LEA-M8F

u-blox M8 time & frequency reference GNSS module

Highlights

- Reception of GPS, QZSS, GLONASS, BeiDou
- Integral low phase-noise 30.72 MHz system reference oscillator disciplined by GNSS
- Accurate measurement and control of external oscillators
- High sensitivity acquisition and single-satellite timing
- Automatic hold-over
- Prepared for integration with external PTP, Sync-E and network listen

LEA-M8F:
17.0 x 22.4 x 3.6 mm

Product description

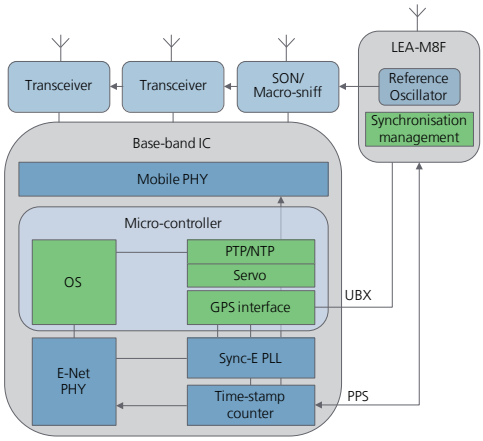
u-blox time and frequency products provide multi-GNSS synchronisation for cost-sensitive network edge equipment including Small Cell and Femto wireless base-stations. The LEA-M8F module is a fully self-contained phase and frequency reference based on GNSS, but can also be used as part of a complete timing 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 providing 100 ppb autonomous hold-over. An external TCXO or OCXO can also be measured and controlled 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											
	GPS / QZSS	GLONASS	Galileo	BeiDou	Timing & Frequency	Dead Reckoning	Precise Point Positioning	3.0 V – 3.6 V	Lowest power DC/DC	UART	USB	SPI	DDC (I2C compliant)	Programmable (Flash)	Data logger	Extra front-end LNA	Front-end SAW filter	RTC crystal	Internal oscillator	Antenna supply	Antenna short circuit detection / protection	Antenna open circuit detection pin	Timepulse output	External interrupt / Wakeup
LEA-M8F	•	•	R	•	•			•	•	•		o	•	•		•	•		V	•	P		•	•

o = Optional, not activated by default or requires external components
R = Galileo ready with future firmware
V = VCTCXO

P = Short circuit protection only

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 (external Flash required)		
		GPS	**GLONASS**
Accuracy		2.5 m CEP	< 4 m CEP
Acquisition	Cold starts:	26 s	30 s
	Hot/Aided starts:	1 s	3 s
Sensitivity	Tracking:	–167 dBm	–158 dBm
	Cold start (aided):	–155 dBm	–138 dBm
	(autonomous):	–148 dBm	–138 dBm
	Reacquisition:	–160 dBm	
Assistance	AssistNow Online OMA SUPL & 3GPP compliant interface		
LNA	Built-In		
Internal oscillator	VCTCXO		
Anti jamming	Active CW detection and removal		
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	10 kHz: –147 dBc/Hz
	100 Hz: –126 dBc/Hz	100 kHz: –153 dBc/Hz
	1 kHz: –140 dBc/Hz	1 MHz: –156 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:	19.2, 20, 26, 30.72 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

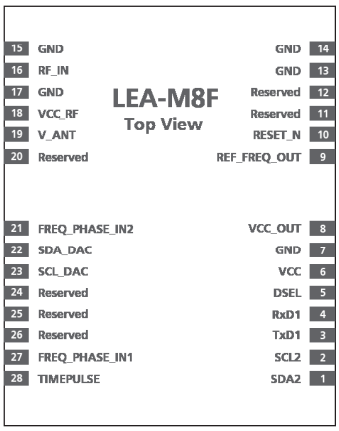
Electrical data

Supply voltage	3.0 V to 3.6 V
Power Consumption	100 mW

Package

28 pin LCC (Leadless Chip Carrier): 17.0 x 22.4 x 3.6 mm

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

Ordering information

LEA-M8F-0	u-blox M8 Time & Frequency module, VCTCXO, 17 x 22.4 mm, 250 pcs/reel

Available as samples and tape on reel

Objective Specification

Contact us

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