



The *ORC* Newsletter

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From the President

de Kevin Steers (K9VIN)



My, where has the time gone? It seems that years pass much more quickly the older I get. I am just completing two years as president of the club and it feels like it went by in a blink. Part of the reason it felt so quick is based on the amount of help I receive in keeping this well-oiled machine going. I am SO thankful for the volunteers who make this job easy, and I look forward to building on the recent accomplishments that we are all part of. If you have not taken your turn as President, I recommend volunteering on the Board, and removing the mystery from the role!

With the holidays upon us, not a lot of operating to speak of. Mostly listening around the bands, for short periods. I have enjoyed more 2M QSOs, now that I have a solid rig and antenna after many years of going without. And as I write this I notice that one of my dipole legs is coiled up on a snow drift, which gives me something to do tomorrow. I do want to make the time to listen to the bottom of the bands for CW at a

speed I can copy, to help me get better at copying. I guess cold weather is good for something ☺

Not much so speak of on the bench these days. More cookie and candy making with Mom than anything else. Soon, though, I will be testing the adjustments to my rotator, and praying for warmer weather. Until then, enjoy the snow, and stay on the warm side of the door, as Mr. Barrow is known to say.

Cheers and 73s,
K9VIN
Kevin

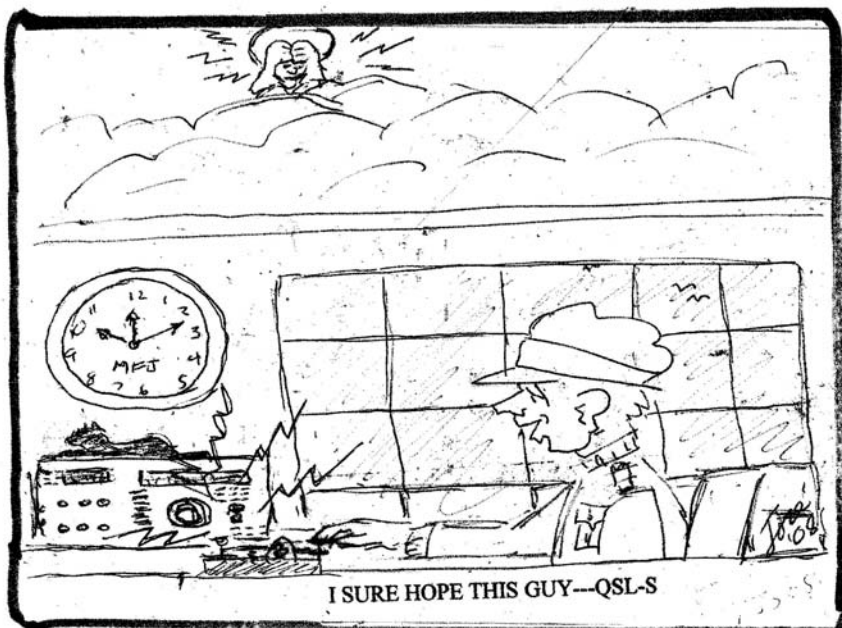
Florian “Joe” Sturmburg, Jr., SK

Joe was a member of the ORC and eventually joined the Wisconsin Amateur Radio Club to avoid the longer night drives from Menomonee Falls.

Joe's interest started in 1935 with a crystal set he received as a Christmas gift. He graduated from Wauwatosa H.S. in 1943 and joined the Marines. He then served as a radio operator in combat in Saipan, Tinian and Okinawa. In peacetime he served as president of the 2nd Marine Division Association.

Joe was involved in chemical sales for over 35 years and served as President of the Wisconsin Chem Group. Upon retirement, Joe founded his own company, Mountain Technologies, and provided environmentally friendly lubricants.

In 1979, Joe got into HAM radio and he was quite content with his Novice license since it gave him all the frequency he needed for his CW operations and he collected well over 1000 QSL cards over the years. He is shown above at his station with his constant feline companion who stays warm on his FT990.



Joe's granddaughter has been greatly influenced by him, and she is presently studying for her Technician license.

As an ORC member, Joe was a frequent contributor of cartoons to the newsletter. To the left is his portrayal of a QSO with GOD and his hope for a QSL card. I am sure they have much to talk about, but Joe will be missed by all who knew him.

DX'ing & Contesting

De Gary Sutcliffe (W9XT)



FT8 is probably the biggest thing to hit ham radio in the last few years. I never saw anything take off so fast in the hobby. The reasons are easy to understand. It allows stations to make contacts with low power and under poor conditions.

It is possible to make contacts about 24 dB below the noise level. If conditions barely allow completion of an FT8 QSO with your 100 watts, you would need to increase your power to about 2 KW to make that QSO on CW, and much more for SSB. FT8 operators learned they could work DX with small stations and wire anten-

nas. Actually, they could always work DX with such stations. An old high school friend of mine has 5BDXCC that he worked with dipoles and a vertical with 100 watts. FT8 just makes it easier. I have worked about 165 different countries in the last 18 months and know guys who have many more.

There are a couple of disadvantages to FT8. First, a QSO is pretty slow. It takes about a minute and a half to make a contact. Also, it is very limited in sending anything but the canned messages. There are upgrades to improve on these limitations.

