GRE Raises the Bar Again!

MT First Look at GRE PSR-500

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I have been a scanner user most of my adult life and I can truly say the advances in scanner technology in the last three years have been remarkable. But what I didn't anticipate coming was last spring's announcement that General Research of Electronics (or GRE as they are more commonly known) was entering the scanner marketplace under their own label.

Most scanner pros know that GRE has been the OEM manufacturer of Radio Shack scanners for many years now. I dare say if you have been in the hobby for any length of time you will recognize some of the old favorites manufactured by this company – RS Pro-2004/5/6 series, RS Pro-43 handheld, and some of their more modern counterparts the Pro-96/97 and Pro-2055/2096 mobile/desktop scanners.

Now this fabled scanner company is releasing this fall and winter six new models – the GRE PSR-200/400/600 desktop/mobiles, and the GRE PSR-100/300/500 handheld scanners.

TABLE ONE: PSR-500 FREQUENCY COVERAGE

Freq Range (MHz)	Default Step (kHz)	Modulation
25.0000 - 27.4050	10	AM
27.4100 - 29.5050	5	AM
29.5100 - 29.7000	5	FM
29.7100 - 49.8300	10	FM
49.8350 - 54.0000	5	FM
108.000 - 136.9916	8.33	AM
137.000 - 137.995	5	FM
138.000 - 143.9875	12.5	FM
144.000 - 147.9950	5	FM
148.000 - 150.7875	12.5	FM
150.800 - 150.8450	5	FM
150.8525 - 154.4975	7.5	FM
154.5150 - 154.6400	5	FM
154.6500 - 156.2550	7.5	FM
156.2750 - 157.4500	25	FM
157.4700 - 161.5725	7.5	FM
161.6000 - 161.9750	5	FM
162.0000 - 174.0000	12.5	FM
216.0025 - 224.9950	5	FM
225.0000 - 379.99375	6.25	AM
380.0000 - 419.987500	12.5	FM
420.0000 - 450.000000	5	FM
450.00625 - 469.99375	6.25	FM
470.00000 - 512.00000	12.5	FM
764.00000 - 805.996875	3.125	FM
806.00000 - 901.987500	12.5	FM
902.00000 - 928.000000	5	FM
928.00125 - 939.987500	12.5	FM
940.00000 - 1300.00000	6.25	FM

Note: The scanner's frequency coverage is not continuous and does not include the cellular telephone, FM broadcast, VHF-TV low channels, or some UHF TV channels. Excludes by US federal law cellular telephone frequencies: 824-848.9875 and 869-893.9875 MHz.

In late August I had a chance to sit down with company officials and engineers to talk with them at length about these new models, and was really surprised to learn about some of the new innovations that these new radios are bringing to the scanner marketplace. As part of this show and tell, the gang from GRE brought with them the latest version of their new GRE PSR-500 handheld scanner. Since that meeting GRE sent an even later version of the PSR-500 for *MT's First Look* to test.

❖ The GRE PSR-500 Advanced Digital Handheld

Recognizing that contemporary scanning receivers are difficult to program and use, GRE's engineers conducted extensive research to determine the functional requirements for an entirely new scanning receiver user interface. They call this new intuitive user interface the *Object Oriented User Interface* (OOUI).

It is based on the premise that, to a hobbyist, a scanner is easiest to use if all of the things that can be scanned are handled using common conventions for interaction between the user and the radio, at least to the extent that this is possible, given that the "things" that can be scanned are different from one another in either subtle or major ways.

In this new user interface design, they call "things" that can be scanned, Scannable Objects. Simply put, a Scannable Object is defined as something that can be scanned or monitored. These include:

- Conventional, non-trunked radio channels
- Trunk talkgroups used on a trunked radio system
- Service searches to search for a specific radio service
- Search ranges with upper and lower limits
- Spectrum Sweeper setups with band segments that can be enabled or disabled by the user

One of the goals of the Object Oriented User Interface is to make the scanner as easy to use as possible. The OOUI does this by treating all Scannable Objects the same, in terms of how they are created, edited, manipulated and grouped. Once you have learned how to create and store a conventional channel, you know most of what you need to know to create a trunking talkgroup, and so on.

GRE
PSR-500

❖ Case, Controls and the Antenna

The PSR-500 is a descendant of the popular RS Pro-96 scanner. But this isn't your daddy's Pro-96, so all other comparisons would be fruitless.

The PSR-500 case is smaller than the Pro-96 measuring Approximately 2.56(w) x 1.65(d) x 5.71(h) inches, 65 (w) x 42 (d) x 145 (h) mm and weighs in at 8.5 ounces (240 grams) without batteries and antenna.

The liquid crystal display (LCD) is part of an amber backlight system and consisting of four lines of 16 characters each, plus 13 display icons. The keypad is also part of this backlit system.

