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☺ **FIRST ISSUE '95** ☺
HAPPY NEW YEAR!

Here we go, folks; first issue of 1995 is hot off the press and we've made progress already. Notice the photo on the right? Compare the detail to other photo's we've published in the past. Well, true to our promise to ever be on the upward spiral, we've added some new equipment to upgrade the quality of our photographic processes. You'll find a steady qualitative improvement in the WSR over this coming year.

SUBSCRIPTION INCREASE

The darned Postal Service raised the cost of mail by just enough that when coupled with ever rising costs of materials and processes these past four years, it's come time to raise subscription prices. Clearly, we have little or no control over these variables, but relax...prices will not rise without ample warning and an opportunity to cash in on the old rates. I don't know how much prices will rise, but the timing will probably be for the last half of 1995, so look for new rates to go into effect by July, 1995. You'll be advised before then.

PRO-2005/6 HACKER TIPS

Refer to the photo on this page for some ideas on how to better implement some of those older modifications.

PinLine Sockets: For starters, notice the PinLine strip just to the left of CN-501? It's a 13-pin strip with male pins inserted into and soldered to the 13-unused holes that can be found on the Logic/CPU Board just to the left of C-502. The exposed female sockets can accept a mating 13-pin strip of male plugs to facilitate easier connection of various mods to CN-501. For instance, Key Research Co's SEARCH & STORE modules require several connections to CN-501. The CE-232/HB-232 Scanner-

WORLD SCANNER REPORT

A Journal of VHF-UHF Radio Technology & Engineering

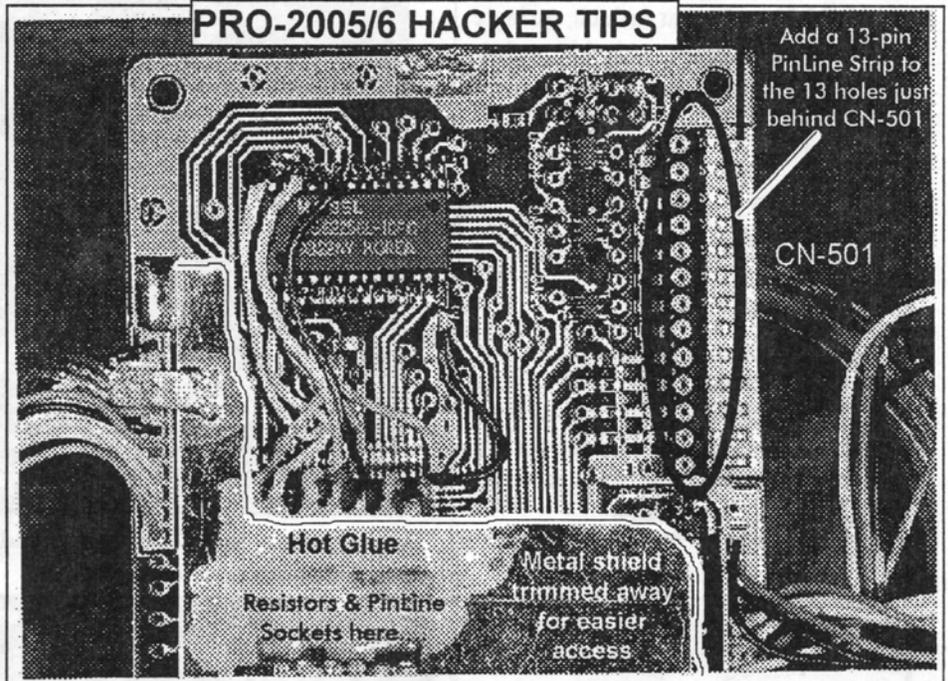
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Computer Interface connects to CN-501. This month's REMOTE CONTROL modification uses several pins at CN-501. There is no sense in connecting directly to CN-501, however; not when those 13 unused holes beg for something much more convenient to be stuck in them. Soldering to CN-501 may destroy it as can repeated connections and disconnections over a period of time. Add a 13-pin PinLine strip to these holes to make it much easier on yourself and your scanner.

Memory Mods Made Easier: The Extended Memory varieties of MOD-16 are immensely easier and less error prone if you use a surface-mount SRAM chip in lieu of the much larger DIP style. See WSR V1N8 & V3N4 for methods and procedures. Most of the pins of the replacement SRAM chips fit, pin for pin, with the existing pads of the stock SRAM chip, so at worst, you need only cut a trace or two and run up to six wires from the new surface mount SRAM (as opposed to 28 or more wires required for the DIP type SRAMs).

Shown in the photo above are the six wires of a 25,600-ch Memory Mod going

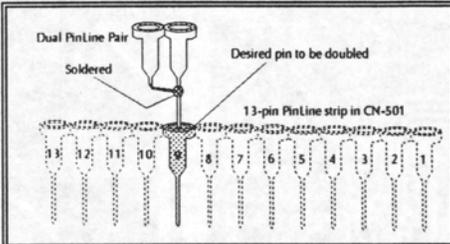
into a smear of hot-glue that holds the corresponding pulldown resistors and a strip of PinLine sockets to mate with a plug that goes to the memory Block switches. Thus, the area of the SRAM chip need have no strain put on it by floating wire bundles and operator tampering.

The above example shows the end of the metal shield cut away to expose the area of the stock SRAM and CN-501. You may or may not wish to be so drastic with your cutting. If you carefully route those six wires away from the new SRAM chip, it may not be necessary to cut any of the metal shield except for about a 1/4" strip that covers the 13-holes in back of CN-501. Even that cut is not necessary, if you don't use CN-501 for anything. (I can't imagine that, though.)

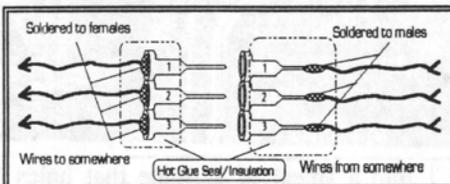
Other Mods on the Logic/CPU Board can be simplified by the use of PinLine Sockets and judicious cutting of the chrome metal shield, as needed. One thing you don't want to do is continually disassemble and reassemble that front panel and Logic/CPU board every time you or I think up a new Mod. Fortunately, mods in that area are rare.

Most other mods actually require one or more connections to CN-501, so that strip of PinLine Sockets can be a godsend if you'll take the time to do it.

