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CARMA Newsletter

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Chicago Area Radio Monitoring Association

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Welcome to the newest rendition of the famed CARMA Newsletter! We hope to have timely information and news for the Illinois scanner listener on a regular basis. Please feel free to provide articles to share with the members.

The Newsletter is intended to supplement the E-Mail exchanges on the Yahoo List and provide a long lasting view into the state of land-mobile communications and club activities.

CARMA Meetings & More!

The next CARMA Meeting will be on June 4th, 2005 at Phillis Restaurant, 63rd & Kingery Highway, in beautiful Willowbrook IL. Be there between 11:00 and 12:00 Noon, buy your lunch and enjoy the friendly atmosphere, great food, wonderful service and fantastic radio activity.

Our next Friday Nighter will be on July 8th, 2005 at 7:00 PM. It is likely to be held at Winnetka PD, but we may have a different location announced soon. Check the CARMA website for more up-to-date information.

The annual CARMA Picnic will be hosted by Rick Kolinek on July 24th, in Riverwoods. A map and directions will be posted to the CARMA Website and the Files Section later.

CARMA Memberships:

We are often asked how does one become a member of CARMA, as well as what are the dues, how do I get an ID Card or Member's Certificate. Well, in short, all you have to do to become a member is participate! Come to a meeting, join the E-Mail list, show up at a tour. We do not issue ID's, have no official Membership list nor do we charge dues. All activities are free of charge, although when we meet at restaurants you MUST buy your lunch so we get the room for free.

Some members donate snacks or drinks at get-togethers. For example, a member brought several cases of soda to the last Friday Nighter in Winnetka.

Please contact any Board Member if you have a tour idea, Friday Nighter or Meeting location or anything that might help the group.

E-Mail List:

CARMA supports its activities and information exchange via a busy E-Mail list hosted at Yahoo. My going to <http://groups.yahoo.com/group/carmachicago/> and following the instructions there you can have access to the various Files, Messages, Links, Chats and other features Yahoo provides for free. Yes, there are ads that Yahoo inserts, but the service has been great and we have been generally pleased with the way things have worked out for us.

The CARMA Files Section, available only to members of the E-Mail list, is well known for the many informative Profiles and databases provided for and by CARMA members. If it isn't there, we don't have it! If YOU have it, send it to us and we will put it up for the rest of us to share. Feel free to send files that meet the CARMA goals directly to the Files Section or send it to a Board Member for editing and uploading.

Dayton Report

Many CARMA members attended the annual Dayton Hamvention in Dayton OH in late May. Your editor had the privilege of working in the ScannerMaster booth alongside Rich Barnett, owner of ScannerMaster and Gommert Buysen, author of the ARC series of programming software.

One of the highlights of this weekend was the chance to play with 2 actual Uniden BC-396T's. This highly anticipated radio was announced last year and should be ready for purchase in July 2005. This radio has "Close Call" that allows you to find local transmitters in a similar fashion to a Scout. The nice thing about the BC396T is that it also

CARMA Profiles:

One of the projects we have worked on are the CARMA Profiles. These .pdf documents, most edited by Rich Carlson, take a specific county, system, or other item and delve into deep detail on the operations Ranging from a single page for small counties to dozens of pages for intensive operations, these have proven to be very popular. After publication of a Profile we invite members to review them and send any errors or additions either to the E-Mail List or to Rich Carlson directly. The Profiles are updated as new information becomes available. Items such as Frequencies, Unit Numbers, Maps, or code lists are always welcome.

The Profiles were developed with information contributed by hundreds of CARMA members. You could be one of them! If you have an area that you can produce a Profile for or just want to add to an existing one please contact: Rich Carlson via E-Mail at rich@n9jig.com.

immediately displays the PL or DPL if present. The 396T also has the ability have fire paging codes programmed in, as well as decoding APCO-25 digital audio and 3 flavors of trunking (Motorola, EDACS and LTR).

I got to meet Paul Opitz, the Product Manager for Scanners at Uniden. He spent most of an afternoon in the ScannerMaster booth meeting and greeting many scanner enthusiasts and answering questions about Uniden's products. He was very gracious with his time and patience. Other notable attendees included the erstwhile Gordon West, Norm Schrien, and Tom Swisher from the All Ohio Scanner Club.

Scanner Equipment:

One of the most common questions at the ScannerMaster booth as well as the many forums at Yahoo and Radio Reference is "What scanner should I buy?". Well, that depends... Here are a few of the current (and soon to be current) scanners. Hopefully this can help make your decision easier.

Uniden:

BC396T (\$550)

The upcoming BC396T (See "Dayton Report" above) has just about all the features one could want in a handheld scanner. In a small package not much larger than a pack of cigarettes, it packs a lot of features in a tiny package. CloseCall, instant PL/DPL decoding, APCO-25 digital decoding, Motorola, EDACS and LTR trunking, Fire pager tone decoding and more round out one of the most feature packed radios ever developed. Uniden has finally switched to using off-the-shelf AA batteries instead of proprietary battery packs. The 396 also has Unidens new Dynamic Memory Management (See the BC246T for details). The 396T also has automatic fine tuning of digital audio.