One of the most innovative features of this radio is its programmable, multi-colored, super bright LED. This tri-color LED can be configured to illuminate or flash when certain channels are active. You can see it from across the room and it is very bright in the car at night. Eight user-defined colors and brightness levels can be specified from thousands of possible combinations. The LED provides visual alerts when certain objects are active; e.g., blue could be used to signal activity on, say, a police channel, red on a fire channel, and so on.

There is only one knob on the top of the unit that controls volume (inner knob) and analog squelch (outer ring). There is also a headset jack and the BNC connector (50 ohms) for the antenna (flexible antenna included).

On the right side of the unit is a PC/IF jack and the left side has a jack for external AC power.

The keyboard (also part of the backlit system) consists of three soft keys, a function key and backlight key, numeric keypad, operations keys, and a five way pushbutton pad.

TABLE TWO: MISCELLANEOUS SPECIFICATIONS

- Eleven tuning steps.
- Triple conversion scanner.
- Attenuator (20 dB).
- 55 channels per second scan speed and 90 steps per second search speed.
- User defined service and limit searches.
- Key lock for safety
- Backlit LCD and keypad with dimmer.
- LCD contrast control
- Built-in power save function and low battery indicator on the LCD
- Frequency and channel lock-out review.
- Earphone jack (3.5 mm stereo).
- PC Interface/Clone jack (3.5mm stereo). Computer cable (GRE USB cable No. 30-3290)
- Memory Backup: No battery backup required. EEPROM used.
- Operating voltage: 6 VDC (4 AA cells)
- External power and charger voltage: 9VDC regulated via external/charger.

Note: Features, specifications, and availability of optional accessories are all subject to change without notice by the manufacturer. Information presented above was based on the test unit provided by the manufacturer.

❖ It's what is under the hood that counts.

Looking inside the radio we found a wonderful world of scanning capability. Here are some of the features that the PSR-500 offers.

- You might be familiar with Uniden's Close Call or Radio Shack's Signal Stalker RF capture technology. GRE's equivalent in its new scanners is called Spectrum Sweep. In head-to-head testing with Close Call and Signal Stalker, we found that Signal Sweep was an improvement in the quiet RF environment we tested it in.
- Flexible Free-Form Memory Organization – Memory is assigned as objects are created using a sophisticated internal file management system. You are not constrained to traditional bank/channel scanner memory layouts as you were with the older Pro-96. No memory is wasted as a result of bank/channel programming constraints. The scanner has sufficient main memory capacity to store over 1800 conventional channels, trunking talkgroups, search configurations and Spectrum Sweeper objects in any combination.
- Powerful and Flexible Scan List Functionality – Allows you to arrange, group and scan objects according to your preference, with no limit to the number or types of objects in a Scan List, and no limit to the number of Scan Lists an object can be a member of.
- GRE's Exclusive V-Scanner Technology – Allows you to save complete radio configurations within the radio for recall into main memory as needed in the field. This is similar to having a laptop computer and programming software available anytime. You can use V-Scanners to store configurations for different geographic areas or usage styles. Twenty-one V-Scanner folders are provided, each capable of storing over 1800 objects. Total memory capacity of main memory combined with V-Scanners is over 39,600 (1800+37800) objects.
- Menu Driven Programming with Context

MT FIRST LOOK RATING (0-10 SCALE)

Audio Quality	8
Audio Levels	9
Backlight/Display	9
Battery Life	8
Dynamic Range	7
Ease of Use	8
Feature Set	9
Keyboard/Button/Control Layout	9
Overall Construction	8
Overall Reception	8
Owners Manual	9
Sensitivity	9
Selectivity	8
Spectrum Usability	8

MT Rating [four and 3/4 stars]

Sensitive Help – Each menu item provides a few lines of help text that provide assistance with programming and using the scanner.

- Upgradeable CPU and DSP Firmware – You can easily keep your scanner current with software enhancements as they become available with free upgrades from **www.greamerica.com**.
- Remote Control Capability – These scanners can be used with third party application software to remotely control a scanner from a personal computer. Uses GRE's 30-3290 USB cable in full duplex mode at six times the speed of previous scanner models for PC transfer and eight times the speed of previous models for radio-to-radio cloning.

GRE's exclusive Automatic Adaptive Digital Tracking instantly adapts the digital decoder to the digital modulation format of the transmitted signal, then analyzes the signal over 50 times each second and adapts to any subtle changes caused by multipath or fading. No cumbersome manual adjustments are required. In my test this worked most of the time for most of the P25 systems in the area.

CTCSS and DCS subaudible squelch coding is processed by the same powerful DSP chip that is used for P25 digital decoding. It provides fast and reliable decoding of subaudible squelch signaling with squelch tail elimination.

The PSR-500 has a digital AGC that instantly compensates for low audio levels that are very common on digital systems. This makes the radio's digital communications easier to listen to in combination with the adaptive digital tracking mentioned above.

Like many of the recently released scanner models, the PSR-500 will perform a NOAA weather band search, SAME weather alert, weather priority scan, and a new SKYWARN Storm Spotter function.

