



The Bull Sheet

The Ocean Monmouth Amateur Radio Club



Winter 2004

The Official Newsletter of the Ocean-Monmouth Amateur Radio Club, Inc.

P.O. Box 267 Oakhurst, New Jersey, 07720

www.omarc.org



At the Helm

OMARC 2004

WHERE DO WE GO FROM HERE ?

Our presence at the Diana site is blossoming nicely. The base plate for our 5 section 80 foot tower has been installed and this spring we will raise that tower with a donated 40 meter beam mounted atop it. This should really give us a potent signal on that band and I'm sure we will be able to work a lot of dx. We will also erect another tower along the side of the building for our vhf/uhf needs and we will address our 80 AND 160 meter concerns by trying to get our Carolina Windom to do its job. When this is all done, we will have coverage from 3.5 thru 144 MHZ plus have coverage for our MARS frequencies.

The recently donated TS450 is in place as our main station transceiver along with the AEA morse keyer and PK232 TNC for digital communications. Back up rigs for HF include the clubs TS440 and TS130 transceivers. (MARS station equipment on loan to OMARC from N2CKH as is the TS-103 from WD2U. The TM-241 was donated by K2KWD. ed.)

For 6 meters we have a donated IC551 and for 2 meters we will use a TM241. Of course our donated Dentron linear is standing by for

future use. Various computer terminals are being readied to compliment each station and an antenna patch panel is being fabricated to manually switch our antennas to various stations.

We're hoping that this is the year that the transfer of the Diana site takes place and goes over to Infoage. When we get ready to do public demonstrations, we will have a first class station that all members can be proud of. Now, where we go from here is going to be up to you. Will all this equipment be there just to look at or are we really going to get involved and make this place shake, rattle and roll? I am counting on each one of you help us do the latter. We finished up 2003 with 70 members and so far 39 have come back to join us for 2004. It usually takes a few months before everyone jumps on board again and I'm hoping that if you were with us in 03, you will again be with us for the new year. I would like to form a committee this year whose responsibility will be to keep our site looking good. I'm hoping that we can get 2 three person crews so that every other month one crew will have the responsibility of a sweep down, damp mopping, dusting and garbage removal. Please volunteer to join one of these committees and do your part in helping the club.

Late Note-

Diana Day was held yesterday at the site and approximately 15 OMARC members were in attendance. Thanks to all those who participated. It turned out to be a nice affair and 65 contacts were made with ham operators throughout the country. I had 3

volunteers for my proposed cleaning crew come forward. Thanks to N2FW, N2JZ and KC2CSJ for helping in this matter. I still would like to get 3 more volunteers, so if you're interested, please let me know.

Nominations for 4 board seats will take place at the February business meeting and I urge you to attend and nominate someone who you feel will lead the club to greater heights in the new year. Per our constitution, a nominee must be a full time member, be at least 19 years of age, be a member in good standing for at least one year and be a full time resident of New Jersey.

I hope you all had a great holiday season and I wish you and yours the very best for a happy, healthy, and prosperous new year.

A Note from the Editor

We have a very special issue for you this quarter. In addition to the Club News and Amateur Radio News in general, Steve N2CKH, has put together a remarkable essay on receivers with plenty of pictures to take you down memory lane. We certainly hope you enjoy this issue and encourage you to share it with a friend.

Cy Stanway VE3IFS/W2

President: Ron Olender, WA2HZT wa2hzt@aol.com

Vice President: Larry Wilkins, KB2RIS
kb2ris@wmconnect.com

Treasurer: Bob Witham, WD2U radiobob@acninc.net
Vice Treasurer: Russ Brahn, AE2X aex2@aol.com
Club Secretary: Steve Hajducek, N2CKH n2ckh@arrl.net
Board Member: Bill Holland, KC2CNB kc2cnb@juno.com
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International Morse Code Gets New ITU Home, New Character:

The 2003 World Radiocommunication Conference (WRC-03) may have eliminated the treaty requirement for prospective amateurs to demonstrate Morse code proficiency to gain HF access, but the International Telecommunication Union (ITU) hasn't forgotten Morse code altogether. In Geneva on December 5, the ITU Radiocommunication Sector (ITU-R) Study Group 8 agreed on the wording of a Draft New Recommendation ITU-R M.[MORSE] that specifies the international Morse code character set and transmission procedures. It also includes a new Morse code character to cover the "@"; symbol used in e-mail addresses.

