Field Programmable
Oscillators and Active Resonators

Description

SiTime offers a wide range of field programmable (FP) MEMS oscillators and active resonators including simple oscillators, differential oscillators, high temperature oscillators, precision TCXO, VCXO and spread spectrum oscillators. These FP devices support the same specifications and performance as their factory-programmed counterparts.

They enable engineers to experiment with different configurations and generate customized samples in seconds for fast prototyping.

Figure 1 illustrates the simple programming setup required for programming SiTime FP devices by using the SiT6100DK, a field programming kit. Refer to SiT6100DK quick start guide and other documents for more information.

For production volume, SiTime offers factory programming of its entire portfolio with the shortest lead time available in the industry.

Applications

- Generic samples in seconds for prototype builds
- Experiment with different options for optimal timing margin
- Configure different drive strengths for best EMI and/or to drive larger loads
- Fast prototype builds

Features

- Support for 10 MEMS oscillator families
  - Low power (SiT1602, SiT8008, SiT8009)
  - Ultra-performance (SiT8208, SiT8209)
  - Ultra-performance differential (SiT9120, SiT9121, SiT9122)
  - High temp (SiT1618, SiT8918, SiT8919, SiT8920, SiT8921)
  - AEC-Q100 Automotive (SiT2024, SiT2025, SiT8924, SiT8925, SiT9025)
  - SOT23 oscillator (SiT2001, SiT2002, SiT2018, SiT2019, SiT2020, SiT2021)
  - VCXO (SiT3807, SiT3808, SiT3809)
  - Spread spectrum (SiT9003, SiT9005)
  - Ruggedized (SiT5146, SiT5147, SiT5346, SiT5347, SiT5348, SiT5349, SiT9346, SiT9347)
  - µPower (SiT1581)
- Support for 3 MEMS active resonator families
  - Low power (SiT1408, SiT1409)
  - High temp (SiT1418, SiT1419, SiT1420, SiT1421)
  - AEC-Q100 Automotive (SiT1424, SiT1425)
- Wide variety of programmable options
  - Frequency from 1 – 725 MHz
  - Frequency stability from ±50 ppb to ±50 ppm
  - Supply voltages of 1.8 V to 3.3 V
  - Operating temperature up to 125°C and down to -55°C
  - Package sizes for 1.5 x 0.8 to 7.0 x 5.0 mm x mm
  - Pull ranges from ±50 to ±3200 ppm
  - Spread percentage from ±0.25% to ±2% or -0.5% to -4% (Spread spectrum only)
  - Rise/fall time from 0.25 ns to 40 ns
- Pb-free, RoHS and REACH compliant

