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THE WORLD SCANNER REPORT

A Journal of VHF-UHF Scanner Technology & Engineering

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INTRODUCING *THE WORLD SCANNER REPORT*

Welcome to the first of what I hope will be a long history of technical publications dedicated to scanners and scanning. All indications are that this will be. The scanner market is growing at an exponential rate in many world markets. Scanner technology has literally shot through the roof since 1986 with the entry of the **Realistic™** PRO-2004 and more recently, the PRO-2005 and PRO-2006. Scanners from AOR, distributed by **ACE Communications**, including the AR-3000, AR-2515 and the AR-1000, are right on the leading edge of technology. **Uniden/Bearcat/Regency** seems to lag a little, but their MR-8100 and BC-200/205XLT are top notch.

Then there are ICOM's R-9000, R-7000, R-1 and R-100; Kenwood's RZ-1; Sony's ICF-PRO80; and Yaesu's FRG-9600, none of which truly belong in what I call the "scanner class" but I won't discriminate here! A number of potentially great scanners circulate around the European scene that haven't yet come to the USA. These include Yupiteru (Jupiter), Fairmate and Black Jaguar, all of which sport some interesting features and high technology.

The Hobby Radio scene has experienced an explosive growth of high technology, but we hobbyists are always at the mercy of what the mfgrs offer. This wasn't so bad some years ago when there wasn't much to offer and when the market demanded very little in the way of sophistication and performance. Today, the technology lies within our grasp, thanks to Large Scale Integration (LSI) and digital techniques. But the manufacturers give us only a fraction of that technology so far! In some scanners, a greater technology already exists, lightly buried, just waiting to be exploited, probed and liberated; yes, freed. In these and other scanners, the addition of a few parts or a small circuit can liberate or augment a deeper layer of that technology.

Of course, we will graciously accept what the mfgrs offer us; but then we'll roll up our sleeves; heat up the soldering irons and get down to liberating or adding to that technology. Thanks to a non-critical, hobbyist oriented digital technology and thanks to a highly developed RF/analog technology, we can jog down to the corner Radio Shack store for $10 worth of parts and by nightfall, have added $100-$200 to the intrinsic value of a scanner! We will do for ourselves at a reasonable cost what maybe the mfgrs cannot yet do. The *"WORLD SCANNER REPORT"* will work to place that high technology in your hands so that you can be free to explore the exciting world of radio communications to the fullest extent.

COLUMNISTS, AUTHORS & READER FEEDBACK WANTED

The *"WORLD SCANNER REPORT"* actively seeks monthly columnists, occasional contributors and Reader Comments/Questions. Monthly columnists may qualify for free subscriptions. Other perks and benefits may be available to enhance the columnist's career and/or hobby interests. Inquire if you're interested in an adventure!

The *"WORLD SCANNER REPORT"* welcomes and encourages YOU to participate in its production. I do not pretend to be the sole authority or expert on the latest technology. One of my strong suits is that of "facilitator" or "conveyor" of information. My 30+ years of engineering experience counts for a lot, but there are RF & digital "gurus" out there who could make me look more like a laborer than an engineer, and I am not kidding! This is to say that YOUR input is needed, be it a mere question or the plans for an exciting new modification. Questions generate answers, you see, and answers are what we all want. Your questions force me to look up the answers and WE BOTH learn something as a result. If you have anything to contribute, however slight, be it a question or a series of technical articles, please feel invited to write. All Reader Input will be respected and seriously considered! Questions may be answered here in the *"WORLD SCANNER REPORT"* or by return mail. See below.

IF YOU WANT A PERSONAL REPLY to a question or problem, you MUST include a self-addressed, stamped, business-sized envelope AND one loose, extra postage stamp (SASE+1) with your inquiry. Expense of reply is prohibitive without this cost-defrayal courtesy. Business inquiries are exempt from this mandate, but an extra stamp or two will always be appreciated. I would like to answer most questions here in the *"WSR"* to economize on time consuming personal replies and to make the answers available to others, as well. We're not like the larger, slick magazines where there's a three month delay. At the most, we'll be maybe a month behind, and usually less than that! Deadlines for publication are flexible and are 1-2 weeks before the 1st of each month.

FOR YOUR INFORMATION: The *"WORLD SCANNER REPORT"* is a publication of my business, *COMMtronics Engineering*. I am fortunate that my business is also my pleasure. The *"WORLD SCANNER REPORT"* is an expression of my hobby pursuits, but it mingles with business interests to an extent that cannot be helped. Time was when I went overboard to keep pleasure from mixing with business. Talk about the Impossible Dream! Older and smarter now, I'm just letting you know the score so you can judge for yourself the merits or demerits of what I am doing here.

I will always give you as many sides of an issue, project or topic so that you can make an intelligent decision on how to proceed. I will not parcel out spoonfuls of information for the purpose of creating business opportunities. You will receive ALL and as MUCH detailed information as can be given within the space available. If you judge a matter to be beyond your capability and want me to handle it for you, perhaps that can be arranged. On the other hand, the information given will be good enough for most hobbyists to take the ball and run to success! In cases where you aren't successful with a venture, I am always available by mail for consultation to guide you out of trouble. The cost is a SASE and one extra first class postage stamp. That is one way how I will honor my commitment to YOU and to Hobby Radio. Conflicts of interest will be managed and kept to a minimum, accordingly.

