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GRE PSR-600 – A Lot of Scanner for the Money

When GRE first announced that they were striking out on their own and releasing a new suite of scanner models into the marketplace, there was a lot of buzz among the scanner hobby community. I was fortunate last year to test drive their first entry, the PSR-500 handheld for *MT* (November 2007, page 66). But I must admit I have always been a desktop/mobile kind of guy. I know that you can build a bit more radio into a larger case, it won't be nearly as crowded, and you get a few extras you don't get with a handheld.

So when the PSR-600 desktop/mobile, the companion model to the PSR-500, became available for testing, I eagerly looked forward to putting it through its paces and I was not disappointed. The PSR-600 is a lot of scanner for the money.

❖ PSR-600 Advanced Digital Base/Mobile

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. Granted, the "things" that can be scanned may be 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, which includes:

- 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.

❖ Case, Controls and the Antenna

The PSR-600 is a descendant of the popular RS Pro-2096 scanner. But this isn't your daddy's Pro-2096, so all other comparisons would be fruitless.

The PSR-600 case is about the same size as a Pro-2096 measuring approximately 7.3 (w) x 5.3 (d) x 2.2 (h) inches, 185 (w) x 135 (d) x 55 (h) mm and weighs in at 27.7 ounces (790 grams) not including mounting hardware and antenna.

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

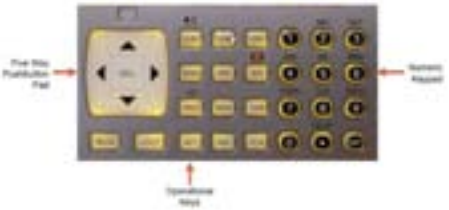
One of the most innovative features of this radio is its programmable, multi-colored, super bright LED with audible alarm capability. This unique alert capability allows you to set different types of visual and audio notifications for different types of objects that the user creates.

For instance, I use a steady blue LED and a certain audio cue for the local law enforcement agencies I have programmed into the scanner. I use a different audio cue and flashing blue LED for law enforcement agencies outside my immediate area. I use the same solid flashing model for other public safety agencies, e.g., red for fire, white for EMS, green for federal, etc.

The Alert LED utilizes a special tri-color Light Emitting Diode module that mixes light from red, green and blue LED elements to produce thousands of different colors. Eight pre-defined color settings are available for use in object menus.

Much like its GRE-500 cousin, there is one knob on the front of the unit that controls volume (inner knob) and analog squelch (outer ring). There is also a headset jack and a PC/IF jack for interfacing the scanner to a computer or sound card (both use third party software). On either side of the front panel you have a DIN keyslot for mounting the scanner in a vehicle using that method.

MT Rating [4-3/4 stars]



The heart of the front panel, though, are the 34 keys which control and program the scanner. The backlit keyboard consists of three soft keys (F1/F2/F3), operations keys, a numeric keypad, and a five way pushbutton pad.

The soft keys are used to activate functions shown in the LCD display which are immediately above them on the LCD display. The five way pushbutton pad keys are used for navigation while browsing objects and menus. The SEL key activates data entry fields and toggles scan list selection in object menus. FUNC SEL activates context sensitive help in menus.

The numeric keypad is used for data entry of frequencies, talkgroup IDs and alphanumeric labels.

There are 12 operation keys that control the following scanner functions:

FUNC – Activates alternate key functions.
DIM – Controls backlight brightness.
MAN – Places scanner in manual mode for monitoring single objects.
SCAN – Places scanner in scan mode for scanning enabled objects. Hitting FUNC then SCAN launches Spectrum Sweeper.
TUNE – Allows direct tuning of any valid frequency, FUNC plus TUNE loads the current or most recently scanned frequency into TUNE.
SRCH – Puts the scanner into a dedicated search mode for service and frequency searches.
ATT – Toggles attenuator on and off and FUNC plus ATT toggles a global attenuator mode.
PRI – Toggles the priority setting for the selected or active object. FUNC plus PRI toggles priority mode on or off for the scanner
FAV – Activates the favorites scan mode while

MT FIRST LOOK RATING (0-10 SCALE)

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

PSR-600 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.