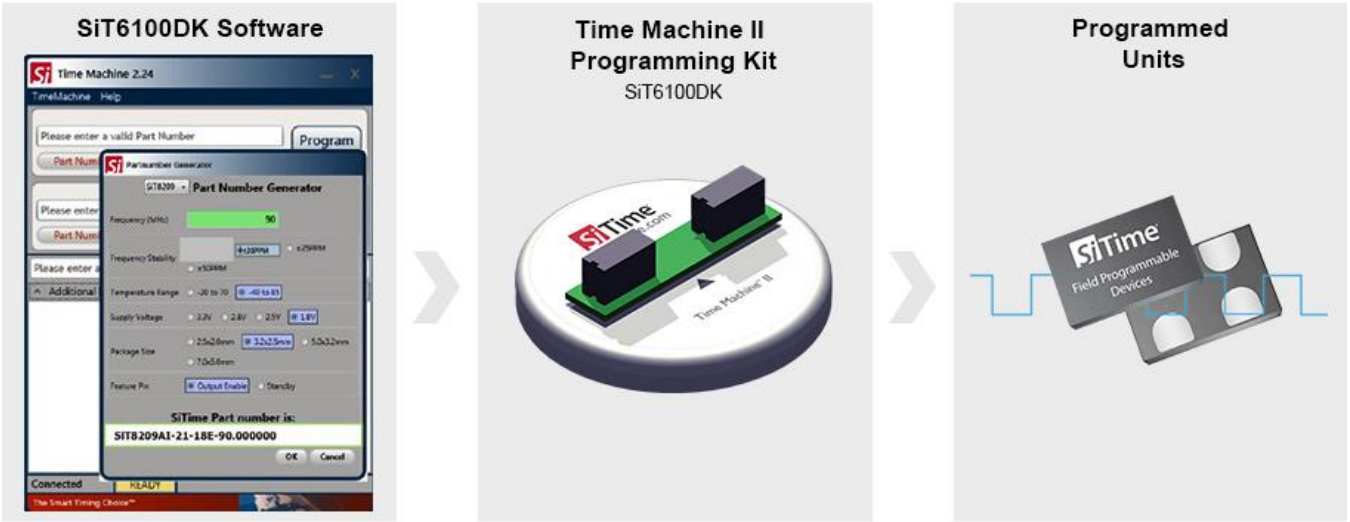

Figure 1. Field Programmable Software and Hardware

Field Programmable Device Ordering Information

A FP device works as a superset of its programmed counterpart. In certain cases, it can also be mapped to different programmed base products.

As an example, SiT8008BI-71-XXX-000.FP0000 is a field programmable device in the low power family. It comes in the 2.0 x 1.6 mm package, and can be programmed to support different combinations of the following:

- Frequency: 1 MHz to 110 MHz with 6 decimal places of accuracy
- Frequency stability: ±20 ppm, ±25 ppm, ±50 ppm
- Temperature range: -20°C to 70°C, -40°C to 85°C
- Supply voltages: 1.8 V or 2.5 V to 3.3 V
- Output drive strength: 8 different options for different rise/fall time

In addition, the SiT8008BI-11--XXX-000.FP0000 can be used for either SiT1602 or SiT8008 in the 2.0 x 1.6 mm x mm package. The SiT1602 and the SiT8008 share similar electrical specs and the same field programmable devices, but they support different frequencies.

Please see Supported Device column to determine which product families can be programmed using the given FP part.

Contact SiTime for devices of your interest that are not covered here.

Table 1. Field Programmable Devices – MEMS XO[1]

Product Family	Field Programmable (FP) Part Number	Supported Devices	Signaling Type	Frequency Range (MHz)	Frequency Stability (ppm)	Temp Range (°C)	Voltage (V)	Package Size (mm x mm)	Socket Card
Low Power Single-Ended Oscillator	SiT8008BI-71-XXX-000.FP0000	SiT1602[2] SiT8008	LVCMOS	1 to 110	±20, ±25, ±50	-40 to 85, -20 to 70	1.8-3.3 V	2.0 x 1.6	SiT6161DK
	SiT8008BI-11-XXX-000.FP0000							2.5 x 2.0	SiT6161DK
	SiT8008BI-21-XXX-000.FP0000							3.2 x 2.5	SiT6165DK
	SiT8008BI-31-XXX-000.FP0000							5.0 x 3.2	SiT6160DK
	SiT8008BI-81-XXX-000.FP0000							7.0 x 5.0	SiT6160DK
	SiT8009BI-71-XXX-000.FP0000	SiT8009	LVCMOS	115 to 137	±20, ±25, ±50	-40 to 85, -20 to 70	1.8 V, 2.5-3.3 V	2.0 x 1.6	SiT6161DK
	SiT8009BI-11-XXX-000.FP0000							2.5 x 2.0	SiT6161DK