BC246T (\$220)

The 2004 release of the BC246T handheld scanner introduce the scanner world to dynamic memory management. Instead of 10 rigid banks made up of a set number of channels this radio allows an almost unlimited number of "Systems" to hold trunked systems or conventional groups of channels. The radio indicates what percentage of memory is available. The 246 uses AA batteries and has a similar small profile as the 396T.

BC796D/BC296D (\$500)

The BC796D (base/mobile) and BC296D (handheld) are essentially the same radio in different form factors. Both have 1000 channels (10 banks of 100 channels each) and track Motorola, LTR and EDACS as well as APCO25 digital. With Mil-Air coverage, and Service Search these radios cover almost any band or mode a scannist would want. The BC296D uses the Uniden 4 cell NiCad pack and comes with the computer programming cable. Both come with an AC adaptor and cigar lighter power cable, the BC796D also comes with a 12VDC power cable.

Both radios require fine tuning of digital audio, sometimes between sites within the same system. Both come with Uniden's "E-Ware" programming and control software.

BC898T (\$200)

The follow-up to the popular BC895 desktop scanner allows for increased trunking capabilities, as well as conventional channels and trunked scanning at the same time. The BC898 allows computer programming and control. A larger form factor and tuning knob allows for more comfortable use in the home.

Others:

Uniden makes several other less pricey models, several geared toward the NASCAR set. Most do not support Trunking or digital. These start at under \$100, and includes desktop and handheld models. One even doubles as an alarm clock!

Radio Shack:**Pro96/Pro2096 (\$450)**

These are Radio Shacks Digital scanners. The handheld Pro96 and base/mobile Pro2096 are essentially identical otherwise. Both have Motorola and EDACS trunking but no LTR. Digital APCO25 modulation with automatic fine tuning of the digital audio allow the monitoring of most public safety systems. Both radios will display the System ID of Motorola systems as well as tower ID's on 9600 baud systems.

Both come with the AC adaptor, the 2096 comes with a DC cord as well. The 2096 uses a different power connector than prior radios, so some rewiring may be needed if you replace a different radio with this one. The 2096 also includes a DIN bracket for mounting in vehicles with an available DIN slot.

Both use the same programming cable (available from Radio Shack among other sources) and software. The 2096's programming port is on the front of the radio for easy access. The 96 uses regular AA batteries, and includes 2 different battery holders, one for rechargables and one for non-chargable cells.

These radios do not cover the Military aircraft band (225 to 400 MHz.) normally, but these freqs can be opened by a software package.

The PRO2096 and 96 both include the famous TP-4 for tapping the discriminator. There is plenty of room on the back of the 2096 for a jack.

Great shielding is provided by the double steel case on this radio. There is an inner metal case to protect the radio when used with the DIN sleeve in a vehicle.

Pro97 (\$200)

See Ted's Most Excellent Review of the PRO-97 later in this Newsletter.

Pro-2051:

The Pro2051 is the first Base/Mobile scanner to offer CloseCall and also includes Motorola, EDACS and LTR trunking but no digital. The 2051 has an appearance similar to that of the 2096, but is slightly smaller and is not DIN compliant.

Other lower priced Radio Shack and Uniden radios are available, with varying features and costs.

Icom**R3, R5, R20, R20**

The Icom line of handheld receivers offer continuous frequency ranges, often including HF as well as UHF and VHF. With slow scan speed and a less "Americanized" method of programming they are considerably more difficult for many users. The R3 has an LCD screen that allows to watch TV or monitor some video transmitters. The R5 is a sub-miniature receiver, the R10 and R20 are somewhat larger. None of these handle trunking or digital modes.

Other Brands:

Alinco, AOR, and others also make scanning receivers available in the USA. These are usually geared towards the specialty market or for more advanced users. The AOR AR8600 allows for an add-on APCO 25 card to be installed. Alinco has several models, including tiny wide range handhelds that fit in a shirt pocket.

Antennas

The next most common question is "What is the best antenna for me". That too depends on you. What you want to listen to, where you are when you listen and other factors all come into play.

Base Antennas

The home allows for the best antennas to be used, but often one is not allowed to install external antennas. If you have access to the attic then you can install many base station antennas with protection from the elements. If you can place an antenna on the roof or a tower that works even better. Be sure to protect your self from lightening and other weather situations.

Discones are great antennas for general use above 100 MHz. They provide decent results across several bands and can also be used for transmitting on the popular VHF and UHF ham bands. While they do not provide gain in any one band they work equally well across them all. If you need low band coverage several discones have vertical radiating elements that provide this.