There are a lot of other PSR-500 features, far too many to include in this review. You can get more information on these features by going to my personal blog page at **http://monitor-post.blogspot.com/2007/08/gre-ps-scanner-informationspecification.html**.

❖ Multi-System Trunk Capability

The PSR-500 is a multi-system trunking scanner. This lets the user follow unencrypted conversations on analog Motorola, Motorola mixed mode (3600 baud) systems, P25 (APCO 25 9600 baud) systems, EDACS (wide and narrow), EDACS SCAT, and LTR trunked radio systems. Trunk systems in VHF, UHF, the new 700 MHz public safety band, 800 MHz, and 900 MHz bands can be programmed. This includes trunk systems now being installed by the Department of Defense in the new 380-399.9 MHz LMR subband. The scanner can also scan both conventional and trunked systems at the same time. The PSR-500 will not decode M/A-COM proprietary modes such as Open Sky and ProVoice. Talkgroup call and individual call monitoring are supported.

I was especially impressed with the trunk system information presented on the display when the scanner was put into the tune mode and a control channel was being monitored. This is the best implementation of this feature I have seen thus far by any manufacturer.

❖ What's in the box?

In addition to the PSR-500 scanner, accessories in the box include a rubber duck antenna, owner's manual, normal battery holder, rechargeable battery holder, belt clip, and USB PC interface cable.

❖ What Else is New?

In addition to the Object Oriented programming and the LED Alert, here are three more features on the PSR-500 scanner that are new to the scanning world:

- SKYWARN Storm Spotter Function – Provides instant, one button access to frequencies used by storm spotter networks. You can monitor storm conditions as they occur, and may become aware of dangerous weather conditions before the media and emergency management officials are able to announce them to the general public.
- P25 NAC Functionality – Much like CTCSS and DCS with analog signals, a P25 Network Access Code (NAC) is used to provide selective squelch operation on conventional P25 channels. This GRE digital scanner will detect the NAC that is being used on a P25 conventional digital channel, and will allow the user to program NAC codes to block transmissions that do not have a matching NAC, including analog traffic on the same frequency. Within a second I was able to determine that the NAC used by the great Smoky Mountain National park comm system was 293.
- Trunking Control Data Output – This function streams decoded trunking control data from your PSR-500 to a personal computer for use with popular third party trunking control channel monitoring software. No slicer is needed. Also streams NOAA weather radio SAME alert data.

❖ Overall Rating and Final Thoughts

Those of you who read this column on a regular basis know that no scanner is perfect. I just haven't found my perfect scanner yet. I do have few complaints with the PSR-500.

In my opinion there are not enough channels per scan list (1800). If I was in a major metro area such as Atlanta and wanted to monitor several trunk systems and conventional frequencies, I would be hard pressed to decide what talkgroups, frequencies, search ranges, etc. I would program within the 1800 limit.

Another area of concern was the dynamic range of the scanner. This radio has a hot front end; in fact, maybe too hot. Our local FM radio station caused me a bit of grief in testing when I added any substantial antenna, such as a beam, etc. When I was mobile in higher RF areas I saw this symptom repeated, especially in the VHF high band area of the spectrum.

While the scanner's audio quality is very good, it falls just a notch below what my ear likes. To my ear, the audio delivered by the PSR-500 is good, but it is just a tad tinny. But audio levels are very good, with good range of control on the volume knob. However, I don't like the volume knob/squelch control. Many times, when I would readjust the squelch, the volume knob turned at the same time. I would have to turn the volume back up, then adjust the squelch control. I don't have fat fingers, so that wasn't the cause of the anomaly.

I am concerned about the keypad durability and the belt clip. I have a Pro-43 that is next to useless now, due to keypad wear. I hope this problem is not repeated in the PSR-500 scanner. And the beltclip? It isn't a matter of *if* it will break, but *when*. After seeing other units in the marketplace with beefed up beltclips, the hard plastic clip on this scanner was a disappointment. Only long term testing will determine if either these concerns will turn out to be issues.

Bottom line, though: GRE has raised the scanner market bar again. No one in the scanner marketplace right now offers a handheld scanner model that has the listening capability that is found in the PSR-500.

*The GRE PSR-500 (SCN-18) is available from Grove Enterprises (1-800-438-8155 or **www.grove-ent.com/grepsr500.html**) for $499.95 plus shipping.*

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Codan-based networks, take this unidentified example from Greece where the format is "0000" + 2 digits + "00" + 2 digits. This network triggers data using the Codan 16 tone modem.

Frequencies:
4517, 5770, 6792, 6875, 7495, 7650, 8007, 9048, 9050, 9215, 9230, 11490kHz (all LSB)

Identifiers:
0000120011, 0000120013, 0000220012, 0000410012, etc

RESOURCES

Codan Audio
www.signals.taunus.de/WAV/CODAN16.WAV
Codan Chirp
www.signals.taunus.de/WAV/CODANCHIRP.WAV
Selcal Translator
www.kloth.net/cgi-bin/selcall.pl