ELECTRIC RADIO

celebrating a bygone era

Number 3 JULY 1989

ELECTRIC RADIO

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Published Monthly

145 C.R. 123

Hesperus, Co. 81326

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The Purpose of Electric Radio

Electric Radio is published for amateur radio operators and others who appreciate vintage radio equipment. It is hoped that the magazine will stimulate the collecting of, and interest in, this type of equipment.The magazine will provide information regarding the modification,repair and building of equipment. We will also work towards a greater understanding of amplitude modulation and the problems this mode faces.

Electric Radio Solicits Material

We are constantly searching for good material for the magazine. We want articles on almost anything that pertains to the older amateur equipment or AM operation. From time to time we will also have articles and stories relevant to the C.W operator and the SWL. Good photos of ham shacks, home-brew equipment and AM operators (preferably in front of their equipment) are always needed. We also welcome suggestions for stories or information on unusual equipment. For additional information please write us or give us a call.

EDITORS COMMENTS

Last night,July 1, I participated in the 20 meter SPAM Jamboree. It was great fun. Propogation was excellent to all parts of the U.S. from Colorado and my new rhombic seemed to be doing a good job. I joined the group on 14.286 about 7pm local and stayed with it until it shut down about midnight. During those five hours about 35 or 40 AM'ers showed up. The west coast co-ordinator was John, WA6ZJC, running a Ranger 2 into an amplifier. He was helped by Bill, WA8LXJ, out in Cincinatti, Ohio, running a Collins 30-K4. Some of the stations participating were as follows: Dave, W6PSS, running a Globe King 500, Fred, W6RNC, running a Ranger 2, Rick, K8MLV/Ø, running a DX-100B, Dale, KW1I, running a KW-1, Doug,VE4BX, running his homebrew KW, Martin, K7BDY, running a DX-100B, WA6IPD, Art, running his BC-610,Evan,NØGMR, running a Viking 2 and Rich, WA2RQI, running a DX-60.The only DX that showed up was Tony, KP4FP, from Puerto Rico running a platemodulated Drake T4XC.Although we did exchange numbers and other information it was very unlike a typical SSB contest. There was no frantic screaming or the usual hysteria. It was more like a giant round table with all of us enjoying each others company. I think that if the event had been more publicized the participation would have been greater. I didn't learn of it until after the last issue had gone to press. In the future I will try to keep better informed.

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Cover: K7POF, Bob Sitterley of Rowland Heights, CA at the mike in his nicely organized ham shack. He contributed an article on modifying the audio on the T-368. The story is on page 25.

A LEGAL LIMIT MODULATOR

by Bill Klerenomos, KDØHG

Sad to say, but true, a sideband transmitter by virtue of putting all its power into the audio contained in one sideband has a heck of a lot more punch than our beloved AM rigs. The average power of a 100 watt AM transmitter becomes 150 watts at 100% modulation and of that 150 watts fully 2/3 is carrier power and only 1/3 is shared between sidebands, so your 100 watt output 32V3 only puts out 25 watts per sideband, while a little Kenwood mobile rig puts its full 100 watts into each sideband. How embarrasing!

As we all know, the carrier in an AM signal does nothing at the receiving end for audio punch and power, it is strictly the audio contained in the sidebands that you hear. In my own mind these days, I have been tending not to look or even care much about the carrier output of an AM transmitter anymore; instead, I look at how much audio power you can cram onto the composite AM signal. IT IS THE POWER PROVIDED BY YOUR MODULATOR THAT DETERMINES HOW STRONG YOU ARE, NOT THE POWER FROM YOUR RF DECK! The plate modulator in an AM rig performs the same function as the RF deck in a sideband rig, as far as your ear and receiver are concerned. We need to get over our fixation with RF power levels and pay more attention to our AUDIO power levels. The audio power provided by your modulator goes directly into the sidebands, so to compete with that 100 watt output Kenwood, you need to come up with 200 watts of audio power; 100 for each sideband, and that doesn't take into account various inefficiencies. If you want to keep up with a 1500 watt SSB station, you're going to need audio power of the same order of magnitude.

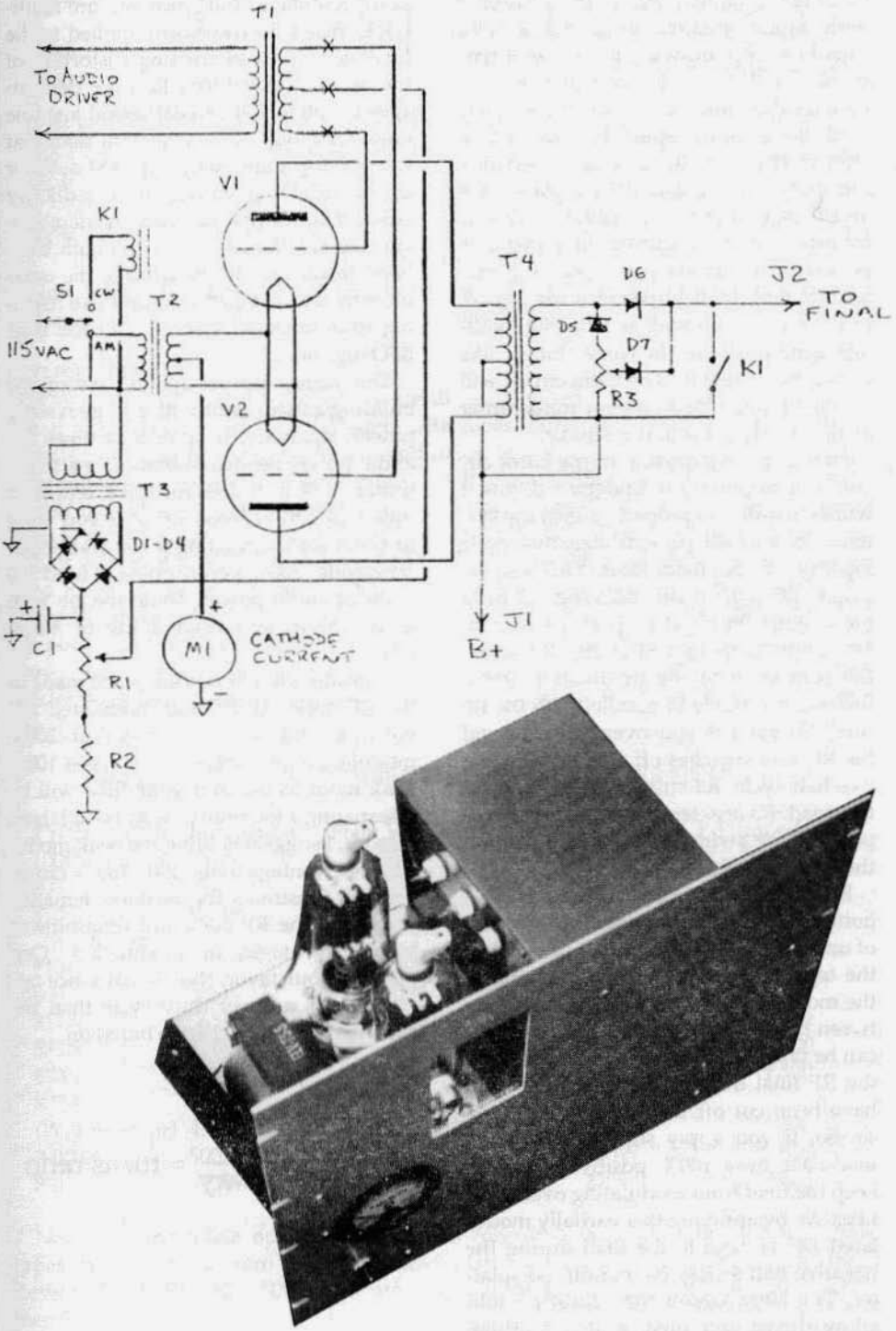
It is well known that when using a pure sine wave for a modulating signal, your modulator needs to deliver 50% of the RF amplifier's input power to achieve 100% modulation- 1KW DC input, for example, requires a modulator that can provide 500 watts of audio power. If you exceed this 500 watt level, you're going to overmodulate, splatter, and make many new acquaintances on the air who will likely give you new nicknames on the spot. There are techniques, however, that can allow you to substantially increase your audio power beyond that required for a given DC input level to your final without splattering. I'll get into the specifics of this later.

