

ISSUE 2; August 2017

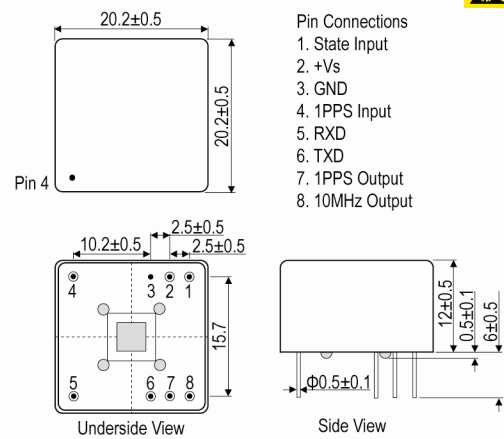
### Description

- A GPS disciplined Oven Controlled Crystal Oscillator (OCXO) with a 1PPS input, 1PPS output and 10MHz output.
- Key Feature - Holdover Stability Options:
  - 80µs/24hrs,  $\Delta T = \pm 5^\circ C$ , 24hrs holdover after turn on 3 days and lock 2 days. Time to maintain  $\pm 1.5\mu s$ : 3-4hrs typical.
  - 20µs/24hrs,  $\Delta T = \pm 5^\circ C$ , 24hrs holdover after turn on and lock 7 days. Time to maintain  $\pm 1.5\mu s$ : 6-7hrs typical.
  - 80µs/24hrs,  $\Delta T = \pm 5^\circ C$ , 24hrs holdover after turn on and lock 2hrs. Time to maintain  $\pm 1.5\mu s$ : 3-4hrs typical.
- 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.

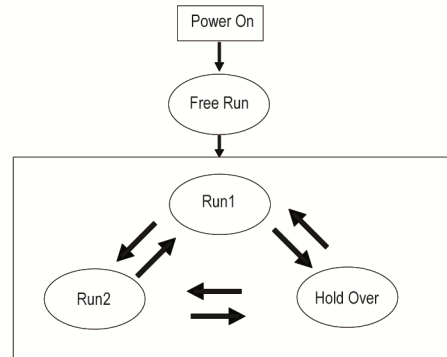
### Frequency Parameters

- Frequency 10.0MHz
- Frequency Stability  $\pm 0.01$ ppm
- Frequency Stability: TA varied across the operating temperature range, measurement referenced to frequency observed with  $f_{ref} = (f_{max} + f_{min})/2$ ,  $V_s = 3.3V$ , load = 15pF and temperature variable speed less than  $2^\circ C/min$ .
- Short Term Stability (temperature stable, no EMI/EMC or other interference, tested after power for 1hr ref. to  $25^\circ C$ ; 1s): 0.1ppb max
- Accuracy (24hrs average when locked to 1PPS after power on 2 days):  $\pm 0.01$ ppb max
- Warm Up (TA =  $25^\circ C$  and  $V_s = 3.3V$  constant, measurement referenced to 10MHz, after power on 3mins with GPS lock):  $\pm 1$ ppm max
- Ageing (constant measurement referenced to frequency observed with TA =  $25^\circ C$ ,  $V_s = 3.3V$  and after 30 days of operation):
  - $\pm 5$ ppb max per day
  - $\pm 500$ ppb max per year

### Outline (mm)



### Workflow Diagram



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**Electrical Parameters**

- Supply Voltage 3.3V ±5%
- State Input (pin 1):  
Lock (<5mA load): 2.4V min  
Holdover (<5mA load): 0.4V max
- Supply Voltage AC Ripple (10Hz to 1MHz, pin 2): 50mV pk-pk max
- 1PPS Input (pin 4):  
Waveform: HCMOS  
Output High VoH: 2.4V min  
Output Low VoL: 0.4V max  
Pulse Width: 10µs min
- Serial Interface (pins 5 and 6, serial protocol 9600-N-8-1):  
Rx high level Input Voltage: 2.4V min  
Rx low level Input Voltage: 0.4V max  
Tx high-level Output Voltage: 2.4V min  
Tx low-level Output Voltage: 0.4V max  
Baud Rate: 9600  
Parity: N  
Bits: 8  
Stop Bit: 1
- Current Consumption:  
Warm Up: 500mA max  
Steady State (@ 25°C): 250mA max
- Note: All pins should not be subjected to a voltage greater than 3.6V. If subjected to a higher voltage the processor will be damaged and the unit will not work correctly.