The first one was Version 1.91, which at the time of writing is the currently latest version. It added a mode for DXpeditions and is called Fox & Hounds mode. It essentially allows DXpeditions to make multiple QSOs at the same time.

First of all, the DXpedition (Fox) is supposed to move off the standard FT8 frequencies. They will be transmitting in the lower 1 KHz of the pass band. The rest of us need to call the DX station above 1 KHz. When it recognizes you calling, it sends a message for you to transmit on a specified frequency below 1 KHz. You need to allow the WSJT program to control your radio to do this. It all happens automatically.

The QSO will progress more or less as usual, except the DX station might be sending a few exchanges and telling a couple of callers where to transmit in the same transmit period. Besides making multiple contacts at a time, the frequency-shifting reduces the problems of multiple stations calling on the same frequency, resulting in QRM and the need for repeats. I have worked a few DXpeditions with this mode, and it is pretty slick.

The other change is to allow more flexibility in sending messages. Earlier versions could not handle portable or weird long call signs. If for example, you worked W1AW/KH6, they would call CQ with the full call. You would enter the full call into the program window, but most of the exchanges would only transmit W1AW.

The new version also handles FT8 contest QSOs. There was an FT8 contest last weekend, mostly as a test to see how it worked. Apparently, it did work well, and some stations made

over 500 contacts. I was operating the 160M contest so I didn't try it out. The ARRL announced that FT8 would be a valid mode in the RTTY Roundup next month.

Version 2.0 will handle the messages and long call sign issues. It is in beta right now. The general release will be out about December 10. Everyone should upgrade when the general release comes out. The old version should not be used after December 31. Besides the new features, the new version is supposed to be about 1 dB more sensitive. I don't know too much about the message thing and how long they can be at this time.

Note that Version 2 is incompatible with older versions. I installed the beta version 2. I can see lots of signals on the waterfall, but it only decoded a few. That will change quickly after December 10.

The fall contest season ends this month. The ARRL 160 meter contest was on November 30-December 2. Propagation was pretty good, but the big storms that came through really raised the noise levels. The QRN was S9 +20dB all weekend, making it difficult to work any but the stronger signals. Even my Beverage and K9AY receive antennas, which are designed to reduce noise, didn't help much on Friday night. They did help a bit Saturday night.

This weekend is the ARRL 10M contest, on December 8-9, UTC. In local time it starts at 6:00 PM Friday night and runs for 48 hours. You can only operate 36 hours, but that will be a lot more than you will want to do. There will be little or no F-layer propagation since we are near the bottom of the sunspot cycle. There may be short openings to the Caribbean and South America. Signals will typically be weak.

What we want is sporadic E (Es) openings. Es is more common around May through July, but there is a second season in December and January. Unfortunately, it is not as good. Still, it can make the contest a lot of fun. My best contest hour ever came during a 10M contest at the bottom of the sunspot cycle. We got a great Es opening and I made 250 contacts in a single hour. The bottom line is you need to be at the radio a lot and be ready for when the band opens. You never know when Es will show up. Propagation to the south will come and go, although that is more likely in the late morning and during the afternoon.

The exchange for us is a signal report and our state. There are a lot of classes: CW only, SSB only, mixed mode, high power, low power, QRP, unlimited, etc. Check out the rules at <http://www.arrl.org/10-meter> if you are interested. Remember, 10M is the only HF band Technician class hams can operate phone.

This has been one of my favorite contests since it started in the mid 1970s. I have only missed a couple. It is a lot more fun when we have a lot of sunspots when it is like a DX contest. This year will be like a VHF contest. If we get some good Es, it is possible to make 500 or more contacts. Or, if it is like last year, it will be very slow. Last year I made only 106 contacts and finished in second place in the US in my category.

DXpeditions are down in December. There will be some vacation style ones for hams traveling during the Holidays. There is one interesting one that may happen this month. Earlier this year, I talked about the DXpedition to Bovet Island (3Y). The group spent about \$800,000 to spend a couple of weeks there. When they got to the island, the weather prevented them from landing right away. Then they had engine trouble and had to leave for safety reasons. They spent a month on the boat in heavy Antarctic seas. It was not a pleasant trip.

There is a group of primarily Polish hams currently in Cape Town, South Africa preparing for an attempt at Bouvet. They are very secretive about it, dates, etc. Every few days they put out a press release. The last couple of releases mentioned that they were doing cold weather emergency training. They also announced they were looking for a couple more ops. You had to be able to be gone for at least a month and have cold weather experience. I don't think just living in Wisconsin is good enough for the last requirement. Let me know if you are interested and I will put you in touch with them.

It all seems really strange to me. This is a very difficult and expensive place to go, and an extremely dangerous place. The ops on the last one even discussed what they would do if someone died. It is not a place you go without extensive preparation and years of planning. Normally, expensive DXpeditions request donations to help with costs, but I am not aware of any such requests for this one.

Bouvet is #2 on the all-time needed list, following only North Korea. So, if they do pull it off, it will make a lot of DXers happy. Time will tell.

