AMATEUR RADIO THROUGH THE AGES

AN INSTALLATION BY
THE MURGAS AMATEUR RADIO CLUB
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THE UNIVERSITY OF SCRANTON DEPARTMENT OF PHYSICS AND ENGINEERING

DISPLAY CASE 1: 1910s-1940s

Old *QST* Magazines
QST is the official organ of the American Radio Relay League and began publication around 1914. It is still published. These issues are over 100 years old. The longtime motto of *QST* is "Devoted Exclusively to Amateur Radio". Note the issue on the lower right with the *QST* logo in green, boasting that it is "Devoted Exclusively to Citizen Radio"! No, this came out decades before CB. The editor used that motto because amateur radio was the only radio service at the time that was available to private citizens, rather than to businesses or government agencies.

Morse keys
Self-explanatory, these are straight keys used for sending Morse code. The one on the left is a cheap version that does not have any screws for adjusting side play. The long defunct Lafayette Radio sold these in 1967 for 69 cents. The key on the right has the side play adjustment. The lever on the right is used to transmit a continuous carrier for tuning a transmitter. In the days when CW was used in the maritime radio service, the radio operator of a ship in distress could close this lever for about ten seconds to allow those who heard his distress call to get bearings on his ship, although few maritime CW operators actually used straight keys such as these.

Hallicrafters S20R receiver
This receiver was manufactured by Hallicrafters of Chicago from 1939 to 1945 and covered frequencies from 540 kHz to 44 MHz. It features bandspread tuning, making it easier to separate stations, AVC (automatic volume control), ANL (automatic noise limiter), and a BFO (beat frequency oscillator, used for tuning in CW signals). Over the years, Hallicrafters added features and introduced newer models. Once one of the great American manufacturers, Hallicrafters succumbed to the Japanese Invasion, as cheaper imports crowded its products out of the marketplace.

QSL cards
Those postcards that are displayed on the wall behind the radio equipment are called QSL cards. For well over a century, radiotelegraphers (including amateur radio operators) have used a series of three-letter abbreviations beginning with the letter Q as a substitute for phrases or even entire sentences. Since these mean the same in every language, they are an excellent way to transcend language barriers. The abbreviation QSL means "to confirm". To confirm a radio contact, amateur stations would send postcards with their call letters, date, and time of the contact.

Many amateur radio organizations, such as the ARRL, offer awards for making confirmed contacts with certain types or numbers of stations, such as WAS (Worked All States, for contacting stations in all 50 states) and DXCC (DX Century Club, for contacting stations in 100 countries). Traditionally, QSL cards received from the stations contacted would be submitted to the sponsoring organization as proof that the award was earned.

Due to the high cost of postage nowadays, many stations confirm contacts electronically, using apps such as LoTW (Logbook of the World, provided by the ARRL) and these confirmations can be submitted electronically for earning awards.

Additional Items
This case also includes a homemade transmitter from Bill Gallagher and a CW key that belonged to Walt Jones.

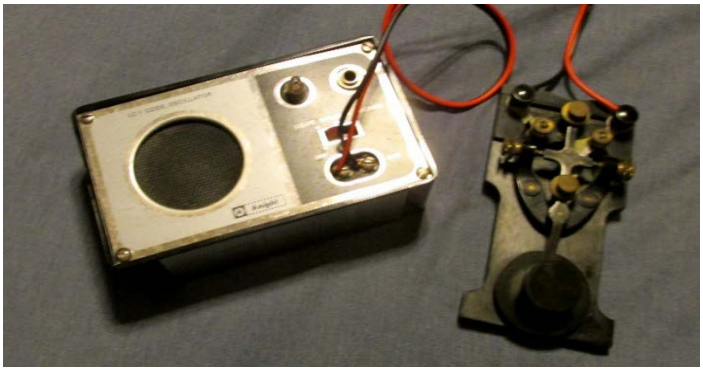
DISPLAY CASE 2: 1940s-1950s

RCA carbon microphone
The element in this microphone contains granules of carbon, which are compressed when sound hits the diaphragm. A DC current is passed through the element and the compression, which increases the conductivity of the carbon, produces a variation of this current/voltage at an audio rate. Telephone mouthpieces used such elements for decades.

Hallicrafters S40A and R46
The Hallicrafters S40 line began in 1946 and ran until 1954. This is a general coverage receiver that covers 540 kHz to 43 MHz in four bands. The R46 is the external speaker with the lower case "h". It was produced briefly in the 1950s.