	SiT8009BI-21-XXX-000.FP0000							3.2 x 2.5	SiT6165DK
	SiT8009BI-31-XXX-000.FP0000							5.0 x 3.2	SiT6160DK
	SiT8009BI-81-XXX-000.FP0000							7.0 x 5.0	SiT6160DK
Low Power Single-Ended Active Resonator	SiT1408BI-11-XXX-000.FP0000	SiT1408 SiT1409	LVCMOS	1 to 110	±20, ±25, ±50	-40 to 85, -20 to 70	1.8-3.3 V	2.5 x 2.0	SiT6167DK
	SiT1408BI-21-XXX-000.FP0000							3.2 x 2.5	SiT6168DK
	SiT1409BI-11-XXX-000.FP0000	SiT1408 SiT1409	LVCMOS	115 to 137	±20, ±25, ±50	-40 to 85, -20 to 70	1.8 V, 2.5-3.3 V	2.5 x 2.0	SiT6167DK
	SiT1409BI-21-XXX-000.FP0000							3.2 x 2.5	SiT6168DK
Ultra-Performance Single-Ended Oscillator	SiT8208AI-21-XXX-000.FP0000	SiT8208	LVCMOS	1 to 80	±20, ±25, ±50	-40 to 85, -20 to 70	1.8 V, 2.5-3.3 V	3.2 x 2.5	SiT6165DK
	SiT8208AI-31-XXX-000.FP0000							5.0 x 3.2	SiT6160DK
	SiT8208AI-81-XXX-000.FP0000							7.0 x 5.0	SiT6160DK
	SiT8209AI-21-XXX-000.FP0000	SiT8209	LVCMOS	80 to 220	±20, ±25, ±50	-40 to 85, -20 to 70	1.8 V, 2.5-3.3 V	3.2 x 2.5	SiT6165DK
	SiT8209AI-31-XXX-000.FP0000							5.0 x 3.2	SiT6160DK
	SiT8209AI-81-XXX-000.FP0000							7.0 x 5.0	SiT6160DK
High Performance Differential Oscillator	SiT9121AI-1B1-XXX000.FP0000	SiT9120[3] SiT9121	LVPECL	1 to 220	±20, ±25, ±50	-40 to 85, -20 to 70	2.5 V, 3.3 V	3.2 x 2.5	SiT6165DK
	SiT9121AI-1C1-XXX000.FP0000							5.0 x 3.2	SiT6160DK
	SiT9121AI-1D1-XXX000.FP0000							7.0 x 5.0	SiT6160DK
	SiT9121AI-2B1-XXX000.FP0000		LVDS	1 to 220	±20, ±25, ±50	-40 to 85, -20 to 70	2.5 V, 3.3 V	3.2 x 2.5	SiT6165DK
	SiT9121AI-2C1-XXX000.FP0000							5.0 x 3.2	SiT6160DK
	SiT9121AI-2D1-XXX000.FP0000							7.0 x 5.0	SiT6160DK
	SiT9122AI-1B1-XXX000.FP0000	SiT9122	LVPECL	220 to 625	±20, ±25, ±50	-40 to 85, -20 to 70	2.5 V, 3.3 V	3.2 x 2.5	SiT6165DK
	SiT9122AI-1C1-XXX000.FP0000							5.0 x 3.2	SiT6160DK
	SiT9122AI-1D1-XXX000.FP0000							7.0 x 5.0	SiT6160DK
	SiT9122AI-2B1-XXX000.FP0000		LVDS	220 to 625	±20, ±25, ±50	-40 to 85, -20 to 70	2.5 V, 3.3 V	3.2 x 2.5	SiT6165DK
	SiT9122AI-2C1-XXX000.FP0000							5.0 x 3.2	SiT6160DK
	SiT9122AI-2D1-XXX000.FP0000							7.0 x 5.0	SiT6160DK

