PETERMANN TECHNIK
Time & Frequency Components

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Press Release

February 12, 2007

PETERMANN-TECHNIK GmbH proudly Announces the Availability of PicoEMI™; Spread Spectrum Clock Modulation for EMI Reduction of the leading mixed sinal clock IC manufacturer PhaseLink / USA

2.5V~3.3V Operation, GREEN/RoHS Compliant Packages

Fremont, California. – February 12, 2007

PhaseLink's PicoEMI family (PL671) is the world's best performing, Lowest jitter Programmable Spread Spectrum Clock Generator (PSSCG). This family offers up to 200MHz outputs, less than 100ps Cycle to Cycle jitter, 16 modulation magnitudes to choose from, 4 pre-programmed configurations to cycle through, low-power consumption, 3 drive strengths to select from, and up to 3 outputs to replace alternative solutions, in a small footprint **GREEN**/RoHS compliant SOT23-6L or SOP-8L package.

PhaseLink Corporation, a leader in frequency source generation and the inventor of the Analog Frequency Multiplier™, PhasorV™, and PicoPLL™ (world's smallest programmable clock) today announced the availability of its PicoEMI, the newest member of PhaseLink's extensive EMI clock family.

Higher frequencies, wider buses, and multiple outputs with faster edge rates are the main contributors of undesired EMI in digital systems. By spreading the energy peak, through its frequency modulation engine, the PicoEMI reduces the dissipated Electromagnetic radiation, thereby providing a low-cost alternative for seeking regulatory agency approvals.

The PicoEMI is PhaseLink's second generation EMI reduction clock ICs and is a merger of PhaseLink's highly regarded Spread Spectrum clock modulation for EMI reduction clocks and PhaseLink's PicoPLL, the world's smallest programmable clock IC, technologies. The PicoEMI offers a wide range of modulation magnitudes for Center or Down spread modulations and, depending on the application, can reduce EMI emission by as much as 20dB.

"Up to 20dB reduction in EMI radiation, cycling through '4' pre-programmed configurations, supporting multiple output frequencies, and its small footprint makes the PicoEMI clock ideal for significantly reducing the system EMI and design cost", said Amir Naghavi, VP of Marketing for PhaseLink Corporation. "PicoEMI's versatility and performance attributes are yet another testament to PhaseLink's commitment to design excellence."

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PicoEMI can be programmed to generate up to 200MHz from a low-cost 10MHz to 40MHz fundamental crystal, or a reference input from 1MHz to 200MHz. The device consumes less than 10µA of power (when PDB is activated) with <100ps Cycle to Cycle jitter performance.

The PicoEMI family is targeted for performance driven designs where EMI radiation is a problem, in particular in applications such as Multi Function Printers (MFP), Video/Graphics systems, and other household appliances where space and power constraints are essential. The PicoEMI family supports commercial (0º C to +70º C) and industrial (-40º C to +85º C) temperature ranges. In addition, all PicoEMI family members operate on 2.5V, or 3.3V ± 10% power supply.

Product Family Summary:

Part Number	Input (MHz)	Output (MHz)	Operating Voltage	Features	Package
PL671-01	▪ Fundamental: 10 – 40 ▪ Reference: <200	<200	2.5V 3.3V	▪ Up to 3 programmable clocks. ▪ 4 on-the-fly configuration switching ▪ Programmable Modulation Rate, PDB or CLK, and output drive strength ▪ Center or down spread with 0.25% resolution	Wafer SOT23-6L MSOP-8L SOP-8L
PL671-03	▪ Fundamental: 10 – 40	<200	2.5V 3.3V	▪ Fixed multiplier of 2 or 4 ▪ 4 pre-programmed Modulation Rates ▪ Output Enable (OE)	Wafer
PL671-05 **PL671-06**	▪ Reference: 10 - 200	<200	2.5V 3.3V	▪ Switchable input/output pins ▪ 4 on-the-fly configuration switching ▪ Center or down spread with 0. 25% resolution	SOT23-6L
PL671-21 **PL671-22**	▪ Fundamental: 10 – 40 ▪ Reference: <200	<200	2.5V 3.3V	▪ Up to 2 programmable clocks. ▪ 2 on-the-fly configuration switching (-22) ▪ Programmable Modulation Rate, PDB or CLK, and output drive strength ▪ Center or down spread with 0. 25% resolution	SOT23-6L
PL671-25	▪ Fundamental: 10 – 40 ▪ Reference: <200	<200	2.5V 3.3V	▪ Up to 3 programmable clocks. ▪ 4 on-the-fly configuration switching ▪ Programmable Modulation Rate, PDB or CLK, and output drive strength ▪ Center or down spread with 0.25% resolution	SOT23-6L MSOP-8L SOP-8L

For additional information on PicoEMI product family, or to request evaluation samples, demo boards, and Gerber files for optimum placement of PicoEMI, please visit [http://www.petermann-technik.com].

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Pricing and Availability

The PicoEMI is currently available in **GREEN/**RoHS compliant SOT23 and SOP-8 packages and is priced for very competitive and unbeatable conditions.

About PhaseLink Corporation

PhaseLink Corporation is the recognized leader in the mixed signal technology for timing source and signal conditioning ICs, in the area of Communications, Data Storage, Personal Computing, and Consumer Products. An innovator of many first to market products such as Analog Frequency Multipliers, Triangular Modulation SST, PicoPLL (world's smallest programmable clock), SMART-BYTE™ Programmable clock chip, etc., PhaseLink offers one of the broadest IC product lines in the industry (XO, VCXO, AFM, PhasorV, EMI reduction, programmable, Video, and LAN clocks).

For more information, please contact:

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PhaseLink Corporation

PicoEMI™
EMI Reduction Clocks

February 2007

47745 Fremont Blvd., Fremont, CA 94538

What is EMI?

- EMI is basically the Electro Magnetic Interference that is produced in most systems. It is the disruption caused by an electromagnetic field.
  - This is why mobile phones are not allowed to be used in hospitals and other sensitive places. Like consumer products, the EM radiation emitted from them can interfere with sensitive equipment.
- All modern electronics emit electromagnetic radiation (PC, cell phones, CRTs, etc.).
- Common ways to reduce EMI
  - Ferrite Beads
  - Metal Shielding
  - ***Spread Spectrum Clocking***

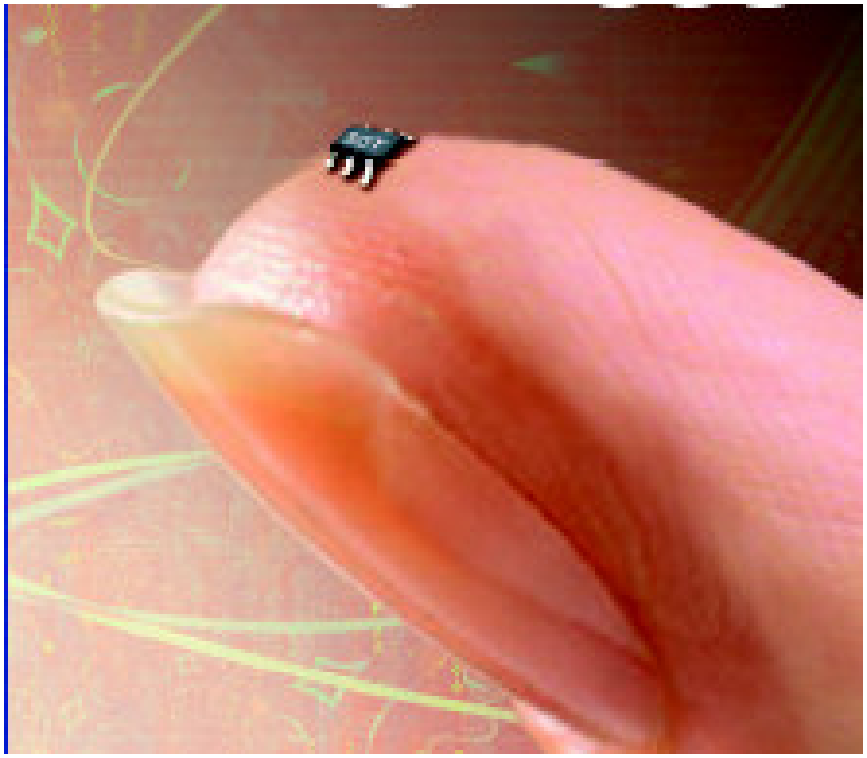
Introducing PicoEMI™

World's

- ✓ Fastest (200MHz)
- ✓ Lowest Jitter (<100ps Cyc to Cyc)
- ✓ Programmable EMI Clock