This modulator is a standard push-pull circuit of more or less conventional design, except for the circuitry consisting of D5-D7, and R3, which comprise an "Ultra Modulation" circuit. An audio input in the 10-30 watt range is applied to the input side of the driver transformer, T1. Should you plan to drive this modulator from a transmitter such as a Johnson Ranger, T1 can be dispensed with as the modulation transformer in it is used as the input transformer, and connections are made instead at the points on the schematic marked with an "X" using a well shielded cable rated at 250 volts or better to the Ranger.

Ultra Modulation was first popularized in the late 1950's and a company of the same name located in New Jersey came out with an adapter kit to add this feature to existing rigs. The Ultra Modulation circuit, when properly adjusted, allows the use of peak positive modulation percentages well in excess of 100% without splattering.

In a conventional AM transmitter as soon as you begin to exceed 100% modulation the final amplifier begins to cut off on the negative modulation peaks, so, instead of generating a continuous carrier, the final produces a train of pulses with a repetition frequency the same as the

continued on page 4


T1
TO AUDIO DRIVER
V1
K1
S1
CW
T2
115VAC
AM
V2
T3
D1-D4
C1
R1
R2
M1
CATHODE CURRENT
T4
D6
D5
D7
R3
K1
J2
TO FINAL
J1
B+

continued from page 2

modulating signal. Those of us familiar with digital circuitry know that a pulse signal or a square wave is rich with harmonics, and this is the source of splatter. Overmodulation can also blow your modulation transformer. If your final is effectively cut off, its impedance becomes infinetely high. Assume 1000 plate volts and 0 plate amps. 1000 divided by 0 is infinity. Therefore, during these negative peaks, your transformer is working into an infinitely high impedance for a load, or no load, if you will, and the high voltage generated can do nasty things, like puncture insulation. The Ultra circuit will also maintain a load on your transformer at all times to prevent this smoke.

Here is an explanation of the Ultra circuit. It is important to understand how it works in order to properly adjust the system. D5 and R3 provide negative cycle loading of the modulator. On positive peaks, D5 is shut off, isolating R3 from the circuit. On negative peaks, however, D5 conducts thereby shunting R3 across the secondary of the modulation transformer, effectively in parallel with the RF final. So even if you overmodulate and the RF amp switches off during the negative half cycle, R3 still provides an effective load. R3 also tends to reduce the output voltage swing of the modulator on the same negative half cycle.

R3 also provides a second function. The bottom end of R3 is connected to a source of unvarying B+ (the plate supply), while the top end has the full audio swing of the modulator on it. At some point in between these two extremes is a voltage that can be tapped off that can be used to feed the RF final during the instant it would have been cut off to keep it from doing so. So, if you apply sufficient audio to modulate over 100% positive, you can keep the final from modulating over 100% negative by applying this partially modulated DC voltage to the final during the negative half swing. No cut off, no splatter. The Ultra circuit theoretically could allow almost unlimited positive modulation percentages but since you are modifying the audio waveform applied to the final you are also creating distortion of the original waveform. Positive percentages of 150 to 200 percent sound just fine (and very loud), but any more than that starts to sound raunchy. The AM detector at the receiving end needs a sufficient amount of carrier to properly demodulate the sidebands, and a too-high sideband to carrier ratio will make the over-ultra-modulated station sound like listening to a sideband station with too little BFO injection.

This brings up yet another reason for building a modulator with a large reserve power capability. It takes four times the audio power needed to modulate a transmitter 200% as it does for 100%, and fully nine times to acheive 300%! If you want to shoot for modulating a 100 watt input transmitter 200%, you're going to need 200 watts of audio power. To do the job with a kw input, you need 2 kw of audio power.

Consideration also needs to be made to the RF deck. All RF and modulated DC voltages will be 50% greater at 200% modulation over what they were at 100% peak modulation, and your final will be dissapating a lot more power. For all these reasons, I suggest holding the peak modulation percentage to the 150 - 200 % range. Table 1 illustrates the heavier demands placed on the RF deck and final tube at high percentages of modulation. One thing in your favor, tho, is that voice operation has a lesser duty cycle than the sine wave tone the chart is based on.

$$\sqrt{\frac{Z\ primary}{Z\ secondary}} = \text{turns ratio}$$

Table 1- Power and Voltage Relationship Versus Modulation Percentage

Modulation Percentage	Average Power Input To Final	Peak Power To Final (PEP)	Peak Voltage on Final	Audio Prw Reguired
0%(CW)	100 Watts	100 Watts	1,000 V.	0 Watts
100%	150 Watts	400 Watts	2,000 V.	50 Watts
150%	212.5 Watts	600 Watts	2,400 V.	112.5 Watts
200%	300 Watts	900 Watts	3,000 V.	200 Watts
300%	550 Watts	1,600 Watts	4,000 V.	450 Watts

Note: Above figures assume sine wave modulation. CW values are arbitrary, for reference comparison. Table assumes use of Class B plate modulation.

