



# PCARA Update



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## Here we go again

Two months ago, your editor had to fill in for PCARA President Greg, KB2CQE. Greg had been affected (like many members) by Hurricane Irene and was unable to provide his usual inspiring words for page 1.

This time around, a “winter storm” passed through our area on Saturday October 29 and dropped around one foot of snow on everything. This included many trees that were still in leaf — as a result, branches were bent over and eventually snapped. I spent a good deal of time knocking snow off my own trees and shrubs in the hope that I could save some of them from another round of breakage and damage. Then in my street, power went off early on Sunday morning, October 30. A utility pole had broken in two further up the street due to the weight of snow on surrounding trees. A quick check revealed that the circuit breaker at the bottom of the street was hanging open, just like two months ago.

By Sunday morning, the snow storm had moved away to the northeast and the sun was shining — but what a mess the storm had left behind. Trees were down all over the place. The main two meter repeater site had lost power, so we had to bring up the standby repeater. There I heard that other members had also suffered trees down and power loss. In White Plains, Ray W2CH reported that power was on, but Cablevision was out.

While we hope that Con Edison and NYSEG will work their magic once again, let’s look on the brighter side and remind ourselves of the wonderful conditions on our higher HF bands. As a result of sunspots finally making their appearance this cycle, ten meters and fifteen meters have been bursting with stations from all around the world. This has been especially noticeable during recent contests, especially the CQ WW SSB contest, running the same weekend as the winter storm. If you have equipment for the HF bands (and don’t forget that Novice/Techs have access to both phone and CW on 10 meters) then now is the time to try it out. You may be describing these conditions to your grandchildren.

Here’s *advance warning* of the December meeting which has been scheduled — as in past years — as



L to R Karl N2KZ, Marylyn KC2NKU and NM9J at the BARA Hamfest on Saturday October 1. Photo by Ray, W2CH.

the PCARA annual holiday dinner, to be held “At the Reef”, the restaurant on Annsville Circle. Start time will be 5:00 p.m. on Sunday December 4th, to accommodate members who might be working that day. If you are planning to attend please make your choice of entrée (page 7) and inform one of the PCARA Officers beforehand, at the November meeting or by e-mail.

The November meeting of PCARA will take place at the usual time and location — 3:00 p.m. on Sunday November 6 at the Hudson Valley Hospital Center. Don’t forget that the clocks “fall backward” the same weekend, so make sure your timepiece is adjusted or you may arrive an hour too soon.

-NM9J

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## Contents

Here we go again	1
Adventures in DXing - N2KZ	2
Hamfest finds - N2CBH	4
Radio review - NM9J	8

# Adventures in DXing

- N2KZ

## The Key to Long Life

Is the secret of long life learning and practicing CW? Recent studies have shown that those who keep their minds active actually stave off the symptoms of dementia like Alzheimer's disease. For example, people who speak more than one language may have equal loss of the ability to remember things as others who suffer from similar dementia but can adapt their minds around these deficiencies.

This may explain why the oldest survivors in the world of ham radio are usually found sending code. Even at the age of 57, I feel like a kid compared with

many of the operators I encounter. It's hard to find hams significantly younger than me behind a key. More fascinating

is just how adept

and sharp senior CW operators seem to be. Not only can they shovel out code at 30 wpm or beyond, their recollections of old times are so detailed and vivid.

My very best QSOs tend to be with retired military veteran radiomen. They have taught me a lot of nifty tricks about sending and operating competitively in a concise and snappy manner. For example: One ham showed me how I can end sentences and thoughts with a simple 'X' instead of di-dah-di-dah-di-dah. Another described the secrets of sneaking in your callsign in a pileup. (We were both really glad I had a short concise 1X2 call!) These guys really know their stuff. When I work these masters, I feel like a little kid visiting with his grandfather saying "Tell me more! Tell me more!" Every story brings more fascination.

CW offers a double dose of mind calisthenics. Not only do you need to comprehend a quite foreign and unusual language, you have to be able to speak your replies with your fist instead of your mouth! It requires excellent spelling skills. You also need to be as concise as a telegram. Always use as few as possible simple words to convey your thoughts. Code sending and reading can be quite a workout for your skills of comprehension. Send often! It keeps you young and on your toes!

## Eleven Heaven

If you like the number 11, in a few days you'll be in heaven. On Friday, November 11, 2011, in the late morning, it will be 11:11:11 on 11-11-11! Savor this

moment! It comes only once in one hundred years!

Too bad you weren't around in the year 1111! That November 11th was the ultimate day of elevens!

## Eleven (Meter) Heaven

Whoever thought I could work most of North America while walking my dog? This is not so far fetched. Throw you a bone? Just find the right combination of repeater links. A trick like this may be easily done with Internet connectivity like Echolink or IRLP but I didn't use a terrestrial digital hookup. All I needed was one direct link to ten meters!

The Rockland Repeater Association has quite an assembly of repeaters capable of such miracles. I get into their system using one of their 440 hubs on 443.85 MHz. This repeater is linked to a 330 watt ten meter FM repeater on 29.640 MHz providing quite a



US Navy Flameproof key



View across the R. Hudson from Rockland Repeater Association's Palisades site, 625 feet asl. [Pic by N2JTI]

window to the world. Also connected are six other 440 machines, a 220 machine, a 6 meter FM machine and even a repeater on 927.85 MHz. It's easy to create quite an on-air forum with facilities like this. (See [www.rra.net](http://www.rra.net) for all the details!)

