### The LongPath

December 2021 - Volume 45 Issue 12

A North Alabama DX Club Publication



#### Contents:

From the President

SR/SS Enhancement and Grayline Propagation

**Product Spotlight** 

Why the Small HF Loop is Not a Magnetic Loop

Christmas Early for AC4G

Meeting Minutes and Financial Report

Upcoming DX Contests

DXpeditions in December 2021

Special Edition: Radios and Manufacturers of the 1960's

#### Contributors:

AC4G AG4W

AI4U AI4VV

K40AH (SK)

K8KI

KE4PT

KG4TEI

KI4KWR

KM4BGF

N4KG (SK)

N4NM

N4UC

N5DF

NG3K

NN4NT

**NS40** 

W4WB

WA4ZXV

WD8DFP

#### From the President

By Bob DePierre, K8KI

The cover story in this month's QST chronicled the celebration of exactly 100 years since the first transoceanic signals heard over amateur radio. Granted, these weren't the first signals heard, but they were the first using equipment built and operated by individual hams. A few of the signals were spark, but most were CW – the revolution to sinewaves had started. The next time you visit the "museum" you may want to look for the collection of spark gap and early superhet equipment, the players of a century ago.

We keep spawning members who achieve recognition on a national basis. This month we celebrate a couple of members in the national news. Steve Werner/AG4W has had a second

If Relate against a bit of international or an artist and a second control or an artist and artist and a second control or an artist and artist and a second control or an artist and a second control or an artist and a second control or an artist and artist and

Steve AG4W's article "A Journey to the Moon and Back" is on page 11 of the December

article this year published in CO Magazine, this one on his travails with moonbounce 0S0's on 2m. Ask him about his **VUCC** awards he'll tell you a great story! Unfortunately, he's the "lightning damage" champion of the club. And Bruce Smith/AC4G sports a smiling photo on page 76 of the December QST. You might notice that he's dressed pretty warm for this winter contest. And he's also hugging a new rig that he'd like to tell you about. Hey Bruce, what's this about low power – isn't that a big Alpha amp sitting in front of you?



Bruce Smith, AC4G, placed second in the Delta Division in the Single Operator, RTTY Only, Low Power category of the 2021 ARRL RTTY Roundup. [Bruce Smith, AC4G, photo]

At our December meetings we usually install officers, but only two directors are new this time. We also award the DXer of the Year to our most deserving member. I happen to know who it is, and he is most deserving. I think he has a story to tell.

I wasn't too enthused with the performance of Old Mother Ionosphere during the CQWW CW contest this last weekend, but we could be in for a real treat in DX, possibly this month, with the journey of the 3YOJ team to Bouvet

# From the President (continued)

Island. Check out the DXpedition schedule in the Long Path. Our banquet friend, Adrian Ciuperca, won't be on this one; his journey isn't scheduled until a year from now.

So, let's have our annual Christmas party at the Terranova restaurant on Tuesday, December 14. We'll open the doors at 11am, and try to start serving lunch around 11:30 from the serving line. I need to give their management a head count, or they won't have enough food for us. We won't be ordering from the menu.



Terranova's Italian Restaurant near GigaParts

We won't have a presentation, but I will ask you: 1) who has increased their DXCC scores this year, and 2) who has new pieces of ham equipment in their shacks.

### SR/SS Enhancement and Grayline Propagation

By Tom Russell, N4KG (SK)

There are TWO effects which take place at sunrise and sunset.

GRAYLINE effects refer to locations along the terminator, encircling the globe along a great circle route. The GRAYLINE provides a low loss path of varying width and duration depending on frequency. On 160 and 80 meters, these openings may last only a few minutes (and are NEVER shown on computer predictions to my knowledge). At the other end of the spectrum, there are also LP openings along the terminator on 10, 12, and 15 meters.

SUNRISE ENHANCEMENT accounts for the peak associated with signals coming from the westerly directions, NOT on the GRAYLINE but often mistakenly referred to as grayline. This appears to be a focusing effect resulting from refractions from the normal F layer propagation plus another refraction from the E-layer which combine to produce significant gains (on the order of 6 to 10 dB, sometimes even more) ranging from a few minutes on 160 meters, 10 to 20 minutes on 80 meters, and 30 to 60 minutes on 40 meters. These enhancements always occur AFTER sunrise on 40 and 80 meters and tend to occur at sunrise

+/- a few minutes on 160 meters.

SUNSET ENHANCEMENT accounts for the peak associated with signals coming from the easterly directions, NOT on the GRAYLINE. Again, this appears to be a combined F and E layer condition, occurring BEFORE sunset with durations similar to those of the above-mentioned SUNRISE enhancement.

It is my OPINION that most computerized propagation programs DO NOT account for the SUNRISE and SUNSET effects on the LOW BANDS, which REQUIRE the presence of daylight at one end of the path to produce the signal enhancement. I recall years ago there was a propagation column in Ham Radio Magazine in which the author ALWAYS indicated that signals on the low bands peaked BEFORE SUNRISE ( NOT ! ) which told me he had never listened to the low bands during his pre and post sunrise times!

On 80 and 40 meters, signals ALWAYS peak AFTER SUNRISE to the west and BEFORE SUNSET to the EAST. On 160M, signals can peak at sunrise and sunset and can also peak during darkness. 160M is the LEAST predictable band in the amateur spectrum.

Page 2 The LongPath December 2021 Volume 45 Issue 12

# SR/SS Enhancement and Grayline Propagation (continued)

To my mind, most computer propagation programs are USELESS for predicting optimum times for LOW BAND propagation, especially the Sunrise and Sunset enhancements. One recent SE Asia DXpedition utilized such programs and regularly appeared on low bands between 10 and 12 GMT, BEFORE USA sunrise, and predictably worked few eastern USA stations, promptly leaving the low bands at east coast sunrise when their neighbors in DU, HS, 9M2 appeared with good signals into the eastern USA between 12 and 13 GMT. (Just because someone is a good operator, experienced DXpeditioner, and uses computer propagation predictions does NOT mean they will be productive LOW BAND providers on the difficult POLAR PATHS. Dedication and experience are required. The BEST example is the German team from VK9CR, VK9XY, S21XX, ZL7DK, P29VXX.)

Again, in my OPINION, most computer propagation programs UNDERESTIMATE MUF by a

significant percentage. IONCAP will often predict the MUF to Europe to be just above 21 MHz and yet we find 12 and even 10-meter openings. These predictions are useful for indicating peak TIMES on the HIGH BANDS and when the HIGH BANDS will open and close (i.e. they pretty well know when the sun comes up and goes down) and their MUF numbers at least track actual MUF even if they are not very accurate. As you can tell, I am not a big fan of computer predictions.

The BEST tools for the serious LOW BAND DXer include a good mapping program (The DX EDGE, GEOCLOCK, MiniProp by W6EL, etc.) and/or accurate tables indicating SUNRISE and SUNSET. It should be noted that the definition of SUNSET and SUNRISE is when the CENTER of the sun is at the horizon (NOT first light or last light).

Remember, it takes a little LIGHT for the low band enhancements to materialize!

Publisher's note: article reprinted from <a href="https://ng3k.com/Misc/n4kgprop.html">https://ng3k.com/Misc/n4kgprop.html</a>, originally written by Tom on March 27, 1998.

### **Product Spotlight**

By Steve Molo, KI4KWR

### GigaParts Flagpole Antenna 24ft with Feedline Kit, Choke and Flag Kit

Do you live in the dreaded HOA restriction neighborhood? Well, if so and you want to have a way to chase DX here is your chance. Why not have a flagpole that in disguise is your hf vertical antenna? These are fresh in the warehouse and selling quite well.... details below.

#### Off Center Fed Vertical Dipole Antenna Design

The GigaParts DX Flagpole Antenna is an off center fed dipole. The feed line routes into the lower half of the dipole up to the feed point. Routing the feed internally minimizes coupling of the feedline with the antenna. As it is a dipole, no ground radials are needed. The off-center fed di-

pole works well with most popular tuners to provide a good match across the most active HF amateur bands, and please note that the remote tuner must be placed at the base of the antenna for optimal performance.

#### **Premium Quality Materials**

The GigaParts DX Flagpole Antenna has been rigorously mechanically engineered for long-term durability in tough weather. We strive to use the best materials available including:

DOM (Drawn Over Mandrel) 6063-T832 aluminum tubing for the flagpole antenna series, having a yield strength exceeding 35,000 PSI.
 Drawn tubing has very tight tolerances enabling the precise fitting adjacent of telescoping

Page 3 The LongPath December 2021 Volume 45 Issue 12

## Product Spotlight (continued)

tubes for easy manufacturing and assembly.

- Fasteners are 304 stainless steel in common Imperial thread sizes such ¼-20. Replacement hardware will usually be conveniently available at your local hardware store.
- Bolts are secured with stainless steel nyloninsert lock nuts.

 Each antenna kit comes with a quantity of Dow Corning High Vacuum Grease for preparing joints and bolt threads for longterm reliability and ease of maintenance.



LDG Electronics RT/RC-100 Four different options available with 24ft / 20ft / 16ft and 12ft long flagpoles so you have many options in height. Thru some testing done on the 20ft and 12ft you can work 80-

### Why the Small HF Loop is Not a Magnetic Loop

The typical Small Loops used at HF are too big to be a Magnetic Field Loop

By "Kai" Siwiak, KE4PT

The typical small HF loop antennas are about 1 m in diameter, and have been mistakenly called "magnetic loops". They are not, and here's why. The small HF loop current is a Fourier series in the angle around the loop circumference. That current is not constant around the loop circumference. Using just two Fourier series terms is sufficient to accurately describe the current around the loop for a circumference of up to 0.3 to 0.4 wavelengths. The amplitude of the second Fourier term — the current variation term — is responsible for all of the near electric field structure, including the electric-to-magnetic-field ratio (wave impedance) at the loop center. Furthermore, this current variation term also produces a far-field component that fills in the loop null. The exact solution to the loop current using Maxwell's equations and taking into account just the first two Fourier terms is, see [1],

$$I(\phi) = I_0 \{ 1 - 2C_{\lambda}^2 \cos(\phi) \}$$

where  $C_{\lambda}$  is the loop circumference in wavelengths and  $\phi$  is the angle around the circumference. The peak magnitude of the current variation is  $2(C_{\lambda})^2$ .

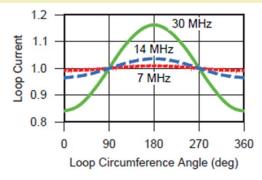


Figure A – Loop current is not constant, and varies over frequency. [Source: Siwiak, ARRL].

**Figure A** shows the current variation around the loop circumference across 7 MHz to 30 MHz. The corresponding equation in [1] for the loop near-field wave impedance (or near-fields ratio) at the center of the loop is,

$$Z_W = \frac{E_{center}}{H_{center}} = -j376.7C_{\lambda}$$

in terms of the free space intrinsic impedance.

Figure B shows the null depth in dB, see [1], calculated analytically, by NEC, and by the exact formula.

$$N_{dR} = -20\log(2C_{\lambda})$$
.

Page 4 The LongPath December 2021 Volume 45 Issue 12

# Why the Small HF Loop is Not a Magnetic Loop (continued)

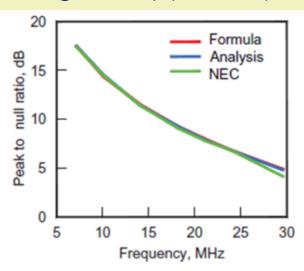


Figure B – Null depth vs. frequency. [Source: Siwiak, ARRL].