Radio Shack, Grove and others sell a variety of other scanner antennas that have multiple elements to cover specific bands. These tend to work better in the scanner bands than a Discone will, but they are not intended for transmitting. Some look like TV antennas set sideways, or a spaghetti mash of elements but the elements are sized and arranged to provide coverage on specific scanner bands.

Beam antennas are also available for scanners. The Grove Scanner Beam is well known and other companies

produce beams intended for transmitting that work great on scanners.

Accessories:

Many scanner users have a variety of accessories. From battery systems, filters, antenna devices and more, these all enhance the experience.

Some of the more popular are listed here.

Optoelectronics Scout:

The famous Scout was and remains one of the most sought after devices around. This is basically a frequency counter with a twist. It will find strong signals and alert the user to them with a beep or vibrator, and the record the found frequency into memory. These memories can be recalled or exported to a computer.

The Scout and its varieties can also control an attached radio. Several makes and models of scanners, including Uniden, AOR, Icom and Alinco, can be controlled by a Scout and automatically sent to a found channel instantly, so one can monitor the traffic.

What's that you say? My scanner has CloseCall? Sure, but the Scout has been around for a decade, and CloseCall scanners are brand new. The Scout resembles a pager so it is inconspicuous, and can toil in relative obscurity.

Stridsberg Antenna Products.

Stridsberg makes a variety of Multicouplers, pre-amps, and filters that allow one to share a single antenna among several radios or perform other minor miracles. FM Broadcast stations messing with your scanner? Use a Notch filter. Can't quite hear that trucked system? Try a pre-amp equipped multicoupler.

A Review of the Radio Shack PRO-97 By: Ted Moran (and big help from Don Starr)



The recently introduced Radio Shack Pro-97, (catalog #20-527) is a GRE manufactured handheld scanner. Its companion GRE base model will be the FCC type accepted but not yet released Pro-2055. (Not the Pro-2051 as indicated by other reviewers). Price has been variable, between 200 and 220 dollars, with online resellers offering prices as low as 180 dollars, buyer beware. This is an analog, trunk tracking radio - no digital audio and 9600 baud control channels are not handled. There has been no news regarding whether or not the radio(s) will be able to be flash updated

to handle future 800 MHz band plans for trunking purposes, a major concern.

Scanning and Searching:

The Pro-97 has 1000 static memory channels in 10 banks of 100 each, numbered 000 to 999 in the GRE fashion. It has one user programmable set of search limits and 6 other pre-programmed service searches, (Marine, CB, FRS/GMRS/MURS, PD/FD, Aero and Amateur). The marine and CB service searches have correctly numbered channels. The amateur search

is broken down into sub-bands, which can be turned on or off:

- 0-28.000-29.700 (5 KHz),
- 1-50.000-54.000 (5 KHz),
- 2-144.000-148.000 (5 KHz),
- 3-222.000-225.000 (5 KHz),
- 4-420.000-450.000 (12.5 KHz) &
- 5-1240.000-130.000 (6.25 KHz).

One user selectable priority channel is available. Priority does not work for or from within trunked operations. Sorry Rich, no railroad service search.

Police and Fire service search is similarly divided into user controlled sub-bands: 0-Low Band, 1-VHF (assorted spectrum chunks), 2-UHF (less T-Band), 3-800 Mhz (851.0125-860.9875 in 25KHz steps & 866.0125-868.9875 in 12.5 KHz steps). With rapidly evolving re-farmed frequency allocations these may not cover every public safety service out there, but they do a reasonably good job.

Memory scan speed is tricky to measure but appears to be in the range of 60 to 70 channels per second. Search speed was accurately measured at a respectable 84 steps per second, both faster than advertised.

One of the biggest drawbacks to this radio is that tuning steps in all VFO modes (direct tuning, user searches, frequency entry, etc) are fixed using a preset band plan map internal to the radio. Users cannot change or alter step sizes anywhere, though the mode of reception can be changed. As far as I can I determine this is the step size band plan map and frequency coverage used by the radio:

25.0000-54.0000	5 KHz
108.0000-136.9750	8 1/3rd KHz
137.0000-138.0000	5 KHz
138.0000-144.0000	12.5 KHz
144.0000-148.0000	5 KHz
148.0000-150.7750	12.5 KHz
150.7825-156.2500	7.5 KHz
(on mostly correct offset channels)	
156.2500-157.4750	5 KHz
157.4750-161.5700	7.5 KHz
161.5700-162.0250	5 KHz
162.0250-174.0000	12.5 KHz
216.0025-221.9975	5 KHz
(on correct offset channels?)	
222.0000-225.0000	5 KHz
225.0000-405.9750	25 KHz
406.0000-512.0000	6.25 KHz
806.0000-823.9875	6.25 KHz
849.0000-868.9875	6.25 KHz
894.0000-960.0000	6.25 KHz
1240.000-1300.000	6.25 KHz