Using just my trusty Icom IC-T7H HT at about three watts into a six-inch rubber duck whip, my dog-portable chats have reached to Spokane, Washington, Mesa, Arizona and several QTHs in Texas. The clarity of FM, even at long distances, is hard to beat. The skip on ten meters has been so strong that these DX links sound like they are close-by local operators. Both sides of the conversations have been equally amazed how clear our connections have been. Repeater custodian Adam N2ACF is often on frequency offering assistance and information. A more professional system would be hard to find.



Icom IC-T7H

## New Age TV Antennas

America's two major home TV antenna manufacturers have updated their product lines and websites.

There's one thing you will notice right away: Since the conversion to digital television, we have lost interest in the low VHF band (Channels 2 through 6.) Very few stations are broadcasting there anymore. New home TV antennas have much smaller elements and turning radii because you don't have to reach all the way down to 54 MHz anymore!



Winegard FV-HD30 "FreeVision" Indoor/Outdoor UHF and high-VHF TV antenna.

Winegard has begun offering 'FreeVision' antennas promoting watching TV over-the-air! "The best HD is free HD." Quite a novel concept! This reminds me of the good old days of the 1960s: "This antenna is color approved!" Channel Master has a similar tact with their new 'Masterpiece' line. You'll see slightly shorter elements, a center boom now painted black and some very slick marketing. After looking at Channel Master's on-line store, it seems you pay dearly for the black paint! Yagi and omni-directional FM antennas are still being offered, as well.

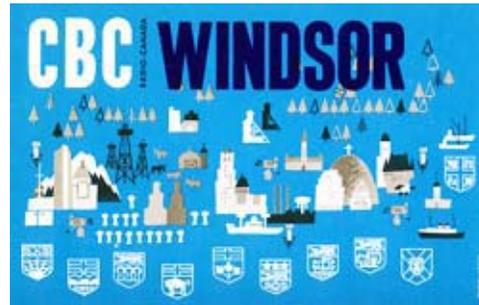


Winegard FVHD45 "Free Vision" Outdoor High-VHF/UHF HDTV antenna.

If you have a RV or camper, Winegard is also marketing several models of TV antennas just for that purpose along with small satellite dishes appropriate for DirecTV. It seems they have a lock on this portion of the business. It's encouraging to see over-the-air TV transmission still going on. Even satellite transmission of cable television networks is being replaced by fiber and I/P distribution. It's a new world!

## Farewell Canada

Another Canadian AM radio station has left the air. The last CBC station heard readily in the northeast is now a part of radio history. CBE 1550 Windsor, Ontario (just across the river from Detroit) has gone silent. Their potent 10 kilowatt signal was the last survivor of the east coast cluster from up north. Previously, the CBC also operated clear-channels CBA 1070 Moncton, New Brunswick, CBM 940 Montreal and CBL 740 Toronto. Now there is nothing left! The closest remaining full-powered CBC station on AM radio is all the way in Winnipeg, Manitoba: CBW 990.



CBE Windsor QSL card.

Listeners in the Detroit-Windsor market can now find CBC Radio One on 97.5 and 91.9 FM. The rest of North America can tune to Sirius satellite radio channel 159 or the very interesting CBC Northern Service on 9625 kHz shortwave with 100 kilowatts.

## Maine or Auxiliary?

One night, I was sitting in my car while my wife and kids were picking up some Chinese food. Tuning around the AM broadcast band, I heard a station playing grandad pop on 780 kHz: Petula Clark's 'Round Every Corner' and other obscure 50s and 60s songs. It was about 6:45 pm - too early for regular 50 kilowatt powerhouse WBBM Chicago to be in so strong - and it was the wrong format. WBBM is a CBS all-news outlet.

The unidentified station then plays a promo for the Imus In The Morning show on 'LA's WEZR 1240.' I knew this couldn't be Los Angeles! Later, some ads mentioned towns like Lewiston and Rumford. Where was this station...really?

It was actually WTME 780 Rumford, ME that sometimes simulcasts WEZR 1240 Lewiston, ME as fill-in when they have nothing better to run. 'L-A' is actually Lewiston - Auburn (yet another Maine city.) I'm guessing WTME was still (mistakenly) on their daytime 10kW power.

They were way too strong and dominant to have been on 18 watts night power!

One of my pals, on an AM DX internet reflector,



reminded me that WTME also had a 330 watt allocation for 'critical hours,' but this was much more than 330 watts! There was not even a hint of co-channel WXME 780 Monticello, ME owned and operated by the legendary Al Weiner of Radio NewYork International fame.

There are only two stations on 780 in Maine: WTME and WXME. OK, I get the ME thing (referring to Maine,) but jeez these are close!

Another fun day with the car radio...It's not every day you pull in Maine!

### Hot Spots

The sunspot cycle is certainly now in our favor. Oh! The things you can hear and the things you can

see! One of my latest conquests was logging John, ZF1DJ, using an excessive one watt CW on 20 meters. I heard John calling and thought I would give him a shot (not knowing

where ZF might be!) and he heard me right away! Ham radio is always a thrill for me. Take some time and get on the air. Do it now before the sunspots fade away!

Remember to join us at the PCARA holiday dinner on December 4<sup>th</sup> at The Reef restaurant in Peekskill. Until next month, 73s and dit dit from N2KZ 'The Old Goat.'