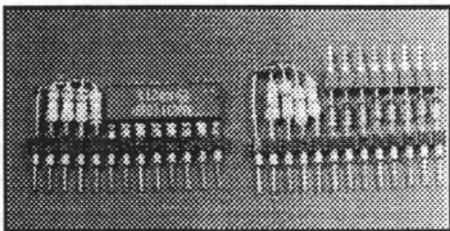
Some mods may require connection to the same pin of CN-501. When that is the case, you can use a pair of pinline sockets soldered together at their bases with one pin plugging into the desired pin of CN-501. In that fashion, a single pin is brought out to a double socket, more or less something like this:



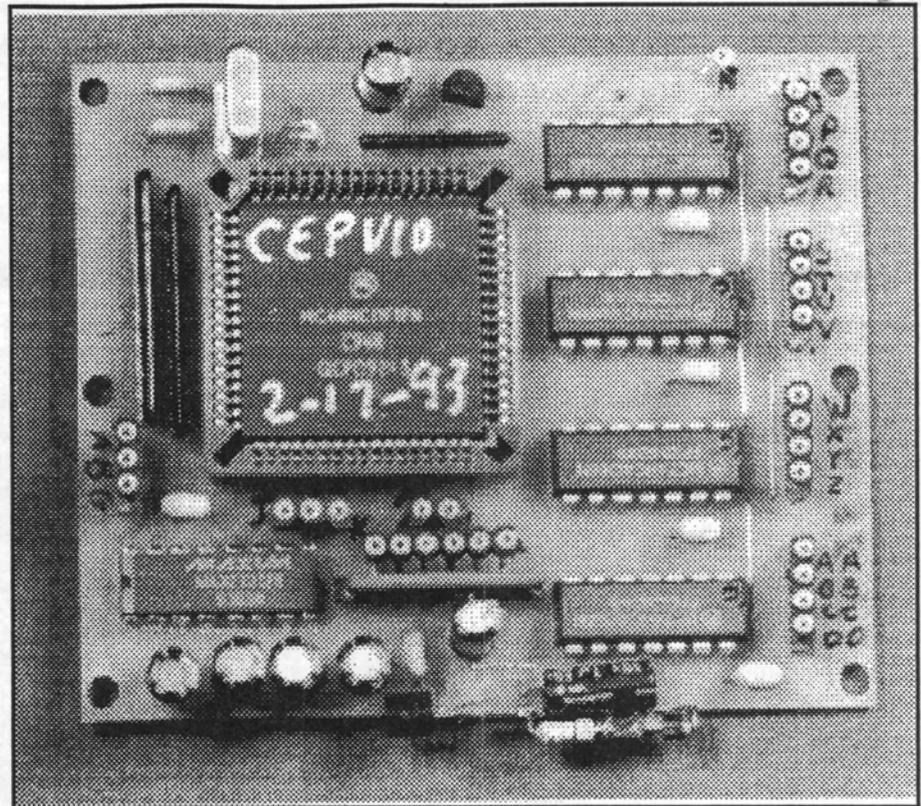
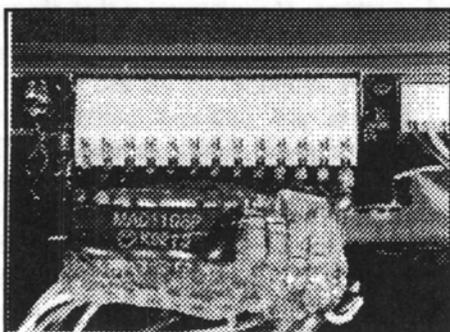
Now here's another neat trick. Make your own *quick-disconnect* wire splices! The males of one set of PinLine sockets are wired to accept the females of an identical set as shown below:



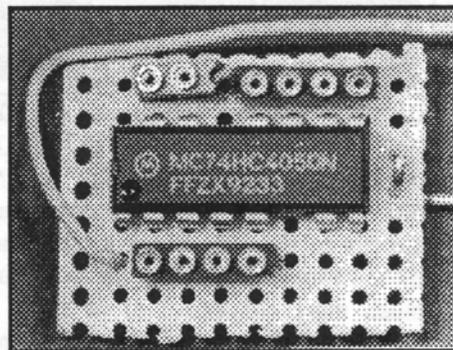
Next, we have a method of building entire circuits on a PinLine strip so that the strip can then plug into a mating strip. Note the two circuits just below:



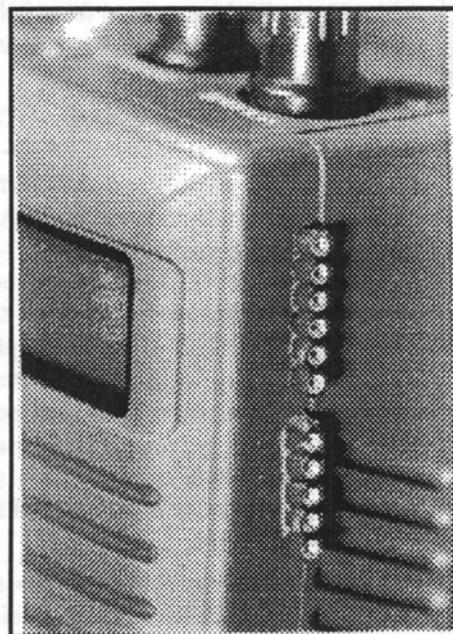
Below is a view of the left circuit above plugged into a mating strip under CN-501. This circuit has been sealed and protected with hot glue for strength and insulation. For those not in the know, above and below depict diodes D1-8 and resistors, R4-7, of the CE-232 Interface.



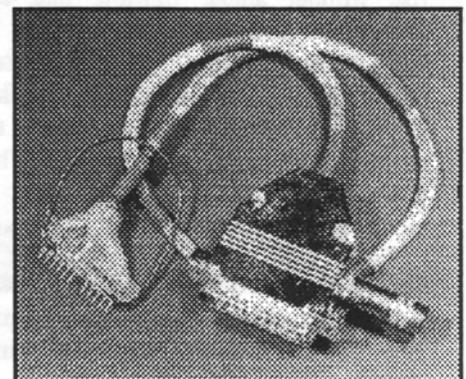
PinLine sockets make great connection points for simple circuits seen below.



Below is a PRO-43 with a polarized strip of PinLine sockets (6 x 5) for connecting



great and wonderful things from the outside world. Below, is a cable with mating PinLine plugs for the PRO-43. The 6 x 5 arrangement eliminates confusion on which way the plug should be inserted. The PinLine plug is sealed in hot glue and features a "pull loop" of stout wire to avoid breaking the fragile pins.



The large photo at the top of the page is a *CE-232 Interface* board that sports liberal use of PinLine sockets with which to connect the various Input, Output, and control wires. This makes for easy installations and easy removal for service and related hacking adventures. A few quick disconnects, and the unit is ready to yank for whatever reason. Smart hackers always make it easy on themselves, knowing full well that if misfortune doesn't strike, they'll be back in there doing something else soon.....

Below are suppliers and part numbers for PinLine sockets. Keep a supply on hand for a variety of uses.

DigiKey (800) 344-4539.....A-208ND
Hosfelt (800) 524-6464...21-161, 21-234 or 21-264
Mouser (800) 346-6873.....151-5520, 151-5530

Hosfelt Electronics' "machine pin SIP sockets" are a best buy with the most pins for the lowest cost. DigiKey's and Mouser's are pricier for some reason.

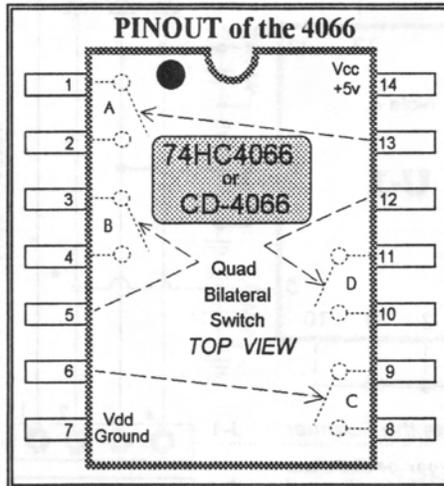
BASIC REMOTE CONTROLLER FOR THE PRO-2004/5/6 & OTHER SCANNERS

You'd think it a simple matter to add a remote controller to the keyboard of a scanner. After all, a keyboard is just a bunch of push-button on-off switches. And, heck, all it would take is a batch of remote switches wired in parallel with the ones on the keyboard via a long cable and there's your controller. Right?