TUBE SELECTION

While this is the era of the solid state device, it is still much easier for the home constructor to generate big audio watts with tubes, rather than with transistors. When deciding on what tubes to use in the modulator, again, let me suggest that you look at your capabilities as you would if designing a linear amplifier for SSB service. As in the case of the SSB amp, your modulator is also a linear amplifier, and the tubes you select need to meet the same criteria for peak current capabilities, linearity, and plate dissapation. If you want to keep up with the 1500 PEP boys on sideband, then you are going to need to select the same tubes a sideband rig of that size would require. I would also suggest that one stick to using triodes as they provide somewhat lower distortion than the power tetrodes, and they don't require the construction of a screen supply. Table 1 shows some suggested tube types. If possible, select a tube from the table that operates efficiently at the same voltage as your RF deck to avoid the need to use a seperate plate supply.

Table-2 SUGGESTED TUBE TYPE FOR HIGH POWER MODULATOR

TYPE	Plate Dissapation	Plate Voltage	Power Out	P-P Impedance
100th	100W	3000	650W	31,000
805	125W	1500	370W	8,200
813	125W	2500	550W	17,000
(triode connected)				
810	175W	2200	725W	11,000
806	225W	3000	1000W	15,000
811A	65W	1500	350W	12,000
572B	150W	2000	550W	16,000
833A	350W	3000	1600W	9,500
833A (W/forced air)	450W	4000	2600W	11,000
3-500Z	500W	3000	2000W	10,000
811	55W	1500	220W	17,600

Note: For complete operating conditions consult data sheets. Many of the above types can operate at zero bias at reduced plate voltages, thereby simplifying circuit design. The 572B and 3-500Z operate at Ø bias at full plate voltage and are recommended.

cont. over

CONSTRUCTION NOTES

A big modulator is an impressive looking piece of hardware, and for good reason- form follows function. There are some big voltages present during operation, and everything needs to be insulated to the max. I used 20KV insulated wire for almost all internal connections. (Available from RadioKit). All through chasses connections are via stout ceramic feedthrough insulators, and don't skimp on these; I had several arc over and carbonize, forcing me to replace them with the next larger size. A 1/2" leakage path is a minimum. Since R3 is at full plate voltage, make sure you mount it on ceramic insulators. Keep components well away from the tubes, they get very, very hot. There are those who suggest insulating the modulation transformer from ground to perhaps prevent an internal insulation breakdown from windings to frame, but I don't personally like this idea for safety reasons. If the insulation does ever get leaky, and you happen to contact the transformer's case, you could sign out much quicker than planned.

Mounting a 25 to 50 pound transformer on an aluminum chassis tends to make things bend a lot. The deeper chassis (4"/5") tend to be more stable. Of course, side angles will be a neccessity, and it helps to come up with a means of bolting the transformer to the panel as well as to the chasssis, with hardware or a strap of some kind. If there was ever a place to use a steel chassis, this is it, but unfortunately, my hand tools aren't macho enough to deal much with steel, and I couldn't find a source for a steel chassis, anyway.

ADJUSTMENT AND OPERATION

To properly adjust this modulator, an oscilloscope and audio oscillator are absolutely required. Don't even try to get by without them. And as a reminder, we're dealing with some big voltages. BE CAREFUL and don't rush.

After hooking up modulator to power supply and RF final, connect the scope to observe the RF waveform, and present the slider on R3 to a point about 1/8" down form the D5 end. Fire everything up. Start by slowly turning up the audio drive (mic gain). As soon as you get to 100% negative modulation, cut the power, then move the slider away from the D5 end a bit and repeat the test. The negative modulation percentage will now be reduced, so turn up the audio a bit more and repeat the test. Keep alternately turning up the audio and moving the slider until you see distortion beginning to show up on the positive peaks. This point is the maximum positive modulation percentage you can achieve. Remove the audio oscillator and plug in our microphone. Look at the audio while saying a long drawn out f-i-v-e (or use your favorite testing word). Verify that your negative peaks still don't exceed 100%, and adjust the slider accordingly if they do. As previously mentoned, I recommend that a maximum of 150 to 200 percent positive be used, and the adjustment made to hit 95% negative at that point. Note where your mic gain is set at this point.

Be observant during these tests- you're going to find any "weak" parts in your modulator or final at this time. Your dummy load will also be getting quite a workout too. Don't let either it or your tubes cook. Let things cool down periodically.

It is important to have adequate grid drive to the final when using high percentages of modulation. I recommed that drive be increased some 20 to 25 percent over that of normal operation. If the Ultra modulation is working properly, you will observe a considerable jump in final plate current on modulation peaks. I also recommed the use of a low level speech clipper or compressor if you really want to blow a hole in the band, but be merciful and back down the audio as conditions warrent.

Operating AM on the air with big audio will be a real kick, and make this construction worthwhile. Since the power provided by the modulator goes right into

the sidebands, your signal will really stand out in the QRM. As I mentioned at the beginning of this article, if you put a kilowatt of audio into your sidebands, you're competitive with anyone using any mode, a worthwhile goal. As the athletic shoe commercial says—Do it!

OBTAINING PARTS

When contemplating the construction of a project such as this, I sometimes get headaches trying to locate parts to build the darn thing, especially at "affordable" prices. It helps not to be in a rush and to try to locate parts at hamfests, in the Yellow Sheets, the Press-Exchange, and of course, right here in ER. Let me go through the modulator's parts list and suggest some sources.

T1-Line to P-P Grid Transformer

If you elect to drive the modulator from a low impedance source, such as from a stereo amp, I suggest Triad part number P-S61Z which is designed for audio output replacement use (primary and secondary both tapped: 1.5 to 20.2 ohm to 4,000 to 12,000 ohm, 20 watts), available from Antique Electronic Supply. I suggest using the 4 ohm and 12,000 ohm taps. If you drive the modulator from a 600 ohm line, such as from a Collins 32V series transmitter, I recommend Stancor part number A-3311, which is multi-tapped 4/8/15/500 ohm to 10,000 ohm CT, at 25 watts. The Stancor unit could also be used with a low impedance source.

