



PCARA Update



Volume 17, Issue 1 Peekskill/Cortlandt Amateur Radio Association Inc. January 2016

Looking both ways

The year 2015 is coming to an end, it seemed to fly by! As one year ends, another begins anew. This is a time of looking back to see where we have been, and looking forward to focus on where we are going.

In 2015 we had a Fox Hunt (May), parking detail for Church of the Holy Spirit Golden Jubilee (June), Special Event Station W2H for the Hudson Valley Chamber of Commerce Hudson Valley Exposition (August), and provided communications support for the 35th Annual Harry Chapin Memorial Run Against Hunger (October). We also took delivery of two Yaesu DR-1X 144/430 Dual Band C4FM/FM Digital Repeaters, and erected a new antenna for the 449.925 MHz repeater (November) which greatly improved performance and coverage.

We ended 2015 with the Annual PCARA Holiday Dinner at the Cortlandt Colonial Restaurant. As in the two years past, the event was most enjoyable. The food and service were excellent, as was the company in which it was shared!

There was one more activity before year end, when the Church of the Holy Spirit requested a return visit to supervise parking for their Christmas Eve Mass. The weather was mild and we squeezed in more cars than you would believe.

We begin 2016 with the Annual PCARA Bring and Buy Auction. This is a perfect opportunity to turn your



PCARA members enjoy the holiday dinner on December 6th.

no longer needed equipment into some cold hard cash. Gather up your treasures and bring them to the January 2016 meeting for sale, and maybe find a few items to bring home to your collection.

Where we go in 2016 is up to you, the membership. Bring your ideas and suggestions to our next regularly scheduled meeting on January 3, 2016 at 3:00 pm at New York-Presbyterian / Hudson Valley Hospital in Cortlandt Manor, NY. I look forward to seeing each of you there.



- 73 de Greg, KB2CQE



Lojji N2CKD, David KD2EVI and Greg KB2CQE supervise Christmas Eve parking at the Church of the Holy Spirit.

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Net night

Peekskill/Cortlandt Amateur Radio Association holds a weekly net on the 146.67 MHz W2NYW repeater on Thursdays at 8:00 p.m. Join net control Karl, N2KZ for news and neighborly information.

(There is no net on Thursday December 31st.)

Adventures in DXing

-N2KZ

Reunited

Do you remember your first radio? For me, the year was 1962. Transistor radios were still an expensive novelty and you were lucky to have one. Most earlier portable radios came with brown leatherette cases with carry straps and snap buttons to keep the case secured. Now you could walk around with a radio everywhere you go. Welcome to the space-age!

People really liked the second generation of transistor sets. Early models required large and expensive 22 volt batteries. New and concise Japanese 9 volt '006P' batteries were so much more practical. More than anything, transistor radios now offered were much smaller than ever before, often boasting they would fit in a shirt pocket. What amazing technology!

My big day began with an unexpected visit from my Uncle Tom. He actually owned his own car and could



Japanese
9 volt battery

travel anywhere. 1960s gas stations were always offering premiums to loyal customers. My uncle earned a gift from his local Sinclair station (remember the big green dinosaur logo?) that he didn't really need. In his coat pocket was a little rectangular cardboard box holding a simple and basic two transistor radio.

"Hey, Karl. Do you want it?" You bet!

Was I thrilled! I could hold the entire radio in my hand! The bright gold medallion on the front proclaimed it was "All Transistor" and it even had its own little whip antenna that plugged into the top. Also in the box was my own personal earphone. Heaven.

