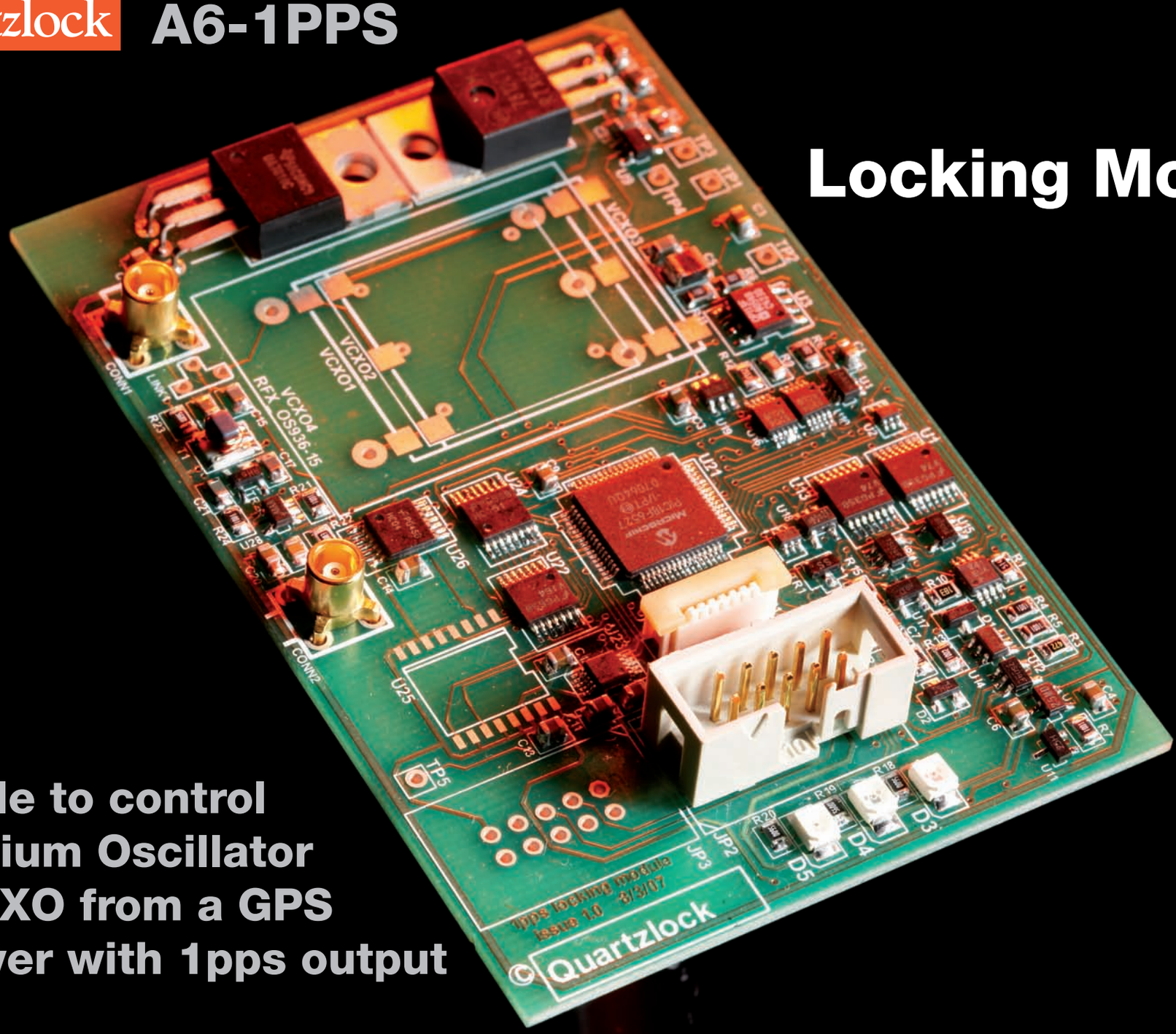
Quartzlock **A6-1PPS**

Locking Module



Module to control Rubidium Oscillator or OCXO from a GPS receiver with 1pps output

