






# High precision and dead reckoning GNSS modules



	High precision GNSS and dead reckoning modules					Standard precision GNSS dead reckoning modules		
	NEO-F9P	ZED-F9P	ZED-F9K	ZED-F9H	ZED-F9R	ZED-F9L	NEO-M9V	NEO-M9L
<b>Grade</b>								
Automotive			•			•		•
Professional	•	•		•	•		•	
Standard								
<b>Physical</b>								
Image								
Size [mm]	12.2 x 16.0 x 3.4	17.0 x 22.0 x 2.4			17.0 x 22.0 x 2.4	12.2 x 16.0 x 2.4		
Package & pins	LCC 24	LGA 54			LGA 54	LCC 24		
<b>GNSS</b>								
GPS	•	•	•	•	•	•	•	•
QZSS	•	•	•	•	•	•	•	•
GLONASS	•	•	•	•	•	•	•	•
Galileo	•	•	•	•	•	•	•	•
BeiDou	•	•	•	•	•	•	•	•
NavIC	•	□				•		
Bands	L1/L5	L1/L2/L5	L1/L2/L5	L1/L2	L1/L2	L1/L5	L1	L1
<b>Interfaces</b>								
UART	2	2	2	2	2	2	1	2
USB	1	1	1	1	1	1	1	1
SPI	1	1	1	1	1	1	1	1
DDC (I2C compliant)	1	1	1	1	1	1	1	1
<b>Features</b>								
Programmable (flash)	•	•	•	•	•	•	•	•
Data logging	•	•		•			•	
Carrier phase output	•	•	□		•			□
Data batching							•	•
Additional SAW	•	•	•	•	•	•	•	•
Additional LNA	•						•	
RTC crystal	•	•	•	•	•	•	•	•
Oscillator	T	T	T	T	T	T	T	T
RTK rover	•	•	•		•			
RTK base station	•	•						
Moving base		•						
Survey-in & fixed mode	•	•						
Built-in sensor			•		•	•	•	•
Time pulse output	1	1	1	1	1	2	1	1
Built-in antenna supply and supervisor	S	S	S	S	S	S	S	S
<b>Power supply</b>								
2.7 V – 3.6 V	•	•	•	•	•	•	•	•

□ = In some product versions

S = Supported, may require ext. components

C/T = Crystal and TCXO supported  
C = Crystal, T = TCXO

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# Timing modules and GNSS correction modules



	Timing modules							Correction modules	
	RCB-F9T	ZED-F9T	LEA-F9T	LEA-M8F	LEA-M8T	NEO-M8T	NEO-F10T	NEO-D9C	NEO-D9S
<b>Grade</b>									
Automotive								•	•
Professional		•	•	•	•	•	•	•	•
Standard	•								
<b>Physical</b>									

Image



Size [mm]	31.7 x 67.2	17.0 x 22.0 x 2.4	17.0 x 22.4 x 2.4	17.0 x 22.4 x 3.5	17.0 x 22.4 x 2.4	12.2 x 16.0 x 2.4			
Package & pins	8 pins	LGA 54	LCC 28			LCC 24			
<b>GNSS</b>									
GPS	•	•	•	•	•	•	•	•	•
QZSS	•	•	•	•	•	•	•	•	•
GLONASS	•	•	•	•	•	•	•	•	•
Galileo	•	•	•	•	•	•	•	•	•
BeiDou	•	•	•	•	•	•	•	•	•
NavIC	□	□	•				•		
Bands	L1/L2/L5		L1/L2/L5	L1	L1	L1	L1/L5	L6	L
<b>Interfaces</b>									
UART	1	2	1	1	1	1	1	2	2
USB		1	1	1	1	1		1	1
SPI		1	1	1	1	1		1	1
DDC (I2C compliant)		1	1	1	1	1		1	1
<b>Features</b>									
Programmable (flash)	•	•	•	•	•	•	•	•	•
Carrier phase output	•	•	•	•	•	•	•	•	•
Additional SAW	•	•	•	•	•	•	•	•	•
Additional LNA			•	•		•			
RTC crystal	•	•	•	•	•	•	•	•	•
Oscillator	T	T	T	V	T	T	T	T	T
Survey-in & fixed mode	•	•	•	•	•	•	•	•	•
Time pulse output	2	2	2	1	2	2	1		
Time mark input		2	2	2	2	2	1		
Frequency output				•					
<b>Power supply</b>									
2.7 V – 3.6 V	•	•	•		•	•	•	•	•
3.0 V – 3.6 V				•					