The above is, in general, a good plan for most standard systems. But try to enter a wireless mike freq like 171.045 and the radios rounds off your entry to 171.0375, not so great. The radio has only one FM filter setting, which is really too wide to make effective use of 5, 6.25 or 7 KHz channel separation, but Radio Shacks patented Zeromatic tuning feature does a decent job of usually landing the radio on the right frequency in search modes. This is the first Radio Shack scanner I know of where the Zeromatic feature can be turned off, should the user so desire. When sitting on a frequency there is very significant adjacent channel interference issues when in portions of the spectrum with active 5, 6.25 or 7.5 KHz offsets. One of the real drawbacks of using this fixed step size design is that an otherwise very fast radio is needlessly slowed down while searching, especially on UHF bands and above. I had no opportunity to test for filter performance

in the aero band using the 8.3333 KHz channel steps. CARMA clearly needs to send me and my radio to Europe for some tests here. Vienna sounds nice.

Delay for conventional memory scanning is 2 seconds, on or off on a per-channel basis. When entering new memory channels its automatically set to delay-on. Same for searching. In search mode an optional resume 5 second delay can be activated and the scanner resumes searching after pausing for an active frequency after 5 seconds. You can scan, search or direct tune up or down.

Unlike the Uniden's taking banks into or out of scan is breeze, regardless of what the radio is doing at the time trunk-wise. Press the numeric button for the bank - that's it.

Physicals:

Case size is 145mm tall, 65mm wide and 42mm thick. It weighs 8.5 ounces without antenna or batteries. Audio output is listed as 170mW into a 1 3/8 inch speaker, which sounds louder. Keypad beep can be silenced. A bit smaller than the Pro-96, its display is smaller but also sharper.

The Pro-97 features 16 character long strings for alphanumeric tagging of memory channels, talk group IDs and bank tags. Upper and lower case and an assortment of punctuation. It has an excellent, sharp, orange backlit display and keypad. The display has good viewing angles from both below and especially above, good from side to side. Display contrast is also adjustable. Keypad markings and key sizes are small and hard to read, but also backlit and the markings appear to be very

durable. Folks with really huge fingertips may have trouble. The backlight has a variety of timer settings or can be left turned on or off.

The Pro-97 has a keypad lock and a clear button. It's a GRE so you have to use the decimal point when entering frequencies. There is a low battery alarm. There is a variety of very handy lockout review and data clear functions, including clearing an entire bank at a time. Up to 50 frequencies can be locked out from each search bank.

It has a combined volume and squelch top mounted rotary control which has a flimsy feel and their actions interfere with each other in an annoying fashion. Audio is excellent, clear and loud. The top mounted earphone jack output level is level limited. It has a plastic push-on cover. The antenna connector looks flimsy, but feels sturdy and mine has withstood much abuse already. The case is all plastic. I have drop tested mine 3 times now from about 2 feet onto hard tile floors and cement without visible damage or marring. No custom cases are yet available, one is badly needed. The plastic clip-on belt clip does not appear very sturdy, but is slightly flexible and I have yet to break mine. Get a case. I also recommend those clear plastic sticky screen covers they sell for PDA and palmtop displays. The case needs rubber side grips, it has some finger indents but remains slippery.

Power is via 4 AA batteries, either disposable or rechargeable. Separate battery packs are provided, the disposable pack prevents the user from attempting to charge them inside the radio. External power is via a 9 volt DC jack, no wall wart or car adaptor is

provided. The manual lists squelched (no audio) current drain at 90 Milliamps. I have not measured this, but I rate overall run times as excellent. With the new 2500 Ma nickel metal hydrides now available I have experienced run times well over 14 hours with fairly busy traffic and the backlight turned on. In manual mode, sitting on a memory channel, the radio goes into a power saver mode which also turns off the backlight. It cannot be turned off, but can be avoided by leaving the radio in program mode instead.

The manual says the radio requires 300 milliamps at 9 volts DC for external power, and will internally charge 1600 Ma Nickel-metal Hydrides in about 12 hours, or 850 MaH Ni-Cads in about 8 hours. I have not tried this, as I use external rapid chargers for the cells almost exclusively.

I was initially intrigued by the manual. In fact, it's awful. Full of jinglish, rhetoric and is often downright wrong or misleading. Read it anyway and make note of all the Function/# operations. Joel and I will probably have to re-write this at some time in the future. Where the manual conflicts with what I have written here, go with my version.

The radio uses an unusual convention for displaying its functions. Unlike most other handheld scanners, this one displays most of its current status indicators on screen, all the time. Upper case means the function is ON and lower case means the function is OFF. Some folks hate it. It takes some getting used to but I find it informative. E.G. DLY Vs. dly - Delay is On Vs. Delay is Off.

One other note: As with many pro-96 users, I have observed improved special feature and sensitivity performance when using rechargeable batteries as opposed to disposables. Your mileage may vary.