Once it's made available in English, French and Spanish, the draft new recommendation will go out to ITU member-states using a new procedure for simultaneous adoption and approval. On December 3, the draft new recommendation won the approval of Working Party 8A, which is

Technical Committee
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Member: John, W2YR
Member: Doug, W2UG

Repeater Trustee
Doug, W2UG

Repeater Control Operators

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Steve, N2CKH
Doug, W2UG
Ron, WA2HZT
Jim, K2DE
James, AB2QJ
Art, KC2CRI
Rich, KB2OPQ
Rob, N2QDQ
Larry, KB2RIS
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Ken, KB2KBD
Mike, N2GEG
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Web Master: Steve, N2CKH
Asst. Web Master: VACANT
Club Librarian: Gerry, W1GD
Club Inventorian: Steve, N2CKH
SSC Liason: Gerry, W1GD
QSL Manager: Steve, N2CKH
Assistant QSL Manager: VACANT
Diana Site Manager: Larry, KB2RIS
Club Postmaster: Rich, KB2OPQ
Sunshine: Pattie, KA2TGC
50/50 Manager: Russ, AE2X

responsible for the Land Mobile and Amateur services.

Within the ITU, the international Morse code has been defined by the Telecommunication Standardization Sector (ITU-T), which is responsible for the public telephone and telegraph network—mostly landline. A couple of years ago, the ARRL pointed out to the US delegation to the ITU Radiocommunication Advisory Group that Morse code's role more properly resides in the radiocommunication realm, not wire, and should be the responsibility of ITU Radiocommunication Sector (ITU-R).

The transfer was agreed to, and International Amateur Radio Union (IARU) President Larry Price, W4RA, proposed the draft new recommendation at the November-December Working Group 8A meeting. The draft new recommendation is almost unchanged from its ITU-T text.

To keep up with the times, however, the IARU proposed adding a new character—the commercial "at" or @ symbol—to permit sending e-mail addresses in Morse code. The draft new recommendation proposes using the letters A and C run together (.—.-) to represent the @ symbol.

While the draft new recommendation is still a working document, its expected to become a Recommendation within six months or so, pending approval by member-states.

Center (SARCC) station located at the National Weather Service Forecast Office in Mount Holly, New Jersey. The Mount Holly NWSFO serves approximately eleven million people in thirty-four (34) counties located within Delaware, Maryland, New Jersey and Pennsylvania. The office is located at 732 Woodlane Road (State Route 630) off of State Route 541 in Westhampton Township, Burlington County, New Jersey. Nick Ipri (KB3JPK) and Mike Patton (W3MJP), Members-at-Large of the SKYWARN Advisory Committee, will be coordinating efforts to staff the NWSFO office with SKYWARN personnel.

SKYWARN Communication Center activation will be based upon prevailing and/or anticipated radio communication center as well as with the operation of the radio, computer and telephone equipment. Volunteers who do not possess a current amateur radio license will be able to operate the station under the supervision of a licensed amateur radio operator and will be handled by the SKYWARN volunteers staffing the SARCC. SKYWARN volunteers who are interested in participating in this program will be expected to become familiar with SKYWARN Net Control Operator guidelines and operating procedures designed by the Mount Holly NWSFO SKYWARN Advisory Committee specifically for the amateur radio communication center as well as with the operation of the radio, computer and telephone equipment. Volunteers who do not possess a current amateur radio license will be able to operate the station under the supervision of a licensed amateur radio operator and will be able to participate in other station activities. Questions about the program should be directed to Nick Ipri or Mike Patton.

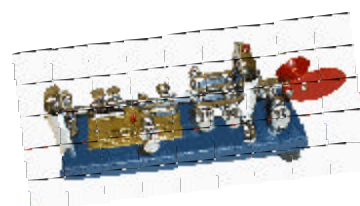
SKYWARN Weather Spotters who are interested in participating in this program should contact Nick Ipri via e-mail at nipri@ieee.org.