A6-1PPS Locking Module

SPECIFICATION

INPUTS

a) 1pps from GPS receiver, time mark positive edge, width 10us to 1ms, TTL/CMOS

b) 10MHz from controlled oscillator, sine wave 0 dBm or logic TTL/CMOS 50% mark/space

OUTPUTS

a) 1pps derived from 10MHz input. 5v CMOS/TTL , width 10us, time mark positive edge.
Default in coincidence with mean value of incoming 1pps time mark. May be offset +/-500ms in steps of 1ns.

b) Analogue voltage for frequency adjustment of rubidium/OCXO. Limits 0V lower limit and 5V to 8V(adjustable) upper limit. 20 bits effective resolution.

TRACKING PERFORMANCE

Performance depends upon quality of 1pps input. Typical with Trimble Resolution-T GPS receiver (predicted from simulation):-

Steady state controlling Rubidium oscillator:		
Allen variance:	1 sec to 1000sec	no effect on Rubidium
	10,000 sec	2x10-13
Steady state controlling OCXO		
Allen variance	1sec to 100sec	no effect on OCXO
	1000 sec	2x10-12
	10000 sec	8x10-13
From switch on controlling rubidium oscillator:		
Initial frequency offset 2x10-10		
	time to within 10-11:	4 minutes
	time to within 10-12	20 minutes

(These times do not include any initialisation or self survey delays in the GPS receiver)

OTHER ELECTRICAL

Power Supply:	5V DC (to be verified)
Power consumption:	0.1W
Computer interface:	serial: RS-232 9600baud
Receiver interface:	serial: RS-232 9600baud
Status indicators	10MHz fail no/bad 1pps holdover mode ready (frequency error less than programmed limit)

OTHER:

Size(without 10MHz oscillator):	25x25x5mm
Weight:	TBD
Operating temperature:	-20/+40 degC
Connector:	TBD

SERVICE: closed case diagnostics and calibration using Windows software package

OPTIONAL: Third RS-232 serial interface for control of a rubidium that has digital frequency control

Module to control Rubidium Oscillator or OCXO from a GPS receiver with 1pps output

GENERAL DESCRIPTION

The module uses a three state Kalman filter algorithm to measure and correct the frequency offset of the oscillator with respect to the 1pps input.

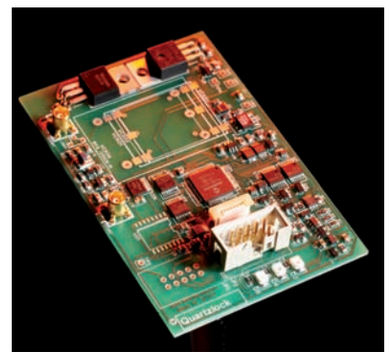
a) A time tagging circuit which time tags the incoming 1pps with a resolution of 200ps, and an inherent jitter of < 1ns rms. The internal clock analogue interpolator is self calibrating.

b) An interface to the GPS receiver decodes messages and extracts relevant information, such as time correction data for the 1pps output.

c) A 1pps output which has the short term stability of the rubidium/ OCXO (jitter <100ps RMS). This output may be steered into time coincidence with GPS time/UTC. Steering resolution is 1ns.

d) Holdover mode is initiated by failure of the 1pps input, or by reception of appropriate data from the GPS receiver that indicates that the 1pps is inaccurate. During holdover measured values of frequency offset and drift is used to steer the oscillator. The output 1pps will still be available.

e) A comprehensive computer interface that can be used to monitor the progress of the Kalman filter, and to set parameters for the type of oscillator to be controlled. Communication with the GPS receiver is possible through the single interface. Operating parameters are stored in non volatile memory.



Quartzlock The most stable Frequency Standards available
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