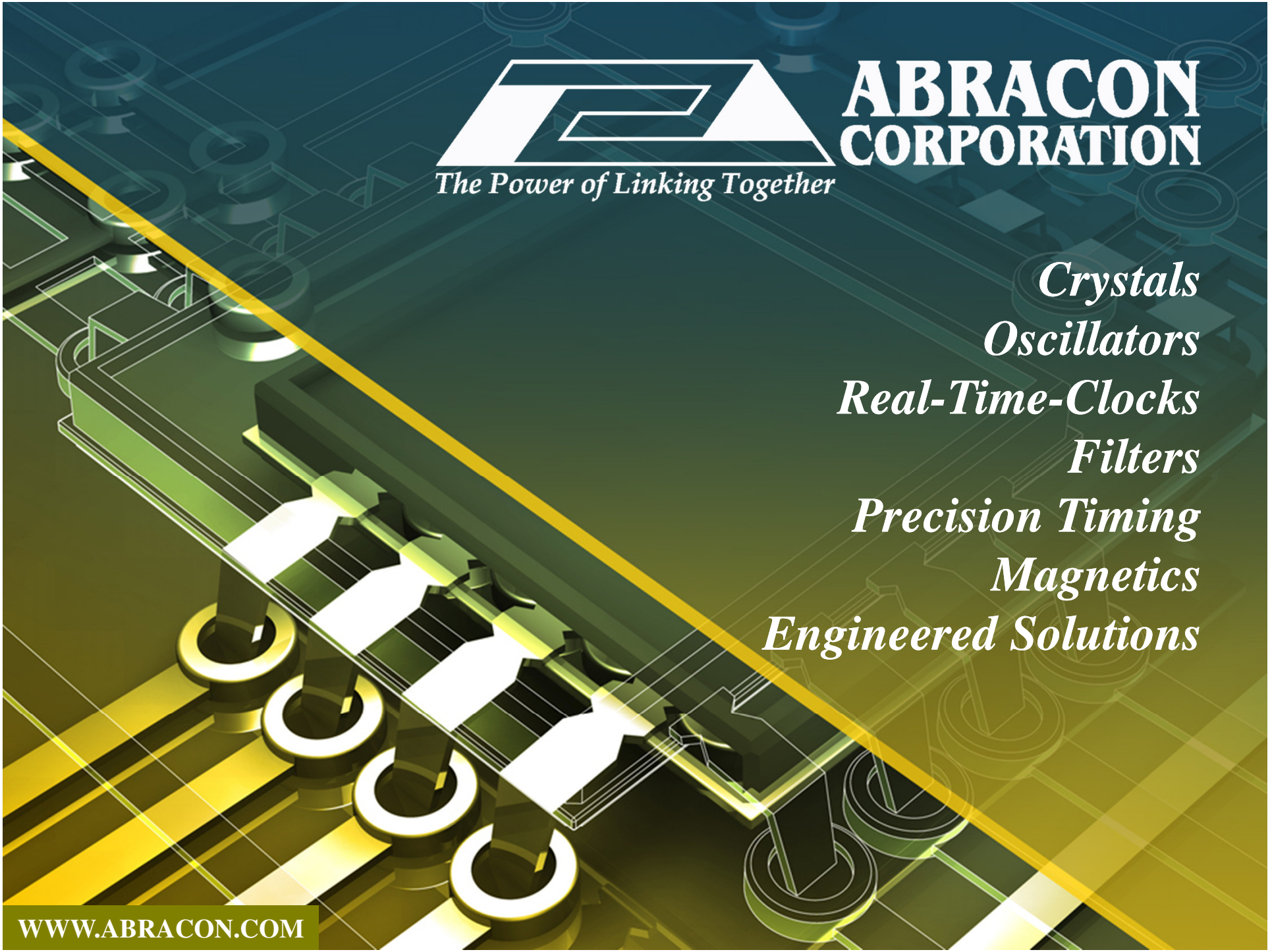
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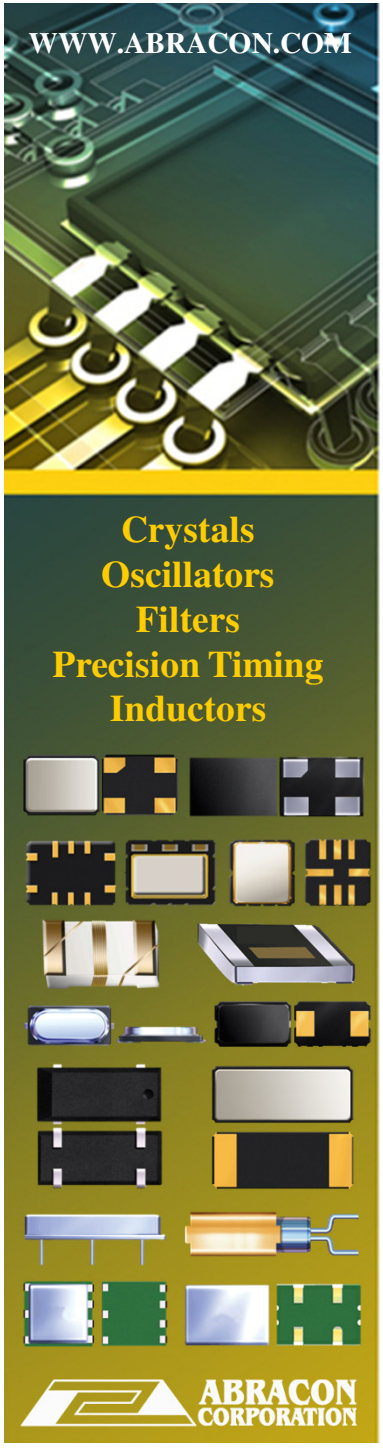



