FIRST LOOK

Signal Hound Spectrum Analyzer/Measuring Receiver

By Bob Grove, W8JHD

With the current spate of software defined receivers hitting the market, it would appear that the future of radio reception has been defined. And, right alongside the multi-thousand-dollar SDRs, we find the Signal Hound SA44B at under $1000. What does it do and what are its limitations? Let's take a look.

Measuring only 6-1/2" long (plus connector length) by 3" wide and 1" deep, and weighing in at a scant nine ounces, this compact receiver has four ports, only two of which are essential for operation: an SMA signal input and a USB 2.0 computer interconnect (cable included), which is the only source of power needed for the instrument to operate. Data rate is 480 MB per second.

The third port (BNC connector) provides input for an external 10 MHz time base if desired, and the fourth port (also a BNC connector) accepts a trigger signal for the sweep, and also has output for SYNC and self test.

❖ Frequency Coverage and Receive Specs

With an extremely wide frequency bandwidth of 1 Hz to 4.4 GHz, a spectrum display span adjustable from 0 to 4.4 GHz, and real-time demodulation capability for AM, FM, SSB, and CW modes, the Signal Hound is already an attention getter.
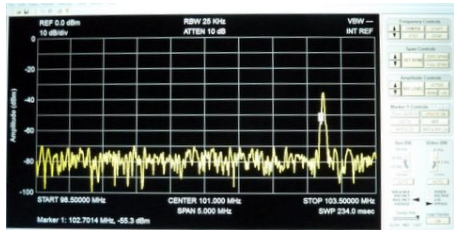
Frequency accuracy is +/- one part per million (that's one hertz per megahertz). For even greater accuracy, an external time base (not provided) can be injected into the appropriate BNC connector mentioned earlier.

Sensitivity is quite good at the narrowest bandwidth settings, and is enhanced further by a selectable preamplifier which adds an additional 10-15 dB of low-noise gain at frequencies above 500 kHz.

Dynamic range (the ability to handle equally very weak and very strong signals) is a wide -151 to +10 dBm. The instrument enables the measurement of the dynamic range with an accuracy of 0.25 dB from 0 to -125 dBm in the

150 kHz to 1 GHz range, and 0 to -115 dBm in the 1 GHz to 4.4 GHz range. The unit exhibits 1 dB gain compression with the 15 dB attenuator invoked and with the preamplifier off is typically +16 dBm below 150 MHz and +19 dBm above.

In addition, the unit provides digital audio filtering and makes accurate AM and FM measurements including demodulation.

❖ As a Stand-Alone Receiver

So why wouldn't this make a dandy receive system for signals surveillance? After all, it has extremely wide frequency coverage, multimode demodulation, and high sensitivity.

The fact is that the Signal Hound is first and foremost a test and measurements instrument. That means that it doesn't have the features that we would expect to find in a dedicated communications receiver, including squelch, tuning while listening, simultaneous spectrum display and audio recovery, narrow single-signal selectivity, or memory channels.

Additionally, the closer you operate near the two IF conversion frequencies, 2.9 and 10.7 MHz, images will likely be produced on the display.

If catching a brief signal spike like a pulse is a prime requirement, the sweep rate is too slow, especially over a wide span of frequencies. The fixed trace is written as slowly as once every

several seconds, and never fast enough to allow the capture or recognition of brief on/off spikes.

But since the product's intended target is a continuous signal, the primary purpose of the Signal Hound as a wide-frequency coverage spectrum analyzer and test receiver with emphasis on measurement accuracy is certainly achieved. The product works with a Windows platform XP or later. A variety of colors may be custom-selected for the graphic user interface (GUI).

❖ Utilities

A number of software sub-routines may be selected, including:
* Audio listening to a signal's contents
* Broadband signal peaking to automatically seek nearby active frequencies
* Broadcast masks to confirm response to published masks
* Channel power to reveal power levels (dBm) of selected channels
* Harmonics viewer to reveal the first 5 harmonics of the entered frequency
* Frequency difference meter to compare the variance between the time base oscillator and the frequency of the received signal.
* Self test of basic functions
* Phase noise plot

❖ Four sweep modes

The Signal Hound has four sweep modes, including:
* Zero span: This conventional mixing of a fixed local oscillator with the RF input signal produces a stable, familiar, heterodyne product.
* Low frequency sweep: Below 6.5 kHz resolution bandwidth (ARBW) or video bandwidth (VBW), two LO frequencies are mixed to produce a trace automatically adjusted to reduce images and other spurious responses ("spurs").
* Medium frequency sweep: between 6.5 kHz and 250 kHz RBW or VBW, LO frequencies are stepped in 200 kHz intervals.
* High frequency sweep: 5 MHz RBW allows rapid sweeps in an effort to find a strong signal rapidly.

You can save a sweep and recall it later, even printing it out on your computer's printer. Once you identify a frequency of interest, you can listen to its contents in any of the modes: AM, FM, SSB, or CW. You can also type in the exact frequency of interest and the receiver will immediately respond to that direct entry.

IF bandwidths are pretty wide for communications purposes, however, with 30 kHz the narrowest demodulation BW. By direct-entering the frequency step intervals you can tune the receiver incrementally.

For technical surveillance and countermea-

sures (TSCM) applications, third party software is available on the Internet ("Kestrel" at **www.pdtg.ca**). Alternatively, the user may write his own operational and automation software with a free application programming interface (API) available from the manufacturer.

❖ A Matching Tracking Generator

Additional versatility for the Signal Hound is provided by the optional TG44A tracking generator, housed in an identical package to the SA44B. It may be used as an integrated generator for the Signal Hound, or as an independent signal generator controlled by the host computer.

