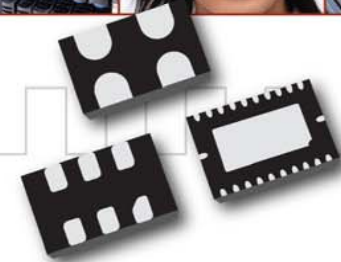# SiTime University Turbo Webinar Series

Instant Oscillators with MEMS Field Programmable Solution

June 3, 2013

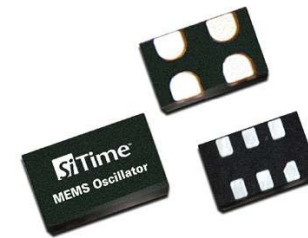The Smart Timing Choice™

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
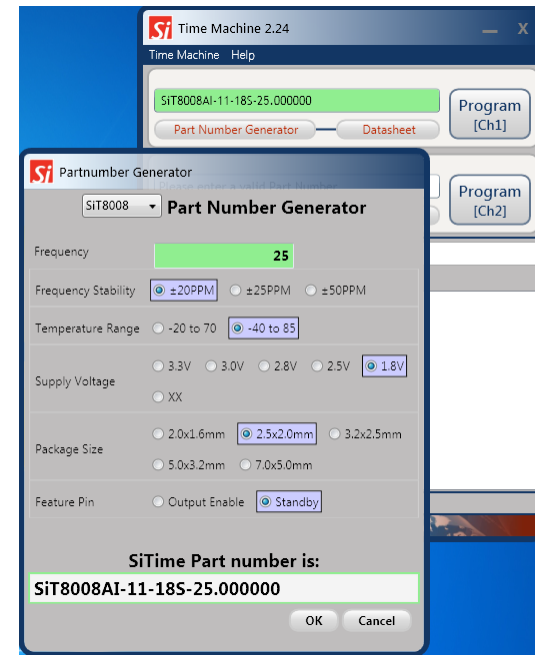
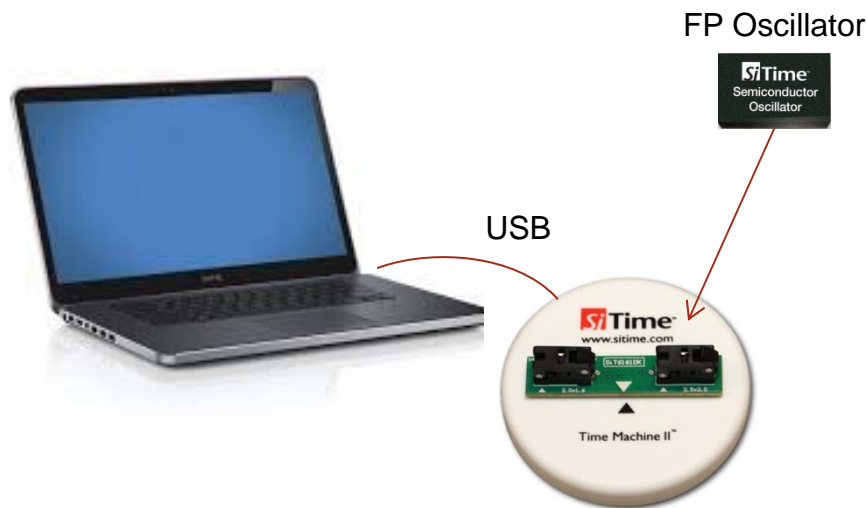Oscillator Programmer

Field Programmable (FP) Oscillators

Create Quartz Replacement in Seconds

Any Frequency, Any Voltage, Any Stability, Any Package

3 Simple Steps to Program Oscillators to Your Exact Specification

FP Oscillator

USB

| 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
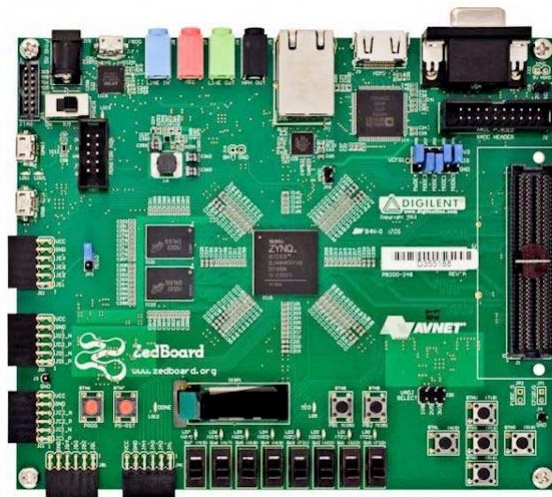
Xilinx Zyng-7000 Reference Board