Table 1. Field Programmable Devices – MEMS XO[4] (continued)

Product Family	Field Programmable (FP) Part Number	Supported Devices	Signaling Type	Frequency Range (MHz)	Frequency Stability (ppm)	Temp Range (°C)	Voltage (V)	Package Size (mm x mm)	Socket Card
High Temperature Single-Ended Oscillator	SiT8920BM-71-XXX-000.FP0000	SiT1618[5] SiT8918[6] SiT8920	LVCMOS	1 to 110 Refer "Supported Frequencies" tables in SiT1618, SiT8918 and SiT8920 datasheets	±20, ±25, ±30, ±50	-40 to 105, -40 to 125, -55 to 125	1.8 V, 2.5-3.3 V	2.0 x 1.6	SiT6161DK
	SiT8920BM-11-XXX-000.FP0000							2.5 x 2.0	SiT6161DK
	SiT8920BM-21-XXX-000.FP0000							3.2 x 2.5	SiT6165DK
	SiT8920BM-31-XXX-000.FP0000							5.0 x 3.2	SiT6160DK
	SiT8920BM-81-XXX-000.FP0000							7.0 x 5.0	SiT6160DK
	SiT8921BM-71-XXX-000.FP0000	SiT8919[7] SiT8921	LVCMOS	115.194001 to 137 Refer "Supported Frequencies" tables in SiT8919 and SiT8921 datasheets	±20, ±25, ±30, ±50	-40 to 105, -40 to 125, -55 to 125	1.8 V, 2.5-3.3 V	2.0 x 1.6	SiT6161DK
	SiT8921BM-11-XXX-000.FP0000							2.5 x 2.0	SiT6161DK
	SiT8921BM-21-XXX-000.FP0000							3.2 x 2.5	SiT6165DK
	SiT8921BM-31-XXX-000.FP0000							5.0 x 3.2	SiT6160DK
	SiT8921BM-81-XXX-000.FP0000							7.0 x 5.0	SiT6160DK
High Temperature Single-Ended Active Resonator	SiT1420BM-11-XXX-000.FP0000	SiT1418[8] SiT1420	LVCMOS	1 to 110 Refer "Supported Frequencies" tables in SiT1418 and SiT1420 datasheets	±20, ±25, ±30, ±50	-40 to 105, -40 to 125	1.8 V, 2.5-3.3 V	2.5 x 2.0	SiT6167DK
	SiT1420BM-21-XXX-000.FP0000							3.2 x 2.5	SiT6168DK
	SiT1421BM-11-XXX-000.FP0000	SiT1419[9] SiT1421	LVCMOS	115.194001 to 137 Refer "Supported Frequencies" tables in SiT1419 and SiT1421 datasheets	±20, ±25, ±30, ±50	-40 to 105, -40 to 125	1.8 V, 2.5-3.3 V	2.5 x 2.0	SiT6167DK
	SiT1421BM-21-XXX-000.FP0000							3.2 x 2.5	SiT6168DK
AEC-Q100 Automotive Oscillator	SiT2024BM-S1-XXX-000.FP0000	SiT2024	LVCMOS	1 to 110 Refer "Supported Frequencies" table in SiT2024 datasheet	±20, ±25, ±30, ±50	-40 to 85, -40 to 105, -40 to 125, -55 to 125	1.8 V, 2.5-3.3 V	2.9 x 2.8 (SOT23-5)	SiT6165DK
	SiT2025BM-S1-XXX-000.FP0000	SiT2025	LVCMOS	115.2 to 137 Refer "Supported Frequencies" table in SiT2025 datasheet	±20, ±25, ±30, ±50	-40 to 85, -40 to 105, -40 to 125, -55 to 125	1.8 V, 2.5-3.3 V	2.9 x 2.8 (SOT23-5)	SiT6165DK
	SiT8924BM-71-XXX-000.FP0000	SiT8924	LVCMOS	1 to 110 Refer "Supported Frequencies" table in SiT8924 datasheet	±20, ±25, ±30, ±50	-40 to 85, -40 to 105, -40 to 125, -55 to 125	1.8 V, 2.5-3.3 V	2.0 x 1.6	SiT6161DK
	SiT8924BM-11-XXX-000.FP0000							2.5 x 2.0	SiT6161DK
	SiT8924BM-21-XXX-000.FP0000							3.2 x 2.5	SiT6165DK
	SiT8924BM-31-XXX-000.FP0000							5.0 x 3.2	SiT6160DK
	SiT8924BM-81-XXX-000.FP0000							7.0 x 5.0	SiT6160DK
	SiT8925BM-71-XXX-000.FP0000	SiT8925	LVCMOS	115.2 to 137 Refer "Supported Frequencies" table in SiT8925 datasheet	±20, ±25, ±30, ±50	-40 to 85, -40 to 105, -40 to 125, -55 to 125	1.8 V, 2.5-3.3 V	2.0 x 1.6	SiT6161DK
	SiT8925BM-11-XXX-000.FP0000							2.5 x 2.0	SiT6161DK
	SiT8925BM-21-XXX-000.FP0000							3.2 x 2.5	SiT6165DK
	SiT8925BM-31-XXX-000.FP0000							5.0 x 3.2	SiT6160DK
	SiT8925BM-81-XXX-000.FP0000							7.0 x 5.0	SiT6160DK
AEC-Q100 Automotive Active Resonator	SiT1424BM-11-XXX-000.FP0000	SiT1424	LVCMOS	1 to 110 Refer "Supported Frequencies" table in SiT1424 datasheet	±20, ±25, ±30, ±50	-40 to 85, -40 to 105, -40 to 125, -55 to 125	1.8 V, 2.5-3.3 V	2.5 x 2.0	SiT6167DK
	SiT1424BM-21-XXX-000.FP0000							3.2 x 2.5	SiT6168DK
	SiT1425BM-11-XXX-000.FP0000	SiT1425	LVCMOS	115.2 to 137 Refer "Supported Frequencies" table in SiT1425 datasheet	±20, ±25, ±30, ±50	-40 to 85, -40 to 105, -40 to 125, -55 to 125	1.8 V, 2.5-3.3 V	2.5 x 2.0	SiT6167DK
	SiT1425BM-21-XXX-000.FP0000							3.2 x 2.5	SiT6168DK