DISPLAY CASE 3: 1950s-1970s





Speed-X straight key from World War II

This is a Speed-X straight key that belonged to the late Walter Jones (WN3LIF), past president of the Murgas Amateur Radio Club and Amateur Radio Emergency Coordinator for Luzerne County. Walter was involved in helping a lot of people get their amateur radio licenses and become involved in emergency communications.

Note the wartime date stamped on the bottom of the base of the key. This key itself is of more rugged construction than are the ones sold in the civilian amateur radio marketplace after the war. Note the thickness of the metal baseplate. This key also has the adjustment screws for sideplay. The other two adjustments are for tension (the spring) and the size of the gap between the contacts. These are set to maximize comfort in sending and to minimize fatigue (also known as "telegrapher's paralysis" or a "glass arm").

1390 microphone

This dynamic microphone produces audio by moving a small coil past a magnet. The design is robust and many of these microphones still show up at hamfests and internet auction sites.

Knight code practice oscillator and J37 key

Knight was the brand name of Allied Electronics of Chicago, representing amateur radio equipment and accessories that are no longer manufactured. Prior to 2000, those wishing to obtain an amateur radio license had to pass a proficiency exam in the International Morse Code. This oscillator is a small audio oscillator with a built-in speaker, allowing one to practice sending. The J37 key is a surplus item, although knockoffs of it are still sold by various companies. It may also be found at hamfests and on the internet auction sites.

Heath Station from 1949

The Heath Company of Benton Harbor, Michigan once sold kits for building airplanes--no, not models but real airplanes that a pilot could fly! After World War II, a lot of radio parts and equipment became available as government surplus. Heath had the idea of selling amateur radio equipment and other electronic items in kit form, using these parts. Many of us older folk turned to Heathkit as a way to get radio equipment that was far less expensive than the stock items from Hammarlund, Hallicrafters, and especially Collins. There was a trade-off. A mistake in assembling a Heathkit could result in much aggravation and long hours of troubleshooting; in fact, this stuff was often called "Griefkit". But, properly assembled, Heathkits provided fine radio equipment at a fraction of the price of the competition. Heath disappeared some twenty-five years or so ago. Here's a description of the items in the picture, counterclockwise from upper left:

1. SWR bridge. This is used for tuning an antenna system for the best match to the transmitter.

2. Model AC-1 antenna coupler. This is a simple pi or L-network used for matching a wire antenna to a transmitter. The indicator is a neon bulb. You would tune for the brightness of that bulb. If you had the SWR bridge, you would connect it between the transmitter and the AC-1 and tune for the lowest SWR.

3. Model AT-1 transmitter. This is a small CW transmitter (25 watts DC input) using a classic MOPA (master oscillator/power amplifier) design. It has just three tubes: 5U4-G rectifier, 6AG7 oscillator, and 6L6 final amplifier. It covers four bands: 80, 40, 20, and 10 meters. When the FCC began issuing Novice Class licenses in 1952, this was the ideal transmitter for beginners. Fifteen meters was not an amateur band when this transmitter was manufactured.

4. Model VF-1 VFO (variable frequency oscillator). If one did not want to have to keep a box full of crystals in order to operate on various frequencies, a VFO eliminated this need, providing continuous tuning across the desired band(s). The VF-1 has two tubes: an 0A2 voltage regulator and a 6AU6 pentode oscillator. The output on the three bandswitch positions is 1.8 MHz on 160/80/40, 7 MHz on 40/20/15/10 and 6.75 MHz on 11. (Yes, 11 meters was an amateur band in the early 1950s, when the VF-1 was sold.) Extreme care had to be taken when using a VF-1 on 80 meters, as it was easy to mistune the transmitter to the third harmonic of the VFO, putting a healthy signal on the 5.4 MHz HF aeronautical band.

Heathkit Q-multiplier

A Q-multiplier is a receiver accessory used to increase the selectivity of the receiver and reject undesired signals. This one, the Model QF-1, was offered by Heath in the 1950s.

Hallicrafters HT-18
This VFO/low power transmitter provides up to 4 watts output of unmodulated carrier or narrowband FM. Some amateurs turned to narrowband FM to escape interference problems caused by AM signals being rectified and detected in telephones and home entertainment equipment. The band coverage dates the HT-18 to the early 1950s, as it includes the 15 meter band. THE 10 meter scale also includes 27 MHz. Eleven meters was an amateur band back then.

