

Special Report
The RadioShack PRO197 Digital Scanner
Features, Operation and Competition

A Scanner Master Ultimate Review
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Introduction

RadioShack has sold scanners for the US market for decades, but they actually don't make them. How's that? Well, remember the Radio Shack PRO2004, PRO2005 or PRO2006? How about the PRO96 or its mobile brother PRO2096? These were all built by GRE and sold by Radio Shack. While some scanners sold by Radio Shack were built by Uniden, most of the big sellers were GRE built.

At the 2007 Dayton Hamvention GRE snuck in a couple of their rumored new line of scanners for direct sales in the USA. A privileged few (including the author) got to check them out for a few minutes each. It was apparent immediately that GRE had produced a winner, or better yet, several winners.

What GRE did was introduce three lines of scanners, each line consisting of a handheld and a base/mobile version. Radios within each line are electronically identical, even to the extent that they can clone to each other.

After the GRE line of scanners were unveiled to the public and readied for sale Radio Shack announced a new line of scanners that mysteriously mirrored the specs of some of the GRE's. The Radio Shack PRO106 turned out to be a GRE PSR500 with a rearranged front panel. The RadioShack PRO197 was a clone of the PSR600 base/mobile. The PSR300 and 400 radios are closely related to RadioShacks PRO97, 2055, 163 and 164 scanners.

The three lines are:

| | | |
|----------|-------------|--|
| Basic | GRE | PSR100 Handheld and PSR200 Desktop |
| Advanced | GRE | PSR300 Handheld and PSR400 Base/Mobile, |
| | Radio Shack | PRO164 Handhelds and PRO163 Base/Mobiles |
| Digital | GRE | PSR500 Handheld and PSR600 Base/Mobile |
| | Radio Shack | PRO106 Handheld and PRO197 Base/Mobile |

While the Radio Shack and GRE versions of the various scanners are visually and electronically similar in most respects there is one difference that one must remember, and that is that the firmware updates are not interchangeable between Radio Shack and GRE versions. Programming files are interchangeable, which makes sharing files easier.

While the Basic and Advanced lines use conventional programming methods such as defined banks and channel arrangements, the Digital line uses an entirely different structure called "Object Oriented User Interface" or more succinctly, "Scannable Objects". Basically what this means is that you program things (Objects) into your radio and then select the things you want to scan (Scannable Objects). These Scannable Objects could be regular frequencies, talkgroups on a trunked system or one of several types of searches.

The Advanced line of scanners are fine for many areas if you do not need to monitor digital communications but want more memory and features than the Basic line provides. The Basic Line is fine if you only need to monitor a few conventional channels such as aircraft, railroads or local public safety channels and don't need any advanced features of the Advanced or Digital lines.

Both the Advanced and Digital lines provide large channel capacity, support for several methods of trunking and PL/DPL capability. Both lines support the 800 MHz Rebanding.

(You can read a great deal more about Rebanding elsewhere on the web but, in short, in order to separate certain NEXTEL/cellular radio channels from public safety channels as a means to limit interference

between the two, many public safety agencies operating on 800 MHz radio systems are being compensated to move to new 700/800 MHz frequencies. For Motorola trunking radio systems this requires a change to the data structure of the system and therefore newer trunking scanners require a firmware upgrade to be able to continue to properly “trunk.” Older trunking scanners, such as the Bearcat 780XLT and many RadioShack models, are not upgradeable and therefore need to be replaced.)

RadioShack PRO197 Base/Mobile Digital Scanner

The PRO197 digital scanner provides the user with up to 1800 Scannable Objects that can be scanned. The radio features the “V-Scanner” system that allows the user to store 20 additional sets of scanner memories. While only one V-Scanner can be used at a time, with 1800 memory locations, you should be able to monitor all the local action without much trouble. If you travel or share the radio between work and home for example, you can load multiple V-Scanners as needed.

The PRO197 comes with several accessories, including an AC adaptor, DC power cable, bracket and hardware as well as a telescoping antenna. The PRO197 does not include the programming cable, it can be purchased for about \$35. Also included is a CD-ROM with the Owner’s Manual. The RadioShack scanners come with a printed manual that the GRE versions lack.

The PRO197 is a “DIN” sized radio and it comes with a DIN sleeve and insertion keys if you want to mount the scanner in this fashion.

The PRO197 has the speaker at the bottom of the case. The front panel’s top right corner has a pair of concentric rotary controls, the inner knob for volume and the outer for squelch. This is more conventional and user-friendly than the arrangement used on current Unidens. Also on the front panel of the radio you’ll find the headphone and PC/IF jacks.

The rear of the radio has the power connector, external speaker and BNC antenna jack. The PRO197 uses a standard BNC connector and includes a BNC telescoping antenna. There is no “record jack” provided.

On the front panel of the radio is a jack for the computer programming cable. While older GRE built radios (such as the PRO96) could use RS232 cables, the Digital Line radios are only capable of working with the GRE or Radio Shack USB programming cables. This cable allows you to read and write programming files to the radio and to control the radio with a computer with, again, the proper software such as Butel’s ARC-500 available through Scanner Master. You can also use a cloning cable thru this jack and clone the radio to and from other RadioShack digital scanners as well as the GRE counterparts.

The placement of the PC/IF jack on the front panel is a nod to the DIN mounting ability. If you mount this radio into a dashboard it is hard to get at the rear panel, so by placing the PC/IF jack on the front makes it easier to program or clone the radio while mounted in a vehicle.

Before trying to connect the radio to the computer remember to install the drivers for the USB cable on your computer, which are found on the included CD-ROM (or download them from the Internet). After you install the drivers and plug in the cable the computer will assign a Comm Port and you will need that to enter into your programming software so that it can find your radio. Some software packages will look for a radio and assign the proper Comm Port if you don’t already know it.

The USB cable can also be used to retrieve special data signals from certain trunked systems to be decoded by programs like the fascinating (and free!) PRO96Com application. When set up to do so the radio sends decoded data to a computer that tells all kind of interesting details about the system such as frequencies used, talkgroup and radio ID’s and other information. Until the introduction of Uniden’s XT line, only certain GRE built radios provided this data, the PRO197 continues the ability to retrieve this information.

The rear of the radio has the required warning label and serial number. Write the serial number down someplace safe so that if the radio is stolen it can be entered into police databases. This will help return the radio to you if it is recovered by the police.

