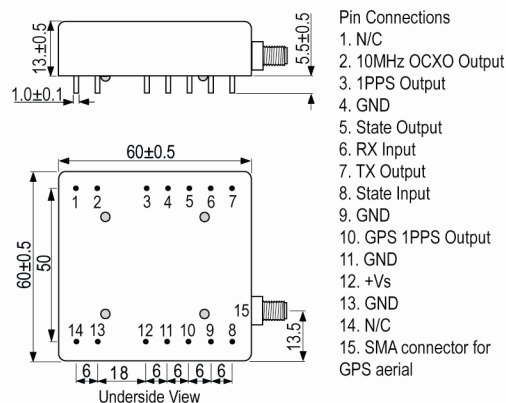




Outline (mm)



### Description

- A GPS disciplined OCXO incorporating GPS receiver unit to give 1PPS and 10MHz output. Holdover stability up to 1.5 $\mu$ s over 24hrs is achieved using an adaptive algorithm. Standard NMEA0183 data is available to the user via a serial port. Frequency stability better than 1E-12.  
Note: Non-GPS GNSS support is available upon request, please contact our Application Support department.
- Working States (Workflow Diagram):  
Run1: Fast track. Adjust the OCXO 10MHz output frequency quickly to track the GPS.  
Run2: Slow track. Adjust the OCXO 10MHz output frequency slowly when phase error is in the defined range.  
Holdover: No GPS input present; an algorithm enables adaptive modelling of the frequency stability of an OCXO with reference to the GPS timing signal.  
Free Run: Clock module powered up with no GPS input.
- NMEA Data Words:  
The following standard GNSS data is available to the user via the interface on Pin 6 and Pin 7: GPRMC, GPVTG, GPGLL, GPZDA. These are broadcast every second in sync with the 1PPS output.
- Note 1: The IQCM-110 should be left powered and running for 7 days minimum before operation to allow for the OCXO's internal drift to stabilise.  
Note 2: The adaptive module algorithm can be built after two days operation with good GPS signal, however this data will be lost at power down.  
Note 3: When State Input (Pin 8) is set low the IQCM-110 will operate in Holdover mode regardless of the 1PPS signal condition.

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### Frequency Parameters

- Frequency 10.0MHz
- 10MHz RF Output Details, Pin 2:  
HCMOS Compatible -  
VoH: 2.7V min  
VoL: 0.4V max  
Rise and Fall Time: 8ns max  
Duty Cycle: 45/55% max  
Accuracy (24-hour averaging when locked to 1PPS):  $\pm 1E-12$   
Short Term Stability (tested after power for 1hr ref to 25°C, 1s, using PN9000 test equipment): 2E-11 max  
Ageing (Vs and temperature constant, reference to T=25°C, Vs = 5.0V and after 30 days operation):  $\pm 0.2$ ppb per day,  $\pm 10$ ppb per year
- 1PPS Output from internal GPS receiver, Pin 10, Phase Accuracy when locked to GPS:  
Initial Lock Status (<30mins locked to GPS):  $\pm 200$ ns max  
Full Lock (>30mins locked to GPS):  $\pm 80$ ns max  
Steady Lock State (>24hrs GPS lock): 25ns RMS max
- 24hrs Holdover Capability:  
Reference 7 days powered on, 2 days GPS lock.  
Temperature varied <1°C/min within operating temperature range.  
Total Temperature Change      Holdover Capability  
 $\Delta T < \pm 2^\circ\text{C}$                        $\pm 1.5\mu\text{s}$
- Note: Other options available on request, please contact our Application Support department.