WRONG! Well, sort of, anyway. To control a few of the scanner's functions by a remote wired controller is not difficult but it can't be done the way you might first think, because the scanner's keyboard connects directly to the micro-computer (CPU) and all the keyboard switches are located only an inch or two from it. When the length of the switch lines is more than a few inches, the CPU becomes vulnerable to noise, capacitive loading and other nasty, disagreeable effects. The CPU will lockup and/or some functions may not work. So, we have to *isolate* the remote controller, its associated switches, and long cable from the CPU and Keyboard, and still provide the same switching action as the Keyboard. **No problem!** We need one chip, and a few parts to remotely control up to three functions.

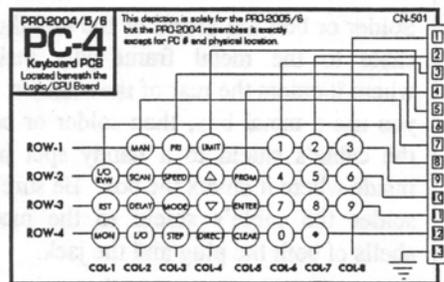
The neat little 4066 CMOS chip we're using here contains four electronic (not mechanical) SPST switches. Take a look at the Pinout for the 4066 chip, and you'll get a pretty good idea of how it works. Each of the four switches on the chip has three pins: IN, OUT (makes no difference which is which) and a Control pin. This accounts for 12 of the 14 pins. Another pin is for GROUND and the last one is for +5volt power. A switch is open when its respective control pin has no voltage applied. When +5v is applied to a control pin, its corresponding switch segment "closes". When +5v is removed

from the control pin, the switch opens again. Each switch is isolated from and independent of the rest. Pretty simple, actually. The 4066 chip isn't available from Radio Shack, but they can order one for you. The CD-4066 is available from most electronic supply firms.



74HC4066 chips are a little better than the CD-4066 because of lower "contact" resistance and higher speed of operation. They are a bit harder to find and either one will do for the most part.

Scanner keyboards are arranged in a expanded "tic-tac-toe" grid or matrix consisting of columns and rows. The PRO-2004/5/6 use a 4-row x 8-column matrix. The functions to be remotely controlled (MANUAL, SCAN and DELAY) are arranged in one column and three rows. (4 wires total). For the necessary isolation of the remote controller from the keyboard, the 4066 chip will buffer the one "column wire" and the three "row wires", a pair each of which will be triggered by one of the three external control switches on the remote control box. See below for a pictorial of the PRO-2004/5/6 Keyboard Switch Matrix.



This article and diagrams are designed for the PRO-2004, PRO-2005 and PRO-2006 scanners, but there's no reason why the exact principles given here can't be applied to other scanners and things that use a matrix keyboard for control or data entry. As depicted here, the principle is

sound and functional for most anything that requires only a few remote control switches. If you want total control of your scanner, like all 29 Keyboard functions, this approach might not be the best because of the necessary eight or nine 4066 chips and the rather heavy umbilical cable with over 30 control wires. As it is, the method shown will control up to three functions using four wires. If you use a shielded 9-conductor cable, you can add another three functions of choice by duplicating the circuit and process shown here for seven wires. For the rest of this article, we will employ the KISS principle: (*Keep It Simple, Stupid*).

It is highly recommended that you get the Service Manual for your scanner. It will help you locate and identify areas in which you will be working. For the PRO-2004/5/6, the Service Manual can be ordered direct at (800) 442-2425.

First, build the simple circuit shown in the schematic on a small piece of perf board and install it as close as possible to the Keyboard.

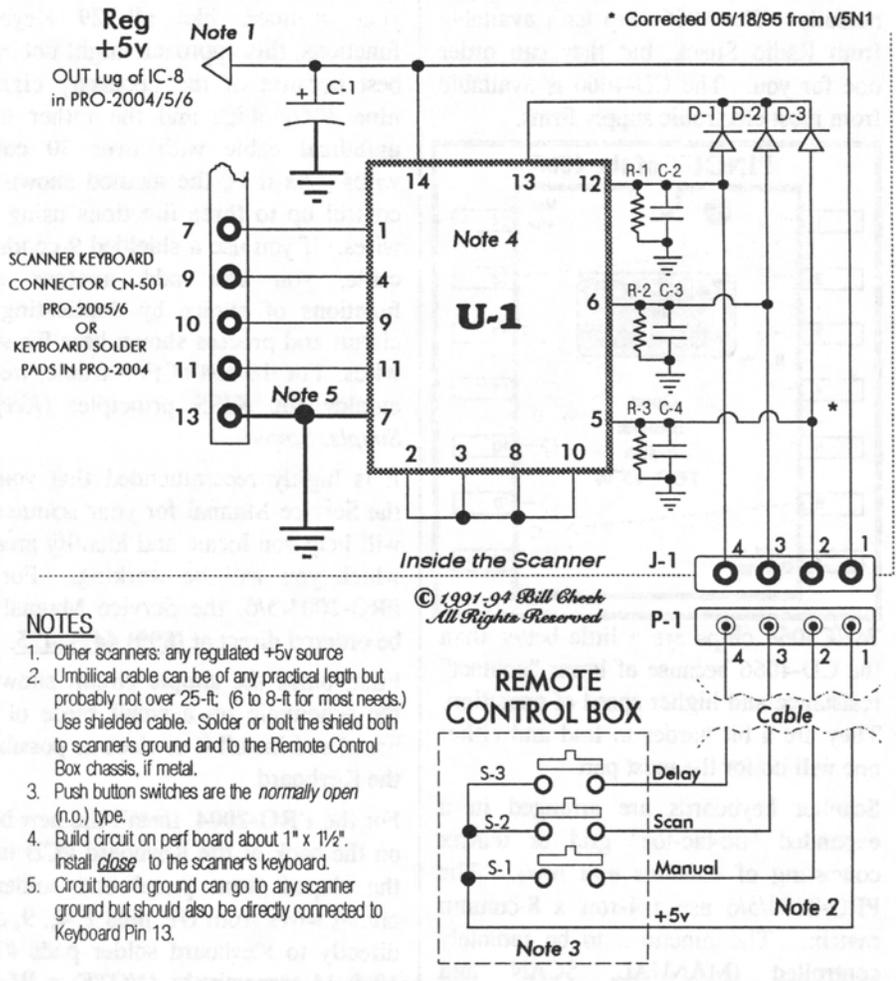
For the PRO-2004, install the new board on the back of the Keyboard PCB inside the sloped front panel and solder its output wires from U1, pins 1, 4, 9, & 11 directly to Keyboard solder pads #7, 9, 10 & 11 respectively. (NOTE: a BLACK factory wire is at Keyboard solder pad #13.) Length of these wires should be a couple of inches at the most.

For the PRO-2005/6, install the new board on its side on the main receiver board just below the Logic/CPU Keyboard Connector. Solder the free end of each output wire from U1, pins 1, 4, 9 & 11 to the PCB holes for the Keyboard Connector (CN-501) at pins #7, 9, 10 & 11 respectively. Better still, use PinLine sockets & plugs as tipped on page 2! Looking down onto CN-501 from the top, Pin 1 is at the extreme right and Pin 13 is at the extreme left.