WX2PHI Mount Holly NWSFO SKYWARN:

Amateur Radio Communications Center to be staffed by SKYWARN Personnel. The National Weather Service's Mount Holly Forecast Office, under the direction of the

SKYWARN Advisory Committee (formerly the SKYWARN Technical Committee), is seeking SKYWARN volunteers to staff the WX2PHI SKYWARN Amateur Radio Communications





I am saddened to report that Charlie Puryear, KB2PUI is now a silent key. Charlie passed away from a brain hemorrhage at Monmouth Medical.

The photo of Charlie above is the best that I could find at present in the old photo archives, it was clipped from a group photo taken after the 1999 OMARC foxhunt.

Charlie and his wife Nina were once very active in the local Amateur community, especially with OMARC and public service activities as most will recall. Over the last few years they have both suffered with some health issues and will be very much missed.

If You Haven't Paid Your OMARC Dues, Yet...

As everyone should be aware, OMARC dues are do in full after the first of the year, however if you pay before 31 December as a single member you get a discount. For convenience, please find an attached .PDF file renewal form.



In 2003 OMARC has made many advances which have all been chronicled herein during the course of the year. Among some of our most worthy efforts we now have an MOU in place with MCARS for the Emergency use of our club sponsored 2 meter repeater and we have charted a course in support of U.S. Army MARS with the AAR2CAB club station.

In addition, we now have the additional capability of a functional test bench at the Diana site which is being used for club projects and members to work on both club and personal Amateur Radio endeavors.

Also, we continue to offer FREE Technician classes and provide VE testing as well and the number of VE's in the club has double during 2003.

Without question, OMARC is the most active and responsive Amateur Radio club in central NJ and with membership support we can be even more in 2004.

The Receiver in perspective.

By Steve Hajducek, N2CKH

I love radio signal receivers of all types, it all started in 1965, when at the age of seven, my Father gave me my first receiver, an old military communications receiver, a Hammarlund Super-Pro 200 (SP-200) that he had secretly setup for me in the basement due to its size and weight and having to bring in a wire antenna lead from outside and I was hooked. When he handed me a Winchester 1890 .22 gallery pump rifle (I have had a Rossi reproduction for 20 years now) a year later, I was hooked again, which is why I own almost as many radios as I do guns, but that's another story. I spent many hours in that basement listening to my SP-200, it was pretty cold in the winter and dank in the summer, but that did not matter much, I remember arriving home from school and immediately disappearing into the basement for a new shortwave adventure, that SP-200 remained in the basement all through my school years and even after moving away from home, that is until I bought my first home and had a place for it in 1985.

Unknown to me, I had actually been using a receiver daily, long before my SP-200 gift, although I did not even know it was a receiver or did I have any idea until many years later that the two were in any way related. As I later learned, there are many types of radio signal receiver's; with respect to the shortwave bands there are three main classes of

receiver, the "Communications Receiver", the "Shortwave Broadcast Receiver" and the "General Coverage Receiver". Radio Amateurs should know the difference between those three types of receivers, they were all developed (and perfected to some extent) during the vacuum tube era and prior to World War II (WWII) and still exist today in various forms.



By now you have probably guessed that the receiver I had been using prior to my SP-200 was a Television (TV) receiver, a Black and White (Color TV debuted in 1953, although not in my household until 1970) TV set actually. Did you know that both Television and Radar receivers were developed during the same pre-WWI era as my SP-200. The Cathode Ray Tube (CRT) that led to the development of various test and receiver equipments had actually been around since before 1900. I bet many of you did not know that television broadcasting actually existed prior to WWII, well it did, although not like we are familiar with today. I remember my Father telling me how he first experienced Television

when he was 18 and seen TV demonstrated to visitors at the NY Worlds Fair in 1939 and then seeing televisions for sale at Christmas just a year later at Macy's in New York city, although he and most other people did not own one until well after the end of WWII. A few years later he left his job at Western Electric and enlisted in the Army Signal Corps where he rose to the rank of Technical Sergeant while in South East Asia carrying an M-1 Carbine and installing Field Telephone and Radio Communications centers, he never learned Morse Code as he was not a radio operator.