# Introduction

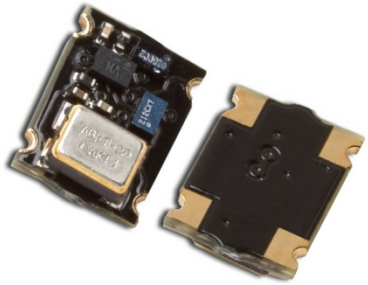
**Purpose:** Introduce the ABFT series, Frequency Translators & Jitter Attenuators

**Objective:**

- Explain the benefits of the ABFT series of products
- Provide overview of the primary features

**Content:** 8-Slides

**Learning Time:** 5-minutes



Welcome to Abracon's ABFT series; Frequency Translator & Jitter Attenuator 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.

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# What is a Frequency Translator / Jitter Attenuator?

| | |
|---|---|
| **Input:** | 10.000MHz ±20 ppm Reference (to be provided by the end-user) |
| **Output:** | 20.000MHz or 40.000MHz Translated output; Phase & Frequency coherent to the input 10.000MHz reference |
| **Phase Noise:** | Excellent close-to-the carrier noise, -150dBc/Hz typical at 10kHz offset from the carrier |
| **rms Jitter:** | Better than 0.50 ***ps rms*** jitter over 12kHz to 20MHz Bandwidth ***(regardless of the Input Reference Jitter)*** |
| **Power Consumption:** | < 14mA typical under locked state into 50Ω load @ 20MHz carrier<br>< 10mA typical under locked state into 15pFload @ 20MHz carrier |
| **Size:** | Small form factor, 5.0 * 7.00 * 2.00 mm SMT Reflow-able package |
| **Rise & Fall Time:** | Ultra fast, 1.2ns max. |
| **Symmetry:** | 45% / 55% worst case |

ABFT is a miniature SMT reflow-able, Frequency Translator which has built-in capability to attenuate close-to-the-carrier jitter; accompanied with the 10.00MHz input reference. This device is ideally suited for space constrained solutions, requiring phase & frequency cohesion to the System Master Clock at 10MHz. This device eliminates the need to implement a PLL or a multiplication scheme to achieve a faster signal; typically employed to clock RF or Digital circuitry such as processors, controllers, decoders, etc.