These equations are exact analytical solutions for two Fourier current terms, and are accurate for a loop circumference of up to about 0.3 or 0.4 wavelengths before additional Fourier loop current terms are needed. As the loop circumference increases, the higher order current terms gradually begin to dominate, and at  $C_{\lambda} = 1$  we have the well known one-wavelength diameter loop that radiates broadside to the loop plane, in the direction that is the null direction for the electrically small loop,  $C_{\lambda} << 1$ . You can easily verify and validate this by using NEC software such as 4 nec2 or EZNEC. Note that the field in the loop broadside direction is cross-polarized relative to the field in the loop plane.

Now we have three exact expressions that depend solely on the circumference in wavelengths: one for the current variation, one for the near-field wave impedance, and one for the null depth. Thus we have three inter-dependent ways of choosing *objective criteria* for when a loop can qualify as a "magnetic-field loop" (but not magnetic loop) based on its circumference. We can either [1] define an acceptable far-field null depth, or equivalently, [2] we could define the maximum acceptable near-field electric-to-magnetic-field ratio (the wave impedance at the loop center), or we can [3] define the maximum acceptable loop cur-

rent variation. A true ideal "magnetic-field loop" or a "magnetic-field probe" would have an infinitely deep null, and a wave impedance of zero ohms, and no loop current variation, implying a vanishingly small loop circumference.

Some references arbitrarily define a small loop as having a loop circumference of under 0.2 wavelengths. However, that results in a null depth of just 8 dB — hardly infinite! — and a wave impedance at the loop center of 75 W — hardly close to zero! — and a loop current

"Small HF loop antennas are a popular subject with Longpath readers. Please consult the September 2021 issue of Longpath for "MPE Compliance Distances for Small HF Loop Antennas." MPE means "maximum permitted exposure" under FCC rules, and is shown in Figure 3. That article is a preview of the new small loop section of FCC OET-65B currently in revision by the FCC and ARRL RF Safety Committee. - Kindest regards, Kai Siwiak, KE4PT"

variation of ±8% — hardly a constant!

I propose to define a "magnetic-field loop" antenna as having a modest far-field null that is at least 20 dB deep, which via the null depth equation requires a loop circumference of 0.05 wavelengths or less, somewhat looser than the 0.031 wavelengths for a loop probe suggested by F. M. Greene, see [2]. The corresponding wave impedance would be 5% of the free-space intrinsic impedance, or about 19 W, and the loop current would vary less than ±0.5%. Typical 1 m diameter loop antennas would meet these "magnetic-field loop" criteria at frequencies below 4.8 MHz. Since the operating range of 1 m diameter loops is usually between 7 MHz and 29.7 MHz, they are *never* magnetic-field loops.

Kazimierz (Kai) Siwiak, KE4PT, holds an Amateur Extra class license. He earned his PhD from Florida Atlantic University, Boca Raton, FL, specializing in antennas and propagation, and has investigated and patented loop antennas since the 1970s. Kai is a *QST* Contributing Editor, and Editor of *QEX*. He is a dedicated DXer and enjoys portable operating. In 2014 he operated as ZL/KE4PT using a small HF loop from various portable locations around Wellington, New Zealand. His

Page 5 The LongPath December 2021 Volume 45 Issue 12

# Why the Small HF Loop is Not a Magnetic Loop (continued)

interests include flying (instrument and multiengine commercial pilot), hiking, and camping.

#### Reference

[1] K. Siwiak, KE4PT, and R. Quick, W4RQ, "Small

Gap-resonated HF Loop Antenna", QST, Sep., 2018, pp. 30-33: available at <a href="https://www.arrl.org/files/file/QST%20Binaries/September2018/">www.arrl.org/files/file/QST%20Binaries/September2018/</a>
<a href="https://www.arrl.org/files/files/September2018/">QSTinDepth-Sept-2018-Siwiak-Quick.zip</a>.

[2] F. M. Greene, "Development of Electric and Magnetic Near-Field Probes," National Bureau of Standards Report No. NBS TN-658, Jan. 1975, see p. 46.

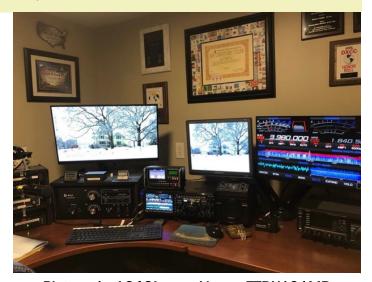
### **Christmas Early for AC4G**

By Bruce Smith, AC4G

By now, everyone has in mind of a Christ-mas present that they can fittingly, hint to their spouse, child, or other family member as what they want for Christmas. With the abundant items that could make the Santa list, they range from perhaps electronic components to large antenna/tower components to fancy HF transceivers. One problem is in current times, the supply chain is diminishing and our "want items" maybe "out of stock" due to global events to include the continual pandemic from 2020, making it difficult to acquire ham radio paraphernalia.

Santa came early for me. I stumbled across a Yaesu FTDX101MP. Although I will keep my Yaesu FTDX3000 as a backup or field day rig, being familiar with the FTDX3000 made it much less difficult and easy for me to understand the features of the 101MP and operate. Within a few hours, I had my new rig setup and making contacts with other ham radio operators worldwide. I must add, it's fun twisting knobs and figuring out how to pull-in those weak stations. Reference Picture 1, AC4G's new Yaesu FTDX101MP.

Well, how does it perform? I used this rig during the recent CQWW CW Contest as a single-op 160m entry knowing that this would be the most severe condition attempting to receive low band signals mixed in with noise and heterodyne. Wow! I could tell a significant difference in



Picture 1: AC4G's new Yaesu FTDX101MP

reception having the ability to turn knobs and tune in long distant station worldwide. Many know that I do not like using the packet cluster during contest, and have more fun either "running" or working up & down the band(s) contacting stations I can receive. At approximately 0125Z, on the first evening of this contest, I received and QSO'd 3B8M on 1.815 MHz. Plus, during the contest, I received many EU stations on top band that were both strong and merely detectable. 3B8M (Mauritius Island) is in the Indian Ocean on the east side of Africa past Madagascar and was glad to put him in the log for a new multiplier. That was a good test to detect and work the 3B8M station.

In the past, with my FTDX3000, I have been able to QSO everything I could hear. Now, I

Page 6 The LongPath December 2021 Volume 45 Issue 12

# Christmas Early for AC4G (continued)

am in a new dimension, hearing stations that I cannot make a QSO due the boost in receive capability of my new FTDX101MP adding to the performance of my new rig and only wishing that I could QSO all stations on the air. Maybe it's time

to focus on top band transmitting antennas?

I wanted to share my Christmas present with you, and maybe later report in a future article on the parameters making the 101MP Rob Sherwood's number one rig on the market. Have a Merry Christmas and I hope your wishes for your Christmas wish list come true.

### **November Meeting Minutes and Financial Report**

By Chris Reed, AI4U

#### NADXC November 2021 Meeting Minutes

- The November meeting of the NADXC was called to order by President Bob DePierre, K8KI at the museum of Information Explosion on Tuesday, November 9th at 6:32pm.
- Fred Kepner, K3FRK, on behalf of the nomination committee, held elections. Being no further nominations from the floor, the following slate of officers were elected by acclimation:

President, Bob DePierre, K8KI Vice President, Steve Molo, KI4KWR Secretary-Treasurer, Chris Reed, AI4U Ex-Officio, Steve Werner AG4W Director at Large, Bruce Smith, AC4G Director at Large, Fred Kepner, K3FRK

- The minutes from the previous meeting and financial report were approved as published in the Longpath.
- Bob asked the group who would be interested in attending the Christmas Dinner at Terranova's. The vote was 80 percent for it. Bob will check with Terranova's on the event.
- Barry, W4WB suggested 300 dollars to be given to the latest Bouvet effort. Chris, Al4U requested that we give 1000 dollars. Steve, AG4W spoke about the challenges of fronting a DXpedition like Bouvet, with cost being front-

ed mainly by those going. After discussion, Barry, W4WB withdrew his motion and Chris made the motion for \$1000 and it was seconded by Tim Winegar, AB4B.

- Chris suggested an entry level CW class.
- Bob thanked all those who contributed to the Longpath.
- Bob, held the DX quiz and announced more are getting the air.
- · We voted on Ham of the Year.
- There will not be a December meeting at the museum. We will have our Christmas Dinner at Terranova in it's place.
- The meeting was adjourned at 6:53 pm.

#### November 2021 Financial Report

Ending Balance \$8861.22

#### NO DECEMBER MEETING

NADXC Christmas Dinner:
Tuesday, December 14th, 2021
Terranova Restaurant by GigaParts
11:00 AM Doors Open
11:30 AM Food Served
RSVP to Bob, K8KI

Page 7 The LongPath December 2021 Volume 45 Issue 12

### **Upcoming DX Contests**

By Chuck Lewis, N4NM

#### ARRL 160 Meter Contest, (CW), 160 meters only



Dec. 3, 2200Z to Dec 5, 1559Z

Exchange: RST + sect; DX sends RST only

See page 62, Dec. QST and www.arrl.org/160-meter

### ARRL Ten Meter Contest, (SSB & CW), 10 meters only



Dec. 11, 0000Z to Dec. 12, 2359Z

Exchange: RS(T) plus State/Province; DX:

RS(T) + Ser. #

See page 62, Dec. QST and www.arrl.org/10-meter



### Russian 160 Meter Contest (CW/SSB) 160 meters only

Dec.17, 2000Z to 2200Z

Exchange: RS(T)+ Serial #: Russian Stns:

RST + 2 letter region #
See page 62, Dec. QST and www.topband.ru/rules.htm



#### OK DX RTTY Contest, (RTTY), 80 - 10 meters

Dec 18, 0000Z to Dec. 18, 2359Z

Exchange: RST plus CQ Zone

See page 62, Dec. QST and okrtty.crk.cz



#### RAC Winter Contest (CW & PHONE), 160-2 meters

Dec 18, 0000Z to 2359Z

Exchange: RS(T) plus Serial No.; VEs send

RS(T) plus Province

See page 62, Dec. QST and www.rac.ca/

contesting

#### Croatian CW Contest, (CW), 160 - 10 meters



Dec. 18, 1400Z to Dec. 19 1400Z

Exchange: RST + SER. # See page 62, Dec. QST and

9acw.org

### Stew Perry Topband Distance Challenge, (CW), 160 meters

Dec. 18, 1500Z to Dec. 19, 1500Z

Exchange: 4 Char. Grid square

See page 62, Dec. OST and www.kknnet/

stew

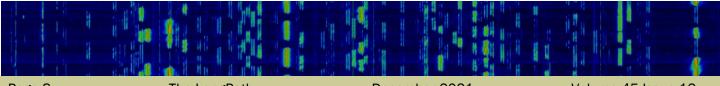


#### GEDEBAGE DX Contest, (CW), 80-10 meters

Dec. 25, 1200Z to Dec. 26, 1159Z

Exchange: RST + Serial #

See page 62, Dec. QST or www.olkb.or.id



Page 8 The LongPath December 2021 Volume 45 Issue 12

# Upcoming DX Contests (continued)



#### RAEM Contest (CW), 80-10 meters

Dec. 26, 0000Z to 1159Z

Exchange: Serial # plus Lat/Long, (e.g.,

57N 85E)

See page 62, Dec. QST and www.srr.ru/en/

<u>main</u>



### DARC Christmas Contest, (CW & SSB), 75/80 & 40 meters

Dec. 26, 0830Z to 1059Z

Exchange: RS(T) [+DOK or special code for

DL]

See page 62, Dec. QST or www.darc.de

### SWEEPSTAKES





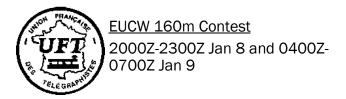
### **Enter here**

#### **OTHERS:**



**ARRL EME Contest** 

0000Z Dec. 19 - 2359Z Dec. 19



Dates & times often change or are misprinted in the journals; beware. Also, check the cluster: "sh/ contest". Have fun!