(Please turn to Page 7)

FEATURE PRESENTATION

SUBSIDIARY CARRIER AUTHORIZATION (SCA) FOR THE PRO-2004/2005/2006 & OTHER SCANNERS WITH 88-108 MHZ & MOST FM BROADCAST RECEIVERS

SCA: FM-BROADCAST PROGRAMMING YOU ARE NOT SUPPOSED TO RECEIVE !!

***CAVEAT:** Intercepting SCA programs without prior authorization is forbidden by the Electronic Communications Privacy Act (ECPA) of 1986. You could be subject to criminal or civil prosecution!*

Virtually ignored by the consumer press, by the high fidelity and stereo industry, and by FM listeners in general, is a special medium of broadcast communications which is available in almost all areas of North America. FM subcarrier broadcasting was first demonstrated in 1953 by its inventor, the late Major Edwin H. Armstrong. Multiplexing of more than one program on a carrier was authorized to begin in the United States by the FCC in 1955. Long eclipsed in the public eye by FM stereo, another multiplexing development, SCA-FM has subsequently become the domain of special interest groups and commercial ventures.

FM-SCA monitoring, however, has enjoyed a steady growth in the last 30 years, thanks to a host of published articles that showed how to assemble FM subcarrier adapter kits and thanks to the companies that supply the kits, components and radios to make SCA monitoring possible. There is a muddled distinction between FM-SCA and FM stereo, both of which are transmitted simultaneously on one frequency from the same FM station. FM-Stereo and FM-SCA are both "multiplexed" transmissions and both can be detected by unsophisticated equipment. It's just that an FM receiver needs a little "extra" before it can detect SCA.

Not all FM stations make use of subcarriers to supplement their regular programming, but most do because of the profitable things that can be done with this interesting medium. SCA can be received as clearly and reliably in the local service area as the regular FM signal, and up to four "channels" of information or programming can be broadcast on one frequency! The two most common subcarrier frequencies are 67 kHz (the original one), and 92 kHz, a newer authorized subcarrier. One FM station can send out three programs and a data track simultaneously: a stereo program to its regular audience and two separate music or voice programs on SCA, such as a radio reading service for the blind at 67 kHz and foreground music at 92 kHz. A third subcarrier channel, 57 kHz, is used exclusively for data which can include digital highway condition alerts and digital paging. By the way, the term "SCA" is also known as "SCS", Subcarrier Communications Service. Either abbreviation, SCS or SCA, means the same thing. Canada has a similar service called SCMO.

SCS is a monaural signal with a bandwidth up to 7000 Hz, or somewhat better than the very best AM stations. It is a multiplex technology which is "readily available" over the public broadcast spectrum. Tuning in an SCA transmission is no more complex or sinister than operating a scanner, radar detector, FM stereo, or color television. FM-SCA, however, is not intended for public reception, and conventional FM detection methods will not work. This is precisely why the "pay as you listen" concept of SCA works. The conceptual intent is to provide a paid subscription service similar to cable TV. Each FM station that offers SCA programming rents out to its customers a special receiver that is tuned ONLY to their frequency. When the ECPA of 1986 was being concocted, the FM Broadcast Industry jumped on the bandwagon to have SCA brought under protection of the Act. Apparently their lobby was stronger and better funded than the Satellite TV Industry's because today it's still perfectly legal to operate a satellite dish antenna in your back yard to receive non-scrambled network transmissions. It's still legal to copy API and UPI teletype and other copyrighted transmissions over the HF bands. But it is illegal to intercept SCA broadcasts, even though the technology required to do so is much less complex than either teletype or satellite!

The power of money never ceases to amaze me. But it is that very power which results in laws against the monitoring of certain radio waves that pass across your property, into and through your home and body. Yet, other radio waves can be legally monitored anytime. The premise of industrial and congressional wisdom, apparently, is that certain radio waves are not "intended" to carry communications for the general public; others are ok. Hmmm. Why, then, are there not laws forbidding the eavesdropping on two persons engaged in a whispering conversation? Obviously, THOSE communications are not "intended" for the general public, either. But then those two people don't have the money that an entire industry has, huh?

Apparently it is not illegal to own radio equipment that can intercept SCA transmissions incidental to the main purpose of the receiver. There could be some potential legal jeopardy, however, if your radio was designed solely for reception of subcarriers. The bottom line is that without an adaptor or the special SCS receiver that the industry wants to rent out, you cannot legally detect any but the normal programming. You can, however, make monitoring of SCA transmissions PERFECTLY LEGAL by obtaining from your local broadcaster(s) a letter of permission authorizing your tuning of their subcarriers for noncommercial, hobby purposes. Whether or not you will actually receive such permission is not predictable, but it is said to have happened.

If the interesting world of SCA appeals to you, there is a readily available, simple, low technology method of modifying your PRO-2004/5/6 or other scanner with FM Broadcast capability and/or regular FM Broadcast receivers to detect the SCA signals. To make the method legal, first draft a letter to each FM Broadcast station owner/manager in your area. Explain that you are a radio hobbyist and that you are interested in modifying your police scanner to detect the subcarrier(s) of their station. Go on to explain that if they permit you to listen to their subcarriers, that you will not under any circumstance record or disseminate the program material and that the interception will be solely for your hobby use. Then explicitly ask for their permission to do this. If and when that permission is granted, you can proceed with a clear conscience.