The power & control lines from the board (U1, Pins 5, 6, 12 & 14) to the remote controller should be neatly routed around the perimeter of the scanner through a 1/4" hole on the rear panel. These wires should protrude from the rear maybe two or three inches at the most and then terminate at the in-line socket (J-1) for quick and easy disconnects when the remote controller is not needed. A mating connector for

REMOTE CONTROLLER FOR PRO-2004/5/6 & OTHER SCANNERS

* Corrected 05/18/95 from V5N1



this plug (P-1) should be soldered to one end of the desired length of shielded umbilical cable, 6-8 ft typical, and maybe a maximum 25-ft. The other end of this cable should be "hardwired" to the remote control box as shown in the schematic diagram.

REMOTE CONTROLLER PARTS LIST

Ckt	Qty	Description	Radio Shack Cat No
U1	1	CD-4066, 74HC4066, or ECG/NTE 4066B	See text
C1	1	2.2- μ F/35vdc Tant cap	272-1435
C2-4	3	0.1- μ F/50vdc mono cap	272-109
DI-3	3	Switch diode, 1N4148	276-1122 or -1620
J1	1	Jack, In-line, DIN, 8-pin	274-027
P1	1	Plug, In-line, DIN, 8-pin	274-026
R1-3	3	100-k, 1/4-watt resistor	271-1347
S1-3	3	Switch, pb, SPST, n.o. or -1556 or -1571 or -1549	275-1547
Misc	?	Shielded Cable, 9-cond	278-775
Misc	1	Metal or plastic box	See text
Misc	?	Hookup wire	278-775
Misc	1	Perf Board (cut 1" x 1½")	276-1395
Misc	1	Socket, IC, 14-pin DIP	276-1999

Neither the box nor the circuit wiring are critical, provided that you stick to the circuit design. You are free to apply some ingenuity and creativity in this

project. The box should be metal, but plastic will do if you can't find something better. Radio Shack doesn't have a really great box for this purpose, but several of their offerings can be pressed into service. I like the sloping metal box from LMB, model MDC-642, available at some electronic supply firms. The box can hold lots of other things besides remote control switches: CTCSS Decoder....DTMF Decoder....much more.

Solder or bolt the shield of the umbilical cable to the metal frame just inside where it enters the rear of the scanner. If you use a metal box, then solder or bolt the cable's shield to a handy spot just inside where it enters the box. Be sure to solder the cable's shield to the metal shells of both the plug and the jack.

PRACTICAL THEORY Suppose you press S-1 to set the MANUAL mode. You'll see how this applies +5v to U-1, Pin 5 and to Pin 13 via D-3. A quick look at the 4066 Pinout on the previous page shows that Pins 5 & 13 are the Control Inputs for Switches A & B. Therefore, pressing S-1 causes Switches

A & B to close. When this happens, whatever is at Lug 7 of the nearby Keyboard Connector passes into U-1 via Pin 1; out on Pin 2 to Pins 3, 8, & 10. Pins 8 & 10 are not active (Switches C & D) but Pin 3 is active (Switch B), so the signal goes back out Pin 4 to the Keyboard Connector at Lug 9. **Summary:** Pressing S-1 causes a short circuit path from Lug 7 to Lug 9 of the Keyboard Connector! So what does that do? Well, take a look at the Switch Matrix diagram on the previous page to see where Lugs 7 & 9 are the unique combination for the MANUAL function.

Diodes D1-3 are isolation diodes to permit simultaneous, individual control of the desired three rows and the one column. C-1 is a decoupling & filter capacitor that should be installed right at Pin 14 with a short lead to Pin 7. I specified 2.2- μ F but it can be as low as 0.1- μ F. Resistors R1-3 and capacitors C2-4 are for noise immunity. The resistors can be of any type, but the smaller, the better. The capacitors should be monolithic types, 0.1- μ F. The alternative ECG or NTE-4066B are the same as the CD-4066.

CONSTRUCTION TIPS: I specified P-1 and J-1 to be an "in-line" plug and socket combination to make the installation as easy as possible. If you want to get slick and if you have the right tools and patience, you can install a female DIN jack or even a DB-9 jack on the rear chassis of your scanner. Fabricate a mating plug for the end of your umbilical cable, and you're in business with a pro-quality installation.

Radio Shack has discontinued my favored 278-775 shielded cable, but some stores may still have a supply. Good stuff, if you can find it. Also #278-776

The push-button switches can be as simple as specified in the Parts List, or you can salvage a telephone keypad or most any other kind of electronic keypad if you want to go 'high tech' with this project. Switches are switches.....

Use an IC socket for U-1, if you're smart. Makes swapping out bad chips a breeze.

Technical support for this and all WSR projects is available through the *Hertzian Intercept BBS* and the FidoNet SCANRADIO and SHORTAVE echoes as well as by US Mail if needed. ♠♦♣

FROM THE READERS

Electroluminescent Panel Problems

From: Scott Larsen, Concord, CA: I would like to tell you that your *WSR* is excellent. Please renew my subscription. Also, I would like to know if you could help me with a small problem. I bought my 2nd PRO-2006 from Grove about ten months ago. I clipped the diodes and did the headphone improvement. That's the only mods I did. I turned the unit on one day to discover that the display light would not work. I disassembled the unit and checked what connections I could, but I could not solve the problem. All other functions work. I plan on getting a shop manual soon. Can you help?

ED: *I can't help a hell of a lot until you have the Service Manual in hand. The Electroluminescent BackLight is a chemically active panel that slides in behind the clear LCD Display module. This EL panel frequently "wears" out, noted by a gradual dimming, but if yours went suddenly, the EL panel is probably ok. You may have to replace it as a last resort, though. Meanwhile, the EL Panel runs from a 60-80 volt AC signal produced by T-501, a small transformer on the Logic/CPU board. T-501 is driven by an oscillator, Q-508, running at about 300 Hz. Power to Q-508 is +5v via SW-502, a series resistor and R-511. The problem you described will reside exclusively in this small area. I have noted in some units that T-501 seems to magnetize and attract metal filings and scraps. It's possible this happened in yours and thereby shorted out two or more terminals of the transformer. A good cleaning may be in order; otherwise, you'll have to troubleshoot the aforementioned circuit.*

CRYSTALS & SCANNER SPEEDS

From: Charlie Warfield, Naperville, IL

I have Scanner Mod Books I & II, as well as several back issues of your newsletter. Using these, I have done several modifications on my PRO-2006 and PRO-43. Your publications are everything you claim them to be and more! Even with the few minor changes I've made, I feel like I already got my money's worth. **THANK YOU!!**

My question is related to speeding up the scan rate in the 2006 and 43. On page

82 of Vol II you state that changing the clock crystal is risky and experimental, but in VIN1 of your newsletter you state with at least some confidence that an 18 MHz crystal is okay. Since I work for a living and cannot afford to "experiment" on my \$400 scanner, I am asking for a clarification on this mod: Is it a tested & approved mod, or is it "experimental"?

I also have the same concern about speeding up the PRO-43. The V3N8 *WSR* has the procedure, but your commentary does not persuade me that this mod is worth risking.

My second question is about crystals. An engineer friend of mine says that, for the most part, all crystals are the same. Yet, if they're all the same, why does Digi-Key have pages and pages of them? Could you please help by explaining in more detail the type and style of crystal needed? Digi-Key has crystals described as being for "general purpose" applications. Will one of these work, or do you have a better recommendation?