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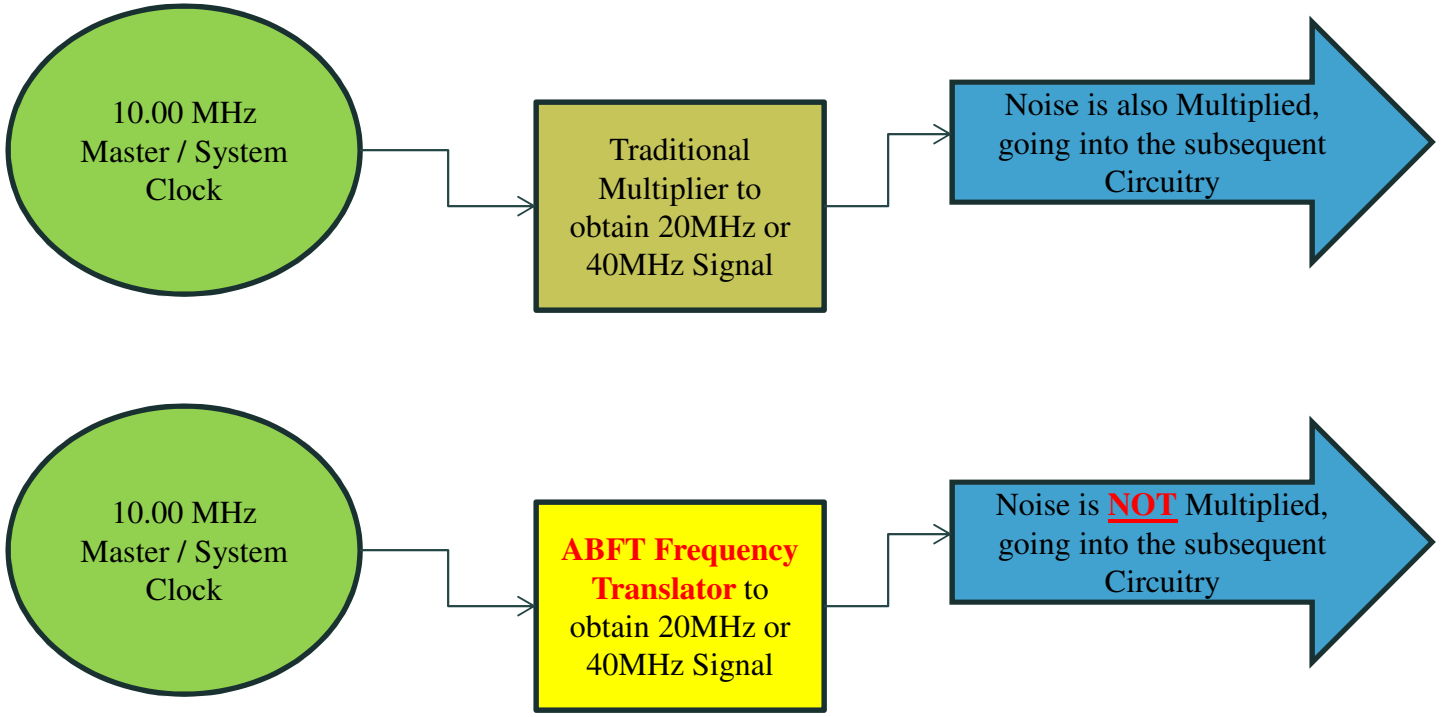
# What is a Frequency Translator / Jitter Attenuator?




ABFT Frequency Translator is designed to attenuate jitter / phase noise; accompanied with a 10MHz Reference Signal - while up-converting the input frequency by times two or times 4. This solution maintains phase & frequency cohesion to the 10MHz input reference. The approached employed in the ABFT design is a non-traditional Phase Locked Loop; ensuring significant jitter clean-up, very close-to-the-input carrier.