Also included in the box is the telescopic antenna, a disk with the owner's manual and some demo applications. The PRO197 also comes with a listing of the preloaded files in the V-Scanner memories.

Comparison to the BCD996T and XT

You can't talk about this radio without discussing the competition from Uniden Bearcat. The Uniden BCD996XT is the direct competition to the PRO197. Many of the comparisons are pretty much the same amongst all of the GRE/RadioShack and Uniden scanners.

On the Uniden one uses modifier keys and a multi-function knob for programming while the GRE/RadioShack one uses the keypad much more intensely. The Uniden takes more effort to operate the radio because with fewer keys you have to remember what many consider to be difficult key combinations. The GRE/RadioShack has more keys so it's easier to operate.

While both radios use forms of dynamic memory architecture, they go about it differently. The Uniden is a bit more conventional in that you create Systems instead of Banks and turn them on or off while the GRE/RadioShack has you enter the objects once and let's you create multiple scan lists (unfortunately only up to 20) to choose the items you want to scan.

The Uniden has many features that some might want while others may not need. These include the ability to connect to a GPS unit and use that to control what you want to listen to (a fantastic feature for mobile use that is described elsewhere on Scanner Master's site). In addition, the Uniden has Fire Tone Out, the ability to use Remote Heads and other fun to use and explore features.

The GRE/RadioShack is well regarded as having better audio, especially on digital signals. While the Uniden XT series has improved the digital decoding over its predecessors, the PRO197 is still superior.

I will discuss the comparison of the two radios in more detail later in this article.

How many Channels

The first question many people ask about a scanner is: How many channels can you program? The answer with the PRO197 is "Well, it depends." Depends on what? Well, it depends on how you define channels and how you program your radio. The PRO197 uses GRE/RadioShack's Object Oriented User Interface (OOUI) programming method. While older radios use defined channels and banks, the PRO197's OOUI has the user enter channels into memory along with trunked system parameters (including Talkgroups) and various types of searches. The user then creates up to 20 Scan Lists that point to the various channels, talkgroups and searches. This allows you to select what you want to listen to at the time. Scan Lists can include any of the programmed operations, and any of the programmed operations may be included in multiple Scan Lists. This is somewhat similar to Uniden's Quick Key system of enabling different sets of channels, search ranges, service searches, etc.

RadioShack advertises the radio as "Over 1800" Scannable Objects. This basically means that you can scan around 1800 objects at a time. This number can be affected by the type of object you program and how you use Text labels, and other parameters. With the 21 available V-Scanners this works out to over 37,000 available memories. Will you be able to program 37,000 channels? Probably not, but you might if you try hard enough!

If you want to see how much memory you have used or have left you can press "0" twice during the start-up screen.

V-Scanners

The GRE digital radios (as well as some Radio Shack digital scanners made by GRE) have a feature called V-Scanners. These are basically 21 sets of scanner memories available to be loaded into your scanner.

Imagine it like having 21 different scanners in one, but you can only listen to one at a time. This is useful for people that travel often between several locales or have multiple scanning targets. You can also use this

to back up variations in your programming so that if you really mess something up you can restore the radio to a prior configuration. Think of this idea as sort of a manually saved Restore Point.

While it takes a couple minutes for the V-Scanners to load it is not difficult to do. When you Save to a V-Scanner the entire radio contents are saved, including frequencies, talkgroups and searches, any startup configurations and settings as well as anything else you have in the radio.

To use the V-Scanner feature press the FUNC then PGM buttons. From there you can load, store or erase V-Scanners.

Banks & Channels, Nuh uh!

On older scanners with defined banks the user entered channels into the banks. If your radio has 10 banks of 100 channels each (for a total of 1000 channels) and you only used 10 channels in a specific bank the extra 90 channels would be wasted. You could lose use of a great deal of the available memories this way. In addition, most older radios were limited to 10 banks. This normally limited you to up to 10 trunked systems or sites, with further limitations on programming methods since you could usually only have a single trunked system per bank. If a trunked system only had 5 or 6 frequencies the other channels in the bank were probably wasted. While most recent scanners allow you to program in conventional channels to use up some of the wasted channel space in banks with trunked systems, in practice this was not often done. Once you set up the trunked frequencies you would then program in trunked talkgroups. While these would not take away from regular channel memory, there was usually a strict limit to the amount of talkgroups allowed in scan lists.

GRE/RadioShack's OOUUI allows you to program many more trunked systems into the radio, and, with proper use of the Scan Lists you can pick and choose the channels or talkgroups you want, in many different combinations. With the 10 bank limit of older scanners you had few choices of how to scan, with the GRE/RADIOSHACK method the choice is almost limitless.

GRE/RadioShack's method is different than Uniden's in that Scan Lists point to various channels, talkgroups or searches programmed into a single pool of memories. Uniden has the user program separate Systems that contain either conventional or trunked systems and you switch Systems on or off (enable/disable). While Uniden scanners have more available channel memory, the GRE/RadioShack method allows you to share a single frequency or talkgroup among multiple Scan Lists.

Sadly, however the GRE/RadioShack limits one to 20 Scan Lists. While this is sufficient for most users, power users may want the ability to program in more Scan Lists than this. In this way the Uniden is far more flexible.

Search & Scan

With older radios, searches were almost always exclusive to scanning. You could scan or you could search, but not both at the same time. The PRO197 allows you to add not only conventional channels and trunked talkgroups but also several types of searches to your scan lists so you can monitor all of these at the same time.

Some of the Search Options include limit searches (checking each frequency between an upper and lower limit), Service Searches or Signal Stalker. You can add any of these search types to a Scan List and run the searches while scanning other channels or talkgroups. As far as the radio is concerned it is just another Scannable Object, it really doesn't care what type of Object it is.

Keyboard

The Keyboard of the radio is how you program the radio manually and control most of its actions. While most users will eventually use a computer to do most of the programming (almost a requirement these days of scanners with thousands of memories and complicated architectures) the ability to program your radio from the keyboard is essential. You will not always have access to a computer with the programming software and a programming cable so you need to know how to do it on the fly.

The PRO197 keyboard has 34 different buttons. The buttons are organized 4 groups:

The **5 Way Pad** allows one to navigate the cursor around the screen in 4 directions (up, down, left and right) and the center Select key completes the action.