K1-High Voltage Relay

I'm using one from a BC-610. Fair Radio stocks a Kilovac RB-3 12KV/30A vacuum relay for $40. H&R stocks an Advance unit, part number TM24K742, rated at 6KV, for $25. Note that these two relays have 28 VDC coils, which means you need to use a voltage dropping resistor, diode, and filter capacitor to run them off of a 120 VAC line.

T4-High Level Modulation Transformer

Obtaining this item could be a challenge, depending on power level. If you want a modulator that delivers lots of clean sounding, low distortion audio, don't skimp on the iron! At the 250 audio watt level, Fair Radio gives you two choices; part number T5/368, which is from a T-368, and part number 2Z9633/610, from a BC-610. Both are priced at under $20. Finding transformers for higher power levels is even more of a challenge. RadioKit will custom wind you a modulation transformer at what I consider a reasonable price, 500W for $129, and 1,000W for $199. I haven't tried it, but I'd suggest using two of the BC-610 transformers at higher power levels with the primaries paralleled and the secondaries connected in series. Then use the two secondary center taps for your connections to the modulated stage. This arrangement should provide an effective impedance ratio of 10,500 to 8,000 ohms, or a turns ratio of 1.14:1. Make sure that the transformers you buy are of the same manufacture, and that the secondaries are center tapped. One last suggestion is that a broadcast station might have an old spare transformer gathering dust somewhere. Broadcast engineers seem to be even worse pack rats than many hams, so it might pay to ask around. If you like AM, it pays to cultivate friends in the broadcast industry!

MODULATION TRANSFORMER,

The most important parameters to look for are the power handling capability and primary to secondary turns ratio. Absolute impedance values are not as important as the turns ratio, and fortunately so, since a "surplus" transformer from somewhere probably won't have the exact impedance values calculated.

It is important to have a transformer that will act as a voltage step-up of sufficient value to enable an adequate modulation percentage. One way to look at this is to look at the schematic. Assume for a moment that the transformer has a 1:1 ratio, primary to secondary. The modulator tubes are operating class B, which means that one will alternately switch on while the other is switched off. That means that at a particular moment, the DC circuit through the primary is from the center-

cont. over

tap, through half the winding, and through one tube to ground. The output voltage on the secondary will then be two times that applied to the primary because the effective turns ratio becomes half the primary (the other half is open circuited-no current flow) to the entire secondary an effective turns ratio of .5 to .1.

It is important, therefore, to secure a modulation transformer that will insure modulation peaks of the desired value by a sufficient voltage step-up via an adequate turns ratio. When shopping surplus look for a 1.5 or less to 1 ratio. The turns ratio can be calculated from the winding impedances.

If you are getting a transformer custom made, set the primary impedance to match that of the modulator tubes you use (in the data sheets), then select an appropriate turns ratio, or better yet, have the secondary tapped at several places for experimenting. The transformer used in the equipment pictured in this article has a 6600 ohm primary and 4600 ohm secondary, which calculates to be a 1.2:1 turns ratio. Well over 150% positive modulation can be obtained from a 4-400 modulated by a pair of 810s.

J1-J2 High Voltage Connectors

These are available from RadioKit in several brands and colors.

Tube Sockets-

Available from RadioKit and Fair Radio. Interestingly, E.F. Johnson still manufactures and sells tube sockets for many large transmitting tubes such as the 805, 810, 811, 572B, 866, 304TL, etc. These sockets go from $20 to $30 each, and can be obtained from Johnson through their reps in many cities.

Tubes-

Best obtained from ads in the ham press, friends, and hamfests. The best prices on new tubes I've found have been from CeCo Electronics in Brooklyn, NY, and Antique Electronic Supply. Be advised that buying from CeCo is like going to a car dealer; they can move around on price to some extent, especially if you tell the salesman you are the tube buyer for the Voice of America or something similar that will cause him to be very, very kind to you.

APPENDIX -PARTS SOURCES

Catalogs Available

Antique Electronic Supply
688 W. First St
Tempe, AZ 85281
602-894-9503

CeCo
2115 Ave X
Brooklyn, NY 11235
800-221-0860
718-646-6300

Fair Radio Sales
1016 E. Eureka St
PO Box 1105
Lima, OH 45802
419-223-2196

H & R Sales
401 E. Erie Ave
Philadelphia, PA 19134-1187
800-848-8001
215-426-1700

RadioKit
PO Box 973
Pelham, NH 03076
603-635-2235

E.F. Johnson
Component Sales Dept
299 Johnson Ave
Waseca, MN 55093
507-835-6222

Stancor
Attn: Sales Dept
131 Godfrey St
Logansport, IN 46947
219-722-2244

Bibliography

Pre-1980's ARRL Handbooks provide a good explanation of AM modulation theory.
Ultra-Modulation for the AM Transmitter
CQ Magazine, November, 1964
Negative Cycle Loading
CQ, January, 1959
Note: Copies of above articles available for $2 each from: Don Hoisington, 202 Baker Dr, Florence, AL 35630

MODULATOR PARTS LIST

C1 80uf 450 V. Electrolytic
D1-D4 1A. 600 V. Silicon Diode
D5-D7 1A. 5KV. or Higher Silicon Diode
K1 High Voltage Relay, 110 volt Coil
M1 1 Ampere Meter
S1 Center-off type Toggle Switch
T1 Line to P-P Grid Driver Transformer (see text)
T2 Filament Transformer to suit tubes used.
T3 Bias Transformer 150V/100MA.
T4 Modulation Transformer (see text)
R1 2.5 K, 5W, wirewound
R2 2K, 5W, wirewound
R3 Two parallelled 5 to 10K , 200 w adustable wirewound type.
J1-J2 Millen High Voltage Connectors

HEY, YOU FIXED MY SIDEBAND RIG---SOUNDS GREAT!

PROPAGATION

SOLOR ACTIVITY TO PEAK LATER THIS YEAR

by Bill Klerenomos, KDØHG

A story in the Boulder, CO Daily Camera with Joseph Hirman, of NOAA in Boulder, has some comments by the re searcher that are of interest to those of us who still rely on the ionosphere for our amateur communications. (Still no AM on OSCAR, yet. Any takers for a sked?)

