

September 17, 2013

Nihon Dempa Kogyo Co., Ltd.

President: Hiroshi Takeuchi

New product developed;  
OCXO with improved frequency temperature characteristics of 10 ppb  
(SMD type; 14 × 9 mm)

Nihon Dempa Kogyo Co., Ltd. (NDK) has developed a new SMD-type oven-controlled crystal oscillator (OCXO) with frequency temperature characteristics of up to  $\pm 10 \times 10^{-9}$  (model: Twin-OCXO™ NH14M09TA; 14.3 × 9.4 × 6.5 mm). This represents an improvement on NDK's previous product (up to  $\pm 20 \times 10^{-9}$ ) of the same size.

This OCXO is intended for use in small base stations for mobile communications (e.g., microcells or picocells) installed in urban areas and elsewhere to accommodate increasing communication traffic. The RF sections of small base stations require compact OCXOs that provide a highly stable reference frequency comparable to those used in macrocell stations.

To meet these needs, NDK has used its proprietary twin crystal technology and temperature control technology with digital signal processing, and additionally adopted hermetic sealing package for excellent environmental-proof performance. The results produce the required compactness and performance improvement simultaneously.

The Twin-OCXO™ NH14M09TA covers the frequency range from 5 to 40 MHz, and is available with 12 standard frequency levels (10, 12.8, 13, 16.384, 19.2, 20, 25, 26, 30.72, 38.4, 38.88 and 40 MHz) so that customers can promptly test samples.

Engineering sample delivery is scheduled for this month, and the start of mass production is scheduled for October.

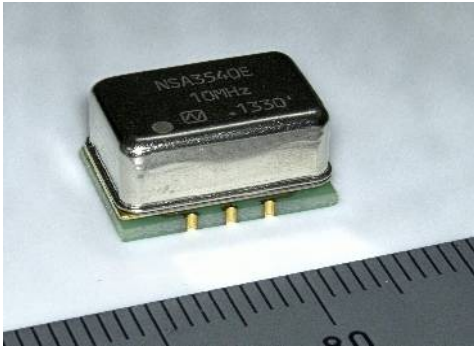
NDK also provides another crystal oscillator based on twin crystal oscillator technology (Twin-DCXO™ NT14M09TA; 14.3 × 9.4 × 6.5 mm; frequency temperature characteristics: up to  $\pm 50 \times 10^{-9}$ ). The product has the characteristics of low power consumption and quick start-up.

The Twin-OCXO™ and Twin-DCXO™ models are tailored to meet various requirements including those relating to frequency temperature characteristics, power consumption and the start-up time of communication infrastructure, base stations for mobile communications, and optical communications devices, whose components undergo constant downsizing.

Note1; NDK will showcase the new product at the CEATEC Japan 2013 event, held from October 1 to 5, at Makuhari Messe (Chiba city). (NDK booth: No. 2A60, Hall 2).

Note2; Twin-OCXO™ and Twin-DCXO™ are NDK's trademarks of the OCXO and the DCXO using the company's proprietary twin crystal technology.

Appearance: NH14M09TA



#### Specifications and characteristics

Outer dimensions	14.3 × 9.4 × 6.5 mm
Terminal	6 Pads (SMD)
Frequency range	5 to 40 MHz
Standard frequencies	10, 12.8, 13, 16.384, 19.2, 20, 25, 26, 30.72, 38.4, 38.88, 40 MHz
Frequency / temperature characteristics	Max. $\pm 10 \times 10^{-9}/-40$ to $+85^{\circ}\text{C}$
Power consumption	Typ. 600 mW
Supply voltage	+3.3 V
Long-term frequency stability (based on frequency after 30 days operation)	Typ. $\pm 100 \times 10^{-9}/\text{year}$
Output level	LVC MOS

For inquiries on other requirement specifications, please see contact information below.

<Contact> Sales representative / Nihon Dempa Kogyo Co., Ltd.  
e-Mail : [salessup@ndk.com](mailto:salessup@ndk.com)

September 24, 2013

Nihon Dempa Kogyo Co., Ltd.

President: Hiroshi Takeuchi

New product developed;

OCXO with world-leading 3 ppb frequency temperature characteristic (20 × 20 mm)

Nihon Dempa Kogyo Co., Ltd. (NDK) has developed a new Twin-OCXO™ Series oven-controlled crystal oscillator (OCXO) with frequency temperature characteristics of max.  $\pm 3 \times 10^{-9}$  in the temperature range from  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ , representing the highest performance level of any 20 × 20 mm-class unit. (PIN type: model NH20M20LB, dimensions: 20.0 × 20.0 × 10.5 mm; SMD type: model NH25M22TA, dimensions: 25.4 × 22.0 × 12.1 mm).

This OCXO has been developed in response to higher demand for smaller electronic devices and more widespread use of surface mount devices (SMDs) for increasingly smaller communication equipment in base stations for mobile communications or optical transmission devices.

To meet these needs, NDK has used its proprietary twin crystal technology of Twin-OCXO™, temperature control technology with digital signal processing and in addition a hermetic sealing package for excellent environmental-proof performance. The results produce the required compactness and even higher stability for reference frequency simultaneously.

The OCXO covers the frequency range from 5 to 40 MHz, and is available with 12 standard frequency levels (10, 12.8, 13, 16.384, 19.2, 20, 25, 26, 30.72, 38.4, 38.88 and 40 MHz) so that customers can promptly test samples.