Three **Soft Keys** (F1, F2 and F3) are used to select menu items on the bottom line of the display, directly above these keys. In some modes the arrow keys from the 5 Way Pad can be used to scroll thru selections available on these Soft Keys.

Operation Keys along the right side of the keyboard provide specific or modified commands to the scanner. These include standard scanner keys like Scan, Manual, Priority, etc. as well as some unique-to-GRE keys like Tune, FAV and PSE.

The **Numeric Keypad** allows you to enter specific frequencies or talkgroups and other programming commands to the radio.

The entire keyboard is well backlit and the same light illuminates the display. Press the DIM key and the backlight scrolls thru 3 levels of brightness (Hi, Lo and off).

Display

The PRO197's display is roughly the same height as the Uniden BC996XT but slightly wider. On the GRE radios the portable's display is identical to that of the corresponding mobiles, the Uniden mobile scanner displays are wider than their portables. The PRO197 display has 4 text lines plus the top line, which is reserved for specific symbols like signal strength, feature status and other items.

The display uses a dot-matrix LCD display, each character is up to 7 dots high and 5 wide, and there are 16 characters per line.

During scanning operations the text lines display the pertinent information about the operation, such as the frequency, talkgroup ID, Tone Code, Scan List, Mode and other information. What information is listed where depends on the operational mode currently in place on the radio. The bottom line is often given over to display the current selections available on the Soft Keys (F1 thru F3).

On the front panel, above the 5 Way Pad is a multi-colored LED light. Remarkably bright, this may be used to indicate many things, like the use of a specific channel or group of channels, a search hit or almost anything else. Set it to white and you can just about use it to replace a broken headlight. Used in conjunction with audible alerts and you can pretty much have any type of activity set to a different alert and tell at a quick glance what the radio is doing.

Frequency Ranges

The PRO197 receives all of the contemporary scanner bands, from 25 to 54, 108 thru 174, 216 thru 512, 764 thru 960 and 1240 thru 1300 MHz. The cellular frequencies are of course blocked. What the PRO197 does not pick up are some non-traditional bands, such as the FM Broadcast band and the occasionally interesting 72-76 MHz band. It also does not pick up most of the frequencies assigned to domestic television broadcast. Even though the new Digital TV mode can not be decoded on any scanners, there are many wireless mics and occasionally other unusual operations found here.

The PRO197 can hear communications in the AM, FM, NFM and P25 modes as well as decode PL (CTCSS), DPL (DCS) and NAC (Network Access Codes, used on P25 digital channels). The ability to swap between FM and NFM will become more important over the next few years, the FCC has mandated that most communications in the various UHF and UHF scanner bands switch over to narrowband soon. One very nice feature of the PRO197 which the Uniden scanners cannot match is the ability to decode CTCSS/DCS and P25 during searches at the same time. With the Uniden it's one or the other, but not both.

Trunking

Like all digital scanners these days, the PRO197 can monitor several types of trunking. The most common are Motorola (3600 baud data channels), APCO25 (9600 baud data channels), EDACS Wide and EDACS Narrow and LTR.

Many wide area statewide and regional systems are coming online that use either the APCO P25 protocol or variants of the analog Motorola trunking format. These systems have several to hundreds of cells (called "Sites") that are all interconnected and share the same Talkgroup and user lists. While on Uniden radios you would program each Site separately as part of a larger System, the PRO197 takes a different tack. You program in the known Control Channels in "MultiSite Roam" mode and the radio will lock onto strong signals. When the decode quality is reduced to a certain level the radio will automatically rescan to look for stronger signals. In contrast the Uniden method has users program individual sites and allows one to turn on and off each Site, either manually, by Quick Keys or GPS.

The PRO197 method of MultiSite Trunking requires no user intervention, just the active control channels need to be programmed into the radio. If you want to you can still program different sites into separate trunked systems. You are however limited to a maximum of 28 channels for the system, if there are more than that you need to decide what channels to use or duplicate the system with the additional channels. The Uniden method requires extra programming steps but allows you to program Site names so you can tell what site is active.

The PRO197 also supports several flavors of standard Motorola and EDACS trunking as well as LTR. Motorola modes (in addition to multi-site SmartZone and P25 systems described above) include older Type I, Type II and Type III modes (both with analog or digital modulation). Both the Wide and Narrow modes of EDACS systems are supported. No scanner can decode EDACS Provoice or Aegis used in selected areas such as San Antonio and some others.

LTR, very popular on UHF and 800 business systems, is supported along with a neat feature called LTR Home Repeater AutoMove. While the name is clunky, the feature is not. LTR systems are difficult to program since they rely on knowing the channel order or position within the system. LTR Home Repeater AutoMove, when enabled, allows you to program in the system's frequencies without regard as to the order and the radio automatically determines the proper positioning.

The basic method of programming a Trunked radio system in the PRO197 is pretty simple. Following the instructions in the manual, enter the frequencies and other parameters as a TSYS (Trunked System). Then program in Talkgroups pointing to the TSYS as part of Scan Lists. You can also program in a search of a TSYS by use of the "Wild Card" option. This works in a similar fashion to Uniden's Trunked Search feature in that it allows one to listen to all active Talkgroups instead of just the ones in a Scan List. You can lockout talkgroups as they become active and you no longer wish to monitor them.

When programming various types of trunked systems you need to know some of the basic information about these systems. This information varies somewhat depending on the type of system. For many Motorola and P25 systems all you really need are the Control Channels and system type. For rebanded 800, most UHF and VHF systems as well as some odd 800 and 900 Motorola or P25 systems you may also need further parameters, such as base channels, offsets or other technical details. For EDACS and LTR systems each of the frequencies used as well as the order in which they are programmed are needed.

Most of the information needed for individual trunked systems is freely available on the RadioReference.com website, paid members can even program the systems directly into their radios using software such as ARC500. Thus, if you are not a scanner expert capable of figuring out technical details of complex trunked radio systems you can share in the work of the rest of the scanner community to program your radio.

Conventional Scanning

Remember the old days when you could enter in the local police and fire channels into your scanner, hit the scan button and enjoy listening? While those days still exist in some areas, the new generation of scanners

are more complicated to program, even for the Plain-Jane conventional channels still used by many agencies.