## Hamfest finds

### How to build a complete stereo system for 20 bucks! - N2CBH

Recently, during a weak moment — or maybe it was a weekly moment — I purchased at a hamfest not one but two items that I couldn't pass up. Ever have one of those days? Why of course you have. Well, I managed to spend a whole 20 bucks on what would turn into a high performance 20 watt per channel AM/FM stereo system with speakers! I really wasn't in the market for a new stereo system but sometimes I just can't pass up a challenge.

I purchased a forty-one year old H.H. Scott Model 382B AM/FM receiver. The little sticker on the top of the unit said: *H.H. Scott receiver - \$10.00 - needs some attention.* This would be my third H.H. Scott purchase from a hamfest and would turn out to be my third

success story. I then found a pair of Radio Shack sealed box — meaning no bass port — bookshelf speakers. Gee I'll bet these will sound great!

### The H.H. Scott 382B

The 382B was introduced in 1970. It is an AM/FM receiver with integrated amplifier. There is provision for external input of auxiliary devices such as a cassette or reel-to-reel tape recorder. Did people actually use that stuff? There is a tape output designed to feed fixed line-level audio to a tape recorder. There are two phono positions — one is for high-level phono devices such as ceramic or crystal cartridges and one position is for low-level cartridges such as moving magnet or moving coil magnetic. The latter types require RIAA compensation, while the crystal type typically does not.

There is provision to connect two sets of speakers, with switching to turn each set on or off. There is also a headphone jack for personal listening. Another feature is a low pass filter to reduce noise in distant FM station reception.

The 382B has a 20 watt per channel amplifier which was considered ample in 1970. (Some at that time would say more than enough.) Previous generations of stereo equipment sported 10 watt amplifiers! Done right and connected to an efficient speaker system, 10 to 20 watts would be enough to fill an average size room with sound. But this was the 1970s and things were getting bigger and better all the time!

### Cursory inspection

I brought home my purchase and decided to do a quick dead-or-alive check of the receiver. I plugged it in, turned off the main speakers, plugged in my trusty Sennheiser 414 headphones and turned on the power. Now normally I would bring up a radio this old on a Variac (variable voltage autotransformer) and highly recommend this if you decide to take on such a project. Bringing the power supply voltage up slowly allows the filter capacitors — which are likely deformed with age — to reform and can actually be serviceable. I decided to skip this step and it worked out OK. The receiver did light up but there were audio issues. It received on AM and FM but was —as advertised— in need of attention.



Bob's Scott 382B receiver

## The lid comes off

I removed the cover and like many stereo systems from that era it was chock full of components. Now this is a fairly modern design even if old enough to have been around before disco. It's completely solid state and most likely a second or third generation design.



Receiver with the cover off, upper left is the IF and discriminator, upper right is the stereo decoder board, below is the audio board.

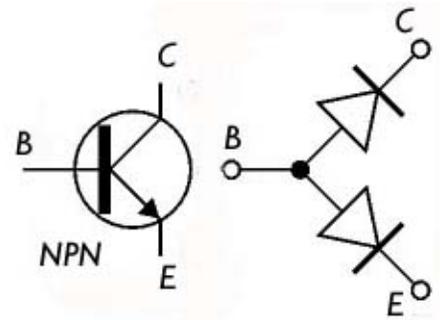
Some good news which turned out to be helpful in getting this receiver running properly was the fact that the right channel seemed to be functioning. The left channel was kind of sick. If you have at least one working channel this can be extremely important as you can compare voltages and signal levels to help pinpoint the problem with the other channel.

I quickly determined that the problem was in one of the low level audio stages. This receiver has separate PC boards for the IF (intermediate frequency) strip/FM limiter/discriminator, another for the stereo decoder and yet another for the low level audio.

The output amplifiers are push pull connected T-03 style transistors which mount directly to the rear panel of the unit. The rear panel doubles as a part of the chassis and heat sink for the audio power output stages.

I was able to determine that the collector voltage of the pre-amp stage on the left channel was only about 3 volts, while on the working channel it was about 19 volts. The transistors are socketed and a quick test with the diode-check position of my trusty digital multimeter showed that all the transistors were in fact good — no shorts or opens. A transistor can be quickly checked with a diode checker as the emitter-to-base junction forms a diode as does the collector-to-base junction. There should be no continuity from collector to emitter — if there is, then the transistor is likely shorted.

Of course even an ohmmeter such as found in the venerable Simpson 260 VOM can be used to check transistors. Low resistance with the leads connected to the emitter-to-base and base-to-collector

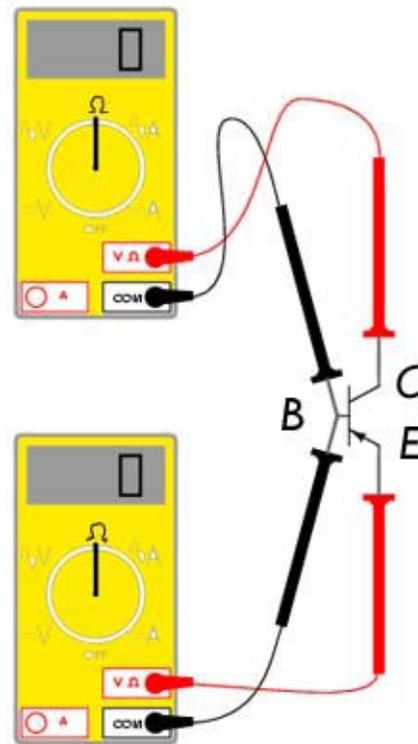


A transistor appears as two diodes when tested for continuity.

terminals in one direction and high with the leads reversed means the transistor is probably OK. There are other dynamic tests that can be done on a transistor

to determine leakage and beta. Beta is a factor of gain but a basic pass/fail test can be performed with simple equipment.