SCA's programming has considerably broadened since 1977, when the majority of the medium was used for background music in elevators, stores and dentist's offices. Now, radio reading services to the blind are found in most metropolitan areas, usually on the subcarriers of public broadcast stations (PBS). Ethnic programming has entered major markets on either the 67 or 92 kHz

subcarrier. Foreground or light rock music predominates on 92 kHz, while many stations have an easy-listening SCA at 67 kHz. With the demise of easy-listening from many FM stations, SCA may be the only way to hear that format in some areas. In certain regions of the country, religious programs, medical news, sports news and special events are broadcast on the subcarriers.

You may have to use some ingenuity to receive SCA. It could be well worth the effort to familiarize yourself with this entertainment medium and a cost effective way to do it is with an FM-SCS adapter kit fitted to your PRO-2004/5/6 or other scanner with the FM Broadcast band. Installation of an SCS Adaptor into a scanner with FM Broadcast capability not a complicated procedure and does not require much technical expertise. The rest of this section will highlight the minimal effort required to install SCA in your scanner and a source to inquire about an inexpensive SCA Adaptor Kit.

SCA FOR THE PRO-2004, PRO-2005 AND PRO-2006

After receiving permission to detect SCA signals from the applicable FM Broadcasters, you should contact the following company for information about SCA Adaptor kits that will work in your scanner:

FM ATLAS - Publishing & Electronics
PO Box 336; Esko, MN 55733-0336

The above company offers two different easy to assemble and install SCA Adaptor kits, the ELF-1A and the ELF-II. The best tonal quality is available from the ELF-1A, but unfortunately, it allows detection of only one of the three possible subcarriers, and you have to specify which. The ELF-II has a special tuning control that allows tuning of all subcarriers, so for the scanning hobbyist, this is probably the best way to go. The slightly degraded tone quality of the ELF-II is probably not noticeable in a scanner anyway, like it could be in a high fidelity stereo.

The ELF-II SCA Adaptor kit comes complete with an etched & drilled printed circuit board about an inch or so square; a 14-pin IC and about a dozen resistors and capacitors. The kit does not include an IC socket so I suggest you add a 14-pin DIP socket to the kit. Radio Shack offers a couple from which to choose. The ELF-II kit is easily assembled within a half hour or so and special techniques are not necessary. The assembly instructions are adequate, especially if you lay everything out and study things first. The kit comes with a trimmer potentiometer that is supposed to be installed on the circuit board, but it is highly suggested that you leave it out and instead install a comparable value "volume control" pot mounted somewhere on the exterior of your scanner so you can easily tune in the different subcarriers. Most any 25k-50k pot will do.

The ELF-II Board is best installed inside the scanner ***away from the power transformer and the speaker*** where it could pick up some hum and interference. Otherwise, location and positioning are not critical. The ELF-II board has four wires or external connections: +8v; ground; SCA-In; and SCA-Out. A DPDT switch (toggle or slide) with five wires is required to complete the project, so that you can switch between regular FM programming and SCA as desired. The switch and the three-wire tuning control are the only necessary external controls.

INSTALLATION OF THE SCA ADAPTOR

See Figure 1, Installation Diagram For Connection of the ELF-II To The PRO-2004 and PRO-2005/2006.

PRO-2004

This procedure deviates from the instructions for the PRO-2004 that come with the ELF-11. Mount the ELF-II Board anywhere that's convenient and out of the way. Remember, you'll be making lots of modifications, and you don't want to use up valuable "real estate" without a plan. You'll want to install a DPDT switch and a 25k-50k potentiometer somewhere, probably on the rear case of the scanner. The SCA-IN tap in the PRO-2004 is at IC-4, Pin 2. Just solder the wire from SCA-IN directly to Pin 2 of IC-4. Cut the RED wire at CN-4 and wire the two cut ends to the SCA Switch as shown in Fig-1. Wire the SCA-OUT to the SCA Switch as shown. Power for the ELF-II Board should be tapped from the Emitter of Q-32 and routed to the other section of the switch before going to the ELF-II. The ground lead on the ELF-II can go to any scanner ground point. Solder three hookup wires to the three holes on the ELF-II that were for the supplied trimmer adjustment (not used) and connect those three wires to the new potentiometer, pin for pin, on the rear case of the scanner. Actually, two wires will do nicely if you first study the foils around those three holes for the trimmer. If it confuses you, go ahead and use three wires; no big deal.

