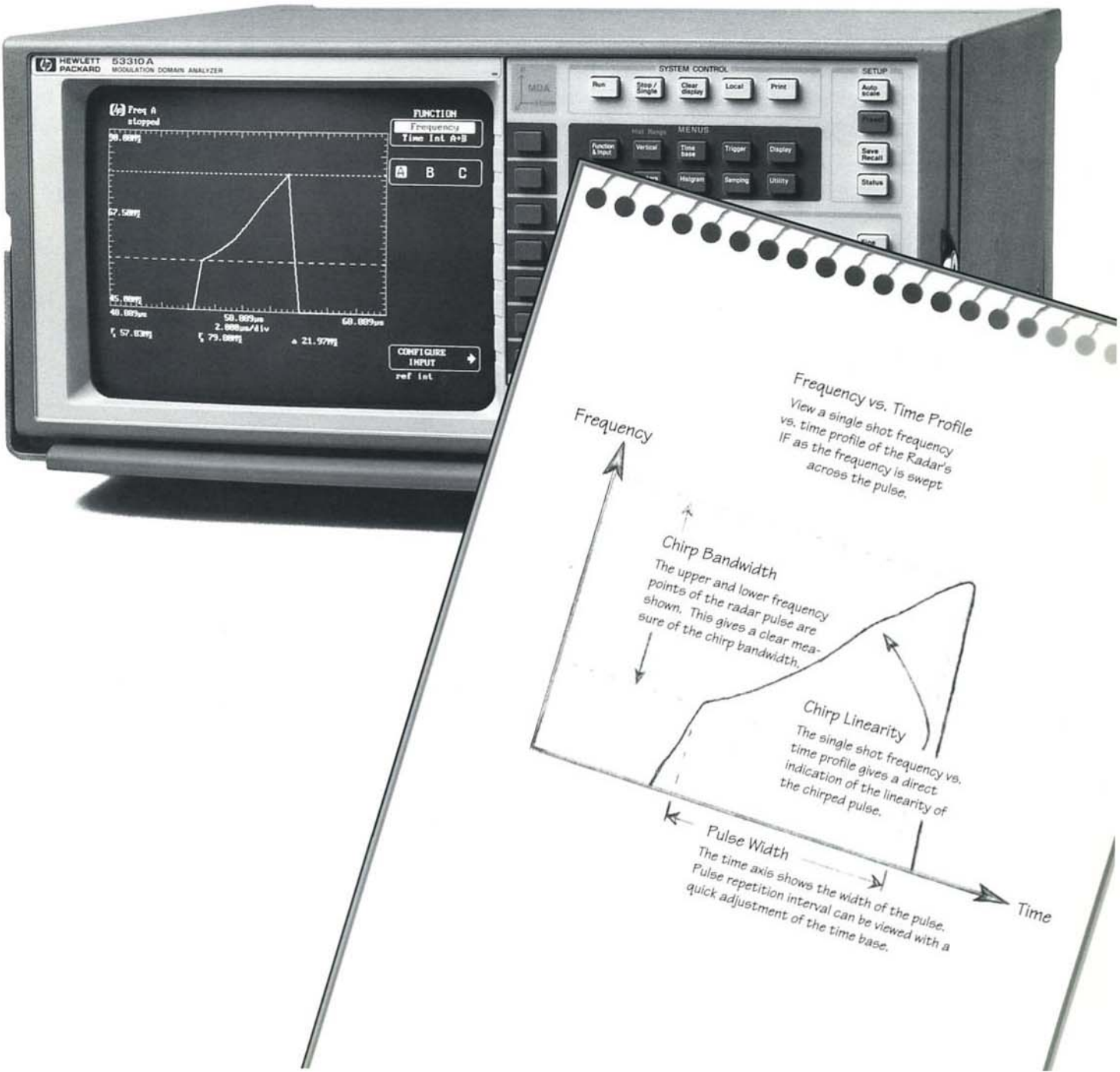
HEWLETT PACKARD

Single Shot Frequency Profiling of Chirped Radars Made Easy

Application Brief AN 1200-8

HP 53310A Modulation Domain Analyzer



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A Direct View of Chirp Linearity and Timing

Situation

Many modern radar systems employ complex modulation techniqes to improve range resolution performance. Linear FM Chirp is a common intra-pulse modulation used for pulse compression. Pulse compression allows a radar to achieve the fine range resolution and single target resolving capability of a "narrow pulse width" radar without sacrificing absolute range performance.

Problem

The analysis of modern chirped radars is challenging. Linearity of the chirp is critical to system performance. Conventional repetitive averaging techniques are time consuming and do not capture single-shot deviations. Use of frequency discriminators and digitizers to acheive a single-shot view is complex and sensitive to calibration. A fast and direct view of chirp linearity and timing is needed to improve design characterization and shorten design cycles.

Solution

The HP 53310A Modulation Domain Analyzer's ability to measure and display a signal's continuous frequency over time makes dynamic frequency analysis of radar pulses easy. Views of single-shot chirp linearity are obtained by measuring the continuous frequency of the IF chirp. The chirp bandwidth, linearity and timing are all easily analyzed with the HP 53310A's frequency vs. time display.

The Modulation Domain Gives You a New Way to View Your Complex Signals

Better ways to analyze your complex signals don't come along often. Now Hewlett-Packard brings you the Modulation Domain - a way of looking at frequency or time interval measurements that directly and clearly reveals both intentional and unintentional modulation.

For frequency analysis, it's the missing piece of the puzzle. The Time Domain shows you amplitude (voltage) vs. time. The Frequency Domain gives you amplitude vs. frequency. The Modulation Domain plots frequency vs. time - an intuitive and insightful way of examining your signal's dynamic frequency modulation.

For timing measurements, the Modulation Domain's view of time interval vs. time allows you to both see and quantify timing jitter directly - taking you one step beyond the Time Domain's qualitative view.

Related Applications

- Profiling stepped frequency radars
- Profiling agile sequences of hopping radios and frequency agile radars
- Profiling stepped pulse repetition interval (PRI) sequences
- Characterizing EW jammer performance
- Characterizing VCO tuning linearity
- Electronic surveillance

For more information, call your local Hewlett-Packard Test and Measurement Sales Office listed in your telephone directory.

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