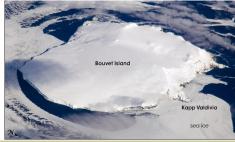


Page 9 The LongPath December 2021 Volume 45 Issue 12

### **DXpeditions in December 2021**

Reprinted with permission of Bill Feidt, NG3K

Start Date	End Date	DXCC Entity	Call	QSL Via	Info
December					
2021 Ded01	2021 Dec14	Dominican Republic	ні	DL2SBY B/d	By DL2SBY as HI7/DL2SBY fm IOTA NA-096; perhaps 1 day during 2d week fm Saona I (IOTA NA-122) using HI2/DL2SBY; HF; CW FT8, some SSB
2021 Ded01	2021 Dec10	St Martin	<u>TO9W</u>	LoTW	By K9NU W9MK VE2BWL FS4WBS K9EL; focus on 160 80 40 m, some 60m; CW,SS, FT8 FT4; QSL via Club Log OQRS
2021 Ded02	2021 Dec15	Zimbabwe	Z2	LoTW	By DL7BO as Z22O and dDJ6TF as Z21A; 160-10m; CW SSB FT8 FT4
2021 Ded02	2021 Dec16	Kenya	5Z4	LoTW	By HB9DSP as 5Z4/HB9DSP fm Malindi; 20 15 10 m; SSB, some FT8; 100w; Spiderbeam Quad; QSL via HB9DSP (B/d)
2021 Ded03	2021 Dec20	Burkina Faso	XT2AW	LoTW	By DF2WO fm Ouagadougou; 160-6m; FT8 CW SSB; 100w; QSL via M0OXO
2021 Ded04	2021 Dec14	Dominican Republic	Н17	YT1AD	By YT1AD YT3M as HI7/YT1AD; HF
2021 Ded08	2021 Dec31	Honduras	HR5	F6AJA (B/d)	By F2JD as HR5/F2JD fm Copan Ruinas; HF; CW SSB + digital; operation to continue until 5 Apr 2022
2021 Dec16	2021 Dec22	Bangladesh	<u>521DX</u>	LoTW	By S21RC S21AM S21D fm Manpura I (IOTA AS-140); 40 20 15 10m; SSB; 100w; yagi, verts, inv vee; 2 stations; QSL via EB7DX
2021 Dec25	2022 Jan25	Bouvet I	<u>3Y01</u>	TBA	By 3Z9DX + team; 160-6m; CW SSB FT4/FT8 RTTY; dates tentative
2022					
January					
	2022 Jan31	Comoros	D6	TBA	By 12 op international team fm IOTA AF-007; 160-10m; CW SSB RTTY FT8/FT4; 5 stns; tentative dates
2022 Jan20	2022 Feb01	Guadeloupe	<u>TO65</u>	F6KJS Direct	By F6BCW F1MNQ F1TCV F5LRL VE7KW fm Terre de Haut I (IOTA NA-114, FK95eu87, WLOTA-3998); HF; CW SSB RTTY FT8; 2 stations; 24/24; QSL OK via REF Buro w/ about 9 month delay, see Web for QSL instructons
2022 Jan23	2022 Feb01	Aruba	P4	DL4MM	By DL4MM as P4/DL4MM; HF w/ focus on low bands and WARC; CW FT8 SSB; QRV for CQ 160 m CW using P40AA (also on FT8)







Page 10 The LongPath December 2021 Volume 45 Issue 12

### Throwback Special Edition: Radios and Manufacturers of the 1960's

#### Introduction

By Fred Kepner, K3FRK

I think Bob, K8KI hit it out of the park with this month's special edition topic. Many of our members have fond memories of sitting by the glow of a vacuum tube radio. This month we get to hear their stories! Thank you to everyone who was willing to contribute with a personal story or by researching and writing about one of these manufacturers from yesteryear.

# A Personal Remembrance of Collins Radio Equipment

By Barry Johnson, W4WB



As a child, Arthur Collins (1909-1987) had a very strong interest in amateur radio and obtained his amateur radio operator license at age 14. He designed and built his own equipment and became quite proficient in circuit design and wave propagation. After Art graduated from high school in Cedar Rapids, he attended college in Massachusetts. After his freshman year, he returned home and never earned a degree; however, for his considered by many as genius innovations in radio communications, he was awarded three honorary doctorate degrees in science and two honorary doctorate degrees in engineering. Art was also elected to be a member of the prestigious National Academy of Engineering. At the age of 24, Art Collins started his own electronics company in Cedar Rapids known as the Collins Radio Company.

Collins amateur radio equipment was nev-

er a significant part of his company, but was near and dear to the heart of this shy and soft-spoken man who avoided undue publicity. Ham gear made by Collins was design and manufactured to the highest standards and frequently provided a gateway to the design and fabrication of groundbased and avionic communication systems for the military and commercial users. Art is appropriately credited for making SSB practical through the development by Collins of their famous mechanical filters. These filters comprised a mechanical metal tube, about the size of many vacuum tubes of the day, that contained a number of precision metal disks carefully ground in size and shape and suspended from one another. Needless to say, the inclusion of these mechanical filters drove the cost of the receivers up quite a bit. In 1956. a Collins 75A-4 and KWM-1 SSB (transmitter) where flown on a C-97 transport aircraft to demonstrate the superiority of SSB over AM and CW for communications. As a result, Collins received a number of contracts from the USAF and other military organizations.

Rather than regurgitate material about Collins radios that you can look up on the Internet, I thought some personal history and experience with Collins gear might be more interesting. As a



Figure 1. 75A-4. Photo Credit: wa3key.com.

very young ham, I dreamed of owning a Collins 75A-4 realizing that my old Hammarlund receiver and EICO transmitter plus a homebrew transmitter (both were CW only) were likely what I would have for a long time. When I earned

my General license, I was surprised with my parents giving me a used Collins 75A-4 and a Hal-

Page 11 The LongPath December 2021 Volume 45 Issue 12

licrafters HT-37 transmitter that could do SSB! My Dad (K5ZQZ, later W4TCD) had gotten interested in ham radio and was very supportive of my interest in electronics and communications. Perhaps I should point out that Dad and I were among the first people in Baton Rouge, Louisiana to operate on the then new Citizens Band Radio (1958) thanks to Mr. Davis who owned Davis Electronics. Mr. Davis obtained the license (8WØ833) and assigned Units 3 and 4 to Dad and me. Thanks to Boy Scouts, I had already started learning electronics and Morse code by sound, light, and flags, so being able to operate on the radio waves was a real treat and so very exciting. A wonderful neighbor who was an Extra Class ham introduced me to ham radio and encouraged me to get my Novice license (KN5FLY). Since my radio gear was in my bedroom, and soon thereafter Dad had earned his Novice license (KN5ZQZ), he wanted to have a place to operate too. Consequently, he constructed in our backyard a 10' by 20' building to hold all of the electronics stuff. Mom was supportive of this new structure and ordered me to move my radio gear out of the house, NOW! Happily, I did so too! Dad started us building EICO and Heathkit equipment and decided he wanted his own equipment rather than use mine. Davis Electronics sold and installed mostly commercial radios and electronic parts, and was an authorized dealer for various radio companies that included the Collins Radio Company.

Mr. Davis was aware that Dad was looking for a good radio system for himself, and he called Dad one day to let him know he had a deal Dad just couldn't refuse. The owner of the major bread company in Baton Rouge was a ham and purchased from Mr. Davis a new Gold Dust Twins, i.e., 75A-4 and KWS-1. Apparently, the gentleman





Figure 2. KWS-1.
Photo Credit:
www.collinsradio.org/
cca-collins-historicalarchives/theequipment-of-collinsradio/the-blackboxes/kws-1/

was able to operate the 75A-4, but was baffled about how to tune the KWS After about 5 or 6 trips to the gentleman's QTH to retune the KWS-1 when the band was changed, Mr. Davis took the KWS-1 back and swapped the fellow for a Central Electronic 100V that once it was set up, it didn't require tuning when changing bands. But why were the 75A-4 and the KWS-1 called the Gold Dust Twins? Together they cost about \$2,500 (1960 dollars which today is approximately \$23,000) with the KWS-1 costing about \$2,060 alone. Collins produced about 6.000 75A-4 receivers and roughly

1.600 KWS-1 transmitters. Before describing these units, here is what happened when Dad went over to talk with Mr. Davis about this "mysterious deal." Mr. Davis offered Dad the now "used" KWS-1, with only a few hours of filament time, for just \$600. Although it was a huge sum of money back then, Dad said yes and my 75A-4 had a new friend, well sort of since the KWS-1 was Dad's and the 75A-4 was mine. Problem was solved by Dad finding another used 75A-4 for about \$250. Somehow my mother noticed the very large equipment being taken to our ham shack and asked Dad what is the "stuff" and how much did it cost. He told her that it was a onekilowatt transmitter and that he got a great deal from Mr. Davis. She wasn't very impressed as I recall and from that day forward, for the rest of her life, she referred to our ham radio gear as

Page 12 The LongPath December 2021 Volume 45 Issue 12



Figure 3. Central Electronics 100V. Photo Credit: K6JCA.



Figure 4. 75A-1 (introduced 1947).

Photo Credit: W5AM.

"kilowatt." It wasn't long before the bread bakery owner tired of ham radio and Dad acguired the 100W Central Electronic 100V which was partnered with the second 75A-4 and my Hallicrafters HT-37 transmitter was retired and later sold. I note that back in that time, we were limited to 1,000

watts input in contrast to 1,500 watts RF output today. Also, when several of us started a ham radio club at the high school, Dad donated an EICO 720 and EICO 730, and Mr. Davis donated a Collins 75A-1! To have this support, we felt that we were very lucky kids to say the least, and most of the club members ultimately had a career involving electronics and/or communications. Several are still active hams today.

The KWS-1 shown in Figure 2 is a beast that comprises a power supply pedestal (about 120 pounds) and the transmitter (about 30 pounds) that can sit on the pedestal or be place a short distance away on a desk for example. It came with a pair of 4X150 finals that allowed for 1 KW input and about 500 W output. Some years later, we replaced these finals with a pair of 4X250s and boasted the output to about 600 W. The KWS-1 was in general a very reliable transmitter, but there were a few times I had to replace parts including one of the transformers in the

power supply that I learned was a very, very rare part. When I found someone who had it, his stock was two and I bought them both figuring if I had a spare, the one I replaced would never fail again. Repair work on the transmitter or the 75A-4 was rather difficult because the components associated with a given tube were mounted on a "tree" located inside of a metal shield.

The 75A-4 was introduced in 1955 and solve all of the problems of other manufacturers receivers which made its performance the "gold standard" for everyone else to attempt to achieve. It provided the ultimate in selectivity at the time by use of the Collins mechanical filters which were introduced with the 75A-3. These small devices replaced dozens of 455 kHz IF transformers and amplifiers having to be critically aligned to match the Collins filters' performance. Collins made mechanical filters until the mid-2010s. Yaesu was their main communications customer and my company (later owned by Ralph N5DOI) W4RT Electronics was the second largest client of these filters from the early 2000s. W4RT Electronics sold several tens of thousands of the filters primarily for the FT-817, FT-100D, FT-847, FT-1000MP, etc. To me, there is something very pleasing about the sound when a mechanical is used compared to crystal and digital filters.

