol	**Parameter**	**Min**	**Max**	**Unit**
f_{SCL}	SCL clock frequency	0	400	kHz
$t_{HD;STA}$	Hold time (repeated) START condition	0.6	-	µs
t_{LOW}	Low period of the SCL clock	1.3	-	µs
t_{HIGH}	High period of the SCL clock	0.6	-	µs
$t_{SU;STA}$	Setup time for a repeated START condition	0.6	-	µs
$t_{HD;DAT}$	Data hold time	0 [17]	- [18]	µs
$t_{SU;DAT}$	Data setup time	100 [19]		ns
t_r	Rise time of both SDA and SCL signals	-	300 (for C = 400pF)	ns
t_f	Fall time of both SDA and SCL signals	-	300 (for C = 400pF)	ns
$t_{SU;STO}$	Setup time for STOP condition	0.6	-	µs
t_{BUF}	Bus-free time between a STOP and START condition	1.3	-	µs
$t_{VD;DAT}$	Data valid time	-	0.9 [18]	µs
$t_{VD;ACK}$	Data valid acknowledge time	-	0.9 [18]	µs
V_{nL}	Noise margin at the low level	0.1 VCC	-	V

17 External device must provide a hold time of at least one transition time (max 300 ns) for the SDA signal (with respect to the min Vih of the SCL signal) to bridge the undefined region of the falling edge of SCL.

18 The maximum $t_{HD;DAT}$ must be less than the maximum $t_{VD;DAT}$ or $t_{VD;ACK}$ with a maximum of 0.9 µs by a transition time. This maximum must only be met if the device does not stretch the LOW period (tLOW) of the SCL signal. If the clock stretches the SCL, the data must be valid by the set-up time before it releases the clock.

19 When the I2C peripheral is stretching the clock, the $t_{SU;DAT}$ of the first bit of the next byte is 62.5 ns.

		I2C Fast-mode		
Symbol	**Parameter**	**Min**	**Max**	**Unit**
V_{nH}	Noise margin at the high level	0.2 VCC	-	V

Table 18: NEO-M9N-00B I2C peripheral timings and specifications

☞ The I2C interface is only available with the UART default mode. If the SPI interface is selected by using D_SEL = 0, the I2C interface is not available.

5.4 USB

The USB 2.0 FS (full speed, 12 Mbit/s) interface can be used for host communication. Due to the hardware implementation, it may not be possible to certify the USB interface. The V_USB pin supplies the USB interface.

5.5 Default interface settings

Interface	Settings
UART	38400 baud, 8 bits, no parity bit, 1 stop bit. Output messages: NMEA **GGA, GLL, GSA, GSV, RMC, VTG, TXT** (no UBX). Input protocols: UBX, NMEA and RTCM 3.3.
USB	Output messages activated as in UART. Input protocols available as in UART.
I2C	Output messages activated as in UART. Input protocols available as in UART.
SPI	Output messages activated as in UART. Input protocols available as in UART.

Table 19: Default interface settings

☞ Refer to the applicable Interface description [1] for information about further settings.

By default NEO-M9N-00B outputs NMEA messages that include satellite data for all GNSS bands being received. This results in a higher-than-before NMEA load output for each navigation period. Make sure the UART baud rate being used is sufficient for the selected navigation rate and the number of GNSS signals being received.