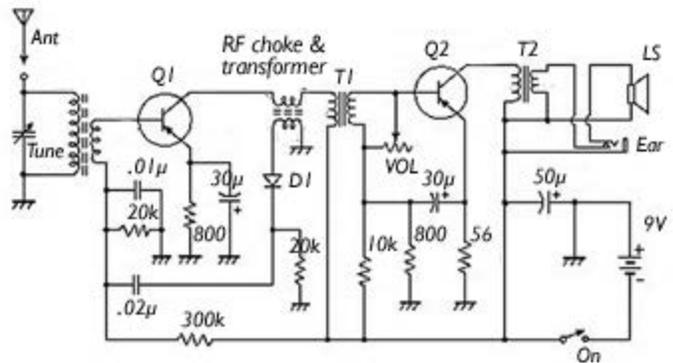
Growing up in Queens, local radio signals were quite strong and easy to hear. The two strongest stations were WNBC 660 and WCBS 880 both broadcasting from High Island sitting in Long Island Sound off the coast of The Bronx. Three sta-



Aud-ION 'All Transistor' radio

tions played pop music: WINS 1010, WMCA 570 with "The Good Guys" and WABC 770 filled with "pow-pow-power!" I could hear a few stations on my bread board radio that used a GE 2N107 transistor and a flashlight battery. Now I could hear them all!

Why would a AM-only transistor radio require a whip antenna? Two transistors only go so far. One transistor begins as a RF amplifier. The resultant signal is detected by a diode and then fed back to the same transistor that also acts as an audio amplifier. This design is called a reflex circuit. The second transistor drives the speaker or earphone. That's it! No AGC. No I.F. transformers. No fancy stuff at all! Very basic radio. With so few parts, this radio could continue to operate forever!



Schematic of a simple 2-transistor AM receiver from the early 1960s. Germanium PNP transistor Q1 acts as both RF amplifier **and** audio amplifier in a **reflex** circuit.

More adventure followed next summer. My family used to vacation in Western Massachusetts in tiny cabins rented by a local park ranger. We had one AC power line, a wood stove and bunk beds. I slept on a cot by the stove. Water was obtained by going out with a bucket to a hand pump. You would prime the pump, bringing up all the rusty water first.



Tiny cabin in Western Massachusetts.

The most delicious cool water followed. It was so refreshing in the hot afternoon!

An outhouse served as a bathroom. With no running water, there was nothing to flush! One sprinkle of lime from the lime bucket would cover everything. At night, little mice would visit our cabin. We would leave out crumbs and scraps and wait with our flashlights. If we were lucky, we would see our visitors as they nibbled at night.

Another pastime came at dusk. We would save up money made from pop bottle return deposits and buy plastic bags of dried green peas. We used beverage straws as miniature blow guns and shot the peas high



into the air. Passing brown bats would think the peas were enormous bugs suitable for dinner and dive for them over and over again. The flying beasts put on quite a show!

Of course, I brought my new radio along with me complete with a fresh nine volt battery. In the daytime, I could just barely hear one station: WMNB 1230 in North Adams. This was a classic local radio station with news, weather, adult pop music and announcers that sounded like your neighbors. At night, I didn't hear much at all! My Dad had a terrific solution. He brought home a length of white wire with a black stripe on it with a bright new alligator clip at one end. My first real antenna!

On my next visit to the cabins, I couldn't wait to try it out. I had to find a place to hang it where it would be high and away and off the floor. I draped one end over a curtain rod and started to walk across the room with the wire. Of course, I pulled the curtain rod down with a mighty crash and immediately heard a chorus of "Karl! What are you doing?"

After dinner, long after sunset, I gave my new apparatus a try. I clicked on the little radio and it was alive! The first station I heard was from Chicago. Chicago? Wow. Tuning up and down the dial was mesmerizing. Dozens of stations were waiting to be listened to. We could hear New York, Buffalo, Toronto, Cleveland and even Wheeling, West Virginia. All sorts of squeals and fading added to what poured out of my magic box. It was the beginning of a lifetime of DXing!

The early 1960s were a very conservative time. President Kennedy had just taken office from General Eisenhower. Popular music was still dominated by the grown-ups playing records by Andy Williams, Perry Como and Mitch Miller. Folk music was big with Peter, Paul and Mary, The Kingston Trio and Burl Ives. Teenagers listened to Chubby Checker doing The Twist, The Four Seasons and Neil Sedaka. You would hear it all on my radio!