Hirman's research at Boulder's Space Environment Service Center indicates that this approaching sunspot cycle peak should be near a maximum from late 1989 into 1992. He is quoted as saying that this present cycle is bigger and rising faster than any previous one, except for the biggie in the late 1950's. He expects solar storms of a major size to occur perhaps twice yearly for the next year or two. This isn't very good news for the higher frequencies. Earlier this year solar activity produced a magnetic storm of such proportion that much of northeast Canada was blacked out due to the circuit breakers in long distance lines tripping in response to voltage transients induced by this storm. I need not remind anyone that it takes quite a bit of induced power to drive a 345 KV power line into a fault condition.

So, it appears that hams can look forward to some real glory days on twenty through six meters for the next couple of years in between the days of flare activity.

OLDTIMER TURNS 40

Tim Smith (Timtron), WA1HLR turned 40 on July 1. The entire AM fraternity sends greetings and best wishes. We all wish that we could have made it to Skowhegan for the big party.Tim has been a mainstay in AM operation for many years and is very well known and appreciated for his technical expertise.

W5PYT Bob Hohertz, Ozona Texas

Bob was born in 1926 and raised on a farm near Priddy, Texas . His first experience with radio occured on a Sunday afternoon in 1932 at the home of Fred Schrader, W5JKD. Their families had attended church together and after church Bob's family went to the Schrader home. Fred took Bob up to his bedroom and showed him his homebrew receiver. Bob remembers coils wound on wooden dowels, a breadboard and a wire leading out to a windmill platform. When he put the earphones on he heard his first radio signal. He says he accquired an interest in radio then that has never left him.

Bob turned 18 in 1944. Instead of enlisting for military service he went to Dallas and joined the United States Maritime Service.During the war the Maritime Service was under the jurisdiction of the War Shipping Administration. He was accepted into radio school and went to Hoffman Island in the New York ship channel for 6 months of training. He learned radio theory, the code , wartime operating procedure and when he finished up he had a second class radio telegraphy license. The service was so short of operators that when Bob shipped out it was as chief radio operator. He says that till then he had never been in a radio station and had never been aboard a ship.

The ship he sailed on was a T2 tanker. It carried aircraft fuel-186,000 barrels a trip- to a U.S. Airforce base at Dakar on the coast of West Africa. The T2- turbine

powered- was very fast-22knots-and took a zig zag course across the Atlantic to avoid submarines. The Liberty ships by comparison had a top speed of about 10 or 12 knots.

The transmitter and receiver he used aboard ship were RMCA units manufactured by RCA in Camden, NJ. The transmitter had a pair of 813's in the final. The receiver was a 4 tube regenerative set.

Most of the information Bob copied aboard ship came from BAMS- Broadcast to All Allied Merchant ships. This was transmitted from NSS in Indianapolis and NBA in Balboa . When the ship got near the African coast they copied information from British stations. Bob says they made a lot of mistakes and were awful cw opeators. "They sounded like they were sending with their left foot". In contrast the American Station operators sounded like they were on tape. They sent perfect code.

Bob's service aboard the tanker was not counted as military service so he was drafted during the Korean war and spent 2 years in Germany as a radio operator. While there he gained experience with the BC-610 transmitter and a variety of receivers including the Collins 51J series.

Bob lives with his wife, Betty Joyce, in Ozona, Texas where he's been a field engineer (communications) for El Paso Natural Gas for 29 years.He and his wife have raised 5 children.

Last month I printed a picture of Bob's shack. It was originally the communications building on a radar base. The base was closed in 1964. In 1967, El Paso Natural Gas purchased the property for a micro repeater site and gave Bob permission to use the building for his amateur radio station.

He says it's an ideal site. It's extremely quiet because the power lines to the building are underground in conduit.and there are no other lines for 20 miles across the northern horizon. 4 black diamond utility poles (75 ft.) were left at the site which Bob uses for his antennas. The 330 by 330 ft lot is entirely surrounded by a chain link fence. It's about half a mile from any other buildings.

Bob has a very large collection of vintage gear, mostly receivers. He describes his receivers as the Rolls Royces and Cadillacs of the 40's and 50's: Collins, National, Hammarlund, Hallicrafters, Technical Material Corp and so on. He says the last good receiver was built around 1960; maybe the HQ-180. His transmitter collection consists of 6 Globeking 400 series,2 Globe Scout 40's, 4 Collins 32V series, 2 Viking 2's, 2 Rangers, a Viking 1, a Valiant, a Viking mobile, a Harvey Wells Bandmaster,and a Techrad (Technical Radio Company).

Up until about 1985 he operated the Globe King 400's. Since then he has operated the Viking 1 almost exclusively. Bob likes it primarily because it's simple. Its so simple he says,"If it breaks down you can fix it between transmissions. You can't do that with a 32V transmitter". His favorite receiver is the HQ-160.

From about 1981 till 1985 Bob did a lot of experimenting with kite antennas. He used big box kites with delta wings. Bob says the antennas were very effective. One night when he was flying a kite with a 2 wave colinear, the phosphor bronze wire he was using broke down near the bottom. The kites carried the the wire across a 13,000 volt power line. That ended the kite flying.

On the subject of receivers Bob is a virtual library of information. Ask him about any communications receiver ever built and he can give you the complete rundown. In a recent conversation he made some interesting comments. "People like particular receivers for particular things, but I just like a good receiver with good audio, good sensitivity and selectivity. I think the Hammarlunds and Hallicrafters have the best sound. I don't care anything about the read-out or rock steady stability and so forth."

Bob loves AM operation and has never operated SSB. He says that not only does he appreciate the audio quality but that-

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THE ULTIMATE BOAT ANCHOR

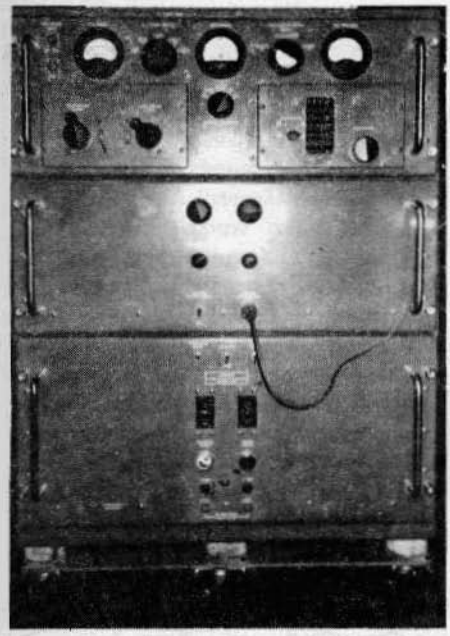
by Tony Wheeler K9BBA

There is an old adage that some wise person once uttered which, loosely stated, goes something like this, "Half the fun of any activity is getting there." This statement could be applied to the location and acquisition of a high power AM transmitter.