Wishing you all safe and happy times during the Holidays.

THE COMPUTER CORNER

No. 250: Reminiscing – The ORC Computer Course.

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Did you know that the ORC had a computer course? Yep, back in 2001 – 2003. Attended by notables such as Ken Christiansen (N9WH, SK), Nels Harvey (WA9JOB), Ed Rate (AA9W), Tom Ruhlmann (W9IPR), Kevin Steers (K9VIN), Dick Scarvaci (K9CAN, SK), Gabe Chido (was WI9GC), Vic Shier (now WT9Q), Mike Matthies (WJ9O, SK), Gregg Lengling (W9DHI) and others. One adult offspring of a member took the course and later became head of what we now call Information Technology at a major US corporation. The course seemed to fill a need for her in the work world, and for the others to help them understand and use computers.

Each of the eight sessions had a lecture, a lab, readings in an assigned text (Mueller's Upgrading and Repairing PCs) or other homework, and often there was a demonstration. For example, the first lecture was on hard drives, their types, master/slave, MBR, FAT, partitioning and formatting, and hard drive physical characteristics (platters, heads). The first lab had pairs of students (two to a machine) partition and format a previously wiped hard drive, and then add MS-DOS 6.22. Everyone had to show they completed the task by having the hard drive boot properly. The instructor demonstration was to show a running hard drive with its cover removed, followed by having the drive seek files at the beginning or end of a platter, so the students could see the heads moving to each site and watch the screen for what the heads found. For homework, each student took home a hard drive to completely disassemble it into its com-

ponents. At the next class, they had to be ready to explain what each component did in the function of the hard drive.

The second session was on components – motherboards, controller cards such as video and sound, serial and parallel ports, USB and Firewire. The lab was to completely tear down their lab computer, then build it back up again and demonstrate that it could boot up. Some troubleshooting was included. And the POST and CMOS setup was demonstrated.

Third, the lecture was on memory, SIMMs, DIMMs, type and installation, and memory management. The lab was to install Windows 98se and to make a startup disk. Also, to modify Windows to boot directly into DOS. The instructor demo was to bench setup a motherboard with a power supply and have it start, and demo checking voltages. Homework was to completely disassemble a CD-ROM drive. As was the case with the hard drive disassembly, students had to be prepared to explain what each part did.

The fourth week lecture was on virology. Definitions and types, scanners and the like. In the lab, student infected the MBR of their machines with a virus (!Yep!) and then proceeded to sterilize it with FDISK.

The fifth week was on floppy and CD-ROM disks – type, installation and formats. In the lab, students damaged a floppy and examined the results. They also examined the contents of the Win98 startup disk. Homework was to completely disassemble a floppy drive, and be prepared to explain what each part did.

Sixth was maintenance backups, surge suppressors, UPS units and advanced troubleshooting. In the lab, tools for troubleshooting were examined (SYSCHK for DOS and System Tools for Win98).

Next was sound cards and how they work. In the lab, students investigated the utility of sounds in computing, and they also became familiar with the Windows calculator.

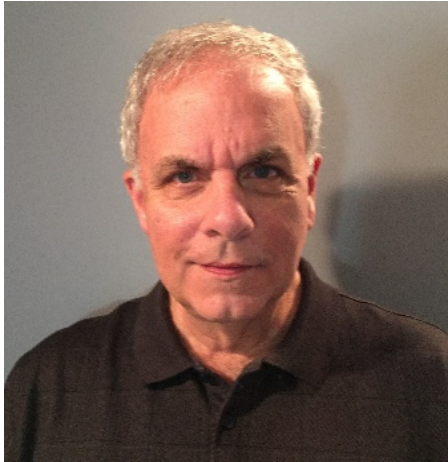
The eighth lecture was on software – Windows 98 and other operating systems. In the lab, students used FDISK to bring their hard drive to its original, pristine state. Then they tidied up Stan's computer workshop.

The required text was the only cost associated with the course, and students were free to get their book wherever. It was great fun for me and student feedback seemed to show it was worthwhile for those who attended.

Happy computing!

Vintage Amateur Radio

de Bill Shadid, W9MXQ



I know, in this series of articles, I repeat my basic theme almost monthly – the concept of a table-top radio station as introduced by Collins in the late 1950's – the S-Line Separate Receivers, Transmitters and Transceivers. Last month we talked about the move by Heathkit to compete in this concept with the SB-Line. Truth be known, I was out of date order here in talking first about the SB-100 and its successors, the SB-101 and SB-102. In 1963, two years before the introduction of the SB-100, Heathkit introduced the beginning of the SB-Line of separate Receivers and Transmitters with the SB-300 Receiver. About six months after that introduction, Heathkit introduced the matching SB-400 Transmitter. So, with this article we continue the discussion of the extremely popular Heathkit "SB-Line."

Here is the operating Heathkit SB-401 Transmitter and SB-303 Receiver in operation at W9MXQ. They are shown with the SB-600 Speaker and SB-200 Linear Amplifier¹.