PRO-2005 & PRO-2006

You guys might have it a little easier. Mount the ELF-II Board anywhere convenient and out of the way. Remember, you'll be making lots of modifications, and you don't want to use up valuable "real estate" without a plan. You'll want to install a DPDT switch and a 25k-50k potentiometer somewhere, probably on the rear case of the scanner. The critical SCA-In tap in the PRO-2005/2006 is at a small circuit trace that comes from IC-6, Pin 10. Just follow that trace (viewed from the top side of the board) for about an inch to where it terminates at an "unused solder pad". Solder a hookup wire from this pad to the SCA-In terminal on the ELF-II. Power for the ELF-II is taken from the Emitter of Q-32 and routed through one section of the switch before going to the SCA Board. Now locate CN-5 on the left-rear Main Board. There is a cable bundle that goes from CN-5 to the VOLUME control on the front of the scanner. Locate the RED wire at Pin #3 of CN-5 and cut it at a point halfway between the connector and where the red wire disappears into the cable bundle sheath. Strip the two cut ends and tin with solder and then splice a hookup wire to each of the cut ends. Be sure to insulate the splices, preferably with heat shrink tubing. Route these two hookup wires to the vicinity of where the switch will be installed. Solder three hookup wires to the three holes on the ELF-II that were for the trimmer adjustment (not used) and connect those three wires to the three lugs of the new potentiometer, pin for pin, on the rear case of the scanner. Actually, two wires

will do nicely if you study the foils around those three holes for the trimmer. If it confuses you, go ahead and use three wires; no big deal. The rest of the instructions that come with the ELF-II are clear enough and we need not go further with them here.

OTHER SCANNERS

I suppose that the ELF-II can be successfully installed in other scanners that have the FM Broadcast Band, such as the Regency Z-60 and the Realistic PRO-2003. There are probably others, too. When you contact the above supplier of SCA Adaptor Kits, mention the type of scanner you have and ask if they offer explicit installation instructions. If your scanner does not have FM Broadcast (88 - 108 MHz) capability, forget it, or install the SCA Adaptor in a regular FM BC receiver per the supplier's directions.

OPERATION OF THE SCA ADAPTOR

CAVEAT: Again, remember that it is illegal to monitor an SCA transmission without the expressed permission of the broadcaster.

Operation is quite simple. Program your scanner for an FM Broadcast signal known to have SCA programming. Keep the SCA switch OFF until you've tuned in the FM station. Flip the "ATT" switch on the rear of your scanner (PRO-2004/5/6) back and forth between the 0 and -10dB positions and select the position that offers the BEST reception of the regular FM signal. Then flip the SCA switch ON and adjust the SCA Tuning Control until a signal pops in. When in the SCA-mode, you'll hear all kinds of weird noises and maybe even some very distorted signals as you adjust the Tuning Control. When you hit a subcarrier, though, there will be no doubt that you've got SCA. You'll have to turn the VOLUME up a little higher than normal.

Fine tune for the clearest reception to enjoy commercial-free programming. If you like, flip the SCA switch ON and OFF to ensure that you're receiving two different programs. Now and again, especially with Muzak™ programming, there will be periodic, silent pauses for up to 90 seconds. If you are tuning for a subcarrier during those intervals, you'll miss it and maybe think something is wrong. A typical pause is around 10 seconds.

Now the question arises as to HOW you are to know which FM stations offer SCA programming and which don't? There won't be a program list in your local newspaper or "Entertainment Guide", that's for sure. You can try phoning the stations in your area and ask, though most of the people you first reach will either be coy or they might not know about SCA! It's possible that only the station engineering and managerial teams know anything about SCA, so if the receptionist gives you a bland reply, ask for an engineer or manager. Of course, as you receive replies from your requests for permission to receive SCA signals, you'll probably know which ones offer it.

There is another resource to draw upon if any aspect of FM Broadcasting is ingrained into your hobby interests: the FM ATLAS AND STATION DIRECTORY which is available from the same source given above for the SCA Adaptor Kits. The FM ATLAS is a source book of all known FM stations in the US, Canada and Mexico. The stations are listed alphabetically by state and city, and again numerically by frequency. The FM ATLAS also has detailed maps of each state and Canadian province which show the FM stations in each city! The FM ATLAS AND STATION DIRECTORY elucidates the types of programming offered by each station, for both regular and SCA program formats! The FM ATLAS, a handy reference work for the monitoring post, is updated yearly. It will be a great addition to your radio library if you are an FM-DX nut or an SCA freak.

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SCANNER MODIFICATION HANDBOOK CORNER

A REGULAR FEATURE! This column will be a monthly feature, probably for a long time to come. Errors, changes, improvements and upgrades to the modifications published in my books will be kicked around right here. Your input and observations about troubles, difficulties and successes with the mods will also usually be discussed here. Brand new material will appear elsewhere in the *"WSR"*. This column is solely to keep my Scanner Modification Handbooks updated!

FEEDBACK & UPDATE: Except for typographical errors throughout the text, the SCANNER MODIFICATION HANDBOOK, Vol 1 is generally accurate and free from technical errors. There is one significant error in the text that you should mark right away. Refer to page 18, the formula for line of sight between two antennas on a curved earth is wrong as shown. The correct formula is as follows:

$$D(mi) = \sqrt{2\ H_{T(ft)}} + \sqrt{2\ H_{R(ft)}}$$

The procedure and answer to the example given is correct, however. Apologies for any inconvenience this oversight may have caused.

