Introduction

**Purpose:** Introduce the ABLNO series of Ultra Low Phase Noise, Fixed Frequency & VCXO’s and the ABLNO-EVAL Board

**Objectives:**
- Explain the benefits of the ABLNO series of products
- Provide overview of the primary features
- Provide target market & applications
- Explain performance data

**Content:** (10) Slides

**Learning Time:** 5-minutes

Welcome to Abracon’s ABLNO series; Ultra Low Phase Noise Oscillators & Evaluation Board Training Module. This training session will provide an overview of the key features and benefits; as well as, discuss the applications of this product series.
## Key Features

**RF Output:** 3rd Overtone Crystal based, 80.000MHz to 156.250MHz range with (14) standard developed frequencies and eight frequencies in stock

**Phase Noise:** Exceptional close-to-the carrier phase noise, -155dBc/Hz Maximum at 10kHz offset from the carrier (*100% Tested @ 25°C*)

**rms Jitter:** Maximum Guaranteed 75 fs *rms* jitter over 12kHz to 20MHz BW

**Stability:** ±28 ppm Maximum ALL Inclusive (including 10-year Aging)

**Power Consumption:** < 25mA Maximum up to 125.000MHz carrier  
< 35mA Maximum up to 156.250MHz carrier

**Size:** 9.2 * 14.80 * 5.50 mm SMT Reflow-able RoHS Compliant package

**Symmetry:** 45% / 55% worst case

ABLNO Series is designed with High “Q”, 3rd Overtone Crystal Resonators, enabling exceptional close-to-the-carrier phase noise and wide-band jitter, ideally suited for noise sensitive applications. ABLNO oscillators in VCXO configuration provide sufficient frequency pull-ability to accommodate re-tuning of the oscillators to precise carrier frequency, over a 10-year product life. *ABLNO oscillators are 100% tested for Phase Noise compliance at room temperature*
Example Application: Ka-Band Frequency Up-Converter

In this example, the Ka-Band Up-Converter would greatly benefit from the Ultra Low Phase Noise performance of the ABLNO reference oscillator at 100MHz; yielding a much cleaner up-converted Microwave Spectrum.
ABLNO devices are guaranteed to have Exceptional Phase Noise of -155dBc/Hz @ 10kHz offset, with < 40 femto seconds of typical rms jitter; and guaranteed maximum jitter of 75 femto seconds - over a 12kHz to 20MHz Bandwidth. ABLNO oscillators are 100% tested for Phase Noise compliance at room temperature.
Abracon’s ABLNO solution offers Linear, Monotonic Frequency Pull to accommodate frequency correction over a 10-year product life. Further, state-of-the-art Quartz Crystal processing techniques yield minimal & consistent frequency variation over -40°C to +85°C operating temperature range; with $<$ ±12 ppm typical and ±18 ppm guaranteed maximum variation over temperature.
Target Markets & Typical Applications

- Satellite Modem Communications Systems
- Point-to-Point Microwave Backhaul
- COTS – Military Communication Circuitry
- Low Phase Noise Signal Sources (RF & Microwave)
- High Definition TV
- Test & Measurement Equipment
- Ultra Low Phase Noise or rms jitter, RF Communications Circuitry
- Avionics
- A/D and D/A Converters
- DDS based architecture
- Phase Locked Loops
- High-End Networking Equipment

ABLNO series is ideally suited for a variety of markets and applications, where Ultra Low Phase Noise and Exceptionally Low rms jitter is of critical importance. Some of these applications include Satellite Modems, Point-to-Point Microwave Backhaul, Avionics, PLL’s and Networking equipment.
Abracon also offers an Evaluation Board to assist engineers & technicians with quick evaluation of the ABLNO oscillators. This evaluation board can also be used to characterize reference clocks, other than the ABLNO. Please download a comprehensive data sheet by visiting this link: http://www.abracon.com/Precisiontiming/ABLNO-EVAL.pdf
The Evaluation Board’s Divider Circuitry is impedance matched and optimized for Best-in-Class Phase Noise Performance; while minimizing Additive Jitter. Stand-alone ABLNO devices typically hold -162dBc/Hz Phase Noise @ 10kHz offset @ 100MHz carrier; and a guaranteed -165dBc/Hz Phase Noise Floor @ 10MHz offset.
ABLNO Evaluation Board

Typical Phase Noise Performance Summary

<table>
<thead>
<tr>
<th>Offset from the Carrier</th>
<th>dBC/Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>-70.00</td>
</tr>
<tr>
<td>100</td>
<td>-80.00</td>
</tr>
<tr>
<td>1,000</td>
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<tr>
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<td>-100.00</td>
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<tr>
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<td>-110.00</td>
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<tr>
<td>1,000,000</td>
<td>-120.00</td>
</tr>
<tr>
<td>10,000,000</td>
<td>-130.00</td>
</tr>
</tbody>
</table>

- 100MHz
- 50MHz
- 25MHz
- 12.5MHz

ABLNO Evaluation Board is designed to minimize additive jitter, while providing a means to evaluate the ABLNO oscillator’s RF Output in divide by 1, 2, 4 and 8 modes. For detail information on this evaluation board, please download the data sheet by visiting this link: [http://www.abracon.com/Precisiontiming/ABLNO-EVAL.pdf](http://www.abracon.com/Precisiontiming/ABLNO-EVAL.pdf)
Summary

• ABLNO series is best-in-class for AT-Strip Crystal based Fixed & Voltage Controlled Oscillators
• It offers exceptional ALL Inclusive Stability of ±28 ppm Maximum
• Ideally suited for applications and systems where Ultra Low Phase Noise and Exceptionally Low rms Jitter is of Critical importance
• (8) standard stocked frequencies with a total of (14) developed frequencies are available
• Custom frequencies will be considered, please contact Abracon
• ABLNO-EVAL Boards are also available to facilitate quick engineering evaluation
• Abracon offers in-depth Application Engineering expertize to aid customers with their particular application
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