**Operating Temperature Ranges**

- -40 to 85°C

**Output Details**

- Output Compatibility HCMOS
- 1PPS Output (pin 7):  
Waveform: HCMOS  
Output High VoH: 2.4V min  
Output Low VoL: 0.4V max  
Pulse Width: 10µs min  
Accuracy (24hrs average when locked to 1PPS after power on 2 days): ±200ns max
- 10MHz HCMOS Output (synchronised with 1PPS input, pin 8):  
Output High VoH (<5mA load): 2.7V min  
Output Low VoL (<5mA load): 0.4V max  
Rise/Fall Time (ref 15pF load): 8ns max  
Duty Cycle (ref 15pF load): 45/55% max

**Noise Parameters**

- Phase Noise (typ) on 10MHz RF Output Signal (pin 8):  
-100dBc/Hz @ 10Hz  
-130dBc/Hz @ 100Hz  
-148dBc/Hz @ 1kHz  
-150dBc/Hz @ 10kHz  
-150dBc/Hz @ 100kHz  
-150dBc/Hz @ 1MHz
- Phase Noise (max) on 10MHz RF Output Signal (pin 8):  
-90dBc/Hz @ 10Hz  
-120dBc/Hz @ 100Hz  
-143dBc/Hz @ 1kHz  
-145dBc/Hz @ 10kHz  
-145dBc/Hz @ 100kHz  
-145dBc/Hz @ 1MHz

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#### Environmental Parameters

- Storage Conditions:  
Temperature: -55 to 105°C  
Humidity: 30 to 80%
- ESD Levels: ANSI/ESDA/JEDEC JS-001-2010:  
Human Body Model, Class 2: 2000V to 4000V  
Machine Model, Class B: 200V to 400V
- Shock: IEC 60068-2-27, Test Ea, Severity 50A: 50G acceleration for 11ms, half sine wave, 3 times in 3 mutually perpendicular planes.
- Vibration: IEC 60068-2-06, Test Fc: 10Hz-500Hz, 0.75mm amplitude, 10G acceleration, 30mins per cycle, 3 times in 3 mutually perpendicular planes, test duration 2hrs.

#### Ordering Information

- Frequency  
Model\*  
Holdover Capability Option\*  
(\*minimum required)
- Holdover Stability Options:
  - 80µs/24hrs,  $\Delta T = \pm 5^{\circ}\text{C}$ , 24hrs holdover after turn on 3 days and lock 2 days. Time to maintain  $\pm 1.5\mu\text{s}$ : 3-4hrs typical.
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#### Compliance

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

#### Packaging Details

- Pack Style: Bulk      Bulk pack  
Pack Size: 18

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Output Data Word (Format Key: c=Character, d=Numerical Digit, s=Sign)

Field No.	Name	Format	Description	Length
0	\$PDP	\$ccc	Message ID, Protocol Header	4
1	No	dd	Message No.	2
2	TxRxFlag	d	Transmit and Receive Flag (0 = upper computer transmit, 1 = upper computer receive)	1
3	CStatus	c	Current Status (F = warm up, L = lock, H = holdover)	1
4	TrackStatus	d	Track Status (Q = fast track, S = slow track)	1
5	cPHDiff	sdddd	Current Phase Difference (1 unit = 6.25ns)	5
6	cPWM1	dddd.dddd	Current PWM1 (voltage controlled value 1)	10
7	cPWM2	dddd.dddd	Current PWM2 (voltage controlled value 2) not used, default value = 32769.0000	10
8	SYNCNT	ddd	Synchronous Times	3
9	HCNT	ddd	Power On Hours Count	3
10	HPAVG	dddd.dddd	Average of the PWM in the Last Hour	10
11	VCH1	dddd.dddd	Voltage Controlled Compensation Value every Hour	10
12	HPMOD	dddd.dddd	Module PWM Value	10
13	VCM10	dddd.dddd	Voltage Controlled Compensation Value every 10mins	10
14	POS	d-dd	Position of the Product (Layer-No) - just for the inner test	4
15	TEMP	sddd.dddd	N/A	9
16	AlarmFlag	sdddd	N/A	5
17	Website		www.IQDFP.com	13
18	Version	d.d	Version	3
19	Date	ddd-dd-dd	Date	10
20		dd	22	2
21	END		<CR><LF>	2

[Click for FOQs on IQD Advance Clock Modules](#)

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