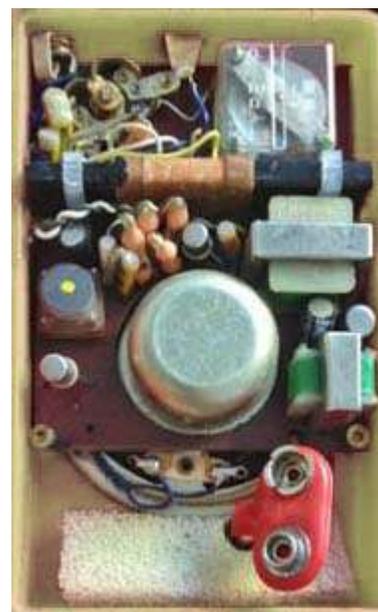
Recorded music from the early 1960s.

The little radio could be pretty creepy when it wanted to be! I remember being 'spooked out' by a faith healer preaching on the air in a loud theatrical voice. "Do you believe in God and all His glory? Are you a sinner?" A show like this would catch you like a deer in headlights. Would you be struck down and hit by lightning if you tuned away? Yikes!

Needless to say, the two transistor radio was well loved. Every night, I would tune in and listen until I was fast asleep. It must have fallen off my bed a thousand times. I wrapped layers of Scotch tape around it to repair all the cracks and breaks to the chassis. The mounting screws that held the circuit board in place broke away long ago. My Dad used to buy 9 volt batteries in multi-packs when they were on sale to fuel my habit. He often repaired my little earphone, too.

I bought myself a little pocket-sized spiral notebook and began writing down all the stations I heard. My local public library had a big professional book that listed all the radio stations in the country. I would bring my radio notebook along with me when I visited and try to identify all the stations I couldn't figure out. Sounds like a budding DXer to me!

DXing with a two transistor reflex radio is challenging. This is not a superheterodyne design that provides reasonable selectivity. It is just one step above having a crystal radio teamed with an audio amplifier. Two little 2SB117 PNP germanium transistors and a diode are the only leads in this show! With no AGC, stations fade in and out dramatically varying from soft to loud. The audio of several stations will usually blend together. It sounds like an inexpensive direct-tuned shortwave set suffering from front end overload!



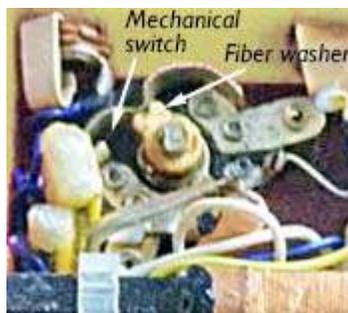
Simple circuitry of two-transistor Japanese radio did not include luxuries such as automatic gain control or selectivity.

Antennas add another dimension to this experience. Even a 25 foot piece of wire can make a huge difference in the amount of stations you can pick up. Alligator-clipping your antenna to the top of the radio also detunes it a wee bit. The frequency calibration goes up and stations below about 1000 kHz become desensitized. So begins another lesson for a junior radio engineer: Let's learn about *coupling*.

Sometimes the antenna signal was just too strong for the little radio to handle. Sometimes, without a big antenna, I received nothing. There had to be some middle ground! Hey! I tried wrapping the wire around the radio without connecting it and it actually worked pretty well. I later tried coiling the wire around a pencil and holding it in different positions around the radio for more control. Even better! If I had only known about the other half of this equation – *using a ground* – I could have gotten even more elaborate! *Now I know!*

I logged a lot of hours with the little radio. I was captivated by all I could hear. Signals would appear and disappear like spirits in the night. Some amazing things peered out of its little speaker. I learned to listen to several people speaking all at the same time and follow just one voice so I could register its identity. My two transistor radio might as well have been a magic lamp!