ED: *I do not support crystal speed-ups anymore except in rare instances where a need overrides the side effects. First, you should be aware of the serial aspect of my books and the WSR: The books were written in '89 and '90 and the WSR was started in '91. Latest information always supersedes older data. There was a time when 18 MHz crystals worked for me in the PRO-2006, but later, two CPU's blew out at 18 MHz, so the maximum safe frequency is now 16 MHz for a modest 33% increase. There are other side effects that I don't like, such as shortened DELAY; squeaky BEEPs; and incompatibility with other important mods. At least two major mods that I know of will not work with crystal-speeded up PRO-2004/5/6's. So, the risk, coupled with reduced performance and shrunken playing fields for other mods has disillusioned me with speed boosting. I don't support it anymore, though I may tell how to do such mods from time to time. That doesn't mean you have to do them, though.*

By the way, crystals are NOT all the same. They differ as night and day! For speedups, the proper type is known as a "microprocessor crystal" which works at the fundamental frequency. Other types are dangerous and risky. Key Research Co. was alive and well last I knew, but no news of recent times.

From: John Kline, Slidell, LA:



Translated: Please *Prof. Peabody*, tell us about those unpublished CTCSS mods?! We all love you!

Speaking of CTCSS, I think a good mod would be to interface the PRO-43 and other handhelds to Optoelectronics DC-440. This unit is small and has battery option so that puts it in the "carry along mode", doesn't it? Merry Christmas

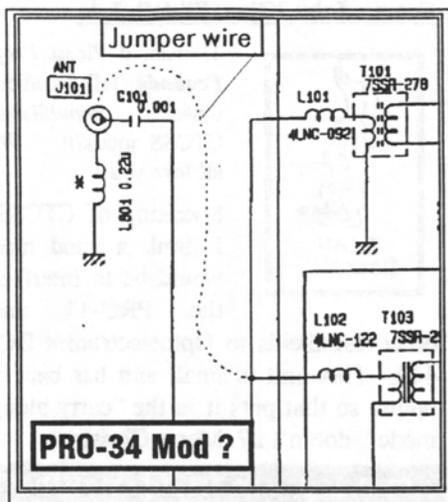
PRO-34/37 SENSITIVITY MOD ?

From: D. Michaels, W. Seneca, NY

I would like to take this opportunity to inform you of an interesting situation regarding my Radio Shack PRO-34 that I purchased in early '90. I am basically satisfied with this scanner but I always felt that the sensitivity on the VHF Lo, VHF-Hi & Aero bands left something to be desired (even on an outside antenna). I just chalked it up to "the nature of the beast" as I have read many complaints in various magazines regarding poor sensitivity of the PRO-2004/5/6.

Approximately one year after purchase my unmod'd PRO-34 developed serious problems. The Radio Shack store told me the scanner would have to be sent to a repair center. As the repair order was written up, I made sure that the salesman noted that I wanted the sensitivity checked against factory specs - aligning or replacing parts if necessary. Ten days, a new PLL chip, and \$54 later, my scanner was reportedly "as good as new." The repair tag stated that the scanner was realigned and that the sensitivity was within specs. After trying it, I still felt that the sensitivity was poor.

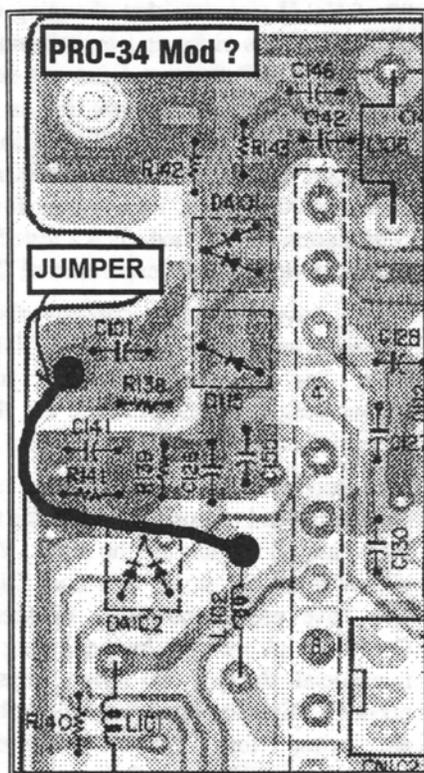
Recently a friend gave me his PRO-37 and asked me to fix an intermittent earphone jack. After repairing the scanner, I had a chance to use it for a few days. I was very surprised at the signals this scanner pulled in. I dug out the service manuals for the PRO-34 & 37 and found that the sensitivity specs were "identical." I compared the PRO-34 & 37 Linear Section schematic diagrams and found them to be similar. Starting at the BNC antenna connector, I looked for reasons that would cause a reduction in the RF signal. I thought that if C101, C125, D115 or DA101 were defective



then the sensitivity would suffer. On a whim I put a small jumper wire from the center pin of the BNC connector (before C101) and the junction of C126 & L102, effectively bypassing C101, C126, DA101 & D115 (see included schematics). I was pleasantly surprised to pick up all sorts of distant VHF frequencies. I was hesitant to make this "mod" permanent as I was unsure of the purpose of the parts that I was bypassing.

Then another friend asked me to make the cellular modification for his PRO-34. I was unsoldering the small wire from the center pin of the BNC connector when I was surprised to find a small jumper wire from the center pin to L102. I knew that my friend was not the type to rip scanners apart and probe around with soldering irons. I asked him about the repair history of his PRO-34. He informed me that from the beginning the scanner suffered from poor sensitivity. One day, while the scanner was still under warranty, he turned on the PRO-34 and smoke came out of it. He took the scanner back to Radio Shack for repair and mentioned the poor sensitivity problem. He was pleased when he got the repaired scanner back as he thought that the sensitivity had improved 100%. I assume that the small jumper wire was some sort of a factory "quick fix."

ED: I do, too, but it is probably an unauthorized fix, performed by a RS Repair Center technician who didn't want to see the scanner come back. While I can see that this "mod" may work, I am disturbed that it bypasses band switching diodes and possibly permits both UHF tuners and the VHF tuner to operate simultaneously. Caution is advised until we can learn more about this technique.



BC-2500 MODS

From: Udo Schlegel, Rockford, IL

Dear Bill, Being a current subscriber, I was wondering if you or any one of your other subscribers could come up with a solution for a couple of mods in regards to the recent Bearcat 2500 portable scanner. I would like to incorporate a user switchable backlight for display. Currently it automatically turns itself off after 15 secs.

ED: I'm sure an extended backlight is possible, but I have neither a BC-2500 nor a service manual for it. We featured a similar mod for the BC-200 in V3N4. You could check it out; compare schematic diagrams; and adapt that one, perhaps.

Also, is it feasible to incorporate a mode switch to select either AM or FM regardless of the frequency range as is present on several Radio Shack models like the PRO-43?

ED: I'm sure it's possible, but same handicaps mentioned above apply here. A careful study of the AM & FM circuits in the BC-2500 would disclose the switch mechanism that's controlled by the CPU. Isolating it and using a toggle switch might do the trick.

Perhaps the keylock switch could be utilized for one of these functions.

ED: Perhaps.....

What is the difference in your mod in V3N10 and the one in Monitoring Times? Yours shows the resistor in the top row being moved, and the MT mod shows it being moved in the bottom row.

