PCARA Update

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Generating a buzz

At the February 2015 monthly meeting it was approved by the membership present, that PCARA take a table at the Orange County Amateur Radio Club Spring Hamfest on Sunday April 19, 2015. The 'fest will be held at the Town of Wallkill Community Center at 2 Wes Warren Road in Middletown, NY. For more information and directions to the OCARC Spring Hamfest, please visit their site at: http://www.ocarc-ny.org/. Please bring along any items that you wish to sell at the Club Table. Hope to see you there.

PCARA will be sponsoring a Foxhunt on Saturday May 9, 2015, which coincides with *CQ Magazine*'s Foxhunting Weekend of May 9-10, 2015. On this occasion the role of the Fox will be played by PCARA's own Karl, N2KZ who has quite a well earned reputation for being a very *Sly Silver Haired Fox*. Better get those Yagis and attenuators ready!

Here is the latest in CTCSS tone generators as Spencer the cat curls up with the microphone from one of Greg's Motorola mobile radios.

The topic of a Special Event Station was raised at the February meeting. One suggestion was to have a demonstration station at Riverfront Green in Peekskill. Another suggestion for a possible venue was a station at an annual event in Yorktown. If anyone has other suggestions, please let us know. Updates to follow.

Our next Community Service Event is in early June 2015, when we are scheduled to assist with parking for the Church of the Holy Spirit 50th Golden Jubilee. We'll need a few members to help with communications for parking. The Church of the Holy Spirit is located at 1969 Crompond Road in Cortlandt Manor, NY almost directly across the street from our monthly meeting location.

All of the hardware for the 449.925 MHz repeater antenna upgrade is on hand. Now we only need for the weather to cooperate. Hopefully we'll thaw out by Spring! Developments to follow.

For those of you that haven't heard the news yet, Hudson Valley Hospital Center and NewYork-Presbyterian Hospital have announced a new affiliation. The former Hudson Valley Hospital Center has been renamed NewYork-Presbyterian / Hudson Valley Hospital. So, our next regularly scheduled meeting is on March 1, 2015 at 3:00 pm at NewYork-Presbyterian / Hudson Valley Hospital. I look forward to seeing each of you there.

- 73 de Greg, KB2CQE

Hudson Valley Hospital Center has been renamed as NewYork-Presbyterian/ Hudson Valley Hospital.

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A New Day

I had a very interesting QSO one recent afternoon. I decided to once again try to operate in AM mode on 75 meters. I heard a strong carrier tuning up. When the carrier stopped, I called CQ. My Yaesu FT DX 1200, using AM mode, produces a modest 25 watts output.

Karl's current shack features a Heathkit HW-16 CW transceiver with external VFO to the left and recently-acquired Yaesu FT DX 1200 HF transceiver to the right.

Even with low power, I connected right away and I learned a lot, too. Joe, K2VXV in Clarence Center, NY (near Buffalo) pulled through my anemic signal and then shared his wisdom. I discovered many things. I gained a whole new maturity in thought and approach. How many of your QSOs are that productive?

Problem one: Joe could barely hear me. Signal? Not so bad. Modulation? Not so good. First clue: It really helps to listen to your own signal to see what you sound like. I never found this necessary as a CW operator, but when you start modulating, your sound is your calling card.

I appreciated Joe's patience. I pulled out my portable Sony ICF-SW7600GR and a set of high-fidelity headphones. I used a resistive terminator into my antenna input to eliminate overload. Listening to my signal was revelatory!

Yaesu MH-31B8 microphone.

What did I learn? My Yaesu's little handheld microphone didn't get the highest marks. I was also suffering from some sort of RF ingress producing very interesting 'snurdles' to my audio. We then went through several of the settings on the Yaesu to see if I could fine-tune my sound. We made a lot of progress, but Joe's commentary provided a lot of food for thought.

It was plainly obvious that Joe was a seasoned AM operator. He had decades of experience with big, heavy metal chassis and glowing tubes. I grew up in a career based upon AM broadcast transmitters and processing. We both shared a true love for old time boat anchors that are capable of a big AM signal and big high fidelity AM audio. His station had no deficiencies. It sounded just great. Joe was impressed that I was listening and ready for a QSO way below the usual 3875 kHz AM watering hole and that I actually heard him tune up, down at 3675 kHz. After a good, long ragchew, I walked away with new knowledge and inspiration to improve my station.

Back to basics

Some useful revelations were discovered. For the first 14 years of my ham radio career, I never really exceeded 5 watts of CW unless I was using my trusty Heathkit HW-16. The HW-16 produces maybe 75 watts of CW on a good day on 80 meters. My Yaesu FT DX 1200 is in a different league. For starters, my new Yaesu employs technology that is about 50 years advanced from my Heathkit — it has no tubes! A lot has changed in half a century!