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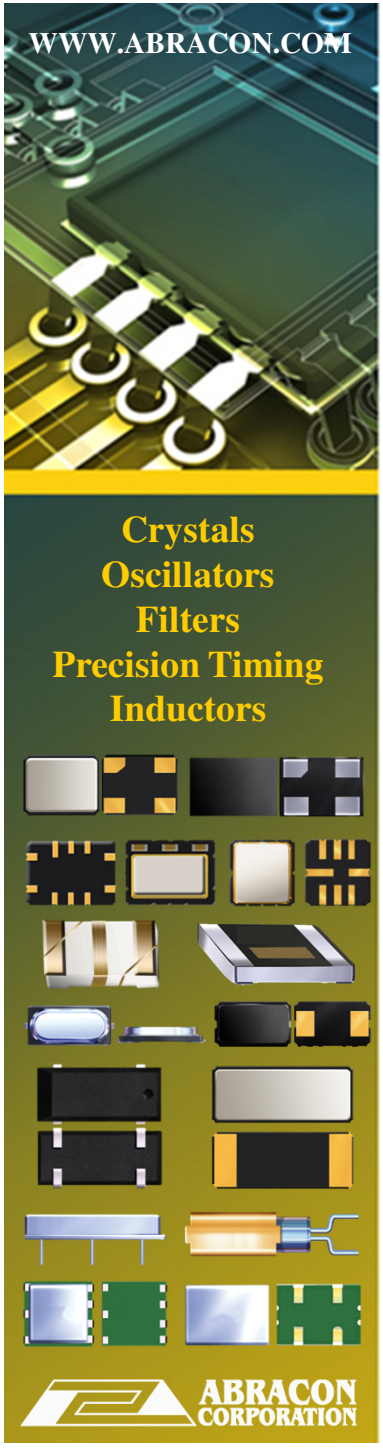
## Frequency Translator / Jitter Attenuator Features:

- **5*7*2 mm** SMT, RoHS Compliant reflow-able package
- Frequency translation to either 20MHz or 40MHz carrier
- (+3.3V ± 5%) Supply Voltage