### Electrical Parameters

- Supply Voltage 5.0V  $\pm 5\%$
- Note: Pins 3 to 11 and Pin 13 should not be subjected to a voltage greater 3.6V. If subjected to a higher voltage the processor will be damaged and the unit will not work correctly.
- 1PPS output from internal GPS receiver, Pin 10:  
Waveform: HCMOS  
Test Condition: 15pF  
ViH: 2.7V min  
ViL: 0.4V max  
Pulse Width: 100ms min
- State Input, Pin 8 (<5mA load):  
Lock: 2.7V min  
Unlock: 0.4V max  
Pin 8 has an internal pull-up cct.
- Power Supply Details, Pin 12:  
Supply Voltage: 5.0V  $\pm 5\%$   
Current Consumption: 2A during warm up, 1A steady state @ 25°C  
AC Ripple: 50mV pk-pk max, 10Hz to 1MHz
- GPS Internal Receiver Specification:  
Type: GPS Position Lock  
Number of Channels: 50  
Frequency Band: L1 (1575.42MHz)  
Tracking Code: C/A Code  
Tracking Capability: 12 Satellites  
Sensitivity: Tracking and Navigation 162dBm  
                  Reacquisition -157dBm  
                  Cold Start (autonomous) -148dBm  
Antenna Input SMA-KE (active antenna recommended)

### Operating Temperature Ranges

- -20 to 75°C

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**Output Details**

- Output Compatibility HCMOS
- Note: Sinewave 50Ω option available on request, please contact our Application Support department.
- 1PPS Reference Output, Pin 3 (15pF test condition):  
Waveform: HCMOS  
VoH: 2.7V min  
VoL: 0.4V max  
Pulse Width: 100ms min
- Lock Status Indicator, Pin 5:  
Module Locked: 2.7V min  
Module Holdover: 0.4V max  
Module Locked means Working State is = Run2  
Current: 5mA max
- Serial Interface (Pin 6 and Pin 7):  
NMEA-0183  
VoL and ViL: 0.4V max  
VoH and ViH: 2.7V min  
Baud rate: 9600  
Bits: 8  
Parity: N  
Stop Bit: 1

**Noise Parameters**

- Phase Noise on 10MHz RF Output Signal (dBm/Hz):

Offset	Typical	Max
10Hz	-118	-113
100Hz	-138	-133
1kHz	-148	-143
10kHz	-150	-145
100kHz	-150	-145
1MHz	-150	-150

**Environmental Parameters**

- Operating Temperature Range: -20 to 75°C
- Storage Conditions:  
Temperature: -55 to 105°C  
Humidity: 30 to 80%
- Shock: IEC 68-2-27 Test Ea, Severity 50A: 50G 11ms half sinewave, 3 times in three mutually perpendicular planes.
- Vibration: IEC 68-2-06, Test Fc: 10G, 0.75mm acceleration, 10Hz to 500Hz, 3 times in three mutually perpendicular planes.

**Manufacturing Details**

- ESD Levels: ANSI/ESDA/JEDEC JS-001-2010:  
Human Body Model, Class 2: 2000V to 4000V  
Machine Model, Class B: 200V to 400V

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#### Ordering Information

- 10MHz Output Compatibility Options:  
HCMOS (standard)  
Sinewave
- Operating Temperature Range Options:  
-20 to 75°C (standard)  
-40 to 85°C  
Note: Holdover stability options will affect capability.
- Holdover Options ref 24hrs Holdover Period:  
Max error    Max temp change  
±1.5us      0 to 60°C  
±8.0us      0 to 60°C  
±1.5us      ΔT<±5°C  
±8.0us      ΔT<±5°C  
±1.5us      ΔT<±2°C (LTE-TDD compatible)  
±8.0us      ΔT<±2°C
- Holdover Options ref 8hrs Holdover Period:  
Max error    Max temp change  
±1.5us      ΔT<±5°C  
±8.0us      ΔT<±5°C  
±1.5us      ΔT<±2°C  
±8.0us      ΔT<±2°C
- Note that for other combinations please contact our Application Support department.

#### Compliance

- RoHS Status (2015/863/EU)      Compliant
- REACH Status                      Compliant
- MSL Rating (JDEC-STD-033):      Not Applicable

#### Packaging Details

- Pack Style: Bulk              Loose in bulk pack  
Pack Size: 1

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