125 Series FTS125
Disciplined Reference and Synchronous Clock Generator

CONNOR WINFIELD

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PRODUCT BRIEF

General Description

The FTS125 Frequency and Time Standard module is a GPS driven, mixed-signal phase lock loop, providing a 1PPS CMOS output from a Connor-Winfield GPS timing receiver and generating a 10MHz CMOS and a 10MHz SINE output from an intrinsically low jitter voltage controlled crystal oscillator. The FTS125 can lock to a 10MHz reference derived from the on-board GPS receiver or an external 10MHz reference or to an external 1PPS reference. Alarms are provided to indicate Loss-of-Lock, Holdover, and Antenna Fault. The on-board GPS receiver requires an outdoor mounted GPS antenna for the best stability and consistent performance.

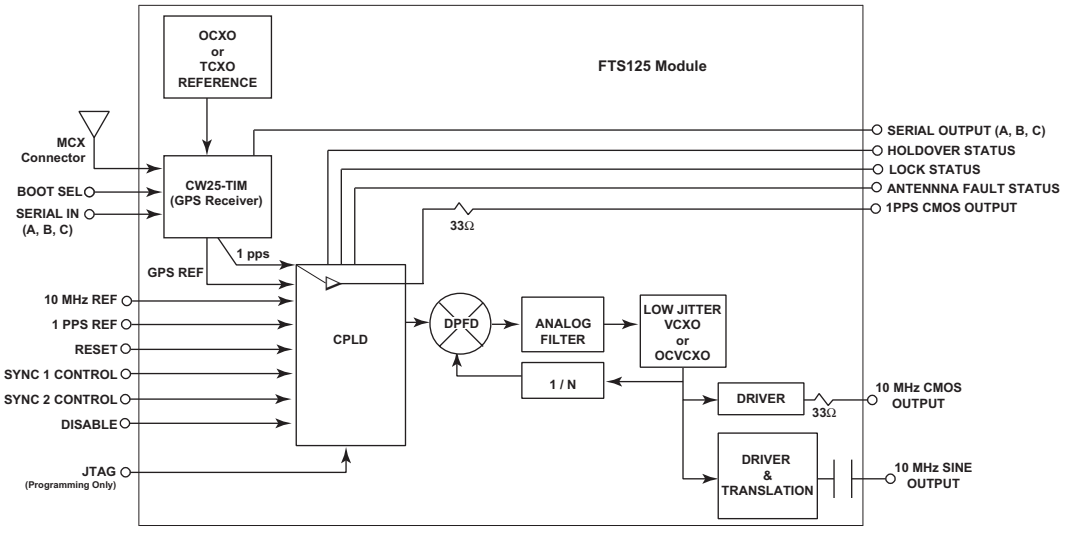
The mode control inputs are used to manually switch between references and/or holdover. The user application should monitor the alarm outputs and manually switch modes as needed.

Serial I/O lines provide access to the NMEA messages from the GPS receiver (referenced in the Connor-Winfield's Wi125 User Manual. Contact Connor-Winfield Sales for a copy).The serial I/O lines can be used to access GPS timestamp information, or to verify that the receiver has recovered from an alarm condition. The reset is used to reset the GPS receiver (if needed).

Features

- Phase locked 10.0 MHz output
- 1 PPS output
- 3 selectable references: GPS, External 10MHz or External 1PPS
- Holdover
- Three alarm outputs. (Loss-of-Lock, Holdover and Antenna Fault)
- Serial input and output ports (GPS receiver)
- Master reset
- +3.3 Volt power supply
- Commercial Temp (0-70° C)
- Meets ITU-T G.811 Wander Generation Mask
- Meets ETSI-PRC Wander Generation Mask (w/ OCXO reference)
- Fixed Position Unit

Block Diagram



Absolute Maximum Rating

Symbol	Parameter	Minimum	Maximum	Units	Notes
V_{CC}	Power Supply Voltage	-0.3	3.7	Volts	1
V_{IN}	Input Voltage	-0.3	4.6	Volts	1
V_{PREAMP}	Antenna Supply Voltage	2.7	13.2	Volts	1
T_S	Storage Temperature	-30	80	°C	1