“Conventional Channels” mean voice channels that do not use some sort of trunking. Mostly you just need to know the frequency in use and you can monitor the action. These days however even these need a bit more knowledge or at least trial and error. Things such as CTCSS, DCS and the modulation Mode make programming even conventional channels a challenge sometimes.

If you just want to listen to these basic analog channels then high-end models such as the PRO197 are not for you. It’s like buying a Ferrari to drive two streets to pick up milk. It’s far too complicated and costly when a simple low-cost model will work equally as well for basic channels. In much of the country nowadays though you must have the Ferrari or otherwise you can’t listen any longer. There’s no such thing as a simple (and low-cost) scanner that can monitor advanced radio systems.

FM vs. NFM vs. WFM

When you program in a conventional channel you need to know the proper Modulation Mode. If you are listening to aircraft in the 108-136 or 225 thru 400 MHz. bands then AM is the proper mode. Beyond that most communications are either regular FM or Narrow FM (NFM). Since the PRO197 does not include the FM broadcast band it also does not include the WFM mode.

Over the last few years, and continuing until 2013, most conventional channels have been or will be converted from what scanners usually call “FM” to a narrower format called Narrow FM. This allows additional channels to be squeezed into the same amount of spectrum.

Until recently most VHF High Band (150 to 162 MHz) channels have been 15 KHz. apart, for example, the next frequency used after 155.250 was 155.265, then 155.280. With the Narrowband initiative the channels are now closer together, 7.5 KHz. apart. 155.250 is followed by 155.2575, then 155.265, then 155.2725 and followed by 155.280. All users of the new channels in-between older channels must use NFM, and users of the existing older channels must convert to NFM by 2013.

UHF is affected the same way, but some of the rules are different. Originally regular channels were 25 KHz. apart, for example, 460.275 was followed by 460.300 and then 460.325. The in-between channels (called “Interstitials”) 12.5 KHz. apart from the main channels (460.275, 460.2875, 460.3000, 460.3125, 460.325) were restricted to low power use only. With the new rules these “12.5 KHz. Channels” or Interstitials were allowed to use the same power levels as the original main channels (subject to certain rules of course) and new 6.25 KHz. offset channels were allowed for use at low power.

In many areas the available pool of original VHF and UHF channels were used up and this method of refarming the available spectrum allows more channels to be squeezed in. It is not without precedent, the same thing has been done several times in the past, when VHF channels were changed to 15 KHz. separation from 30, and 60 was the norm before that.

How will I know whether to use FM or NFM?

While the new channels are almost always going to be using the NFM mode, older channels could use either, at least for now. Unless you know for sure you may have to try both methods and see which works best. If you select FM now, your local agency might switch over any time, requiring you to adjust your programming. If you chose the wrong mode you will still hear the communication, but at a reduced volume or with distortion. If the volume is low, compared to other nearby stations, then you are likely programmed to FM on a NFM channel. If the conversation sounds distorted or over-driven (like many CB operations) then you may have a channel programmed in narrow mode still using regular FM.

Since many channels are shared among many users, some may have switched over to NFM while others have not, at least not yet. If listening to both NFM and FM users on the same scanner channel is not working for you then you could use the CTCSS or DCS feature and program in a separate channel for each.

PL, DPL, CTCSS, DCS, NAC, etc.

Years ago radio manufacturers hit on a great idea. Transmit a low level tone on a radio channel so that radios equipped with a special decoder would only hear radios transmitting that tone. This way users would not have to listen to all the rest of the users of the channel, either local or when “Skip” comes in. Eventually dozens of different tones were developed by manufacturers and 38 of them were more or less standardized. The various manufacturers had different trade names for this feature, Motorola’s “PL” (Private Line) was the most used. It kind of became a generic name for the feature even though it was offered by GE, Kenwood and many other vendors, much like Kleenex has become a generic name for facial tissue. Since Motorola owns the trade name however, the scanner manufacturers call the feature by its technical name of Continuous Tone Coded Signal Squelch, or more succinctly, CTCSS. These are expressed in Hz., with one digit right of the decimal point, ranging from 67.0 to 254.1 Hz.

CTCSS served the industry well, and eventually scanner users wanted this feature on their scanners. Eventually it became a standard feature on higher end scanners.

As the radio bands became more crowded the few dozen CTCSS tones became inadequate and a new method of achieving the same results was developed. Motorola called it Digital PL (DPL) and the industry name was called DCS for Digital Coded Squelch. These are continuous digital words transmitted in a similar fashion to CTCSS. They are expressed in a three digit number, and there are about 100 codes in common use. Some references express DCS codes as Dxxx (D023, D251 etc.) but the GRE only displays the 3 numbers.

When P25 was introduced it was not compatible with CTCSS or DCS codes so a new format was devised, called Network Access Codes (NAC). NAC’s work the same as CTCSS and DCS codes do, and newer GRE digital scanners, such as the PRO197, can display or decode them. As mentioned earlier, a great thing is that the PRO197 will display any one of these three codes (CTCSS, DCS or NAC) when the channel is active during a Search Event.

What can you use CTCSS, DCS or NAC codes for? Well, pretty much the same reasons they are used in the field. The most common use is to screen out unwanted radio traffic, either on repeaters or on simplex (non-repeater) channels. Is the same fire frequency in your area also used in the next county? Figure out the code used by your local agency and program it in to your scanner to exclude the other unwanted users of the same frequency.

Some agencies also use multiple codes to separate traffic on multi-site repeater systems to avoid interference and expensive steering equipment systems while only needing a single channel. On one system in my area, there is one code used for operations and another used only to contact emergency services, so the 9-1-1 Center does not need to listen to the day-to-day operations. You need help, you use the emergency code. This allows a single channel to be used but keeps the 9-1-1 center from having to pick out emergency requests from the routine communications.

How do I find these codes?

OK, you have convinced me to use a CTCSS, DCS or NAC code. How do I figure out what codes are used in my area? Well, there are a couple ways. You can find them yourself by using the Tone Search feature on your scanner, you could look them up on RadioReference or another source, or you could ask the users if they could tell you. Chances are the third option would be laughed at by the local users, if they had any idea what you were talking about so the first two options are more realistic.

To have the radio decode the code for you program the Squelch type to “Search”. Once you find the correct tone change the type to CTCSS, DCS or P25 as appropriate and enter in the proper code.