I had been looking for an AM transmitter with enough power to cut through the QRM at a reasonable price for quite a while. My search came to fruition when I found a military surplus T-368 transmitter in Detroit, MI. This transmitter was in the 450—500 watt output class, and only an 8 hour drive from the QTH! My excitement began to build. I felt like I had found a lost treasure. I plotted how to convince the XYL that we should take a "scenic drive" to Michigan. It was easier than I expected. Although she didn't share my excitement, being adventurous, she agreed. So her, I and Max (our Scotty dog), drove up to Michigan one weekend in late August to bring the T-368 home.

I had been preparing her for some time on the necessities and advantages of owning "boat anchors", and the "required" progression to equipment of ever increasing size irregardless of available shack space. Therefore, her only comment upon seeing the T-368 for the first time was, "It certainly looks like the ultimate boat (or battleship) anchor". There may have been other mutterings but they were underneath her breath and not audible. Anyway, the trip home for the T-368 and us was mostly uneventful in my heavily loaded little Toyota pickup truck.

After the transmitter was safely deposited in the shack, it was time to determine what was necessary to restore it to operating condition. It had been stored in a garage for several years and before that at a military base. This particular transmitter was circa 1954 and looked like it hadn't been used very much. It probably



hadn't even been turned on for a long time. Several of the knobs were broken, the cabinet had some scratches on it and a lot of dead paint. One of the 4-125A's was broken but the rest of the interior looked OK. The transformers and other inductors all checked out OK with an Ohmmeter. The vacuum variables and filter capacitors also tested OK.

The T-368 is a relatively large transmitter and also quite heavy (650 - 700lb). It has 3 decks; the RF deck is in the top, the modulator deck is in the center and the power supply deck is in the bottom. Removing these 3 decks obviously makes it more movable, but I wanted to be able to move it around with all of the decks installed. Consequently, I decided to install casters on it so this would be possible. I used 6 relatively inexpensive 3" casters and they have worked well. Casters can be expensive so shop around. I obtained these at a Farm & Fleet store.

I was fortunate enough to have a manual included with my transmitter. Fair Radio also has copies of the T-368 maintenance and operations manuals. Be sure to get both manuals because you will need them. The original military maintenance manuals are also still available from the NTIS. I have included their address and ordering information at the end of this article (1).

My transmitter had severe interconnecting cable damage so that was the first obvious repair. These cables have large connectors used to interconnect each deck. Mine had plastic clamps to support the cables which had deteriorated and broken. If your transmitter has this problem be sure to label each connector because the modulator and power supply connectors are identical and can be reversed. This happened to me but fortunately no permanent damage occurred.

Arcing Problems

Finally it was time to "fire the transmitter up". The first problem that materialized was arcing across the plate relay contacts K10 and the power supply choke L8's arc gap when the transmitter was keyed. Considerable time was spent trying to clean and adjust the relay contacts and arc gap spacing to no avail. I finally found carbon tracks in a relatively inaccessible area of the final tank coil L2. Attempts at insulation proved futile, so I finally had to physically remove the offending metal coil bracket bolt which cured this arcing problem. At this point several other arcing problems became apparent. I will lump them all together since their solution is common. I had the transmitter on the air at this time and the following arcing problems were intermittently present:

1. The PA bandswitch assembly to chassis
2. Across the plate choke assembly
3. Final tank coil L2 to chassis

All of these arcing problems occurred only when the transmitter PTT switch was keyed. Initially my approach to resolve them was insulation and isolation. How-

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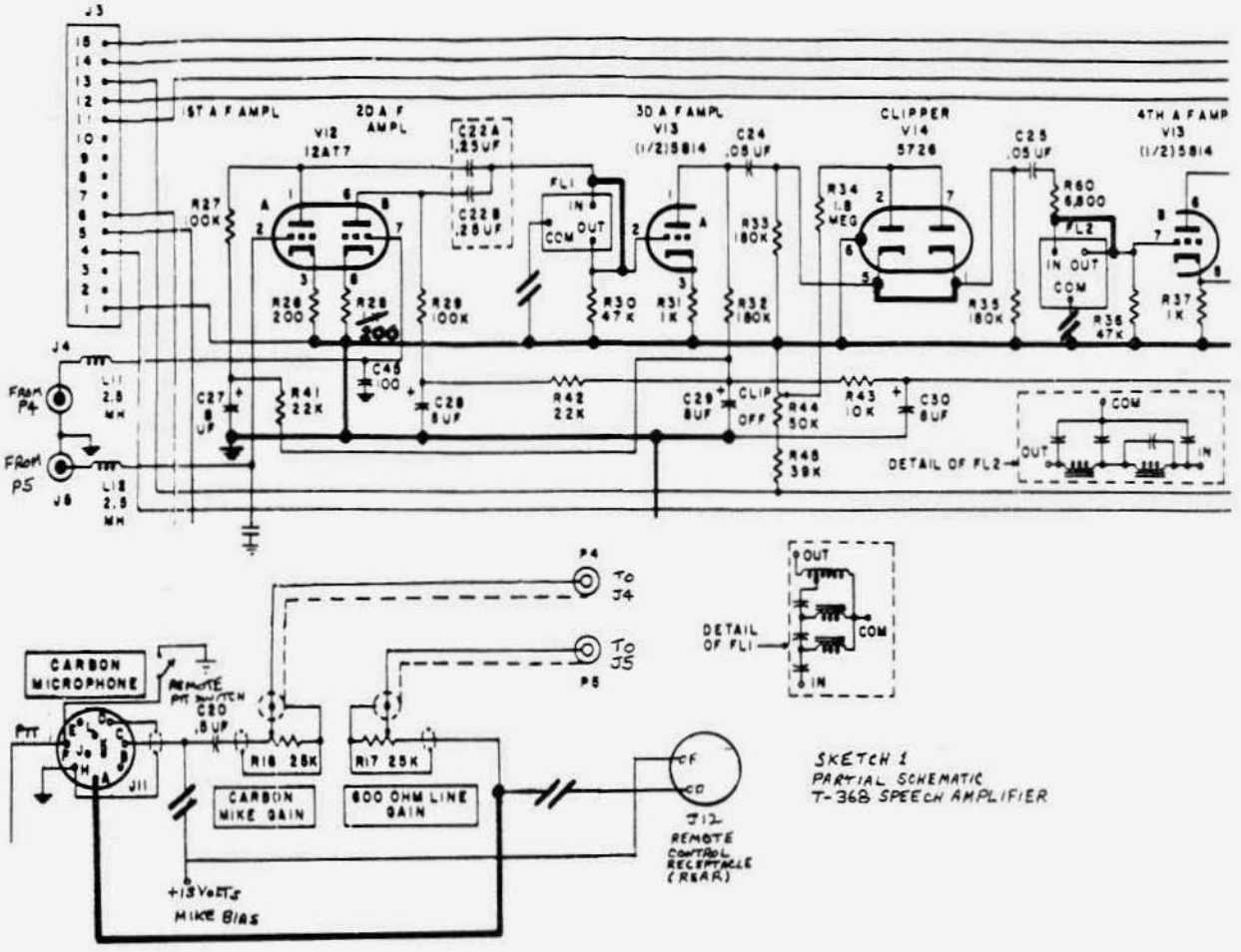