Yaesu FT DX 1200 transceiver as used by Karl to investigate AM mode and performance of low-band dipoles.

After talking with Joe, I scanned my Yaesu across the bands I visit to measure all of my antennas' bandwidth. Immediately apparent: My low band antennas need upgrading! I use wire dipoles for 10, 15, 20, 30, 40 and 80 meters. The high band antennas were good performers across their entire band. They are above a half wavelength off the ground, in the clear and operating with efficiency. The 40 meter antenna was not bad for the CW range from 7000 to 7060 kHz, but the SWR started to soar above 7080 kHz. After the FT DX 1200's antenna tuner did its work, phone operation on 40 was possible but not very efficient. My 40 meter dipole is only about 30 feet high, so the results were not surprising. I need height!

Some of Karl's dipoles are highlighted — and weighed down — by heavy snow that followed the Nor'easter of October 29, 2011.

80 meters was a rocky road. This dipole was the very first antenna I installed. It is cut perfectly for the center of the year-1999 Novice CW allocation: 3700 kHz. I used to live on this frequency, but not anymore! This won't serve me very well in the year 2015. The CW-only allocation now only runs from 3500 to 3600 kHz. My 80 meter dipole hangs low at around 30 feet which is quite inadequate for nice take-off and wider band efficiency. Even with the Yaesu's antenna tuner, the useful range of my dipole starts to roll off dramatically below 3650 kHz. The antenna needs to be longer and, optimally, higher too — at least 60 feet up!

My 80 meter dipole also taught me some lessons when I first installed it long ago. Back then, I didn't understand the requirements for a successful RF radiator! My first attempt was to tie the center insulator to a bathroom breather pipe on the peak of my home's roof. Both elements of the dipole were resting on the shingles of my roof. With this arrangement, I discovered quickly that I was talking to myself. I needed a boost!

I cut a three foot length of white PVC pipe and placed it vertically over the breather pipe. It made a fine insulator and support and pulled the antenna up into the air and off the shingles. Now I was being heard! I have been using this arrangement ever since with pretty good results!

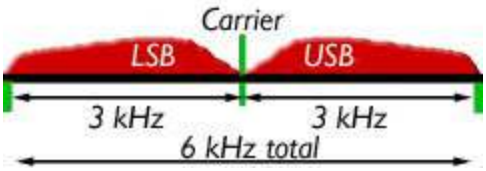
Restrain the RF

Problem 2: RF ingress. I am trying to get my signals to go out into the world — not come back to my shack! I have always taken great (foolish?) liberties with my amateur radio antenna designs. My QRP CW rigs are very forgiving. A dipole is technically a 75 ohm antenna and I have always used whatever surplus 75 ohm coaxial cable I could find as feed-lines: discarded video cable ends, Radio Shack discount cable, left-over CATV cable — you name it. To keep my design losses to a minimum, I have never ever used a balun or a un-un. Now when I analyze the performance of my current 80 meter dipole, the concept of 80 meter CW and 75 meter phone being entirely separate bands is plausible. Obviously, I need a broadband antenna and additional height to continue operation between 3500 and 4000 kHz! Want even a better challenge? What should I do for 160 meters? I also discovered how much antennas can interact even when they are not connected to the rig. Keep those PL-259 connectors apart when you are on the air and off the air!

When you have several different antennas available, keep the antenna connectors apart.

No room for AM

My conversation with Joe also left me with a concept I don't think I will ever forget: The modern Yaesu FT DX 1200 is "one of those new SSB transceivers." He couldn't be more correct. Many new solid state rigs are not ready to produce AM modulation with confidence. The inclusion of AM mode is nothing more than a tip of the hat to legacy operation. At 25 watts output, a rig like this cannot be anything more than an AM exciter. You really need a serious linear amplifier to create a useable AM signal in today's environment. The FT DX 1200 has an enormous collection of DSP filters and features for SSB, CW and data modes, but most of them are not available for dual sideband AM reception and transmission. I asked Yaesu technical support guru Tim Factor about the lack of features for AM mode. His reply was simple: The DSP designs within this rig simply don't lend themselves to a dual sideband scenario. Life goes



Amplitude modulation requires two sidebands plus a carrier.

on. I can assure you that the FT DX 1200's DSP is simply amazing on SSB and especially CW!

If you really want to dig into DXing medium wave or longwave AM broadcast DXing, you need to use one of the receivers cherished by BCB DX fans. My good friend and AM radio DX expert Pat Martin loves his Drake R8B receiver. Also popular within the medium wave DX community are the legacy Yaesu FRG-7, the military surplus R-390A, the Icom IC-R9000 and the Kenwood R-5000. These are major league receive-only designs that understand what AM DXers deserve.