World's Smallest Programmable SSCG Clock (PicoEMI™)

- The smallest programmable EMI reduction SSCG Clock.
- Support 2.5V~3.3V
- SS Modulation Magnitude:
  1) Center Spread: ±0.125% to ±2.0% in ±0.125% steps
  2) Down Spread: -0.25% to -4.0% in 0.25% steps
- Optional pin selectable configurations (4)
- <10µA using Power Down Mode (PDB)
- Low jitter (Max c-c jitter 100 ps)
- 6-pin SOT23 or 8-pin (M)SOP GREEN/RoHS

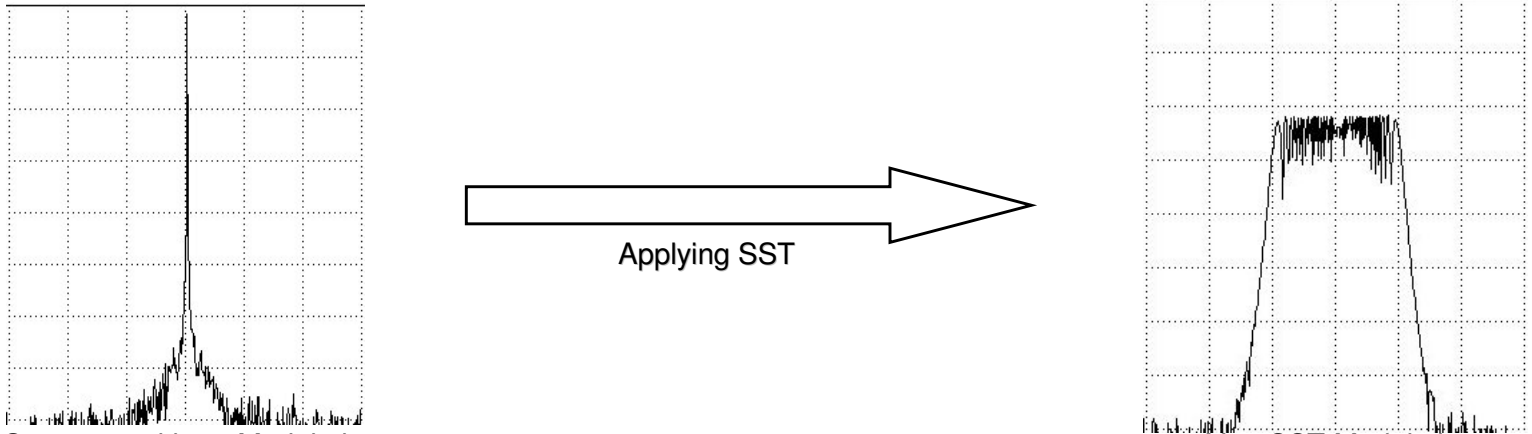


PicoEMI (PL671) Product Overview

	PicoEMI
Operating Voltage	2.5V to 3.3V, ±10%
Output Frequency @ 3.3V/2.5V	200MHz/166MHz
Input — Fund. Crystal Ref. Input	10MHz - 40MHz 1MHz - 200MHz
Clock Outputs (6-bit "Odd/Even" Divider)	3 Programmable Clocks
Feature Pin Programming	PDB, SST On/Off, 4 "On the Fly" Switchable Configurations
Modulation Magnitude Center Spread: Down Spread:	 ±0.125% to ±2.0% in ±0.125% steps -0.25% to -4.0% in 0.25% steps
Rise/Fall Time — 15pF Load/3.3V/High Drive	1.7ns Max.
Output Drive — Programmable	4mA, 8mA, 16mA
Duty cycle	50% ± 5%
Package, GREEN/RoHS Compliant	6-pin SOT23 8-pin (M)SOP

How does PicoEMI Reduce EMI ?

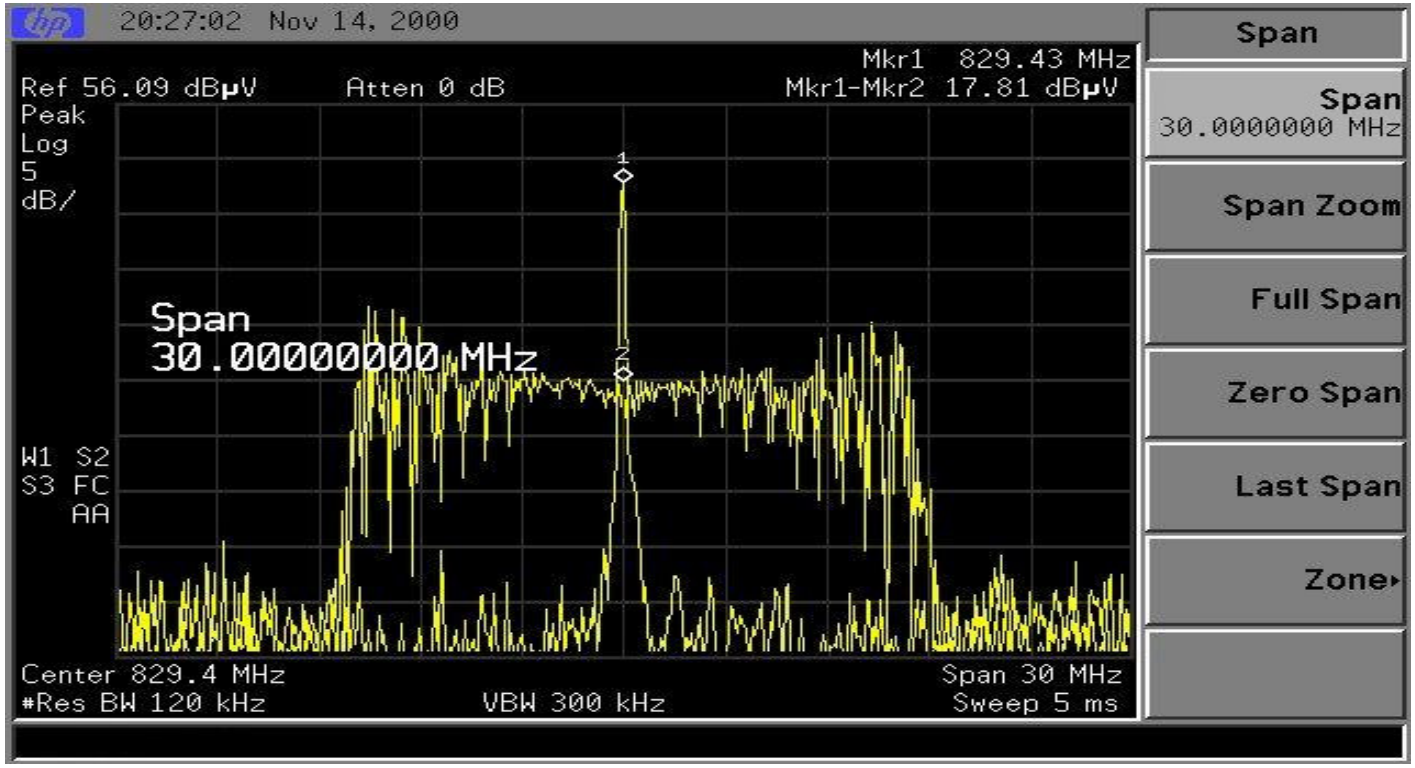
- Un-modulated clock signals have all their energy centered at the output frequency, as shown below. This electronic noise can leak out and affect other electronics in the surroundings such as radios, TVs, medical equipment, etc…
- **Spread Spectrum Modulation Technology** (SST) can supress the peak energy by "Spreading" the frequency and lowering the peak emissions.



