

vides outputs for use on an external scope or X-Y plotter.

Actually the idea of spectrum-analyzer plug-ins isn't new. Nelson-Ross Electronics, Lake Success, NY, has offered them for years, mostly as modules for Tektronix and Hewlett-Packard scopes. For instance, the company's Model 236 can plug-in to an HP 140A/141B scope and provide a quick look at an over-all 25-MHz scan or resolve 100 Hz on a narrow scan.

Nelson-Ross also makes self-contained units—such as the CSA 290, a 400-MHz communications-oriented analyzer whose built-in frequency counter provides $\pm 0.1\%$ tuning accuracy. Unusual is the unit's self-test and self-calibration features, which eliminate the need for external equipment.

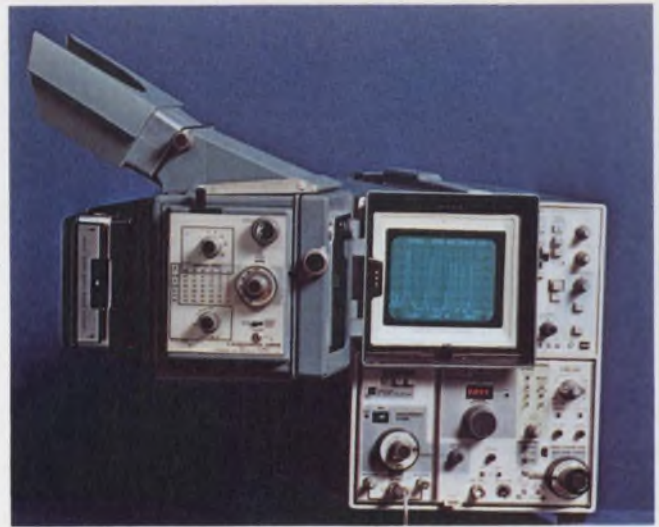
Another plug-in, the P9040 from Kay Elemetrics, Pine Brook, NJ, fits the company's 9000AS scope or comes completely self-contained for use with any commercial storage scope. The \$2390 P9040—which covers the video-through-vhf range—also exemplifies the trends toward simplicity and digital design: Both center frequency and attenuation can be digitally read out, and signals are calibrated directly in dBmV.

While the plug-in analyzer's necessarily small size once severely limited its performance, a look at some outstanding units offered by Tektronix (the Beaverton, OR, company that "immortalized" the plug-in in its scope line, and continues to do so in its TM500 series of measuring instruments) reveals that the plug-in has become a factor to be reckoned with.

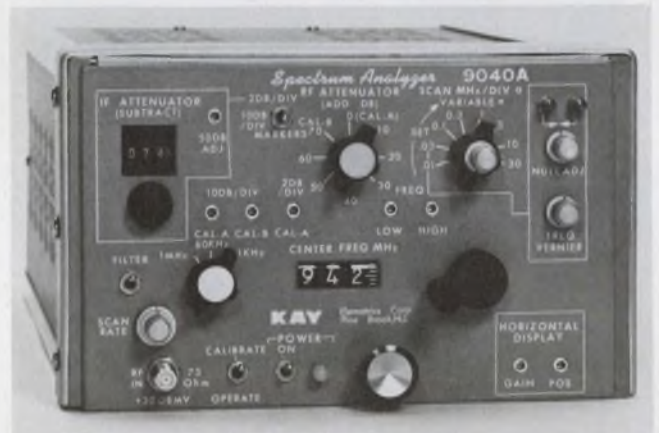
Consider the Tektronix 5L4N—a low-frequency (0 to 100 kHz), swept-front-end unit that fills two of the three holes in any of the company's 5000 series scopes. Among other things, the unit offers 80 dB of dynamic range, resolution down to 10 Hz, a built-in tracking generator and front-panel selectable impedance. With the latter feature, you can match the analyzer to your source impedance, be it 50 Ω , 600 Ω or 1 M Ω . And the calibration of the 5L4N automatically follows the impedance you select—goodbye mental arithmetic and conversions.

All of the 5L4N's performance, plus a mainframe storage scope than can also be used for time-domain measurements, can be bought for \$3045.

Another Tektronix spectrum analyzer—the 7L13—works at the forefront of analyzer performance in a number of key areas. Made to fit any of the company's 7000 series scopes, the 1800-MHz 7L13 mirrors the design advances that have revolutionized analyzer performance and ease of use: Just one tuning knob on the 7L13 handles both coarse and fine frequency adjustments. Center frequency can be read on a 4-digit LED display or directly on the CRT screen. And



A resolution of 30 Hz out to 1800 MHz marks the Tektronix 7L13. Part of the company's 7000 Series CROs, the unit is shown in a variable-persistence storage mainframe.



Available as a self-contained unit or for use with an available storage scope is the 300-MHz P9040 from Kay Elemetrics. The unit costs just \$2390.

the screen also shows alphanumeric displays of reference level, resolution, span and other parameters.

All of this makes the unit easy to use. But it's in performance that the 7L13 really excels. Low incidental FM (less than 10 Hz), low drift (2 kHz per hour) and low noise and intermodulation distortion have combined to give the 7L13 a narrow, 30-Hz resolution bandwidth and a super-sensitive -125 -dBm response.

Narrower filters bring better resolution

With such resolution, the Tektronix instrument can clearly display 50-Hz sidebands 125 dB below a carrier of, say, 1476 MHz. And with low drift and distortion products, a sweep lasting, say, 20 seconds will show a clean, jitter-free display.

Part of the credit for the 7L13's performance,