SKETCH 1
PARTIAL SCHEMATIC
T-368 SPEECH AMPLIFIER

ever, when I observed a high voltage arc from the bandswitch assembly to the front panel (about 1&1/2"), I suspected something else must be wrong. Fortunately about that time I had a QSO with a helpful AM operator (2), who gave me a hint as to the possible cause of the problem. It turned out to be an antenna changeover relay timing problem. The T-368 has an internal antenna changeover relay but I choose to use an external one. Over the years it had become misaligned and slower, so it was not making fast enough. Thus for a period of time after the transmitter was keyed it had no load. This caused very high extraneous voltages to be developed, thus, much arcing. After readjusting and cleaning this realy, no further arcing problems have occurred.

Modulating The Transmitter (See Sketch 1)

The T-368 has two separate audio inputs - a carbon mike and a 600 Ohm line. These are both specified as low impedance, but there is a 25K potentiometer across each input. I have had very good results using an amplified D-104 fed directly into the 600 Ohm line input. A mike with less output will require an external preamplifier. Note: the 600 Ohm input connects to the remote control receptacle J12D on the back of the transmitter. To avoid hum pickup from adjacent AC circuits, disconnect this input and reroute it to microphone jack J11 on the modulator deck front panel. Note also that the two audio inputs are connected to the first and second AF amplifiers V12A & B (12AT7). The only difference in these stages are the cathode bias resistors R26 (200 Ohms) & R28 (1K Ohm). Change R28 to 200 Ohms to equalize the gain of these 2 preamplifier stages. This will allow either (or both) audio inputs to be used. Fair Radio has U77A plugs available which will connect directly to the front panel mike connector. Another note: to use the carbon mike input for another type of mike, the +13 volt mike bias line on J11C must be disconnected. Also disconnect the interconnecting cable between J11C and J12F to prevent hum pickup.

The frequency response of the stock speech amplifier measured flat from 250 to 3500 cps. The response curve rolled off sharply above and below these frequencies. To improve the audio frequency response, I bypassed the high and low pass filters FL1 & FL2. The ground connections from the common pins of these filters must also be removed or an unpredictable frequency response will result. I also removed the 5726 clipper tube V14 and jumpered across pins 1 & 5. After the above modifications were completed, the frequency response of the speech amplifier measured flat from 200 to 20,000 cps with little detectable distortion. If desired, the frequency response can be limited externally to compensate for changing band conditions with an equalizer or other method.

Exciter Deck

The T-368 uses a very stable PTO and a mechanical digital counter as a VFO. The output of this VFO ultimately drives a 6000 tube which in turn drives the 4-400A final amplifier. The 6000 is a rugged tube with 26 volt filaments and should last for a long time. However, they are rare and will be very difficult, if not, impossile to find when failure occurs. A 25AV5 TV tube can be plugged directly into the 6000 tube socket and it will work (3). However the 25AV5 should only be used on a temporary basis since its ratings are exceeded by this operation. A better solution would be to rewire the 6000 tube socket to accept a 6146 or 6159 (26 volt 6146), which are much more readily available than the 6000. Several hams in this area have completed this modification and the transmitter appears to operate normally (4). Some experimentation with component values and placement may be required to prevent spurious oscillations.

Conclusion

This transmitter is very rugged and is built for the military to operate at 450 - 500 watts output with almost 100% duty

cont. over

cycle. It performs very well on the amateur bands and should give many years of trouble free service.

In this article I have attempted to describe the situations and problems encountered with getting my T-368 operational. After finally getting it on the air and after completing the above modifications, I have received very good reports on the signal, the audio amount and the audio quality. The completed transmitter is shown in the photograph.

One final note: my transmitter is a basic model, one of the very early T-368's. However, most of the previous discussion also applies to the more recent lettered models.

I usually operate on 160 meters around 1885 or 1985 Kc. I would be glad to contact anyone wishing to discuss the T-368 transmitters further.

73's and good luck.

Footnotes and Credits:

(1) National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161
Ask for manuals TM 11-809-10 & TM 11-809-35, cost-$10 each plus $3 handling charge.

(2) N5MEP, Larry
(3) N8FSB, Gene
(4) N9FOY, Steve
(5) WA9ZOR, Don

W5PYT story from page 11

the style of operation is more enjoyable for him. He says," A typical sideband qso is very impersonal. I never liked the hello, goodbye type of operation.I like to rag chew. I like to learn about the country and get to know the people I talk to."

During the cycle that occurred around 66 to 72 Bob worked over 400 Japanese stations on 10 meter AM and as many or more Vk's and ZI's. At that time these stations were mostly home-brew. Their antennas were verticals or dipoles. When the next cycle came around Bob says they were all gone." They got wealthy and went to sideband".

Bob has stayed with AM and is very encouraged by the increased activity he has seen lately. Another thing Bob commented on was the increase in SWL ing. He says he is getting a lot of mail from shortwave listeners.

In the course of our conversations we talked about the state of amateur radio in general. I asked him about the no code license. Bob said in his opinion CW wasn't that important anymore, but that he agreed with Rick, K8MLV/Ø, that the code requirement is a good "lid filter"." With the written exams being so simple nowadays the code test is about all that prevents amateur radio from turning into CB."

