

Helping Customers Innovate, Improve & Grow



The MD-023 series is the first product to be introduced in Vectron's Extended Holdover Crystal Oscillator platform. With aging rates of 0.08ppb/day and temperature stabilities of 0.1ppb from 0 to 70°C, the MD-023 is capable of providing holdover of 6 μ s for 24 hours over a 10°C temperature change. The product employs an ultrastable ovenized quartz oscillator with proprietary Vectron digital correction algorithms to achieve rubidium like performance at a fraction of the cost and power.

Features

- Ultrastable 10 MHz OCXO
- Proprietary digital correction algorithms
- Digital EFC adjust
- Serial communications interface standard
- Low Phase Noise Outputs

Applications

- 3G Basestations (WCDMA, CDMA2000)
- LTE
- WiMAX Basestations
- Digital Video Broadcast
- E911 Location Systems
- General Timing and Synchronization
- Military Radio

Block Diagram

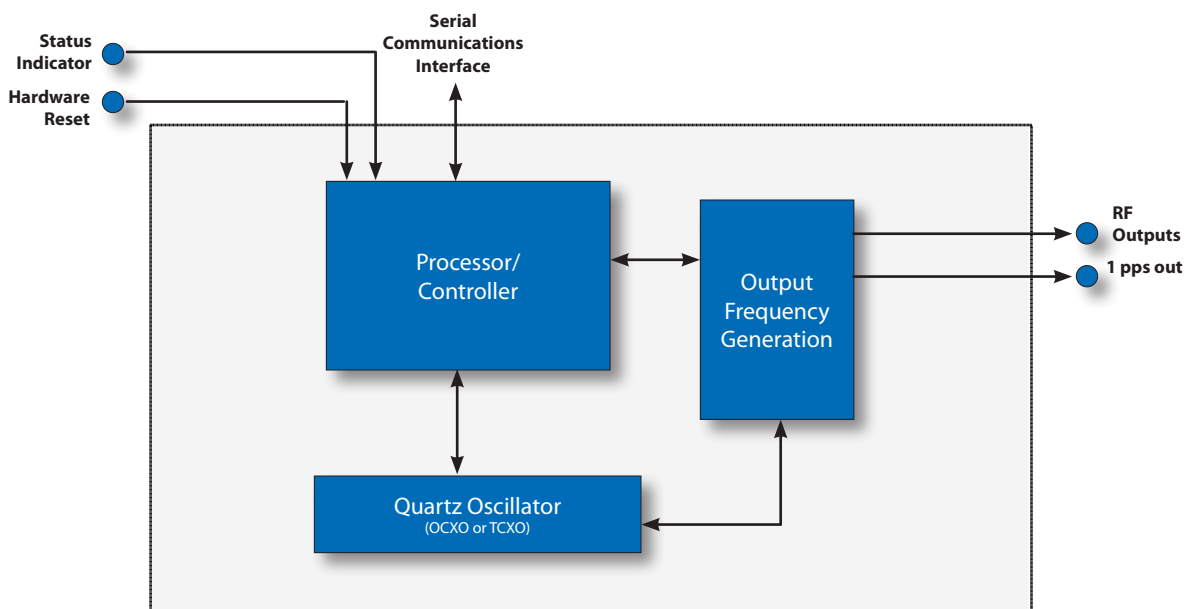


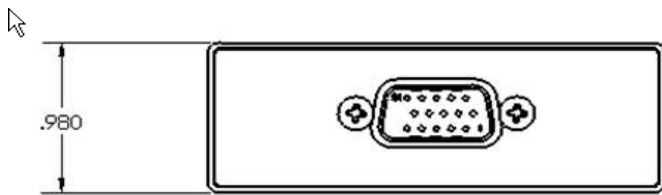
Figure 1. Functional Block Diagram

Specifications

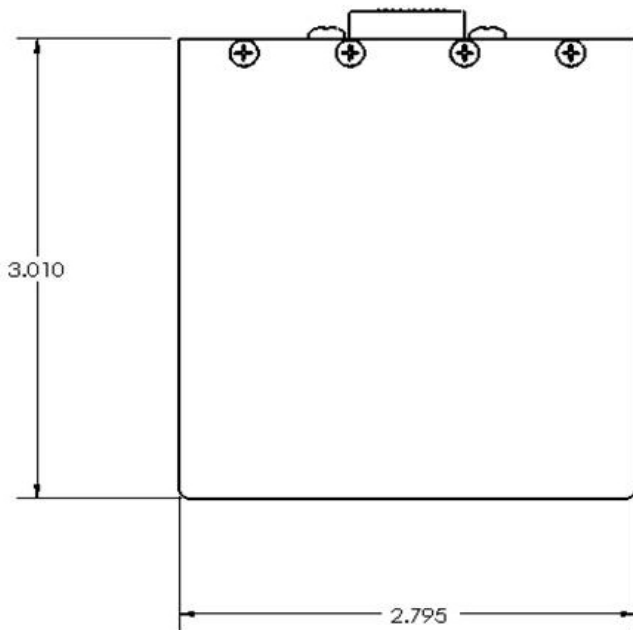
RF Output Stability					
Parameter	Min	Typical	Max	Units	Condition
Nominal Frequency		10		MHz	
Short-term stability (All conditions after 24 hours)		5	10	E-12	@ Tau = 1 sec
		15	20	E-12	@ Tau = 10 sec
Phase noise (All conditions)			-95	dBc/Hz	@ 10Hz offset
			-125	dBc/Hz	@ 100Hz offset
			-140	dBc/Hz	@ 1kHz offset
			-145	dBc/Hz	@ 10kHz offset
			-145	dBc/Hz	@>10kHz offset
Frequency Temperature Stability			0.1	ppb pk-pk	0 to 70 °C
Aging			0.08	ppb/day	after 7 days on power
Frequency Pullability	+/-500			ppb	
Frequency resolution		1		E-12	20 bit DAC
Holdover Capability					
Holdover Time	Min	Typical	Max	Units	Conditions
24 hours			6	µs	after 7 days on power with a 10 °C temperature change during holdover
RF Output Waveform Characteristics					
Waveform	CMOS				
High-Level Output Voltage (V _{OH})	3.0		3.3	V _{DC}	< -0.5mA Load
Low-Level Output Voltage (V _{OL})		0.0	0.3	V _{DC}	< 0.5mA Load
Rise/Fall Time		3	5	nSec	15pF
Duty Cycle	40	50	60	%	15pF
1pps Output Characteristics					
Waveform	TTL				
High-Level Output Voltage (V _{OH})	2.4		3.6	V _{DC}	TTL pulse
Low-Level Output Voltage (V _{OL})		0.0	0.5	V _{DC}	
Pulse width		10		µs	programmable from 10 to 100 µs
Supply Voltage					
Supply voltage	+11.4	+12	+12.6	V _{DC}	
Current consumption			1500 700	mA mA	During Warm-up During steady state operation
AC ripple			200	mVpk-pk	10Hz to 1MHz
Status Indicator					
Module Hardware OK	0		0.5	V _{DC}	<10mA Load