Heathkit SB-401 Transmitter and SB-303 Receiver
Shown with HDP-121A² Microphone SB-200 Linear Amplifier, and HD-1410 Keyer
(W9MXQ Shack Photo)

The SB-401 and SB-303 superseded the original SB-400 and SB-300 models. Most differences are detailed in this article. Here is how the series progressed:

Model	Function	Introduced	Discontinued	Compatible With	Technology
SB-300	Receiver	1963	1966	SB-400/401 Transmitter	Mostly Vacuum Tube
SB-301	Receiver	1966	1970		All Solid State
SB-303	Receiver	1970	1976		
SB-400	Transmitter	1964	1967	SB-300/301/303 Receiver	Mostly Vacuum Tube
SB-401	Transmitter	1966	1975		

So, just like the station you see in my personal ham shack, pictured above, the oldest receiver model could be paired for transceiver use with the newest transmitter model, and vice-versa. You can also see that the first receiver preceded the arrival of the first transmitter and the last receiver was on the market longer than the last transmitter. This was common for the time. Receivers were generally a bit more popular in those days than transmitters. There were, at the time, companies like E. F. Johnson that made only transmitters – so one could assume that a buyer might buy, for instance, a Heathkit SB-301 Receiver to work with a Johnson Viking Invader¹ of the time.

Like Collins and Drake, Heathkit used a permeably tuned oscillator (PTO) for frequency control – unlike the capacitor tuned VFO used by Hallicrafters, Swan, Galaxy, National, and most other companies in the field at the time. Heathkit, however, called the PTO an LMO for Linear Master Oscillator. This was to emphasize their focus on the linearity of the oscillator circuit and associated mechanical system. As I have often mentioned as a reminder, this is a little confusing in terms of how the VFO is described. One refers to the variable frequency control system in a radio as the VFO – which is correct whether capacitor or inductor tuned. If you think this is confusing, you are right!

Like Collins, but unlike Drake and Hallicrafters, Heathkit used the same conversion scheme in their transceivers and their separate receivers and transmitters. So an ingenious ham could use an SB-300/301/303 Receiver to work together with one of the SB-100/101/102 Transceivers to transceive on the transmitter or the receiver LMO. This did require a bit of engineering on the part of the user – but such practice was common at the time. At the end of this article I will touch on one such experience with an SB-300 Receiver and an SB-100 Transceiver.

Here is the original product offered in this line:



Heathkit SB-300 Receiver
W9MXQ Shack Photo



Heathkit GD-125 Q-Multiplier
W9MXQ Shack Photo

This is the original Heathkit SB-300 Receiver, introduced in 1963. Like the Collins 75S-1, it was devoid of any kind of interference control system. In fact, Heathkit never added any such circuits to the SB-300 series. Collins, however, added Rejection Tuning (a Q-Multiplier) beginning with the 75S-3 model. Heathkit offered compatible Q-Multiplier products like the model GD-125 and other similar models.

Special Note: Connections to run the Heathkit GD-125 plug-n-play with the Collins KWM-2 Transceiver were on the KWM-2's chassis.

One exception to what I mention above about interference control was the unique offering of an Automatic Noise Limiter (ANL) circuit in the SB-301 Receiver only. This feature was absent from the SB-300 and the SB-303 Receivers.

The SB-300, as well as the later SB-301 and SB-303 all covered the high frequency (HF) spectrum (80 through 10 meters) in 500 kHz ranges. There were four such ranges to cover 10-meters. Since all the SB-300 and SB-400 series units were pre-WARC band units, they do not cover the 30, 17, or 12-meter bands. Unfortunately, the SB-300 lacked a way to monitor WWV to verify dial accuracy. That was corrected in the SB-301 and SB-303 with the addition of a 15.0 to 15.5 band position and resulting access to 15 MHz WWV. In my opinion, this was a design error – with 10 MHz being a much better choice for more opportunity to find WWV access in a wider variety of propagation. But Heathkit followed the design practices and features of Collins and the S-Line and its similar band position of a 14.8 to 15 MHz band position.

The SB-300 and SB-301 had factory assembled, vacuum tube LMO units included with the kits – no assembly of this critical device was required of the builder of the kit. In the last version, the SB-303, this pre-assembly practice was retained but, by then, the LMO was of solid-state design. The LMO design was remarkably linear with less than a 400 Hz error in linearity at any point within a 100 kHz range on the LMO. The SB-300 and SB-301 Receivers included a 100 kHz Crystal Calibrator. The SB-303 Receiver had a calibrator as well, but it was selectable 25 kHz or 100 kHz.

Special Note: A separate receiver would be necessary to make this alignment with the SB-300 model which had no access to WWV. This was a flaw in the SB-300 which was, as noted above, corrected in the SB-301.

In their time, the SB-300 series radios were competitively sensitive. The SB-300 and SB-301 were rated as having a better than 1uV for 15 dB signal plus noise-to-noise ratio. The SB-303, however, improved this performance greatly. It offered a better than 0.25 uV for 10 dB signal plus noise-to-noise ratio. This was in keeping with the performance improvement in a similar timeframe coming from the sister SB-102 Transceiver product. It is interesting to note that while this performance still exists in a SB-303 Receiver today, an older SB-102 Transceiver may not perform as well if its 6HS6 RF Amplifier Tube has been replaced. The 6HS6 tube is almost “unobtainium”³ today and is often replaced with the 6AU6 tube used in the RF amplifier of the original SB-100 and SB-101 Transceivers (and the SB-300 and SB-301 Receivers). The solid-state devices used in the SB-303 are most likely still functioning.