- Industrial operating temperature range (-40ºC to +85ºC) standard
- LVCMOS Output
- Internal absolute pull range ≥ ±100 ppm allowing for long term drift correction; including Aging over 10-years

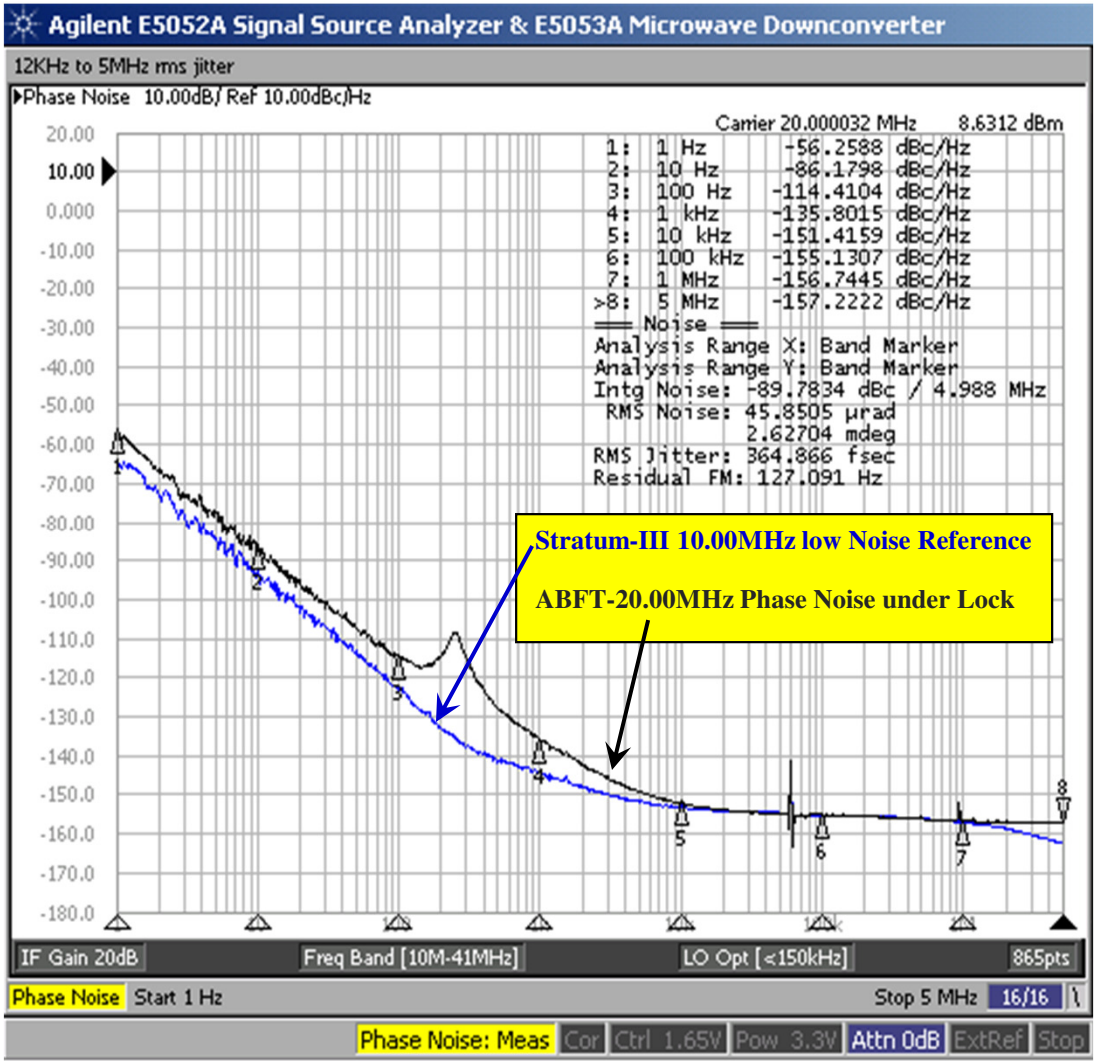
## Frequency Translator / Jitter Attenuator Applications:

