SFX-800G Synchronous Clock Generators

CONNOR WINFIELD

PLL

2111 Comprehensive Drive
Aurora, Illinois 60505
Phone: 630-851-4722
Fax: 630-851-5040
www.conwin.com

Applications

- SONET / SDH / ATM
- DWDM / FDM
- FEC (Forward Error Correction)

Features

- Available as a 3.3V High Precision PLL
- Eight User Selectable PECL Output Frequencies
- Jitter Generation OC-192 Compliant
- 1.2” x 1.0” x 0.285”, Surface Mount
- ROHS Compliant

RoHS COMPLIANT

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General Description

The SFX-800G is a high precision frequency translator that translates one input, greater than 1MHz, to one of eight selectable output frequencies between 10 MHz and 1 GHz. The SFX-800G supports all major FEC rates such as 15/14, 255/237 etc.

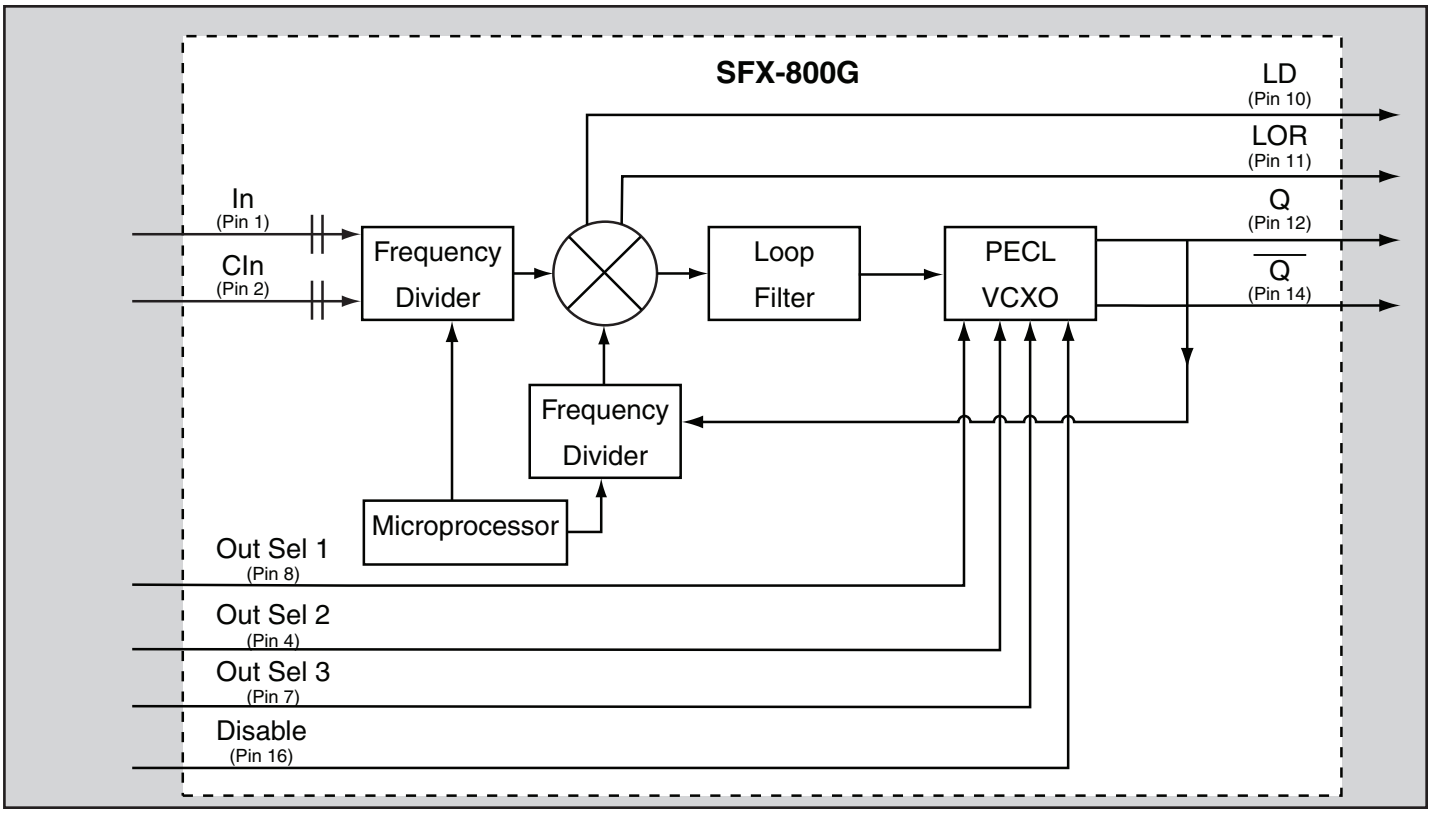
SFX-800G is well suited for use in line cards, service termination cards and similar functions to provide reliable reference, phase locked, synchronization for TDM, PDH, SONET and SDH network equipment. The SFX-800G provides a jitter filtered, wander following output signal synchronized to a superior Stratum or peer input reference signal.