Dad traveled a great deal to oversee the operations of the several dozens of tank truck terminals located all over the Southern states. He first had the CB radio installed in his car, but after he earned his General license, he decided to put a ham radio in it. I don't recall the first radio he tried, but it was a bummer. In 1963, he purchased one of the first Sideband Engineers (SBE) Model 33 transistorized transceiver. It was a nice improvement, and he enjoyed it a lot during the approximate 50,000 miles he drove each year. Having a reliable HF transceiver in his car turned out to become a valuable emergency communications

Page 13 The LongPath December 2021 Volume 45 Issue 12

resource during the frequent horrid weather experienced in south Louisiana when we lived in Baton Rouge. He was honored several times by State and Local officials for his support of emergency workers in extremely dangerous locations and conditions when normal communications broke down. Dad demonstrated the ARRL saying "When all else fails, ham radio works!"

About 1962, Mr. Davis decided to concentrate on commercial radio and no longer sell ham radio equipment. During his many trips to Birmingham, Dad made friends with Mr. Ack (real name was Everette C. Atkerson) who owned Ack Radio Supply Co. in Birmingham and Atlanta and was a Collins Radio Dealer. Mr. Ack often supported DXpeditions by the legendary Gus Browning (W4BPD, SK). Dad had been talking with Mr. Ack about acquiring a KWM-2 as his mobile trans-



Figure 5. KWM-2 transceiver. Photo Credit: W2XC.

ceiver. The KWM-2 was introduced 1959 and was in production over 25 for years! **Before** Dad long, brought home a KWM-2 and mo-

bile mount. What a fun weekend job we had together installing it in his car! It was a wonderful radio and far better than the SBE-33, but comparatively it generated a lot of heat. While in high school, I was earning good wages as an audio and video engineer at WBRZ-TV, but there was no way I could afford a KWM-2 for my car which I figured would allow me to keep in touch with my family when I went to Georgia Tech. To my great surprise, my parents gave me, as a high school grad-



Figure 6. Collins 30L-1 amplifier.

Photo Credit: radiopics.com

uation gift, a KWM-2 and mobile mount! Mom said "Now you have one of those kilowatts for your car!" The KWM-2 was a great performing radio, but

I always felt that its receiver was not quite as good as the 75A-4. After I graduated from Georgia Tech, I purchased from Mr. Ack a Collins 30L-1 amplifier that electrically and cosmetically matched the KWM-2 and yielded 1,000 watts PEP power input on SSB and 1,000 watts average on CW. It used four 811A triodes that provided essentially instant ON operation ... no delay in warming up.



Figure 7. Collins S-Line.
Photo Credit: RadiomanPA, <a href="https://commons.wikimedia.org/w/index.php?">https://commons.wikimedia.org/w/index.php?</a>
<a href="mailto:curid=6347581">curid=6347581</a>

Soon after I went to Georgia Tech, my parents moved to Jackson, Mississippi. Dad decided to give the Collins S-Line a try since it was supposed to be an upgrade to the Gold Dust Twins and have the more modern look like that of the KWM-2. Figure 7 shows what a typical S-Line setup looked like. One feature that everyone liked was that the transmitter and receiver could be slaved together to act as a transceiver. The S-Line was introduced in 1958 as the replacement for the A-Line. Just as the KWM-2 had a long production life, so did the S-Line. After a while, he sold the S-Line because he simply loved his Gold

Page 14 The LongPath December 2021 Volume 45 Issue 12

Dust Twins more. Dad liked its audio and he thought the Twins looked like "real" ham radio gear. The KWM-2 remained in his car however.

In 1966, my parents moved to Winder, GA so that they could help care for their parents. Dad was in semiretirement and setup his ham gear at their new home, and acquired his new call sign of W4TCD since at that time the FCC required hams to have the "correct" FCC District in their call sign. Dad decided to downsize his ham gear and just keep his favorite equipment which included the KWS-1, 75A-4, and Central Electronics 100V. He



Figure 8. Ralph W4TCD (SK) with his Gold Dust Twins and other favorite gear. [1983].

sold his KWM-2. S-Line and some other equipment part of as the downsiz-As an ing. aside. Dad discovered that one of the two inventors of 100V the had retired

about 20 miles south of Dad's home. The gentleman, I believe his name was Joe Batchelor, was delighted to see one of his old 100Vs and was happy to realign and fix whatever it needed. The 100V was a great transmitter and had fine audio quality. Figure 8 shows Dad at his station in 1983, about a year before he became a SK. I expect many of you recognize the Astatic D-104 microphone in the photograph. Also notice the "creeper" we made to set the KWS-1 Power Supply Pedestal on so that it could be easily moved.

When Dad passed away, I inherited his gear and moved all of it to my home. In the mid-1990s, I decided to sell all of my Collins equipment as well as that of Dad's. Basically, that was the Gold Dust Twins, my 75A-4, Central Electronics 100V, two KWM-2's, 30L-1, and some other radios too. I was surprised how quickly I found buyers willing to pay a fair price. With my ham radio fund now amply replenished, I decided to "modernize" and buy Yaesu radios that included the FT-1000MP, FT-100D, FT-897, Quadra amplifier, and FT-817. About a quarter of a century later, I again sold all of my Yaesu equipment, except the FT-817 and FT-100D, and Elecraft K3 to "modernize" again, but this time with my newly arrived Elecraft equipment, viz., K4D and KPA1500, which will be the final equipment for my station.

### R.L. Drake Company

Drake articles gathered by Larry Morphew, NS4Q



### Personal Experiences with Drake

By Garey Barrell, K40AH (SK)

I worked for NASA from 1961 to 1972 in Huntsville, AL. All the usual suspects, Saturn I, V, Gemini, Apollo ... 'Work' was from 0730 to 1600, so had long 'evenings'.

We had a local electronic distributor, Electronic Wholesalers, that sold to NASA, support, and TV repairmen. They also had an AUDIO department (McIntosh, Marantz, Fisher, etc.) and a HAM department with Drake, Collins, Hallicrafters, Hammarlund, Johnson, etc.

They offered a 'job' in the HAM department, part-time, that paid a whole \$1 per hour for eve-

Page 15 The LongPath December 2021 Volume 45 Issue 12

# Personal Experiences with Drake (continued)

nings and Saturdays. This job was highly prized among the local Ham population (everyone was from 'somewhere else', and every other person you ran into was a Ham), and it was NOT because of the generous salary. I would leave work at 1600, be at EW by 1615 ready to talk Ham radio until 2100. Saturday was 0900 - 1700. Essentially I got paid for hanging out, playing with the latest gear (we had a tribander on the roof), and talking Ham radio! Ah, but the GOOD part was, since I was 'actively employed selling Ham equipment', I qualified for the 50% discount most manufacturers offered for 'personal' use, meaning essentially one of anything or everything! Now you see why the 'job' was highly prized!! Incidentally, we took trade-ins on new gear, and of course I was able to acquire any of that for what we allowed in trade. So you would hold the job for six months or a year. and then pass it on to the next guy....

Anyway, I got to spend MANY hours playing with all the latest toys, and after much consideration decided I would replace my Drake 1-A with a 2-B. We sold a LOT of those, many by tuning in a station, lifting up the front end off the counter by a couple of inches and then dropping it; it would 'boing' and then return exactly on frequency. This was when Hallicrafters, Hammarlund, and National were selling their 'built like a battleship', 70# receivers that would jitter when you walked across the floor. Not long after that, the 4 Line was announced and I ordered a set immediately. I got the R-4 pretty quickly, but no T-4X. I drove them crazy via phone, and one day here comes the T-4X. Opened it up, turned it on, and nothing. A little troubleshooting showed that were about five connections in the Carrier Oscillator that weren't soldered, and once done it worked fine. I couldn't resist harassing the service guy

that I dealt with regularly. He said they hadn't shipped any T-4Xs yet, did mine have a s/n on it? It did, something like 10020, and he said that was an engineering model that should NOT have been shipped. (This was actually BEFORE Bill Frost!!)

### Personal Experiences with Drake

By Art Davis, N4UC

Attached are a couple of pics showing my twins that are currently functional, and then a pair that are in for some maintenance.

I received my first set of twins in 1970 for my 16th birthday and they have followed me eve-

rywhere I've been since that time. They were shipped from Texas by rail and I picked them up straight off



the boxcar at the Railway Express Office. Exciting days, trains and radios! It was a great birthday!

The second set was recently acquired from

Randy, KS4L. That explains why they actually work. If you know Randy you know why they are in pristine condition.



I owned a TR-7 which I acquired from Bill Christian K4IKR but sold it a few years later at the Hamfest. That was just one of the many selling decisions regarding radios and cars I have lived to regret.

The performance of Drake equipment is still extremely competitive with modern radios and thus very desirable. Resources such as the Drake Users BB and the Drake tech net on Sunday afternoons will help keep these fine radios on the air

Page 16 The LongPath December 2021 Volume 45 Issue 12

### Personal Experiences with Drake

By Larry Morphew, NS4Q

Licensed as WN4IVO in 1962. 1st rig was a Hallicrafters SX-24 (1939-1943) and a borrowed Globe Chief (2 ea 807s) and antenna t/r was a spdt toggle switch. CW only. Due to age and tech level, the SX-24 was grossly unstable but surprisingly sensitive. The Florence AL radio club members said my \$25 receiver was unusable and should be scrapped. Kept it and persisted. Worked all over the USA with the 3725 crystal.

W4VWG was a WW2 combat veteran and gifted mentor. He won a Drake 2B at the 1963(?) North Alabama Hamfest. The hamfest rotated between the Florence, Decatur and Huntsville clubs. Now we have the wonderful Huntsville Hamfest. Buford invited me over to experience this new marvel of receiver technology. He demonstrated the now famous "drop test" for receiver stability. For me, that was amazing. Variable bandwidth and variable passband if tuning was a wonderful qrm fighting tool.



Drake 2B Receiver

Receivers of the day typically used a diode detector for all modes but the 2B added a switchable product detector. On SSB, that made the audio clear and it just sparkled compared to a diode detector.

The receiver front end used a tunable

preselector and a crystal-controlled oscillator/ 1st mixer. Bands above 80M were down converted to 80M. Simple, stable and effective with additional crystal sockets for non-amateur hf frequencies. Quite affordable in the day. No Collins 75A4 needed.

Bought my used 2B from Electronic Wholesalers on Bob Wallace Ave. 1966. Like most owners, I regretted selling it.



Left: TR-1A circa 1957, the first Drake

Below: TR-7A circa 1979, the final Drake



Web Resources for Drake Equipment:

http://www.wb4hfn.com/DRAKE/ DrakePageHome.htm https://groups.io/g/DRAKE-RADIO

https://history.k4lrg.org/Projects/ Magic of Boatanchors/index.html

http://www.zerobeat.net/drakelist/

http://www.zerobeat.net/drakelist/drakeb.html

Page 17 The LongPath December 2021 Volume 45 Issue 12

### The History of the R.L. Drake Company

By Bill Frost, WD8DFP Service Dept. Manager, R.L. Drake Co.

The R. L. Drake Co. was founded by Robert Lloyd Drake Sr. He was the eldest son of four children and also the father of four children. Born in Cincinnati, Ohio, he attended the University of Cincinnati after graduating from high school. At that time, the university was a city college and he lived at home while attending college.

Graduating in the early 1930's, Mr. Drake was first employed by Dayrad (Dayton Radio Co.) in the Engineering Department. He later went to work for the Bendix Corp. in their Aviation Department. Mr. Bill Lear, of Lear Jet fame, hired Mr. Drake to work for his company, which was Learavia, in the Engineering Department.