6 Mechanical specifications

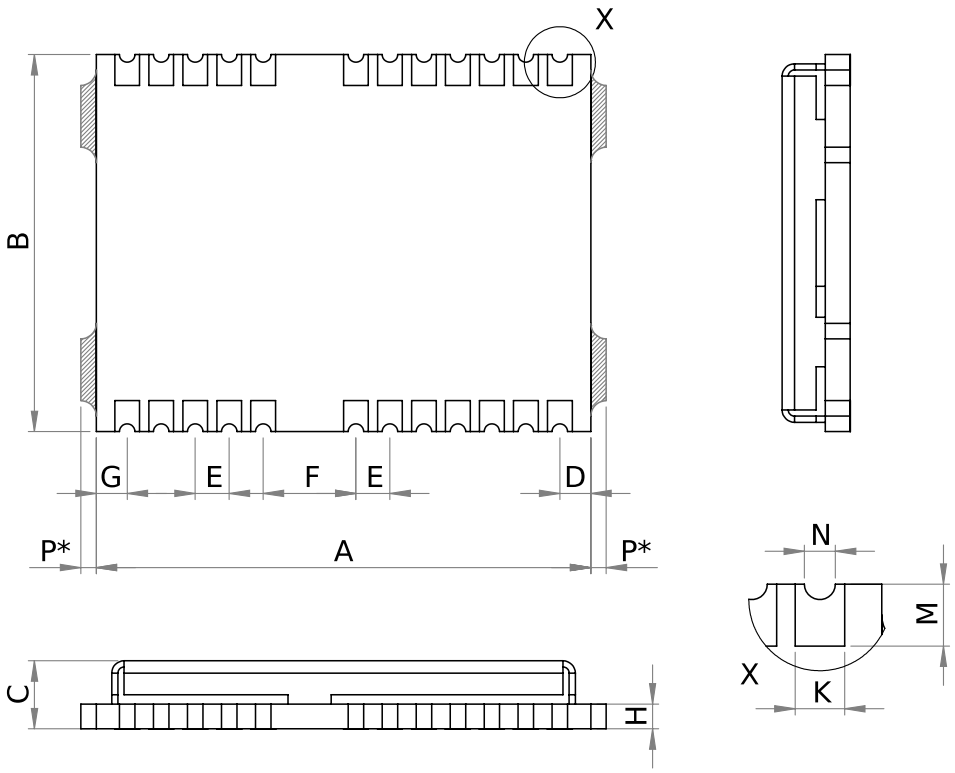


Figure 5: NEO-M9N-00B mechanical drawing

Symbol	Min (mm)	Typical (mm)	Max (mm)	
A	15.9	16.0	16.1	
B	12.1	12.2	12.3	
C	2.2	2.4	2.6	
D	0.9	1.0	1.1	
E	1.0	1.1	1.2	
F	2.9	3.0	3.1	
G	0.9	1.0	1.1	
H	-	0.82	-	
K	0.7	0.8	0.9	
M	0.8	0.9	1.0	
N	0.4	0.5	0.6	
P*	0.0	-	0.5	The de-paneling residual tabs may be on either side (not both).
Weight		1.0 g		

Table 20: NEO-M9N-00B mechanical dimensions

☞ The mechanical picture of the de-paneling residual tabs (P*) is an approximate representation. The shape and position may vary, but the overall size of the residual tabs remains within the maximum dimensions even when the tab sizes differ.

☞ Take the size of the de-paneling residual tabs into account when designing the component keep-out area.

7 Reliability tests and approvals

NEO-M9N-00B modules are based on AEC-Q100 qualified GNSS chips.

Tests for product family qualifications comply with ISO 16750 "Road vehicles – environmental conditions and testing for electrical and electronic equipment", and appropriate standards.

7.1 Approvals

NEO-M9N-00B complies with the essential requirements and other relevant provisions of the Radio Equipment Directive (RED) 2014/53/EU.

NEO-M9N-00B complies with the Directive 2011/65/EU (EU RoHS 2) and its amendment Directive (EU) 2015/863 (EU RoHS 3).

The Declaration of Conformity (DoC) is available on the u-blox website.

8 Product marking and ordering information

This section provides information about product marking and ordering.

8.1 Product marking

The product marking provides information on NEO-M9N-00B and its revision, as in Figure 6. For a description of the product marking, see Table 21.

The product marking is done by laser etching on the NEO-M9N-00B module metal shield cover.