OUTDATED MODIFICATIONS

Several mods in the SCANNER MODIFICATION HANDBOOK, Vol 1 are outdated or not applicable anymore and should not be performed. Better versions have been developed and will be available soon. Cancel the following modifications:

MOD-12: An S-Meter for the PRO-2004/2005; Method 1
MOD-13: An S-Meter for the PRO-2004/2005; Method 2
MOD-17: CMT & Other Channels for the PRO-2021 [Maybe]

Much improved replacements for MODs 12 & 13 will be forthcoming and the old ones just aren't worth it. Besides, MOD-13 was full of errors and major weaknesses anyway. Stay tuned for some super superior S-Meters soon. MOD-17 is simply not capable of yielding the desired results as suspected anyway. There is no sense in trying it. It won't work.

UPDATED SCANNER MODIFICATIONS - Vol 1

MOD-1: Cellular Restoration for the PRO-2004/5/6
No change for the PRO-2004, but this might make it clearer for the PRO-2005 & 2006: Clip diode D-502, which is located immediately behind the numeral "3" key on the keyboard. All you have to remove is the top plastic cover to find D-502. It is clearly labeled.

MOD-2: Speeding SCAN & SEARCH rates in the PRO-2004/5; no change

MOD-2c: New for PRO-2006: DO NOT install D-501 as for the 2005; instead, clip D-503 to increase speed from 26 to 30ch/sec. NOTE: clip D-503 ONLY in the 2006; but NOT in the 2005!

MOD-3: Speeding SCAN & SEARCH rates in the PRO-2004/5; no change

MOD-3c: New for PRO-2005: You can make your PRO-2005 run faster by converting it to a PRO-2006 first. You only need two or three parts: a new CPU chip; a new Clock Resonator; and maybe a new plastic front panel, if that trips your trigger. These are standard parts stock at Tandy National Parts Center; 900 E. NORTHSIDE DR; FT. WORTH, TX 76106; (800) 442-2425. Part numbers for the PRO-2006 parts to install in your PRO-2005 are as follows: (By the way, when you call, have a credit card handy and ask for parts for the PRO-2006, catalog number 20-145; then mention below:)

CPU, IC-501:	GRE-0918
Ceramic Resonator, CX-501:	CST12.0MT
Plastic Front Panel:	GA-89D-8303

You can dispense with the Ceramic Resonator, CX-501, by replacing it with an 18 MHz quartz microprocessor crystal which will yield speeds up to 45 ch/sec. Otherwise, the replacement CST12.0MT will yield stock speed of 26 ch/sec. This mod is easier said than done, even though the 2005 & 2006 CPUs are directly interchangeable. ***Removing and the replacing of those super-mini 72-pin chips is not easy. We will cover the mechanics of this process in a future issue, so hold off if you're unsure.***

New for PRO-2006: You can make your PRO-2006 run much faster, even after MOD-2 above. Replace the Ceramic Clock Resonator with up to an 18 MHz quartz microprocessor crystal for 45 ch/sec. ***Removing and the replacing the ceramic resonator, CX-501, is not very easy. We will cover the mechanics of this process in a future issue, so hold off if you're unsure.***

MOD-4: Improving Squelch Action: PRO-2004/2005/2006

PRO-2004: No change
PRO-2005/6: No change in principle, but added detail might be useful. R-152 should be removed, but this is easier said than done because it's on the bottom side of the main board just beneath IC-2. It can be accessed from an angle through a slot in bottom side of the chassis. The best bet is to slit the circuit trace that goes to R-152 from IC-2, Pin 14 and let it go at that. This effectively removes R-152 from the circuit anyway. The rest is easy from the top side of the main board. Solder a mini 200-k trimmer pot directly to Pins 12 & 14 of IC-2 and adjust it for desired squelch action; about 100k-150k ohms will probably give best results.

MOD-6: Automatic Tape Recorder Switch for PRO-2004/5/6: This mod is basically sound, but I've developed a simpler version that will appear as MOD-33 in Vol-2 of my book to be published in early-mid 1991. If you haven't done MOD-6 yet, hold off and wait for MOD-33.

MOD-6: PRO-2004/5/6 - Change 1: One thing I don't like about MOD-6 is its DC power connection point, which conceivably could drain the Memory Retention Battery if a power failure occurred and if your ATRS switch were left on. Refer to page 96, Vol-1 and try connecting the DC power lead to the emitter of Q-32. R-5 might need to be jumpered out if operation is at all weird or flaky with the new +8.3 power. Otherwise, MOD-6 is great!

MOD-9: Disabling the Beep in the PRO-2004/5/6: Why? I dunno, but some people have to do it. No changes here, but there is a better approach. Why not put your Beep on a volume control? It can be easily done by replacing a resistor with a 5-k to 25-k potentiometer or trim pot. The appropriate resistor to replace is:

PRO-2004:	R-213
PRO-2005/6:	R-223

This way, you'll be able to not only control the loudness of the Beep, but also turn it OFF.

MOD-12: Cancelled; wait for MOD-25

MOD-13: Cancelled; wait for MODs-25 or 26

MOD-16: 6,400 Channels For The PRO-2004/2005/2006: Much to be discussed here, but for now, change R-1,2,3 & 4 to 47-k ohms, RS #271-1342. Refer to pages 130-131, Vol 1. Depending on the printing of Vol-1, R-1,2,3,4 are wrong either as 1-k or 4.7-k ohms. Change your book thusly.