Spectrum without Modulation

After SST Modulation

Measurements from Spectrum Analyzer



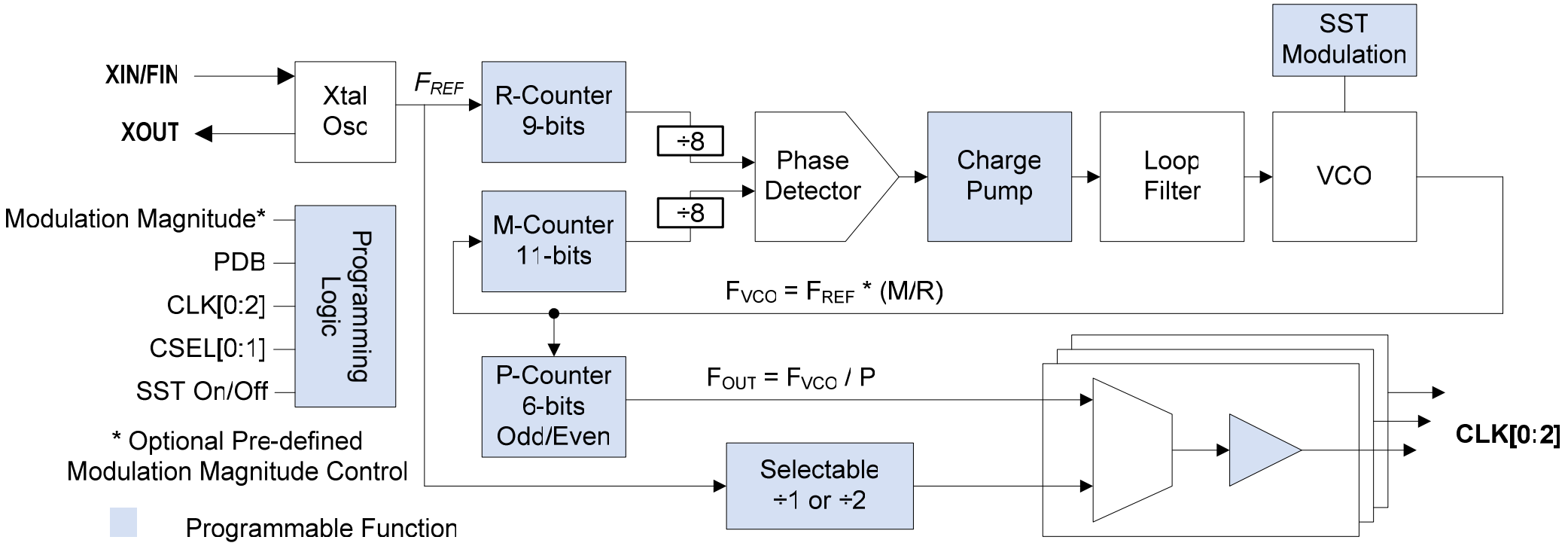
Harmonic	Frequency (MHz)	Modulation Magnitude	Spectrum Without SST (dBm)	Spectrum With SST (dBm)	EMI Reduction (dB)
Main	100	±1%	-0.2	-2.8	2.6
3	300	±1%	-6.9	-16.5	9.6
7	700	±1%	-16.9	-32.5	15.6
15	1500	±1%	-32.7	-52.9	20.2

PicoEMI Product Overview

Part Number	Input (MHz)	Output (MHz)	Voltage	Other Features	Package
PL671-01	Fundamental Xtal 10 to 40 Reference input 1 to 200	<200	2.5V 3.3V	3 Programmable Clocks 2 Programmable I/O's Power Down (PDB) Configuration Select (CSEL) Programmable Drive Strength Center Spread: ±0.125 to ±2.0% Down Spread: -0.25% to -4.0%	SOT23-6L MSOP-8L SOP-8L
PL671-05 PL671-06	Reference input 10 to 200	<200	2.5V 3.3V	1 Programmable Clock Configuration Select (CSEL) Programmable Drive Strength Center Spread: ±0.125 to ±2.0% Down Spread: -0.25% to -4.0%	SOT23-6L
PL671-21 PL671-22	Fundamental Xtal 10 to 40 Reference input 1 to 200	<200	2.5V 3.3V	2 Programmable Clocks 1 Programmable I/O Power Down (PDB) *(-21)* Configuration Select (CSEL)(*-22)* Programmable Drive Strength Center Spread: ±0.125 to ±2.0% Down Spread: -0.25% to -4.0%	SOT23-6L
PL671-25	Fundamental Xtal 10 to 40 Reference input 1 to 200	<200	2.5V 3.3V	3 Programmable Clocks 2 Programmable I/O's Power Down (PDB) Configuration Select (CSEL) Programmable Drive Strength Center Spread: ±0.125 to ±2.0% Down Spread: -0.25% to -4.0%	MSOP-8L SOP-8L

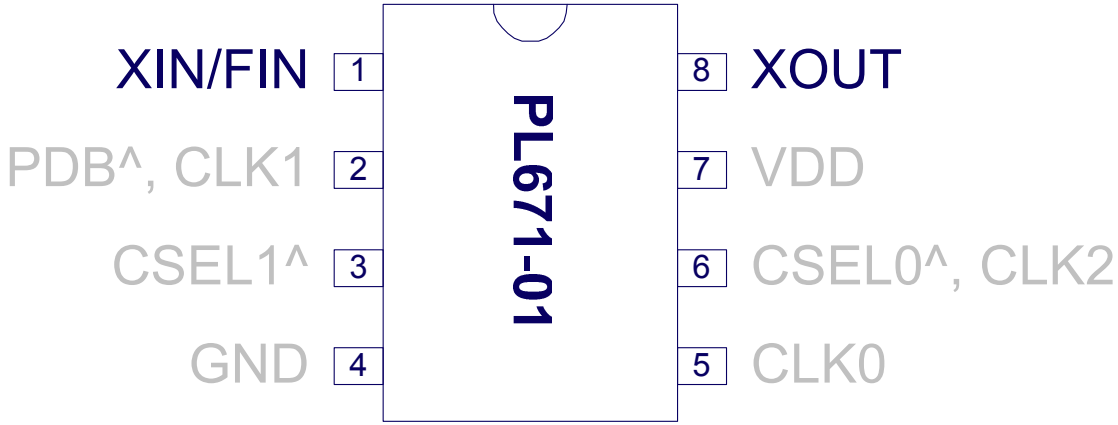
PicoEMI (PL671-01)

Block Diagram



PL671 Input Specification

Crystal or Reference Input

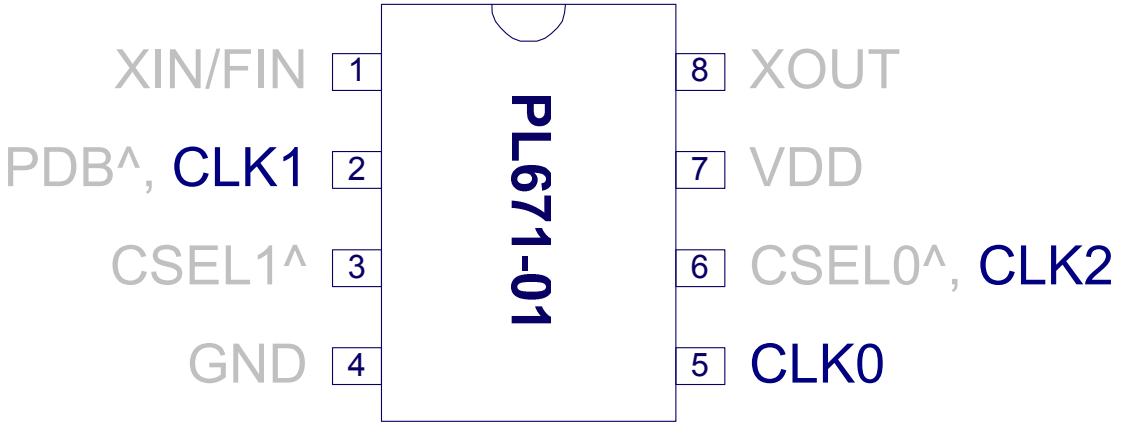


PARAMETERS	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Crystal Input Frequency (XIN)	Fundamental Crystal	10		40	MHz
Input (FIN) Frequency	@ V_{DD} =3.3V	1		200	MHz
	@ V_{DD} =2.5V			166	
Input (FIN) Signal Amplitude	Internally AC coupled (High Frequency)	0.9		V_{DD}	Vpp
Input (FIN) Signal Amplitude	Internally AC coupled (Low Frequency) 3.3V ≤50MHz, 2.5V ≤40MHz	0.1		V_{DD}	Vpp