Drake R8B all-mode world-band receiver.

Amazing AM

So what makes a truly awesome AM station? Joe explains: "All of the transmitting and receiving equipment was manufactured in the 1950's. Included is the EF Johnson Viking Kilowatt which is driven by the Viking Ranger I, and the EF Johnson Viking 500 transmitter."

"The Johnson Kilowatt can operate at two power levels, 300, or 1000 watts DC input, making it a rather flexible AM/CW transmitter. It has continuous frequency coverage from 3.5 MHz to 30.0 MHz. The Viking 500 transmitter will operate at 500 watts AM and 600 watts CW DC input, and covers 80 through 10 meters on AM and CW. The Viking Ranger I, one of the most popular transmitters that EF Johnson manufactured, covers 160 through 10 meters. It is a 75 watt CW or 65 watt phone rig that will also serve as an RF and audio exciter for the high power Viking Kilowatt amplifier."

The K2VXV radio room features (L to R) Drake R4C/T-4XC separates and Henry 2KD-5 linear, EF Johnson Viking KW Matchbox, Collins 75A4 receiver, Heath monitor, Viking 500 transmitter, and Viking Ranger 1 transmitter atop the Viking Desk Kilowatt power amplifier.

"The receiver used for my AM operation is the well known Collins 75A4, which is probably one of the top ten all time receivers ever made. In the receiver, you will find 3.1 kHz, 6.0 kHz, and 9.0 kHz mechanical filters, which provide excellent selectivity for AM and SSB reception. It was designed expressly for amateur operation on 160 through 10 meters, and has precise dial calibration and high stability." Transmit or receive, signals sound silky and sweet at K2VXV. Thanks for a great QSO, Joe!

Ham-aid

Amateur radio is an enormous fraternity. There are very few things in our hobby that you can do alone. I think we like it that way. This column and this amateur would not be the same without the encouragement and guidance provided by fellow PCARA members and nearly everyone else I work on the air. Every day is a new experience — always a little wiser and a little smarter. Thank you all very much!

Take a look at the PCARA's Facebook page and visit our website: http://www.pcara.org. Don't forget to join us for The Old Goats Net every Thursday night at 8:00 p.m. on the PCARA 2 meter repeater at 146.67 MHz (-600 kHz offset, 156.7 PL.)

Until next month, 73 es dit dit de N2KZ 'The Old Goat.'

Skywarn Training

Our neighbors at the Putnam Emergency and Amateur Repeater League (PEARL) will be hosting a Skywarn Training Class in April.

Skywarn is a National Weather Service program that consists of trained weather spotters who provide reports of severe and hazardous weather to help meteorologists make life-saving decisions. Forecasters from the NWS conduct training sessions each year to prepare spotters for the upcoming severe weather season. Sessions are about three hours long and cover the fundamentals including safety, identification of key weather features and reporting procedures.

PEARL's training session takes place on Thursday April 16, starting at 7:00 p.m. Location is Putnam County Bureau of Emergency Services Training and Operations Center, Donald B Smith Govt. Campus, 112 Old Route 6, Carmel, NY. Register using the following web page: http://www.weather.gov/okx/SkywarnTraining

Show and tell

February's PCARA meeting was well-attended, with members bringing in items of their own equipment for "Show and Tell" demonstrations.

Three HTs

Three members brought inexpensive, Chinese handi-talkies to the meeting. Mike N2HTT had his original BaoFeng UV-5R, Greg KB2CQE had a later UV-5RV2+ model, while Ray W2CH showed his latest acquisition, a BaoFeng BF-F9V2+ transceiver.

Three BaoFeng HTs as seen at the February meeting. Left: UV-5R belonging to Mike N2HTT; Center: UV-5RV2+ brought in by Greg KB2CQE, and on the right BF-F9V2+ recently purchased by Ray W2CH.

All three transceivers are dual band VHF/UHF, covering 2 meters and 440 MHz FM. The UV-5R was FCC Part 90 approved for the frequency bands 136-174 MHz and 400-480 MHz, with additional FM broadcast reception on 65-108 MHz. Power output is either 1 watt or 4 watts. (Note: FCC Part 90 radios are intended for commercial use and cannot operate in "VFO" mode — they have to be programmed externally, with each authorized frequency stored in memory. This may not be convenient for amateur use.)

The UV-5RV2+ model has an upgraded case with metallic finish for the speaker grille. The case has limited compatibility with UV-5R accessories.