All the SB-300 series radios (SB-300, SB-301, and SB-303) were very competitive in selectivity with 8-pole crystal filters possessing an excellent shape factor. They are effective even on today’s bands. Also, Heathkit offered a variety of optional CW and AM filter bandwidths. Today, such filters are still available from third party suppliers such as INRAD⁶ and others. Heathkit brand filters often appear on the used market.

The SB-300 and SB-301 radios had 6 and 2-meter converters offered that could be mounted to the back of the receivers. These were the SBA-300-3 for 6-meters and SBA-300-4 for 2-meters. These were switched into the circuit with a switch accessible through the opening top cover of the cabinet on the SB-300. They were not accessible from the front panel. The SB-301 model improved this by adding a front panel control to access the converters. The SBA-300-3 and SBA-300-4 Converters did not last into the time of the SB-303 Receiver but the access to up to two of what had to be third party converters was accommodated and switched from the receiver’s front panel. A limited amount of 15 VDC current was available from the SB-303 rear panel to power an outboard converter. The SB-303 was solid-state and therefore unable to supply plate and filament voltage to an external converter. Heathkit apparently did not feel there was enough market demand to design and market solid-state converters to support the SB-303 Receiver.

Worthy of note was the addition of a RTTY mode position on the SB-301 and SB-303 Receivers. By this time, most RTTY operation was handled by AFSK (Audio Frequency Shift Keying) rather than true FSK (Frequency Shift Keying). The receiver’s passband in RTTY mode was adjusted for best offset to allow for effective audio recovery to feed an AFSK decoder.

I am always amazed by little things like the model breakdown of the SB-300, SB-301, and SB-303 models. What happened to the missing SB-302? Similarly, there was an SB-100, SB-101, and SB-102 Transceiver with the next model being the solid-state SB-104. What happened to the SB-103? I guess I assume there is a closet somewhere with those mystery models – never to go to production. I suspect that models were in transition between vacuum tube and solid-

state designs. Could there have been a later version of the vacuum tube SB-301 under development as an SB-302 that never happened? Did Heathkit take the solid-state leap and bring out the SB-303 instead? We have no way to know – but it is fun to think about.

While not part of this article, it is worth mentioning that there was a Short-Wave Listener (SWL) version of the SB-300 Receiver, the SB-310 (1967 to 1972), and a similar unit parallel with the SB-303 Receiver, the SB-313 (1972 to 1975).

The other part of this article is focused on the transmitter side of this product line . . .



Heathkit SB-401 Transmitter
W9MXQ Shack Photo



SB-400/401 Differences
See text for explanation.

The SB-400/401 is matched in size to the SB-300/301 Receivers and are all identical in size to their Collins competition.

Like the Collins competition and the SB-100/101/102 Transceivers, the SB-400/401 Transmitters use a tank circuit that is set to a narrow range of antenna loading range of 50 to 75 ohms impedance – designed to feed modern coaxial cable. So, like in the earlier article about the SB-100 Transceiver, and its successors, they did not work well with older Heathkit Linear Amplifiers, such as the HA-10 Warrior¹. The final amplifier tubes used in the SB-400 and SB-401 Transmitters were two of the very popular 6146 or 6146A tetrode final amplifier tubes for an input power of 180 watts PEP SSB and CW. These radios were not really designed for AM operation⁴. Output power was a nominal 100 watts – dropping to 80 watts on 10 meters. Tuning of the driver and final amplifier stages of the transmitter section of the transceiver was relatively straight forward and easy even for today’s amateur operators to master⁵.

The major difference between the SB-400 and SB-401 Transmitters was the addition of convenience circuitry for switching between transceive operation and separate frequency control of the receiver and transmitter. Note in the illustrations above on the transmitter. To the right you will see the SB-401 front panel with a ganged control for MIC CW LEVEL and FREQ CONTROL (short for Frequency Control). Note the ability to switch between LOCKED (REC) and UNLOCKED. This is charted as . . .

FREQ CONTROL Setting	Frequency Control is Handled By . . .	
	On Receive	On Transmit
LOCKED (REC)	Receiver	Receiver
UNLOCKED	Receiver	Transmitter

Later in the evolution of radio convenience features, frequency could be controlled by the receiver or the transmitter or one could transceive using frequency control from either unit. These earlier radios had less flexibility.

The chart above reflects the operation of any of the three receivers (SB-300, SB-301, and SB-303) and the SB-401 Transmitter. This is not the same with the earlier SB-400 Transmitter. The

SB-400 Transmitter interconnects with the receiver but lacks the front panel switch. The above shown control has no concentric FREQ CONTROL function switch on the SB-400. One must open the top cover of the SB-400 to change a jumper cable. While identical in function, it was a huge difference in convenience!!