RadioReference.com and other websites will often already have the proper codes listed so a little research may be all you need.

Searching and Sweeping

All scanners allow you to search between a set of frequencies in order to find new (to you at least) channels. Some, including the PRO197, also have preset search protocols, called Service Search, which scan thru a set of commonly used channels for specific types. The PRO197 has a limited set of Service Searches that include a generic "Public Safety" group, Aircraft, Marine, Ham Radio, CB and a group of miscellaneous radio channels called FRS/GMRS/MURS/DOT. This last group is often used by families, small businesses and others for low power local communications.

Surprisingly RadioShack did not include any type of Service Search for racing operations, race fans are among the biggest buyers of scanners. The generic nature of the Public Safety Service Search reflects the modern use of many of these channels by different types of agencies. Gone are the days of segregated Police, Fire, Conservation, Highway and Special Emergency allocations, now all the frequencies are in a single pool that has reduced the segregation of use. Uniden has a more extensive list of service search options.

Service Searches ("SRVC") are entered into a Scan List just like any other Scannable Object. The Service Search frequencies themselves are not editable by the user but you can lock out freqs when scanning a Service Search.

The PRO197 also has the standard Limit Search that allows you to search all channels between a pair of frequencies. You can also lock out frequencies in Limit Searches.

Signal Stalker is a nearfield frequency detector that allows you to find nearby transmitters. There are a couple different modes. All-Band allows you to search all frequencies the radio is capable of while the Public Safety Mode allows you to concentrate your search on the bands commonly assigned to police, fire etc. These bands are parts of the Low and High VHF bands, part of the UHF band and part of the 800 band.

The ZeroMatic option allows you to set the radio to look for the actual frequency used by the transmitter instead of stopping on the first valid hit it finds. Let's say there is a strong transmitter on 155.4750 in your area. A strong signal might cause a hit on 155.470 and the radio would stop there with the hit. ZeroMatic checks to see if the same signal is actually on a nearby or adjacent frequency and causes the radio to go to the actual frequency.

The PRO197 also displays any received CTCSS, DCS or NAC code received during a Search Event.

Let there be Light (and it was pretty cool...)

The PRO197 has an LED on the upper center of the front panel that is visible from above or in front. In fact it is really visible from the next county. This is actually 3 LED's (red, green and blue) that sit behind a single prism, These LED's combined can make almost any color light, depending on your settings. At its maximum brightness you can just about use it to read by.

Combined with an audible alert tone you can create innumerable combinations to advise you of different activities. For example, you can set the LED to flash red when a CloseCall hit is found and green if your favorite channel comes up. You can even set it to stay on indefinitely after activation, so if a rarely used channel pops up you will know that it was active, even if you weren't around to hear it.

There are so many settings for the Alert System (LED and audible) that as you use the radio you can add different combinations as you learn the radio. While it seems daunting at first, it can come in handy eventually. Like so many other advanced features this might never be useful for some but indispensable for others.

Power

On the rear of the radio is a center pin coaxial power connector so you can plug in an external power source to run the radio. The external power should be 13.8 VDC, with at least 600 mA. The PRO197 comes with an AC power supply and a DC cable.

The radio does not come with a cigar cord, the included power cable has tinned ends that you can connect to a cigar lighter plug if you want.

It all starts at the antenna...

The most important part of a scanner is the antenna. This determines how well the scanner will perform. While in many instances the included antenna will work just fine, if you are doing any type of serious monitoring from a building or vehicle an external antenna is required. While there are dozens of available scanner or two-way antennas that will work fine, the antenna that works best for you depends on many factors. This includes the frequencies you want to monitor, the distances and power levels involved, you location and elevation and more. Entire books have been written to help you decide what works best. See Scanner's Master's antenna section for a variety of excellent options.

The PRO197 comes with a standard BNC telescoping antenna. It connects onto the BNC connector on the rear of the radio. You can also use this to connect another antenna, either directly or with coaxial cable. You can use an antenna geared toward a specific band or one more generalized over the range of frequencies.

...and continues with the radio...:

With like antennas the PRO197 and it's competition, the Uniden BCD996XT, perform similarly as far as sensitivity is concerned. If you read the Yahoo, RadioReference and other user groups and web sites online you'll find a spirited debate over which radio is the better receiver. It seems as though it depends on the environment you're in (urban, suburban, rural), how close you are to nearby unwanted transmitters (cellular, paging, broadcast and the like), among other factors. There is no definitive answer on this. I personally did get a bit more intermod type interference from the PRO197 when comparing them in a high RF environment (in a city or when you're close by the aforementioned types of transmitter sites). I have also heard of cases where in a high RF environment, when you connect an outdoor/base station antenna, the PRO197 will tend to become overloaded but you can remedy this by enabling attenuation. The problem with this is that it lessens the impact of the time, money and effort you put into putting up an outdoor antenna in an effort to receive distant signals. Now suddenly you're attenuating them. All radios are subject to this problem to some degree but the Uniden less so than the PRO197.

Your results may vary, and results can vary from radio to radio.

... and ends up at the speaker.

The PRO197 provides about 1.8 watts of audio into a built-in speaker. This provides pretty good audio punch for a mobile scanner and the audio sounds good across the board. The PRO197 really shines over the competition when listening to digital P25 signals, the digital decoder circuits (called a vocoder) handle digital audio well and cements GRE/RadioShack's reputation as superior for digital decoding. While Uniden has improved with the XT line, the PRO197 still wins out.

The PRO197 has an earphone jack that provides limited audio power so as not to blast your eardrums. If you want to use an external speaker then you should plug it into the rear External Speaker jack. The earphone jack works fine with iPod style earbuds or other standard earphones and devices.

Programming

If you have never programmed a scanner before you will want to take time to read the manual thoroughly. This is a complicated radio and there are a lot of things to learn. That said, it isn't really hard to learn if you have patience and are willing to take the time. The same goes for the Uniden scanners. There's a learning curve with these radios and if you're not up for spending some quality time with the manual and, if you're not an experienced radio hobbyist or professional, also prepare yourself for some quality time with web sites and forums which explain and provide information on trunking and other types of radio systems. If you'd rather not go through this process, a process which will help you understand and make better use of your scanner in the long run, then you can have Scanner Master program the radio for you for a fee. A good percentage of Scanner Master's customers do this very thing.