The third generation BaoFeng radio that Ray purchased through Amazon, model BF-F9V2+, has increased output power, with a choice of 8 watts, 5 watts or 1 watt. UHF coverage is extended to 400-520 MHz. The manual mentions reduction of squelch-tail noise on simplex by using a sub-audible tone burst.

One of the competing BaoFeng importers has called into question the "BF-F9V2+" model, claiming that it is really an older version of the BF-F8HP. If you were thinking about purchasing one of these inexpensive radios manufactured in China, choose your vendor with care, study the specifications and *caveat emptor*. See (for example) https://baofengtech.com

Ray W2CH demonstrates the inexpensive BaoFeng BF-F9V2+ handi-talkie at February's PCARA meeting.

New Icom, non-digital

Ray also brought along his brand new mobile radio, an Icom IC-2730H. This is a dual band *analog-mode only* transceiver covering 2 meters and 440 MHz FM. There are separate controls for simultaneous operation on each band.

Icom IC-2730H in the hands of Ray, W2CH, is a dual-band mobile FM transceiver covering 2 meters and 440 MHz.

Icom's previous *analog-only* dual-band mobile was the IC-2720, introduced in 2002/2003. Subsequent models have either included D-Star or were D-Star compatible, with an expensive digital-voice add-on. The IC-2730 is more attractively priced than the digital models, but it does need *optional* brackets to attach the controller to the main unit, to suspend the radio or to mount the controller to the dash.

Digital fisticuffs

Mike N2HTT brought along an interesting project that he has been working on recently. He suggested that it might be a 21st century solution to a 19th or 20th

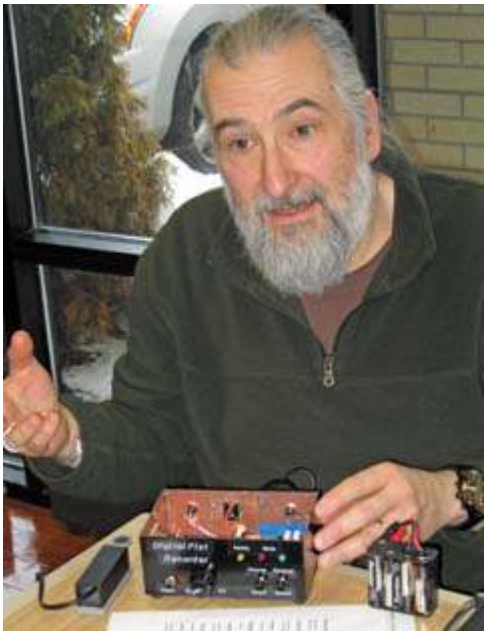
century problem — how to record Morse code messages for subsequent replay, while retaining the "fist" of the individual operator?

Various "Memory Keyers" are available, including models built-in to modern HF transceivers. They allow an operator to store Morse Code messages in memory using a paddle or keyboard. When played back, the output can be convenient for repeatedly calling "CQ" in a contest and for other repetitive information.

Messages are usually stored in memory as individual characters, then retransmitted on demand in "perfect" Morse Code, with accurate timing of the dots, dashes and spaces in-between. Unfortunately, this technique loses the individual characteristics of each operator's Morse "fist", which can include small variations in the timing of dots, dashes and spaces, as well as slowing down for important items.

In the days before electronic keyers, when operators had to use straight keys or mechanical "bugs", the individual characteristics lent a distinctive style to the outgoing Morse code. For example, the sender's "fist" was used in World War II to help identify operators of clandestine and enemy transmitters.

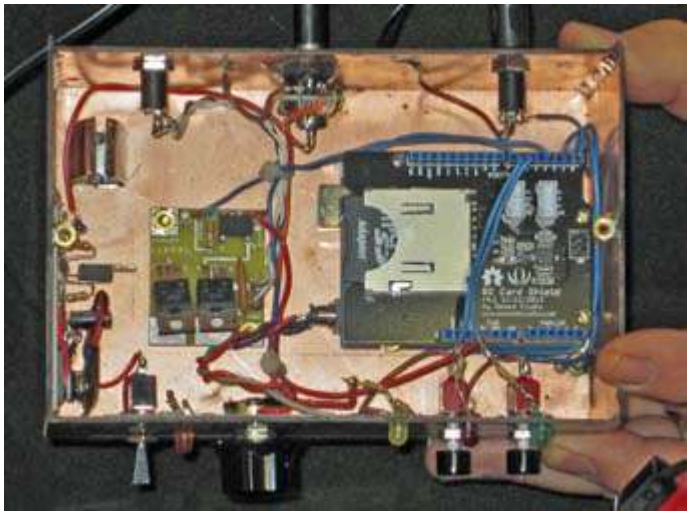
Mike's modern memory keyer accepts input from a *mechanical* key that is plugged into the "Digital Fist Recorder". The unit notes the actual length of dots and dashes as indicated by the opening and closing of the key contacts — then stores this information in memory. When memory contents are played back, the exact timing of dots and dashes is retained, and the transmission maintains the "fist" of the operator.