Mr. Drake's hobby was amateur radio. He enjoyed talking to other amateurs on the "wireless" and had tinkered with the design of different filters to help improve his reception, as well as his transmitted signal. The amateur radio operators at the other end of the wireless radio, were very interested in obtaining these filters for their own equipment.

In 1943, Mr. Drake decided to start his own company and leave his secure position at Learavia. He gathered three other people to help him design, and build his products. One of the individuals was Katherine "Katy" Quake, who worked for the company until 1988. Another was Milton "Milt" Sullivan, a fellow Engineer and amateur radio operator. The company began at 11 Longworth St. in Dayton, Ohio. The upper level of the building was rented to a manufacturer of coat hangers.

Products at the time were mainly low pass filters and high pass filters for the amateur radio

operator and for military use. Filters for amateur radio use were a part of the company's product line for over forty years. A tank jamming device was also produced for the US military. The military also wanted a filter designed to eliminate the jamming, but this could not be done due to the method Mr. Drake had designed. He had a difficult time convincing the government officials that it could not be done. The tank jamming equipment was successfully used in major events of WWII such as Normandy Beach on June 6, 1944.

The recession that followed WWII meant difficult times for everyone, the R. L. Drake Co. included. The Company managed to survive the hard times by continuing the production of filters and by doing small jobs for larger companies. This included making table lamps for S. S. Kresge, spring contacts for General Electric, winding coils and chokes for Delco Electric, and assembling communication cables for an airplane manufacturer.

Ten years later, in 1953, the company moved its 10 to 12 employees to Miamisburg, Ohio. The new location was in the once famous Baum Opera House. This building later became the home of Star City Marine. They say, that if you stand in Market Square and catch the sun just right you can see the name, Baum Opera House showing through the faded paint on the building.

The product line now included more accessories for amateur radio operators, such as Q-multipliers for HRO and National receivers, product detectors for Collins Radio receivers, and the Drake High Patch phone patch. Being an amateur radio operator himself (W8CYE), Mr. Drake had modified his own Hammarlund receiver for single sideband reception. However he was not totally satisfied with the receiver's performance and knew that he could design a "better mouse trap."

While recovering at home, from a bad case

Page 18 The LongPath December 2021 Volume 45 Issue 12

of hives, partially due to worry about the survival of the company and its employees, he began the design of the 1-A single sideband receiver. The receiver was long, thin, and tall like a mailbox. It was very different to the large box like conventional receivers that were on the market. This receiver was destined to be the first receiver designed solely for single sideband reception. All other receivers for amateur radio use received only on AM (Amplitude Modulation) or were old military AM receivers, which were then modified by the amateur radio operator for SSB (single sideband) reception. Single sideband was in its infancy and many amateur radio operators said it was only a fad and would never last and certainly would never equal AM operation.

Once the 1-A was finished, he was unsure that he could mass produce such a product, let alone finance it. He decided to offer his design to well-known receiver manufacturers such as National, Hammarlund, and Hallicrafters. After many letters were mailed back and forth neither party was able to reach any type of agreement. A turning point came when Francis R. Gibb or "Gibby" as he was known to his amateur friends said "You build'em and I'll take the first hundred." Gibby was a good friend of Mr. Drake and he was a wellknown supplier of amateur radio equipment, as he owned and operated Universal Service in Columbus, Ohio. Another amateur radio equipment supplier, Hyde "Rube" Rubel, of Srepco in Dayton, Ohio, also supported the 1-A receiver concept and urged production of the first single sideband receiver.

The first ten or so 1-A receivers were built at the old Baum Opera House location, then in 1958 the company moved to the present 540

Richard Street address, as more room was needed. The production of the 1-A was then put into full force. The 1-A design was based on a simple to operate concept, no bells, no whistles, easy to service, high quality, and high performance. Cosmetically, it was plain, the front panel was black, the cabinet was black, and it was soon dubbed "The Black Box" among amateurs. Receivers prior to the introduction of the 1-A were large, bulky, had large knobs, large meters, and were often called "Boat Anchors."

The 1-A receiver was a success, as it was well received by amateur radio operators. However, amateurs wanted a receiver that had both AM reception and SSB reception, built with the performance of the 1-A. AM was still the most popular mode of communication between amateurs, but SSB was slowly growing in popularity. The 2-A was designed and produced to meet this requirement. It was soon followed by the design of the 2-B receiver, which included several improvements. Mr. Drake offered the 2-B receiver design to radio receiver manufacturers such as Globe Radio and Hallicrafters, as he felt uneasy about increasing the size of the company. Unable to come to terms, it was decided in 1961, to proceed with production of the 2-B under the R. L. Drake Co. name.

In 1963, the company introduced its first transceiver and named it the TR-3. The TR-3 was a tube type unit, as were all Drake products at that time. It used a 9.0 MHZ IF, tube type VFO (Variable Frequency Oscillator), and three 12JB6 sweep tubes as the final output tubes. The sensitivity was excellent and the 300-watt PEP final output stage gave it the punch needed by the amateur radio operator. The demand for the TR-3 was tremendous and its popularity grew as did the name Drake.

In 1965, the Inland Testing Laboratory (a division of Cook Electric, Chicago, Illinois) was pur-

Page 19 The LongPath December 2021 Volume 45 Issue 12

chased by Mr. Drake. The name was changed to Dayrad, a name familiar to Mr. Drake as helping him start his earlier years. Unfortunately, a few years later, the equipment was sold and the company was dissolved, as there was not enough work to keep the employees busy. Some employees were transferred to the Miamisburg plant.

Then in 1966 a completely new line was designed and introduced, which became known around the world as the "Drake Twins." The receiver was the R-4 and the mating transmitter was the T4-X. Also produced were accessories such as the W-4 wattmeter, the MN-4 matching network, the MS-4 matching speaker, and the AC-4 power supply. The R-4A soon replaced the R-4 and the L-4 linear amplifier was introduced along with the MN-2000 matching network. The L-4 and the MN-2000 proved to be two of the most desired products by amateurs around the world. These two products are still sought after by amateurs today.

Shortly after the R-4A had reached the market, the company was approached by Radio New York Worldwide to build a low cost International Shortwave receiver for their own use. The SW-4 was designed primarily from the R-4A concept and was to receive AM only. The front panel stated "Designed especially for Radio New York Worldwide." Again, not wanting to expand beyond the companies means, the receiver was offered to RCA. Who, at the time, was a leader in communications type receivers. RCA was at the time producing the CRM-R6A receiver for the world communications market and declined the offer. The SW-4A short wave receiver soon followed the SW-4 with several improvements and with more solidstate devices being used instead of tubes.

The C-4 station console was introduced in

1966 and was another first in amateur radio equipment. The unit was engineered and designed by Ronald E. Wysong, who was later to succeed Peter W. Drake as president and CEO of the R. L. Drake Company. The unit housed a phone patch, rotor control, wattmeter, equipment control switch, ID timer, 24-hour clock, remote antenna selector, and it could also control the AC power to other units in the "Ham Shack." Thus turning off the C-4 could turn all of the amateurs' equipment off. It also grounded the amateur's antenna coax lines to help protect the equipment from the dangers of a lightning strike.

Also in the year 1966, Ron Wysong was interested in cameras and photography as a personal hobby. He learned that printed circuit boards involved photography and negatives. He persuaded the company to invest in the first steps toward a printed circuit board department. He made an etching table out of plywood and 2x4's, mounted a motor to vibrate the tabletop, and was soon making progress. The first printed circuit board to be used in a product was the audio board of the R4-B receiver. This was the start of the PC Fabrication Department.

In the year 1967, the 2-C receiver and the 2-NT CW transmitter were introduced which filled the need of a good low-cost novice station for many beginning amateurs. The TR-4 transceiver replaced the TR-3 with several improvements, including a solid state VFO, and a BFO circuit.

The R4-B, T4-XB and the L4-B were improved versions of the earlier products and were introduced in late 1967. The production rate was averaging four to six units per day of most products. More room was needed and an addition was made to the building to provide office space, an Engineering Department and a lunchroom area. The Engineering Department was sharing space with the Machine Shop in a small building across

Page 20 The LongPath December 2021 Volume 45 Issue 12

the railroad tracks from the main plant. The new addition would give the entire building to the Machine Shop.

The SPR-4 was introduced in 1970 as a replacement for the ever-popular SW-4A. The receiver was all solid state, could receive both SSB, AM, CW, and RTTY. Crystals could be added to extend the listening range to meet the needs of the owner. The two-meter FM (Frequency Modulation) band was gaining in popularity and the ML-2 twometer FM transceiver was introduced. This was the first unit to be imported and sold bearing the R. L. Drake Co. name. This led to the import of the TR-22 portable 2-meter transceiver and the TR-22M portable transceiver. The TR-22M was a marine transceiver which allowed the company to enter into the marine communications market. The introduction of the TRM single sideband transceiver followed and its use ranged from small shrimp boats to the larger oil tankers. The TR-22C was imported to replace the TR-22, which was later replaced by the TR-33C. All three units required crystals for each channel, unlike the synthesized handheld units of today.

The DSR-1 receiver was introduced in late 1971. It covered the complete HF spectrum and used "nixie" tubes for the digital display. It also allowed reception of independent sideband as well as single sideband and AM. It was followed by the MSR-1, a 19-inch rack mount commercial type receiver. The MSR-1 was used aboard oceangoing ships as the mains receiver or primary receiver. The DSR-2, MSR-2, and the MSR/FMP succeeded the DSR-1 and MSR-1. These units contained gold plated switch contacts to minimize contact failure in the salty air.

The ever-popular C-line was introduced in

1973 to replace the B-line twins. The C-line units made use of more solid-state components, a dual dial VFO, a plug-in antenna change-over relay in the T4-XC, and crystal filters replaced the old reliable Pass Band Tuner in the R4-C. The R4-C receiver and the T4-XC transmitter are still sought after by many amateurs and held as prize possessions by others. Accessories included the TC-2 two-meter transverter and the SC-2 receiving converter, the TC-6 six-meter transverter and the SC-6 receiving converter. The TR-6 six-meter transceiver was also introduced.

The SSR-1 receiver was imported and added to the shortwave receiver line as a low-cost unit covering the complete spectrum from the broadcast band through 30 MHz. A whip antenna and a compartment for eight D-cell batteries made it portable.

In 1975 amateur radio operators across the world were in mourning as word spread that R. L. Drake Sr. had passed away. They had lost a very dear friend, a fellow amateur, and a pioneer of Amateur Radio. The operation and management of the company was turned over to Peter W. Drake, as Mr. Drake had been training his son to assume his position for some time.

Drake amateur radio equipment can be found on every part of the globe. If the equipment is not there, the name Drake is known and respected. Amateur Radio operators come in all walks of life and at one time or another have owned, wanted, or used a piece of radio gear manufactured in Miamisburg, Ohio. King Hussein of Jordan has used Drake gear, as well as Barry Goldwater, Roy Neal, and Ronnie Milsap.

The amateur radio station aboard the Queen Mary was once a complete line of Drake equipment. The R. L. Drake Co. amateur radio equipment has been used in hot air balloon flights trying to fly non-stop across the country or around

Page 21 The LongPath December 2021 Volume 45 Issue 12

the world. An around the world attempt on a sailing yacht used Drake gear, the details were outlined in an issue of the Smithsonian Magazine. The non-stop flight of the Voyager was aided with Drake gear. Many far away and remote islands have been temporary home of DX-peditions using Drake gear to contact their fellow amateurs. A complete 7-line was taken to China as international goodwill by a California University. Famous amateurs include James Stewart, Chet Atkins, Joe Walsh, and Astronauts such as Owen Garriot and Tony England. Marlon Brando, at one time, wanted to use Drake amateur radio equipment as a communications link on his island.