Back to my new SP-200, the thrill of monitoring the world of Shortwave filled with signals from standard AM broadcast to exotic mystery signals was so exciting to me a child, its still exciting to me an old man of 45. There was and is a new adventure with each rotation of the VFO knob or tuning dial. I remember monitoring signals as a child in foreign languages that I did not (and still don't) speak and signals making strange sounds that I could not identify. There were Broadcast, Amateur, Commercial, Maritime and Military signals to monitor and so much more, I did not even know the names for the categories of the stations I was able to receive at first, it was a new world to me and I was very eager to learn what it was all about and over time did as I explored the airwaves, listened (a key quality for all new Amateurs) and made notes and did research at the public library. Those strange sounding signals later in my teenage years lead to the acquisition of Terminal Units (TU's) and according to my Mother, big, noisy, smelly Read Only (RO) and Keyboard Send Receive (KSR) Teletype equipments, later replaced by dedicated TU's and video monitors as I became a utility station monitor and wanted to decode every signal that my receiver received.

Receiver technology has changed over time, as most things do and not always for the best, what is currently found on the shortwave bands to monitor has changed as well, an awful lot has moved off to other venues such as satellite and new modes are now being used that old receivers were designed to support, even on our Amateur bands, the older receivers have a hard time in many cases standing up to the crowded conditions with stations too close, distorted and running high power, splattering up and down the band. Many of the changes to the modern communications receiver have been good, however today's radios for the most part do not have the same character as models from yester year, they do not even have the contrast of bright colors to highlight important controls on the front panel, or ranges on the S/R/F meter, the newer designs are rather bland in visual appeal. Perhaps its more perception than fact, but I have more affection for an older receiver with character, one that looks and feels like the radios I grew up with than a modern state of the art radio, a brand new piece of used piece gear is more exciting to me than the latest radio equipment, new gear is simply a needed tool for congested band condition survival, something to keep me competitive, something to demodulate today's latest digital modes or to fill a niche need like QRP or mobile operating, nothing more.

I own some of the latest Amateur Radio transceivers on the market, such as the Yaesu FT-847 in my truck and the FT-817 in my backpack, so I can attest to some extent as to what is and what is not great about today's receiver technology. I also own and use some slightly older models in my activities, such as the Yaesu FT-890/AT, Kenwood TS-930S and TS-450S/AT models that I use daily for my Amateur and MARS operations, they are all excellent solid state HF transceivers

with General Coverage receivers featuring a number of excellent receiver capabilities, however when using them just for receive, they just do not provide the same feeling as using an older, stand alone communications receiver.



However, the TS-930S comes the closest as it was designed at the transition era from hybrid to all solid state and although it has a digital display, it also features a moving red marker on the 0-1000khz sub dial display that provides the sense of tuning



an older rig. It also has one, if not the best of receiver with plenty of needed tools and the best S/R/F meters in any HF transceiver ever made in my opinion.

I was very fortunate to begin my radio experiences with a good quality receiver and to later acquire real world experience as a young engineer with some of the best receivers ever made. When I was first licensed as a Radio Amateur in the 1970's the ham radio manufacturers still offered separate receiver and transmitters (a.k.a. twins) for HF, by the end of that decade however that was no longer true, the transceiver was then the only game in town. Although the world of radio equipment has transitioned from the vacuum tube era, to the hybrid era, to the all solid state era, to the integrated circuit era, to the microprocessor controlled era and now into the

software defined digital era, I have a huge appreciation for what man was able to accomplish with vacuum tubes and pre-microprocessor solid state technology. Although we have gone from 100 pound plus backbreaking rack mounted models to table top, to portable, to handheld receivers with ever more features, I cannot part with my past. The list of advances in receiver technology over the past 100 years is quite extensive, but there is more to a communications receiver than just its specifications, in my opinion it has to do with character.

Receiver technology has advanced to the point where models of old just do not compare technically with today's latest, such advances as IF filtering going from mechanical, to crystal and now to Digital Signal Processing (DSP) filtering are dramatic changes. It all began with spark and Morse Code and transitioned to Continuous Wave (CW), thus outlawing the use of spark, which was followed by Amplitude Modulated (AM) radiotelephone, then Frequency Modulated (FM) phone, still later data modes, with RTTY (today there are so many digital modes its mind boggling) being the main mode for many years and still used today. Later Single Side Band (SSB) came along with commercial and military support and killed off AM in all but broadcast, Military and commercial aviation and some Amateur use. Then there is Independent Side Band (ISB) which was only used in commercial, government and military applications for point to point data and studio relay feeds like two languages at the same time for the same shortwave Voice of America (VOA) studio feed.