The SFX-800G includes a lock detect (LD) alarm output and a loss of reference (LOR) alarm output. The LVPECL outputs may be disabled for external testing purposes by asserting a high signal to the Enable/Disable pin.

The SFX-800G package typical dimensions are 1.2" x 1.0" x 0.285". Parts are assembled using high temperature solder to withstand surface mount reflow process.

Functional Block Diagram

Figure 1



Absolute Maximum Rating

Table 1

Symbol	Parameter	Minimum	Nominal	Maximum	Units	Notes
Vcc	Power Supply Voltage (OptionD)	-0.3		3.6	Volts	
VI	Input Voltage	-0.3		Vcc + 0.3	Volts	
Ts	Storage Temperature (OptionF)	-65		150	°C	

Specifications

Table 2

Symbol	Parameter	Minimum	Nominal	Maximum	Units	Notes
f_{IN}	Input Frequencies (Comp PECL)	1		250	MHz	
	Input Frequencies (HCMOS	.008	0	250	MHz	2.0
f_{OUT}	Output Frequencies (Comp PECL)	10		1125	MHz	
Vcc	Supply Voltage	3.135	3.3	3.465	Volts	
I_{CC}	Supply Current		175		mA	
V_{OH}	High Level Output Voltage	2.275			V	
V_{OL}	Low Level Output Voltage			1.68	V	
T_R/T_F	Rise/Fall Time (20% - 80%)			180	ps	
SYM	Output Symmetry	45		55	%	
J_{GEN}	Jitter Generation RMS (12 kHz - 20 MHz)		0.5	1	ps	
J_{TRAN}	Jitter Transfer			0.1	dB	1.0
APR	Input Frequency Tracking	±300			ppm	
T_{OP}	Operating Temperature	0		70	°C	
CAL_{VCO}	Self VCO Calibration		1.5		sec	3.0
	Jitter Bandwidth -		450	-	Hz	
	Phase Detector Comparison Frequency	-	24	-	kHz	

NOTES: 1.0: GR-253-CORE, Sec. 5.6.2.1.2
2.0: CIN (Pin 2) is not used internally. It is AC coupled and loaded with a 180Ω resistor to ground.
3.0: VCO calibration occurs with each power-up and with each new output frequency selection. See figure 3 for the proper calibration sequence. Without a proper VCO calibration sequence, the unit will not lock and the output frequency could vary substantially from nominal.