I carefully replaced each transistor in its socket after testing and began to search for other clues. It occurred to me that this problem could be a leaky bypass capacitor that is used to decouple the collector stage. When a capacitor becomes leaky its capacitance can drop to a lower value than it was originally and the internal resistance of the capacitor can



Testing a PNP transistor on the diode check or ohmmeter setting of a multimeter.

become very low — which can make it act like a resistor in a resistor divider circuit for DC potential.

I was able to determine which capacitor was connected to the collector lead of the transistor in the stage in question. I removed it and checked it on my B&K capacitor checker — it measured something less than  $1 \mu\text{F}$  when in fact it was marked to be  $250 \mu\text{F} / 25 \text{VDC}$ . I had some  $220 \mu\text{F} / 50 \text{V}$  capacitors so I replaced it with one of those. Sure enough, when I powered up the unit it was better but not all better.

I was able to get the collector voltage up a bit but the channel was still much distorted. I began to poke around with a scope and found that it appeared that the stage was swinging positive nicely but not

negative. The waveform looked beautiful above the base line but terribly clipped below the base line.

Now I should point out that I did not have a schematic for this receiver and was doing all of this investigation by what made sense to me. I figured if I had one bad 40 year old electrolytic capacitor, then the likelihood of having a few more was high. I began to look closely at some of the other capacitors around the transistors in the same side of the amplifier and discovered several with small cracks.

These capacitors are made with a molded plastic outer shell. With age the chemicals inside begin to change composition and tend to grow, causing the shell to burst. This is a sure sign of a faulty capacitor. When doing this kind of troubleshooting you need to use all of your senses — including the one that sometimes is forgotten, common sense! I changed one capacitor at a time which is the common sense rule. Make only one change at a time or you may get yourself in trouble. With each capacitor change, things got a little better until I hit the one that was causing most of the problems.



*Faulty capacitors removed from the receiver by Bob. In the background are some faulty bulbs.*

### **Get Your Shotgun!**

I was feeling pretty good about myself now as I had figured out what was going on without a schematic and with a dollar and a half worth of components. Then more trouble!

The other side of the amplifier was sounding as sick as the one I had just fixed. Now for a little reverse trouble shooting! I used the same procedure and discovered that many of the same capacitors that I replaced on the bad side were now acting up on the previously good side.

Time to “shot gun” it I thought. That’s an old expression I learned in the TV repair shop for changing all the suspect components. I did this but again one at a time.

Little by little I got the stage to work properly. OK so now I have two good channels. What about the

receiver?

It turns out that the receiver needed no attention at all to pull in FM stations from NYC, Connecticut and local stations. What dawned on me was how well this 40+ year old receiver picked up stations and decoded in full stereo. No blend circuits in those days. It was either mono or stereo, with nothing in between.

Well, how about the AM side? The AM side of the receiver was designed before the NRSC (National Radio Systems Committee) recommended pre-emphasis/filter curve was instituted in the early 1980’s. That standard recommended that all AM broadcasters apply a modified 75  $\mu$ S pre-emphasis to their audio before applying it to the transmitter. This pre-emphasis is a boosting of high frequencies above about 400 hertz. In addition, there is a sharp filter above 9 kHz audio response to prevent splatter and the annoying 10 kHz whistle that used to occur at night when sky wave propagation is present. Receiver makers are supposed to place a complimentary de-emphasis network in the receiver decoder section — but few bother. The reason is that the IF is so narrow that the filter is unnecessary. In addition many receiver makers today have narrowed the IF of the AM section of receivers to the point where they are extremely narrow band and sound not so good.

This 40 year old Scott receiver has no such narrow IF so it actually sounds very good on AM — if you can get a decent AM signal to the antenna — another challenge today!

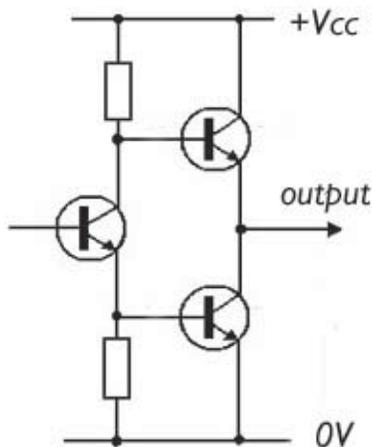
### **Time to Connect the Speakers**

All this time I had been troubleshooting and listening with a pair of headphones. It was time to connect the speakers. I made up some leads and connected the Radio Shack loudspeakers to the main speaker terminals and let it rip. When trying anything like this for the first time I recommend starting out with the volume control at zero and slowly bringing it up. I did this and nice audio began to play from the speakers. They were working with no rattles, buzzes or blown drivers. A little more work and I could put the lid back on.

All of the controls needed cleaning with a product I have come to really like to use — DeoxIT by Caig is a great electronic cleaner. It is a bit expensive but it works and I highly recommend that you get a can if you are planning any work on senior citizen electronic equipment. One more item I want to take care of however. This receiver has a pair of T-03 output transistors in each channel, forming what is known as a totem pole arrangement. The two transistors are connected emitter from one to the collector in the other.