3 Programmable Outputs

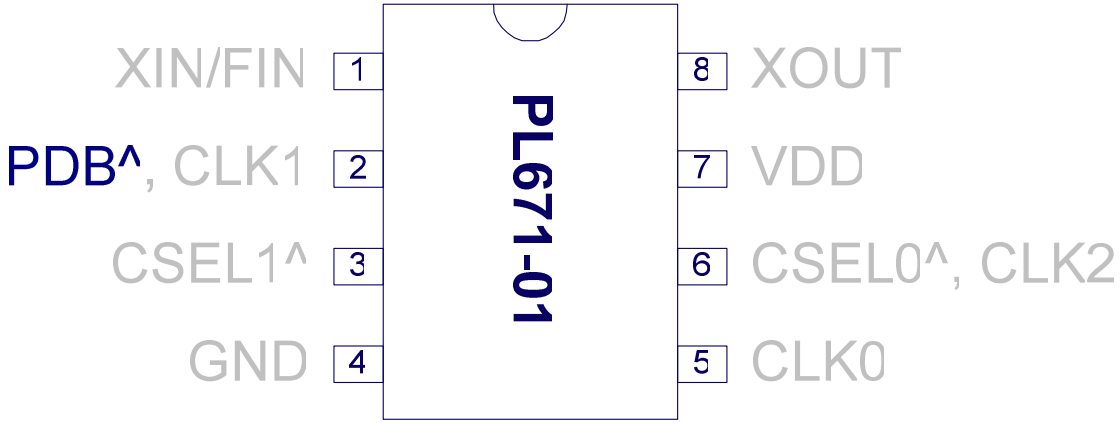
- **CLK0**= F_{REF}, $F_{REF}/2$ or F_{VCO}/P*
- **CLK1**= F_{REF}, $F_{REF}/2$ or F_{VCO}/P*
- **CLK2**= F_{REF}, CLK0, CLK0/2 or CLK0/4

**** 'P' is a 6-bit Odd/Even divider.***



PARAMETERS	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Output Frequency	@ V_{DD} =3.3V			200	MHz
	@ V_{DD} =2.5V			166	
Settling Time	At power-up (after V_{DD} increases over 2.25V)			2	ms
Output Rise Time	15pF Load, 10/90% V_{DD}, High Drive / Standard Drive		1.2 / 2.0	1.7 / 3.0	ns
Output Fall Time	15pF Load, 90/10% V_{DD}, High Drive / Standard Drive		1.2 / 1.7	1.7 / 2.5	ns
Duty Cycle	At V_{DD} /2	45	50	55	%
Cycle to Cycle Jitter*	$T_{CYC-CYC}$ Over output frequency range @ 3.3V			100	ps

PL671 PDB Specification

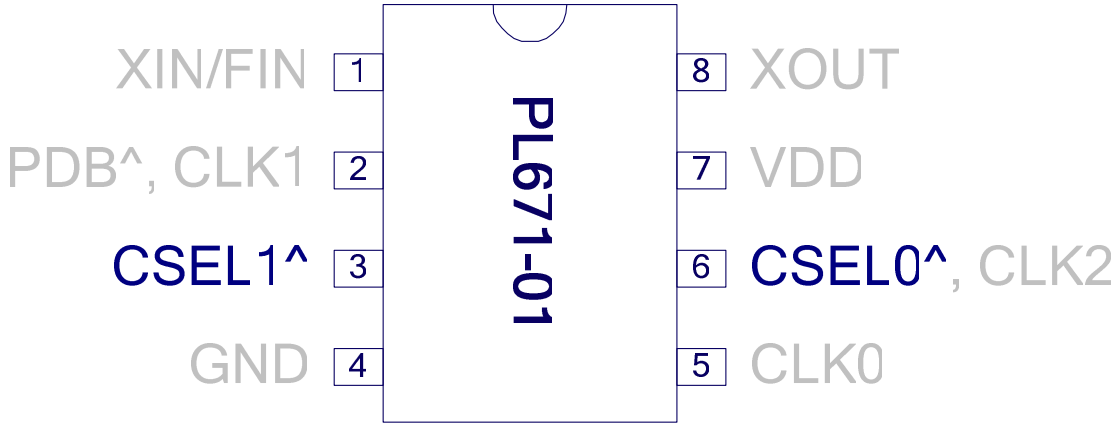


PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Output Enable Time		PDB Function; Ta=25° C, 15pF Load			2	ms
Supply Current, Dynamic, with Loaded Outputs	I_{DD}	At 27MHz, 3.3V, load=15pF, (PDB=1)			15	mA
		PDB=0			10	µA

4-Configuration Selections

(Output Freq., Modulation Mag., Output Drive)

Example 1

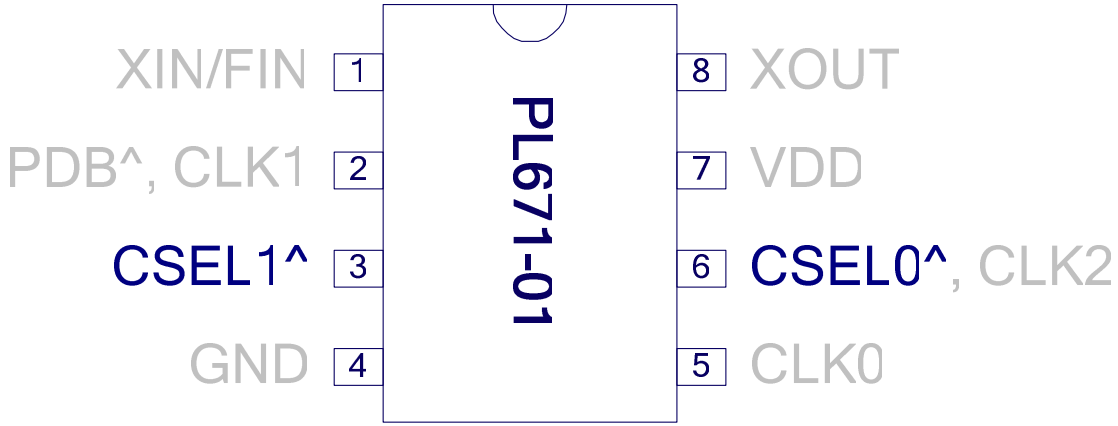


CSEL0	CSEL1	CLK0	SST Mod.	O/P Drive
1	1	27MHz	SST Off	4mA
1	0	27MHz	±0.25%	8mA
0	1	27MHz	±0.5%	8mA
0	0	27MHz	±1.0%	16mA

4-Configuration Selections

(Output Freq., Modulation Mag., Output Drive)

Example 2



CSEL0	CSEL1	CLK0	CLK1	SST Mod.	O/P Drive
1	1	27MHz	13.5MHz	±0.25%	4mA
1	0	54MHz	27MHz	±0.50%	8mA
0	1	54MHz	27MHz	±0.50%	16mA
0	0	108MHz	54MHz	±0.75%	16mA