Table 1. Field Programmable Devices – MEMS XO[4] (continued)

Product Family	Field Programmable (FP) Part Number	Supported Devices	Signaling Type	Frequency Range (MHz)	Frequency Stability (ppm)	Temp Range (°C)	Voltage (V)	Package Size (mm x mm)	Socket Card
SoT23 Oscillator	SiT2001BI-S1-XXX-000.FP0000	**SiT2001**	LVCMOS	1 to 110	±20, ±25, ±50	-40 to 85, -20 to 70	1.8 V 2.5-3.3 V	2.9 x 2.8 (SOT23-5)	SiT6165DK
	SiT2002BI-S1-XXX-000.FP0000	**SiT2002**	LVCMOS	115 to 137	±20, ±25, ±50	-40 to 85, -20 to 70	1.8 V, 2.5-3.3 V	2.9 x 2.8 (SOT23-5)	SiT6165DK
	SiT2020BM-S1-XXX-000.FP0000	**SiT2018**[10] **SiT2020**	LVCMOS	1 to 110 Refer "Supported Frequencies" tables in SiT2018 and SiT2020 datasheets	±20, ±25, ±30, ±50	-40 to 105, -40 to 125, -55 to 125	1.8 V, 2.5-3.3 V	2.9 x 2.8 (SOT23-5)	SiT6165DK
	SiT2021BM-S1-XXX-000.FP0000	**SiT2019**[11] **SiT2021**	LVCMOS	115.194001 to 137 Refer "Supported Frequencies" tables in SiT2019 and SiT2021 datasheets	±20, ±25, ±30, ±50	-40 to 105, -40 to 125, -55 to 125	1.8 V, 2.5-3.3 V	2.9 x 2.8 (SOT23-5)	SiT6165DK

Notes:

1. Revision number which is placed right after SiTXXXX in the part number is fixed and not programmable. For instance, SiT8008A cannot be programed to SiT8008B.
2. SiT8008 FP devices are used to program SiT1602 part numbers. Excluding family, SiT8008 and SiT1602 also share the same orderi ng codes.
3. SiT9121 FP devices are used to program SiT9120 part numbers. Excluding family, SiT9121 and SiT9120 also share the same ordering codes.
4. Revision number which is placed right after SiTXXXX in the part number is fixed and not programmable. For instance, SiT8008A cannot be programed to SiT8008B.
5. SiT8920 FP devices are used to program SiT1618 part numbers. Excluding family, SiT8920 and SiT1618 also share the same ordering codes.
6. SiT8920 FP devices are used to program SiT8918 part numbers. Excluding family, SiT8920 and SiT8918 also share the same ordering codes.
7. SiT8921 FP devices are used to program SiT8919 part numbers. Excluding family, SiT8921 and SiT8919 also share the same ordering codes.
8. SiT1420 FP devices are used to program SiT1418 part numbers. Excluding family, SiT1420 and SiT1418 also share the same ordering codes.
9. SiT1421 FP devices are used to program SiT1419 part numbers. Excluding family, SiT1421 and SiT1419 also share the same ordering codes.
10. SiT2020 FP devices are used to program SiT2018 part numbers. Excluding family, SiT2020 and SiT2018 also share the same ordering codes.
11. SiT2021 FP devices are used to program SiT2019 part numbers. Excluding family, SiT2021 and SiT2019 also share the same ordering codes.

Table 2. Field Programmable Devices – MEMS VCXO[12]

Product Family	Field Programmable (FP) Part Number	Supported Devices	Signaling Type	Frequency Range (MHz)	Frequency Stability (ppm)	Temp Range (°C)	Voltage (V)	Pull Range (ppm)	Package Size (mm x mm)	Socket Card
High Performance Single-Ended VCXO	SiT3808AI-22-XXXX-000.FP0000	SiT3807[13] SiT3808	LVCMOS	1 to 80	±25, ±50	-40 to 85, -20 to 70	1.8 V, 2.5-3.3 V	±50 to ±1600	3.2 x 2.5	SiT6165DK
	SiT3808AI-C2-XXXX-000.FP0000								5.0 x 3.2	SiT6160DK
	SiT3808AI-D2-XXXX-000.FP0000								7.0 x 5.0	SiT6160DK
	SiT3809AI-22-XXXX-000.FP0000	SiT3809	LVCMOS	80 to 220	±25, ±50	-40 to 85, -20 to 70	1.8 V, 2.5-3.3 V	±50 to ±1600	3.2 x 2.5	SiT6165DK
	SiT3809AI-C2-XXXX-000.FP0000								5.0 x 3.2	SiT6160DK
	SiT3809AI-D2-XXXX-000.FP0000								7.0 x 5.0	SiT6160DK