FUNC plus FAV adds the current object to the favorites scan list.

WX – Activates the weather scan and FUNC plus WX activates Skywarn mode

PGM – Places scanner in program mode for editing radio-wide options, adding new objects or editing existing objects. Hitting the FUNC plus PGM keys accesses V-Scanner mode.

The back panel of the scanner has a BNC antenna connector, external speaker jack and an external DC power jack.

❖ 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-600 offers.

Ungradable 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**.

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

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.

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 scanners. 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.

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.

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.

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.

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-600 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-600 will perform a NOAA weather band search, SAME weather alert, weather priority scan, and a new SKYWARN Storm Spotter function (see below).

There are a lot of other PSR-600 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-psr-500-handheld-and-psr-600.html.**

❖ Multi-System Trunk Capability

The PSR-600 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-600 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.

MISCELLANEOUS SPECIFICATIONS

- Triple conversion PLL super-heterodyne scanner.
- 1st IF 380.8 MHz (The 1st LO uses high side of receive frequency range for VHF and UHF Low/T, and low side of receive frequency range for >512 MHz)
- 2nd IF 21.4 MHz (The second LO uses low side of 1st IF)
- 3rd IF 455 kHz (The 3rd LO uses the low side of the 2nd IF)
- Attenuator (20 dB).
- 55 channels per second scan speed and 90 steps per second search speed.
- User defined service and limit searches.
- Earphone jack (3.5 mm stereo).
- Internal speaker 64 mm 8 ohms, 1.8 watts audio output
- 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: 12-16.4 VDC, 13.8 VDC nominal, 16 VDC maximum

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.

❖ What's in the box?

In addition to the PSR-600 scanner, accessories in the box include a whip antenna; owner's manual; mobile mounting bracket with rubber feet, rubber washers and knurled knobs; DC cable; AC adapter; and USB PC interface cable.

❖ What Else is New?

In addition to the Object Oriented programming and the LED/Audio alert, here are three more features on the PSR-600 scanner that are new to the scanning world from GRE:

- 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

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Field Day Bonus Point Project!

By Carl Herbert, AA2JZ

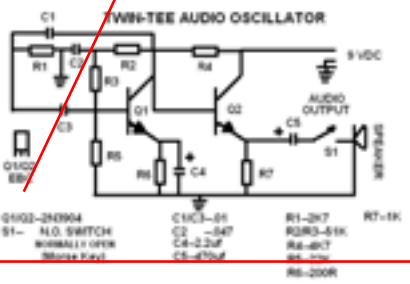
"Field Day," June 28-29, 2008, isn't that far off! And this year's rules will give your event an additional 100 points if you have an "Educational Activity." (7.3.10, listed among the "Rules") What a golden opportunity to introduce fellow amateurs to "Manhattan" style of building, while providing a usable piece of equipment for the new members to the ranks.

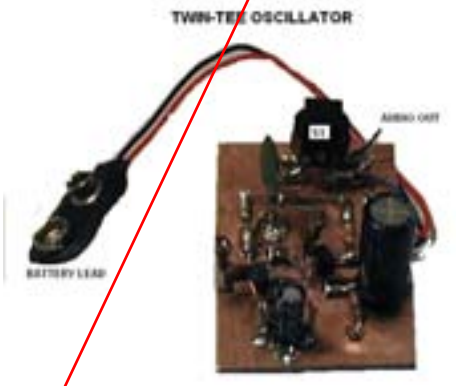
When I read that portion of the rules, I knew that this was an opportunity too good to miss. Our club, "The Citrus County Amateur Radio Club,"(Florida) is fortunate in that we have several newly licensed members. Their ages range from teens to senior, none of whom have had formal training in electronics. They're all neophytes to the hobby and are receptive to learning new phases of the hobby. New to them is "old hat" to the majority of us, but "Elmering" (*one who aids the new members in the hobby*) is one of the mainstays of amateur radio.