If you have dealt with programming scanners before, you will still need to know that this PRO197 works markedly different than any other scanner. While a lot of the familiar GRE and Radio Shack scanner protocols remain, there is enough left over that will make your head spin if you try to dig into it without reading up on it.

The basics are that you create “Objects”, then tell the scanner what Objects you want to scan by using Scan Lists. Objects can be conventional scanner frequencies, trunked system talkgroups, Limit Searches, Spectrum Sweeps or Service Searches. While conventional channels and the various searches can pretty much be entered directly, trunked Talkgroups have to be identified with a Trunked System (“TSYS”).

The PRO197 manual advises to start off slow and work towards more complicated items later. This is good advice, since it takes a while to learn the various nuances of this radio. For example, start off with conventional radio channels first. Then learn how to add names (called Tags) to these channels. Then learn how to create Scan Lists. Finally learn how to program Trunked Systems and talkgroups into Scan Lists. Along the way you can take side trips and learn how to program limit searches and Signal Stalker events as well as adding these and Service Searches to Scan Lists.

RTFM (Read The Flippin’ Manual) or Not

The PRO197 scanners come with a very inclusive Owners Manual on an included CD-ROM. While it is good it isn’t perfect. There are some typos and formatting errors, and there are several instances of the sister PRO106 being identified instead of the PRO197. This really isn’t a big deal since both radios are functionally identical and share firmware, programming files and the rest. A printed version is also included, unlike the GRE radios.

If you don’t understand or like the PRO197 manual you may want to try other sources to help learn the radio. One of the best sources for scanner techniques and tips is the MarksScanners pages. Mark has detailed instructions on how to program and operate many scanners, the PSR500/PSR600 and sister Radio Shack PRO106 and PRO197 instructions are found here:

http://marksscanners.com/106_197/106_197.shtml

You can also draw a lot of information from the relevant RadioReference.com and YahooGroups forums. RadioReference also has an inclusive Wiki system that covers these scanners.

Since the Firmware updates that GRE/RadioShack produces as needed may change how some of the features work it is a good idea to check for more current editions of the Manual on RadioShack’s website. Updated manuals are a free download. They come in a PDF format so you can read or print them with free software.

Basic Programming techniques

To program *Conventional* (non-trunked) channels, talkgroups or searches you go into the Program mode by pressing the PGM button then select the proper soft key. For conventional channels you enter in the frequency and then if you then press the soft key (F1) labeled Save the channel will be stored into a memory slot. If instead you press the down button on the 5-way pad you can then edit more parameters such as the text tag, Squelch type (CTCSS, DCS, NAC, or Search) Priority, how the LED and display backlight reacts with the channel and more. Keep on going you can go into the “Expert” menu items where you can change the modulation from the default to another mode, set the attenuator, the delay settings, AGC settings and a couple others.

In this Expert Menu are a couple unusual items. The first is called “SuperTrack”. This is a method of changing the way the radio processes digital signals. Since each digital system has slightly different parameters, this adjustment can help make decoding a bit more reliable. If you are having difficulties with a channel or system’s digital decoding toggle the SuperTrack setting on or off to see if it helps.

Another Expert Menu item is AudioBoost. This pumps up the audio on that channel by 6dB. Since some systems use lower modulation levels than others, this will allow you to adjust weaker audio to match the rest of the channels.

Lastly there is a Hit Count item in the Expert Menu. This allows you to keep track of how many times that particular channel received traffic.

Similar methods are used to program **Trunked Talkgroups**. First however you need to program the actual **Trunked System** unless you already have it programmed and stored in the radio. When you select TGRP (Talkgroup) the next menu allows you to select an existing Trunked System or create a new one. Select New and you will be able to scroll thru the various trunked types until you come across the type you want. Scroll down once more and you can label the system with a descriptive name. One more scroll down and you can start entering frequencies used by that system. Remember that on standard 800 and 900 MHz. Motorola systems and P25 systems you usually only need to enter the Control Channels. EDACS and LTR systems not only need all the channels used by the system but they have to be in the correct order or position number.

The Expert Menu for trunked systems have a few different options, such as “Narrow FM” in case your system uses NFM on a band that is defaulted to regular FM, “Dwell” which controls how long the scanner waits for activity, the “MultiSite” feature for networked trunked systems and the ability to set custom tables and fleet maps as needed.

Trunked Systems can also be programmed with a “**Wildcard**”. This allows you to search the trunked system and hear any traffic on the system even if the talkgroups are not programmed specifically. Otherwise you would hear only traffic specified in your Scan Lists.

When programming **Search** events (SRCH) you can then select one of 3 options, Limit, Service and Sweeper.

When you select **Limit Search** you enter the lower and upper limits of your desired search along with a name (Tag). You can then enter more detailed specifications, such as the LED, Alarm and backlight settings and Expert Menu items like the modulation type (if different than the default), attenuator, delays, Zeromatic setting, hit count and the direction you want to search.

If you select **Service Search** you can choose the Service you want to search from the options presented (such as Public Safety, CB, Railroad Aircraft etc.) as well as the LED, Alarm and backlight options and other parameters.

For **Signal Stalker** searches you can select to search all bands or just the Public Safety allocations. You can also turn on and off specific band segments, called Sub Bands. The LED, Alarm and Backlight parameters and other options work the same as with other searches.

If you want to store a Search Hit look for the “Stor” (**Store**) soft key when the radio stops. This will send that hit’s information to memory as a separate Scannable Object that can then be assigned to any of the Scan Lists in the radio.

While searching you can press the PSE (**Pause**) key to stop the search and stay on that channel until you want to move on.

Special Programming Features

The PRO197 has several unique features that you can use to make programming easier once you learn how to use them. One of these is the “**Dupe**” (“Duplicate”) option. This works like a Cut & Past operation on a computer, you copy a channel, talkgroup etc. to a clipboard and paste it where needed. This is useful when you have a lot of similar objects to program.

If you remember programming in a specific channel but can't remember where you left it, you can search the radio for it. Using the **FIND** feature is pretty easy. Press the Program key, then the Edit soft key and lastly the Find soft key. Select how you want to search, such as by locked out status or the text tag. Select the method you want. If finding Locked Out channels then you can scroll thru them and unlock any of them you wish.