Trunk Tracking:

The Pro-97 trunk tracks Motorola type one, two and hybrid systems, GE-EDACS and LTR, on VHF, UHF, 800 and 900 MHz. It will not trunk track anything below 137 MHz. It employs control channel tracking above 512 MHz and sub-audible signal tracking on all LTR systems and other systems below 512 MHz. Side by side comparison testing against a Uniden 780xlt indicated the Pro-97 was missing about 10 percent of the talk group traffic the 780 was catching on a strong type one 800 MHz Motorola system. However, the Pro-97 clearly out performed the 780 on weak, distant systems, especially in terms of displaying accurate talk group numeric identifiers from weak control channel data streams. In fact, it never displayed a wrong one, all the way down to zero percent copy accuracy of the data decoding. Very impressive. Some folks are investigating if it will do any tracking on 220 MHz trunked systems, no definite word yet.

Each bank/system can have up to 150 alphanumeric tagged talk group identifiers entered by the user. Those are divided into 5 sub-banks of 30 each. When tracking a trunked system the talk groups can be locked out in either open (search) or closed (scan) modes. In open (search) mode, if activity is detected on a user-entered talk group ID, its alpha tag is displayed, ID look up. Radio Shack finally got it right. In addition, the user

can enter a TG delay of 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5 or 4.0 seconds. Sadly, the default is zero. Also see tips and tricks below.

Generally, trunk tracking performance and 800 MHz sensitivity is excellent, especially with 800 MHz gain antennas. Again, the radio really earns its keep on weak and distant systems. It will continue to track accurately until it can no longer reliably get data from the control channel. After that, if you are still in scan, you will hear nothing. But you can manually switch over to listening to the control channel and the radio will accurately display talk group ID activity until the signal fades into the noise floor. The radio also displays the trunked system identification code and control channel decode accuracy rating in percent for Motorola systems.

The radio really soars on LTR systems. A new feature assists the hobbyist in making heads or tails out of LTR systems by displaying the repeater channel numbers associated with repeater pairs in the system. Yup, built-in LTR system decoder, very cool. Once the info is gleaned the user can enter the system into a bank and LTR trunk track the traffic as usual. Works well. LTR systems themselves however remain something of a black art.

Of course, every trunked silver cloud has a dark lining. With the Pro-97 you get no I-Calls or phone connects of any kind on any system. An editor prevents anything other than base (divisible by 16) talk group numeric identifiers for Motorola type two systems, so it appears the radio does little in terms of status bit signal processing. I think it also blocks encrypted talk groups with the

associated status bit. So, the radio must be doing something with those added bits. What? They couldn't give the info to us? Grrr - makes me mad. Oh well. I haven't seen any emergency activations, another status bit signal, either. Basically, the Pro-97 locks the user out of the world of status bit signaling, shame.

RF Performance:

Overall, just what we have come to expect from GRE triple conversion radios, excellent everywhere. An occasional front end overload image here or there, but very rare. Even functioned quite well in downtown Chicago with virtually zero intermod, impressive. I suspect in ultra-high level signal background listening environments the overall sensitivity is somewhat reduced as the front end eventually gets swamped with RF.

Good sensitivity and fairly selective on all the bands, but especially hot up on 800 MHz and surprisingly, low-band and CB. Decent but not stellar on VHF aero in AM mode. Good on VHF and UHF. Yes, it has UHF Mil-air (225-400 MHz) and is fairly sensitive here, much better than a software expanded Pro-96. Seems a little hotter 300-400 than 225-300 MHz. In suburban and rural listening the only time I start hearing the screwy noises is when I get within 50 or 100 feet of a cell tower. The radio performs well, even when hooked up to mobile or outdoor antennas. Reminiscent of the Pro-2006 and Pro-43, but with fewer birdies and more sensitivity. Not quite up to Yupiteru 7100MVT standards, but getting there. In fact, with the antenna off and the attenuator on I have only verified one birdie around 348 MHz.

The radio has an attenuator which can be set for all channels (global) or on a per-channel basis. But, its a very weak attenuator that doesn't seem to make much difference one way or the other on most signals. Happily, it seems to be seldom needed. It improves audio quality on very strong signals when using external antennas.

The Pro-97 hates any type of pre-amp. It is the only way I have found to utterly swamp the radios front end. Stay away from preamps. You will hear nothing.

Channel Modes / CTCSS / DCS:

Each memory channel and the VFO can be set to a variety of modes. These include the usual AM or FM. But there are also settings for CTCSS tone and DCS tone. Here, you can either program a tone for PL receive or use it for decoding and display of the sub-audible tone on FM signals. Works accurately and instantly. This is also how you set a memory channel for Motorola, GE-EDACS or LTR trunking, but you also have to configure the bank in question. The CTCSS/DCS decode and display feature can also be activated via the Mode system in search, very handy. But, you can only select CTCSS or DCS, one at a time, one or the other. There is also no tone lockout feature like some of the Unidens. Tone decoding is very accurate, I have yet to see an inverse DCS code displayed. 50 CTCSS and 112 DCS tones are covered. So far, I have not found a way to use CTCSS receive while in search.