In the year 1977, land was purchased in Franklin, Ohio, just off Route 123, to build a new production facility. The production facility was to be completed in three phases. The first phase of the building provided 42,500 feet and was completed in 1978. The Machine shop, PC fabrication department, production lines, and component assembly lines were moved to this new facility. The office staff, Sales department, Engineering department, and the Service department remained at the Miamisburg plant.

Production now included the TR-7, a completely solid-state transceiver and a companion receiver, the R-7. Complementary accessories included the L-7 linear amplifier, WH-7 wattmeter, and the MN-2700 matching network, to mention a few. The UV-3 was introduced in 1978, and was another first in amateur radio. It was a single unit housing a 146 MHz band transceiver, a 220 MHz band transceiver, and a 450 MHz band transceiver all in a compact, rugged package. It was designed for mobile operation or for base station use. The MRT-55, designed from the UV-3, proved

to be a viable product in the marine radio market, and led to the production of the MRT-55C. The RR-3 was introduced in 1981 to replace the RR-2 which had replaced the RR-1 earlier. The RR-1 had gained popularity as being a very reliable, low cost secondary receiver aboard ocean going ships.

The TR-4310 transceiver and the R-4245 receiver were also introduced as primary units for ocean going ships. These were redesigned TR-7 and R-7 respectively with a VRTO (variable rate tuning oscillator), full transmit coverage, and with all crystal filters installed. They were also standard 19" rack mount units built for rugged duty. Radio Monaco at one time used four complete rack mounted stations, consisting of the TR-4310, R-4245, L-77, and the MN-4438. The L-77 and the MN-4438 were built on the lines of the L-7 and MN-2700 with a face lift to match the TR-4310 and R-4245.

In the year 1981, it was decided to enter the home satellite receiver market. This meant a completely new product, which means engineering time, drawings, board layouts, ordering parts, market analysis, marketing forecasts and advertising brochures, all of which take time. It is usually two years or more before all of the pieces fit together and a product is actually on the shipping dock. The ESR-24 design and production set new standards, as it was in the shipping department within eight months. Design of the ESR-24 (Earth Station Receiver - 24 channels) began in May, the first prototype unit was shown at the Omaha, Nebraska home satellite show in August, and the first units left the shipping dock in November of 1981. The ESR-24 was the first cosmetically appealing, professionally built consumer receiver for home satellite reception. The competition units were either built in a back room or in a garage. It was designed especially for the home dish owner. It soon became a leader in a very new and exciting market.

Page 22 The LongPath December 2021 Volume 45 Issue 12

The ESR-24 brought new fame to the company, so instead of offering the design to other manufacturers, the company was approached by other manufacturers to produce receivers under their name. The OEM accounts included Channel Master, Winegard, Conifer, and National Microtech.

In July of 1983, the upper level of a building on Springboro Pike was leased to the company. The office staff, Sales staff, and the Engineering department were moved to this new address to become the Corporate Office. This provided the much-needed room for all three departments, which were expanding rapidly.

The second phase of the Franklin plant became reality in 1984. An addition of 50,000 square feet was added, which gave an overall building size of 92,500 square feet. This addition provided the much-needed room to move the Engineering department into the same building with the Production department as well as providing more area for production lines. The PC Fabrication department now consumed 11,000 square feet of the building. The equipment was of the latest technology. Its wastewater treatment plant could treat 80 gallons a minute, removing all heavy metals, and automatically adjust the pH balance properly before being released.

The postponed, but eventual decision was made to cease production of amateur radio equipment. The market had all but disappeared, there was a lack of FCC deregulation, the foreign competition was increasing more and more, and the dollar was strong.

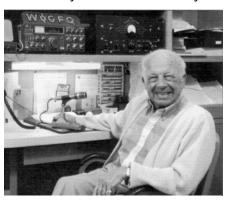
Publisher's Note: Article retrieved by NS4Q from the 1988 edition of the Printed Circuit.

### The Globe / Galaxy Story

By Bob DePierre, K8KI



The story of Globe and Galaxy Electronics revolves around Leo Meyerson, who lived in Council Bluffs, IA, for all of his productive life. He had a long life, from 1911 to 2011, dying at age 100. He had an especially outgoing personality and was constantly involved in many ham radio activities.



His interest in radio began at age 9. He went to college and trained as a musician. That experience earned him a job in his father's grocery store, where

**Leo Meyerson** he stayed until age 24, when he just had to start his own electronics business.

Leo established World Radio Labs (WRL) in 1935 selling things radio amateurs needed. During World War II he shifted to Scientific Radio Products manufacturing FT-243 crystals for the war effort. After the war he sold his interests in that business and restarted WRL. They soon began offering the Globe line of sturdy, reliable AM/CW transmitters. These rigs used proven circuit designs with comfortable operating margins, and all but the massive Globe King 500 were available as kits or wired. The King cost a whopping \$675 when it was released in 1956.

On my second day of high school in 1961, I

Page 23 The LongPath December 2021 Volume 45 Issue 12

## The Globe / Galaxy Story (continued)



heard announcement regarding all of the school clubs. One of them was the amateur radio club, so I walked over to the electronics shop after school, where I came before the imposing Globe King 500! It was

on the operating

Globe King 500

bench, where it stood taller than any student my age, and weighed 275 pounds. I was genuinely humbled by a beast of this size. I remember one of the seniors working a ham in Salt Lake City when I walked up.

Meverson operated WRL until he sold it to Textron in 1959. Textron manufactured the '500 for two more years, but marketed it mostly to the military. Leo didn't stay out of the ham business for long. He started Galaxy Electronics in 1962, with a whole new line of products. His market timing was perfect - consumer interest in heavy metal had evaporated, and it was time for the much smaller, lighter HF transceiver designs. His first offering was the Galaxy 300, which first appeared in 1963. I once owned one of these, finding it at a hamfest when it was already 25 years old. It was fairly large, and there wasn't much effort put into miniaturizing it. But it was strong and stable. It covered 3 bands, each with its own frequency calibration. It included SSB, but didn't have the filters for CW. It worked flawlessly...for what it was meant to do.

The Galaxy line of transceiver eventually extended to five models, all released in the 1960's. The Galaxy V and GT-550 models covered the five ham bands. They even produced a couple of less memorable amplifiers, both rated at 2kW, using TV sweep tubes.

I once crossed paths with a Galaxy V at a hamfest in Los Angeles, and just had to bring it home. It was much smaller than the '300,



Galaxy 300

and more complex. It was also a solid design, and I had absolutely no problems with it. It had a "linear" transistor VFO with much better frequency resolution. The input power was rated at 400 watts...with sweep tubes, of course. It wasn't optimized for CW, but I never had a performance problem with it. It sure looked pretty once I cleaned it up. I must have paid all of \$35 for it. Not a scratch on it.

By 1970, Leo Meyerson's run had come to an end, and he sold the business to Hy-Gain Antenna Co. He retired in 1977, dividing his time between Omaha and the California desert, and continuing as an active radio amateur until his death.



Galaxy V

Page 24 The LongPath December 2021 Volume 45 Issue 12

### **Hallicrafters Company**

By Kevin Hibbs, KG4TEI



The Hallicrafters Company was founded by William J. Halligan (W9AC (SK)) in Chicago, IL in 1932. His company first began to develop components for radio and later developed their own radios. During World War II they halted amateur radio production to produce radios for the war effort such as the BC-610. After the war, they expanded their production to include not only ham equipment like the S-38 and S-40 line, but also table top radios and even televisions. At one point there were at least 2500 people employed by Hallicrafters in multiple locations around the Chicago area. Hallicrafters continued their military efforts and produced components for missiles and missile defense programs including Atlas and Nike. The company eventually was sold to Northrop Corporation for their defense assets in 1966 and by the 1970s had ended amateur radio production.

Hallicrafters radios are special to me because they represent a lot of firsts in my ham radio life. Years ago, I purchased a S-120 receiver and it became one of my first HF receivers. It was also the first tube radio I restored with all new capacitors and a diode to replace the selenium stack rectifier. It was also the first live chassis I ever worked on and thankfully lived to talk about, even though I found out first hand just how "live" it was. This radio, though consumer grade, became a learning tool more than anything else. Yes, I did listen to it quite a bit, but it was soon replaced with a radio with a synthesized VFO that didn't drift quite so much. This was one of those special occasions where the right equip-

ment came along at the right time to make a lasting impact on my ham radio career.

There is much more information available about William Halligan, Hallicrafters, and the work they did available online. Here are a few links that I reference for this article:

https://en.wikipedia.org/wiki/Hallicrafters
https://www.madeinchicagomuseum.com/single-post/hallicrafters/

https://www.wikiwand.com/en/Hallicrafters

#### Hallicrafters HT-4 Transmitter

By Chris Reed, AI4U



Here is my article on the Hallicrafters HT-4 transmitter, known by the ARMY designation of BC -610.

During WWII it was common practice for manufactures to retool their factories and make items to be used for the war effort. Such is the case with Hallicrafters in Chicago, IL. Hallicrafters was known as a reliable amateur radio manufacturer for many years and was chosen by the department of the army to manufacture a portable radio capable for service in the field as a mobile unit.



US Army BC-610

Enter the HT-4 a transmitter that would push 450 watts CW and 350 on phone. It could operate on any frequency 2 to 18MHz. Three band coil packs were configured for quick change in frequency. As the unit was to be portable, it had to be hardened to accept the rigors of the battlefield. The army assigned the HT-4 the

Page 25 The LongPath December 2021 Volume 45 Issue 12

# Hallicrafters HT-4 Transmitter (continued)

designation, BC-610 for the military version. Rubber feet, Heavier case, shock mounts and even tube stabilizers to keep them in their sockets were implemented. Once finished, the BC-610 was probably named for its weight. It came in at just over 600 lbs. This is just the transmitter portion of the radio system.

The transmitter would be the mainstay in the two-man portable operating communications vehicle SCR-299. The equipment could travel overland or be mounted in an amphibious vehicle. Its versatility and its capability allowed for the "message" to get through from command to field units allowing for quick response to out flank the enemy or reinforce units in the hot zones. The SCR-299 was first used on November 8, 1942, during Operation TORCH involving companies of the 829th Signal Service Battalion establishing a radio net that could exchange messages between beach-landed forces and bases in Gibraltar. According to US Army military historians, "General Dwight Eisenhower credited the SCR-299 in his successful reorganization of the American forces and final defeat of the Nazis at Kasserine Pass."

Many companies participated in the war



Internal and external views of the Hallicrafters HT-4

effort. I would argue that Hallicrafters contribution enabled distant communication allowing the Allies to win the war on several fronts. A great video from Hallicrafters, explains much more than can be included in this article. A 30 min movie from Hallicrafters is at this link You Tube:

https:// www.youtube.com/ watch? v=JkXwPc81rzU Excerpts for this article are taken from Hallicrafters brochure and Wikipedia at:

http://en.wikipedia.org/wiki/SCR-299.



Period HT-4 advertisement

### Hammarlund

By Billy Gold, KM4BGF



#### HAMMARLUND

The first Hammarlund plant started in a loft in lower Manhattan, New York City by Oscar Hammarlund in 1910. The company started out as a radio component manufacturer. The Hammarlund variable capacitor designs and were adopted as the industry standard. The variable capacitor's schematic symbol became as the company's logo. The name Hammarlund is one of the most distinguished in the early history of radio in America. The Hammarlund Manufacturing Company ranked among the nation's very oldest producers of radio equipment.

