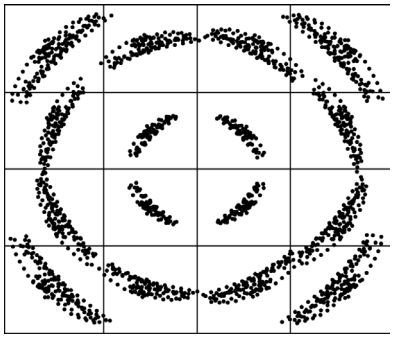
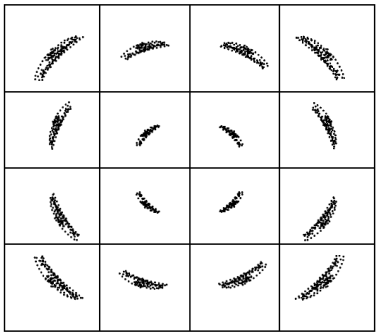
Qualifying LO Substitution Phase Noise Improvements

Today's communication systems (e.g., 5G and Wi-Fi) utilize high order modulation to achieve high data throughput. Higher throughput requires faster clock rates, which can increase symbol errors. A potential source of these errors is phase noise from the existing local oscillator (LO).



16 QAM with a poor phase noise LO

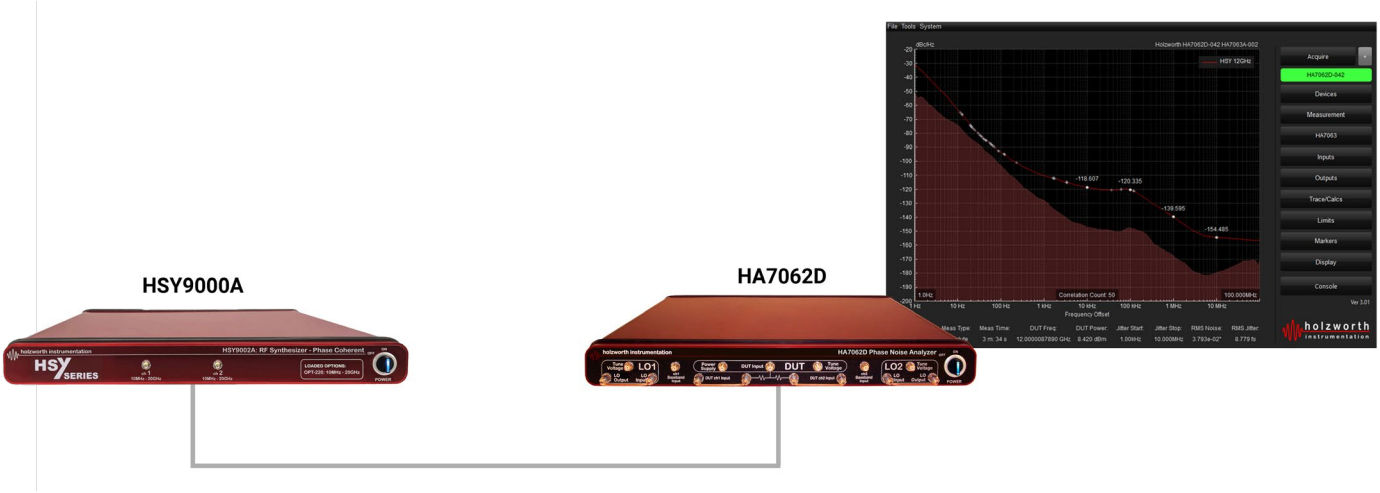


16 QAM with a low phase noise LO

A low phase noise synthesizer signal can be used as an LO substitute to see if a reduction in symbol errors is possible. Using a high-performance phase noise analyzer, engineers can measure the phase noise improvement directly to find a suitable replacement LO.

This demonstration highlights the capabilities of the Maury Microwave HSY9000A Series Multi-Channel RF Synthesizer as an ideal LO substitute, as well as the Maury Microwave HA7062D for real-time phase noise measurements.

Demo Setup



Target Users

Target users include design engineers and technicians engaged in design, verification, and troubleshooting of RF and microwave communication systems.

Product Overview

HSY9000A Series Multi-Channel RF Synthesizers

The HSY9000A Series Multi-Channel RF Synthesizers of the Holzworth product line utilize YIG-based technology to offer industry-leading phase noise and excellent spectral purity. The instrument can be configured with 2 independently controlled, phase-coherent channels in a compact 1U high chassis. Application-specific frequency options can be configured to cover combinations of 10 MHz to 3 GHz, 6 GHz, 12 GHz, and 20 GHz. Each broadband channel output provides an accurate dynamic range of up to +18 dBm to -110 dBm. The unique multi-loop architecture of the HSY9000A Series provides the ultimate in frequency accuracy, channel-to-channel stability, and phase coherency.

KEY SPECIFICATIONS AND FEATURES:

- Up to 2 independently controlled phase coherent channels
- Mix or match 3, 6, 12, and 20 GHz channels
- Compact 1U form factor
- 20 GHz Phase Noise: -118 dBc/Hz 10 kHz offset
- Ultra-low phase noise (ULN) option available
- +18 dBm to -110 dBm

HA7062D Real-Time Phase Noise Analyzer

The HA7062D Real-Time Phase Noise Analyzer of the Holzworth product line offers a unique combination of accuracy, speed, flexibility, and reliability in a compact form factor. Control is easy through an intuitive GUI or simple remote commands, making them ideal for use in the lab and production. The fully shielded, fan-less compact 1U chassis eliminates ground loops and troublesome microphonics for uncompromised performance and repeatability. The configurable front end uniquely enables users to measure the analyzer noise floor for the greatest measurement confidence.

KEY SPECIFICATIONS AND FEATURES:

- DUT input: 10 MHz to 26 GHz, opt 40 GHz
- Measurement bandwidth: 0.1 Hz to 100 MHz
- Automated absolute and additive (residual) measurements
- Only analyzer available that allows actual noise floor measurements
- Real-time cross correlation
- Extremely fast measurement speeds

More Resources

Visit info.maurymw.com/eumw-2024 to learn more about Maury Microwave solutions.