SiTime Programmed Part	Xilinx Zyg-7000	SiTime FP Oscillator
SIT9121AI-2D3N25E200.00000	X	SiT9121AI-2D1-xxx000.FP000
SIT8008AN-23-25^E-12.00000	X	SiT8008AI-21-XXX-000.FP000
SIT8008AC-23-18-E33.33333	X	
SIT8008AC-23-18-E66.00000	X	

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

Si Time™

CPU: Over-Clocking

32M Flash
(One piece with each side)

64M SDRAM
(One piece with each side)

CPU/Mother Board
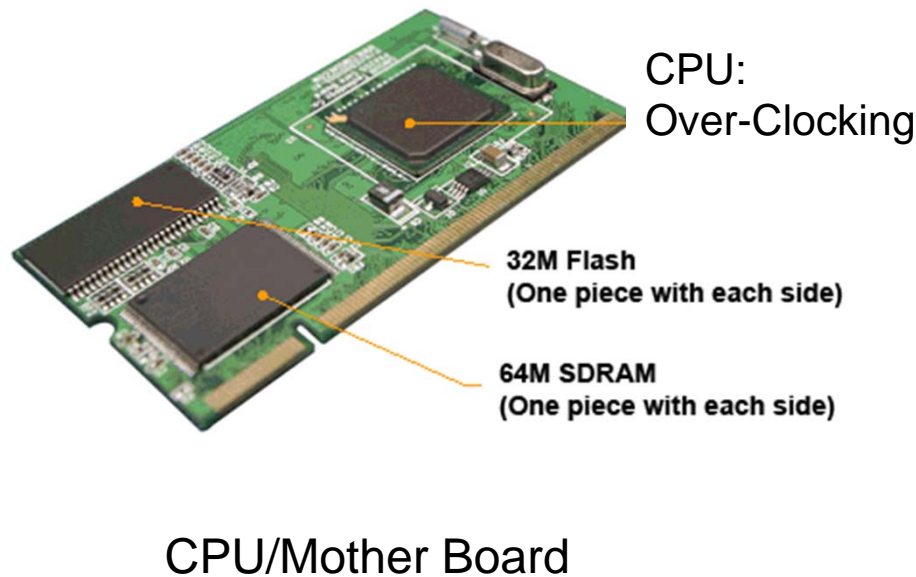
SiTime Programmed Part	SiTime FP Oscillator
SiT8008AI-22-33E-100.000000	SiT8008AI-21-XXX-000.FP000
SIT8008AI-22-33E-110.000000	
SIT8008AI-22-33E-120.000000	
SIT8008AI-22-33E-130.000000	