Mike N2HTT demonstrates his "Digital Fist Recorder" at the February meeting.

Mike's unit is based on an Arduino microcontroller for the logic and control functions. Messages are stored on an "SD" flash memory card, which has a huge capacity for almost any length of message stored in four memory channels 1-4.

In addition Mike used a "Keyall" keyer circuit from Ham Radio Kits (http://wb9kzy.com/keyall.htm) that is capable of keying old-style tube transmitters with negative voltage (grid block keying) or positive voltage (cathode keying) as well as modern solid state radios powered by +13.8V DC.



View inside the N2HTT "Digital Fist Recorder" showing the "Keyall" keying circuit left and Arduino controller right.

These items are all installed within an elegant case built from copper-clad circuit board.

Digital Fist Recorder is housed in this attractive case.

The project was inspired after Mike purchased a Vibroplex Champion "bug" key from a west coast amateur (N6CW) who commented that memory keyers cannot capture the individual characteristics of a hand-keyed message. Mike wrote the software for the Arduino himself and has written up the project for *QST* (watch for it there in the next few months). There are more details on Mike's Amateur Radio/Linux blog site, http://n2htt.net/ as well as a video demonstration on YouTube: https://www.youtube.com/watch?v=WM9lCqJPNtY

Streaming SDR

The final "Show and Tell" item was brought along by Mike, N2EAB. Mike was able to demonstrate remote SDR (Software Defined Radio) reception on an 8 inch tablet computer that is normally connected to the Inter-

net through WiFi at his home, but for this demonstration he was using a complimentary 4G T-Mobile connection.

The tablet computer is an inexpensive HP "Stream 8" (http://www.hp.com/us/go/stream8tablet) which is compatible with a normal home computer as it runs Windows 8.1. Mike had a copy of "SDR-Radio.com" installed, which is an advanced Windows console for Software Defined Radio receivers and transceivers. (See: http://v2.sdr-radio.com/). The "SDR-Radio" software works fine with Windows 8.1. For the demonstration, Mike was connected to an amateur in New Hampshire who has three software defined radios available for sharing. Mike was able to view the spectrum display, tune to individual signals (in this case on 40 meters) and view the S-meter reading.

Mike, N2EAB demonstrates remote SDR reception on a small tablet computer.

Remote operation of a software defined radio using SDR-Radio.com software, as demonstrated on 40 meters by N2EAB at the February meeting.

- NM9J

Sourcing components

During the Old Goats Net for February 5th, the Topic of the Week asked participants where they obtained components for their radio activities. This query was inspired by news that several Radio Shack stores in our immediate area are scheduled to close. Stores at the Triangle Shopping Center, Yorktown Heights and inside the Jefferson Valley Mall are listed for closure at the end of February, while the store at the Beach Shopping Center in Peekskill is staying open.

Here is a list of alternative sources of electronic components as recommended by members of PCARA's *Old Goats* net.

Amazon. Web site http://www.amazon.com. Various suppliers of electrical and electronic components have merchant arrangements with Amazon. Just try searching for what you need on Amazon's main page. Several amateur radio dealers including Gigaparts, HamCity and Advanced Specialties also have items on sale through Amazon.

Antique Electronic Supply. Web site: https://www.tubesandmore.com/. Good for vacuum tubes and the more traditional electronic parts. Located in Tempe, AZ.

Digi-Key Corporation. Web site: http://www.digikey.com. Claims to have the world's largest selection of electronic components. Located in Thief River Falls, MN.

Element14. Web site: http://www.element14.com. Features new technology such as Arduino, Raspberry Pi and 3D printing. The Ben Heck Show has "how to" demonstrations. Links to Newark/Element 14 for ordering components (http://www.newark.com). By the way, chemical element number 14 is *silicon*. Recommended by Bob, N2CBH. Located in Chicago, IL.

Fair Radio Sales. Web site: https://www.fairradio.com/. Mostly military surplus. Located in Lima, OH.

Jameco Electronics. Web site: http://www.jameco.com. Encourages hobbyists and DIY projects. Has paper and PDF catalogs available. Located in Belmont, CA.

Mouser Electronics. Web site http://www.mouser.com. PDF and paper catalogs available. Good selection of semiconductors and other electronic components. Located in Mansfield, TX.