Since it is also powered through its USB cable, it requires a second port from the host computer in its tracking mode. A BNC cable is also provided for the triggering and synch commands from the Signal Hound. A male-to-male SMA adapter is also provided for direct insertion into an RF circuit.

Capable of tracking the frequency settings of the mated SA44B from 10 Hz to 4.4 GHz, harmonics generated by the generator are a consideration since they may be as high as -10 dBc (decibels above the carrier level).

Typical applications include the measurement of gain, frequency response, compression, flatness, and insertion loss on equipment, systems, and components like filters. A separate CD-ROM comes with the TG44A.

The SA44B Signal Hound is available for $919 plus shipping, and the TG44 tracking generator sales for $599, from Test Equipment Plus, 35707 NE 86th Avenue, La Center, WA 98629; phone (800) 260-TEST, or visit their website: **www.signalhound.com**.

Uniden Bearcat 880 CB Radio

By Larry Van Horn, N5FPW

Uniden is well known for its legendary Bearcat brand of CB radios. Now Uniden has introduced a new standard for CB communications with the Bearcat 880. The 880 combines the power and ruggedness of a Bearcat CB radio with a stylish design and some great features.

The Bearcat 880 has four watts of transmit power (AM mode only) and 40 channels, with NOAA weather channels and an instant channel 9/19 for emergency channel access.

The Bearcat 880 has quite a few features including dynamic squelch control, Hi/Lo microphone gain control, memory channel scan, and an automatic noise limiter/noise blanker filter to reduce background noise. The 880 includes a noise canceling microphone with an extra long microphone cord.

What really sets the Bearcat 880 apart from other CB radios is the display. The large, easy-to-read channel display offers seven backlight color options to customize your radio. You can change the colors for the day and night and can adjust brightness/contrast for both settings, so you can have a red radio display at night, blue during the day, or green/blue, dim/bright, bright/bright, etc. The Bearcat 880 display also features a large signal strength/RF/SWR digital meter, day and night brightness control, and TX/RX indicators.

❖ What's in the box?

The Bearcat 880 40 Channel CB radio includes a microphone (6-pin), mounting bracket kit, DC power cord, 6-pin to 4-pin microphone adapter, owner's manual and two year manufacturer warranty. An antenna cut for the CB band is not included and is sold separately. This unit is compatible with all CB antennas in the marketplace.

Additional Features:

This CB radio is loaded with quite a few features, including some new ones we have not seen in any CB radio currently in the marketplace.

In addition to the ones listed above, here are even more 880 features:

- Adjustable RF gain
- Backlit control knobs/buttons
- Brightness Control: Dimmer switch day/night
- Color: Black or silver
- Diagnostic features like those that the Cobra LX LE CB has including: voltage (gives reading), RF power (pass/fail), and Antenna SWR (pass/fail).
- Easy to read laser etched keys
- Enhanced display graphics
- External speaker connector
- Frequency counter/Channel indicator
- Front microphone connector
- Local/DX switch
- Public address capability (PA capability)
- SWR CAL meter
- SWR calibration (SWR CAL)
- Variable microphone gain (4 levels)
- Variable talk back
- Volume control
- Weather channels (seven channels) with scan option and weather alert.
- Wireless microphone compatible

❖ Bottom Line

The Uniden Bearcat 880 has a great looking display. It reminds me of an in-dash CD player, with its huge display with seven different color options. RF output out of the box was measured right at four watts (higher than most stock CB radios I have tested in the past). Modulation was excellent with good reports from other stations in the area. The extra long microphone cord allows you to talk from anywhere in the front seat area of your car (if mounted in the center of the vehicle).

The audio is nice and clear and can be turned up to near full volume without distortion if you have a noisy vehicle. The display, though, is really what makes this CB a shining star – it is extremely easy to read and has thoughtful features like a dedicated night button which can be programmed to switch to any of the display colors you prefer for night/day.

This is one solid radio with almost everything you want built in. But as most of you know, I have not found the perfect radio in any of my reviews. The one feature I wanted to see that was missing in the 880 was single side band capability.

This is perfect for the serious CB users and night drivers, and the Uniden Bearcat 880 CB radio will be a great addition to your semi, truck, SUV, motor home or even as a base station with a suitable AC/DC power supply (not included).

The Uniden Bearcat 880 CB lists for $149.99 and is available at several outlets online, including Amazon.com, at reduced prices. I saw pricing that ranged from $119.00 to $139.00.

UNIDEN BEARCAT 880 SPECIFICATIONS

(manufacture and tested):
- 40 Channel operation (AM mode only) 26.965 – 27.405 MHz
- Antenna impedance: 50 ohms, unbalanced
- Adjacent channel rejection: 55 db
- Audio output: Five watts (max), four watts (10% distortion)
- Cable connection utilizes standard CB PL-259 connection.
- Current drain: Transmit 2.2 amps, receive (no signal): 650 mA
- Dimensions: 2.2" (H) x 6.3" (W) x 6.3" (D), Metric dimensions: 54 mm x 160 mm x 160 mm (not including knobs and jacks)
- Frequency tolerance: +/- 0.002%
- Hum and noise: Better than 40 db
- Image rejection: 65 db
- Operating temperature: -22 deg to 140 deg F (-30 deg to 60 deg C)
- PA Output power (10% distortion): Four watts
- PLL synthesizer
- Radio mounts with "U" mounting bracket to any flat surface.
- Speaker impedance: 16 ohms (internal), 8 ohms (external)
- Spurious rejection: -70 db
- Weight: 2.2 lbs.