Symmetricom

5110A

Fast, Accurate Frequency Measurements—Automatically

KEY BENEFITS

- Easy to Learn and Use: Graphical User Interface
- Simple, Automatic Operation: Reduces Need for Skilled Technicians
- Instant, Real-time Display of Measurement Results
- Precision Measurement: Resolution to Less than 100 Femtoseconds
- Reliable Results: Accurate, Repeatable Measurements
- No Extra Data Processing: Instant Allan Deviation Calculations
- Saves Time: Preconfigured for Immediate Use
- Cost-effective Solution: No Additional Hardware Required
- Portable: Weighs Less than 10 kg
- Rapid Data Transfer: Ethernet Port
- Measures Allan Deviation for Averaging Times from .01s to 10^5s

TIME INTERVAL ANALYSIS

This easy-to-use instrument performs fast, accurate phase comparisons between two RF signals of equal or differing frequencies, within a range of 1 and 20 MHz. To accomplish this, the 5110A utilizes low-noise mixers, precise Direct Digital Synthesizers (DDS) and high-resolution zero-crossing detectors to track the time difference. This technique enables sub-picosecond measurement resolution of the phase difference between two RF signals, making this instrument ideal for the most rigorous application requirements.

The 5110A is typically used for short-term stability measurements of high-precision oscillators, such as cesium, rubidium and other atomic clocks; measurements of frequency versus power supply voltage, temperature and radiation and the evaluation of digital tuning circuits.

EFFICIENT USE OF RESOURCES

With one instrument, Symmetricom replaces complex, expensive multi-product solutions; costly testing and maintenance procedures; and the need for highly skilled system operators. Because the instrument is pre-configured and measurements are made automatically—rendered using a simple, graphical user interface—a technician can monitor the application with ease.

MULTIPLE MEASUREMENTS

By touching a button, the 5110A user can view in real time the Allan deviation, phase difference, frequency counter or the frequency difference between two signals.The frequency counter continually computes and displays three frequency averages (1, 10 and 100 second), comparing one input to another. The frequency counter display shows frequency measurements to 13 digits of precision in a single second (15 in 100 seconds). The 5110A also features high resolution, at less than 100 femtoseconds.

The screen graphs can be output to a printer and the data transferred to a PC for long-term storage. Customers can download real-time 10 ms phase difference data via a standard Ethernet port. This capability also enables the user to control the system remotely from a PC. As many as five users can connect to the data port of a single 5110A.

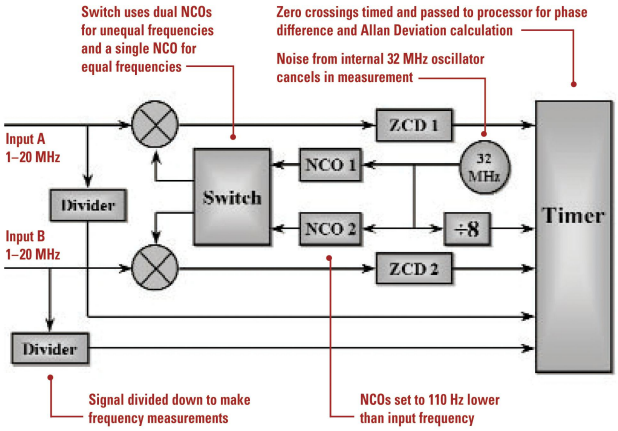
5110A Time Interval Analyzer

OPERATION

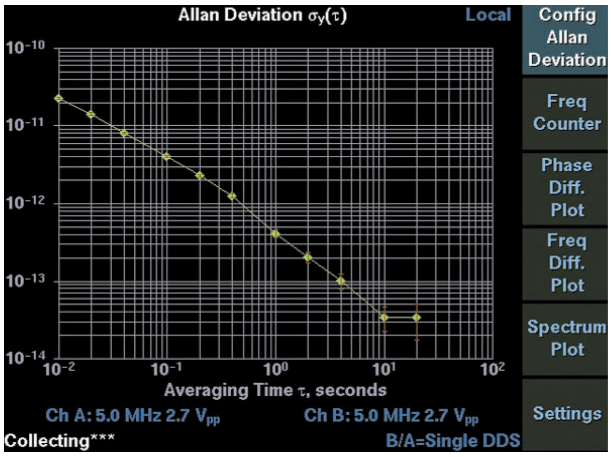
The 5110A has two modes of operation: single DDS and dual DDS. Single DDS mode is automatically selected when the instrument senses that the two input signals are within two Hz of one another. In this case, the 5110A operates as a standard dual-mixer time difference measurement system. In this mode, the instrument has the lowest noise floor because noise from the internal oscillator (32 MHz) and the numerically controlled oscillator (NCO) cancel out.

Dual DDS mode is automatically selected when the two signals differ by more than two Hz. This mode enables the instrument to compare any two signals in the range of one to 20 MHz.

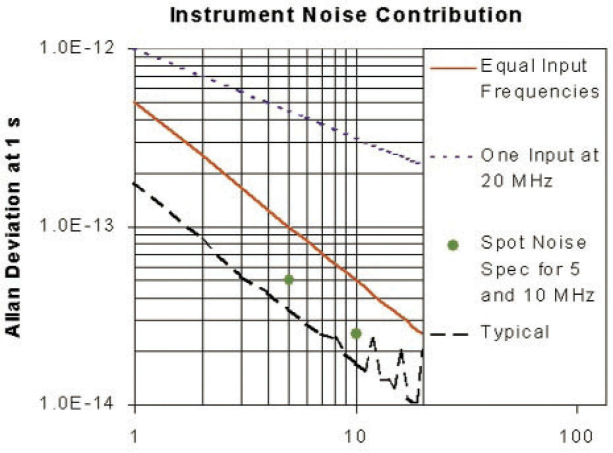
The instrument will always make correct phase measurements, provided that the inputs do not change more than 10 Hz after data collection begins.



5110A Block Diagram



5110A Sample Display Capture



5110A Performance (Noise Floor)

5110A Specifications

PERFORMANCE

- Allan deviation (1 s): <5.0 x 10-14 at 5 MHz
  <2.5 x 10-14 at 10 MHz

ELECTRICAL SPECIFICATIONS

- Frequency range: 1-20 MHz
- Input signal level: 3 dBm -17 dBm
- Input impedance: 50Ω
- Input connector: TNC (supplied with two BNC adapters)
- Printer port: Standard - parallel
- Network interface: Standard RJ-45 Ethernet port

ENVIRONMENTAL & PHYSICAL SPECIFICATIONS

- Temperature: 15°C – 40°C (operational)
  -25°C – 55°C (storage)
- Weight: 9.5 kg (21 lbs.)
- Size: 34 cm x 17 cm x 44 cm (13" x 7" x17")
- Power: 85 – 264 VAC, 47 – 63 Hz, 60W (max), IEC 320 connector

OPTION

- Rack Mount

Symmetricom

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