This is referred to as a totem pole arrangement because one transistor sits on top of another. The

output is taken from the connection of the emitter of the top and collector of the bottom. The power supply in this unit is single ended 52V DC. This means that in order to take advantage



*Totem pole output circuit.*

this arrangement you need a fairly large value electrolytic capacitor to isolate the DC voltage of the stage from the speaker. Scott used a 3,300  $\mu\text{F}$  / 35V DC electrolytic capacitor for this purpose. There is one in each channel of the amplifier. These really need to be replaced. Forty year old electrolytic capacitors are never to be trusted. I replaced these with modern equivalents of the same ratings. They are half the size! This is because many strides have been made in basic



*Electrolytic output capacitors*

electronic components. Better materials and manufacturing processes have allowed capacitor manufacturers to shrink capacitors to very small sizes compared to their predecessors.

### Oh, a couple more things!

No basic restoration of this type of equipment would be complete without replacement of the dial lamps. This unit used four #47 bulbs — common bulbs still available from Radio Shack, and they run on 6.3 V. Three of the four bulbs were burned out, so they

were replaced.

Some cleaning of the control knobs and front panel bezel followed, and this little gem was ready to go. I am not really big on making the unit look like it just rolled off the assembly line. I repaired it to working order, cleaned to the best of my meager abilities and enjoyed it!

### Listening Experiences

Tuning around on the FM dial was a big surprise and a little disappointing at the same time. I was surprised at how many stations this receiver could hear. I was disappointed in the technical quality of some of the FM stations themselves. Some sounded quite good. WNYC-FM is always a standout. I am a little biased — they have some of my equipment on line! Many of the stations in the educational part of the band below 92.1 MHz also sound quite good. Our local station WHUD does a good job as well.

Some other stations from NYC — which I will be kind and not call out — were atrocious to my ears. Audio processing done properly can make a real improvement in reception and quality. But there is an old saying that too much of a good thing is no longer a good thing. Some stations, to my ears, are over-processed and fatiguing to listen to. There are some good stations though and certainly worth the effort of getting this receiver going.

The AM section sounds quite good, but the ambient noise level in my shop is high and an outside antenna is really needed for good reception. H.H. Scott — like Saul Marantz and Avery Fisher — were quality-conscious men whose companies made great consumer electronic products. Sadly, their companies have all been sold to offshore manufacturers and mostly build products that are not worthy of their prestigious namesakes. The good news is you can still own a quality American-made AM/FM receiver for very little money and a little bit of work — so scour the next hamfest for a great project!

- Bob, N2CBH

## Holiday dinner menu

“At the Reef” menu Includes:

- Tossed Green Salad
- Potato and Vegetable
- Choice of Entree:
  - Boneless Breast of Chicken Marsala
  - Chicken Cordon Bleu
  - Penne ala Vodka with Grilled Breast of Chicken
  - Broiled Stuffed Filet of Sole
  - Broiled Filet of Salmon
  - Prime Ribs of Beef (Add \$2.95 per person)
- Cake of the Day
- Coffee or Tea per person. plus tax and gratuity (18%)

# Radio review

The main HF radio at NM9J/G3VNZ does not get changed very often. HF transceivers are expensive and their choice has to be considered very carefully. Once you have made your choice, you have to get used to the new radio's quirks and foibles over a period of time. *Marry in haste, repent at leisure.*

## Old faithful

My old HF Radio was getting somewhat long in the tooth. The Kenwood TS-870 that I purchased from Ham Central at the end of 1995 was revolutionary in its use of IF-stage digital signal processing (DSP). This radio had an excellent reputation for audio quality on transmit and receive, but mine was an early model whose strong-signal handling left something to be desired. I had previously replaced two small, gray control knobs on the front panel, and



Kenwood TS-870 was showing its age.

now their replacements were starting to crack. In recent years, reliability of the radio was in question, with more frequent adjustments of the synthesizer VCO trimmers being called for.

The search was on for a new radio. I picked up brochures at hamfests and downloaded data from the Internet. I read reviews in QST and on eHam.net. An eleven year old IC-706MKIIG portable radio had shown me that Icom could make excellent tiny transceivers. Was there a full size equivalent? I was especially interested when Icom's IC-7600 appeared. Strong signal performance was good, but the initial price was more than I wanted to pay — that radio costs more than my first and second cars put together!

## Son of Pro

Early in 2011, Icom introduced a new mid-range transceiver — the IC-7410. This was intended to be a replacement for the IC-746Pro transceiver from 2001, which covered 160-10 meters, 6 and 2 meters. Compared with the 746Pro, the IC-7410 has higher speed DSP, plus wider-range analog to digital conversion with better S/N ratio. The monochrome LCD display is one centimeter wider, and the radio has superior strong signal handling, akin to the IC-7600. Performance was confirmed by tests recently published on NCOB's web site: <http://www.sherweng.com/table.html>. To improve the strong signal handling when QRM is close by, optional 3 kHz and 6 kHz roofing filters can be selected, ahead of the first IF amplifier, for better rejection than the stock 15 kHz roofing filter.

## Twice the price

One oddity about this "successor to the 746Pro"

is that Icom did *not* include 2 meter coverage. An explanation is that Icom has another new model using the identical chassis and cabinet — the IC-9100 — which does include two meters plus 440 MHz out of the box. An optional module is available for 1296 MHz. Tempting as this was, the price of the IC-9100 was still way up there, alongside the expensive IC-7600, and more than I wanted to pay.

At the Ramapo Mountain ARC hamfest, I discovered that K2KJI had IC-7410s in stock, so after careful consideration, I came back with one in the trunk. The next few weeks were spent getting used to the new interface and incorporating the new radio into my radio room.