Table 3. Field Programmable Devices – MEMS Spread Spectrum XO[12]

Product Family	Field Programmable (FP) Part Number	Supported Devices	Signaling Type	Frequency Range (MHz)	Frequency Stability (ppm)	Temp Range (°C)	Voltage (V)	Spread Range (%)	Package Size (mm x mm)	Socket Card
Spread Spectrum Single-Ended Oscillator	SiT9005AI-71-XXXX000.FP0000	SiT9005	LVCMOS	1 to 141 Refer to Table 5 for unsupported frequencies	±20, ±25, ±50	-40 to 85, -20 to 70	1.8 V, 2.5-3.3 V	±0.125 to ±2, -0.25 to -4	2.0 x 1.6	SiT6161DK
	SiT9005AI-11-XXXX000.FP0000								2.5 x 2.0	SiT6161DK
	SiT9005AI-21-XXXX000.FP0000								3.2 x 2.5	SiT6165DK
AEC-Q100 Automotive Spread Spectrum Single-Ended Oscillator	SiT9025AM-71-XXXX000.FP0000	SiT9025	LVCMOS	1 to 150 Refer to SiT9025 datasheet for unsupported frequencies	±20, ±25, ±50	-55 to 125, -40 to 125, -40 to 105, -40 to 85,	1.8 V, 2.5-3.3 V	±0.125 to ±2, -0.25 to -4	2.0 x 1.6	SiT6161DK
	SiT9025AM-11-XXXX000.FP0000								2.5 x 2.0	SiT6161DK
	SiT9025AM-21-XXXX000.FP0000								3.2 x 2.5	SiT6165DK
Spread Spectrum Single-Ended Oscillator	SiT9003AI-33-33XX-000.FP000	SiT9003	LVCMOS	1 to 110	±50, ±100	-40 to 85, -20 to 70	2.5 V, 2.8 V, 3.3 V	±0.25 to ±0.5, -0.5 to -1	5.0 x 3.2	SiT6160DK
	SiT9003AI-83-33XX-000.FP000								7.0 x 5.0	SiT6160DK
	SiT9003AI-33-18XX-000.FP000						1.8 V		5.0 x 3.2	SiT6160DK
	SiT9003AI-83-18XX-000.FP000								7.0 x 5.0	SiT6160DK

Table 4. Field Programmable Devices – MEMS µPower XO[12]

Product Family	Field Programmable (FP) Part Number	Supported Devices	Signaling Type	Frequency Range (MHz)	Frequency Stability (ppm)	Temp Range (°C)	Voltage (V)	Package Size (mm x mm)	Availability
µPower XO	SiT1581AI-J3-XXE-000.FP0000	SiT1581	LVCMOS	32.768	±0.5	-40 to 85, -20 to 70	1.8 V	1.5 x 0.8	Contact SiTime

Note:

12. Revision number which is placed right after SiTXXXX in the part number is fixed and not programmable. For instance, SiT8008A cannot be programed to SiT8008B.
13. SiT3808 FP devices are used to program SiT3807 part numbers. Excluding family, SiT3808 and SiT3807 also share the same ordering codes.

Table 5. List of SiT9005 FP Oscillator Unsupported Frequencies

SiT9005 FP Oscillator Unsupported Frequency Range (MHz)					
±2.06% center spread		-4.01% down spread		-4.28% center spread	
Min.	Max.	Min.	Max.	Min.	Max.
120.100000	121.100000	121.000000	121.300000	120.100000	122.300000
				122.900000	123.100000
				123.500000	124.000000
				124.9000000	125.200000

Tape & Reel Options

FP devices are shipped with standard Tape & Reel options. An additional letter is affixed to the end of the FP device part numbers in Table 6 to Table 8 to specify the tape size and the reel quantity.

For example, the last letter "G" in the SiT8008AI-71-XXX-000.FP0000G indicates 250 pieces of SiT8008AI FP devices shipped in 8 mm tape.

The complete list of T&R options for different device package sizes are shown in tables below.