Now we have multiple narrow band Digital Data, Image and Voice modes for communications becoming common place on shortwave and within our Amateur bands, many of these modes can be decoded using a personal computer and sound card, many required dedicated modems, almost all require extreme receiver frequency stability a task which older receivers are not up to delivering. In the shortwave broadcast world the newest development is Digital Radio Mondiale (DRM) standard [IEC 62272-1] for multi-media digital radio broadcasting standard for frequencies below 30 MHz. where a raw 12 KHz. digital data signal is converted at the receivers IF stage for up to four mono-stereo programs simultaneously or a single stereo program with FM quality sound and supports digital data for text display, still images and web pages.

The present state of the art in receiver design has many benefits, DSP at the IF is great, however it does not make up for a bad front end, regardless, there is just something timeless about sitting down in front of an older shortwave receiver, flipping that electro-mechanical on/off power switch and listening to the noise during the time it takes to come alive in anticipation of what signal will emerge from that old set of 1000 ohm head phones (I later found a use for my 1000 ohm phones when I bought a Ten-Tec PWM2 QRP rig as a Novice, boy the micro phonics with the PWM2 had when I bumped things) or the 600 or 16 ohm speaker or whatever your classic setup provides. For instance, the thrill of using an old vacuum tube short receiver that was used to receive radio signals before one was even born is something that is hard to put into words. Seated there in front of you is something that was built before you were born and you are listening to signals being received in 2004 and wondering just what had been received by that radio over the years, it is just simply fascinating, and in some cases challenging to keep working as some of those hollow state devices are getting harder to find, even the substitutes are disappearing.

However using a pre-1980 shortwave receiver design, vacuum tube or most solid state models, required using two hands to adjust your receiver controls simultaneously, such as your band spread, pre-selector, beat frequency oscillator (BFO) for CW/SSB demodulation, audio gain due to signal strength changes etc., that was real radio, you needed the knowledge and experience of a radio operator to use one, you didn't just turn it on and dial up a frequency on the digital display and select a mode with one of those receivers, if you did not understand the mechanics involved you did not know what frequency you were on and probably did not receive much or anything. The dial calibration resolution may be at most 1Khz, most only 5Khz, many even less, not exactly what you want if you are an Official Observer and

want to determine if a station is operating in band or not. Then after changing frequency a few hundred kilohertz you needed to teak that pre-select and maybe even turn on the crystal calibrator (if your so configured, I can remember buying an outboard MFJ crystal calibrator as a Novice) and zero beat the main dial, now that's real radio. The next best thing is using a receiver is an all tube or a hybrid HF transceiver for the fun of it, those of you that have never used anything but solid state radios have no idea of the skills needed (or limitations these days) to operate HF with such a radio, anyone that uses one for their main radio still is either just getting started and its all they can afford or real slow to accept change or only operates on CW.

Although today's newer receivers have capabilities that far exceed the older vacuum tube models like my Hammarlund receivers, such as being far superior in frequency stability, having better sensitivity, better IMD, built in digital displays, computer control and more, they do not have the character or the charm of the old Hammarlunds or any of the older vacuum tube or early solid state models. Any old, high quality communications receiver in the class of a Hammarlund Super Pro is a treasure, my Hammarlund SP-200 was my first and you know what they say about your first love. I have not always been faithful to my SP-200 though, I have had many others since and I welcomed the Hammarlund HQ-120X into my life a few years ago, and would do the same for an SP-600 on a seconds notice. Oh if I only had the budget and the room for each and every make and model of classic shortwave receiver that was ever made, its interesting to review the features of the old designs to see the impact on today's models, many of today's units implement capabilities that were developed years ago but did not work well due to the technology available then to implement the idea, many of today's Amateurs and even communications professionals do know and thus can not appreciate these facts.