- Frequency translation, clock smoothing and jitter attenuation of the input 10MHz reference
- Datacom - DSLAM, DSLAR, Access Nodes
- Cable modem head end
- Base Station - GSM, CDMA
- Telecom - SONET/SDH/ATM

ABFT Frequency Translators are offered in an industry standard 5x7mm footprint, with sufficient internal pull-ability to ensure long-term frequency correction over >10-years. Typical applications for these devices include Datacom, Cable Modem Head-End, Telecom architectures, etc.




# Comparative Phase Noise Performance; under Lock




If ABFT Translator is driven with an Ultra low noise 10.00MHz reference, the intrinsic phase noise of the Translator; starting at 10kHz offset will typically be better than -150dBc/Hz

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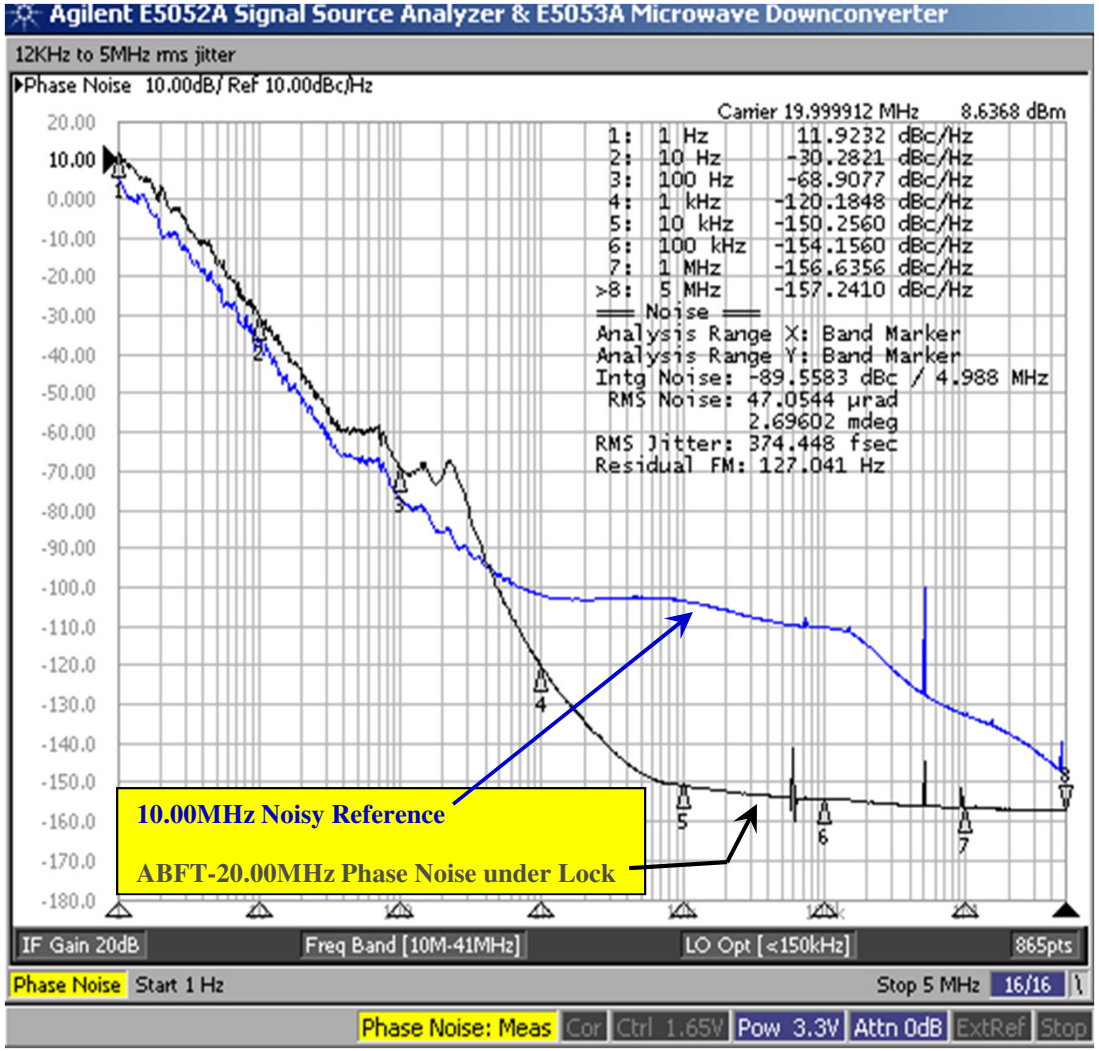
# Comparative Phase Noise Performance; under Lock… (*continued*)




If ABFT is driven from a Noisy 10.00MHz reference, the intrinsic phase noise of the ABFT device will take over; starting at about 1kHz offset and will be typically better than -150dBc/Hz @ 10kHz away from the carrier. This will yield better than 0.50 ps rms jitter over 12kHz to 20MHz BW, ***regardless of the input reference noise***

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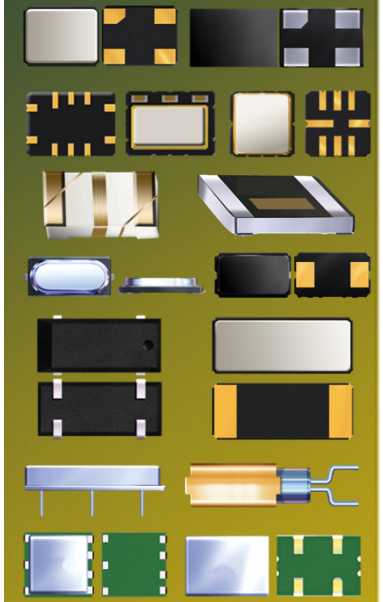