ED: That was my error, subsequently corrected and clarified in V4N5. Sorry.

The BC-2500 has not received wide acceptance from the hobby community and many regard it as an inferior receiver, despite its bells and whistles, all of which are "firmware" based. We've discussed this in back issues with the conclusion that firmware features are cheap, almost to the point of being free, and cannot contribute to the quality of a receiver like hardware can. Without a BC-2500 and its service manual in hand, there's little I can do to be of help, but perhaps others out there have cut some turf on that rig. I'll print any worthwhile responses to that effect. Generally speaking, I have to restrict my time to the better quality receivers.

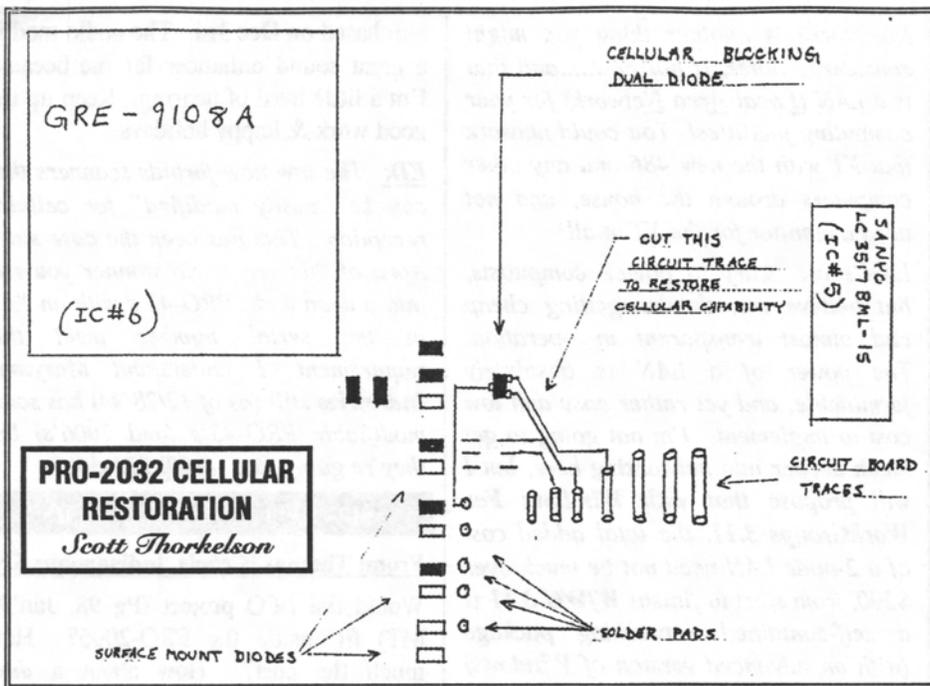
PRO-2032 CELLULAR COVERAGE

From: Scott Thorkelson, Canada: I was asked to restore cellular capabilities in a PRO-2032 scanner. I found the procedure described in WSR V4N6, but the article referred to a diagram which was not shown. **ED:** Our mistake, and subsequently printed in V4N7. I got a copy of Monitoring Times (June 94), and found the article and diagram. The diagram was poorly done and somewhat confusing (I have enclosed a copy), but I managed to figure it out and perform the modification.

I would like to offer my own diagram and a simpler method for this mod.

1. Unplug scanner from power.
2. Remove bottom half of scanner case.
3. Desolder and remove shield plate located behind Volume and Squelch controls.
4. Refer to my diagram (next page). Locate the dual diode between IC-6 & IC-5. Cut the trace that runs from the upper right leg of this dual diode.
5. Replace and solder shield plate.
6. Replace bottom scanner case.

ED: I'm reprinting your diagram and method largely because it differs from the one of which I'm aware. You call for just one leg of the diode to be cut where



"Monitoring Times" and the WSR, V4N6 & V4N7 call for removal of the dual diode. Obviously, your method works, so what is the difference, I wonder?

From: Robert Lopez, Hesperia, CA

Dear Bill: I hope you're doing fine. I know you're busy, but I need your views on the AR3000A receiver. What you like and don't like about it, you know things like that. Also, I know you like the PRO-2006 which I also own, but I need a more compact wide receiver radio, 500 KHz - 1.3 plus, AM/FM - WFM at least.

I drive a big truck for a living, you know, an 18-wheeler for Yellow Freight System. I run to the LA basin twice a day, six days a week. My radio system is set up in an aluminum square cube box basically. Ham radios, scanner, amp, speakers for noise problems. Thank you for your time.

PS. Best mods? Sensitivity? Options? Would make a good mobile scanner?

ED: The AR-3000 is one of the better scanners around, possibly "better" than the PRO-2004/5/6 series. I don't own one because the US distributor failed to communicate with me on numerous occasions when I requested technical information on it. Furthermore, the service manual is a basic piece of manure, not at all typical of that for a world class instrument. The AR-3000 has failed to attract the attention of the engineering and serious hobby communities, so I don't mess with it.

My hands are full anyway, just supporting the better Realistic™ scanners and in keeping up with the latest news around the grapevine. In cases like this, I have to depend on input from others, and no one is coughing up goodies for the AR-3000. I don't know why not, other than it is a 'minority' scanner that attracts little or no interest. I'd be glad to print information on it, if there were any available.

PRO-2030 LOCKOUT KEY DISABLE

From: Kelly Winz, Ragan, NE: How can I put a keyboard lock on my scanner? I have a Radio Shack PRO-2030. My channel banks keep accidentally getting locked in or out or individual channels get locked out.

ED: How in the world does that happen? Anyway, there is no practical way to lockout the entire keyboard of the PRO-2030, but you can disable the LockOut key line, if that is causing the trouble. The LockOut path consists of the traces between Pins 23 & 28 of the CPU, including R-225 & R-229. Interrupting anything, anywhere on this path with a SPST switch will disable the L/O function as well as a few other keys. Study the schematic diagram to see which, and to determine where to place the SPST switch, or pick a spot per above. By the way, the PRO-2030 is of Uniden origin, so we're not looking at one of the more versatile scanners here. Still, it appears to be a decent scanner, so try my suggestion above and let me know if and how it works.

A SUPPORTIVE READER RAPS

Dear Cindy & Bill: I want to renew my subscription and thank you both for your help. I've enclosed a \$20 bill simply as my way of expressing gratitude and relief that my scanner mods actually work! My year-old PRO-2006 now has 25,600 channels, and better yet has 640 Search banks. Once I saw this actually work I took the plunge and ordered the CE-232. I didn't own a computer at the time, but after reading how you did the R&D on an XT, I picked one up for \$100. It ran like a dream until the old monochrome monitor gave up the ghost. My scanner sat idle while I searched in vain for a new one. Then a buddy of mine solved the problem. He installed a color VGA card in the XT, and I simply unplugged the SVGA monitor on my two-week old 486 multimedia computer and plugged it in the XT. I only need the monitor for about 15 minutes a day to check AutoLogged frequencies anyway. Besides, who can afford to tie up their computer time, controlling the scanner when everybody (me & 3 kids) wants to play with it? The moral of the story is; don't get rid of those old PC's. Put a \$20 VGA card in it and let it run your scanner. This bit of wisdom has certainly prevented countless potential domestic disputes for me.