Individual banks can be toggled between open and closed modes. In open mode you search trunked systems and detect and display sub-audible PL tones. In

closed mode you scan pre-programmed talk group ID lists and get PL receive.

Signal Stalker Two:

The Pro-97 is the first radio with the new Signal Stalker Two feature, which is similar to the Uniden close-call. Important - these are not frequency counters or near field receivers. This is instead, an automated, smart searching system intended to rapidly unearth previously unknown local transmitters. Think of it as a super-fast search mode with a bad antenna and the squelch closed.

Essentially, the radio uses a wideband filter to very quickly check each one-megahertz chunk of the radio spectrum coverage in sequence. If it sees no activity at least 20Db strong it keeps going. If it does detect activity it then re-searches that particular one-megahertz chunk using a default step size in order to attempt to accurately determine the exact frequency the activity is taking place on.

Using SS2 the Pro-97 will check its entire frequency coverage in about 5 seconds, (assuming no activity). That's pretty astounding, considering it includes 175 MHz at 225-400 and another 60 at 1240-1300. On the Pro-97, SS2 can also be limited to only a preset group of police and fire frequencies. It will check that large group of frequencies many times a second.

SS2 is using predetermined reception modes (AM or FM) in different band segments. Transmissions in non-standard modes may not be detected. It will stop for digital (P25) signals, but not for TDMA signals like Iden, Nextel, etc. It

may not stop for wide or medium bandwidth FM signals like some 900 MHz cordless phones and wireless headsets. You may have to be very close (inches) to detect very low powered transmitters (>50 mW), but higher power mobiles and bases can often be detected from several miles away. With 2 to 5 watt simplex handhelds I am seeing one-quarter to one-half mile ranges and sometimes more. I have had stalker hits from aircraft overhead at over 20,000 feet and yes, it does work on UHF Mil-air (225-400) in the correct AM mode. But remember, you need a moderately strong signal. Its never going to stop on extremely weakly received signals of any kind. Having an antenna cut for the band of interest or just a better antenna makes a huge improvement in SS2 performance. Using an outdoor base antenna produces interesting results, but mobiling around your local community with SS2 running is downright fascinating.

On the Pro-97, SS2 can be further single key press controlled via removal or activation of sections of spectrum as follows:

- 0: 25-54 MHz
- 1: 108-137 MHz
- 2: 137-174 MHz
- 3: 216-300 MHz
- 4: 300-406 MHz
- 5: 406-470 MHz
- 6: 470-512 MHz
- 7: 806-869 MHz
- 8: 894-960 MHz
- 9: 1240-1300 MHz

Removing non-suspect bands greatly decreases search times and improves your chances of catching short transmissions in targeted bands. Its also

a handy way of quickly resolving broad banded local interference which may be slowing SS2 down. Yes, the display shows the system at work, buzzing through the bands.

There's also another mode called Special Stalker. Here, once 5 frequencies in any given one megahertz chunk are locked out that single chunk is no longer checked. Sadly, the only way to configure this in advance is via software, but in practice, its usually not much of a problem. Up to 150 individual frequencies can be locked out from SS2 mode. CTCSS/DCS detect and display is not available in SS2 modes, and there is no auto-store system like the Unidens. Nor can you stalk and scan at the same time, like the Unidens.

One arena these systems really shine in is special events. Here, the signals are all local, fairly strong, nearby, probably unknown and likely of some interest. There's no better way yet been invented to cover a special event scanner-wise. In minutes, you will have everything talking on site. Trust me, its amazing.

The only problem I have had with my particular Pro-97 and SS2 is that it seems to work very poorly on disposable batteries. Some other users report the same, others do not. I am still investigating.

Many reviewers are claiming the Uniden close call feature is much faster than the Pro-97. They are actually about equal in terms of speed, the Pro-97 is slower but is covering much more spectrum. The big difference is the superior RF stage in the GRE designed Pro-97 which makes for smoother, more efficient overall reception with less intermod and noise.

The Pro-97 also has easier to use controls to handle what SS2 is doing at any given moment. These, in my view, makes the SS2 implementation in the Pro-97 a more effective tool. Others disagree.

Weather:

The Pro-97 does the SAME and FIPS codes alerting, Skywarn channel check, etc. I guarantee there will be weather of all sorts in Chicago. But I am not a huge fan of these features and have not yet tested all the ins and outs. They appear to work. I own a very big shovel.

Computer Programming:

Okay let's see, 1000 memory channels, 6 or 7 key presses for each frequency, another 4 or 5 for the PL, maybe another one or two for modes or delays. 16 alpha characters for each entry, maybe 2, 3 or 4 key presses for each letter. You realize we are talking about over 61,000 key presses to fully program the radio? Ouch. Think you will want to back that up after your fingers stop bleeding?