Time took its toll. Not only did the radio get bounced around and cracked, I eventually wore out the on/off switch! One morning I noticed that my battery was completely dead. I couldn't figure out why. I removed the back cover looking for clues. The radio



On/Off-Volume control.

switched off with a click when you turned the volume all the way down. The little fiber washer that pushed the spring loaded mechanical switch had actually worn down. The wafer could no longer push the switch open to turn the radio off. From that day forward, I had to unsnap the battery after every use.

My Dad had to repair the snap a couple of times after this because I kept breaking away the power wires. The plastic tuning capacitor wore out, too. I had shuffled back and forth across the dial so much that the rotor was no longer making contact. I literally loved my radio to death!

Christmas was not too far away and I received the very gift I had prayed for — and then some. My parents bought me a new 6 transistor radio made by Aiwa — another major Japanese radio manufacturer. ‘Wow! **SIX** transistors?’ It was even smaller than my two transistor set and it was a full super-heterodyne design. Suddenly, all sorts of new possibilities appeared!



Aiwa ‘Transistor Six’

IWA Again! chieves!

PERFECTION PLUS
in performance
miniaturization
styling

MODEL
AR-665

The world's smallest, high sensitivity six-transistor radio. Another AIWA achievement in creative engineering, craftsmanship, and design.

Complete set with top-grain cowhide case and earphone, and standard 9-volt battery*.

(Size 90 x 36 x 25.5mm)

AIWA
SIX TRANSISTOR RADIO

AIWA electronic products are sold in better stores around the world.

AIWA CO., LTD.
Tokyo, Japan

* 9-volt battery replacement are now available everywhere.

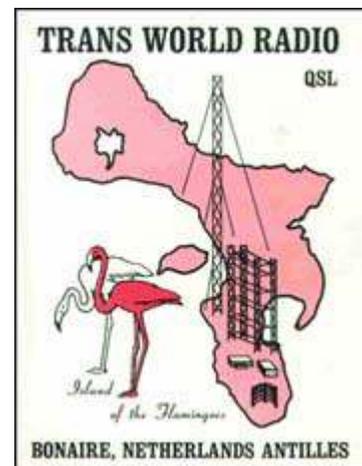
One major step forward: My AM radio listening became international. I could hear Canada on 740, 940, 1070 and 1550 kHz. I could hear Cuba on a dozen frequencies at night especially 600 kHz. Radio Americas from Swan Island in the Caribbean on 1160 kHz would come in regularly. It was amazing!



I used to listen to top 40 rocker CKLW ‘The Big 8’ from Windsor, Ontario directly adjacent to Detroit. One night another station appeared on

800 kHz that literally blew me away: Trans World Radio from Bonaire in the Netherlands Antilles in the Caribbean. CKLW operated with 50,000 watts. Trans World Radio operated with 500,000 watts. Guess who won!

With my 6 transistor Aiwa in hand, my two transistor radio was retired into a box and became a memory. Fast forward 53 years to 2015! I had always wondered if there could possibly be another radio like it somehow - somewhere. I occasionally trolled through



radio sites and eBay looking for clues. I once found a picture of a similar set but never an offer for sale.

Just a month ago, an eBay search result made my eyes open. There it was — an exact replica of my original radio — but this time in red instead of a cream color — and with a 'FuJI' logo. My original radio had been trademarked 'Aud-ion' which must have been a different edition made for giveaway promotions for places like gas stations. Aha! Another clue.

I had never participated in an eBay auction before and I tried hard to win. Several people were interested in it. I'm very pleased to tell you that I had the winning bid. In about ten days, the red radio was in my hands and I was listening again to a 2 transistor reflex radio. I



The red radio was in Karl's hands.

had several moments of 'I remember that' as I experimented with it. The memories brought me great happiness!

I asked the seller if he knew anything about the radio's history. The red Fuji was found by a dealer at the Alameda antique flea market in the Bay Area near San Francisco and passed on to me via eBay. That's all he knew! Considering the nice physical and working condition of the unit, it appears to be only gently used and quite a find.