## Not a review

Excellent reviews of the IC-7410 have already been published in the October 2011 QST (<http://www.arrl.org/reviews-listed-by-issue>) by Rick, WW3DE and on the Yahoo Groups forum (<http://groups.yahoo.com/group/icom7410>) by Adam VA7OJ/AB4OJ. Please read these reviews for detailed features and measurements. In this column, I'll just try to report my *own* experiences.

## First impressions

The IC-7410 arrives in a well-constructed, sizable and substantial steel cabinet, with a hefty weight of 22lb. The first thing that strikes you when you switch on is — this is a radio designed for "boomers". The large monochrome liquid crystal display has giant 7-segment digits for the main frequency that you can read across the room. After switch on, there is no delay while the display shows 'cute' start-up messages — instead the radio begins operating immediately. The top part of the display is crisp, clear and legible without eyeglasses. The bottom part of the display is a dot matrix, for menu choices and graphical presentations.



Boomers might need eyeglasses to read the IC-7410's operating manual — but not the frequency display.

This display has a very wide viewing angle, though the contrast does deteriorate when seen from the far right. (Supply your own political joke here...)

The boomer-friendly design extends to the front panel, where the matte black finish has controls and buttons clearly marked in large, white letters. None of



The IC-7410 has broad stripes on the rotary controls and clear labels on the front panel.

of that tiny, gray lettering that you might find on other radios! Four of the six main rotary controls are marked with wide, white paint stripes to show the knob positions. The five soft function keys F-1 to F-5 below the LCD panel are finished in contrasting silver, with offset positions so they do not get confused with the black mode buttons below. The only black spot is on the four small rotary controls for key speed, break-in delay, compression and monitor gain. These have an indentation,

but no contrasting paint to show the knob position. I used some slivers of white vinyl tape to highlight the indication.

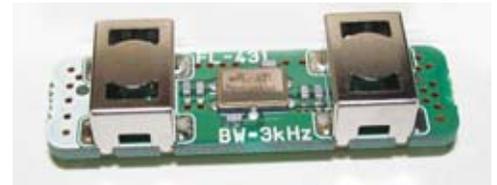
One tiny complaint — the “Transmit” button is immediately below the “Power” switch, and easy to press by mistake when you are closing down.

### Let’s accessorize

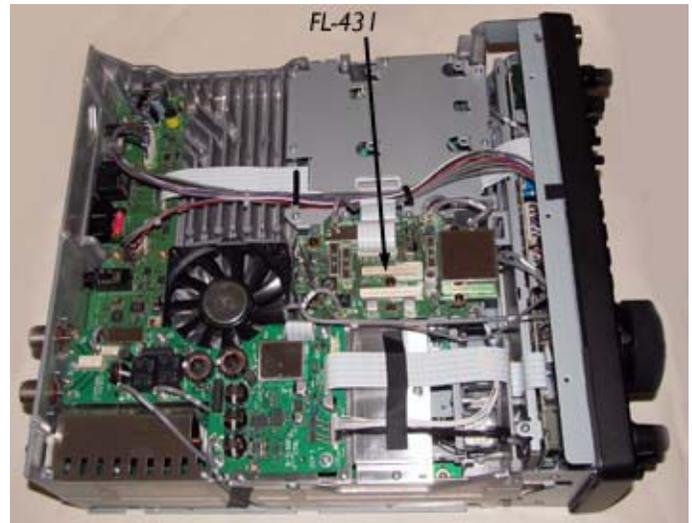
One of the tenets of the NM9J canon is that a transceiver for contesting needs all optional filters to be fitted. That’s because the stock filter for SSB operation is usually far too wide for CW and RTTY and after the contest it’s much too narrow for AM and FM modes. This rule was overthrown by radios like the TS-870 where bandwidth is determined by IF digital signal processing, and no additional filters are required. (Even so, Kenwood made sure that TS-870 owners still needed a few accessories — I installed the high stability TCXO unit and the DRU-3 digital recording unit.)

In contrast with earlier radios, there are only *two* optional extras for installation *within* the IC-7410 — the 3 kHz and the 6 kHz roofing filters. Various reviews suggest that the FL-431 3 kHz filter is the only one needed for SSB and CW, so I picked one up from KJI.

Installation does not take very long — once you have removed the 18 screws that secure the top and bottom covers. After installation, you can specify in the radio’s menu system which roofing filter should be used at the three preset IF bandwidths.



Icom’s optional FL-431 3 kHz bandwidth roofing filter operates on first IF of 64.455 MHz.



Icom IC-7410 with bottom cover removed, showing position for optional roofing filter FL-431.

One accessory I did not need to purchase for the IC-7410 was a voice synthesizer. This item is built-in, so that when you press the “Speech” button, a nice lady announces the S-meter reading and frequency through the loudspeaker. A better accessory in my view would have been a **voice keyer** — useful for calling CQ on long contests or dead bands. An electronic memory keyer for CW is built-in, though you need to dive down through three menu levels to reach the soft keys that control memory sending. An alternative is to plug a home-brew four-button memory keypad into the MIC socket.

### Processing digits

One of the best aspects of modern transceivers is the IF digital signal processing, which — amongst other things — allows receiver bandwidth to be adjusted on demand. The TS-870 could only change bandwidth in 200 Hz steps, but the IC-7410 allows adjustment in 25 Hz steps. Three preset filter bandwidths are available for each mode by pressing the “Filter” button. These individual filters can then be narrowed using concentric click-knobs of the “Twin-PBT” control to adjust the upper and lower frequency limits. A hidden feature — if you turn the inner and

outer PBT controls *together* in the same direction, this is equivalent to an “IF shift” control. The individual filters can be set to a response curve that is either “Soft” or “Sharp”. My preference was to set a “soft” shape for SSB and a “sharp” shape for CW.