In the mid-1920s, Hammarlund formed a partnership called Hammarlund-Roberts Co. specifically to offer kits for AM broadcast radios using Hammarlund parts. The first Hammarlund-Roberts radio receiver kits were placed on the market in 1925 and found almost immediate acceptance. Not only were the kits purchased by hobbyists, but they were also sold to custom radio builders who resold them as ready-to-use radio sets. The Hammarlund-Roberts radio kit business was hit hard

Page 26 The LongPath December 2021 Volume 45 Issue 12

# Hammarlund (continued)

by the depression in 1931 and closed the kit business.

The Hammarlund Mfg. Co., Inc. instead concentrated on highest quality, custom units with an emphasis on top quality radios. This even became the company slogan "Quality without compromise". Hammarlund later entered into the shortwave receiver market with the introduction of the "Comet Pro", the first commercial short wave super heterodyne receiver. Within five years, thousands of these receivers were in use at commercial radiotelegraph and radiotelephone stations, aboard ships and at broadcasting stations as well as by amateur radio operators the world over.



The Hammarlund Comet Pro

In 1936 following the introduction of the Comet-Pro came an improved receiver, called the Super-Pro (the SP-200 series).

After the start of World War II Hammarlund expanded and started producing the Signal Corps model BC-779 and they also produced over 1 million variable capacitors a month. After the end of the War, the radio market was flooded with surplus receivers. Many working models can still be found today.

In 1947 Hammarlund introduced the SP-



Signal Corps Radio Receiver BC-779-B

600 Super-Pro receiver. The SP-600 Super-Pro receiver had much better performance than the SP-200. It covered a frequency range from 540kHz through 54MHz and a 0-100 kHz calibrated mechanical band spread. The SP-600 series were also used throughout the world for military, laboratory and commercial applications.

Hammarlund was most famous for its amateur/short-wave receiver lines such as the Super Pro series and the HQ series but also produced several transmitters but they saw limited use. Hammarlund also built a substantial quantity of the VHF FM "Village Radios" for the United States Agency for International Development (AID) to use in Vietnam, as well as a number of land-mobile radios and transceivers for the Citizens band radio market. The company continued to produce com-



1939 ad for the SP-200 Super Pro

munications equipment for several more years but bought and sold multiple times and eventually sold off and closed in 1973.

Page 27 The LongPath December 2021 Volume 45 Issue 12

### A Heathkit Dominated Shack for the First 20 Years

By Steve Werner, AG4W



My first transmitter in 1965 at age 12 was a Heathkit DX-20. It had 50 watts input power



Heathkit DX-20 Transmitter

(about 30 watts output) and used a 6D06 output tube. It was crystal controlled. which all novices were required to use back then. when I purchased it used for \$20.

With a Pi network output you could operate into antennas from 50-1000 ohms.



Drug store tube tester

My first antenna was a 40 meter inverted V fed with RG-59 75 ohm coax. Back then I didn't have an SWR bridge so I didn't understand why the DX-20 didn't tune up. A local ham brought his SWR bridge over and quickly figured out I did not do a good job soldering the coax connector. It was shorted. I also blew the 6DQ6 final. Fortunately that sweep tube was not expensive and easy to purchase. Back then drug stores had tube testers and they sold tubes stocked in the case below the tester.

My first ham receiver was a used Heathkit HR-10, 7 tube ham band only receiver. Back then the 40 meter novice band was 50 KHz from 7.15 - 7.2 MHz or about 3/4 of an inch of dial space. A novice license was only good for a year back then. Sensitivity was 1 uv for a 10 dB signal plus noise to noise ratio. Selectivity was 3 KHz at 6 dB down and 9 KHz at 40 dB down.



Heathkit HR-10 Receiver

The sensitivity was poor on 10 and 15 meters and the selectivity was very poor on CW. It used a 2 crystal filter operating at an IF frequency of 1681 KHz. I used a ceramic knife switch to switch the antenna from transmit to receive.

When upgraded to the general license in 1966 I purchased a used Heathkit DX-40 for \$37. That was a big upgrade. It had a transmit-



Globe VFO deluxe

ting tube, a 6146 that was rated for 75 watts input. It also had an AM modulator. I then bought a Globe VFO deluxe. As shown in the picture of my

second station my receiver was upgraded to a Hammarlund HO-129X. This receiver was first produced 1945 and was \$129 back then. Because of the age many of the paper and electrolytic capacitors had to be replaced.

It was exciting use a VFO and I was really hap-



A young AG4W operating his to be able to station with his Hammarlund HQ-129x in the background

py to get on phone. I bought a new JT-30 Astatic crystal microphone for about \$10. These were

December 2021 Volume 45 Issue 12 Page 28 The LongPath

### A Heathkit Dominated Shack for the First 20 Years (continued)



Astatic JT-30 microphone

manufactured between 1945 and 1970. The handle was made of wood painted black.

Looking back to using the HR-10 and HQ-129X I believe it made me learn to use my ears to copy stations better.

It was very common to have multiple stations heard then due to poor selectivity. It was also common as a novice to have a station come back to you that was not on your frequency since most



Frequency Reference Crystals

stations only had a half dozen crystals. It was interesting because when you tuned off frequency and answered a station you no longer heard your signal when you transmitted. Another interesting feature was starting a OSO on one frequency and both stations moving the dial due to drift. Another specification you don't see any more is backlash. This specification

was due to the mechanical method of tuning. If you set the dial and let your hand off the dial, in some radios the frequency would move. The HR-10 used the old reliable dial string and pulley system with a tensioning spring to minimize backlash.

The following year I sold the DX-40 and VFO and bought a Heathkit DX-100 at the Breezeshooter's hamfest. This transmitter had a pair of 6146 final tubes and a pair of 1625 modulator

tubes. I got it home from hamfest the and it didn't work. I spent the better the part of summer age 14 fixing the DX-100. About a third



Heathkit DX-100 Transmitter

of the tubes were dead. It had a .94 ohm resistor that was burned up. I still remember the Tydings Electronic store salesman teaching me that I could make my own resistor replacement using wire. I wound it on a wood dowel. I thought I got a bargain at the hamfest, but learned a valuable lesson that hamfest equipment may need repair even if they say it doesn't. I did learn a lot about that transmitter repairing it. One of the advantages of owning a Heathkit is the documentation was good and included a good theory of operation. The manual also helped with troubleshooting. It was 107 pounds so the first thing I discovered was a card table was no longer a good support for a transmitter like that. I had already replaced my HR-10 with a Hammarlund HQ-129X that weighed 47 pounds. The card table was ok with that.

The last hamfest of the year was in Warren, OH. It was also the biggest one I went to back then. I was so happy to sell the DX-100 and HQ-129X. I sold them out of the trunk of the car. Even my dad was motivated not to bring them home. I still wonder if he gave the buyers a discount to take them away. I was not present when they sold. I used the money from those sales to buy a new Heathkit HW-32A for \$105. I really enjoyed assembling that single band 20 meter transceiver. When you built a Heathkit and aligned it you always felt comfortable working on it later if it failed. Over 90 percent of the components including 14 tubes were mounted on a single circuit board and it had a nice factory prepared wiring harness. Heathkit did such a great job with step by step instructions and illustrations. I also purchased the HP-23 AC supply originally for \$50 and even purchased the DC supply later to use in our Ford Torino. The HW-32A operated at 200 watts PEP input

Page 29 The LongPath December 2021 Volume 45 Issue 12

## A Heathkit Dominated Shack for the First 20 Years (continued)



Heathkit HW-32a Transceiver

and had a 2.7 KHz four crystal filter. The big improvement was I could now operate SSB. It used a diode type balanced modulator. Even though it advertised it could run on USB and LSB I had a report of a little carrier. I took it to a friend's house and saw the carrier on the oscilloscope. I nulled it out with the capacitor adjustment optimized for USB. This radio also had frequency stability of 200 Hz per hour after warm up. With the earlier radios like the DX-100 it was best to always leave the filaments on. The HW-32A VFO was temperature compensated and operated at 1618-1771 KHz which was low enough frequency to make it easier to be stable. It also had 2 KHz dial calibration.

I started to work some DX with this transceiver and decided my next upgrade was my antenna. I purchased a HyGain 203BA 3 element 20 meter yagi and built a tower from scratch using surplus pipe and treaded rod. I tried to rotate it with an Alliance Tenna rotor that quickly failed. I upgraded to a CDE AR-22R. Now I am surprised that rotor never failed.

The next summer I turned 16 and went to work for Joseph Horne department store in downtown Pittsburgh as a stock boy for \$1.60/hour. That was much better pay than the \$2-\$3 per lawn I made mowing and weeding since age 12 to fund my hobby. I had one use for the money I earned that summer and it was to buy a Heathkit HW-100 for \$240. The power supply I had for the HW-32A would work with the HW-100. At the end of the summer I had enough to order the HW-100 and started building it the last week of summer



Heathkit HW-100 Transceiver

vacation. The transceiver had 20 tubes and 2 transistors. I had gotten a NASA soldering manual from a ham friend and decided to use some of the techniques in my HW-100 build. I had that radio for a very long time. I finished my first DXCC on phone in October of 1969 using that rig. It did not get much use except during the summers during college from 1971-1975. In 1980 it got paired with a Dentron GLA-1000 amplifier. The HW-100 was much nicer than the HW-32A not only because I could work all bands and CW, but it also had .5uv sensitivity instead of 1uv and a 2.1KHz crystal filter. It also used two 6146 final amplifier tubes and had 180 watts input (100 watts output). It was my first rig to use a solid state VFO that operated from 5-5.5 MHz. It only had 5 Khz dial calibration and only drifted 100 Hz per hour after a 30-minute warmup. Another specification we don't see any more is drift based on plus or minus 10 percent line variation of only 100Hz. One of the failure mechanisms of this radio was that it used rubber drive belts to control some of the variable capacitors. I remember one of them breaking on a Field Day Contest early Sunday morning right about the time a herd of cows came to visit us on top of a hill.

Heathkit was smart coming out with the HW-100. They recognized that their SB-101 was too expensive for many hams. Many hams thought due to the styling that the HW-100 borrowed much of the design from the single band HW-32. In reality it was almost identical to the SB-101 design with a few notable exceptions. The biggest difference was the VFO. The SB-101 used a Linear Master Oscillator, as Heathkit called it. It also had a better crystal filter than the HW-100 with a shape factor that was 5KHz at 60 dB down instead of 7dB.

Page 30 The LongPath December 2021 Volume 45 Issue 12

### **Knight and Allied Radio**

Presented by Norm Schklar, WA4ZXV



A vintage Knight-kit C22 ad

Name: Allied Radio Corp.

Trade names: Knight (Knight International), Lin-

coln, Polydyne, Roamer, Wextark.

Location: 833 West Jackson Boulevard, Chicago,

Illinois (USA)

Abbreviation: allied-rad

Founded: 1928

Summary: 1931 ARC-catalog shows the following

addresses:

Chicago sales - 711 W. Lake Street, Chicago,

III.

General offices - 1903, Pershing Road, Chica-

go, III.

The website Allied Catalogs Com is showing many catalogs from Allied Radio Corporation, 711 W. Lake St., Chicago, beginning 1929 (before they did no catalogs) to nearly present. You can browse all single pages per catalog and look at the official pictures, prices etc. The owner of that site - and member here - has given us the right to use the catalog pictures he scanned for showing on the model pages.

The "in house" brand tubes offered by the company were Knight and Hylon. Manufacturer not known. As well as these, several brands such as Arcturus, Cunningham, Duovac, Marathon and Sonatron were also listed in the catalogues.

**History:** Simon Wexler founded Columbia Radio Corporation in 1921 and sold crystal sets.

1928: Allied Radio was established as the radio parts distribution arm of Columbia Radio Corporation. The company was soon to become one of the most recognizable names in the electronics industry.