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Several members of the Old Goats Net recommended **Hamfests** as a good source of inexpensive components, especially if you need to stock up for the future. And if you already have an existing stock in the **attic** or **basement**, then you should certainly check there before spending any money at the more expensive sources. Thanks to everyone who contributed to this list.

- NM9J

Radio Avenger

Digitally remastered

One of the advantages of owning a DVD or Blu-ray player is that vintage TV series from decades ago become available for quality viewing today. Although video tape recording was well-established by the 1960s, many TV series from the 1960s, '70s and '80s were still originated on 35mm or 16mm movie film, which has much higher quality.

The reason for producing series on film was the multiple video standards in use at the time for analog TV. Differences between countries included the number of scan lines in the picture — 405, 525, 625 or 819 lines, the field frequency — 50 or 60 Hz and the method of encoding color information which might be NTSC for the USA or Europe's competing systems of PAL and SECAM.

Fortunately, most TV transmission facilities around the world were equipped with a high quality film scanner that could produce video signals in the appropriate local format from material distributed on film — whether it came from Hollywood, CA or from Elstree, Pinewood or Borehamwood studios in England.

Film can incorporate a great deal of detail — far more than needed for analog TV transmission — so when these old series are transferred from original film to digital format for distribution on DVD or Blu-ray, the quality can be far higher than when originally aired on analog TV, decades ago.

Back in time

One of my favorite TV series from the 1960s was *The Avengers*, produced by Associated British Corporation (ABC Television). The TV *Avengers* of the 1960s investigated spies and sci-fi with a light, humorous touch, and should not to be confused with the more modern superheroes of "Marvel's The Avengers".

The Avengers format was devised around 1960 in the UK by ABC Television's Head of Drama Sydney Newman, who later became famous for the format of BBC's Doctor Who. The first three seasons of *The Avengers* were studio productions using the UK's 405 line TV standard and recorded on video tape. Early stars were Ian Hendry as Dr David Keel, Patrick Macnee as John Steed and from Season 2, Honor Blackman playing Cathy Gale.

When Season Four was produced in 1965, the series had just been sold to the USA, so production switched from 405-line video to black and white film. Patrick Macnee was still very present, but Honor Blackman decided to drop out and a replacement had to be found. With inspired casting, a young Shakespearian actress named Diana Rigg eventually took the role of Mrs. Emma Peel, the new sidekick for smooth secret agent John Steed, of the traditional brollie and bowler hat.

Seasons Four and Five of The Avengers *starred Patrick MacNee and Diana Rigg as Steed and Emma.*

Season Four proved popular in the UK, with obvious chemistry between the two leads. It also aired on ABC Television in the USA, from March 1966. The film format allowed for more varied storylines and better outdoor locations than the previous studio-bound episodes. Scripts featured nuclear weapons, power-mad scientists, man-eating plants, downpours of rain and remote-controlled robots.

Beginning in 1967, Season Five saw a significant change from black and white to color film. This was a result of American networks transitioning to 100% color, several years before the same thing would happen in the UK. Patrick Macnee and Diana Rigg returned to their previous roles, though Diana said this would be her last series playing Emma Peel. The episodes had a similar theme, with plenty of fantasy/sci-fi, including lasers, shrunken vehicles, remote-controlled airplanes and radio-controlled felines.

See it now

Episodes of *The Avengers* have been broadcast recently on "COZI TV", which is available in our area as a sub-channel of WNBC (Ch 4.2). I would not recommend this particular outlet as airings were at awkward times and episodes have been significantly trimmed to fit between commercial spots.

The entire Diana Rigg *opus* is available on DVD as: *The Avengers — The Complete Emma Peel Megaset™*. This is excellent value as it includes all of Season 4 and Season 5. More recently, *The Avengers Season 5* has

been released on Blu-ray at a very reasonable price. This volume is well worthwhile as the Diana Rigg/Patrick Macnee color episodes look positively spectacular in high-definition, after the remastering process.

Best episode

As you might expect, episodes of a sixties Spy/Sci-Fi series feature radio communication techniques of the period and it's always fun trying to identify the actual equipment shown on-camera.

There is one episode from Season Five that deserves special mention in the amateur radio context. This is Episode 10, *Never, Never Say Die,* in which the tagline explains: "Steed meets a dead man; Emma fights the corpse." (See http://www.dissolute.com.au/the-avengers-tv-series for a complete listing of all the *Avengers* episodes and some informative commentary.)

Never, Never Say Die opens with a puzzled motorist who — while tuning in his *Radiomobile* car radio — knocks down a very large man in a dark coat. The 'corpse' gets up and walks out of hospital, only to be knocked down *again* by the same driver.