Software is the only way to go. The Pro-97 needs a special programming cable. It is a serial port connector with a white cable and a right angle jack for the radio. I suspect Radio Shack may be upgrading it as it is not currently listed on their web page. There is a rumor they are also planning a software release in June. That may have something to do with it. Until then the only software worth buying is Win97 from Don Starr:

<http://www.starrsoft.com>

It runs pretty well on my 600 MHz Pentium laptop under Win98 SE. Sometimes after I quit the program my

desktop crashes but that is probably a problem with my particular configuration. You will probably want at least 800x600 screen resolution to use the software. See his web page for more details and screen shots. It costs 25 dollars, a steal.

GRE has the cable for 17 dollars plus 6 dollars shipping:

<https://www.greamerica.com/shop/cgi-bin/cp-app.cgi?pg=prod&ref=SCAN001>

Pro-97's can clone each other via a 1/8th inch jack cable connection. I have not yet tested it.

Pro-97 Hints & tricks:

Edit the startup text manually-

1. Turn on the scanner.
2. Press the MAN (manual) key.
3. Press PGM (Program) key.
4. Press F (function) key.
5. Press TEXT key.

When trunk tracking a bank and stopped on an active talk group, pressing the "text" key will cause the radio to switch between displaying talk group ID alpha tags or numeric decimal identifiers. This is a mode switch. That is, once activated it stays in that state, radio-wide. Press the "text" key again to go back. I still personally prefer the old Uniden method where both the numeric and alpha tags are displayed, but this is a good work-around.

On startup, pressing the "0" key puts the radio into test mode. Pressing another key within 5 seconds activates various test functions:

1 - Total initialize, clears everything and resets to factory condition

2 - Test setting, loads test freqs, previously loaded alpha tags remain but freqs change.

3 - Does something, not sure what. No indicator but radio switches a mode.

4 - Probably undoes what ever 3 does

5 - EEPROM Test Mode, will check your EEPROM. Returns "EEPROM OK! Please power off then power on." message. When turned back on the radio initializes.

6 - EEPROM Test Mode. Appears to be same as 5 (?). Maybe a deeper, read/write test.

7 - Delay Off Mode. Deactivates all delay settings to "no delay", regardless of displayed configurations. This globally deactivates delay. Program in a new delay in this mode and it doesn't work.

8 - Delay On Mode. Switches back from 7. No message displayed, however.

9 - Program All Mode. Loads (test?) data into all memories.

0 - Does something, not sure what. (Undoes 3???)

Other "on startup keys" perform these function:

- 1 - Keypad beep on
- 2 - Keypad beep off
- 3 - Displays operating version, (mine is 1.00)

0 - Test modes (above)

PGM - gives you the option to pre-load the radio with nationwide common freqs and tags. The radio comes pre-programmed with these when purchased.

LIGHT - adjusts dial light timings and settings

Other keys appear do nothing when pressed in startup mode.

Note that if you want delay to work on a talk group while trunk tracking you have to manually configure that on a per-ID basis. The default is "off", so you have to turn it on manually if you want it. This is in the manual, but remains a source of confusion. Other users are reporting some keypad or software work-arounds but I have not been able to get them to work so far. Don Starr is a very smart guy and he says I am wrong and I may well be, I need to do more testing:

Further info...

When the trunked transmission ends and the scanner returns to its "scanning" display, it's really watching the control channel for as long as the talk group alpha tag is displayed. The time for this is the "ID Delay" time set in Win97 (the value set by the steps you listed).

I've confirmed this by:

1. Trunked system (Motorola type II) in bank 0
2. Having a few conventional channels in bank 1
3. Set Bank 0's ID Delay to 4 seconds
4. Wait for transmission on trunked system

5. While the transmission is still active, open squelch (squelch knob fully counter-clockwise)
6. When the trunked transmission ends, the "Scanning up..." display returns and the last talk group alpha tag is displayed for 4 seconds.
7. When the 4 seconds expires, the scanner immediately tunes to a static-filled conventional channel in bank 1.

In step 3, I can set the ID Delay via Win97 or by following the steps on page 77 of the PRO-97 manual. If I'm doing it from the scanner's keypad, it doesn't matter which talk group ID I'm editing at the time - the steps always affect the bank's "global" ID Delay setting. -Don

I also noticed that if you are manually stopped on a trunked frequency (inside a programmed system / bank) and a talk group goes active on that particular freq the radio displays the TG ID and/or alpha tag. Pretty neat.

I thought I had an issue entering type one talk group ID numbers via the software but Don brought me to the light:

Motorola Type-I IDs are entered as:

For size code S1: BFFF-S

For all other size codes (S2 - S14):
BFF-SS

B: Block

F: Fleet

S: Subfleet

The reason for this is the values that Fleet and Subfleet can take for the various size codes. For size code S1, the Fleet value is 7 bits, requiring 3 digits, and the Subfleet value is 2 bits. For the

remainder of the size codes, the Fleet value will always fit in 2 digits but the Sub-fleet can require 2 digits.