MOD-17: Cancelled; not possible

MOD-19: 3,200 Channels for the PRO-34: See comments under MOD-16

MOD-20: Restoring Cellular Freqs in the BC-950XLT: No change, however, it has come to light that later production models of the BC-950XLT require a different procedure than given in MOD-20. This will be detailed in MOD-42 in the coming Vol 2. By the way, the Regency R-1600 is identical to the BC-760/950 XLT.

MOD-21: Restoring Cellular Freqs in the BC-200/205XLT: No change, however, it has come to light that later production models of the BC-200/205XLT require a different procedure than given in MOD-21. This will be detailed in MOD-40 in the coming Vol 2. By the way, the Regency R-4030 is identical to the BC-200/205XLT.

MOD-22: Restoring Cellular Freqs in the BC-760XLT: No change, however, it has come to light that later production models of the BC-760XLT require a different procedure than given in MOD-22. This will be detailed in MOD-42 in the coming Vol 2. By the way, the Regency R-1600 is identical to the BC-760XLT and the BC-950 XLT.

Ok, that's the roundup of the latest developments on the old mods. Stay tuned for a detailed dissection of MOD-16/19 changes and enhancements next month. Please tell about your mod experiences!

DEDICATION

The ***"WORLD SCANNER REPORT"*** is YOURS. Much of the material here will be instigated and developed, in part or in whole, by others. My job is now less to create and develop and more to review, debug, test, evaluate, interpret, translate and write; a job that suits me well. Primeval forces are bringing us together; we are stepping to the beat of a primordial drummer. You and I need each other equally; no more, no less. When I think of the basic act of what we are doing here, goose bumps ripple over my skin. To be sure, the essential rudiment of our mutual act is a simple manifestation of Supply and Demand in a Free Enterprise. Oh, but there is more and very much to the point.

We are gathered here together, unwittingly drawn into serving a basic, fundamental need of all life; we are hearing the primal scream in a modern setting: COMMUNICATIONS. Don't think for a minute that your interest in hobby radio is an attraction and nothing more. An interest is a superficial illusion created by the conscious mind to rationalize, to justify and to compel. The conscious mind does not clearly interpret the genetic program codes that silently and inexorably guide the tides and currents of our inner longings, desires, ambitions and actions. A primeval genetic code governs the core characteristics of Life; breathing, metabolization, sleep, and more. As these can be termed essential needs, so too, can be COMMUNICATIONS, for what living thing does not communicate with another near it? So it happens, incidentally or purposefully, the higher the intelligence of life, the more evolved is its communications structure. No wonder the dinosaurs, many of which had a brain at each end, are extinct. But Man rose from the primordial soup to become the most intricate, highly refined communications system in Earth's 4-billion+ year history.

Not only has the human body evolved an unfathomably intricate organic communication structure, but so too has Society evolved an artificial communication network almost as unfathomable! Consider the networks of the telephone, transportation, mail and satellite systems, telegraph & teletype, spoken, written and sign languages, and RADIO COMMUNICATION! Are these not arteries or veins for the Life Blood of Society? Isn't COMMUNICATION that very Life Blood? You have not wandered aimlessly and haphazardly into an interest in radio. You were subtly, silently, inexorably drawn, guided, directed and, in some cases, downright <u>shoved</u> into radio.

And so here we are, you and I, doing what the primordial soup programmed us to do: IMPROVING OUR ABILITY TO COMMUNICATE. All of us chose RADIO as a specific artery, but we might also be truck drivers, mail handlers, telephone operators, ship captains, cooks, construction workers, politicians, plumbers, writers, teachers, janitors; each and every one being a link to a different artery or capillary for COMMUNICATION. Our common bond is radio and it is that artery in which we will improve upon that handed to us from somewhere up stream. It is what we are supposed to do, for what river narrows to a trickle before meeting the Sea? No; a river begins as a trickle; then it grows, widens, deepens and develops into its full potential before losing its identity at the End.

We will do no less. Somewhere, someone digs copper ore out of the ground; someone else melts the ore and pours it into bars. Another draws that bar into wire. Another makes capacitors; another packs carbon into a resistor; another turns metal into plate. Someone else bends, trims and cuts that plate into a chassis. Then, a manufacturer assembles all the component parts into a scanner and breathes "life" into it. Others package that scanner and convey it to a store shelf. A day later, you walk in and plunk down the fruits of your labor and take it home to another shelf where it becomes a tool that helps you tune closer to the Life Blood of your community. The process can end right there, and it is ok if it does, for the Primordial Purpose has been fulfilled.

Some of us are not satisfied to leave it there; not when a buck's worth of parts and an hour's time can result in something more suitable; functional or better performing. We are "hackers"; we dare to modify, to change, to probe and to improve on the efforts of those before us? And why not? There are two reasons why not: (1) manufacturers do not want us to modify their products, partly because they fear liability if someone gets hurt or killed; partly for if their design is changed, they can't be responsible for the product's conformance to technical and legal specs, and partly because they think you are stupid and will make a serious mistake and then not be able to enjoy their product. Manufacturers universally want their customers to be happy; blindly happy.

