LEA-M8F

Standard | Professional | Automotive

POSITIONING

u-blox M8 time & frequency reference GNSS module

Highlights

- Concurrent reception of GPS/QZSS, GLONASS, BeiDou
- Integral disciplined low phase-noise 30.72 MHz system reference oscillator
- Accurate measurement and control of external oscillators
- Industry leading acquisition sensitivity and single-satellite timing
- Autonomous 100 ppb hold-over
- Prepared for integration with external PTP, Sync-E and network listen

LEA-M8F:
17.0 x 22.4 x 3.5 mm

Product description

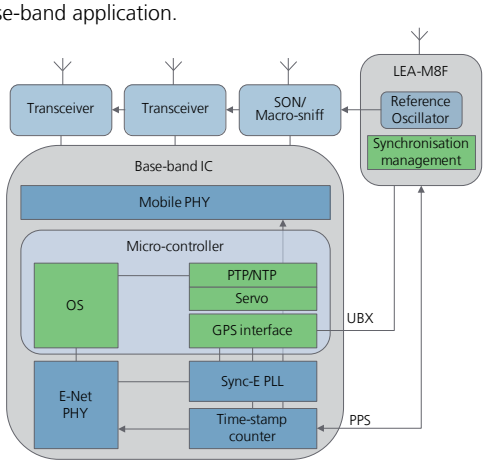
u-blox time and frequency products provide multi-GNSS synchronisation for cost-sensitive network edge equipment including Small Cell and Femto wireless base-stations. The LEA-M8F module is a fully self-contained phase and frequency reference based on GNSS, but can also be used as part of a complete timing sub-system including macro-sniff Synchronous Ethernet and packet timing.

The LEA-M8F module includes a low-noise 30.72 MHz VCTCXO meeting the master reference requirements for LTE Small Cells and provides 100 ppb autonomous hold-over. The LEA-M8F module can also measure and control an external TCXO or OCXO for TD-LTE, LTE Advanced and other applications requiring extended hold-over. External sources of synchronization are supported through time-pulse and frequency inputs and a message interface. This allows measurements from macro-sniff, Sync-E or packet timing to be combined with measurements from GNSS.

u-blox time and frequency products include timing integrity alarms that report phase and frequency uncertainty both during normal operation and hold-over. They feature a high dynamic range radio with both analog and digital interference mitigation supporting their inclusion as an integral part of a local area base station design.

Example application (Small Cell)

In a wireless Small Cell application, the LEA-M8F can distribute a disciplined low-phase noise 30.72 MHz reference signal directly to the RF transceivers. GNSS synchronisation is combined with network sources by an exchange of synchronisation signals, status and control messages with the base-band processor. Source selection and hold-over may be controlled by either the LEA-M8F or base-band application.



Product selector

Model	Type								Supply		Interfaces				Features											Grade		
	GPS / QZSS	GLONASS	Galileo	BeiDou	Timing	Dead Reckoning	Precise Point Positioning	Raw Data	3.0 V – 3.6 V	Lowest power DC/DC	UART	USB	SPI	DDC (I2C compliant)	Programmable (Flash)	Data logger	Additional SAW	Additional LNA	RTC crystal	Internal oscillator	Active antenna / LNA supply	Active antenna / LNA control	Antenna short circuit detection / protection pin	Antenna open circuit detection pin	Frequency output	Standard	Professional	Automotive
LEA-M8F	•	•	R	•	•				•	•	•	D	•	•	•		•	•		V	•		P		•		■	

P = Short circuit protection only
R = Galileo ready
V = VCTCXO

D = Development use

Features – GNSS

Receiver type	72-channel u-blox M8 engine GPS/QZSS L1 C/A, GLONASS L10F, BeiDou B1 SBAS L1 C/A: WAAS, EGNOS, MSAS Galileo-ready E1B/C (subject to firmware upgrade)		
		GPS	**GLONASS**
Accuracy		2.5 m CEP	4.0 m CEP
Acquisition	Cold starts:	26 s	30 s
	Aided cold starts:	2 s	8 s
Sensitivity	Tracking:	–165 dBm	–165 dBm
	Cold start (aided):	–157 dBm	–148 dBm
	(autonomous):	–148 dBm	–145 dBm
	Reacquisition:	–160 dBm	–157 dBm
Assistance GNSS	AssistNow Online OMA SUPL & 3GPP compliant interface		
Internal oscillator	VCTCXO		
Noise figure	On-chip LNA; Extra LNA for lowest noise figure		
Anti jamming	Active CW detection and removal; Extra onboard SAW band pass filter		
Supported antennas	Active and passive		
Internal SQI Flash	For firmware update		

Features – synchronization

Frequency output:	30.72 MHz disciplined	
Phase noise:	10 Hz: –90 dBc/Hz 100 Hz: –120 dBc/Hz 1 kHz: –130 dBc/Hz	10 kHz: –143 dBc/Hz 100 kHz: –145 dBc/Hz 1 MHz: –149 dBc/Hz
Jitter (100 Hz - 1 MHz):	0.15 ps	
EVM (100 Hz - 1 MHz @ 2100 MHz):	< 0.2%	
Frequency control (internal oscillator)	GNSS locked:	5 ppb
	Hold-over:	100 ppb, 24 hr
Frequency control (external oscillator)	Resolution:	< 5 ppb
	Frequencies:	10, 13, 19.2, 20, 26, 30.72, 40 MHz
	Hold-over:	Determined by external oscillator
Phase control	Clear sky:	< 20 ns
	Indoor:	< 500 ns typ.
Time-pulse input	Resolution:	< 50 ns
Time-pulse output	Jitter:	< 2 ns
Time-pulse frequency:	0.5 Hz to 2 Hz	

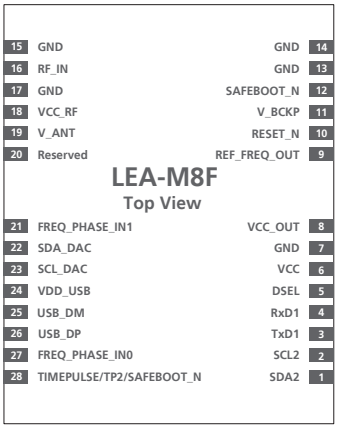
Electrical data

Supply voltage	3.0 V to 3.6 V
Power Consumption	41 mA @ 3.3 V

Package

28 pin LCC (Leadless Chip Carrier): 17.0 x 22.4 x 3.5 mm, 2.0 g

Pinout



Environmental data, quality & reliability

Operating temp: –40° C to 85° C

RoHS compliant (lead-free)

Qualification according to ISO 16750

Manufactured in ISO/TS 16949 certified production sites

Interfaces

Serial interfaces	SPI or UART and DDC (I²C compliant) USB v2.0 full speed (ext. voltage regulator)
Protocols	NMEA, UBX binary, RTCM
Timing interfaces	Timepulse output 2x timepulse/frequency inputs

Support products

u-blox M8 Evaluation kits:

Evaluation kit to get familiar with u-blox M8 positioning technology, evaluate functionality, and visualize GNSS performance.

EVK-M8F:	u-blox M8 Time & Frequency Reference Evaluation Kit, supports LEA-M8F

Product variants

LEA-M8F	u-blox M8 Time & Frequency Reference module, Flash, VCTCXO, dual SAW, LNA

Further information

For contact information, see www.u-blox.com/contact-us.

For more product details and ordering information, see the product data sheet.