Two other differences were:

1. The SB-401 did not come with range crystals to determine band – it utilized the same crystals that were in the matching receiver. That was a move allowing a reduction in price of the SB-401 compared to the SB-400. But the crystals were offered optionally for a buyer not using the SB-300/301/303 Receiver.
2. The SB-401 added a sidetone level control to make CW monitoring more comfortable to a wider range of listeners with different preferences and hearing.

Also, it is important to say that the SB-400 and SB-401, unlike their competition, had internal power supplies. The SB-100, SB-101, and SB-102 Transceivers had an HP-23 model Power Supply usually tucked away inside the SB-600 Speaker. That speaker cabinet was empty (or unnecessary) when used with an SB-400/401 equipped station.

As I related in the article on the SB-100/101/102 Transceivers, the Heathkit SB-Line radios, when carefully built, were the equal of, or were superior to, any of the fully assembled competitive units on the market at the time – including the Collins S-Line.

Remember earlier in this article that I told you about a personal experience with an SB-100 Transceiver with an SB-300 Receiver? Some years ago, I owned an SB-100 Transceiver and an SB-300 Receiver. I did not have an SB-640 External VFO for the SB-100. The LMO in the SB-100, the SB-300, and the SB-640 External VFO were identical. So, to me it seemed that using the SB-300 Receiver as a separate VFO for the SB-100 Transceiver was feasible. I developed an external box that brought the SB-100 and SB-300 LMO output to a common point and routed the signals through a switch circuit that allowed:

1. Transceive with the Receiver LMO.
2. Transceive with the Transmitter LMO.
3. Receive with the Receiver LMO and Transmit with the Transmitter LMO.

There was also other switching involved for muting the receiver during transmit and the development of a system of a lighted pushbutton select switch bank and associated relays (rather than a rotary switch) to make this switching convenient. It worked for me for several years. I wonder if that switch box is still working out there somewhere??!!

The SB-Line internal circuitry allows many ideas to be applied to how the radios are used to suit one's own special needs. For a while I even toyed with dual receive with such a system. But, at the time, I could not master the mixing circuitry required.

Heathkit provided a complete line of accessories for the SB-Series Radios. The most popular accessories for the receivers and transmitters appear in the pictures, below:



SB-200 1.2-Kilowatt Linear Amplifier¹



SB-220 2-Kilowatt Linear Amplifier¹



SB-600 Speaker Console



SB-610 Monitor Scope



SB-620 Spectrum Scope



SB-500 Two-Meter Transverter
(Heathkit Catalog)



SB-630 Station Console



HD-1410 Electronic Keyer



SB-650 Digital Readout
(for SB-Series Radios)
(Heathkit Catalog)

(Pictures, unless otherwise noted, are from W9MXQ Photographs)

These accessories have been used by Heathkit and other brand users for years and continue to be popular in ham stations to this day.

I appreciate that you read my articles. Remember that I am open to questions and comments anytime at my email address, W9MXQ@TWC.com.

A special note of thanks to my proofreader, Bob Bailey, W9DYQ. Bob is also the previous owner of several of my pieces of Heathkit equipment.

Credits and Comments:

¹Subject of a future article.

²The HDP-121A used at W9MXQ is a bit later than the vintage of the radios in this article. You can see this in the beige color of the microphone body – a later color scheme used by Heathkit. The HDP-121 (without the “A” suffix) is green like the series of equipment covered here.

³“unobtainium” is a word used by collectors – in radio and other areas of interest – to indicate that there is no supply of the item left to find – or at least very, very difficult to locate. Collectors measure their success in their ability to find things that are called, “unobtainium.” I have several items in my collection that others would call, “unobtainium.”

⁴AM operation was not accommodated in the SB-400 and SB-401 Transmitter but was accommodated in the SB-300/301/303 Receivers. (AM mode on the SB-400/401 was covered in third-party modifications.) AM on the receivers supported the idea that the receivers were purchased by hams using other brands or models of transmitters – some of those were earlier Heathkit transmitters that did operate AM.

⁵Most ham radio operators of today are accustomed to solid-state final amplifiers. These radios do not require tuning of the tank circuit.

⁶INRAD, a part of Vibroplex Corporation, can be reached at <http://www.inrad.net> on the internet.

Christmas Gift?

De Nels Harvey, WA9JOB

I was recently visiting in Seattle for Thanksgiving, when my son and I needed a starting capacitor for a fan. We went to a store called Vetco (Vetco.net). This store is across from Radio Shack, Olson Radio (Remember that one?), and Allied Radio. After browsing the shelves, which held Arduinos, heat shrink, scopes, wire, meters, Raspberry Pi tools, and much, much more, we bought an exact replacement cap. After checking out, an older gentleman motioned me over to another counter, where he showed me an emergency lithium battery pack and jump starter by Zamp Solar. It comes with adaptors for many computers, and has two USB ports. It



also has jumper cables to start a car!

My sister recently had a dead battery in her car, and someone pulled out one similar to this, and started her car! This one was going for \$70.00, so I bought one. Check it out on amazon.com. I'm very impressed with it, but don't ask how I got it home on the airplane.