1932: The company built a growing business in marketing radio parts and kits to home hobbyists, and was one of the first to sell electronics through a catalog. In addition, Allied opened storefront distribution outlets to reach more amateur ham radio operators and experimenters.

1941-45: Having survived the depression, Allied focused on the war effort, primarily servicing government contracts and high-priority industrial orders. Allied gained experience in the industrial arena for the first time through government and military contracts, which laid the groundwork for the distribution niche we occupy today.

1946-60: The electronics industry exploded as new developments in electronics were adopted on a widespread basis in commerce and industry. Innovations such as television, industrial automation, space technology and defense accelerated the need for electronics. Consumer demand also grew as radio sets and components not available during the war proliferated. During this exciting era, Allied gained both the experience and specialized staff necessary to handle both consumer and industrial sales.

1962: The first industrial catalog for Allied Electronics, a subsidiary of Allied Radio, was released. The company continued to serve both amateur and professional ham radio operators as one of the few places to locate that "hard to get" piece of radio equipment.

1970: Allied has 21 regional locations. Allied moved its headquarters from Chicago, Illinois to Fort Worth, Texas because 1970 marked the year when Radio Shack's parent company, the Tandy

Page 31 The LongPath December 2021 Volume 45 Issue 12

# Knight and Allied Radio (continued)

Corporation, purchased Allied Electronics and Allied Radio. On the consumer side, the new firm became known as Allied Radio Shack. Allied Electronics, with their new "computerized order tracking systems," boasted the highest percentage of filled orders in the country.

1972: The catalog is now a treasure trove for persons tracking down old components when trying to restore old professional and industrial equipment. Essex/Stancor, UTC, Switchcraft, Dialco, Arrow-Hart, Sprague, Fairchild, Robertshaw, Centralab, Belden, Sigma, Magnecraft, C. P. Clare, Amphenol, Shure, Electro-Voice, Sola, Simpson, Superior Electric, Hurst, RCA, Elmenco, ADC, H. H. Smith, are only some of the brand names represented. Interspersed with the major pro names were Micronta, Realistic, and other Radio Shack "consumer level" house brands.

1981: Allied began the process of moving from an all manual system to a fully computerized company. The process was completed in 1985.

1995: Allied is the first electronics distribution company to come out with a CD-ROM catalog and quickly followed-up by entering the e-commerce arena with the launch of a web site. 1999: Allied Electronics acquired by Electrocomponents of the United Kingdom.

Resource used:

https://www.alliedelec.com/alliedhistory.aspx

#### Knightkit T-60 transmitter

The Knightkit T-60 is a kit-built CW and AM transmitter introduced in 1962-63. A very compact design, it replaced the T-50. Designed for the 80 to 6 meter ham bands, the T-60 uses a 6DQ6B final RF tube. Power input was advertised at "60 watts CW/ peak AM on 80-10. Less on 6". Output is about 40 watts on the lower bands. Output of the final is straight through for 80-10 and doubling for 6 meters. Oscillator/ buffer is a 6FH8. It also uses a 12AX7 for speech amplifier and 6DR7 for audio driver/ controlled-carrier AM modulator.

The T-60 does not have the usual plate or grid current meter. Instead, it has a simple two-level RF output meter for tune-up and relative power output. Either a crystal or external VFO can be plugged into the front panel. Price of the T-60 was \$49.95 in 1963. The price had increased to \$59.95 by 1967.

The Knight R-55A is a matching receiver. Allied advertised the T-60 with the R-55A receiver in its 1963 to 1967 catalogs. Compare the size of the very compact T-60 to the much larger R-55A. The R-55A ranged in price from \$59.95 in 1963 to \$64.95 in following years. Prices dropped in the Spring 1967 sale catalog to \$46.70 for the T-60 and \$54.95 for the R-55A. I assume they were closed out shortly afterwards.



These graphics were captioned:

"A perfect 'First' Station." (The R-55A is the) "Ideal match for the T-60 transmitter on facing page. R-55A has six calibrated scales for the 80 through 6 meter Amateur bands. Gray metal cabinet



Resources used:

https://people.ohio.edu/postr/bapix/ Kni T60.htm

https://radioattic.com/item.htm?radio=1000275

Page 32 The LongPath December 2021 Volume 45 Issue 12

# Knight and Allied Radio (continued)

https://www.radiomuseum.org/ dsp\_hersteller\_detail.cfm?company\_id=1865 https://www.qsl.net/la5ki/org/kn/kn.htm - Some Knight Kit photos.

#### **National**

By Susan Seaford, AI4VV



National was at first a manufacturer of parts for power plants. But even at the turn of the 19th century they had the capacity to manufacture other items. A friend was a toy buyer for Woolworth, the large dime store company, and he suggested toys as the next branch of the business. In 1914 they incorporated into the National Toy Company. Their next plan successfully added home merchandise and they renamed the National Company in 1932. Management was always interested in new products and in the 20's there was the radio "craze". They were already manufacturers of capacitors.

In 1924, Fred Drake and Glen Browning developed a radio tuner and asked National to make it for them. When it became very popular, the company decided to make it their main business. They brought in James Millen, an engineer and writer, to help with that. They expanded their facilities in Malden, Massachusetts. In 1929 with Browning, they introduced the MB-29 broadcast band tuner which had 3 stages of rf amplification and band pass tuning and in 1930 a fourth stage was added. Both were TRF models.

In 1928, the company made it's first short-wave receiver, the SW-2, made of two tubes, followed by SW-3, SW-4 and SW-5. The 2-5 tubes were all regenerative and there was one or two stages of amplification. Of course, as newer vacuum tubes came out they were incorporated into the radios. The fourth tube was for audio power output. In 1930 Millen and Kruse designed the SW-5 with the 5th tube was push-pull audio output for speaker use. This was also one of the first radios designed for AC use.

Collectors will know that a variation was the SW-58C, a product which resulted from a joint effort of GE and National. GE had developed a transmitter so National designed a receiver to go with it for the airline industry. In this form it was known as the AGS or Aeronautical Ground Station. It was also one of the first high performance receivers made. A different set of coils was made for amateurs. The FB-7 superheterodyne version was released later.

The announcement of the HRO came in the October 1934 issue of QST. This radio included 2 RF stages and a crystal filter and their distinctive tuning dial. It could go as low as 20 Hz. It remained popular until after WWII. In 1939 National got orders from the British Navy and subsequently other Allied countries for HRO radios.

After the war other radios were introduced and the company made other amateur equipment. They also remained a government contractor but by the 1980's National had unraveled.



Page 33 The LongPath December 2021 Volume 45 Issue 12

### **Side Band Engineers**

By Rob Suggs, NN4NT



I've never touched a Side Band Engineers (SBE) radio but I have to admit that Bob is right, they are intriguing. A little internet research showed that the company was founded by Faust Gonset who already had a company devoted to some popular radios. He wanted to sell mobile radios with the latest solid-state technology and introduced the SB-33 transceiver in 1963. The key selling point in the SB-33 ads were the "bilateral" transistors in the mixer and amplifier stages. As best as I can tell this means the same circuits were used in the transmit and receive chains thus, as the ads say, "avoids needlessly idle stages in either transmit or receive, which eliminates a boxful of components, simplifies wiring, reduces equipment size ... and results in a lower selling price - with no compromise!". The selling price was \$398.50 which is \$3,567 in 2021 dollars. The radio operated on 80, 40, 20 and 15m with 135 w PEP SSB. In addition to 19 transistors, 13 diodes and 1 zener diode there were two PL-500 power tetrodes and a 12DQ7 driver. It is interesting that the all solid-state except for the final stage architecture lived on in



SBE 33 for sale on eBay for \$299.

popular radios until the 1980s. The radio had a built-in AC supply and required an optional DC to AC inverter for mobile operations. It had a temperature ompensated VFO and a Collins

mechanical filter with 2.1 kc of selectivity at 6 dB used on both transmit and receive.

The SB-34 was introduced in 1966 along

with the SB-2LA 1000w linear amplifier. By then, SBE was a subsidiary of Raytheon. As the Japanese amateur radios gained popularity, SBE introduced the SB-35 and SB-36 which were manufactured in Japan. Not many were sold and the company stopped selling amateur equipment and



SBE SB-34

switched to CB radios and scanners in the 1970s.

The Japanese site where I found most of the information speculated that the

reason the Japanese manufacturers overtook the US amateur market in the 1970s was that the US manufacturers were stuck in the paradigm that bigger and heavier radios were better, just like our auto manufacturers. They recognized that SBE broke with that tradition and embraced the idea of smaller, lighter, mostly solid-state radios and were clearly ahead of their time.

http://www.noobowsystems.org/restorations/sb-33/sbe-company-e.html

### **Swan Engineering**

By John Stensby, N5DF



In the early 1960s, Swan Engineering was founded by Herbert Johnson, W7GRA, in his Benson, Arizona garage. Initially, the company's main products were single-band, SSB-only (no CW capability) vacuum-tube type transceivers. The rigs performed well, and became popular with phone operators. Each transceiver fit easily on a desk top, unusual at the time in an era of large and heavy separate receivers and transmitters. Eventually, the company offered 80 through 10 meter transceivers capable of both CW and SSB operation. In the newly-emerging transceiver marketplace of the early 1960s, Johnson's only seri-

Page 34 The LongPath December 2021 Volume 45 Issue 12

# Swan Engineering (continued)

ous competition was the more expensive Collins KWM-2.

Not long after its initial product offering, Swan moved to Oceanside, California, a small idyllic coastal community just south of Los Angeles. In its new location, the company produced several successful products, with production peaking at nearly 400 radios per month. Also, Swan manufactured and marketed station accessories, such as the SWR 1 standing wave bridge.

In 1967, Swan became a subsidiary of Cubic Corporation. In this capacity, until around 1979, the company continued to introduce and market new amateur radio products. The Swan 350 (shown below) and 500 transceivers were the company's most commercially successful products. The models 700 and 750 were the end of the Swan transceiver line. Until the late 1970s, the company remained in Oceanside, eventually folding when costly vacuum tube equipment lost favor in the amateur radio market place.

Single Sideband Transceiver



Swan 350

Swan advertised monthly in amateur radio magazines. Also, direct-mail marketing campaigns were initiated, and the company sent out

literature and trinkets to large numbers of amateur radio operators. For example, small call sign plaques, similar to the one shown to the right (note the Swan logo in the upper left-hand corner), were mailed to amateur radio operators.



Swan marketing trinket

In 1974, Johnson started Atlas Radio, a producer of small, solid-state radios. In 1995, Atlas Radio announced the Atlas 400X. Towards the purchase of this radio, from about 250 individuals, the company collected advanced deposits and payments. While trying to produce the 400X, the company ran into technical difficulties, and it could not deliver on its promises. Unfortunately, only a few of the up-front investors ever got a transceiver or their money back. Shortly after this debacle hit, a company called O.M. Radio took over Atlas Radio's assets. In 2000, Herbert G. Johnson, now W6QKI, died at the age of 79.



A vintage Swan Electronics ad

#### 2021 NADXC Officers and Directors

President Bob De Pierre, K8KI Vice-President Steve Molo, KI4KWR

Secretary/ Chris Reed, AI4U

Treasurer

Directors: Kevin Hibbs, KG4TEI

Tom Duncan, KG4CUY

(SK)

(Ex-Officio) Steve Werner, AG4W

How to Join

Come to a club meeting or send in an application by mail (form on <a href="https://www.NADXC.org">www.NADXC.org</a>)

This edition of The LongPath published by: Fred Kepner, K3FRK

Page 35 The LongPath December 2021 Volume 45 Issue 12