

Description



- A GPS disciplined OCXO incorporating a GPS receiver unit to give 1PPS and 10MHz output. With 1.5µs holdover stability achieved by using an adaptive algorithm. Standard NMEA0183 data is available to the user via a serial port.
- Model IQCM-110
- Model Issue number 1
- Working States (Reference Drawing):
 - 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.

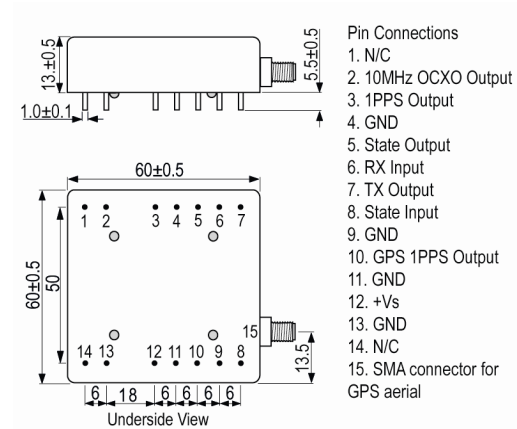


Frequency Parameters

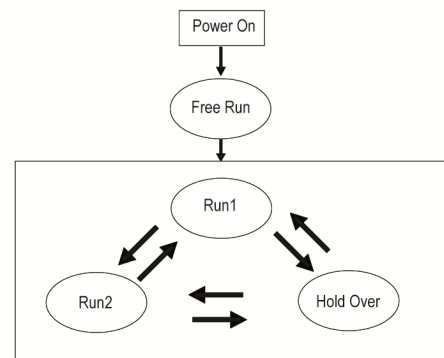
- Frequency 10.00MHz
 - Operating Temperature Range -20.00 to 75.00°C
 - 10MHz RF Output Details, Pin 2:
 - HCMOS Compatible (Sinewave 50Ω option available)
 - VoH: 2.7V min
 - VoL: 0.4V max
 - Rise and Fall Time: 8ns max
 - Duty Cycle: 45/55% max
 - Accuracy (24-hour averaging when locked to 1PPS): ±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): ±0.2ppb per day, ±10ppb per year
 - 1PPS Output from internal GPS receiver, Pin 10, Phase Accuracy when locked to GPS:
 - Initial Lock Status (<30mins locked to GPS): ±200ns max
 - Full Lock (>30mins locked to GPS): ±80ns 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
 $\Delta T < \pm 2^\circ C$ $\pm 1.5 \mu s$

Note: Other options available on request.

Outline (mm)



Workflow Diagram



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Electrical Parameters

- Supply Voltage 5.0V ±5%
- 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 ±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)

Output Details

- Output Compatability HCMOS
- 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

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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

Compliance

- RoHS Status (2011/65/EU) Compliant
- REACH Status Compliant
- MSL Rating (JDEC-STD-033): Not Applicable

Packaging Details

- Pack Style: Bulk Loose in bulk pack
 - Pack Size: 1
- *Alternative packing option available*

Technical Notes

- *Holdover stability 1.5µs in 24hrs ref ±2°C*

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