When I was a young engineer just out of school, I had the pleasure of using a number of high end communications receivers that were brand new models and many dating back to the early 1960's (there were some museum pieces around too!) while I was employed at ITT (began there in 1981) in the Avionics division working on the ALQ-117 Electronic Countermeasures system for the B-52 bomber. As we were in the same building at ITT Defense Communications Division (DCD) that were developing the new SINGARS frequency hopping radios and near the antenna test range and calibration lab, receivers were all over the place. I was, as you can well imagine, thrilled to have my hands on a number makes and models of sophisticated communications receivers, many that I had never even knew existed, both vacuum tube and solid state models, US (Collins, Drake, Hammarlund, ITT, National) and foreign (Eddystone, Marconi, Racal, Siemens) made models and many military models, with features (like received spectrum panoramic display where signals from the receiver IF amplifier, before the IF filter are sweep and displayed on the vertical axis of an oscilloscope display, more on panoramic displays later, also external fundamental frequency notch filtering and IF notch filtering) which were not yet common in Amateur Radio equipments.



At ITT there were various general coverage receivers in use, vacuum tube Hammarlund SP-600 and R-390's and Collins 51S-1 (and 51S-1/LTVG133H with panoramic spectrum display, more on panoramic displays later) and newer solid state Collins 651S-1, Drake RR-1 and R-7, National HRO-500, ITT/McKay DR-44 and others, in addition, although a transceiver, there were a number of Collins HF-380 units being used as receivers. They were all built to last a lifetime to receive mission critical signals either over the air for long haul communications or used in laboratories during experimental design development or testing. Some were used for communications purposes and some were used to check for RF leaks from other military systems. Whatever they were used for, to me they were all exciting to see and have my hands on as young junior engineer and I wish I could have taken them all home with me at the end of the day. Interesting note, there were also a number of rack mounted, dedicated WWV receivers and WWVB comparator receivers at ITT, I later went to

work for a company called Lavoie Laboratories in Morganville, NJ that had built some of the WWV units at ITT, they were also in the Oscilloscope and Spectrum Analyzer business, however by time I went to work for them they were no longer in that business, but a number of the old units were still around the Lavoie factory, including a Hammarlund HQ-120X and a beautiful Collins 204F-1 three stage HF power amplifier, both of which I eventually ended up owning.

As I have past the age of 40 and can afford to do so, I have also started a collection of radio equipments that I wanted when I was younger and could not afford to purchase, my main interest in the 1970's Yaesu hybrid equipment line as can be seen the partial photo of my collection, not only because it was what I was interested in back in those days and appeals to me still, but also because the line is still readily collectable at low prices.





In my collection receivers (three tube, six solid state receivers) I have two vacuum tube models that date back to World War II and before, my venerable rack mounted Hammarlund SP-200, my first ever receiver which I later learned was the king of military receivers before and during WWII, along with its home made external power supply. The SP-200 provides for .1-16Khz variable IF passband, great for CW to AM, a bit wide for AM in our crowded ham bands today though, until I bought my first (I currently own four) TS-930S in 1984 it was the first modern transceiver that could tailor the IF passband width from 100hz to 10Khz by cascading filters and the SP-200 was designed in the late 1930's!

I also have the just ever so much newer WWII era Hammarlund HQ-120X which includes an internal power supply that I received just a few years ago from the estate of my good friend Kay Sears, who served as Captain Sears in WWII and commanded a communications station in Alaska copying CW at 65 words per minute on a mechanical typewriter and later as an Engineer and eventually Chief Engineer with Lavoie Labs was involved in WWVB receiver and spectrum analyzer development. Kay had purchased the HQ-120X from Lavoie many years ago, however he often brought in back into factory for various lab work.



Then there is my third vacuum tube receiver, a late 1960's vintage Japanese made 9R-59 General Coverage receiver by Trio-Communications (later Trio merged with Kenwood to become Trio-Kenwood) that I had aspired to own as a kid, which I only managed to acquire a few years ago, it is not in the same class as the Hammarlund receivers, but it's a much smaller and lighter table top unit which uses newer tubes that glow in the dark, that's an inside joke as my Hammarlund receivers have metal case tubes so they don't glow in the dark.

Even though born I was born in the transistor age, the world of solid-state electronics did not exist in my young world, everything was vacuum tubes until the late 1970's. In our household all the electronics except for the gv transistor radio used tubes, the wall clock, the clock radio, the TV sets, all tubes, the first major solid state device purchased was a portable Color TV for my parents bedroom. It was many years before my first solid state shortwave radio came along. It was a Christmas gift from my parents in the mid 1970's, I had asked for a Yaesu FR-101S communications receiver, I received a Radio Shack Patrolman 9 portable radio, not exactly what I had wanted. Made in Japan, AC or battery powered, it was a typical broadcast, shortwave, VHF/UHF FM portable radio that feature an on/off BFO for tuning CW/SSB signals and not very well. I was an aspiring Amateur by then and planned on the FR-101S for Christmas and then the FL-101 transmitter for my birthday when I got my ticket the following year.