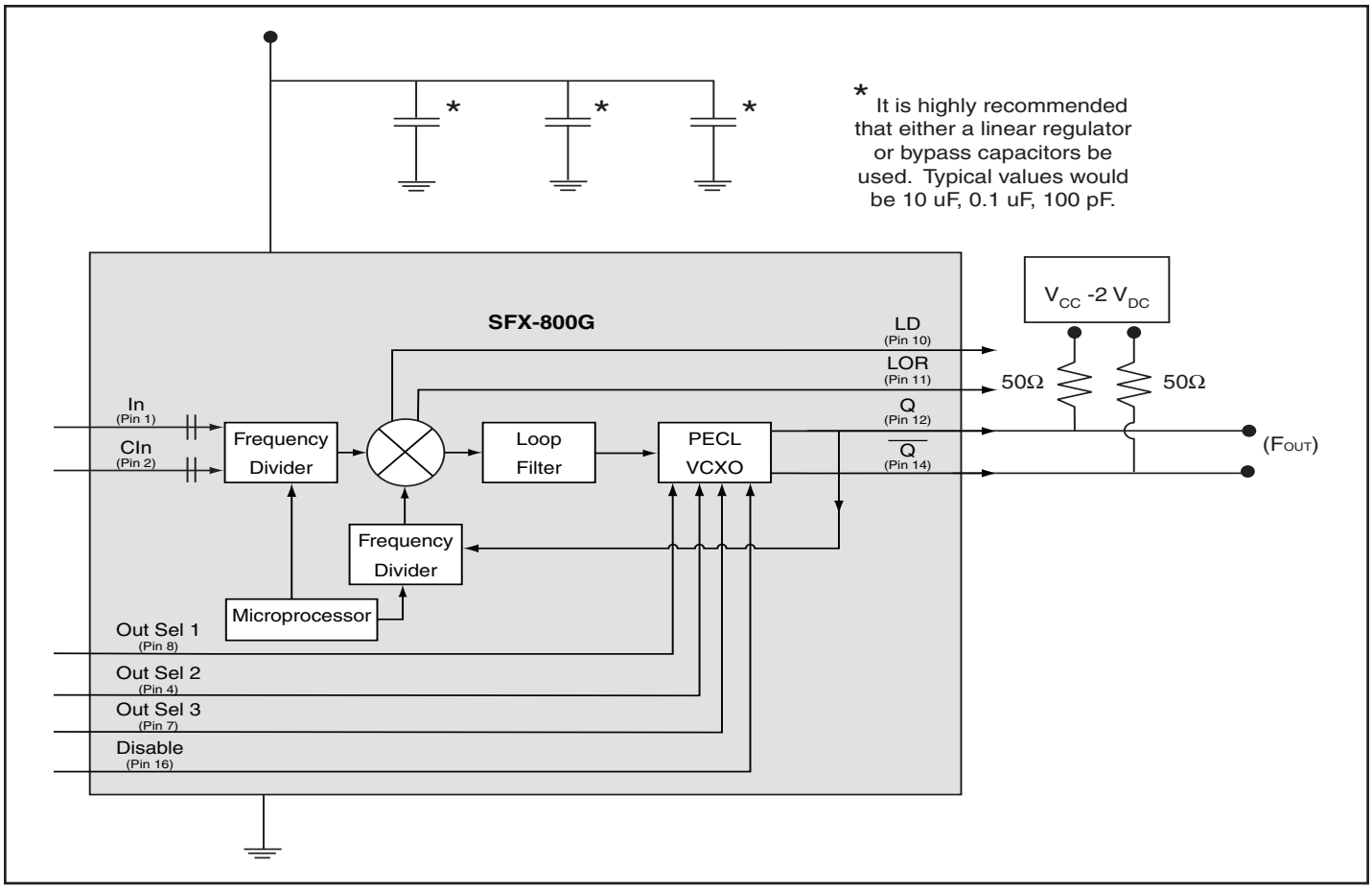
Pin Description

Table 3

Pin #	Connection	Description
1	In	Input Frequency, Signal is AC coupled
2	CIn	Complementary Input Frequency, Signal is AC coupled
3	GND	Ground
4	Out Sel 2	Output Frequency Select 2
5	NC	Do Not Connect
6	NC	Do Not Connect
7	Out Sel 3	Output Frequency Select 3
8	Out Sel 1	Output Frequency Select 1
9	Vcc	Supply Voltage
10	LD (Output)	Lock Detect Logic “1” indicates that the unit is locked to the input reference Logic “0” indicates that the reference is lost or out of lock range
11	LOR	Loss of Reference Logic “1” indicates that reference is present Logic “0” indicates that reference is lost
12	$\overline{Q}$	PECL Output (Low when Disabled)
13	GND	Ground
14	Q	PECL Complemetary Output (High when Disabled)
15	GND	Ground
16	Disable (Input)	Logic “0” (or no connect) = PECL Outputs are Enabled Logic “1” = PECL Outputs are Disabled

Output Load and Power Supply Filtering Recommendations

Figure 2



Output Select Table

Table 4

Out Sel 3	Out Sel 2	Out Sel 1	Output Freq. Selected
0	0	0	Output Freq. 1
0	0	1	Output Freq. 2
0	1	0	Output Freq. 3
0	1	1	Output Freq. 4
1	0	0	Output Freq. 5
1	0	1	Output Freq. 6
1	1	0	Output Freq. 7
1	1	1	Output Freq. 8

Note: VCO calibration occurs with each new output frequency selection. See figure 3 for the proper calibration sequence. Without a proper VCO calibration sequence, the unit will not lock and the output frequency could vary substantially from nominal.

