

ISSUE 1; March 2020

Description

- A disciplined OCXO incorporating a GNSS receiver unit to give 1PPS and 10MHz output. Compatible with GPS, GLONASS, BEIDOU and GALILEO.

Holdover stability up to 1.5µs over 24hrs is achieved using an adaptive algorithm.

Standard NMEA0183 data is available to the user via a serial port.

Frequency stability better than 1ppt.
- Working States (Workflow Diagram):

Run1: Fast track. Adjust the OCXO 10MHz output frequency quickly to track the GNSS.

Run2: Slow track. Adjust the OCXO 10MHz output frequency slowly when phase error is in the defined range.

Holdover: No GNSS input present; an algorithm enables adaptive modelling of the frequency stability of an OCXO with reference to the GNSS timing signal.

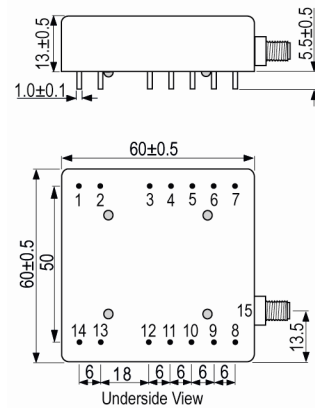
Free Run: Clock module powered up with no GNSS input.
- NMEA Data Words: GNSS data is available to the user via the interface on Pin 6 and Pin 7. These are broadcast every second in sync with the 1PPS output.
- Note 1: The IQCM-112 should be left powered and running for 7 days minimum before operation to allow for the OCXO's internal drift to stabilise.

Note 2: The adaptive module algorithm can be built after 3 days operation with good GNSS signal, however this data will be lost at power down.

Note 3: When State Input (Pin 8) is set low the IQCM-112 will operate in Holdover mode regardless of the 1PPS signal condition.



Outline (mm)



- Pin Connections
1. N/C
 2. 10MHz OCXO Output
 3. 1PPS Output
 4. GND
 5. State Output
 6. RX Input
 7. TX Output
 8. State Input
 9. GND
 10. GNSS 1PPS Output
 11. GND
 12. +Vs
 13. GND
 14. N/C
 15. SMA connector for GNSS aerial

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): ±1ppt

Short Term Stability (tested after power for 1hr ref to 25°C, 1s, using PN9000 test equipment): 0.02ppb.

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 GNSS receiver, Pin 10, Phase Accuracy when locked to GNSS:

Initial Lock Status (<30mins locked to GNSS): ±200ns max

Full Lock (>30mins locked to GNSS): ±80ns max

Steady Lock State (>24hrs GNSS lock): 25ns RMS max
- 24hrs Holdover Capability:

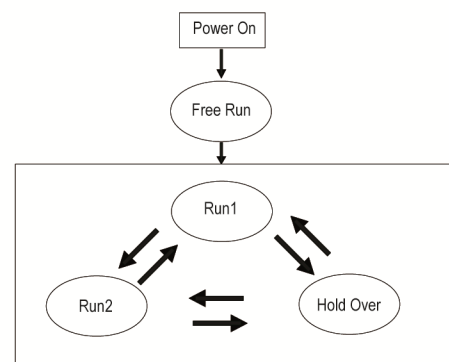
Reference 7 days powered on, 3 days GNSS lock.

Temperature varied <1°C/min within operating temperature range.

Total Temperature Change Holdover Capability

ΔT<±2°C ±1.5µs
- Note: Other options available on request, please contact our Application Support department.

Workflow Diagram



Sales Office Contact Details:

UK: +44 (0)1460 270200
Germany: 0800 1808 443

France: 0800 901 383
USA: +1.760.318.2824

Email: info@iqdfrequencyproducts.com
Web: www.iqdfrequencyproducts.com

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 GNSS 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 Enable: if left unconnected (internal pull-up cct) or logic high (2.7V min) is applied to pin 8 then the device will operate normally and lock when appropriate.
Lock Disable: If logic low (0.4V max) is applied to pin 8 then the device cannot be locked.
- 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
- GNSS Internal Receiver Specification:
Type: GNSS Position Lock
Number of Channels: 50
Frequency Band: L1 (1575.42MHz)
Tracking Code: C/A Code
Tracking Capability: 12 Satellites
Sensitivity: Tracking and Navigation -159dBm
Reacquisition -144dBm
Cold Start (autonomous) -148dBm
Antenna Input SMA-KE (active antenna recommended)

Operating Temperature Ranges

- 20 to 75°C

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

Sales Office Contact Details:

UK: +44 (0)1460 270200
Germany: 0800 1808 443

France: 0800 901 383
USA: +1.760.318.2824

Email: info@iqdfrequencyproducts.com
Web: www.iqdfrequencyproducts.com

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

- Storage 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

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 (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

Sales Office Contact Details:

UK: +44 (0)1460 270200
Germany: 0800 1808 443

France: 0800 901 383
USA: +1.760.318.2824

Email: info@iqdfrequencyproducts.com
Web: www.iqdfrequencyproducts.com