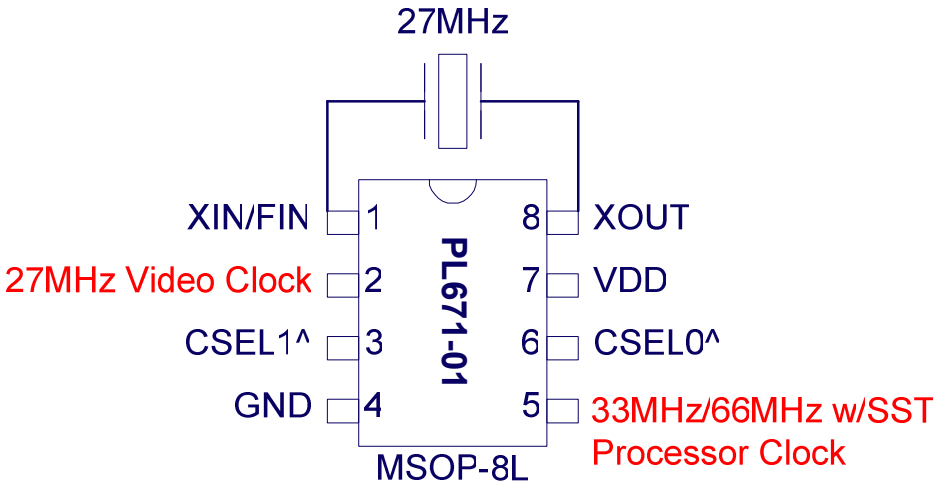
Modulation Magnitude Selection

Modulation Type	Modulation Magnitude	Programming Steps
Center Spread	±0.125% thru ±2.00%	±0.125%
Down Spread	-0.25% thru -4.00%	0.25%

Applications Examples

Application: **Portable Video Player**

Situation: Processor clock causing EMI radiation beyond that allowed by the FCC.



CSEL0	CSEL1	CLK0	CLK1
1	1	33MHz, ±1.0%	27MHz
1	0	33MHz, ±2.0%	27MHz
0	1	66MHz, ±1.0%	27MHz
0	0	66MHz, ±2.0%	27MHz

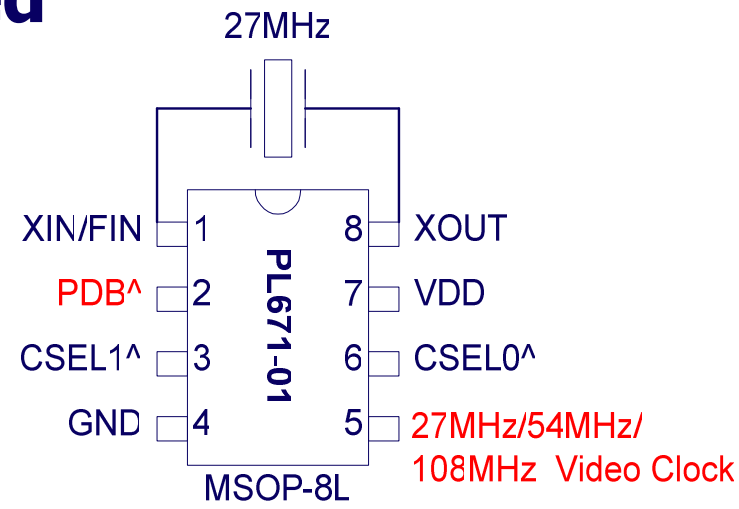
Part #	Voltage	Cyc-Cyc Jitter	CLK Outputs	Special Features	Package (GREEN/RoHS)
PL671-01	2.5~3.3V	<100pS	- 27MHz - 33MHz / 66MHz	-Configuration Select -Selectable Frequency -Selectable SST	- 6-pin SOT23 - 8-pin SOP

Applications Examples

Continued

Application: **Video System Clock**

Situation: Need to support multiple video standards requiring three clock frequencies, and provide EMI reduction.



CSEL0	CSEL1	CLK0	Drive Strength
1	1	27MHz, SST Off	8mA
1	0	27MHz, ±1.0%	8mA
0	1	54MHz, ±1.0%	16mA
0	0	108MHz, ±1.0%	16mA

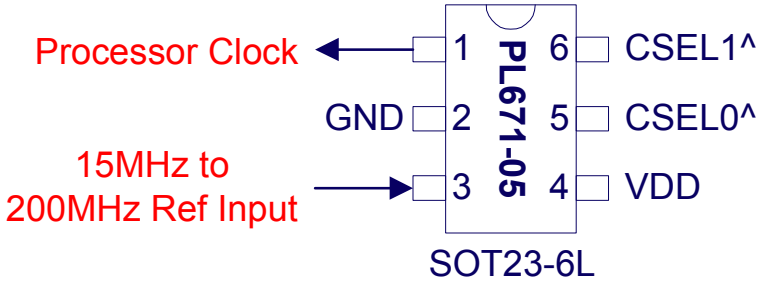
Part #	Voltage	Cyc-Cyc Jitter	CLK Output	Special Features	Package (GREEN/RoHS)
PL671-01	2.5~3.3V	<100pS	-Selectable -27MHz -54MHz -108MHz	-Configuration Select -Selectable Frequency -Selectable Drive Strength -SST On / Off	- 6-pin SOT23 - 8-pin SOP

Applications Examples

Continued

Application: **Processor Clock with SST**

Situation: Need low cost solution to create processor clock with SST from any reference source



CSEL0	CSEL1	CLK0
1	1	33MHz, ±1.0%
1	0	33MHz, ±2.0%
0	1	66MHz, ±1.0%
0	0	66MHz, ±2.0%

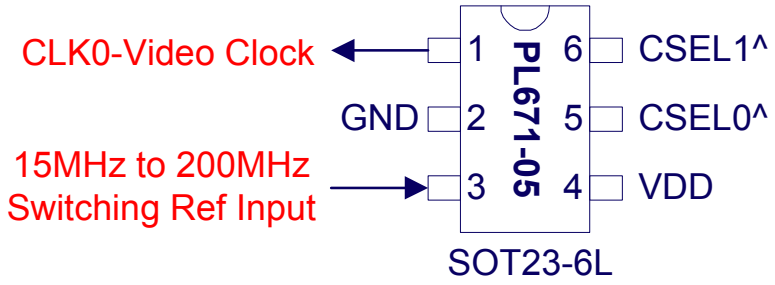
Part #	Voltage	Cyc-Cyc Jitter	CLK Output	Special Features	Package (GREEN/RoHS)
PL671-05	2.5~3.3V	<100pS	-Selectable -33MHz / 66MHz	-Configuration Select -Selectable Frequency -Selectable SST -Low-cost XO replacement	- 6-pin SOT23

Applications Examples

Continued

Application: **DVI / HDMI Video**

Situation: DVI / HDMI video cables require expensive shielding to block EMI radiation from high speed pixel clocks.



CSEL0	CSEL1	CLK0
1	1	Input Frequency, SST Off
1	0	Input Frequency, ±0.25%
0	1	Input Frequency, ±0.75%
0	0	Input Frequency, ±1.50%

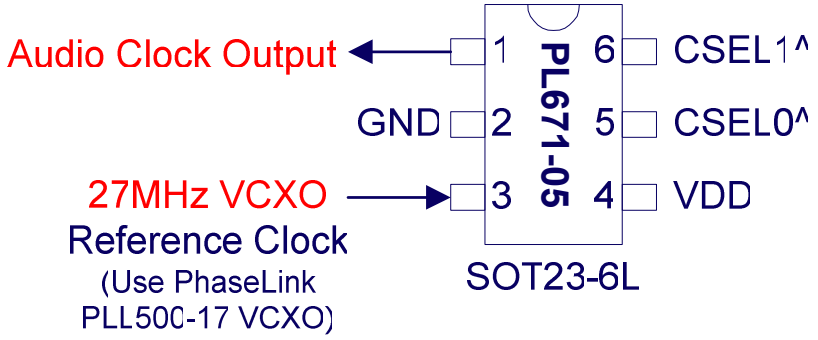
Part #	Voltage	Cyc-Cyc Jitter	CLK Output	Special Features	Package (GREEN/RoHS)
PL671-05	2.5~3.3V	<100pS	-Equal to input	-Track incoming frequency -Configuration Select -Selectable SST	- 6-pin SOT23

Applications Examples

Continued

Application: **Selectable Audio Locked to VCXO**

Situation: Need to create audio clocks that track incoming video clock.



