

**Characterization and Reduction of Clock Jitter**

The HP E1725A Option 243 TIA and clock jitter analyzer software provides digital designers with a powerful tool for understanding and reducing clock jitter. High-speed clock distribution networks are critical for high performance digital systems. The clock buffers found in these networks—PLLs, frequency dividers, fanout and translation ICs—are also affected by jitter.

The HP E1725A Option 243 includes powerful jitter measurement and display capabilities:

- Capture every clock cycle up to 80 MHz, continuously for a trillion cycles using fast histogram or 32K cycles using a vs. time display.
- Understand true peak-to-peak and cycle-to-cycle jitter using a complete range of statistics.
- Display jitter spectrum (using a built-in FFT) to determine the root causes of jitter.
- View the power spectral density display to see phase noise as noise power offset from the carrier.
- Use the Allan variance display to understand the type and level of noise (white phase, flicker phase, random walk phase, flicker FM, random walk FM, and white FM).
- Export data to another analysis package or to spreadsheet or wordprocessor packages.

**Test Token Ring Jitter for Compliance with IEEE 802.5**

The HP E1744A Token Ring jitter analysis software, included with the HP E1725A Option 244 TIA, provides both interoperability testing as defined by the IEEE 802.5 standard and general purpose jitter measurements. This solution is used by the designers of products for computer networks and gives them a faster, automated alternative to tedious oscilloscope measurements.

The displays described in the previous application overview, Characterization and Reduction of Clock Jitter, are available with this version of the HP E1725A instrument. In addition, measurement of Filtered Accumulated Jitter (FAJ) and Filtered Accumulated Phase Slope (FAPS) are fully implemented by the HP E1725A Option 244—including averaging and filtering specified by the IEEE 802.5 standard. The HP instrument also measures transmitter duty cycle distortion (TDCD), Tdiff01, and Tdiffmax.

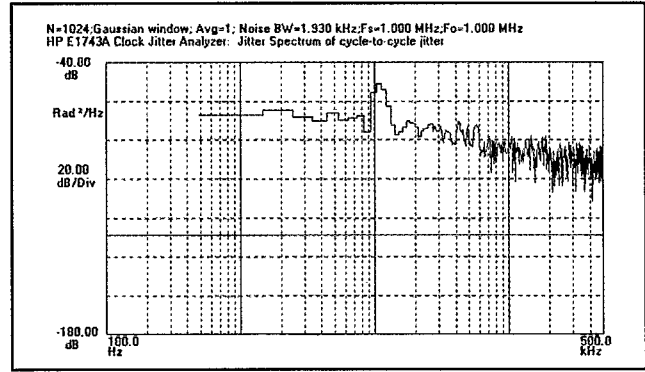
A scrolling text window below the data display automatically records every action the instrument takes and records every result. This includes marker clicks and other actions performed in order to read, examine, or interpret results. Custom notes can be intermixed in this file to record important information such as type/length of cable, number of PHYs, pass/fail, and so forth. The file can be saved and used in reports or other documents to provide a complete record of the test.

**Powerful Radar Signal Characterization**

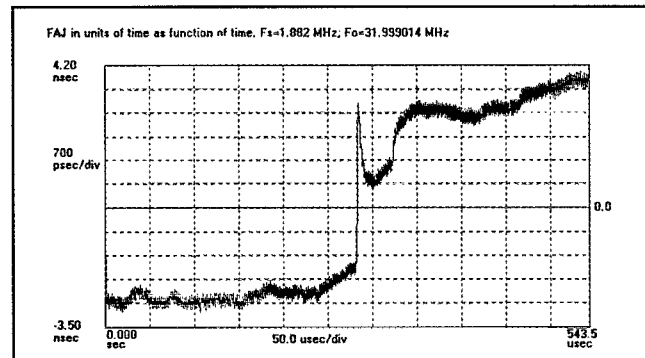
Combining the HP 5364A microwave mixer/detector with an HP modulation domain analyzer and a local oscillator extends the modulation domain to 18 GHz.

The HP 5364A microwave mixer/detector is designed to ensure downconversion with minimal distortion and group delay over its 500-MHz IF bandwidth. Configure the HP 5364A with your own local oscillator or an HP source such as the HP 8671A synthesized CW generator, the HP 8673C synthesized signal generator, or the HP 8673E synthesized signal generator. In addition to the IF channel, the HP 5364A provides a video detector output to trigger the HP 5373A. The video output can also be used to directly measure pulse width, rise and fall time, and PRF/PRI.

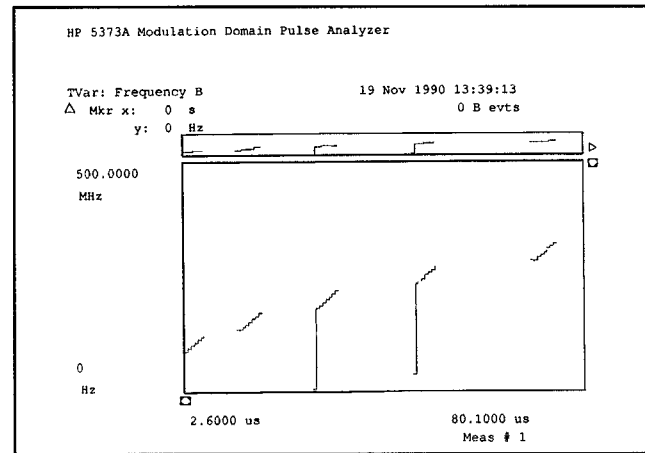
Radar chirp-linearity is easily characterized in the modulation domain. The HP 5364A microwave mixer/detector can be used to downconvert the chirp to baseband, maximizing measurement resolution. A frequency vs. time display clearly shows deviation from linearity. The HP 5373A features display-averaging which dramatically improves the resolution of measurements on repetitive signals.



The HP E1743A Phase Power Spectrum feature allows you to examine jitter spectrum, in this case of cycle-to-cycle jitter on a clock signal. A jitter component near 10 kHz can be easily identified.



IEEE 802.5 specified jitter measurements are simplified with the HP E1744A Token Ring Jitter Analysis software, such as this display of Filtered Accumulated Jitter (FAJ).



The power of modulation domain analysis can be seen with this HP 5373A frequency vs. time graph of a frequency chirp on an agile carrier with a varying PRI.