Win97 requires this format because this is how the PRO-97 displays its Type-I IDs, even though the 97 will allow entry without "leading zeroes". That is, if block 1's size code was S2, you could enter: 105-3 The PRO-97 will then display: 105-03 Win97 requires that you enter the ID as: 105-03 -Don

Who should buy one:

Anyone who can not wait another day for the Uniden 386 or those who do not want or need digital modulation or dynamic memory. Many will argue the Uniden 246 is a better buy. The 246 has a lot more features. I strongly suspect the Pro-97 is a better performer and it covers a lot more spectrum. The 246 is a good deal cheaper and smaller. Uniden says it will be able to be flashed for 800 MHz changes. I have heard both good and very bad on the 246's RF performance as a receiver. Every radio is a compromise and none are a perfect fit for everyone. My only real remaining Pro-97 gripes:

1. Fixed step sizes - awful
2. No I-Calls or Emergency Activations while trunking
3. Unknown on 800 MHz flashability
4. Really bad manual
5. No digital -sigh-

Other than those I really love this set. 220 for the set, 23 for the cable, 25 for the software and maybe 19 bucks for a wallwart and plug adaptor. Even at 287 dollars this is an amazing amount of great performing technology for the money and more than a couple of

hundred dollars less than what we will be dishing out for our 386's, when they eventually arrive. Or, add up the price of an LTR decoder, tone finder, wideband

radio and frequency counter. (Okay, it's not a frequency counter). I'm also on pins and needles for a Pro-2055, come on Radio Shack! Great work GRE!

PRO-97 Websites:

Radio:

http://www.radioshack.com/product.asp?catalog_name=CTLG&product_id=20-527

Manual:

<http://www.radioshack.com/images/ProductCatalog/Manuals/OME20-527.pdf>

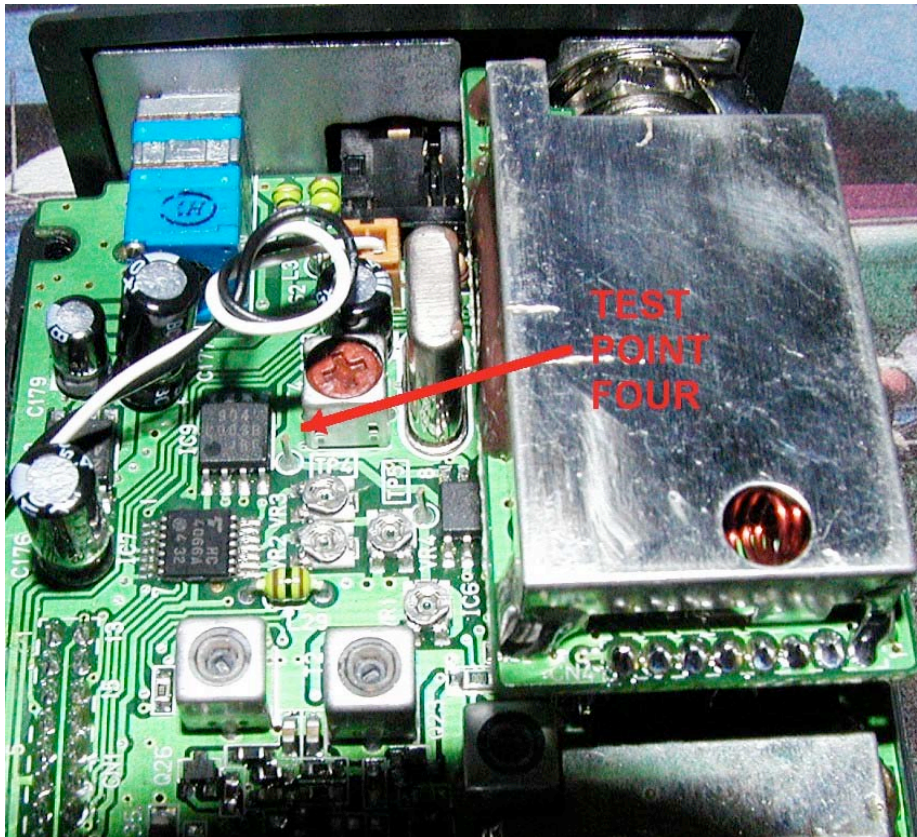
Yahoo group:

<http://groups.yahoo.com/group/Pro-97/>

Radioreference discussion:

<http://www.radioreference.com/modules.php?name=Forums&file=viewtopic&t=15418>

Need to tap the Discriminator on your PRO-97? Here is the infamous TP-4 that is commonly used on GRE made Radio Shack scanners for Discriminator audio. Be sure to follow all standard precautions!



Happy Scanning! – Ted, Rich and the rest of the CARMA Gang!