CSEL0	CSEL1	CLK0
1	1	8.192MHz (32kHz Audio)
1	0	11.2896MHz (44.1kHz Audio)
0	1	12.288MHz (48kHz Audio)
0	0	24.576MHz (96kHz Audio)

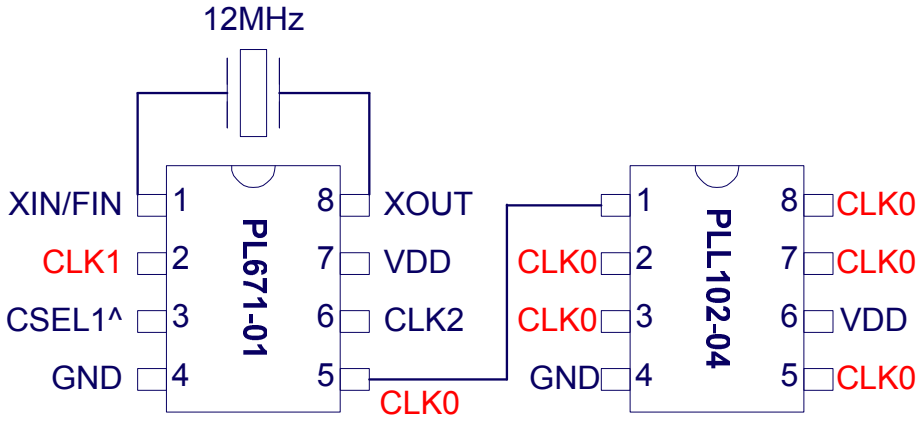
Part #	Voltage	Cyc-Cyc Jitter	CLK Output	Special Features	Package (GREEN/RoHS)
PL671-05	2.5~3.3V	<100pS	-Selectable (see above)	-Audio clock tracks video clock -Configuration Select -Selectable Frequency	- 6-pin SOT23

Applications Examples

Continued

Application: **Multi-Function Printer**

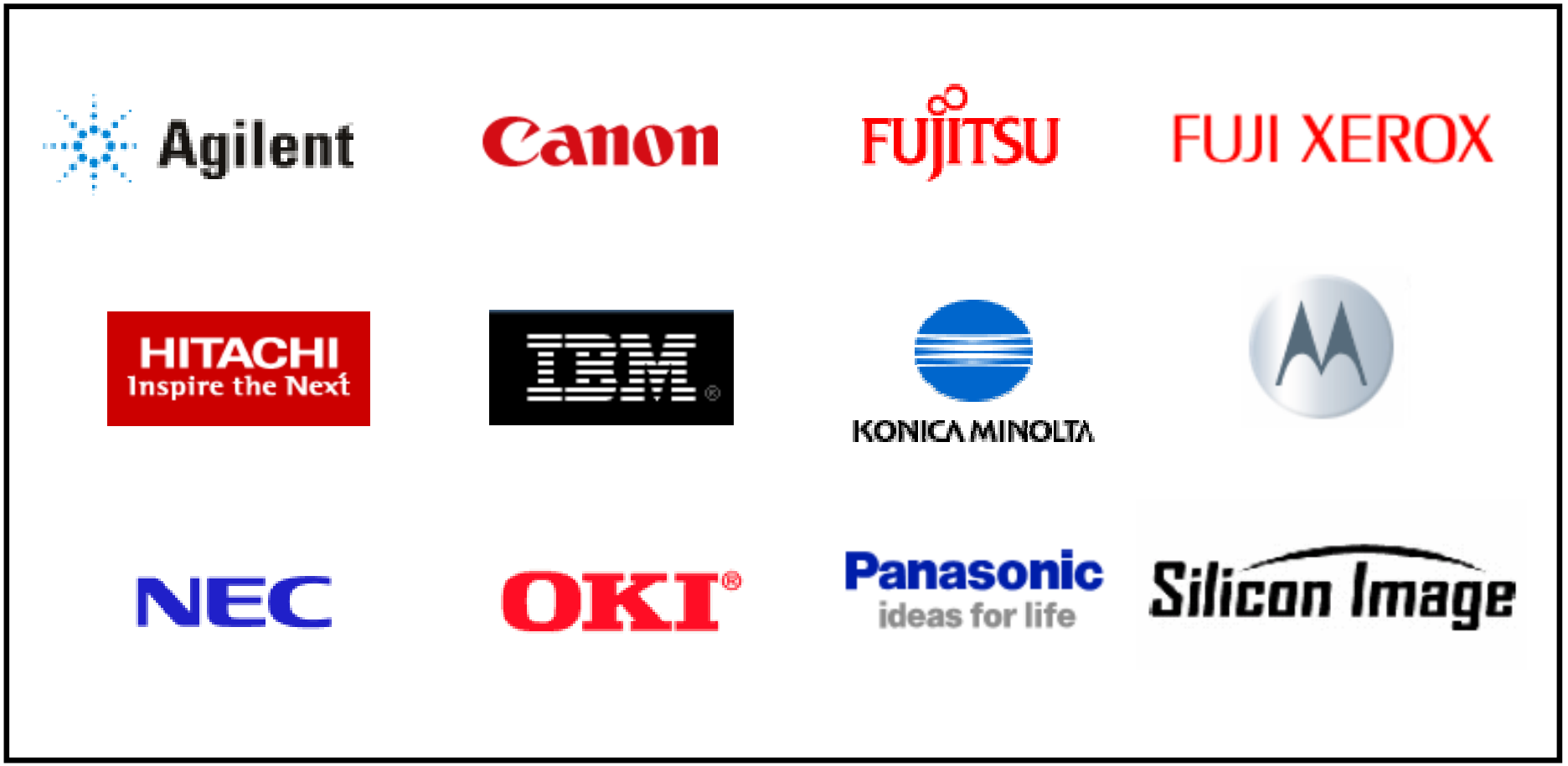
Situation: Multiple clocks running at the same frequency are needed to support multi-function capabilities of modern printers. These cause high amounts of EMI at that frequency and its harmonic frequencies.



CSEL1	CLK0	CLK1	CLK2
1	66MHz, ±1.0%	12MHz	33MHz, ±1.0%
0	66MHz, ±2.0%	12MHz	33MHz, ±2.0%

Part #	Voltage	Cyc-Cyc Jitter	CLK Output	Special Features	Package (GREEN/RoHS)
PL671-05	2.5~3.3V	<100pS	-66MHz -33MHz -12MHz	-Audio clock tracks video clock -Configuration Select -Selectable Frequency	- 6-pin SOT23
PLL102-04	3.3V		-66MHz x 5	-Low Skew outputs	- 8-pin SOP

PhaseLink Key SSCG Customers



Applications Requiring SSCG

- Printer, MFP, Copier, Scanner
- DVI, LCD Monitor, LCD TV, Plasma TV, Projector
- Set-top Boxes, Networking, NAS, SAN
- Notebooks
- Phone Systems
- Interface Controllers
- PCI/CPU/Memory buses.
- Video Security Systems