With the new knowledge of its manufacture, I researched 'Fuji' and made some interesting discoveries. The company's formal name was *Fuji Denki Seizo K.K., Japan*. 'Fuji' is actually derived from a joint venture between Japan's *Furukawa Electric* and the German company *Siemens AG*. In Japanese romanization, *Siemens* translates to *jiimensu*. Marry the two names together and you get *Fu-Ji*. Today, the company is known as Fuji Electric and is a dominant worldwide manufacturer of a myriad of professional electric products: See <http://www.fujielectric.com>.

A final revelation: Now using the search terms 'Fuji 2 transistor radio,' I also discovered that the set came in a third color — black. Who knows what more I can discover in time? It only took me 53 years to learn



The Fuji two-transistor radio came in three colors.

the full story of my first radio and become reunited with the joy of owning one. It was worth the wait!
- 73 de N2KZ 'The Old Goat.'

P.S. Don't forget 'Straight Key Night', Jan 1st 2016, from 0000 GMT through 2359 GMT (7:00 p.m. EST Thu - 6:59 p.m. EST Fri).



Bring & Buy reminder

PCARA's first meeting of the New Year, on Sunday Jan 3, will include the Annual Bring and Buy Auction.

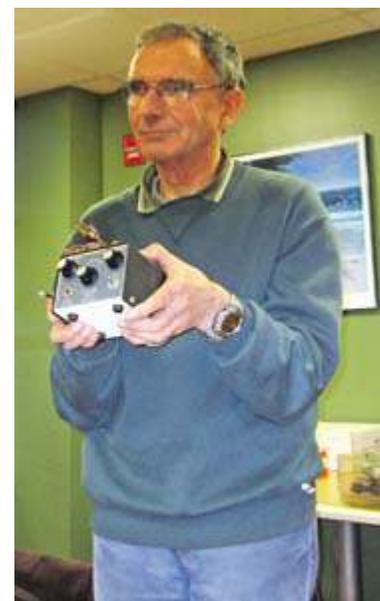
UK mobile rallies (hamfests) often have a Bring and Buy table where visitors can leave items for sale and club volunteers take care of the selling activities.

In our part of the world, there are few local hamfests during the winter months, so buying and selling opportunities are limited until spring.

In order to fill the void, the idea was born of a local Bring and Buy Auction. Members and friends can bring radio-related items along to have them offered for sale by the PCARA auctioneer.

Please pay a visit to your basement or attic and pick out a few treasures that have not been used in a while. Bring them to the January meeting to see if someone else can provide a good home where the filaments will glow once again.

If you are successful in selling your desirable items, a donation to PCARA's treasury will be much appreciated, to help keep our club services running.

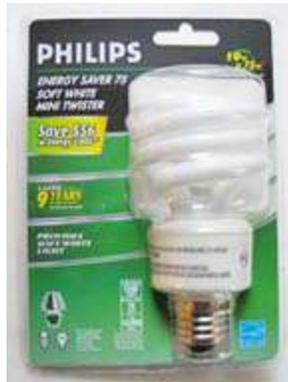


PCARA's auctioneer offers an Autek Active filter at the January 2015 event.

Light my wire

Highlights from the past

The PCARA Update has reported in the past on lighting developments and how they can affect our hobby. In “Farewell to Tungsten” (PCUD, January 2008) we reported how Congress had approved an Energy Bill that requires new lamps to become more efficient — and how compact fluorescent lamps were meeting some of those requirements at the time. Unfortunately, CFLs with electronic ballasts produce RF interference from their 50-60 kHz switch-mode power supplies, affecting MF and HF. The lamps contain a small amount of toxic mercury, they take a while to warm up before producing full light output, color rendering can be a problem, and their output slowly deteriorates. CFLs are **not** suitable for applications such as stairwells and closets where they are only switched on for short periods.



Philips CFL lamp, 75 watt equivalent.

