SiTime University Turbo Webinar Series

Instant Oscillators with MEMS Field Programmable Solution

June 3, 2013
Agenda

- Introduction to the Field Programmable Solutions
- Time Machine II Hardware and Software Highlights
- Features and Products Supported by Field Programmable Oscillator
- Web Resources
MEMS Field Programmable Solution Enables Instant Oscillators

Create Quartz Replacement in Seconds

Any Frequency, Any Voltage, Any Stability, Any Package
3 Simple Steps to Program Oscillators to Your Exact Specification

Connect Time Machine to PC

Insert FP Oscillator

Add part #, Program and Use

No Need to Waste Time Searching or Waiting For Samples
User Case 1 – Program Oscillator for FPGA Designs and Prototyping

Xilinx Zyng-7000 Reference Board

<table>
<thead>
<tr>
<th>SiTime Programmed Part</th>
<th>Xilinx Zyg-7000</th>
<th>SiTime FP Oscillator</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIT9121AI-2D3N25E200.00000</td>
<td>X</td>
<td>SiT9121AI-2D1-xxx000.FP000</td>
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<tr>
<td>SIT8008AN-23-25E-12.000000</td>
<td>X</td>
<td>SiT8008AI-21-XXX-000.FP000</td>
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<tr>
<td>SIT8008AC-23-18-E33.33333</td>
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</tr>
<tr>
<td>SIT8008AC-23-18-E66.000000</td>
<td>X</td>
<td></td>
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</tbody>
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Fast Prototyping - 1 Differential and 3 LVMCOS oscillators can be programmed in real time with 2 FP oscillator part numbers
User Case 2 – Program Oscillator for Frequency Margining / Overclocking

CPU: Over-Clocking

CPU/Mother Board

<table>
<thead>
<tr>
<th>SiTime Programmed Part</th>
<th>SiTime FP Oscillator</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIT8008AI-22-33E-100.000000</td>
<td>SIT8008AI-21-XXX-000.FP000</td>
</tr>
<tr>
<td>SIT8008AI-22-33E-110.000000</td>
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<tr>
<td>SIT8008AI-22-33E-120.000000</td>
<td></td>
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<tr>
<td>SIT8008AI-22-33E-130.000000</td>
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Instant Frequency Margining – Four different frequencies can programmed in real time with 1 FP oscillator Part #
Time Machine II Hardware and Software Feature Highlights

• **Complete Kit** with everything an engineer needs to program an oscillator right out of the box

• **User Friendly** hardware and software with complete documentation for best user experience

• **Extremely Portable** with the programmer and all accessories in a DVD size carrying case

• **Future Proof** with hardware and software upgradability to support support future devices

• **Durable** with connectors and sockets are rated for 5000 insertions
Complete MEMS Oscillator Programming Kit

Programmer and Accessory Description

<table>
<thead>
<tr>
<th>Programmer and Accessory</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB MEMS Oscillator Programmer</td>
<td></td>
</tr>
<tr>
<td>Socket card for 6-pin and 4-pin devices in 7.0x5.0 mm and 5.0x3.2 mm packages</td>
<td></td>
</tr>
<tr>
<td>Socket card for all 4-pin devices in 2.5x2.0 mm and 2.0x1.6 mm packages</td>
<td></td>
</tr>
<tr>
<td>Socket card for all 4-pin devices in 3.2x2.5 mm and 2.7x2.4 mm packages</td>
<td></td>
</tr>
<tr>
<td>Other Accessories</td>
<td>USB cable, tweezers, USB flash drive w/ installation software</td>
</tr>
</tbody>
</table>

Visit [http://www.sitime.com/time-machine](http://www.sitime.com/time-machine) for information on supported oscillator package sizes and new socket card availability.
User Friendly and Future Proof Time Machine II Hardware

- Fast Programming - ~5 second per device
- Firmware upgrade – support future MEMS oscillator products

- USB powered w/ micro USB port
- Two package sizes per socket card
- Socket card color-coded for different package sizes
- Oscillator pin-1 Location indicator
- Visual cue indicating proper socket card insertion
Easy-to-use Programming Software with Auto Update

Programmable Feature with Time Machine

Configure Devices to Your Exact Specification

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customizable Frequency</td>
<td>Differential: 1 to 625 MHz</td>
</tr>
<tr>
<td></td>
<td>Single-ended: 1 to 220 MHz</td>
</tr>
<tr>
<td></td>
<td>6 decimals of accuracy</td>
</tr>
<tr>
<td>Frequency Stability</td>
<td>±20 to ±50 PPM</td>
</tr>
<tr>
<td>Supply Voltage</td>
<td>1.8V, 2.5 to 3.3V</td>
</tr>
<tr>
<td>Pull Range</td>
<td>Programmable from ±25 to ±1600 ppm in VCXO</td>
</tr>
<tr>
<td>SoftEdge™</td>
<td>Programmable high and low drive strength</td>
</tr>
</tbody>
</table>

Additional Options

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Package Options</td>
<td>2016, 2520, 3225, 5032, 7050 plastic packages</td>
</tr>
<tr>
<td>Temperature Range</td>
<td>Ext. Commercial (-20 to +70°C), Industrial (-40 to +85°C)</td>
</tr>
<tr>
<td>Output Signaling</td>
<td>Differential: LVPECL, LVDS or HCSL, Single-ended: LVCMOS</td>
</tr>
</tbody>
</table>

Visit [http://www.sitime.com/time-machine](http://www.sitime.com/time-machine) for updates on new programmable features
Example of a Field Programmable Oscillator

- Field Programmable oscillator is an **one-time programmable device** that supports a wide range of configurable features.

- A given field programmable oscillator can be mapped into one or more SiTime oscillator products.

- Example of a Field Programmable Oscillator

**SiT8008AI-21-XXX-000.FP000**

- **Support**
  - SiT1602, SiT8008
  - C-temp or I-temp

- **Support**
  - 3.0x2.5 mm pkg
  - 20 to 50 PPM

- **Support**
  - 1.8 to 3.3V
  - OE or ST

- **Support**
  - 1 – 110 MHz
  - 6 decimal places
SiTime Products Supported by Field Programmable Devices

Visit [http://www.sitime.com/fp-devices](http://www.sitime.com/fp-devices) for information on field programmable devices
Where to Buy

• **SiTime Distributors—**
  • N. America: Arrow, Mouser, Macnica
  • Japan: Brilliant Technologies (BTC)
  • Greater China, Europe, Korea: go to SiTime Web site for distributor directory

• **SiTime Direct:**
  • Contact SiTime Inside Sales at:
    • [http://www.sitime.com/company/contact-sitime-corporation](http://www.sitime.com/company/contact-sitime-corporation)

• **Unit Price: $249 Resale**
  • Includes Complete Time Machine Kit
Web Resource

• Visit [http://www.sitime.com/time-machine](http://www.sitime.com/time-machine) for information on
  • Time Machine product brief
  • Ordering info
  • Software downloads
  • Support documentation
  • Supported devices

• Visit [http://www.sitime.com/fp-devices](http://www.sitime.com/fp-devices) for information on
  • Field programmable datasheet
  • Field programmable oscillator ordering info
  • Updates on support for new SiTime products
Contact Information

• For Questions, contact SiTime Technical Support
  Technicalsupport@sitime.com

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  • For a list of part numbers used for each test, contact SiTime Technical Support at the email address listed above.