(2) Governments don't much like for us to modify things. Not that it's against the law in all cases, which it isn't, but governments are not content to let things be and otherwise conform to natural forces. If they did, they would shrink to about 1% of their size and THAT can't be at all! Unemployment would rise because of all the people who couldn't get a real job in a competitive market. For example, government dramatically cautions you against opening the case of your scanner because you might touch something on the A/C line and get killed. Never mind that your mother or spouse will caution you just as well or better. The government likes you and your tax dollars very much and it wants to protect and nurture you and serve your best interests and have you fall at its feet in worshipful adoration, and then gratefully give it more power because it just proved it's smart and you're stupid.

'Scuse me, but I had to have a little fun. I think we have a great nation and a fine government, but just between you and me, a little fine tuning and improving is needed, just like our scanners.

Speaking of which, let's get down to brass tacks..... To those of you who dare leap into the dark, dank, bottomless void of your scanner with nothing more to go on than a wisp of trust in my say-so, to hack, to cut and to chop, diligently following excruciating detail after detail, I salute you.

YOU, who patiently and persistently follow every detail to the success of a modification; YOU, who ride the emotional yo-yo through the agony of defeat to the thrill of victory in your modification efforts; and YOU who fall into the bleak depths of despair over a tiny hidden error, before finally breaking through to success; all of YOU will at some point in your modification adventures, reap the ultimate reward: an experience of one of the most exhilarating, euphoric natural highs of your Life. This will be your badge and YOU, herewith and forever more, shall be proudly known and recognized among your peers as:

"HACKER"

(Continued from Page 1)

THE COMPLAINT DEPARTMENT IS ALWAYS OPEN

But if we have your filled-in subscription blank, complaints will be few because I will use the information YOU provide to compile a statistical profile of WHO reads the ***"THE WORLD SCANNER REPORT"***. Make sure we have a record of which scanners you own. THAT alone, will tell me a lot about what you want in the ***"WORLD SCANNER REPORT"***! If the ***"WSR"*** offers what you want, you'll be happy! The ***"WSR"*** is so new that it is very flexible and not rigidly committed to any single direction other than the technology of scanning, in general. Over the next few months, I will use the subscription blank data to chart a course into the future. By the way, feel FREE at any time to complain or to critique our subject matter and operations. Your opinion counts!

STEADY IMPROVEMENT AHEAD

As a new operation, we have to work with what is available. A few years ago, this format and print style was perfectly acceptable for a newsletter. What you see here is rather archaic for the age of Desktop Publishing. The question for the time being is: Does it affect the QUALITY of the information? I would like to think not. But you may rest assured that we will work constantly to implement new techniques, new ideas and proven concepts. We will do this on a gradual, planned basis to avoid price increases and needless waste on our part. Available machinery consists of an Apple system and several thousand $$$ worth of information & data handling hardware & software. For you computer nuts our system consists of an Enhanced Apple IIe with 3-Mb RAM; 30-Mb Hard Drive; two $3^1/_2$" drives; two $5^1/_4$" drives; 1-Mb RAM drive; 2400 baud modem; Accelerator card; and Appleworks™ 3.0 Integrated Software with TimeOut™ enhancements. This system will outperform most anything else at triple the cost; it just doesn't look pretty. We plan to upgrade to an IBM-386/compatible or maybe a MacIntosh system, but for now we have to make do.

Apologies for the administrative content of this first issue, but you need to know what is happening, and there will be less and less of it with each succeeding issue.

PRO-2004, 2005 & 2006 COMPARED

The PRO-2005 and PRO-2006 scanners are virtually identical with only three differences. The least important distinction is the front plastic panel. They are mechanically the same, though, just with different markings. The PRO-2006 runs at 26 chan/second; the PRO-2005 at 16 chan/sec. THAT is the ONLY performance difference between the two and there are only two parts differences inside the scanners: the CPU chip (IC-501) and the Clock Oscillator or resonator (CX-501). CX-501 in the PRO-2005 is 7.37 MHz while its counterpart in the PRO-2006 is 12 MHz. This alone accounts for the speed difference between them. You cannot, however, pop a 12 MHz crystal into the PRO-2005 because its CPU won't run that fast. The PRO-2006's CPU is a pin-for-pin and function-for-function copy of the 2005's, but it was redesigned to run at 12 MHz. Therefore, to make a PRO-2006 out of a 2005, IC-501 and CX-501 must be replaced with the appropriate parts for a 2006. For a finishing touch, replace the plastic front panel, and voila: your PRO-2005 becomes a real PRO-2006, in appearance and in performance!

PRO-2004 COMPARED TO THE PRO-2005/6: The functional difference, other than appearance, between the PRO-2004 and 2005 is 100 channels of programmable memory. The PRO-2004 came with 300 channels, while the PRO-2005/6 have 400 channels. My easy MOD-15 adds the "missing" 100 extra channels and basically turns the 2004 into a 2005. There are many insignificant internal differences between the 2004 and 2005/6, but not in function or performance!