More incidents follow — a young man listening to a Belair seven-transistor radio has the radio smashed by a large passer-by, a Bakelite home radio is mysteriously destroyed, and then an elderly enthusiast with a radio-controlled model boat has a very close encounter with the same large man.

The sergeant, played by John Junkin, uses a military radio to contact his C.O.

Shortly afterwards, two soldiers, marching through the countryside are using a portable radio to contact their commander — when they suddenly encounter the same large man who proceeds to destroy their walkie-talkie.

The radio used by the soldiers appears to be a U.S. Air Force **RT-159A/URC4**. This is a small hand-held transceiver with RF output on the 121.5 or 243.0 MHz emergency frequencies, for aircrew search and rescue after an airplane has come down. The casing could be finished in yellow or green.

Soldier's radio.

RT-159A/URC4 search and rescue radio had eight miniature tubes.

The main identifying feature is the pull-out telescopic dipole antenna which was set to length for the VHF or UHF band in use. See: http://www.eetimes.com/document.asp?doc_id=1271750 .

John Steed and Emma Peel have been called in to investigate the attacks. While checking a nearby weekend cottage, Steed discovers a note in the diary of Professor Frank N. Stone — "See George Eccles, Aerial Cottage, Serious Interference." Suddenly Steed is attacked by the large man. (Incidentally, Professor Stone was played by noted horror-movie star Christopher Lee.)

John Steed discovers this note in the diary of Professor Frank N. Stone.

Emma sets off to Aerial Cottage — sadly the cottage exterior is only visible as a studio set, with no actual aerials (antennas) visible. There she meets George Eccles, a dedicated radio amateur played by David Kernan. He explains to Emma that Professor Stone has been hounding him for months about interference. "Which frequencies?" asks Emma. "Oh about 540 megacycles" replies Eccles. But that is hardly his territory as those frequencies only operate over short distances, unlike the short waves that Eccles uses to talk to fellow chess enthusiasts around the world.

Emma Peel (right) encounters radio amateur George Eccles at 'Aerial Cottage'.

The Blu-ray version of this episode gives an opportunity to identify much of the equipment in George Eccles' radio room. Some of it is just electronic "junk" but there are other items of authentic radio equipment, suggesting that a UK radio amateur might have helped with supplying appropriate props.

This first shot of George Eccles' radio room shows various items of equipment in use by radio amateurs of the 1960s.

In the establishing shot of the radio room, there is an **AR-88** receiver visible to the right of Eccles, a **BC-221** frequency meter to the left and what seems to be a dark-colored HF transceiver with **Shure 444** microphone on the operating bench. Details of the

Detail from the opening shot shows a dark color HF transceiver on the bench and AR-88 receiver far right.

radio are in shade, but the cabinet, power supply, two-tone tuning knob and control layout make it look very much like a **Swan 350**. This five-band HF SSB transceiver was originally produced in 1964-65, so it would be consistent with the period.

RCA AR-88 communications receiver.

The RCA AR-88 MF/HF communications receiver was a World War II surplus item, highly regarded by post-war radio amateurs with strong arms — it was very heavy. I remember seeing many an AR-88 in amateur shacks of the 1960s, usually alongside a home-brew AM transmitter.

The BC-221 heterodyne frequency meter was also surplus from World War II. In the days before digital frequency displays, I had a BC-221 in my UK shack in order to measure transmission frequencies accurately — and keep the Post Office Inspector satisfied. It could also be used to align homebrew crystal filters. Incidentally, Eccles' chess partner in Tokyo is shown *transmitting* with a BC-221 as the main equipment in an otherwise austere shack — that's a good trick for a frequency meter.

BC-221 frequency meter from WWII, with fold-down calibration booklet.

As Eccles moves from one chess game to another, the camera tracks with him, and we see more of the radios in his cottage. There are closer views of the BC-221 and AR-88 to his left, while on his right a **BC-348** receiver becomes visible with its black-crinkle-

George Eccles moves to another radio where we see the BC-221 on the left and a BC-348 receiver to the right.

paint and characteristic tuning dial. The BC-348 was another item of World War II surplus, in this case an airborne HF communications receiver for the USAAF, housed in a beautiful aluminum case for light weight, with a tuning range of 1.5 - 18.0 MHz. I had a BC-348 in

BC-348 receiver from WWII.

the 1960s-70s. It was the tunable IF for my VHF/UHF receive converters for 4 meters, 2 meters and 70 cm, with outputs in the range 4.0 - 6.0 MHz.

For the third chess game, Eccles moves to another board and an **RF-40** absorption wavemeter comes into view. This was a small piece of contemporary equipment made in Japan. I still have my own Eagle RF-40, purchased in the 1960s to persuade the Post Office Inspector that I was transmitting on the correct amateur band.