There are many different features that you may or may not be interested in. Some of them include:

Object Lockout: Locks out a channel or the like no matter what scan list it is a member of. If you have a frequency in more than one Scan List, and lock it out of one, it still can be heard of you are scanning another List it resides in. This allows you to lock it out entirely, even if it is in multiple Scan Lists.

Temporary Lockout. This feature works differently than Uniden's. On the PRO197 there is a menu setting in the Global menu that allows you to select Temporary or Permanent Lockouts. If you choose Temporary then the radio will remove the Lockout when you turn off the radio. If you set it to Permanent then the channel will stay locked out until you unlock it specifically. You can still set a channel to a permanent Lockout by pressing the Func key then Lockout.

To unlock a channel just press Manual and scroll to or use the Find feature to get to the Object and press the Lockout key to unlock it.

Search & Talkgroup Lockouts: During Search or when scanning a trunked system events one of the Soft Keys will display L/Out and you can use this button to lock out a frequency or talkgroup.

Tune Mode: If you want to go to a specific frequency quickly, press the Tune key on the keypad then enter in the frequency you want to monitor. From there you can search up or down and let the radio stop on received signals. You can store hits to a memory slot, it then becomes a Scannable Object.

When, if in Tune Mode, you come across a trunked channel the radio will display information about that channel. For example on Motorola and P25 systems the System ID and Site number will be displayed.

This functionality of quickly "pumping in" a frequency into a scanner and listening to it, and to nearby channels, is a great tactical scanning feature that is lacking on the Uniden scanners.

Weather Alert: The PRO197 can be used as a Weather Radio Receiver. The most simple method is to press the WX button and find an active NOAA weather station in your area. You can then enter SAME Codes to have the radio open on weather or emergency messages for your county. If you do not enter a SAME code then the radio will display any SAME messages it decodes. Press the "stby" soft key to enter the SAME Standby Mode, the Soft key switches to upper case (STBY) when in that mode. Press the SAME soft key and you can enter SAME codes for your area. You can get these codes from the National Weather Service website.

If you want to use the older 1050 Hz. alert tone activation method (now called the All Hazards Alert) press the WX button, go to an active weather channel for your area and press the Priority button. The radio will then activate when it detects the proper code.

Favorite: The PRO197 "Favorite" feature allows you to tag an Object as a "Favorite" by pressing the FAV button. This is essentially a special scan list that allows you instant access to that group of channels. You can tag any type of object, trunked or conventional, sweeper, search etc. When scanning just press the FAV button and any of those tagged channels are now active, regardless of whether they are in other scan lists.

Cloning

You can clone your radio to another PSR500, PSR600, PRO106 or PRO197 with a simple cable. This cable is the same one used to connect iPods to car stereos and other uses, a 3 conductor "Mini" cable. Connect the cables to both radio's PC-IF jacks, turn them on and enter the proper keystrokes on the Master (Source) radio and Slave (Target) radio. The information from the Master radio will be programmed into the Slave

radio in a matter of a minute or two. The Radio Shack model 42-2387A or any similar stereo cable can be used.

Object Numbers

When you enter a Scannable object into memory it gets assigned a sequential number. This number can be used to go directly to that object and for your reference. This number is displayed when the scanner stops on that object or when editing it. The number also contains what scan list(s) it may be assigned to. 01-1282 indicates that the object is in Memory position 1282 and a member of Scan List #1. While viewing this object you can scroll up or down and view other members of the same list.

When in the Manual or Program mode you can press the 4 digit memory address and the Enter key to go directly to that Object.

Text Entry

The GRE allows you to add text Tags to just about everything, from conventional channels to trunked talkgroups and systems to search types. If you have had high-end GRE-made scanners like the Pro96 in the past the PRO197 method will be easy to learn. After you have entered the frequency, talkgroup or whatever scroll until you see the "Tag" menu option. Select the Tag menu and scroll to the character you want to change. Each number key on the keyboard is assigned to various characters, you then press the corresponding key to select it. This works out to a 2-digit number is assigned to each character you can enter into the Text Tag. While it sounds confusing perhaps, once you start using it it gets pretty easy.

Of course it is a lot easier to enter tags from the computer, but that comes later. You will want to know how to do it from the radio so you can make changes on the fly and impress your friends.

The PRO197 manual has complete instructions and a code chart. If you are going to enter a lot of text tags manually you may want to copy this chart and keep it with the radio.

Quick Text allows you to store 10 tags that are commonly used. You can change these to fit your needs and paste them into the names of the tags you are editing; it's a nice touch.

Scan Lists

Scan Lists are the heart of the radio. This is how you determine what you are going to listen to when. While you can listen to individual channels or search events without Scan Lists, if you want to do more than that then you need to set up Scan Lists.

When you first program a Scannable Object it will be assigned to Scan List 1 by default. You can assign it to others later as well or you can further edit Scan List 1 to remove it.

There are 20 regular Scan Lists as well as a couple of special ones. Regular Scan Lists can include any type of Scannable Object, conventional channels, trunked talkgroups, searches, etc. You can use Scan Lists in much the same way as you would use Banks on older radios. Set up Scan Lists by agency, location, for specific types of incidents, or any other reason you might want to group channels together.

Scannable Objects of any type can be in any scan list. Get creative with them and you can create different Scan Lists for any mood. Like to listen to fire calls? Set one up for fire channels. Going to the airport? Set one up with aircraft channels.

You can add newly created Scannable Objects to existing Scan Lists or create new ones. When you press the PGM key to enter programming mode and select a type of Object, use the left and right arrows to select a Scan List. If the Scan List number shown when scrolling has an asterisk next to it then that Scan List already has this object as a member. Scroll thru the Scan Lists until you come across the one you want to use and then press the Down Arrow key to go to the next field. When you save your Object the Scan List will have the object you just added.

Don't forget to add names to your Scan Lists. Press the GLOB soft key and scroll down to the Scan Lists menu. Use the arrow keys to move the cursor and use the standard GRE Text Tag procedures to edit the names.

To turn on or off the various Scan Lists go to the Scan Mode by pressing the Scan button then press one of the number keys (for Lists 1 thru 10, the Zero activates Scan List 10) or Func then a digit for Lists 11 thru 20 (Func-2 for List 12, Func-0 for List 20...). When scanning the radio will display the Scan List number on the third and fourth lines of the display, the third line displays Lists 1 thru 10 and the fourth line displays Lists 11 thru 20.