Table 6. Ordering Codes for Supported Tape & Reel Packing Method

Supported FP Device: SiT8008, SiT1408, SiT8009, SiT1409, SiT8920, SiT1420, SiT8921, SiT1421, SiT8924, SiT1424, SiT8925, SiT1425, SiT9005, SiT9025

Tape & Reel	8 mm Tape		12 mm Tape		16 mm Tape	
Package Size (mm x mm)	**250 pcs reel**	**1ku reel**	**250 pcs reel**	**1ku reel**	**250 pcs reel**	**1ku reel**
2.0 x 1.6	G	E	–	–	–	–
2.5 x 2.0	G	E	–	–	–	–
3.2 x 2.5	G	E	–	–	–	–
5.0 x 3.2	–	–	X	Y	–	–
7.0 x 5.0	–	–	–	–	X	Y

Table 7. Ordering Codes for Supported Tape & Reel Packing Method

Supported FP Device: SiT3808, SiT3809, SiT3821, SiT3822, SiT8208, SiT8209, SiT9002, SiT9003, SiT9121, SiT9122

Tape & Reel	12 mm Tape		16 mm Tape	
Package Size (mm x mm)	**250 pcs reel**	**1ku reel**	**250 pcs reel**	**1ku reel**
2.5 x 2.0	X	Y	–	–
3.2 x 2.5	X	Y	–	–
5.0 x 3.2	X	Y	–	–
7.0 x 5.0	–	–	X	Y

Table 8. Ordering Codes for Supported Tape & Reel Packing Method

Supported FP Device: SiT2024, SiT2025, SiT9201, SiT2001, SiT2002, SiT2020, SiT2021

Tape & Reel	8mm Tape	
Package Size (mm x mm)	**250 pcs reel**	**1ku reel**
2.9 x 2.8	G	E

Time Machine II Programmer Kit

FP devices are programmed with SiTime's oscillator and active resonator programmer. Time Machine II is a complete programming kit. It comes with the programmer base unit and three socket cards, each of which accommodates two different package sizes. The ordering codes for the programming kit and the socket cards are shown in the table below.

Note that earlier versions of the programming kit were shipped with the SiT6162DK socket card that accommodates 2.7 x 2.4 mm x mm (2.5 x 2.0 compatible) and 3.2 x 2.5 mm x mm 4-pin packages. The SiT6162DK has since been replaced with SiT6165DK, which supports the 2.9 x 2.8 mm x mm (SOT23-5) packages in addition to 3.2 x 2.5 mm x mm packages.

The SiT6167DK and SiT6168DK exclusively support the SiT14xx family of active resonators. This family of devices cannot be programmed with other sockets.

Table 9. Programmer Kit Description and Ordering Codes

Device Name	Part Number	Description
Programming Kit	**SiT6100DK**	The complete kit that includes the programmer base (SiT61650DK) and three socket cards (SiT6160DK, SiT6161DK and SiT6165DK)
Programmer Base	**SiT6150DK**	The base programmer with no sockets
Programming Socket	**SiT6160DK**	5.0 x 3.2 and 7.0 x 5.0 packages programming sockets to program all 6-pin and 4-pin field programmable devices
Programming Socket	**SiT6161DK**	2.0 x 1.6 and 2.5 x 2.0 packages programming sockets to program 6-pin and 4-pin field programmable devices (excluding SiT14xx active resonators).
Programming Socket	**SiT6165DK**	3.2 x 2.5 package programming sockets to program 6-pin and 4-pin field programmable devices (excluding SiT14xx active resonators). 2.9 x 2.8 (SOT23-5) package supports 5-pin field programmable devices
Programming Socket	**SiT6167DK**	2.5 x 2.0 packages programming sockets to program 4-pin SiT14xx active resonators
Programming Socket	**SiT6168DK**	3.2 x 2.5 package programming sockets to program 4-pin SiT14xx active resonators

Socket Card Selection for Programming

Each socket card for the Time Machine II programmer comes with two sockets, each of which accommodates a particular package size. In addition, some sockets are designed to work with 4-pin devices only whereas other sockets can accommodate both 4-pin and 6-pin devices.

Table 10 and Table 11 shows how to select the proper socket card for the desired FP device package size. Note that the package sizes are also printed right next to the sockets on the socket cards for visual identification during device programming.