□ = In some product versions

T = TCXO

V = VCTCXO

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# Standard precision GNSS modules



	Standard precision GNSS SiP modules					Standard precision GNSS modules		
	MIA-F10Q	MIA-M10Q	MIA-M10C	EVA-M8M	EVA-M8Q	MAX-F10S	MAX-M10S	MAX-M10M
<b>Grade</b>								
Automotive								
Professional	•	•	•	•	•	•	•	•
Standard								
<b>Physical</b>								
Image								
Size [mm]	4.5 x 4.5 x 1.0			7.0 x 7.0 x 1.1		9.7 x 10.1 x 2.5		
Package & pins	S-LGA 53			LGA 43		LCC 18		
<b>GNSS</b>								
GPS	•	•	•	•	•	•	•	•
QZSS	•	•	•	•	•	•	•	•
GLONASS		•	•	•	•		•	•
Galileo	•	•	•	•	•	•	•	•
BeiDou	•	•	•	•	•	•	•	•
NavIC	•					•		
Bands	L1/L5	L1	L1	L1	L1	L1/L5	L1	L1
<b>Interfaces</b>								
UART	1	1	1	1	1	1	1	1
USB				1	1			
SPI				1	1			
DDC (I2C compliant)	1	1	1	1	1	1	1	1
<b>Features</b>								
Programmable (flash)				E	E			
Data logging				E	E			
Data batching	•	•	•			•	•	•
Additional SAW	•	•				•	•	
Additional LNA	•	•				•	•	
RTC crystal	•	•	•	o	o	•	•	•
Oscillator	T	T	C	C	T	T	T	C
Time pulse output	1	1	1	1	1	1	1	1
<b>Power supply</b>								
1.3 V – 1.98 V			•					
1.76 V – 3.6 V	•	•				•	•	
1.8 V – 5.5 V								•
1.65 V – 3.6 V				•				
2.7 V – 3.6 V					•			

o = Optional, or requires external components






E = External flash required

C = Crystal, T = TCXO

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# Standard precision GNSS modules



	Standard precision GNSS modules					Standard precision GNSS antenna modules	
	NEO-F10N	NEO-M9N	NEO-M8J	NEO-M8M	NEO-M8Q-01A	CAM-M8Q	SAM-M10Q
<b>Grade</b>							
Automotive					*		
Professional	•	•	•	•		•	•
Standard							
<b>Physical</b>							
Image							
Size [mm]	12.2 × 16.0 × 2.4					9.6 × 14 × 1.95	15.5 × 15.5 × 6.3
Package & pins	LCC 24					LCC 31	LGA 20
<b>GNSS</b>							
GPS	•	•	•	•	•	•	•
QZSS	•	•	•	•	•	•	•
GLONASS		•	•	•	•	•	•
Galileo	•	•	•	•	•	•	•
BeiDou	•	•	•	•	•	•	•
NavIC	•						
Bands	L1/L5	L1	L1	L1	L1	L1	L1
<b>Interfaces</b>							
UART	1	1	1	1	1	1	1
USB		1	1	1	1		
SPI		1	1	1	1	1	
DDC (I2C compliant)		1	1	1	1	1	1
<b>Features</b>							
Programmable (flash)	•	•	•				
Data logging		•	•				
Data batching		•					•
Additional SAW	•	•	•			•	•
Additional LNA	•	•	•			•	•
RTC crystal	•	•	•	•	•	◆	•
Oscillator	T	T	C	C	T	T	T
Time pulse output	1	1	1	1	1	1	1
Built-in antenna						•	•
<b>Power supply</b>							
1.65 V – 3.6 V				•			
2.7 V – 3.6 V	•	•	•		•	•	•