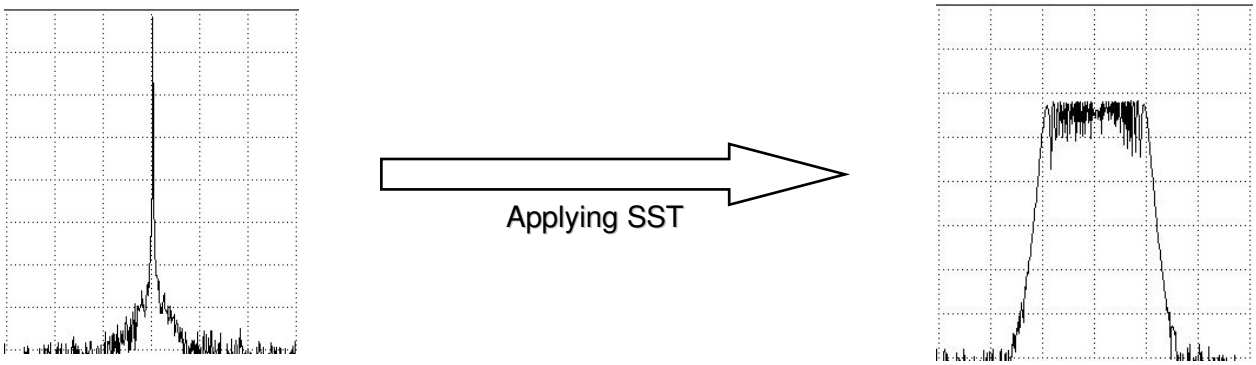
A BRIEF INTRODUCTION TO EMI AND SPREAD SPECTRUM

What is EMI?

EMI stands for **E**lectro**M**agnetic **I**nterference and can be described as the "Electrical Noise" that all electronic systems emit when they operate. The main source of this noise is system clocking. As system timing rises in speed and complexity, the amount of interference radiated to the outside world increases as well. The amount of EMI a system can emit is regulated by the Federal Communications Commission (FCC) and all electronic equipment sold in the US must pass FCC testing to assure that the peak emissions do not interfere with other electronics in the vicinity. There are three major ways to combat EMI and reduce it below the level allowed; Shielding, Filtering and Spread Spectrum.

What is Spread Spectrum?

The Spread Spectrum method of EMI reduction utilizes the idea that "Peak" energy radiation needs to be suppressed. By modulating, or "Spreading" the main clock frequency you can distribute the energy emissions over a wider frequency range thereby lowering the peak radiation at any one frequency. Below is a Before and After view of the radiation from a clock signal without and with Spread Spectrum.



There are two main components to a spread spectrum clock, they are:

Modulation Magnitude a.k.a "Spread Percentage" – This is the amount of frequency variation, or how much the frequency is "Spread", from the main clock frequency. The two types of Modulation Magnitude are Center Spread and Down Spread. Center Spread is where the spreading is centered around the main clock frequency while in Down spread the spreading is below the main clock frequency.

Modulation Rate – This is the frequency (or rate) at which the spread is modulated onto the main frequency.

How Spread Spectrum affects EMI

Most systems have one or more reference frequencies which are used to generate the rest of the systems clocking requirements. By introducing spread spectrum to the reference clock all clock dependant outputs will also include this modulation resulting in a cumulative reduction of EMI throughout the entire system. This method of lowering EMI is FCC approved and very often significantly less expensive than the other methods of EMI reduction and can bring as much as a ***20dB*** reduction in EMI emissions.

PL671 PicoEMI™ Family Product Overview

The PL671 PicoEMI™ family is PhaseLink's second generation of EMI reduction products and the first in a line of Programmable Spread Spectrum Clock Generators (PSSCG). These IC's provide an excellent high performance, low-cost, small footprint method to reduce a systems overall EMI emissions. In the pages that follow you will learn about the complete feature set and capabilities of the PicoEMI™ family as well as see some example applications which highlight these products unique capabilities. The table below shows a "Quick Glance" overview of the specific products in the PicoEMI™ family.

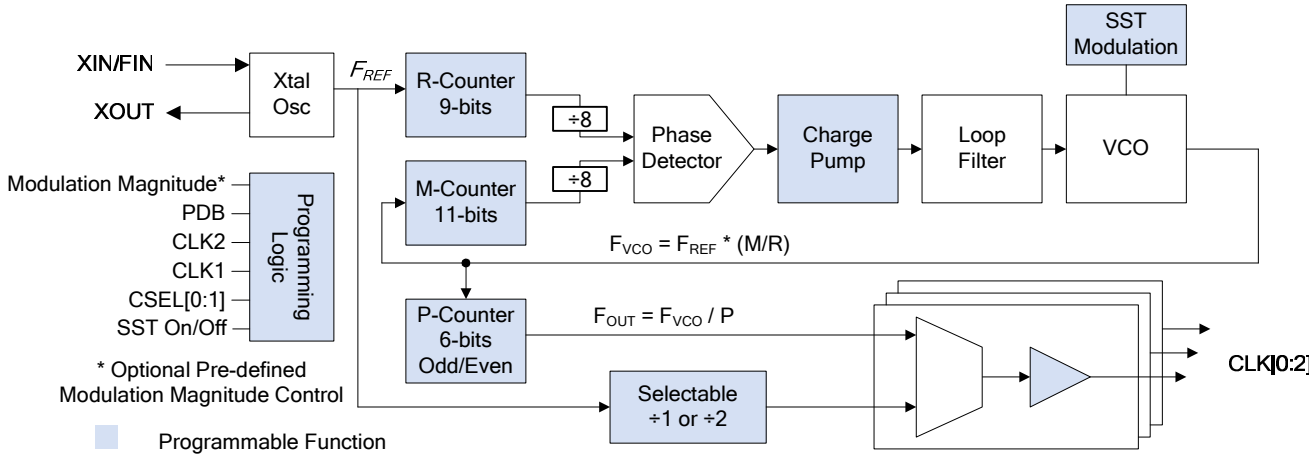
Note: We have the 03 in the press release.

PicoEMI - Programmable SST for EMI Reduction

Part Number	Input (MHz)	Output (MHz)	Voltage	Other Features	Package
PL671-01	Fundamental Xtal 10 to 40 Reference input 1 to 200	<200	2.5V 3.3V	3 Programmable Clocks 2 Programmable I/O's Power Down (PDB) Configuration Select (CSEL) Programmable Drive Strength Center Spread: ±0.125 to ±2.0% Down Spread: -0.25% to -4.0%	SOT23-6L MSOP-8L SOP-8L
PL671-05 PL671-06	Reference input 10 to 200	<200	2.5V 3.3V	1 Programmable Clock Configuration Select (CSEL) Programmable Drive Strength Center Spread: ±0.125 to ±2.0% Down Spread: -0.25% to -4.0%	SOT23-6L
PL671-21 PL671-22	Fundamental Xtal 10 to 40 Reference input 1 to 200	<200	2.5V 3.3V	2 Programmable Clocks 1 Programmable I/O Power Down (PDB), -21 Only Configuration Select (CSEL), -22 Only Programmable Drive Strength Center Spread: ±0.125 to ±2.0% Down Spread: -0.25% to -4.0%	SOT23-6L
PL671-25	Fundamental Xtal 10 to 40 Reference input 1 to 200	<200	2.5V 3.3V	3 Programmable Clocks 2 Programmable I/O's Power Down (PDB) Configuration Select (CSEL) Programmable Drive Strength Center Spread: ±0.125 to ±2.0% Down Spread: -0.25% to -4.0%	MSOP-8L SOP-8L

Product Block Diagram

The PL671 is a versatile, feature rich Programmable EMI Reduction Clock capable of producing three different clock outputs up to 200MHz with Spread Spectrum. Almost the entire IC is programmable for flexibility and ease of use (see the blue colored blocks in the diagram below). The input can be from a Fundamental Mode crystal (10MHz to 40MHz) or a Reference Clock (1MHz to 200MHz) and can be programmed to provide both Center (±0.125% to ±2.00%) and Down (-0.25% to -4.00%) Spread capabilities. The full block diagram of this product family is shown below:



Q. Do the PicoEMI products have selectable settings?

A. YES. The PicoEMI products have up to two Configuration Select pins available. These pins allow for as many as four pre-programmed settings to choose from. Each setting can have different frequencies, spread magnitude settings, modulation rates and drive strengths.

