Migrating from PE9702 to PE97022

Introduction

A new generation of low phase noise frequency synthesizers has been released to address the need of the space application requirements for low phase noise. Three new products – PE97022, PE97042 and PE97632, are based on the existing products – PE9702, PE9704 and PE9763 respectively. Careful planning and attention have been made during design to minimize the effort and changes required for the migration from the existing products to the new products. There are trade-offs between design constraint and extent of phase noise improvement. The priority is always given first to produce a solution with the lowest phase noise possible and then with minimum effort for the migration. This application note describes in detail the necessary steps that are needed to migrate from an existing design that uses PE9702 to PE97022 to achieve improved phase noise.

Summary:

- Details of low phase noise availability in new PLL products
- Migration from PE9702 to PE97022
  - PE97022 fully pin and drop-in compatible with PE9702
  - No PCB Modification Necessary
  - Phase Noise greatly improved by raising V_{DD} to 3.3 V on PE97022
- Operational Specification Comparison chart between PE9702 and PE97022
- Phase Noise Comparison graph between PE9702 and PE97022

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The PE97022 is fully pin and drop-in compatible with the PE9702. There is no PCB modification necessary to obtain improved phase noise performance with the new PE97022 parts. PE97022 can operate at 3.0 V nominal V_{DD} and benefit from the lower phase noise but the phase noise can be further improved by raising the V_{DD} supply level to 3.3V. See *Fig. 1* for a comparison between the Typical Phase Noise levels for the two parts.

The typical operational I_{DD} for PE97022 is about 10 mA more than PE9702. The existing design needs to be capable of sourcing the extra current without lowering the voltage level on V_{DD} pins of PE97022. Please see *Tables 1&2* for a comparison of operational specifications.

Table 1. PE9702 Operational Specifications

Symbol	Parameter/Conditions	Min	Max	Units
V_{DD}	Supply voltage	2.85	3.15	V

Symbol	Parameter	Conditions	Typ	Units
I_{DD}	Operational supply current; Prescaler disabled Prescaler enabled	V_{DD} = 2.85 to 3.15 V	10 24	mA mA
Φ_N	Normalized Phase Noise	V_{DD} = 2.85 to 3.15 V	-210	dBc/ Hz

Table 2. PE97022 Operational Specifications

Symbol	Parameter/Conditions	Min	Max	Units
V_{DD}	Supply voltage	2.85	3.45	V

Symbol	Parameter	Conditions	Typ	Units
I_{DD}	Operational supply current; Prescaler disabled Prescaler enabled	V_{DD} = 3.3 V	14 41	mA mA
Φ_N	Normalized Phase Noise	V_{DD} = 3.3 V	-216	dBc/ Hz

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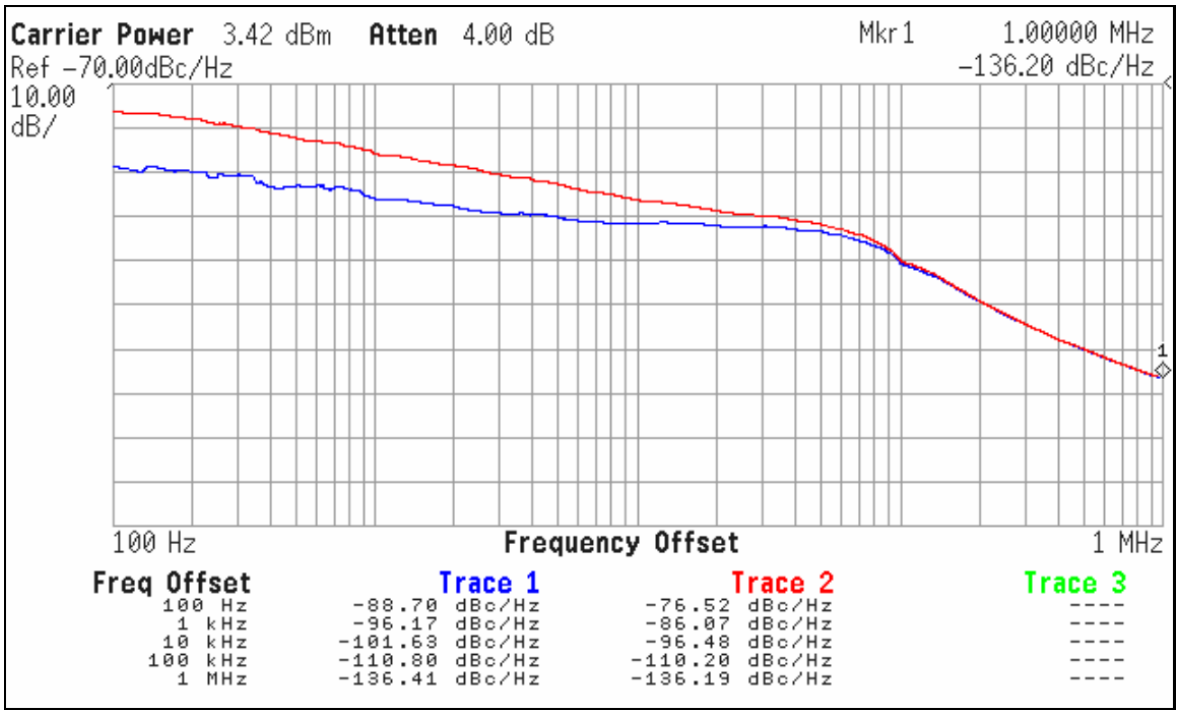
Figure 1. Typical Phase Noise for PE97022 (Trace 1) and PE9702 (Trace 2), Fvco = 1.92 GHz, Fcomp = 20 MHz, Loop Bandwidth = 50 kHz



Conclusion

This application has described the steps necessary to convert any existing design that uses PE9702 to the newer, lower phase noise PE97022. For help or more information about this report, please contact Peregrine Applications Support at help@psemi.com.

Datasheets can be found on our website at www.psemi.com.

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Sales Offices

The Americas

Peregrine Semiconductor Corporation
9380 Carroll Park Drive
San Diego, CA 92121
Tel: 858-731-9400
Fax: 858-731-9499

Europe

Peregrine Semiconductor Europe
Bâtiment Maine
13-15 rue des Quatre Vents
F-92380 Garches, France
Tel: +33-1-4741-9173
Fax : +33-1-4741-9173

Space and Defense Products

Americas:

Tel: 858-731-9453

Europe, Asia Pacific:
180 Rue Jean de Guiramand
13852 Aix-En-Provence Cedex 3, France
Tel: +33-4-4239-3361
Fax: +33-4-4239-7227

Peregrine Semiconductor, Asia Pacific (APAC)
Shanghai, 200040, P.R. China
Tel: +86-21-5836-8276
Fax: +86-21-5836-7652

Peregrine Semiconductor, Korea
#B-2607, Kolon Tripolis, 210
Geumgok-dong, Bundang-gu, Seongnam-si
Gyeonggi-do, 463-943 South Korea
Tel: +82-31-728-3939
Fax: +82-31-728-3940

Peregrine Semiconductor K.K., Japan
Teikoku Hotel Tower 10B-6
1-1-1 Uchisaiwai-cho, Chiyoda-ku
Tokyo 100-0011 Japan
Tel: +81-3-3502-5211
Fax: +81-3-3502-5213

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