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

Visit 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

Si Time

Two package sizes
per socket card

USB powered
w/ micro USB port

Socket card color-coded
for different package sizes

Oscillator pin-1
Location indicator

Visual cue indicating
proper socket card insertion
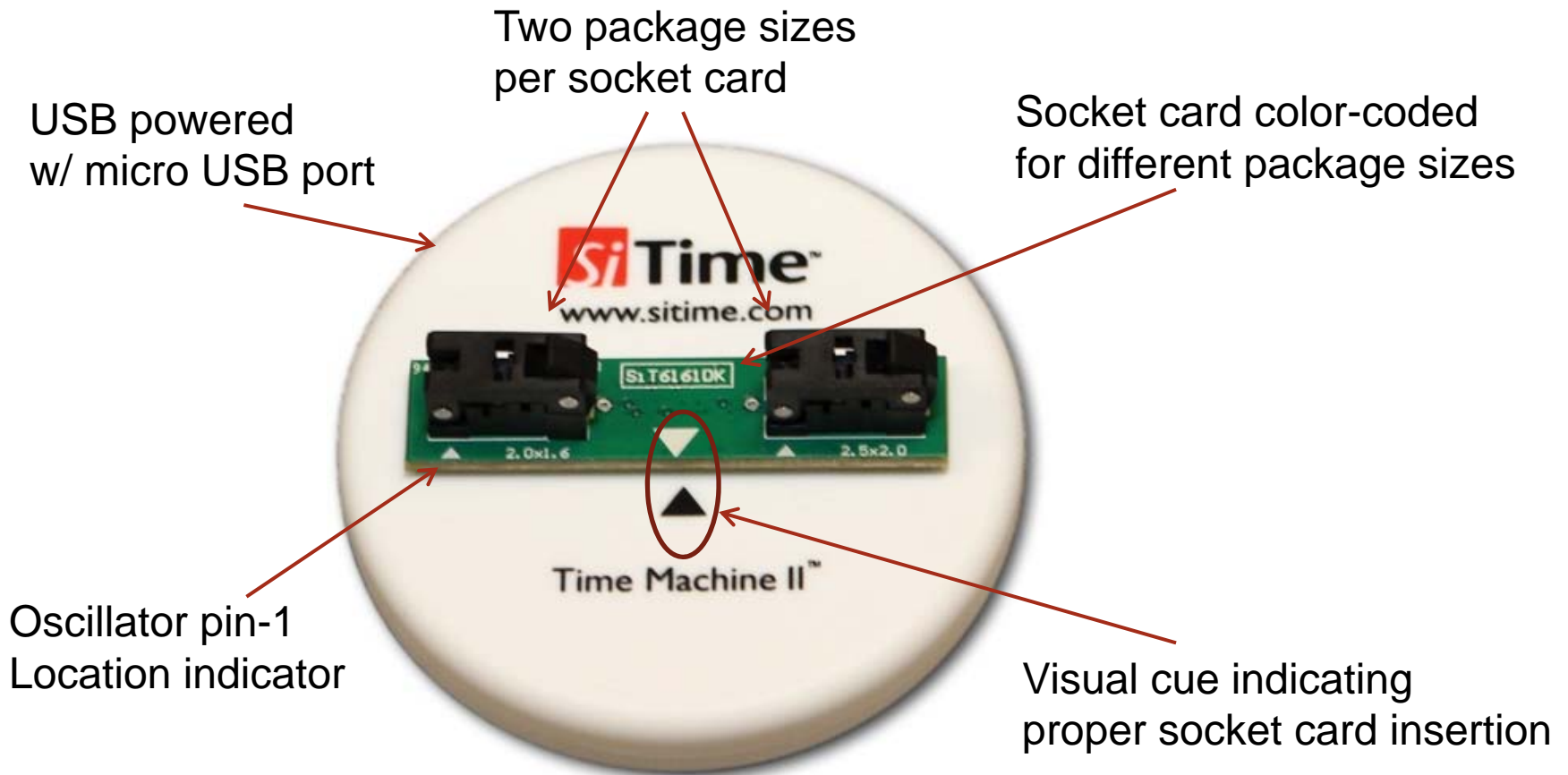
Fast Programming - ~5 second per device
Firmware upgrade – support future MEMS oscillator products

Easy-to-use Programming Software with Auto Update

SiTime™

Generate a part #
Click Program

Si Time Machine 2.24 — X

Time Machine   Help

SiT8008AC-31-33E-44.000000 | Program [Ch1]
Part Number Generator — Datasheet

Enter Part #
Click Program

SiT8008AC-81-18E-55.000000 | Program [Ch2]
Part Number Generator — Datasheet

Link to online document

Please enter a Tracking ID (optional)

Additional Information

Other features::
Auto update,
programming history

Programming status info

Connectivity Status

Connected   READY

The Smart Timing Choice™

Auto-update or download software from http://www.sitime.com/support/time-machine-oscillator-programmer

Programmable Feature with Time Machine

Configure Devices to Your Exact Specification

Customizable Frequency	Differential: I to 625 MHz Single-ended: I to 220 MHz	6 decimals of accuracy
Frequency Stability	±20 to ±50 PPM	
Supply Voltage	1.8V, 2.5 to 3.3V	
Pull Range	Programmable from ±25 to ±1600 ppm in VCXO	
SoftEdge™	Programmable high and low drive strength	

Additional Options

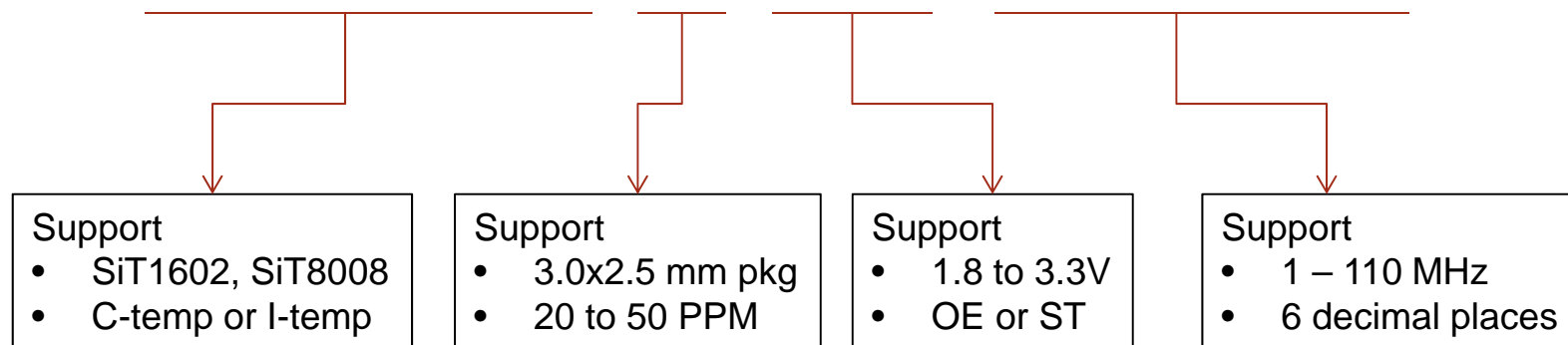|	
Package Options	2016, 2520, 3225, 5032, 7050 plastic packages
Temperature Range	Ext. Commercial (-20 to +70°C), Industrial (-40 to +85°C)
Output Signaling	Differential: LVPECL, LVDS or HCSL, Single-ended: LVCMOS