RF-40 absorption wavemeter.

RF-40 as used at G3VNQ.

Emma Peel asks Eccles if he can tune in to the frequencies being used by Professor Stone. He is happy to help and tunes in a strange noise on the UHF frequency, boosting the gain at Emma's request. As Emma goes to check a strange noise outside, there is a side shot showing yet another piece of amateur radio equipment. This is a **TW Communicator**, distinguished by its black front panel with meter and tuning dial set between two horizontal chromium-plated strips, like an AR-88. Judging by the lack of a VFO dial, this must be a *VHF* Communicator.

As Emma runs out to check on a strange noise, a TW Communicator becomes visible bottom right, with the matching PSU/speaker just above.

The TW Communicator was a combined transmitter-receiver for amplitude modulation produced by UK Company **TW Electronics**, and owned by **T**om **W**ithers, G3HGE. Models were available for 2 meters, 4 meters and 160 meters AM. It has been described as the original British "Black Box", forerunner of today's popular mobile black boxes imported from the Far East.

I had a TW Communicator for 160 meters, purchased in the early 1970s from Harold G3LWK. It ran the maximum UK input power on 160 meters of 10 watts and fed a "G-Whip" helical antenna (see http://gwhip.co.uk/) mounted on the rear bumper of my diminutive Hillman Imp vehicle. In the days before repeaters, I had a lot of fun driving to and from work while contacting stations far and wide on 160 meter ground wave. Performance was even better when I parked on the Sea Wall at Southport and made contacts across the Irish Sea.

TW "Communicator" was originally manufactured by TW Electronics in Waltham Cross, Hertfordshire, UK.

There are further details about TW Electronics and their super '60s equipment at the following site, maintained by Mike Crawshaw, G4BLH: http://www.twradio.uk .

After the break

Picking up on the *Avengers* story again, we find that Emma's request for Eccles to tune in to the Professor's activities on UHF had a very unhappy effect and she returns to find the radio shack has been destroyed — along with Eccles.

I won't spoil the rest of the episode for you by revealing the "surprise" dénouement, but radio interference is still involved, right up to the very end.

Back to the present

If you remember *The Avengers* from the 1960s, then I'd encourage you to pick up a copy of the DVD or Blu-Ray editions while they are still available. Some of the stories hold up remarkably well, and you can help me identify more of the radio equipment.

The subsequent season with Linda Thorson as Ms. Tara King was also made on color film and has its moments. For example, the **TW Communicator** reappears inside a lighthouse during the episode: *All Done With Mirrors*.

But my fondest memories are for the episodes with **Steed** and **Emma**, from Seasons Four and Five. I would also mention that the series' influential producer and screenwriter **Brian Clemens** sadly passed in January 2015, so why not watch while the rest of his original crew are still with us?

- G3VNQ, NM9J

Peekskill / Cortlandt Amateur Radio Association

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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 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 Mar 1: PCARA Meeting, Hudson Valley Hospital Center, (now *NewYork-Presbyterian/Hudson Valley Hospital*), 3:00 p.m.

Hamfests

Sun Mar 8: LIMARC Hamfest and Electronics Fair, Levittown Hall, 201 Levittown Pkwy, Hicksville, NY. 9:00 a.m.
Sun Apr 12: Splitrock ARA North Jersey Hamfest, Roxbury Snr Cntr, 72 Eyland Avenue, Succasunna, NJ. 8:00 a.m.
Sun Apr 19: Orange County ARC Spring Hamfest, Town of Wallkill Community Center, 2 Wes Warren Dr., Middletown, NY. 8:00 a.m. **Club table**.

VE Test Sessions

Mar 1: Yonkers PAL Ham Radio Club, 127 N Broadway, Yonkers. 2:00 p.m. Pre-reg Michael Rapp, (914) 907-6482.
Mar 1: Yonkers ARC, 1st Police Prcnct, E. Grassy Sprn Rd, Yonkers, NY. 8:30 am. Pre-reg John Costa, (914) 969-6548.
Mar 7, 14, 21, 28: Westchester ARC Radio Barn, 4 Ledgewood Pl, Armonk NY. Pre-reg M. Rapp, (914) 907-6482
Mar 12: WECA, Westchester Co Fire Trg Cen, 4 Dana Rd., Valhalla, NY. 7:00 pm. S. Rothman, 914 831-3258.
Mar 16: Columbia Univ VE Team ARC, 531 Studebaker Bldg, 622 W 132nd St, New York. 6:30 pm. Alan Crosswell, 212 854-3754.
Mar 20: Orange County ARC, Munger Cottage, 183 Main St, Cornwall NY. 6:00 PM. Contact: T. Ray, (845) 391-3620.

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