MT REVIEW

AVCOM PSA-37XP Spectrum Analyzer

By Bob Grove W8JHD

Next to a good receiver, a spectrum analyzer is the most valuable piece of test equipment that a serious monitor of the radio spectrum can own. While a receiver or scanner can monitor a single frequency, and a spectrum display unit (SDU) can reveal activity within a limited band of frequencies, only a spectrum analyzer can simultaneously provide a visual display of a broad spectrum of frequencies, instantly alerting the user to activity anywhere within its set limits.

While it's true that some new, stand-alone, wide-frequency-coverage receivers also have a "band scope" to visually reveal signals within a small chunk of spectrum, they sweep so slowly through their span that many on-off signals are missed.

Over the years, many manufacturers have produced spectrum analyzers – Tektronix, HP, Rohde and Schwarz, Advantest, B&K, Marconi, IFR and many other brands are familiar to the electronics technician. AVCOM of Virginia occupies a niche of its own, specializing in high-performance, low cost spectrum analyzers, making them particularly attractive to both the hobby radio market as well as professional businesses and agencies operating on a limited budget.

❖ Spectrum Analyzers and Oscilloscopes

So how is a spectrum analyzer different from an oscilloscope? The oscilloscope operates in the "time domain" – Simply put, the left hand side of the trace on an oscilloscope is the beginning of a time interval for a specific frequency, and the right hand side is the end of that interval. The display reveals what went on during the period.

A spectrum analyzer, on the other hand, operates in the "frequency domain" – as it paints its picture from left to right, it is sweeping from a designated lowest frequency to a designated highest frequency in a span of spectrum, revealing with its trace the activity it finds during its sweep.

By narrowing the span to zero, we can home in on a specific frequency, analyzing its contents like we would do with an oscilloscope. Thus, the spectrum analyzer can function in both the time domain and in the frequency domain.

But except for a limited number of top-end spectrum analyzers, they can't be used as receivers because they don't have multimode audio detection – you can see the signal as a spike on the screen, but you can't hear it. And even among those spectrum analyzers that have audio detection, you can't simultaneously see the wide spectrum and listen to a signal.

❖ So Who Needs One?

The spectrum analyzer proves itself invaluable to many sectors, to name a few: surveillance countermeasures detecting radio-frequency "bugs"; analyzing electronic prototypes for unwanted signal radiation; spectrum profiling for cell sites and communications complexes; antenna evaluation; calibrating and adjusting the radio-frequency circuitry; measuring signal levels and possible interference for wireless computer installations; aligning satellite earth station dishes; optimizing RF systems for signal-to-noise performance; viewing, locating, and identifying radio-frequency interference; and monitoring the radio spectrum for signal detection and propagation characteristics.

For wide-frequency-coverage applications, the user must select a spectrum analyzer that not only covers the amount of spectrum necessary, but which has the functions required to make necessary measurements. Let's take a look at one instrument that may qualify for the "Biggest Bang for the Buck" award.

❖ AVCOM's PSA-37XP

This recent release from AVCOM of Virginia has a lot going for it. As with most spectrum analyzers, it doesn't have audio recovery, but it does have everything else needed by the majority of technicians and frequency specialists, and it's perfectly suited for portable and mobile applications. The AVCOM PSA-37XP is compact (13.5"W x 5.25"H x 13"D), lightweight (10 lbs.), internal battery or externally powered, loaded with features, and has a high-definition, 5-1/4" diagonal, LCD screen for fast response and extended battery life.

Continuous frequency coverage from 1-4200 MHz (4.2 GHz) in four overlapping bands may be shown in spans of up to at least 500 MHz, or narrowed down to distinguish closely-spaced signals. Frequency range may be increased to 6000 MHz (6 GHz) with the use of an optional AVCOM MFC-4060-37

MHz microwave frequency extender.

Reference levels (sensitivity) of -40, -20 and 0 dBm are switch-selectable.

An amplitude accuracy of 2 dB is typical, with an on-screen dynamic range exceeding 65 dB.

The center, beginning and ending frequencies for any selected span are displayed on screen, with the center frequency accurate to within 100 kHz. Resolution band width (RBW – selectivity) is selectable from 75 kHz, 300 kHz, 1 MHz and 3 MHz.

While the sweep is fast enough to capture fast-burst transmissions, it's not fast enough, nor is the RBW narrow enough, to see the modulation on the skirts of the signal spike.

The agile, high-contrast, 1/4 VGA LCD is back-lit for night viewing, and shows brilliant contrast in full sunlight. The display offers user-selectable viewing choices like reverse video (white on black vs. black on white), contrast ratio, amplitude units (dBm or dBmV), sweep reversal (high/low frequencies right or left), persistence (display hold), signal peak indicator, graticules (latitude/longitude lines) on/off, signal marker, multiple trace memories, time/date display, signal alarm and more.

For satellite TV installers, toggle switches enable the BNC and N input connector to be "hot" with +13 or +18 VDC for use with an LNA or LNB; a switchable 22 kHz filter is included. Approximately two hours of portable operation is supported by an internal lithium-ion battery; an optional second battery may be installed, extending the line-free operation. An AC power supply (included) acts as a charger as well as powering the unit for test-bench applications.

The unit's rugged, aluminum enclosure and multi-functional bail-tilt handle invite carry-along trips where it might be needed. An optional Cordura nylon case with accessory pockets may be ordered for extra protection and convenience.

Computer Control

A standard DB-9 serial port is provided on the rear apron of the PSA-37XP accepts a simple serial command set to interface with a computer.

The Bottom Line

Our test unit performed flawlessly, providing reliable indications of local and shortwave broadcasters, two-way VHF and UHF transmitters, 2.4 GHz wireless computer links, and more. While a rudimentary instruction manual is provided, the simple layout of the control panel invites immediate, intuitive operation.

The wide frequency coverage, easy operation, versatility, portability and reasonable cost of the AVCOM PSA-37XP make it an excellent choice for the majority of technical applications requiring an RF spectrum analyzer.

The AVCOM PSA-37XP with 12V cigarette plug cord, universal 85-265 VAC power supply/charger, lithium-ion battery, and basic instruction manual are available from Grove Enterprises (1-800-438-8155; **http://www.grove-ent.com**) for $3795 plus shipping.

News from Winterfest

Banquet speaker at the 2005 SWL Winter SWL Festival in March was Frans Vossen of Radio Vlaanderen Internationaal. Unfortunately Frans' voice will be disappearing from the airwaves as RVI itself loses languages and cuts services.

Sadly, it is a trend that is occurring throughout Europe. On March 4, Kim Andrew Elliott interviewed Wim Jansen, station manager of RVI Flemish World Radio and Juhani Niinistš, head of YLE Radio Finland, about reductions in European shortwave broadcasting. The interview gives further background information on Frans' subject. To close the evening on an up beat, the staff and management of the 'fest have announced the 19th 'fest is scheduled for March 3 and 4, 2006, and the big number 20 - two decades - will be on March 9 and 20, 2007! Check the Web site **http://swlfest.com/**

- Tom Sundstrom, W2XQ, Baudwalking