



Low Noise 6GHz Fractional-N Synthesizer with Integrated VCO Matches Integer-N Performance

MILPITAS, CA – June 25, 2014 – Linear Technology Corporation introduces the [LTC6948](#), a high performance fractional-N PLL with 6GHz-plus integrated VCO. In the heart of the LTC6948 is an advanced fourth order delta-sigma modulator that employs intelligent noise-shaping techniques to minimize noise contribution without creating the fractionalization spurs found in most fractional-N PLLs on the market. This results in a device with the full benefits of fractionalization – from frequency agility to overall improved phase noise – but without the traditional drawbacks of using a fractional-N PLL. In other words, the LTC6948 is a fractional-N PLL with integer-N spurious performance. Pairing these benefits with industry-leading $1/f$ noise and reduced in-band phase noise, makes the LTC6948 ideal for demanding wireless, test and measurement, and military applications.

A good normalized in-band phase noise floor, or figure-of-merit, is important for a low phase noise solution. However, in-band noise floor is often corrupted by the $1/f$ noise performance of the PLL core. The LTC6948 boasts an unparalleled -274dBc/Hz normalized $1/f$ noise specification that does not hinder its outstanding -226dBc/Hz normalized in-band phase noise floor. These combined specifications make the LTC6948 shine in applications that demand a high SNR, such as wireless communications using complex modulation schemes, communications systems that employ long burst durations and Doppler radar.

The LTC6948 reduces overall system cost, design complexity and solution size by integrating a VCO with competitive phase noise performance and all PLL components, including a reference divider, phase-frequency detector, ultralow noise charge pump, fractional divider and VCO output divider and buffer. There are four versions of the LTC6948, each offering a different VCO frequency band with the fastest option delivering up to 6.39GHz. The VCO output divider can be programmed from 1 through 6 to cover a wide range of frequencies down to 373MHz. VCO calibration is typically completed in a little over $10\mu\text{s}$, an order of magnitude faster than

many competing parts, making the LTC6948 the PLL of choice in solutions requiring ultra-short settling times.

Designing with the LTC6948 is made easy using the FracNWizard™ simulation and design tool, available for free download at www.linear.com/FracNWizard. The FracNWizard design tool helps provide appropriate loop filter component values with a click of a button, saving the system designer hours of complex calculations. It accurately predicts PLL performance, assisting the designer in the debugging process and in making design choices.

All versions of the LTC6948 are specified over the full operating junction temperature range from -40°C to 105°C. The products are available in a 4mm × 5mm, 28-lead plastic QFN package. Prices start at \$7.25 each for the LTC6948 in 1,000-piece quantities. The LTC6948 is available immediately from stock. Samples and demo boards are available by request at www.linear.com/product/LTC6948 or via your local Linear Technology sales office.

Photo Caption: 6GHz Frac-N PLL with Integrated VCO

Summary of Features: LTC6948


- Low Noise Fractional-N PLL
- Integrated VCO, up to 6.39GHz
- 18-Bit Fractional Denominator
- -226dBc/Hz Normalized In-Band Phase Noise Floor
- -274dBc/Hz Normalized In-Band 1/f Noise
- -157dBc/Hz Wideband Output Phase Noise Floor
- Excellent Spurious Performance
- Output Divider (1 to 6, 50% Duty Cycle)
- Output Buffer Muting
- Charge Pump Current from 1mA to 11.2mA
- Reference Input Frequency up to 425MHz
- Fast Frequency Switching
- FracNWizard Software Design Tool Support

Output Frequency Options (in GHz)

	LTC6948-1	LTC6948-2	LTC6948-3	LTC6948-4
O_DIV = 1	2.240 to 3.740	3.080 to 4.910	3.840 to 5.790	4.200 to 6.390
O_DIV = 2	1.120 to 1.870	1.540 to 2.455	1.920 to 2.895	2.100 to 3.195
O_DIV = 3	0.747 to 1.247	1.027 to 1.637	1.280 to 1.930	1.400 to 2.130
O_DIV = 4	0.560 to 0.935	0.770 to 1.228	0.960 to 1.448	1.050 to 1.598
O_DIV = 5	0.448 to 0.748	0.616 to 0.982	0.768 to 1.158	0.840 to 1.278
O_DIV = 6	0.373 to 0.623	0.513 to 0.818	0.640 to 0.965	0.700 to 1.065

About Linear Technology

Linear Technology Corporation, a member of the S&P 500, has been designing, manufacturing and marketing a broad line of high performance analog integrated circuits for major companies worldwide for over three decades. The Company's products provide an essential bridge between our analog world and the digital electronics in communications, networking, industrial, automotive, computer, medical, instrumentation, consumer, and military and aerospace systems. Linear Technology produces power management, data conversion, signal conditioning, RF and interface ICs, μ Module[®] subsystems, and wireless sensor network products. For more information, visit www.linear.com

 , LT, LTC, LTM, Linear Technology, the Linear logo and μ Module are registered trademarks and FracNWizard is a trademark of Linear Technology Corp. All other trademarks are the property of their respective owners.

Press Contacts:

North America / Worldwide

John Hamburger, Director Marketing
Communications
jhamburger@linear.com
Tel: 408-432-1900 ext 2419

Doug Dickinson, Media Relations Manager
ddickinson@linear.com
Tel: 408-432-1900 ext 2233

UK & Nordic

Alan Timmins
alan@ezwire.com
Tel: +44-1-252-629937