Alarm Function

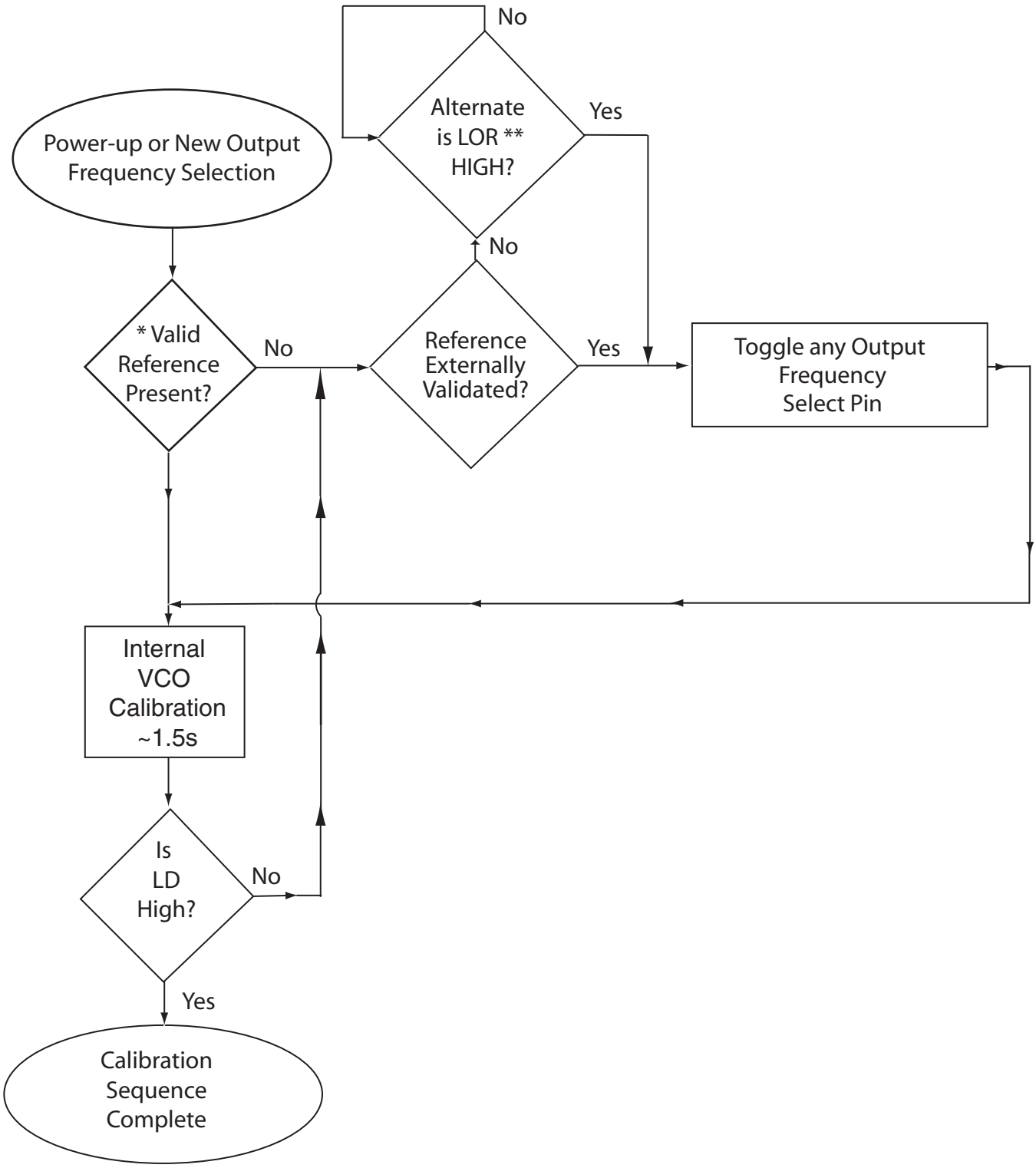
Table 5

LOR (Loss of Reference)
When the external reference is <= 1MHz, LOR is LOW
When the external reference is > 1MHz, LOR is HIGH

LD (Lock Detect)
When the Phase Detector Error is <= 7ns (typ) for 5 cycles, LD is HIGH
After LD is HIGH, it will go LOW if the Phase Detector Error of any cycle is >15ns (typ)