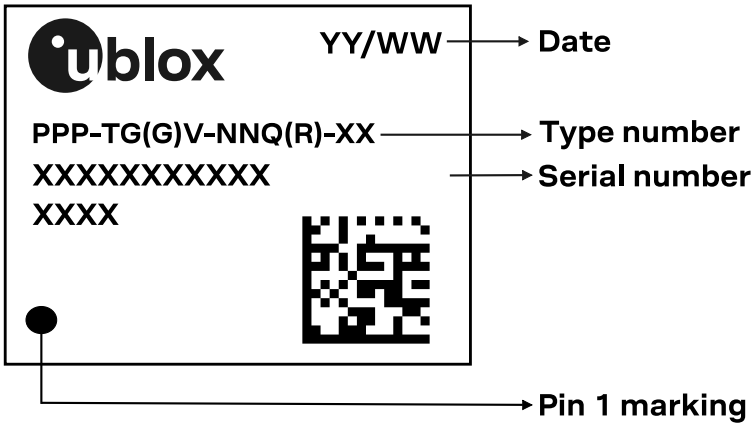


Figure 6: Example of NEO-M9N-00B product marking

Code	Meaning	Example
PPP	Form factor	NEO
TG(G)	Platform	M9 = u-blox M9
V	Variant	N = Standard precision with SAW and LNA
NN	Major product version	00, 01, ..., 99
Q	Product grade	A = Automotive, B = Professional, C= Standard
(R)	Production site	No character = global, 1 = regional variant
XX	Revision	Hardware and firmware revisions
YY/WW or YYWW	Production date	Year/week, e.g. 24/04 or 2404
XXXXXXXXXXX	Serial number	Alphanumeric characters, e.g. BN600001181
Other information	QR code	For internal/technical use.

Table 21: Description of product marking

8.2 Product identifiers

The NEO-M9N-00B label features three product identifiers: product name, ordering code, and type number. The product name identifies all u-blox products. It is used in documentation such as this Data sheet and is independent of packaging and product grade. The ordering code indicates the major product version and product grade, and the type number additionally specifies the hardware and firmware revisions.

Table 22 describes the three different product identifiers used in the NEO-M9N-00B label

Identifier	Format	Example
Product name	PPP-TG(G)V	NEO-M9N-00B

Identifier	Format	Example
Ordering code	PPP-TG(G)V-NNQ	NEO-M9N-00B
Type number	PPP-TG(G)V-NNQ-XX	NEO-M9N-00B-00

Table 22: Product identifiers

8.3 Ordering codes

Ordering code	Product	Remark
NEO-M9N-00B	u-blox NEO-M9N module, professional grade	

Table 23: Product ordering codes

u-blox provides information on product changes affecting the form factor, size or function of the product. For the Product change notifications (PCNs), see our website at https://www.u-blox.com/en/product-resources.

Related documents

[1] u-blox M9 SPG 4.04 Interface description, UBX-21022436
u-blox M9 SPG 4.04 Interface description, UBX-21022437 (NDA required)
[2] u-blox M9 FW 0.00 XXX 0.00X00 Release notes, UBX-20036165
[3] NEO-M9N Integration manual, UBX-19014286
NEO-M9N Integration manual, UBX-19015769 (NDA required)
[4] Product packaging reference guide, UBX-14001652

☞ For regular updates to u-blox documentation and to receive product change notifications please register on our homepage https://www.u-blox.com.

Revision history

Revision	Date	Status / comments
R01	15-Aug-2019	Objective specification
R02	14-Nov-2019	Advance information
R03	24-Jan-2020	Advance information. Added out-band value for Prfin, renamed VDD_USB to V_USB.
R04	11-Sep-2020	Early production information. - Updated firmware to SPG 4.04. - Updated I_BCKP and indicative power consumption values. - Added supported voltage range for V_USB. - Added value for Ext_gain, External gain at RF_IN. - Added digital I/O pin DC current and pull up resistance values. - Clarified UART timing specifications. - Clarified use of USB interface.
R05	09-Jul-2021	Document status replaced by Product status in Document information. - Updated product name to include product option and quality grade - Updated GLONASS tracking sensitivity - Updated supported GNSS constellations: QZSS L1C/A support now listed - Updated QZSS augmentation service name - Updated Absolute maximum ratings: supply voltage ramp requirements
R06	14-Dec-22	Updated section Mechanical specification
R07	27-Mar-2023	Updated sections - Document information: updated IN/PCN reference - Absolute maximum ratings: updated maximum VCC_RF output current - DC electrical characteristics: updated TIMEPULSE drive strength - Indicative power requirements: current measured at 1 Hz navigation update rate, updated hardware backup mode current - SPI: updated timing specification - I2C: updated timing specification
R08	09-Oct-2025	Updated sections - Updated module weight in table Mechanical specifications - Updated section Product marking

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