Power On Options

The PRO197 allows you to perform some special tasks by pressing specific keys during the Welcome Message on the display. These include bringing the radio to specific menu setting locations, clearing memories, resetting the radio or getting ready for firmware updates.

Firmware Updates

The PRO197, in common with most high-end scanners these days, allows you to download and update the Firmware version in the radio. The Firmware is the basic operational language and user interface of the radio, kind of like what "Windows" is to a computer. With such a complicated system there are bound to be bugs, mistakes, or changes to be made. These updates are free from the RadioShack website and are applied with a Windows computer using the regular RadioShack or GRE USB programming cable.

There is a separate firmware for the DSP (Digital Signal Processor) that can also be upgraded. These updates may or may not help your specific situation, as digital systems vary. Check the message boards on the Yahoo and RadioReference forums before updating your DSP firmware, occasionally older versions work better on some systems.

CC-Dump

The various GRE/RadioShack digital radios (and now the Uniden XT digital scanners) support a special feature called CC-Dump. This inelegant name for such an elegant feature refers to the porting of Control Channel data to the serial port of the scanner. This data is used by programs that decode it and display and log pertinent information about P25 radio systems.

The most popular of the programs that use the CC-Dump data is Pro96Com, (<http://www.psredit.com/pro96com/index.html>) a free utility that decodes the CC-Dump data and displays all the information you could ever want on the system being monitored. This program is used even by System Administrators to watch their systems.

This program will not only display the active talkgroups, frequencies, radio ID's and site information, it will allow you to control a second radio to monitor the voice traffic.

Computer Programming

There are several programs available to program your PRO197. Since most offer some sort of demo mode it is a good idea to try them until you find the one you like best. Programs that work with a PRO197 also work with the sister radios, the PSR500, PRO197 and PRO106.

The PRO197 does not include a USB programming cable, these are sold separately. While this cable can be used for many GRE and Radio Shack scanners, the older RS-232 serial cable used for the PRO96 and 2096 will not work with the newer radios.

My favorite program is ARC500 available at Scannermaster.com. ARC is also available for most other scanners and it offers easy to understand methods of creating Scannable Objects and other parameters as well as a Virtual Control option.

Comparisons with the Uniden BCD996XT

The obvious competition for the PRO197 is the Uniden BCD996XT and its predecessor BCD996T. Both radios offer new style programming, digital decoding and hundreds of features. As a user of the various Uniden DMA scanners (BCD396XT and BCD996XT and predecessors) I have gotten used to the programming methods used by the Unidens so I was apprehensive about learning the RadioShack/GRE method of Scannable Objects, it all sounded pretty strange to me. As I worked with the PRO197 I learned how to program various Scan Lists, Scannable Objects and Searches and discovered that it really wasn't all that difficult. It is no harder to learn than the Uniden method and some people may find the PRO197 method more intuitive. If you have not already learned one method or the other you might find the PRO197 method easier to learn.

The real question will likely be the feature set and comfort level you develop with the radio. If you have a chance to play with both for a while do so. Download the manuals for both and see how well you understand them.

While the PRO197 is a fantastic radio everyone will have ways they would have done it. I would have created a quick reference card to allow explanations of the basic features that fit on a pocket or wallet. The BCD996XT seems to reject strong signal interference better.

Operations on large networked trunked systems using the Roaming feature on the PRO197 is pretty good but I think Uniden's method of individual defined sites is better, especially on larger systems that have more than 28 control channels altogether. On smaller scale systems however, the GRE is easier to program.

A few of the Uniden features that I really like are the Fire Tone Out, GPS and Remote Head system. These are not available on the PRO197. The PRO197 however handles some items better, such as during Search Events it will display the CTCSS, DCS or NAC code without having to select either Analog or Digital like you do on the Uniden. Also, the received code will remain on the display until there is another code decoded, the frequency changes or the radio is put into another mode.

The PRO197 uses more conventional keyboard activity and volume/squelch controls. It has better audio, especially on digital systems and has the unique V-Scanner feature. If you listen to LTR systems, AutoMove system helps immeasurably to decipher the unusual channel locations.

Normal retail price for these scanners are from \$450 to \$500, a similar price as Uniden's BCD996XT.

The PRO197 is better if these are most important to you:

- * Better digital decoding, especially on simulcast systems.
- * You prefer a radio with better audio.
- * If you prefer separate volume and squelch controls.
- * If you don't want or need the extra features of the BCD996XT
- * If you are not bothered by excessive strong-signal interference.
- * If you need higher sensitivity.
- * You like to have Virtual Scanners available to you.

You will want the BCD996XT if these are more important:

- * You prefer a simpler but more detailed display.
- * If you want the amazing feature-set of the BCD996XT
- * You prefer the Banks/Systems/Groups method of programming.
- * You need or want the GPS features.
- * You will use the radio in a high interference area.
- * You want to have a lot of channels available all the time.
- * When fire tone-out capability is important.
- * You monitor a large networked system with multiple sites.

Recommended Accessories

When people invest \$500 for a scanner, they probably want to protect it, get some accessories to go with it or otherwise add to the experience. Scanner Master (<http://www.scannermaster.com>) has a full line of

scanner accessories such as antennas, cables, power adaptors and references to make your scanner more enjoyable.

Probably the most important accessory will be a copy of the ARC500 software, which is available at www.scannermaster.com. If you're going to program this scanner on your own, or even if you have Scanner Master or a friend do the programming for you, it's a great benefit to back up a copy of the programming to your PC. Furthermore, once you've backed it up, you might also want a copy that you can tweak and add to over time as you get more familiar with the scanner and scanning. Then you can tailor the programming just for your tastes. The software is easy to use and extremely powerful and it will help you understand all that the radio can do.

Many of the accessories for the other GRE and Radio Shack scanners will work for the PRO197 as well. Here are a few that you might be interested in:

Lose your AC adapter? Want a second one to keep for travel? Use this adapter from Scanner Master.

You can also buy an assortment of remote speakers (amplified or not), headphones, antennas and more. Just go to http://www.scannermaster.com/Accessories_s/3.htm and chose what you want.