Table 10. Supported Packages (Excluding SiT14xx Active Resonators)

Package Size	2.0 x 1.6 (4-pin)	2.5 x 2.0 (4-pin)	2.9 x 2.8 (5-pin)	3.2 x 2.5 (4-pin & 6-pin)	5.0 x 3.2 (4-pin & 6-pin)	7.0 x 5.0 (4-pin & 6-pin)
Socket to use	**SiT6161DK**		**SiT6165DK**		**SiT6160DK**	
Supported Field Programmable Devices	SiT8008	SiT8008	SiT2024	SiT8008	SiT8008	SiT8008
	SiT8009	SiT8009	SiT2025	SiT8009	SiT8009	SiT8009
	SiT8920	SiT8920	SiT9201	SiT8208	SiT8208	SiT8208
	SiT8921	SiT8921	SiT2001	SiT8209	SiT8209	SiT8209
	SiT8924	SiT8924	SiT2002	SiT8920	SiT8920	SiT8920
	SiT8925	SiT8925	SiT2020	SiT8921	SiT8921	SiT8921
	SiT9005	SiT9003	SiT2021	SiT8924	SiT8924	SiT8924
		SiT9005		SiT8925	SiT8925	SiT8925
		SiT9025		SiT3808	SiT3808	SiT3808
				SiT3809	SiT3809	SiT3809
				SiT9121	SiT9121	SiT9121
				SiT9122	SiT9122	SiT9122
				SiT9003	SiT9003	SiT9003
				SiT9005		
				SiT9025		

Table 11. Supported Packages (Exclusively for SiT14xx Active Resonators)

Package Size	2.5 x 2.0 (4-pin)	3.2 x 2.5 (4-pin)
Socket to use	SiT6167DK	SiT6168DK
Supported Field Programmable Devices	SiT1408 SiT1409 SiT1418 SiT1419 SiT1420 SiT1421 SiT1424 SiT1425	SiT1408 SiT1409 SiT1418 SiT1419 SiT1420 SiT1421 SiT1424 SiT1425

Table 12. Revision History

Revision	Release Date	Change Summary
0.8	1-Apr-2013	First release
1.0	27-Feb-2014	Added more field programmer devices Updated Time Machine Socket Card information Formatted enhancement
1.01	12-Mar-2014	Corrected the ordering code for High Temperature, Single-Ended devices
1.1	30-Mar-2015	Updated revision from A to B for SiT8008/8009/8920/8921 Corrected frequency stability of SiT9002
1.2	21-Jul-2015	Added supports for AEC-Q100 automotive products;SiT2024, SiT2025, SiT8924,SiT8925 Added supports for clock generators products;SiT9201, 2001, 2002, SiT2018, SiT2019, SiT2020, SiT2021 Corrected frequency range and frequency stability of the high temperature products (SiT8920/SiT8921) in Table 1 Updated the part number of the program kits in Table 6
1.3	15-Sep-2015	Added ±25 ppm frequency stability option to AEC-Q100 family Revised spread percentage of SiT9001 Added 2.8 V voltage option to SiT9003
1.4	14-Mar-2016	Corrected and added one more “0” at the end of all part numbers except for SiT900x”
1.5	1-Feb-2018	Added SiT9005 Added SiT9002 unsupported frequencies list Took out 2520 and 3225 package options from SiT9003 Took out 2520 package option from SiT8208, SiT8209, SiT3807 and SiT3808 Took out SiT9001 Updated logo and company address, other page layout changes
1.6	26-Nov-2019	Added SiT5155, SiT5156, SiT5157, SiT5356, SiT5357 Added SiT6166DK Corrected SiT8208, SiT8209, SiT3808 and SiT3809 part numbers Corrected SiT3808, SiT3809, SiT3821, SiT3822 pull range options Corrected SiT3808, SiT3809 p/ns
1.7	4-Mar-2020	Added footnotes to supported devices Removed SiT3821, SiT3822, SiT9001, SiT9002 Removed SiT6166DK
1.75	9-Mar-2020	Added SiT1581, SiT5146, SiT5147, SiT5346, SiT5347, SiT5348, SiT5349, SiT9346, SiT9347
1.76	18-Sep-2020	Resolved typographical errors
1.77	12-May-2021	Added 1.8V to 3.3V support for SiT1602 and SiT8008, Added SiT9025 support
1.78	1-Feb-2022	Added SiT1408, SiT1409, SiT1418, SiT1419, SiT1420, SiT1421, SiT1424, SiT1425 active resonators Removed ruggedized Super-TCXOs and differential oscillators Fixed hyperlinks and other formatting issues

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