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# ABFT Evaluation Board

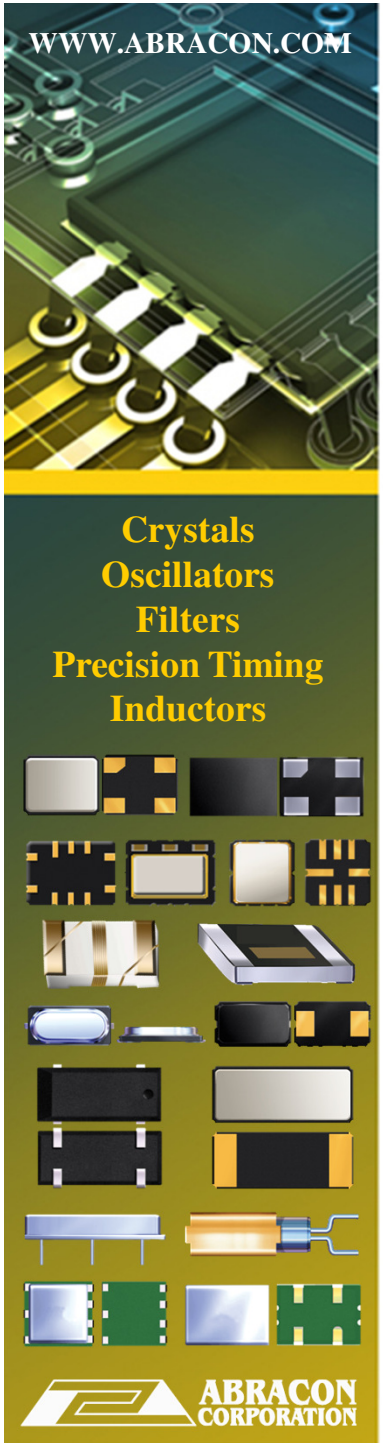
**Abracon Part #:**

ABFT-20.000MHz-EVAL

***Or***

ABFT-40.000MHz-EVAL

To facilitate quick engineering evaluation of the Frequency Translators, Abracon also offers Evaluation Boards – with either the 20MHz or 40MHz Translators already mounted for ease of use. Designers can input a 10MHz reference into the Evaluation Board and quickly characterize the output characteristics of the Translator solution.




# Summary

## Key Specifications:

- Ultra Small SMT packaging
- 20MHz and 40MHz frequency offering for clocking processors, µcontrollers, A/D, D/A, decoders, etc.

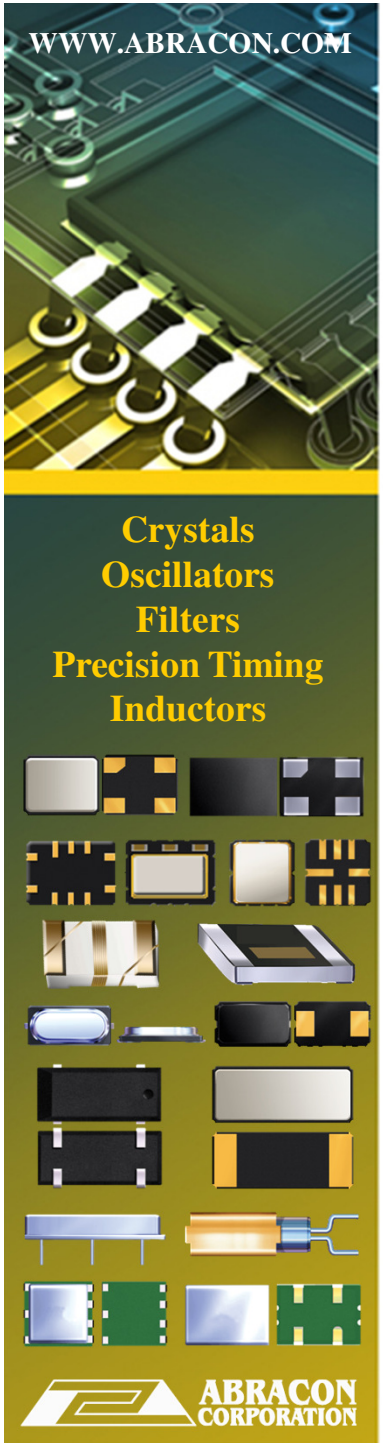
## Target Markets and Applications:

- Ideally suited for Applications using a Master Clock as a primary reference and clocking subsequent RF/Digital circuitry at a higher frequency. A typical example will be measurement & telecommunication instruments, BTS equipment, Networking cards, etc.

- Hand-held, miniature designs (space constrained) limiting the possibility to up-convert (multiply) the master frequency

## Abracon's Advantage:

- Low cost, small form-factor solution
- Available through Abracon's Global Distribution Network

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