Module Hardware Failure	3.3			V _{DC}	<10mA Load
Module Hardware Reset					
Reset Module	0		0.3	V _{DC}	Load able to sink >2mA

Package Outline and Interface Specifications

Serial Communications Interface					
Parameter	Min	Typical	Max	Units	Condition
Rx high-level input voltage (V_{IH})	3.0		3.3	V_{DC}	
Rx low-level input voltage (V_{IL})	-0.3	0.0	0.3	V_{DC}	
Tx high-level output voltage (V_{OH})	3.0	3.3		V_{DC}	
Tx low-level output voltage (V_{OL})	-0.3	0.0	0.3	V_{DC}	
Communications Protocol	Command List is Vectron Custom - available on request				



15 Pin I/O Connections		
Number	Name	Description
1	Vcc	12VDC in
2	Ground	
3	Ground	
4	Ground	
5	RF output	10 MHz
6	Vcc	12VDC in
7	Ground	
8	N/C	
9	N/C	
10	Ground	
11	1pps	1pps TTL out
12	Status Indicator	
13	Hardware Reset	
14	Rx	Serial communications Receive
15	Tx	Serial Communications Transmit



Absolute Maximum Ratings

Parameter	Value
Supply Voltage (V _{cc})	18 V _{DC}
DC Voltage on any I/O pin	5.5 V _{DC}
Output Load	10 Ohms

Environmental Conditions

Parameter	Conditions
Operating temperature	-0 °C to +70 °C
Humidity @ 40°C	90 %
Storage Temperature	-55 °C to +125 °C

Reliability

VI qualification includes aging various extreme temperatures, shock and vibration, temperature cycling, and IR reflow simulation. The MD-011 family is capable of meeting the following qualification tests:

Environmental Compliance	
Parameter	Conditions
Mechanical shock	MIL-STD-2002, Method 213 condition B
Mechanical vibration	MIL-STD-2002, Method 204 condition A
Resistance to solvents	MIL-STD-2002, Method 215

Handling Precautions

Although ESD protection circuitry has been designed into the C6350 proper precautions should be taken when handling and mounting. VI employs a human body model (HBM) and a charged-device model (CDM) for ESD susceptibility testing and design protection evaluation.

ESD Ratings		
Model	Minimum	Conditions
Human body model	1500 V	MIL-STD-883C, Method 3015
Charged device model	1000 V	JEDEC, JESD22-C101

For Additional Information, Please Contact

USA:

Vectron International
267 Lowell Road
Hudson, NH 03051
Tel: 1.888.328.7661
Fax: 1.888.329.8328

Europe:

Vectron International
Landstrasse, D-74924
Neckarbischofsheim, Germany
Tel: +49 (0) 3328.4784.17
Fax: +49 (0) 3328.4784.30

Asia:

Vectron International
1F-2F, No 8 Workshop, No 308 Fenju Road
WaiGaoQiao Free Trade Zone
Pudong, Shanghai, China 200131
Tel: 86.21.5048.0777
Fax: 86.21.5048.1881

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