Also Bill, I couldn't agree with your politics more. But I think you missed a basic element of freedom, namely FINANCES. And the assault is on all our freedoms as never before. GATT passed last night. We have a blatantly oppressive and socialist tax structure, which props up a treasonous federal reserve system. Everyone I know works harder and longer for less and less spending power. Soon none of us will be able to afford transportation, self-defense or communications. It will all be under government control, or illegal. Keep up the good work and I'll stay in touch!

Please don't print my name. I don't care to wake up to BATF shock troops at my front door or IRS auditors at my office.

POLITICS - RADIO - COMPUTERS

ED: Right on! You're safe with us. Thanks a million for the extra \$20. I don't encourage that sort of thing for 'political' reasons, but your gift is graciously accepted. Matter of fact, it played a role in our decision to buy a

flatbed scanner for our computing facilities, results of which are plainly evident in this issue of the WSR. You kind of helped us set a precedent in the sense that any future gratuities and gifts absolutely will not be used for personal gain; rather we will invest it in something for the betterment of the WSR's facilities and resources and thereby give the donors a return on their investments. Not that any such are solicited, for we expect to work for our gain, and any windfalls will be allocated to a wise investment for the good of all. Thank you for your gift and especially for helping us to establish this precedent.

Politics-wise, you're right that I've not said much about the attacks on our purchasing power. I don't know enough to peg that danger. What I do know, is that all my adult life, society seems to have felt that government, business, labor and our fellow man have had their sights set on our wallets. Nothing much differs in that respect today from over 30 years ago when I started paying attention to the value of my time and my money. Yet, I am considerably better off today than 30-years ago. These attacks, if that is what they are, have been rather impotent in my case anyway. That is not intended to convey any relief because I am a lot different from my fellow man. I refuse to live in fear and intimidation and I do not follow all the rules commonly respected by the herd. I work from sun-up to long after sundown for barely more than a pot to pee in. My TV set is 12-yrs old; my stereo system is over 20-yrs old; my vehicles are over 20 yrs old; and I carry no more insurance than the minimum required by law.

On the other hand, my kids are getting educated to the max; my tools of the trade are state of the art and growing all the time; and Cindy and I are happy.

Speaking of tools....I'm wondering why you're not running your CE-232 on that new 486 computer of yours? You do know, don't you, that the CE-232 runs under Windows very well? And Windows is a multitasker, eminently capable of running several applications at the same time! You can run the CE-232 in a background window or minimized all the while the kids are playing games or Mama is whacking out a recipe! You are not limited or restricted to needing a dedicated computer for the CE-232!

Now there is another thing you might consider.....later, if not now.....and that is a LAN (Local Area Network) for your computing facilities! You could network that XT with the new 486 and any other computers around the house, and not need a monitor for the XT at all!

LAN's are scary to novice computists, but believe me, they're getting cheap and almost transparent in operation. The power of a LAN is absolutely formidable, and yet rather easy and low cost to implement. I'm not going to get much deeper into networking here, but I will propose that with Windows For WorkGroups 3.11, the total added cost of a 2-node LAN need not be much over \$200, from start to finish! WfWG 3.11 is a self-contained networking package (with an advanced version of Windows) that needs only a network interface card per computer and some RG-58 coax. The Add-On version of WfWG 3.11 is \$49 and LAN adapter cards need not cost more than about \$49 each....\$100 per node will get a nice LAN up & running!

I mention this solely because a LAN can be an indispensable tool for the compleat radioist! Ummmm, take me, fer instance. My personal workstation consists of five computers, more or less in a circle around me, each one connected to the LAN, and then there are three more computers elsewhere also on the LAN and readily at my access, and with rare exception, I need not leave my one personal keyboard and monitor to have the power of eight machines working for me, each capable of doing several things at the same time. Ponder that concept, as you grow in your radioing and computing. ☺

NON-CELLULAR PRO-43

From: Tony Thornton, Mize, MS I write this note with sadness in my heart. I just purchased a new PRO-43 and tore it down to do the diode and audio mods. To my dismay there is no D-4 diode in my pro-43, just empty space. I added a 1N4148 to restore 54-88 MHz to D3 spot but I suppose cellular is a dead issue. I am waiting on a service manual I ordered a week ago. Just thought I would let you know about it if you don't already, so you could let the word out in V5N1. By the way, the serial # is A002396. The CPU has this stamped on it: GRE9326 250 9403 MD014. It was

purchased on Dec 3rd. The audio mod is a great sound enhancer for me because I'm a little hard of hearing. Keep up the good work & happy holidays.

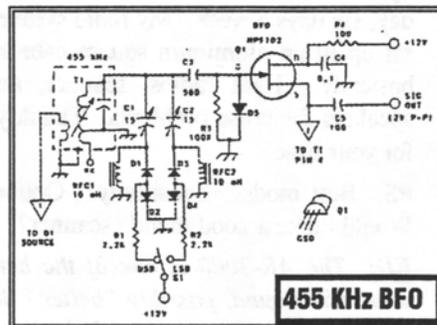
ED: The law now forbids scanners that can be "easily modified" for cellular reception. This has been the case since April of this year. No wonder you ran into a dead end. PRO-43's with an "A" in the serial number meet this requirement. I understand Marymac Industries still (as of 12/28/94) has some modifiable PRO-43's (and 2006's) but they're going fast. (800) 231-3680.

SSB - BFO FOR SCANNERS ?

From: Thomas Nichols, Indianapolis, IN

Would the BFO project (Pg 98, Jan'94 MT) fit inside the PRO-2006? How much the cost? How about a dual control on/off volume control/squelch control. Mount it in one hole and put BFO control in squelch slot. The control is an idea from some CB radios I've seen. Think it would work? Looking forward to Book 3. When the hell is it due out?

What is the cost of adding a LED center tuning indication cost? No red LED's please. How about med or light blue? Regarding the EMB chip, if I am reading the right one, how much would it increase the memories with just two switches or no switches if it replaces the old chip and how much the cost? What happened to Key Research? Have you come up with anything on the new PRO-2035 with 1,000 mems?



ED: The above circuit, to which you referred is a classic type of BFO that's virtually worthless for scanners. USB and LSB tuning are accomplished by trimmer capacitors C1 & C2; maybe great for hams and SWL's, but a pain in the arse for scannists. This type of BFO is not very stable, drifting wildly with excursions of temperature and supply voltages. Scanners require precision

frequencies for SSB, and precision adjustments to clarify a signal. This circuit would not do for the kind of SSB that would be found on VHF and UHF.

Yours is a great idea for a dual potentiometer & On/Off switch on one control to free up space for a "clarifier" or BFO in the Squelch spot. Cobra and other CB radios have long used dual concentric controls. So, let's see, the PRO-2004/5/6 scanners use a 50-kΩ pot for volume and a 10-kΩ pot for Squelch. That combo might be rare. It does not appear in Cobra CB rigs that I researched. If you come up with anything, let me know.

I cannot quote costs of mods for you as I no longer perform them for others; at least not at the present, nor in the foreseeable future. You can rest assured that blue LEDs in an S-Meter are costly, and will be rather boring unless mixed with green, yellow and red LED's.

An Extended Memory mod without switches yields no extra memory. One switch yields two 400-ch Blocks; two switches produces four 400-ch Blocks; three switches, eight 400-ch Blocks; four switches for sixteen 400-ch Blocks, etc. There is no sense in an Extended Memory Mod without address switching. You can use a single BCD (hex) rotary switch to control up to sixteen Blocks of 400-ch ea. 32-pos BCD switches are available.