Visit 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	Support	Support	Support
• SiT1602, SiT8008 • C-temp or I-temp	• 3.0x2.5 mm pkg • 20 to 50 PPM	• 1.8 to 3.3V • OE or ST	• 1 – 110 MHz • 6 decimal places

SiTime Products Supported by Field Programmable Devices

32 kHz XO and XTAL Replacement 85% Smaller 50% Lower Power	Low Jitter XO 0.3 to 0.5 ps Jitter ±10 to 50 PPM	Low Power XO ±10 to 50 PPM	High Temp XO up to +125°C ±25 to 50 PPM	VCXO 0.5 ps Jitter	DCXO 0.5 ps Jitter	(VC) TCXO 0.5 ps Jitter	Spread Spectrum XO ±50 to 100 PPM	Clock Generator ±20 to 50 PPM
SiT1532 32.768 kHz 1508 CSP 1.2 to 3.63V	SiT8208/9 1-220 MHz	SiT1602 3.75-75 MHz Std Freq	SiT1618 7.3728-48 MHz Std Freq -40 to +125°C	SiT3807 1.5-45 MHz Std Freq	SiT3907 1-220 MHz	SiT5000 10-45 MHz ±2-5 PPM	SiT9001 1-200 MHz	SiT9201 1-100 MHz 1 Output 2824 SOT23
SiT1533 32.768 kHz 2012 SMD 1.2 to 3.63V	SiT8225 25 MHz 1/10 GbE	SiT8008 1-110 MHz 3.5-5 mA	SiT8918 1-110 MHz -40 to +125°C	SiT3808/9 1-220 MHz	SiT3921/2 Diff 1-625 MHz	SiT5001/2 1-220 MHz ±1.5 to 5 PPM	SiT9003 Low Power 1-110 MHz	
SiT1534 1 Hz–32.768 kHz 1508 CSP, 2012 SMD 1.2 to 3.63V	SiT8256 156.25 MHz 1/10 GbE	SiT8009 115-137 MHz 5-7 mA	SiT8920 1-110 MHz -55 to +125°C	SiT3821/2 Diff 1-625 MHz		SiT5021/2 Diff 1-625 MHz ±1.5 to 5 PPM	SiT9002 Diff 1-220 MHz	
SiT1542 32.768 kHz 1508 CSP 2.7 to 4.5V	SiT9120 Diff 25-212.5 MHz	SiT8003XT 0.25mm thin 1-110 MHz						
SiT1543 32.768 kHz 2012 SMD 2.7 to 4.5V	SiT9121/2 Diff 1-625 MHz	SiT8503 200-1000 kHz						
SiT1544 1 Hz–32.768 kHz 1508 CSP, 2012 SMD 2.7 to 4.5V	SiT9156 Diff 156.25 MHz 10/40 GbE							
SiT1630/1 32.768 kHz SiT1630: 1.2 to 3.63V SiT1631: 2.7 to 4.5V								

Legend:
- ■ LVCMOS output
- ■ Differential output
- ◣ NanoDrive™ output
- ◣ Available as field programmable for use with Time Machine II Programmer
- 📍 Pin-to-pin compatible with quartz devices

Visit http://www.sitime.com/fp-devices for information on field programmable devices

Where to Buy

- **SiTime Distributors—**
  - <u>N. America</u>: 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

- **Unit Price: $249 Resale**
  - Includes Complete Time Machine Kit

Web Resource

- **Visit 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 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

- **For _Turbo Webinar_ pdf Downloads on SiTime's Web Site**

  www.sitime.com/support/sitime-u/turbo-webinars

  - All new webinars will be posted within 24-hours
  - For a list of part numbers used for each test, contact SiTime Technical Support at the email address listed above.