VCO Calibration Sequence Flowchart

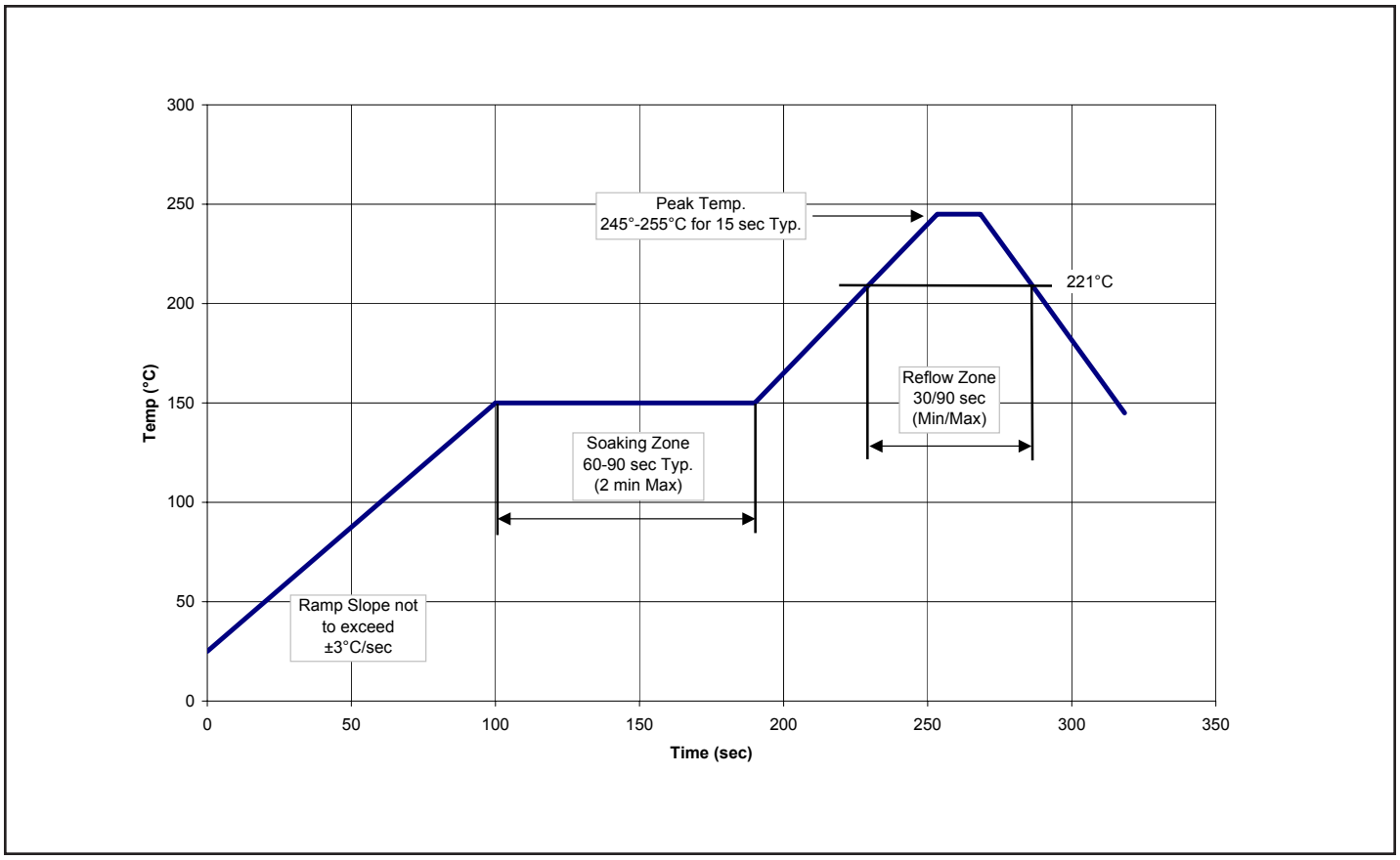
Figure 3



*Note: * A valid reference must be within the input frequency tracking range of the unit and must meet the jitter requirements of the LD alarm (see Alarm Function Table)*
*** As indicated in the Alarm Function Table, the LOR alarm does not validate the external reference but simply indicates that the reference frequency > 1 MHz is present..*