My third scanner modification book, The Ultimate Scanner, is long overdue as it is, but might hit the streets by Spring.

PRESS RELEASE

DRAKE EXPANDS MARKET for SW8 WORLDBAND SHORTWAVE RECEIVER

Miamisburg, Ohio (Nov 9, 1994) —The R. L. Drake Company is expanding the market for the SW8, a portable World Band Shortwave receiver, by advertising in the December 1 issue of *American Way*, the official magazine of American Airlines. Traditionally focusing on the shortwave hobbyist through information and advertising in radio publications, Drake now wants to reach a new population of world band shortwave receiver consumers. "Drake hopes *American Way* magazine is a way of reaching those people who have an interest in international news and entertainment and therefore might be in the market for a shortwave receiver. the SW8 is ideal because it is capable of receiving radio broadcast transmissions from all over the world, hence the name world band radio," says Marketing director, Bob Jackson.

Based on marketing research findings, Drake has decided to expand beyond traditional media channels for information and advertising. the company needed a media outlet to advertise to a different, more general audience of people who were not shortwave hobbyists. Exploring alternate mediums for advertising resulted in a four-color, half page ad for Drake's SW8 in the December 1 issue of *American Way* magazine.

"Advertising the SW8 in *American Way* magazine is targeted to people with an interest in, or a need for, an international perspective on news or to people who

simply enjoy entertainment broadcasts from other countries," Mr. Jackson says.

Drake was searching for an efficient means to target the general population, while filtering out those people that might have an interest in shortwave receivers. Through demographic and psychographic research Drake found that airline travelers, more specifically business travelers, have interests that are similar to those of avid shortwave radio listeners. Drake realized that people with these interests could lend themselves to becoming potential shortwave customers.

Drake also hopes that the ad in *American Way* will accomplish yet another goal — to generate additional business for their dealers. Currently, a significant amount of Drake shortwave equipment is sold direct from the manufacturer by calling 1-800-568-3795. "While Drake's method of selling direct has been successful thus far, the company would like to see customers utilizing the authorized dealers more in the future. The dealer can interact with the customer on a more personal basis and show aspects of the equipment that can't be demonstrated over the phone." Mr. Jackson says.

The R. L. Drake Company has been a leader in the communications field since 1943, and manufactures a diverse line of products including consumer satellite television equipment, commercial satellite communications equipment, and radio communications equipment.

For additional information contact the R. L. Drake Company, PO Box 3006, Miamisburg, OH 45343. (513) 866-2421, or FAX (513) 866-0806.

For additional information editors can contact: Georgia Morgan.

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SPARE BATTERY PACK RECHARGER

By Mike W. Flenz - ANR Enterprises
Neenah, Wisconsin

Enclosed are the photos I said I would send to you about 3 months ago of the battery pack charger for the PRO-34/37/39/ 43 battery packs. Better late than never, huh?

This little holder allows me to pop in a spare pack and charge it up without tying up a radio. I have two PRO-43's and four battery packs, so I'm never without a fresh pack. The holder is made from a Radio Shack 4 X 2 1/8 X 1 5/8" project box (#270-231) that is just the right size for a battery holder tray to drop down into. The two springs that contact the pack terminals are out of an old battery tray from a junked cheapie radio. They are mounted into a piece of plastic cut from another old box but unplated circuit board material would work here, too. The springs are mounted with 6/32 bolts at the same spacing as the contacts on the packs. That piece is then epoxied (R.S. #64-2313) into the box at such a position to allow tipping the battery tray (contact end first) down into the box resulting in some spring tension against the contacts. (About 2 1/2" from the inside edge of the interior round posts that the cover screws go into.) I put a small piece of wood behind the springs to relieve the pressure on the epoxy.

The female coaxial jack (R.S. #274-1577) is epoxied into a hole in the side and accepts the center-negative plug of the R.S. power supply that is used with the PRO-34/37. One could use any size jack here that fits their power supply. This one has a 22 ohm

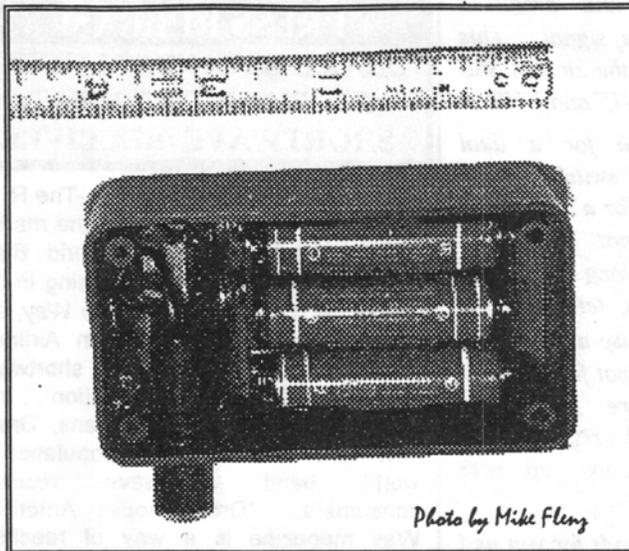


Photo by Mike Flenz

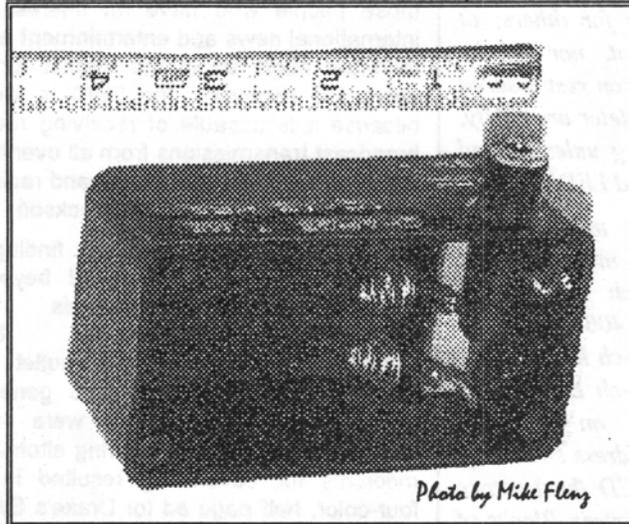


Photo by Mike Flenz

resistor in series with the + terminal to mimic the charge rate/time of the PRO-34/37/43 scanners. This also could be changed to suit a person's need or eliminated altogether and the box plugged into your super-duper ni-cad "Safe Charger". (The one I have all the parts

lives and property someday. Now there is a measure of "caliber" for you! I think you did quite well on this one. Got any more ideas up your sleeve?

for and still haven't had time to build.) oh, and I also stuck a fuse down in there under the jack just for that extra safety margin.

I didn't use the aluminum cover that comes with the box, but I did cut a piece of black plastic that covers the wiring end of the box and installed it with two of the cover screws, leaving the big end open to tip the battery tray in and out.

Hope you can use this idea, Bill. Certainly not of the caliber of the CE-232 or 25,600 channel mod, but one of those little things that makes life more pleasant.

ED: Oh, Mike, the "caliber" of things is not measured by their glitz and glitter. There are many ways to measure caliber, but none prove up until tested by fire. Your project might well save

HAPPY NEW YEAR!

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- + Crystals & Scanner SpeedUps ~ PRO-34/37 Sensitivity Mod ??
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