Q. Is the Modulation Rate programmable?

A. YES. Unlike our competitors the Modulation rate of the PicoEMI is fully programmable. The modulation rate is determined by the R counter and the input frequency, $F_{MOD} = F_{IN} / 8 * R$. This means the modulation rate is very flexible and can be programmed to 20kHz and higher depending on the user's requirements. Each configuration can have a different modulation rate if desired unlike our competition which has

Q. How quickly can I get samples?

A. Typically the samples are prepared and shipped out in 1 to 2 working days. Once the customer is ready for production PhaseLink will ship product programmed to the customers specifications.

PicoEMI™ Availability

Availability:

The PL671 product family is available for customer sampling and production. Please visit www.phaselink.com for datasheets and sample ordering.

PhaseLink Corporation

PicoEMI™ Product Overview

So Who Uses EMI Reduction?

EMI reduction clocks are becoming common in a wide variety of applications. Long used in Video applications (HDTV, Monitors, DVI Links, …) it is now finding it's way into most industrial electronics and consumer devices including home routers, DSL/Cable Modems and the new generation of electronic home appliances. As more and more electronic devices are deployed in homes and business the need to control EMI emissions is greater than ever.

Target Applications for the PL671 PicoEMI™ Family

The PL671 family is designed to help lower EMI emissions from any clock(s) up to 200MHz. Some key target applications for PhaseLink's PicoEMI products are:

- Communication products
- Multi-function printers
- High definition/standard definition TVs
- Security Systems
- Video systems
- Handheld devices
- POS and other Terminal devices
- Automotive Electronics
- Wireless Base Stations
- Home Appliances

Show me some example applications.

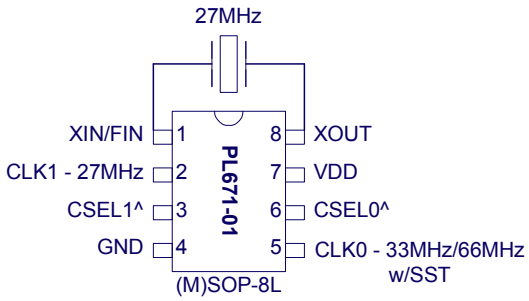
Applications Example 1 *(Frequency Generation)*

Application: Portable Video Player

Problem: Processor clock causing EMI radiation beyond that allowed by FCC

PhaseLink Solution

By using spread spectrum on the processor clock EMI was reduced below the peak levels allowed. Consolidation of both the video and processor clocks into one IC brought ~20% cost savings as well.



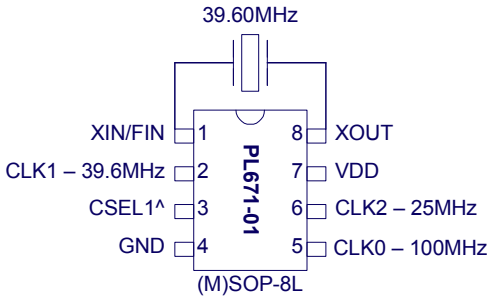
CSEL0	CSEL1	CLK0	CLK1
1	1	33MHz, ±1.0%	27MHz
1	0	33MHz, ±2.0%	27MHz
0	1	66MHz, ±1.0%	27MHz
0	0	66MHz, ±2.0%	27MHz

√ **Clock Consolidation**
√ **Cost Savings**
√ **Peak EMI Reduction**
√ **Frequency Switching**

Applications Example 2 *(Frequency Generation)*

Application: WiMAX BaseStation

Problem: Harmonics from the Ethernet clocks (25MHz & 100MHz) were considered to be a potential problem. If these harmonics propagated thru the system they could cause problems with critical timing paths.



CSEL1	CLK0	CLK1	CLK2
1	100MHz	39.6MHz	25MHz
0	100MHz, -1%	39.6MHz	25MHz, -1%

PhaseLink Solution

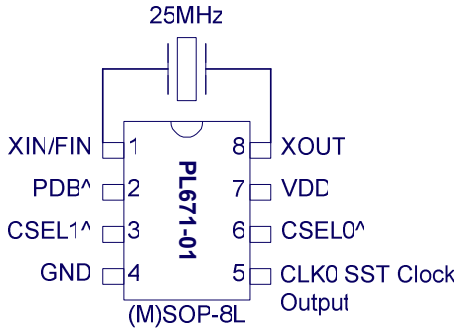
The 671-01 was able to consolidate three 5x7mm oscillators into one IC and the ability to "Turn On" the SST gave the customer the ability to add the spread to the signals if they become a problem.

- √ **Clock Consolidation**
- √ **Cost Savings**
- √ **Harmonic Reduction**
- √ **SST ON/OFF**

Applications Example 3 *(Frequency Generation)*

Application: KVM (Keyboard, Video, Mouse controller)

Problem: Customer was using four 5x7mm oscillators and a switch. They wanted a way to consolidate their clocking and lower their cost.



PhaseLink Solution

Using the two Configuration Select pins of the PL671-01 we were able to provide four selectable output frequencies to support their requirements. By increasing the drive level at the higher frequencies, rise and fall times remain fast. Cost was lowered by over 50%.

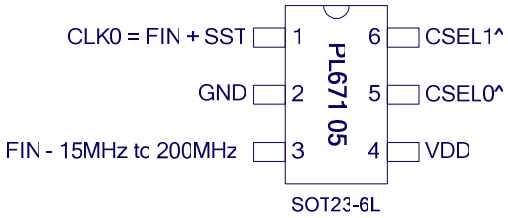
CSEL0	CSEL1	CLK0	Drive Strength
1	1	23 75MHz ±0 25%	8mA
1	0	38 25MHz ±0 25%	8mA
0	1	63 50MHz ±0 25%	16mA
0	0	109MHz ±0 25%	16mA

- √ **Clock Consolidation**
- √ **Cost Savings**
- √ **Peak EMI Reduction**
- √ **Frequency Switching**

Applications Example 4 *(Signal Conditioning)*

Application: DVI Video Link

Problem: High Speed video clocks require expensive shielded cables.



PhaseLink Solution

DVI (Digital Visual Interface) and HDMI (High Definition Multimedia Interface) are the leading technologies for Video Transport. The high pixel frequencies (165MHz +) used in DVI and HDMI, the leading video transport technologies, require expensive shielded monitor cables. By adding spread to the pixel clock the cost of cabling can be reduced by over 50% or up to $2.00

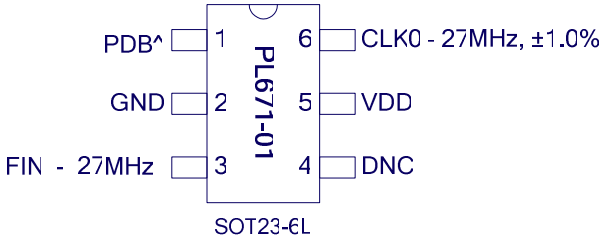
CSEL0	CSEL1	CLK0
1	1	FIN
1	0	FIN, ±0.50%
0	1	FIN, ±1.0%
0	0	FIN, ±1.5%

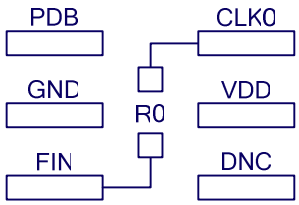
- √ **Reduce Cabling costs**
- √ **SST ON/OFF**
- √ **Peak EMI Reduction**

Applications Example 5 *(Signal Conditioning)*

Application: Video Surveillance System

Problem: Past designs had problems passing FCC testing. Customer wanted a way to plan for possible EMI reduction without having to commit to an additional IC should it not be required.





PhaseLink Solution

By adding the PL671-01 SOT23 package layout to their board with a bypass resistor position the customer had the confidence that they could add spread spectrum support should EMI from their system clock become a problem.

- √ **No Cost Adder if SST not required**
- √ **SST ON/OFF**
- √ **Peak EMI Reduction**