“LED Lamps” in PCARA Update for December 2008 described the technology of early LED lamps that were just becoming available, with the promise of better efficiency and longer life than compact fluorescent bulbs. Unfortunately, those early LED lamps had weak output and a distinct color cast. In “Noisy World” (PCUD March 2010) and “Wireless light” (PCUD October 2011) further problems came to light, with some brands of LED lamps producing copious amounts of RF interference on MF, HF and VHF. In particular, one EcoSmart LED Lamp prevented my garage door opener from functioning whenever its internal light was switched on.



Garage door opener would not respond to remote commands when the LED lamp was lit.

Incandescent with range

The article “Goodbye to tungsten?” in the January 2014 PCARA Update noted an upcoming milestone set by the Energy Independence and Security Act, where standard incandescent lamps in the 40-60 watt range could no longer be imported or manufactured. At the same time, LED lamps with higher output were becoming available and I described the “remote phosphor” technology used by Philips. These lamps required a

heavy heat sink to keep the LED junctions sufficiently cool, and the built-in switch-mode power supply could still produce substantial amounts of interference at MF, HF and VHF. My advice at the time was as follows:

“If you can, stay with the lower-power 40 watt and 60 watt equivalent lamps, which seem to cause less RFI than their higher-powered brethren and are much more reasonably priced. I would forecast that the price of 75 watt and 100 watt equivalent LED lamps will fall as sales volume builds up.”

“As an aid to choosing, here is a table of typical light output in lumens from standard incandescent lamps and the power consumption of halogen-incandescent, CFL and LED lamps with equivalent brightness.”

Incandescent watts	Lumens	Halogen watts	CFL watts	LED watts
100W	1600	72W	26W	19W
75W	1100	53W	23W	17W
60W	800	43W	15W	12W
40W	450	29W	11W	9W

Weather forecast

I have a Radio Shack ‘WeatheRadio’ operating close to two of those Philips LED lamps with the large heat sinks. Even with an external antenna and the LED lamps switched off, NOAA Weather Radio broadcasts from NYC are difficult to receive because of the weak signal from KWO35 on 162.55 MHz. But when the Philips lamps are switched on, there is significant RFI from both the 60 watt and the 75 watt equivalent bulbs, making reception impossible. Those lamps had cost around \$19 – \$30 each in 2013.



RadioShack SAME WeatheRadio suffered interference from nearby LED lamps.

Slimming down

A couple of years ago, Philips introduced a novel lamp design that reduced size, cost and weight. The “SlimStyle” lamp has a circle of 13 LEDs mounted on each side of a circular printed circuit board, which also acts as the heat sink. As a result, this bulb is almost flat



Philips ‘remote phosphor’ LED lamp has a large, heavy heat sink. It can replace a 75 W bulb while consuming 17 W.

when viewed on edge — it looks rather like a lollipop. I purchased one of these lamps to light up a closet and it works well, though RF interference is still a problem.



Philips 'SlimStyle' LED lamp.

Light my wires

On a recent visit to Home Depot, I noticed that my forecast about falling prices was still coming true. There was a new range of Philips “Everyday” A-shape LED lamps at much lower prices. The 100 watt equivalent bulb was **\$8.97** while the 60 watt equivalent was only **\$3.97**. In addition, the new bulbs were lighter and smaller than before, with the same A19 shape as traditional incandescent lamp-bulbs. I purchased a 100



Philips 'Everyday' LED lamps are less expensive than previous models.

watt soft white model to try in a ceiling fitting and found it quite adequate. That lamp illuminated my recent tidy-up efforts as I transferred wire and cable from the shack to basement

storage. I purchased several more lamps, replacing multiple 60 watt incandescent bulbs in ceiling fixtures as well as the two bulbs that were causing problems to my weather radio.

The good news is that RF interference from the new bulbs to NOAA Weather Radio is **much lower** than before, disappearing altogether at distances of a few feet. I carried out a second check with a portable

LW/MW/SW/FM broadcast receiver held near the lamp and found almost no interference for the 60 watt bulb and only slightly more for the 100



Philips 60 watt replacement bulb is on the left. 100 watt replacement bulb (with taller metal base) is on the right.

watt equivalent.