Therefore, the question arises: Can the PRO-2004 be converted to a PRO-2006? Certainly NOT in looks, but ***maybe*** in performance! The bottom line is that the PRO-2004/5/6 are all pretty much the same radio with only minor differences! The 64-pin DIP CPU in the 2004 has the exact same functions as the 72-pin SMT CPU in the 2006! Of the 72 pins, 8 are not functional, so that leaves 64 pins to wire into the PRO-2004. Obviously, we would also change out the clock oscillator in the PRO-2004 to 12 or 18 MHz for Warp Speed. As far as I can see, the process should be limited to an exchange of the CPU and Clock Resonator! This is the general strategy, anyway, and it is in the plan to do it soon. Some of you ambitious hackers might have beaten me to the punch, and if you have, please tell us about the experience!

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List the make & model of your scanners and other radio equipment:

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List the make & model of any computer equipment you own/operate:

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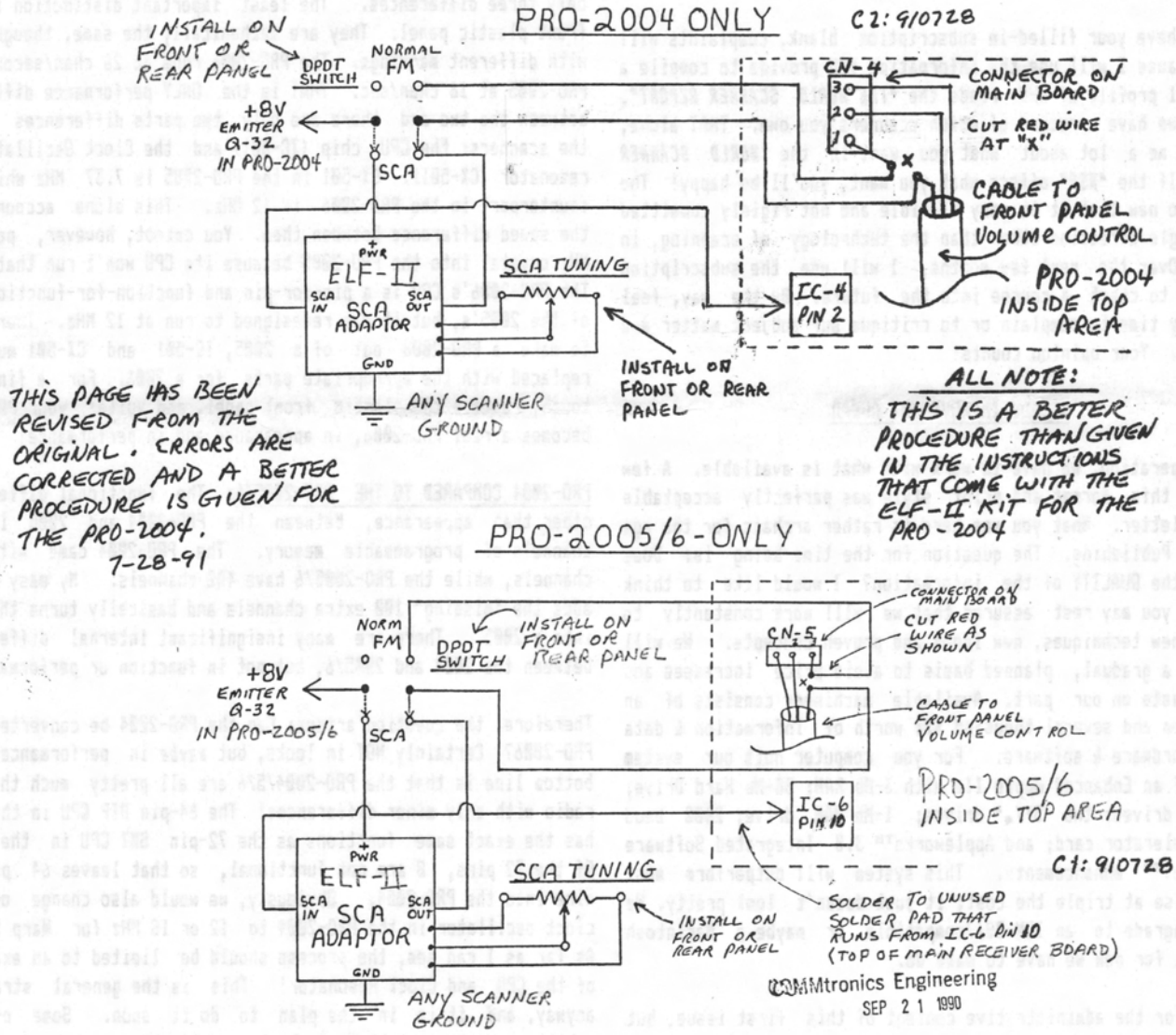
Figure 1

INSTALLATION DIAGRAMS FOR CONNECTION OF THE ELF-II SCA ADAPTOR KIT TO THE PRO-2004, PRO-2005 and PRO-2006



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"THE WORLD SCANNER REPORT" IS DEDICATED TO

The Hackers of the World, who take the calculated risk for the sake of challenge; for the thrill of victory; or maybe because someone told you not to do it or said that it couldn't be done, and so you did it anyway.

The Hackers of the World, who know that anything fashioned by the hand of Man, without exception, can be improved, and then do it.

The Hackers of the World, who are sometimes thought to be dull and stupid, but who pay the salaries of those who fancy themselves bright and smart.

-= The Publisher =-

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