It would take some 20 plus years latter before I acquired an Yaesu FR-101S, found one fully loaded with all shortwave band crystals and the



hard to fine 6m and 2m converters and then later an FR-101SD/FL-101, the FR-101SD has a digital display). A few years later, when I was in school at DeVry in the late 70's we had a pair of Kenwood 599 twins, the R-599D and T-599D to be exact (not too long ago I added the original R-599 to my receiver collection for \$115 shipped from eBay, not only is it better looking than the later R-559D, it has one additional band, 11 meters, which with a crystal change and re-alignment can be made to work on 12 or 17 meters or not)

and I ended up getting my Novice ticket and buying a Kenwood TS-520SE before graduation as the Yaesu '101 line as I knew it ceased production.





My first true General Coverage, all mode receiver without any gaps in coverage was a gift to myself in the early 1980's in the form of the Yaesu FRG-7700. By then I had wanted a smaller general coverage receiver with better frequency stability for RTTY. The FRG-7700 had no optional filters, even provided AM wide-narrow and CW wide-narrow standard, along with FM reception. The FRG-7700 went all the way from VLF to 30Mhz, I actually used it as low as 30Khz to

monitor slow speed RTTY from the U.S. Navy NAV station that was sent in the open during my last SWL utility station years when I was still living in Sayreville, that was after I have built an external filter to block the AM broadcast and beacon signals in the 300-1600Khz range.



As I am always on the lookout for receivers that I aspired to own but did not have the funds for as a youngster, not too long ago I also added a mint condition Yaesu FRG-7 that also included an after market digital display unit. This was an extremely good receiver design that featured the famous Wadley Loop system which was being used in military receiver designs. The shortcoming of this mid range priced receiver was its 5Khz. dial frequency resolution, the external display addresses that issue. The FRG-7 was so popular that you could even go down to your local Sears store in the U.S. and purchase one if you had the funds, I have seen many Sears labeled models over the years, however they are always priced to high due to expectations of collector interest, some just have a Sears label on the front and others were in black with Sears silk screened on the unit..



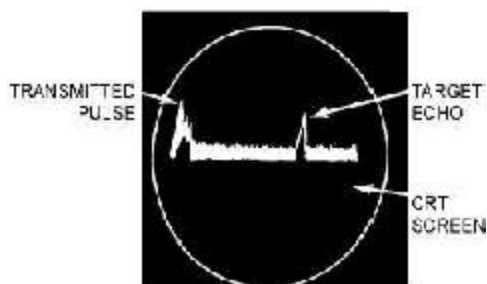
Then shortly after acquiring the FRG-7, I came across a great deal on an FRG-7000 General Coverage receiver to add to my collection, this was their first to include a built in digital display and also used the Wadley Loop principle.

For club members that have never experienced or want to relive the thrill of using a stand alone communications receiver, we have a few on hand at the Diana site. First, we have the general coverage receiver capability (note, they now transmit out of band as well for MARS use, so be careful) of the Kenwood TS-440 and TS-450 radios at the club station. However, we also have a Kenwood R-2000 solid state all mode receiver at the Diana site, which is simple to use by any first time user. Then

we have a late 1970's hybrid Drake R4-C receiver and matching TX-4C transmitter, it makes for a complete classic station, I am in the process of putting this station back together and aligning it for our members (with proper instruction) use.

We also have the very scarce FS-4 frequency synthesizer (full frequency coverage in .5Mhz steps from 11.10 through 40.60 MHz). Also at the Diana site is an old RCA BC-348 WWII aircraft communications receiver, which I have yet to investigate, I have used these in the past, they were in almost all large Army aircraft during WWII through Korea, it's a similar design to the SP-200, a bit smaller and lighter as size and weight were key design criteria for aircraft.