Operating Specifications

Symbol	Parameter	Minimum	Nominal	Maximum	Units	Notes
$V_{CC}1$	Supply Voltage 1	3.135	3.3	3.465	V	
$I_{CC}1$	Supply Current 1					
	with TCXO		.200	.300	A	
	with OCXO		.480	1.2	A	
$V_{CC}2$	Supply Voltage 2	3.135	3.3	3.465	V	2
$I_{CC}2$	Supply Current 2					
	with VCXO		.040	.75	A	
	with VCOCXO		.380	1.0	A	
T_O	Temperature Range	0		70	°C	
t_{JTOL}	Input Jitter Tolerance	30			ns	
t_{AQ_GPS}	GPS Input Acquisition Time					
	TCXO		50		sec	3
	OCXO		90		sec	3
t_{AQ_EXT}	External Input Acquisition Time					
	VCXO		10		sec	3
	OCOCXO		90		sec	3
			Oscillator Performance			
PLL Option:		VCXO		OCVCXO		
F_{CAP}	Capture/Pull-in Range	±50 ppm		±45 ppb		
F_{BW}	Jitter Filter Bandwidth	6 Hz Typ.		0.1 Hz Typ.		
DC	Duty Cycle	45/55%		45/55%		
RMS	RMS Phase Noise					
	10Hz - 2MHz	20 ps Typ.		1 ps Typ.		
	12kHz - 2MHz	0.5 ps Typ.		0.6 ps Typ.		
			Holdover/Wander Generation Performance			4
Reference Option:		TCXO		OCXO		
T_{STA}	Temperature Stability	±0.5 ppm		±20 ppb		
V_{STA}	Vcc Stability	0.1 ppm		±5 ppb		
A_{DAILY}	Daily Aging	TBD		2 ppb		
A_{YEARLY}	Yearly Aging	2 ppm		80 ppb		
	Wander Generation Specification	ITU-T G.811		ETSI-PRC		

NOTES:

1. Stresses beyond those listed under "Absolute Maximum Rating" may cause permanent damage to the module. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under "Operating Specifications" is not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.
2. Requires external regulation and supply decoupling
3. Cold Power-up
4. Holdover will be re-calculated with each successful lock. Yearly aging represents 1 continous year in Holdover.

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Mode Control Table

SYNC 1	SYNC 2	Operating Mode
0	0	Force Holdover
0	1	Lock to External 10MHz reference
1	0	Lock to External 1PPS reference *
1	1	(Default) Lock to GPS Signal

**NOTE:*
Not functional in prototypes. This mode currently forces Holdover.

Input And Output Characteristics

LVCMOS Inputs and Outputs

Symbol	Parameter	Minimum	Maximum	Units	Notes
V_{IH}	High Level Input Voltage	1.7	4.0	V	
V_{IL}	Low Level Input Voltage	-0.5	0.8	V	
V_{OH}	High Level Output Voltage	2.4		V	
V_{OL}	Low Level Output Voltage		0.4	V	
C_O	Output Capacitance		10	pF	

10MHz Sine Output

Symbol	Parameter	Typical	Units	Notes
	Load	50	ohms	
	Output Power	9	dB_m	
	Total Harmonic Distortion	2.2	%	

GPS Receiver Specifications

Parameter		Specifications	Notes
Acquisition/Tracking Sensitivity		-155dBm/-156dBm	
Acquisition Time:			
	Hot Start w/ Network Assist	Outdoor: <2 sec Indoor(-148dBm) <5 sec	
	Stand Alone	Cold <45 sec Warm: <38 sec Hot: <5 sec Re-acquisition: <1sec (90% confidendce)	
Supported Protocols		Network Assist, NMEA 0183	

Reset Generation (I/O pin 10 - RESET)

The power-on-reset for the FTS125 is generated on-board. If it is desired to extend the power-on-reset signal or provide a manual reset of the GPS receiver, pull this signal low.

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Ordering Information

Ex: FTS125-COO-010.0MHz

FTS125	C	O	O	-010.0M
Frequency	Temp Range	CW25 Reference	PLL Oscillator	Output
	C = 0-70degC	O = OCXO	O = OCVCXO *	
		T = TCXO	V = VCXO	

** CTO Option is not available*

Revision	Revision Date	Note
A00	6/19/08	Preliminary Release
P00	9/15/08	Indoor Temp Revision
P01	11/19/08	Block Diagram Revision
P02	01/08/10	Fixed Unit Clarification & GPS Receiver Information
00	06/14/10	125 Series Update and revised to release