73, Nels, WA9JOB

Volunteers Needed for Monthly Programs

The monthly program is the highlight of the Ozaukee Radio Club meeting. We are fortunate to have a number of very talented people in our club, many of whom have shared their knowledge through a presentation. Share your expertise and experience with the club. Programs can be on any topic that is ham radio-related. Contact Pat Volkmann W9JI at w9ji@arrl.net to discuss your idea for a program.

Ozaukee Radio Club
November 14th Meeting Minutes
De Ben Evans (K9UZ), Secretary



President Kevin Steers (K9VIN) called the meeting to order at 7:32 PM. All the attendees introduced themselves.

Announcements, Show-and-Tell, Bragging Rights:

Tom R. (W9IPR): Finished his feed-thru for the basement window.

Jeananne (N9VSV): Congratulations to Robert and Gary for upgrading to General Class.

Program:

Vic (WT9Q) gave a presentation on his newly acquired Flex Radio 6600, which he can control remotely from anywhere. Later in the meeting, he live-demonstrated the use of the remote interface to rotate his antenna at home.

50/50 Drawing:

Bob S. (WI9BOB) was the winner of the 50/50 drawing.

Auction:

Stan WB9RQR conducted the auction. Many items were sold, including a Kenwood 2-meter 5930 transceiver, a Dell Optiplex desktop computer with Linux Mint "Sylvia" installed, some "super-magnets", and a router.

Officer Reports:

Kevin S. (K9VIN) President – No report.

Pat V. (W9JI), 1st VP – No report.

Tom T. (KC9ONY), Repeater VP – Nels, Jim and Loren went to KK and LL and swapped out the remote site. Also, the noisy cable for the 440 repeater was replaced. Please use the repeaters; there are three of them and there is very little activity on them.

Ben E. (K9UZ), Secretary – This month's newsletter has been posted on the website which includes the October meeting minutes. Motion to accept the minutes was made by Bill S. W9MXQ, seconded by Stan WB9RQR and approved by the members.

Robert E. (K4WTH), Treasurer – The profit and loss report for October was emailed to everyone. A motion to accept the Treasurer's report was made by Stan WB9RQR, seconded by Kristian KC9TFP and passed by the members. Robert is going to collect all the members' updated information including address, phone and email address so that everyone's info is current for the upcoming 2019 ORC roster.

Committee Reports:

Tom R. (W9IPR), Scholarship – Tom gave a review of the history and operation of the club's Scholarship Fund (SF) Program and a proposal to restructure it. Below are the main points made in Tom's presentation and in responses to questions from members:

1. Over the last 20 years, the SF raised over \$80,000 primarily through the sale of donated

- equipment and parts, and \$22,000 has been given in Scholarship awards.
2. The SF was first formed in 1997 by donations totaling \$600 from Stan, Ed Frac and Dave Knaus (SK) plus matching funds. The original Scholarship Committee was composed of Stan, Dick Scarvaci (SK), Dave Knaus and Ed Rate.
 3. Half of the club auction proceeds go to the SF. The other half goes to OZARES.
 4. The objective of SF was to award \$1,000 per year to a Wisconsin youth who attends an accredited four-year higher education program and who has a ham radio license. In 2017, the amount of the award was raised to \$2,000.
 5. For the first 18 or 19 years, the Scholarship Awards were administered by the Foundation for Amateur Radio. Last year, the club opted to transfer the administration of the awards to the ARRL. The ARRL charges a fee of 1% of the award amount to administer the awards (for example, \$20 for a \$2,000 award).
 6. So far, no award has gone to an Ozaukee County resident. This is because the Scholarship Program is statewide and so far, no one in Ozaukee County has applied or qualified. It is planned to form a new committee to create a Youth Education Program that would support local STEM and other education projects and scholarships.
 7. The SF money is currently invested in CDs which in recent years have yielded very little return. The original purpose of putting the money in CDs was so that the money was safe; however, while the return years ago was at a decent rate, today it is near zero percent.
 8. So we asked ourselves, "With so much money (about \$65,000) in the fund, couldn't we get a better rate of return?"
 9. Several months ago, we started looking into the ARRL Foundation as an alternative to how the SF money is now invested. The money is given to the Foundation as endowments, for them to invest on our behalf. The typical investment breakdown for the ARRL Foundation is 60% bonds and 30% stocks.
 10. The ARRL specifies 4% as the goal on the rate of return. The performance in recent years of the Foundation fund was: 2015, -1%; 2016, +6%; 2017, +8%. Although there can be down years, in the long term, the return evens out to positive.
 11. As an example, an investment of \$25,000 yielding an average of 4% a year would grow by \$1,000 a year (enough for a substantial scholarship award). Thus, through the ARRL Foundation endowment, it's possible that our Scholarship awards, given the amount of money currently in the SF, can be self-funding in perpetuity. The awards can continue long after the club and its members are gone.
 12. The characteristic of an endowment is that it continues to award scholarships as per the last instructions by the entity endowing the money until the money is gone. As a club, we control the amount and frequency of the awards. The money, once endowed, can't be returned.
 13. Who manages the money? The ARRL treasurer started managing the Foundation investment two years ago. He has a doctorate in economics, and he answers to the ARRL board of directors regarding the investments.
 14. There is no fee for managing the investment. The only fee charged is 1% of the money awarded in scholarships as administered by the ARRL.
 15. The Scholarship Committee met and reviewed the ARRL Foundation as a possible instrument for the Scholarship funds. We agreed that we would be much better off moving our funds to the ARRL Foundation in the name of the Ozaukee Radio Club as an

endowment for the ARRL to handle and manage.