Hallicrafters S53 receiver
This is another general coverage receiver made by Hallicrafters. It was in production from 1950 through 1959. On the top band, which is the AM broadcast band, note the round symbol with a triangle in it. This is the CONELRAD (Control of ELectromagnetic RADiation) symbol once used by Civil Defense, whose logo was the red letters "CD" inside a white triangle and a blue disc. On broadcast receivers sold until the mid sixties, this symbol marked 640 and 1240 kHz. If the government activated CONELRAD, all normal broadcasting would stop and people were instructed to tune to 640 or 1240. There, clusters of stations in a given area would move to either of those frequencies and keep the filaments on in the transmitter. A signal sent by wire from a Common Program Control Station would turn the plates on at a given station for 5 to 30 seconds while emergency program material was sent to all stations in the cluster. This was said to enable listeners to receive emergency information while denying enemy pilots the ability to use local broadcast stations as direction finding aids. (The Defense Department learned that the Japanese homed in on KGMB and KGU in Honolulu in order to find Pearl Harbor.)
The STANDBY switch mutes the receiver during transmission.

Additional Items
This case also includes an ElectroVoice Model 638 microphone.

DISPLAY CASE 4: 1970s-1980s

Yaesu FT-101B
This transceiver was in the vanguard of the Japanese Invasion. Just as the British Invasion of the 1960s changed popular music, the Japanese Invasion, which started in the 1970s, changed amateur radio. Longtime American manufacturers, such as Hallicrafters, Hammarlund, Drake, Swan, and Collins, were displaced by cheaper imports made by Yaesu, Inoue (now Icom), and Kenwood. Some of the American firms went completely out of business while others stopped making amateur radio products. Drake, for example, concentrates on TV satellite receiver products and Collins (now part of Rockwell International) is a major government contractor. The

FT-101B is a hybrid rig, solid state except for the driver and final amplifier in the transmitter section. It covers 160 through 10 meters, AM, CW, and SSB. Since early versions of the FT-101 (including this one) included the 11 meter band (26.96-27.23 and 27.255 MHz), they were popular with CBers who wanted to operate at power levels far above the FCC limit; in fact, CB publications such as the now defunct *S9 Magazine* ran ads for it. Eventually, the FCC made Yaesu remove the 11 meter band. Yaesu simply relabeled the 11 meter bandswitch position "AUX" on transceivers sold in the United States. All one had to do to restore 11 meter coverage was to install a suitable heterodyne oscillator crystal. FT-101 series transceivers may still be found at hamfests and on internet auction sites.

Additional Items
This case also includes a Shure 450 Microphone, Heathkit code oscillator with CW key, and Heathkit HM-102.

DISPLAY CASE 5: 1970s-2000s

AEA CP-1 interface
This item is used for operating RTTY (radioteletype). The receiver audio consists of two tones, usually 170 Hz apart, a mark and space tone. These form the RTTY characters. This audio is connected to the input of the CP-1 and the red bar graph LED display on the front panel will close if the signal is properly tuned in. Tones from the CP-1 are fed into a transmitter. A computer is connected in order to send text and display received text. For an old-timey feel, there is a receiver interface that can be used to operate the printer magnets on old fashioned Teletype machines, such as the Model 15 or 28.

Bencher BY-1 paddles
This is used for sending Morse code together with an electronic keyer. The operator squeezes one side to make the keyer produce dits and the other side for dahs.

B & W VS-300A antenna tuner
This is a device for matching a transmitter to an antenna. It appears to be a pi network with a meter that can read forward or reverse power. Power is limited to 300 watts. B&W is a longtime

American manufacturer once based in Bristol, Pennsylvania. The company is still in business and has moved to Melbourne, Florida. It manufactures antenna products (mostly for the military), accessories, and air dielectric coils under the Miniductor and AirDux brand names. Nowadays, B&W does not sell directly to individuals, although its amateur radio related products are available through Ham Radio Outlet.

Micromatch
This is another SWR bridge used to indicate the match between a transmitter and the antenna.

MFJ Versa-Tuner
This handy little gadget is used to match a transmitter to an antenna. Power rating is about 100 watts. The meter indicates SWR--the lower the reading on the right side of the scale, the better the match. MFJ is a newer manufacturer of amateur radio accessories and equipment based in Mississippi.

Additional Items
This case also includes a Palstar PM 2000 and Signalink.