Our "Educational Activity," will be a Morse Code Practice Oscillator, built by each of the members desiring one. Yeah, I know, Morse Code isn't a requirement any longer. But there's a lot of ragchewing and DX chasing to be had on the lower ends of the bands. If you can't copy code you can't work them! Those learning the code now are those who "want to learn," vs. it being a necessity. It makes all the difference in the world.

A "Twin-T" oscillator is one of the easiest circuits to build. There is a minimum of parts, which keeps the cost very low. All of the parts for our activity were scrounged from my "junk box." But then, I keep a very full "junk box." The circuit board measures 1-1/2" by 1-1/4" and could be made larger if desired. There was ample room for construction on this size. See Drawing 1 and Photo 1 for particulars on the unit.

Output from the circuit is about 1000 Hz, with ample audio in for a quiet room. This will be good, should the others not be interested in Morse Code. If you want more gain (louder), feed the output from the circuit to the microphone input of





a desktop computer speaker system. You'll have all the volume you want.

Setting Up the Demo

When the great day arrives, I plan to have two builders' stations set up. Both will have an adjustable fluorescent light with magnifier in the middle. The normal collection of needle nosed pliers, cutters, solder, etc. will be provided for their use. I plan to sit opposite from them and observe while they perform the assembly process. By being across from them, I can ward off errors before they become a problem, answer questions that always arise, and provide moral support.

It's difficult to monitor more than two persons building at a given time. The remaining builders will perform their task as Field Day progresses. A "break" from the rigors of contesting is appreciated, especially when other operators want to use the gear, and your next student wants his/her time on the bench.

Along with a plastic bag of parts, I provided each "kit" with an assembly guide. The guide has included in it a schematic of the circuit, a parts list, with identification notes (capacitors marked 103 are .01uf, etc.), helpful hints to make construction an enjoyable event, and website listings related to building circuits, operating, and more.

A Bonus to All!

What a great way to earn an additional 100 bonus points! Teaching others about what I enjoy about the hobby, seeing the look of satisfaction from each of the students when *their circuit* functions, and hopefully, adding more builders and Morse Code operators to the amateur radio ranks. A new member that's proud of the circuit they created is more likely to be a more active "ham," than one who "just gets by" with minimal effort.

Good luck on "Field Day," and remember to keep building.

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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.

- Trunking Control Data Output – This function streams decoded trunking control data from your PSR-600 to a personal computer for use with popular third party trunking control channel monitoring software (such as the Butel ARC 500 software package). No data slicer is needed. Through this port the scanner also streams NOAA weather radio SAME alert data.

Overall Rating and Final Thoughts

Those of you who read my reviews on a regular basis know that I am never satisfied and no scanner is perfect. I just haven't found my perfect scanner yet. So, as you might expect, I do have a few complaints with the PSR-600.

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 this 1800 memory location limit.

Another area of concern was the dynamic range of the scanner. Since this is essentially a PSR-500 in a different case, I expected that this would be a problem.

This radio has a hot front end; in fact, maybe too hot. Our local FM radio station caused me grief in testing when I added any substantial antenna, such as a ground plane, beam, etc. When I went mobile in higher RF areas I saw this symptom repeated, especially in the VHF high band area of the spectrum. On more than one occasion I was forced to use the global attenuator function when I encountered these conditions to receive in band signals.

While the scanner's audio quality is very good, especially when compared to the PSR-500. I believe this is due to the larger speaker, increased audio output, and the larger case. But I don't like the speaker location. I guess I still like that speaker facing out at me like some of the Bearcat scanners of old.

But audio levels are very good, with good range of control on the volume knob. However, like the PSR-500 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.

Bottom line, though: As I mentioned before, the GRE is a lot of scanner for the money. No one in the scanner marketplace right now offers a desktop/mobile scanner model that has the listening capability/features that the PSR-600 has. If you are looking for the latest and greatest, the GRE PSR-600 should be on your scanner short list.

The GRE PSR-600 (SCN-19) is available from Grove Enterprises (1-800-438-8155 or www.grove-ent.com/grepsr600.html) for $499.95 plus shipping.