Another aspect of DSP is noise and interference reduction. The IC-7410 has an adjustable noise blanker that works remarkably well on impulse noise. The outer concentric control adjusts the noise blanking level, while the inner control adjusts noise reduction. DSP noise reduction improves reception of weak signals, adjusting itself to the speech components of SSB or to the narrower signals of CW. This feature is a lot more effective than on the TS-870. There is also an automatic notch filter for removing heterodynes on SSB. If you need to select a manual notch—for example on CW—there is another concentric control to adjust the notch frequency.



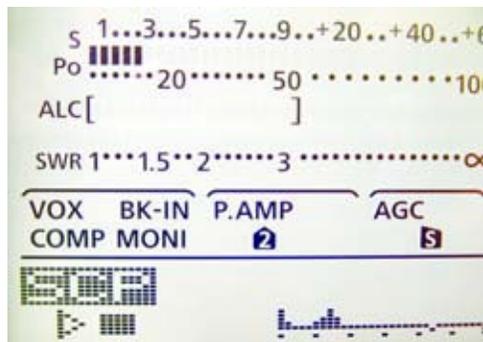
*Top to bottom — Twin pass band tuning control; Notch filter and CW pitch control; RIT and ΔTX incremental tuning control.*

### LCD dismay

I mentioned earlier that the IC-7410 has a large monochrome liquid crystal display. The backlight uses a dimmable cold cathode fluorescent lamp — old technology in an age of white LED backlights, but it works well. Although I suffer from display envy when I see the color LCDs of other radios, monochrome displays have less to go wrong and remain fully legible in bright sunlight.

Each of the control buttons on the front panel has its own icon, which appears on the LCD panel when the button is pressed. For example, pressing “VOX”, “BK-IN”, “COMP” (compressor) and “MONI” (monitor) displays the first group of four adjacent icons.

The S-meter is incorporated into the liquid crystal display. This is not my favorite arrangement — I’d much rather have a moving-coil analog S-meter. But the IC-7410’s meter has 18



*Lower left of IC-7410 liquid crystal display shows S-meter and icons for VOX, BK-IN, COMP and MONI.*

segments representing S-zero to S-9 and a further six double-segments representing the 10dB steps from S-9 to 60dB over S-9. This gives a good approximation to an analog meter. Other radios in Icom’s HF line have a jack socket for plugging in an external analog meter — sadly this feature is not included on the 7410.

One final feature of the display deserves a mention. The IC-7410 has a very straightforward “band scope” function. Press the “SCP” soft key (band SCoPe) and the receiver goes quiet for a second while a band scan is performed. The result is then displayed as vertical bars of varying height on the dot matrix display, with marker pips along the x-axis at the specified frequency steps. The best part is yet to come — if you see an interesting signal on the band scope, just turn the VFO knob and a contrasting marker pip shows just how far you have tuned toward the signal’s spike. This lets you home quickly onto an interesting signal. The “band scope” is not as pretty as a continuous panoramic display, but it works very effectively when needed.

### Spin that dial

The VFO knob is a large, 2" diameter control with a knurled rubber ring around the rim for a comfortable grip. Rather like the IC-706, there is a mechanical slider to adjust the frictional drag from none at all to the feel of stiff molasses.

In my view, the VFO knob operates a bit *too* rapidly. At the standard setting, the IC-7410 moves frequency by 8 kHz for every turn of the VFO control. This compares with 5 kHz per turn for the TS-870 and 2.7 kHz for every dial spin of the IC-706. There are a couple of ways to slow down the 7410’s VFO knob. You can hold down the nearby “TS” (tuning step) button to change the tuning steps from 10 Hz to 1Hz. A third decimal digit then appears on the LCD frequency display and the tuning rate drops to 0.8 kHz per turn. Another way to obtain a slower rate is to select the CW, RTTY or SSB-digital modes — where you can choose “1/4” tuning steps with one of the soft keys. This lowers the standard rate from 8 kHz to 2 kHz per turn of the tuning dial.

You can speed up tuning steps to a very rapid rate by tapping the “TS” button. The actual step size can be selected in the Menu system — I have mine set to 1 kHz steps. There is another menu option that allows you to speed up the tuning rate even higher whenever the VFO dial is spun rapidly.

### Peak power switch

The IC-7410 may need more electrical power than you are used to. My previous solid-state HF transceiver only needed a 12 volt DC supply capable of 20 amps. The 7410 requires 23 amps peak. For initial tests I ran the 7410 from an Astron SS-30M switch

mode power supply. I had some problems with this power supply's switching harmonics that were audible in the amateur bands — especially 40 meters — but this may have been caused by a defective coaxial cable. When testing was over I changed to an Astron RS-35A transformer-based analog power supply for the permanent installation.

### CI-Vilized modes

Icom's "Computer Interface-V" (where V=five), or CI-V, is the company's designation for computer to radio digital signaling. The traditional Icom CI-V interface employs a cable with 3.5 mm mono jack plugs at each end. Connection to a computer with an old-style serial COM port requires an expensive Icom CT-17 level converter.

I've previously described how convenient it is to use an external USB sound adapter such as Tigertronics' Signalink USB to work the digital modes. (*PCARA Update*, Oct 2009 and Sept 2011.)