One reason for reduced interference might be that these bulbs are more efficient than previous models. The 100 watt equivalent consumes **14.5W** of electrical power (compared with 19W previously) while the 60 watt equivalent only requires **8.5W** of electrical power (compared with 12W previously).



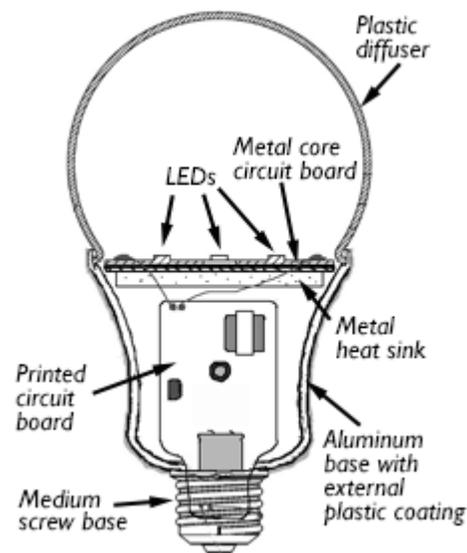
Checking the RF interference from a Philips 'Everyday' LED lamp using a portable LW/MW/SW/FM radio.

No dim bulb

There are a couple of drawbacks for these low-cost Philips bulbs. They are rated ‘**non-dimmable**’ — but that is not a problem for me as I banished all electronic dimmers from the house years ago in the interest of a radio-quiet environment. The bulbs’ lifetime is given as “**10 years**” in normal use whereas the more expensive, dimmable Philips bulbs are rated for 22 years.

There is an interesting “teardown” of the Philips Everyday 60 watt equivalent bulb at the website “Designing with LEDs”: <http://www.designingwithleds.com/teardown-philips-everyday-8-5w-bulb/> . Another teardown of dimmable and non-dimmable Philips bulbs appears on “SparkFun” at: <https://www.sparkfun.com/news/1821>.

These web articles show that the translucent plastic bulb of the Everyday 60 watt lamp is largely empty and acts as a light diffuser. At the bottom of the plastic bulb there are eleven individual LEDs mounted on a metal-core circuit board, which is fastened to a circular metal heat sink. This heat sink is then attached to the hollow aluminum base, which has an external plastic coating. Inside the aluminum base is another circuit board for the discrete-component switch-mode power supply — **no** integrated circuit is



Cross-section of a Philips 60 watt equivalent 'Everyday' LED lamp.

involved. This method of construction encloses all the electronic components — apart from the LEDs — inside a metal shield, which may contribute to the low RF interference.

According to my 'Kill A Watt' electric usage monitor, power factor for the "Everyday" lamp is only around 0.67.

The more expensive dimmable Philips lamps from a couple of years ago with their large, heavy heat sinks have improved power factors, around 0.92. But they also cause more RF interference. Perhaps the simple circuit design of the newer Philips Everyday lamps also contributes to their reduced RF interference.



Kill A Watt electrical consumption meter displays the power factor (PF) of a Philips 'Everyday' LED lamp.

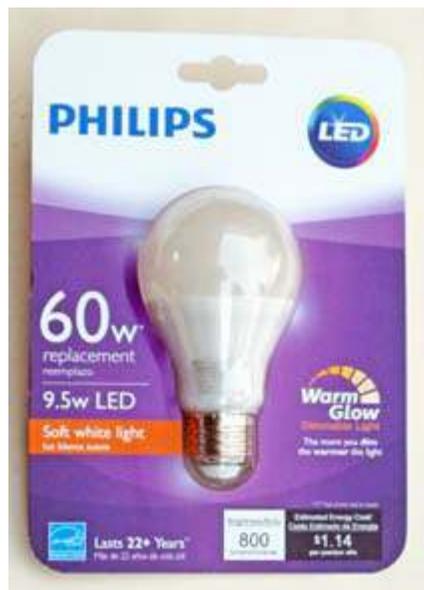
Warm glow

If your home has adjustable light switches, Philips also has dimmable versions of their new, lightweight bulbs, with a 22 year life and special circuitry that adds a "Warm Glow" as the power is reduced. This color

shift is produced by activating a second set of LEDs with a lower color temperature as the lamp is dimmed.