On the subject of Panoramic displays mentioned earlier, I bet you guys with ICOM rigs with CRT/LCD displays thought ICOM came up it, not so, the panoramic display or pan adaptor goes back to the days prior to WWII. The first commercial "Panoramic Adapter" or "Pan Adapter" first appeared in the Amateur Radio world commercially after WWII when in 1946, the Hallicrafters company sold the SP-44 Skyrider Panoramic display which was actually the Panoramic Radio Company model PCA-2 T-200 Pan Adaptor, which was found in only the best equipped Amateur (most wealthy) had in their station. I have long found the visual display of my receiver pass band to be a very interesting and useful tool to rapidly identify a new signal on the band while DXing or waiting for a prearranged schedule +/- 5Khz or to rapidly find an interfering signal and more.



It was during WWII that the use of panoramic display equipment first became valuable for use with communications receivers and in radar techniques (prior to the polar plot indicator or plan position indicator display (PPI)) and while monitoring enemy broadcasts and for locating off-frequency distress and emergency transmissions. The earliest radar systems used the simple A-scope display, as did the panoramic display, on an electrostatic-deflection CRT the sweep is produced by applying a sawtooth voltage to the horizontal deflection plates. The electrical length (time duration) of the sawtooth voltage determines the total amount of range displayed on the CRT face, the radar antenna was fixed in position, or could be steered from target to target by an operator,

much like a searchlight, with the direction to the target given by the antenna position and the range by the length of the trace on the A-scope, later with the PPI a "cathode ray display tube (CRT)", much like a modern TV picture tube, displaying echoes from a rotating antenna. A moving sweep on the display, tracking the rotating antenna, painted a "picture" of what the radar unit saw. The CRT had a high-persistence phosphor so the sweep would leave an image on the display that would fade slowly, and be updated by the sweep on the next pass.



These radio countermeasures uses of panoramic display equipment went from infancy to amazing maturity during WWII, including initial exploration of concepts that were well beyond the capabilities of technology of the day that were revisited in the future. Many of the concepts explored during WWII have only been fully realized operationally since the advent of integrated circuits. The panoramic receiver or pan adapter in various forms was used for radio surveillance to acquire, record, and analyze German and Japanese communications and radar activity. For those familiar with WWII era receivers, the military APA-10 panoramic adapter was used with the ARR-5, ARR-7, and APR-4 or APR-5 receivers of the day, if you visit the Diana site, look at the photos of the 1946 moon bounce experiment and you will see the panoramic display of the returned pulse off the surface of the moon.

The development of Panoramic display in receivers lead to sophisticated radar and surveillance receivers and the later development of the dedicated Panoramic Display Monitor and then even later the Spectrum Analyzer, which are both basically a special forms of radio receivers with built in CRT displays for the visual monitoring of received radio signal spectrum and amplitude, these are used for specialized radio surveillance as well as test and measurement activities. I acquired my first such unit in the 1970's, it was a commercial vacuum tube Singer model which went as high as 26Mhz (the white unit with orange display resting atop its power supply in the photo of my basement test bench from the early 1980's when I lived in Sayreville) I later came across a military version of the same unit in use at a company I went to work for in the late 1980's.



I had a great time exploring signals on shortwave with that Singer unit. I later acquired a two piece HP spectrum analyzer that went from 10Mhz to as high as 40Ghz with options, that opened an entirely new world for my monitoring and test bench activities (center of the photo with my Lafayette HA-126 2m FM radio on top) by the way, my old Heathkit HW-16 CW transceiver is visible atop the oscilloscope on the cart and my Hammarlund SP-200 can be seen on my number 2 test bench at the left.

A later development that can be traced back to the Panoramic display is the communications analyzer or communications service monitor, I own an older Motorola R2002D/HS communications analyzer that in addition to many other features, supports the modes of CW, AM, SSB and FM (PL/DPL) for receive and transmit (very low power) and has a built in 1Ghz range spectrum analyzer, not only is this a valuable piece of test equipment, but it makes for one great communications surveillance receiver, I use it almost daily to monitor signals and observe the parameters of those signals.

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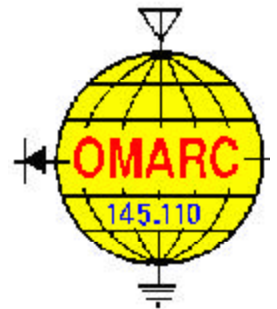
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