The Icom IC-7410 goes one step further by integrating rig control with USB audio. While there is still a conventional CI-V mini-jack socket on the rear panel, there is

also a **USB** (Universal Serial Bus) type-B connector which combines both the CI-V control function and a built-in sound card. This is a significant improvement over previous

ways of connecting a personal computer to a radio as it allows a single USB cable to carry both digital-audio signals and control signals at the same time.

### Lengthy USB tale

I followed Icom's instructions for setting up the computer to transceiver connection by first downloading the USB driver for the IC-7410 from Icom's web site in Japan, <http://www.icom.co.jp/world/support/download/firm/>. I also downloaded Icom's USB Driver Installation Guide. Installation of the driver on my Windows 7 notebook went well until I connected the radio to the computer with a standard USB A-B cable and restarted. I then saw an error message that the device driver software was not successfully installed. I tried replacing the brand new USB cable with an old cable for an external hard drive. This time there was more success and most of the drivers installed. Only



*USB type-B connector on rear of IC-7410 requires a USB A-B cable.*

the "Silicon Labs CP210x USB to UART bridge" was unable to start, and this was fixed by changing a menu item on the IC-7410. The Silicon Labs device driver then came up successfully, configured as COM5.

I tried W1HKJ's FLDIGI software, which had previously worked well on my Windows 7 notebook. I was able to configure FLDIGI to make use of the Icom external audio adapter successfully — but there was a problem. The incoming received audio from the IC-7410 was at too high a level and signals were heavily distorted. I turned down the Windows 7 "Microphone" level to its lowest setting of "1" but the incoming audio was still heavily distorted. Nothing I could do on the computer or on the radio's menu would fix this.

In a final desperate step, I replaced the USB cable once more, this time with a short Radio Shack Gigaware #26-712 USB cable that is only 3 feet long. That fixed it! The incoming level was fine and CI-V was working after I configured FLDIGI to use COM5. I have not seen any reason why a USB cable would need to be so short — the specification is a maximum length of 5 meters (around 16 feet).

Once communication was established, there was still work to be done in order for FLDIGI to talk to the IC-7410 successfully. There was no FLDIGI RigCat XML file available for the IC-7410, so I downloaded the IC-7200 file from W1HKJ's site (<http://www.w1hkj.com/xmlarchives.html>) and began editing it to allow for differences between the IC-7200 and the 7410. I had to download an XML editor, then go through the file, changing the CI-V address to 80h, and changing the "get bandwidth" command to 03h. I also reduced the baud rate to 19200.

Finally, I had the computer communicating with the radio, receiving and transmitting on digital modes. And all down the same, shorty USB cable. Woohoo!

### Conclusions

I must say that I am very pleased with my new IC-7410. Perhaps I have not had it long enough for buyer's remorse to set in, but the overall package is well designed, ergonomics are to my liking and there are only a few missing features. The radio was given a thorough work-out in the New York QSO Party and performed very well. I even warmed up the PA sufficiently for the internal cooling fan to become audible. Performance has also been excellent during recent openings on 10 meters, when the band is packed with strong signals.

In my opinion, this transceiver has just the right combination of features and performance to fill the middle ground between small, starter radios and high end models that are aimed at lottery winners.

- NM9J

# Peekskill / Cortlandt Amateur Radio Association

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*Newsletter contributions are always very welcome!*

Archive: <http://home.computer.net/~pcara/newslett.htm>

## PCARA Information

PCARA is a **Non-Profit Community Service**

**Organization.** PCARA meetings take place the first Sunday of each month\* at 3:00 p.m. in Dining Room B of the Hudson Valley Hospital Center, Route 202, Cortlandt Manor, NY 10567. Drive round behind the main hospital building and enter from the rear (look for the oxygen tanks). Talk-in is available on the 146.67 repeater. \*Apart from holidays.

## PCARA Repeaters

**W2NYW:** 146.67 MHz -0.6, PL 156.7Hz

**KB2CQE:** 449.925MHz -5.0, PL 179.9Hz

**N2CBH:** 448.725MHz -5.0, PL 107.2Hz

## PCARA Calendar

**Sun Nov 6:** PCARA monthly meeting, Hudson Valley Hospital Center, 3:00 p.m.

## Hamfests

**Fri Nov 5:** Fair Lawn ARC Auction, Fair Lawn Senior Center, 11th Street and Gardiner Road, Fair Lawn, NJ. 7:00 p.m.

**Sat Dec 10:** Boy Scout Troop 139/Venture Crew 7373 - Flea Market/Craft Fair/Hamfest, Conlon Hall 19 North William Street, Bergenfield, NJ 8:00 a.m.

## VE Test Sessions

**Nov 6:** Yonkers ARC, Yonkers PD, Grassy Sprain Rd, Yonkers, NY. 8:30 a.m. Contact Daniel Calabrese, 914 667-0587.

**Nov 10:** WECA, Westchester Co Fire Trg Center, 4 Dana Rd., Valhalla, NY. 7:00 p.m. Contact Stanley Rothman, 914 831-3258.

**Nov 18:** Orange County ARC, Munger Cottage, 183 Main St, Riverlight Park, Cornwall NY. 8:00 p.m. Contact Thomas Ray, (845) 391-3620.

**Nov 21:** Columbia Univ VE Team, 2960 Broadway, 115 Havemeyer Hall, New York NY. 6:30 p.m. Contact Alan Crosswell, (212) 854-3754.



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