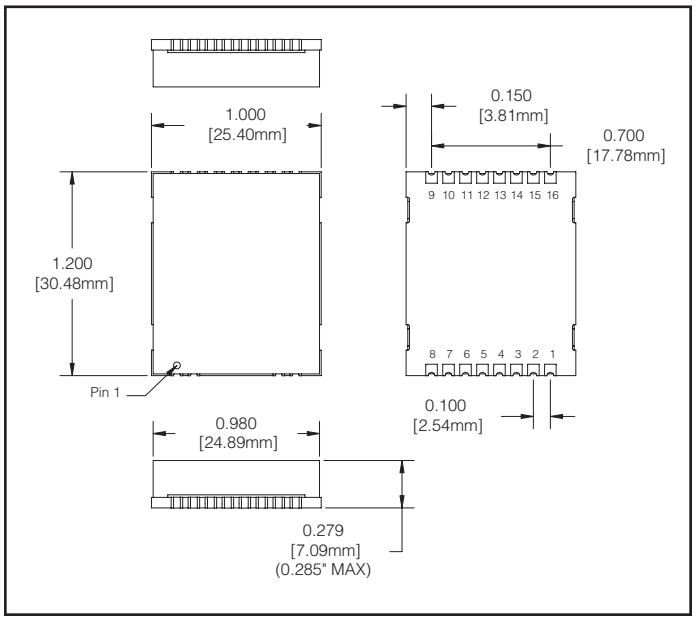
Solder Profile

Figure 4



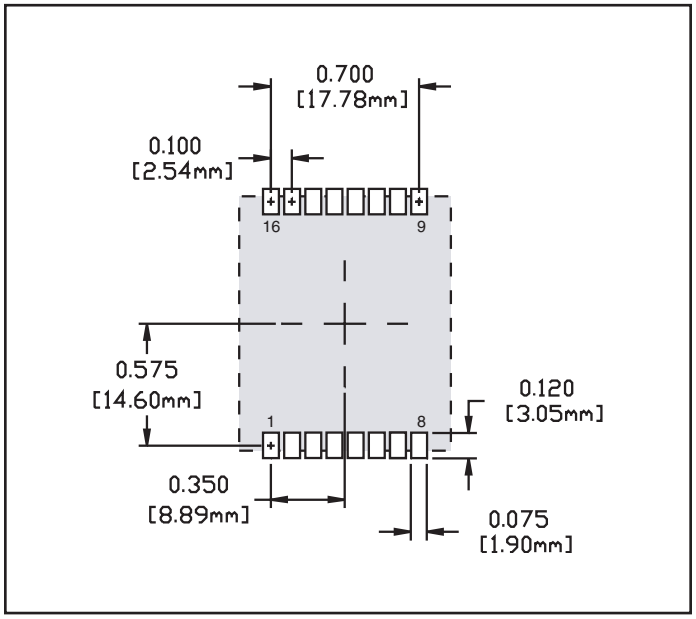
Package Dimensions

Figure 5



Recommended Footprint Dimensions

Figure 6



Standard Frequencies

Table 6

1.0240 MHz	26.0000 MHz	114.0000 MHz	657.4219 MHz
1.5440 MHz	27.0000 MHz	125.0000 MHz	666.5143 MHz
2.0480 MHz	29.4912 MHz	139.2640 MHz	669.1281 MHz
4.0960 MHz	32.7680 MHz	155.5200 MHz	669.3266 MHz
6.4800 MHz	37.0560 MHz	156.2500 MHz	672.1627 MHz
8.1920 MHz	38.8800 MHz	161.1328 MHz	690.5692 MHz
10.0000 MHz	44.4343 MHz	166.6286 MHz	693.4830 MHz
12.8000 MHz	44.7360 MHz	167.3316 MHz	704.3806 MHz
13.0000 MHz	51.8400 MHz	168.0407 Mhz	707.3527 MHz
15.0000 MHz	61.4400 MHz	311.0400 MHz	710.9486 MHz
16.3840 MHz	65.5360 MHz	531.2500 MHz	719.7344 MHz
19.4400 MHz	77.7600 MHz	624.7048 MHz	777.6000 MHz
20.0000 MHz	78.1250 MHz	622.0800 MHz	Contact Factory for other Frequencies
20.1416 MHz	78.6432 MHz	625.0000 MHz	
20.4800 MHz	82.9440 MHz	627.3596 MHz	
22.2171 MHz	112.0000 MHz	644.5313 MHz	

Ordering Information

Part Number	Input Frequency A (MHz)	Output Frequency 1 (MHz)	Output Frequency 2 (MHz)	Output Frequency 3 (MHz)	Output Frequency 4 (MHz)	Output Frequency 5 (MHz)	Output Frequency 6 (MHz)	Output Frequency 7 (MHz)	Output Frequency 8 (MHz)
SFX-800G-E1	19.44	622.0800	669.3266	644.5313	657.4219	690.5692	693.4830	704.3806	707.3527
SFX-800G-E2	19.44	155.5200	161.1328	168.0407	174.7031	622.0800	644.5313	672.1627	698.8123
SFX-800G-E3	19.44	622.08	672.1627	696.4215	696.6149	644.5312	690.5692	666.5143	155.52

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Revision	Revision Date	Note
P00	6/5/08	Preliminary Release
P01	12/23/08	Update Output Frequencies
P02	02/03/09	Frequency updates
R00	05/07/09	Release and Operating Temperature Revisions
R01	08/09/10	Add New Model to Ordering Information
R02	09/17/10	Output Frequency updates

Consult the factory for a Part Number for your application