◆ = Yes, but with higher backup current

\* = Operating temperature -40 °C to +105 °C

C = Crystal, T = TCXO

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	Functional safe chip	Dead reckoning / high precision GNSS chips				Standard precision GNSS chips				
	UBX-A9940-KA	UBX-F9940-KA-DR	UBX-F9140-KA-DR	UBX-M9140-KA-DR	UBX-M9340-KB	UBX-F10150-KB	UBX-F10050-KB	UBX-M10050-KB	UBX-M9140-KA	UBX-M9140-KB
<b>Grade</b>										
Automotive	*	*	*	*					*	
Professional					•	•	•	•		•
Standard										
<b>Physical</b>										
Image										
Size [mm]	5.0 x 5.0 x 0.59	5.0 x 5.0 x 0.59				5.0 x 5.0 x 0.55	4.0 x 4.0 x 0.55		5.0 x 5.0 x 0.59	
Package & pins	QFN40	QFN40				QFN28		QFN40		
<b>GNSS</b>										
GPS	•	•	•	•	•	•	•	•	•	•
QZSS		•	•	•	•	•	•	•	•	•
GLONASS		•	•	•	•			•	•	•
Galileo	•	•	•	•	•	•	•	•	•	•
BeiDou	•	•	•	•	•	•	•	•	•	•
NavIC			•			•	•			
Bands	L1/L2/L5	L1/L2/L5	L1/L5	L1	L1	L1/L5	L1/L5	L1	L1	L1
<b>Interfaces</b>										
UART		2	2	1	2	1	1	1	2	2
USB		1	1	1	1				1	1
SPI	1	1	1	1	1	1	1	1	1	1
DDC (I2C compliant)		2	1	1	1	1	1	1	1	1
<b>Features</b>										
Dual output		•	•	•						
Programmable (flash)		E	E	E	E	E			E	E
Data logging									S	S
Data batching						•	•	•	•	•
RTC crystal		S	S	S	S	S	S	S	S	S
Oscillator	T	T	T	T	T	C/T	C/T	C/T	T	T
Antenna supply / supervisor		S		S	S	S	S	S	S	S
RTK rover		•								
Sensor-based spoofing detection		•	•	•						
Time pulse output		2	1	1	2	1	1	1	2	2
Measurement pulse	1									
<b>Power supply</b>										
1 V – 1.8 V						•	•	•		
1.4 V – 3.6 V										
1.65 V – 2.0 V					•					
1.65 V – 3.6 V		•	•							
1.8 V – 3.6 V				•						
2.25 V – 3.6 V									•	•
3.0 V – 3.6 V	•									

\* = Operating temperature -40 °C to +105 °C  
S = Supported, may require ext. components

E = External flash required

C/T = Crystal and TCXO supported  
T = TCXO supported

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	L1 / L2	L1 / L5		All bands
	ANN-MB	ANN-MB1	ANN-MB5	ANN-MB2
<b>Physical</b>				
Image				
Size [mm]	60.0 x 82.0 x 22.5	60.0 x 82.0 x 22.5	46.1 x 49.1 x 15.9	92.9 x 108.5 x 24.7
Cable length [m]	5	5	3	5
<b>Mechanical</b>				
Connector	SMA, SMB, MCX	SMA	SMA	SMA
Mounting	Magnetic base, fixed installation option (screw)	Magnetic base, fixed installation option (screw)	Magnetic base	Magnetic base, fixed installation option (screw)
<b>GNSS</b>				
Frequency [MHz]	1559 - 1606, 1197 - 1249	1559 - 1606, 1164 - 1188	1559 - 1608, 1164 - 1186	1535 - 1602, 1166 - 1285
Bands	L1, L2, E5b, B2I, B2b	L1, L5, E5a, B2a, NavIC	L1, L5, E5a, B2a, NavIC	L, L1, L2, L5, E5, E6, B2, B3, NavIC
<b>Environmental</b>				
Operation temp.	-40 °C to +85 °C	-40 °C to +85 °C	-40 °C to +85 °C	-40 °C to +85 °C
Water proof	IP67	IP67	IPX7	IP67
<b>Compatible products</b>				
Platform	u-blox F9 L1/L2 high precision / dead reckoning / timing	u-blox F9 L1/L5 high precision / dead reckoning / timing	u-blox F10 L1/L5 dual-band standard precision / dead reckoning	u-blox F9 L1/L2, L1/L5 high precision / dead reckoning / timing
Recommended to use with these modules	ZED-F9K ZED-F9H ZED-F9P-0xB ZED-F9R ZED-F9T-00B	NEO-F9P ZED-F9K ZED-F9P-15B ZED-F9T-10B NEO-F10T	MAX-F10S MIA-F10Q NEO-F10N ZED-F9L	ZED-F9K ZED-F9P ZED-F9T LEA-F9T
<b>Power supply</b>				
3.0 V – 5.0 V	•	•	•	•