Engineering sample delivery is scheduled for October 2013, and the start of mass production is scheduled for January 2014.

Note1; NDK will showcase the new product at the CEATEC Japan 2013 event, held from October 1 to 5, at Makuhari Messe (Chiba city). (NDK booth: No. 2A60, Hall 2).

Note2; Twin-OCXO™ is the NDK's trademark of the OCXO using NDK's proprietary twin crystal technology (trademark registration pending in Japan).

Appearance

Left : SMD type

Right : PIN type



## Specifications and characteristics

Outer dimensions	PIN type: 20.0 × 20.0 × 10.5 mm
	SMD type: 25.4 × 22.0 × 12.1 mm
Terminals	PIN type: 9 Pads
	SMD type: 7 Pads
Frequency range	5 to 40 MHz
Standard frequencies	10, 12.8, 13, 16.384, 19.2, 20, 25, 26, 30.72, 38.4, 38.88, 40 MHz
Frequency / temperature characteristics	Max. $\pm 3 \times 10^{-9}$ / -40 to +85°C
Power consumption	Typ. 1200 mW
Supply voltage	+3.3 V
Long-term frequency stability (based on frequency after 30 days operation)	Typ. $\pm 50 \times 10^{-9}$ / year
Output level	LVC MOS

For inquiries on other requirement specifications, please see contact information below.

<Contact> Sales representative / Nihon Dempa Kogyo Co., Ltd.  
e-Mail : [sallessup@ndk.com](mailto:sallessup@ndk.com)



November 25, 2013

Nihon Dempa Kogyo Co., Ltd.

President: Hiroshi Takeuchi

New product developed;  
VCXO (size:  $7 \times 5$  mm; SMD type) enabling customers to set the desired output frequency for optical communications

Nihon Dempa Kogyo Co., Ltd. (NDK) has developed a new voltage-controlled crystal oscillator (VCXO) (model: NV7050SH;  $7.0 \times 5.0 \times 1.6$  mm). The product allows customers to set the desired output frequency within the range of 15 to 915 MHz after delivery <sup>(\*1)</sup> and is characterized by low phase noise and low jitter as required in VCXOs for superior communication quality in optical communications.

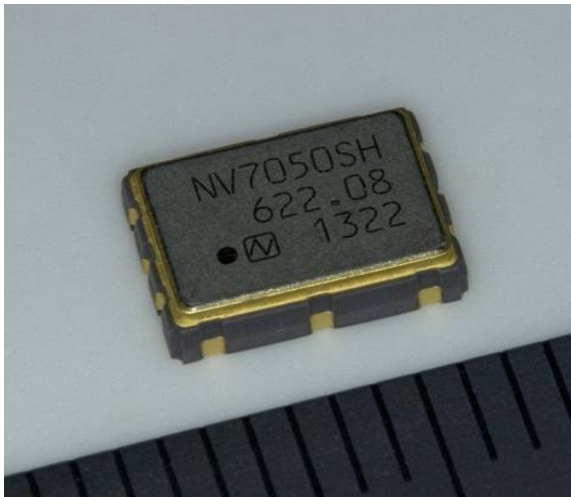
Optical communications, such as backbone networks, metro networks and CATV, have enabled faster and higher-capacity data transmission over distances of several hundred kilometers with optical transmission devices operating at different transmission rates. Therefore, different VCXOs with a specific frequency for each transmission rate were required. As a result, a number of challenges have arisen in the field: Multiple devices for different transmission rates make customer's parts management complex. When changing transmission rates, delivery of VCXOs takes time after order placement and additional work of part replacement.

To address these challenges, NDK has developed the new VCXO that customers can set the desired output frequency for themselves, using NDK's advanced crystal oscillator technology and digital PLL-IC. This new product represents a significant contribution to maintenance and improvement of optical communication quality, standardization of optical transmission device substrates, reduction of the load and waste in parts management, and speedy changes in transmission rates.

Engineering sample delivery is scheduled for this month, and the start of mass production is scheduled for January 2014.

\*1: The desired frequency can be selected by writing a present value in a register by I<sup>2</sup>C communication.

## Appearance



## Specifications and characteristics

Model	NV7050SH
Outer dimensions	7.0×5.0×1.6 mm
Frequency range	15~915 MHz
Supply voltage	3.3 V±10 %
Control voltage	0~3.3 V
Operating temperature range	-40~+85 °C
Current consumption	Max. 175 mA
Overall frequency tolerance *1	Max. ±50 ppm
Output level	LVPECL
Absolute pull range (APR)*2	Min. ±100 ppm
Phase noise (@622.08MHz)	Typ. -50 dBc/Hz @ 100 Hz
	Typ. -79 dBc/Hz @ 1 kHz
	Typ. -100 dBc/Hz @ 10 kHz
	Typ. -119 dBc/Hz @ 100 kHz
	Typ. -125 dBc/Hz @ 1 MHz
Phase jitter (@622.08MHz)	Typ. -158 dBc/Hz @ 10 MHz
Phase jitter (@622.08MHz)	Max. 0.6 ps (12 kHz~20 MHz)

\*1 : Overall frequency tolerance = Frequency tolerance + Frequency/temperature characteristics  
+ Frequency/voltage coefficient + Long-term frequency stability

\*2: Absolute pull range (APR) = Frequency control range - Overall frequency tolerance

<Contact> Sales representative / Nihon Dempa Kogyo Co., Ltd.  
e-Mail : salessup@ndk.com