16. The endowment to the ARRL would have the following advantages: 1) it would assure that the ORC Scholarship would continue long after our members are gone; 2) it would remove the funds from the club domain and thus from the controversy of how the money is to be used; 3) the club would still have control over how the funds are awarded.
17. There will be a motion under New Business to move \$60,000 from the current Scholarship Fund to the ARRL Foundation over a period of about 20 months.
18. Interest in the Scholarship Program would increase if it were more locally oriented. With the money left over after the endowment, and with income to the SF from that point forward, we could use these funds to support STEM education in local schools or award scholarships locally.
19. The proposed endowment, if approved, would not jeopardize the club's 501(c)(3) status. Money earned by the SF going forward can be added to the Foundation fund at any time.

Gary B. (N9UUR) commented that the concept of the endowment sounds great, but the idea of one person managing the money is unsettling. Tom responded that the ARRL treasurer who manages the funds is responsible to the ARRL committee that oversees him, and that it's not uncommon for an investment fund to have one, sometimes two managers. Jim (K9QLP) commented that in organizations such as ours, there are members who have "sticky fingers" with regard to how the club's money is used; it is better to entrust it to someone else. Jim said that if we can't trust our money to a large and reputable organization like the ARRL, then why are we paying them dues?

Old Business:

Ken (W9GA): Regarding the status of the Field Day tent, Ken reported that K&D has offered for sale a used white canopy and is working to get sides for it. The plan is to acquire this new tent and bring it to the shed. K&D will be trying to keep the price around the same as the original price to modify the existing Field Day tent, which they decided not to do because of liability concerns. The poles and stakes from the existing tent can be used with the canopy. K&D volunteered to haul the existing tent back to the club shed. The canopy with the sides should be ready any day now.

New Business:

Pursuant to the proposal as outlined by Tom (W9IPR), Pat (W9JI) made the following motion: "The Ozaukee Radio Club (ORC) approve the creation of a scholarship endowment fund with the ARRL Foundation with an initial donation of \$20,000.00 from the Ozaukee Radio Club Scholarship Money Market Fund (-02). This initial donation would be followed with a \$28,000.00 donation derived from the 2 year jump up CD (-41) which matures 10/08/2019.

"These first two donations would be followed by a third donation of \$12,000.00 derived from the 30 month CD which matures 7/26/2020. The total donation to the endowment through 9/2020 would then be \$60,000.00.

"Any residual funds in the ORC Scholarship Account could then be used toward the endowment or local youth education programs/projects."

The motion was seconded by Stan (WB9RQR). Tom noted that the ORC Board of Directors unanimously voted in favor of the motion. A question was raised as to whether the proposal should be separated into three motions, one for each donation. Tom responded that if there was

a change of heart or the market goes south, a motion can later be made to reconsider or amend the action made at this meeting, but it's important that we approve the entire plan as proposed.

After much discussion, the members voted to approve the motion. Ken (W9GA) thanked Tom and Ed for their work on the Scholarship Program over the years.

Adjournment:

A motion to adjourn was made by Stan (WB9RQR), seconded by Vic (WT9Q) and approved by the members. The meeting was adjourned at 9:35 PM.

Attendance:

There were 34 members and one guest present at the meeting.

A copy of the attendance sheet is available upon request in PDF format. Please contact Ben Evans via email at ben@evansengsolutions.com for a copy.

Respectfully submitted,



B. Benjamin Evans, K9UZ
Secretary

ORC Meeting Agenda

December 12, 2018

1. 7:00-7:30 PM – Network & Rag-Chew
2. Call to Order & Introductions
3. Announcements, Bragging Rights, Show & Tell, Upcoming Events, etc.
4. Program: Scott Ruesch, W9JU, SATERN.
5. Fellowship Break
6. 50/50 Drawing
7. Auction – Stan Kaplan (WB9RQR)
8. President's Update – Kevin Steers (K9VIN)
9. 1st VP Report – Pat Volkmann (W9JR)
10. Repeater VP Report – Tom Trethewey, (KC9ONY)
11. Secretary's Report – Ben Evans (K9UZ)
12. Treasurer's Report – Robert Escola (K4WTH)
13. Committee Reports:
 - A. FCC License Classes
 - B. Elections
 - C. Other
14. OLD BUSINESS
15. NEW BUSINESS
16. Adjournment to ?

Return undeliverable copies to:

The ORC Newsletter

465 Beechwood Drive
Cedarburg WI 53012

First Class

Next ORC Meeting:

Grafton Multipurpose Senior Center
1665 7th Avenue, Grafton
Wednesday, Dec. 12th, 2018
7:00 PM – Doors Open
7:30 PM – Meeting Begins