These extra features increase the price to \$9.97 for the 60 watt equivalent and to \$15.97 for the 100 watt equivalent.

I carried out a short test with the 60 watt dimmable bulb and found slightly more RF interference than from the "Everyday" lamp. Power factor was improved from 0.67 to



Philips "Warm Glow" LED lamp.

~ 0.89.

Best buy?

Assuming you don't need a dimmable bulb, then

the \$3.97 Philips 'Everyday' 60 watt equivalent LED lamp seems to be best value with least interference. If you need a dimmable bulb with longer life, then the "Warm Glow" range might be a better choice. Keep an eye open for special offers on these bulbs as they are occasionally offered at reduced prices.

No doubt there will be further developments in energy-efficient lighting. For example LED replacements are becoming available for standard fluorescent tubes that can be used with existing ballasts. However, the current LED tubes are usually rated for *industrial* use (FCC Part 18) and would probably cause excessive RF interference in a domestic situation.

- NM9J

WECA Extra Class

Westchester Emergency Communications Association will be conducting a free license class for the Amateur Extra FCC exam in the New Year. This class will run for ten weeks every Tuesday night from 7:00 - 9:15 p.m., starting Tuesday January 5th. Location is the Westchester Fire Training Academy, 4 Dana Road in Valhalla, NY. A V.E. Test Session will be conducted on Thursday of the tenth week at the same location.



The instructor is WECA's Education Director Larrie, W2UL. (Larrie may be familiar to you from our joint PCARA/WECA "Run Against Hunger" activities.) Larrie asks participants to obtain a copy of the following text books, which are available from ARRL and from local dealers:

- *ARRL Extra Class License Manual*, 10th Edition w/CD-ROM Practice Exam Software,
- *ARRL's Extra Q&A*, Third Edition.

Begin reading the books as soon as possible! If you would like to upgrade to Amateur Extra, please contact Larrie by e-mail at: W2UL@WECA.org. Further details of the course and location are available on WECA's web site, <http://www.weca.org/> and on ARRL's web site at: <http://www.arrl.org/courses/valhalla-ny-10595-11>

Incidentally, the current question pool for the Amateur Extra Class is due to be replaced with a **new** question pool, effective July 1st 2016.

Peekskill / Cortlandt Amateur Radio Association

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PCARA Update Editor: Malcolm Pritchard, NM9J

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Newsletter contributions are always very welcome!

Archive: <http://home.lanline.com/~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 NewYork-Presbyterian/Hudson Valley Hospital, Rt. 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 and July/August break.

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 Jan 3: PCARA Meeting with Bring and Buy Auction, Hudson Valley Hospital Center, 3:00 p.m.

Hamfests

Sun Jan 10, 2016: Ham Radio University, Briarcliffe College, 1055 Stewart Ave, Bethpage, NY. 7:30 a.m.

VE Test Sessions

Jan 2, 9, 16, 23, 30: Westchester ARC Radio Barn, 4 Ledgewood Pl, Armonk NY. 12 noon. Pre-reg. M. Rapp, (914) 907-6482.

Jan 10: Yonkers ARC, Will Library, 1500 Central Park Ave, Yonkers NY, 1:00 p.m. Preregister with John Costa, WB2AUL (914) 969-6548.

Jan 14: WECA, Westchester Co Fire Trg Cen, 4 Dana Rd., Valhalla, NY. 7:00 p.m. S. Rothman, 914 831-3258.

Jan 15: Orange County ARC, Munger Cottage, 183 Main Street, Cornwall NY. 6:00 p.m. Thomas R. Ray (845) 391-3620.

Jan 25: Columbia Univ VE Team ARC, 531 Studebaker Bldg, 622 W 132nd St, New York. 6:30 p.m. Alan Crosswell (212) 854-3754.



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