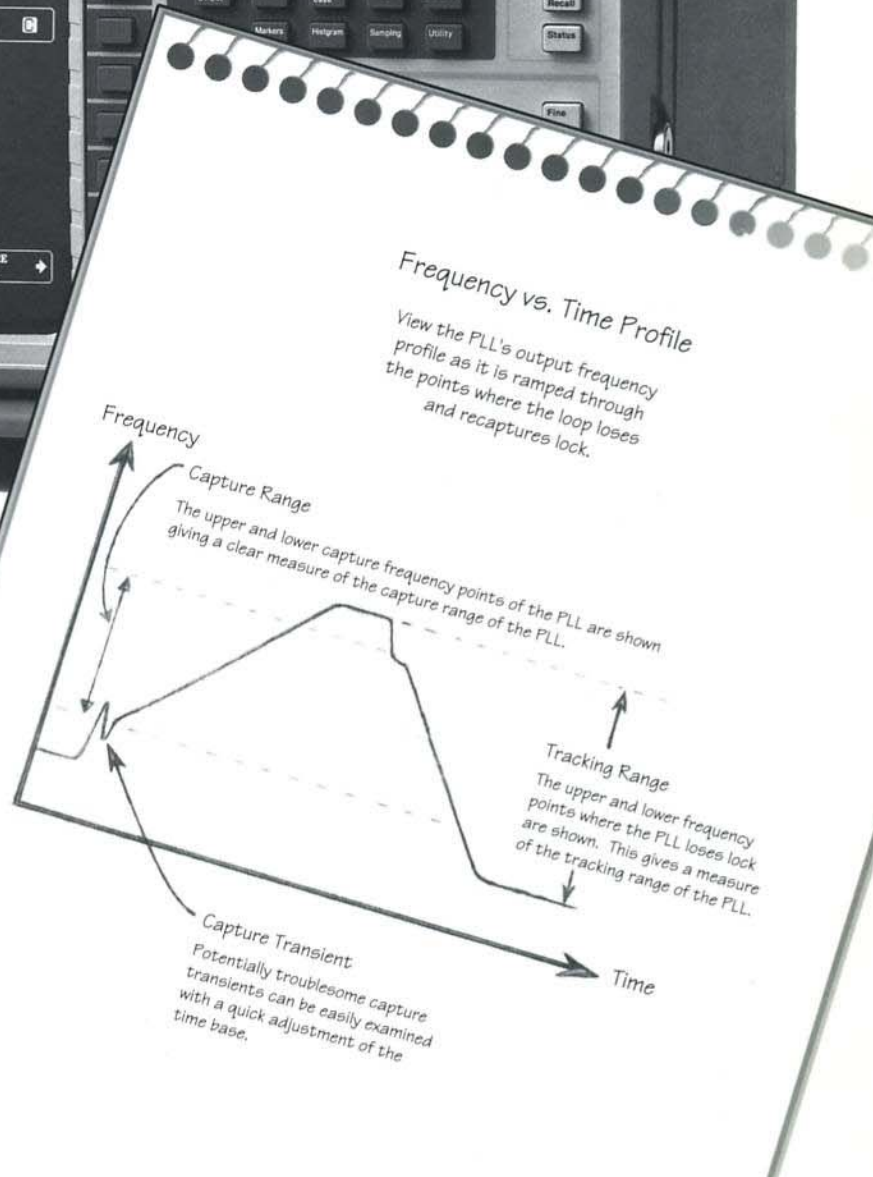
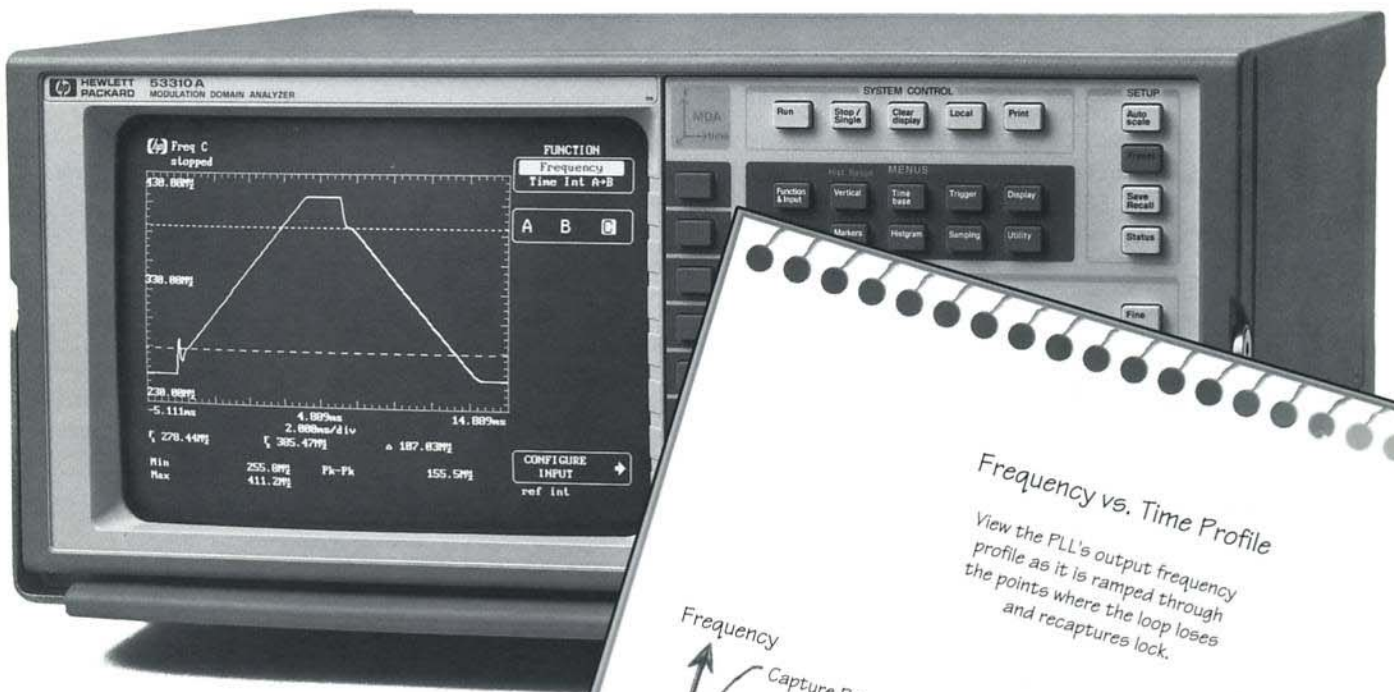


Simplified Analysis of Phase-Locked Loop Capture and Tracking Range

Application Brief AN 1200-7

HP 53310A Modulation Domain Analyzer



Direct Analysis of Phase-Locked Loops

Situation

Phase-Locked Loops (PLLs) are common yet essential circuits in many electronic applications. They may be used as narrow-band filters to recover signals embedded in noise, or for synchronizing digital transmissions in communication applications. Other traditional uses include frequency synthesizers, demodulators, multipliers, dividers and many more.

Problem

The analysis of PLLs is challenging. Components can be assessed individually, but closed loop characterization is often difficult to obtain. Both transient and dynamic frequency response are of interest to the designer. Fast and direct analysis of parameters such as capture and tracking range are needed to improve 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 PLLs easy. A direct measure of the PLL's capture and tracking range is obtained by monitoring the output frequency while the PLL is forced to go in and out of lock. A quick and simple view of the PLL's capture and tracking range can now be displayed in one direct measurement.

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

- Carrier lock time and switching of cellular radios
- Switching characterization of PLLs, VCOs and frequency synthesizers
- Frequency profile PLL output during acquisition
- Clock recovery circuit analysis
- Velocity profiles of motion control systems

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

December 1990

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Printed in U.S.A.
5091-0391E