Bob is representative of the old time amateur radio operator. I think it would be good if more people emulated his style. He's friendly, easy-going, courteous and always positive. It's people like Bob that have made AM operation so attractive to an increasing number of hams. I think I can speak for the entire AM fraternity and say that we all appreciate Bob and he makes our amateur radio experience a richer and better experience by his being a part of it.

WANTED

Does anyone know what's going on in Australia or New Zealand now regarding AM activity? Do they operate any tube type equipment? What about Japan? Recently I was told that there are companies here in the U.S. buying up vintage equipment for shipment to Japan. Does anyone know anything more about this?

I've also heard that in Great Britain and Europe there is a renewed interest in vintage amateur gear. When ten meters opens up in the fall I hope some of the east coast operators can get some information on this.

A RAMBLING ODE TO THE 6L6 AND THE 807

BY JIM HANLON W8KGI

Most people celebrate birthdays, some more quietly than others, but generally at a level well above the general "noise". In particular, 50th birthdays seem to draw a lot of attention, more than desired it might seem to the celebrant. But three years ago 1986, two old friends of old hams celebrated their 50th birthdays with virtually no notice! So here's a somewhat belated birthday greeting to those two, close cousins, the 6L6 and the 807.

The birth announcement for the older of these two, the 6L6, is found on page 50 of QST for May 1936. It says in part, "As this issue of QST goes to press, data on a new type of audio output tube, to be known as the 6L6, has just been released by RCA Radiotron. Not just another triode or pentode, this new all-metal tube is of distinctly different design. It has four elements, cathode, control grid, screen grid and plate, so arranged that the electrons reach the plate in 'beams' of high density. .... This would certainly seem to be the ideal modulator, from both fidelity and economy standpoints, for a transmitter running an input of around 100 watts. Complete dope on operating the tubes and on their special features in our next issue".

As encouraging as this announcement was, it didn't even hint at what was shortly to come from this first member of RCA's Beam Power Tetrode family which at its heyday boasted such members as the 6L6, 807, 2E26, 5763, 813, 829B and 6146, several of which still show up in significant numbers on the air even now. But let me not get too far ahead of my story.

June '36 QST, as promised, had an article by George Grammer on "A 50- Watt Audio Amplifier-Modulator With Beam Tube Output", subtitled "Theory and Practical Operation of the New 6L6". It was typical of the class AB-2 6L6 modulator circuits that showed up in most handbooks until the 60's when transistors arrived to take over the field. A few pages further back however was another article that opened the curtain on the real show for the 6L6 and family, "The 6L6 Beam Power Tube as a High-Output Crystal Oscillator". Here we are told that it was possible, using the simple "crystal tuned grid, tuned plate or XGTP oscillator circuit" and a 40 meter crystal to get anywhere from 15 watts in and 8 watts out with a sedate, 300 volt, 50 ma supply to a whopping 70 watts in and 36 watts out with a 425 volt, 165 ma supply! I suspect even the metal shell was starting to glow under that later set of conditions.

And speaking of the metal shell, even this first article wasn't quite sure what to do with it. The author, Frank Edmonds from the United Transformer Corp, noted about the shell that, "It did not interfere with the tube's performance if it was left floating". The tube will work well with the shield grounded in the usual manner, but is more stable and gives more output if the shield is left ungrounded. It was used in one laboratory set-up as a coupling condenser to excited a succeeding pentode buffer stage.....

It didn't take long after that for the 6L6 to really get hot. In the July QST, Edmonds had another article on "A High-Power Three-Stage CW Transmitter With Beam-Power Crystal Control" in which a 6L6 XGTP oscillator ran more than 30 watts output on 14 mc and pushed two more stages of triode amplification to a full kilowatt input. In the September issue, B. G., who was probably Byron Goodman, ARRL Assistant Secretary, published a good design article on "The 6L6 As Amplifier and Doubler". He found that with a 375 volt plate supply, the 6L6 would run a respectable 35 watts in and 20 watts out straight through or 30 watts in and 15

watts out as a doubler. This is exactly what it continued to do 16 or more years later in Heathkit's first amateur transmitter, the AT-1. B.G. also found that his tuned grid, tuned plate, straight through amplifier had to be neutralized to keep it from acting as a TGTP oscillator, a problem that many a ham , including myself and my older brother, also experienced with 6L6 and 807 amps. Most of all, I enjoyed his articles closing comments that although "the 6L6 at maximum ratings does not have the wide margin of safety built in, ... this will probably only serve as a challenge to the average amateur!" And another, "The tubes dissipate a considerable amount of heat. We may be an old fuss, but we still like to be able to see the color of the plate!"

Come November and Goodman was back with "A Simple Two-Band 6L6 Tri-Tet Transmitter" for portable and emergency work. It was an 80 and 40 meter crystal oscillator transmitter that he had built into a plywood box and run with 15 watts on both bands in the previous June's Field Day. In case you don't know what a "tri-tet" is, you can find a very good description of how it evolved from the XGTP circuit and why it's superior to it in several ways in "A Practical Survey of Pentode and Beam Tube Crystal Oscillators for Fundamental and Second Harmonic Output" by James J. Lamb in QST for April '37.

December '36 QST had still more historic- proportion announcements. RCA announced the 807 as "...a glorified 6L6, rearranged to make it especially suitable for transmitting." Preliminary maximum operating ratings as a Class-C Amplifier or Oscillator included plate voltage 400, plate current 100 ma and plate dissipation 21 watts. Immediately following the 807 announcement was one for Raytheon's competitor, the RK-39. The RK-39's good news was ratings up to 750 plate volts, 80 ma plate current, and 20 watts plate dissipation. Its bad news was that it had to be neutralized in straight through amplifier service, supposedly unnecessary for the 807 when it was used below 14 mc. The RK-39 must have been quite formidable competition for the new 807 as can be seen from the way 807 ratings changed over the next few years.

	Pd	Vp	Vg2	Vgi	Ip	Igl	P out
807, 1936 QST	21wt	400v	300v	-200v	100ma	5.Oma	—
807, 1938 Handbk	21wt	600v	250v	-50 v	95ma	2.5ma	30wt
807, 1952 Handbk	30wt	750v	250v	-45 v	100ma	3.5ma	50w
RK-39, 1936 QST	20wt	750v	250v	-60 v	80ma	4.Oma	40wt
6L6, 1952 Handbk	21wt	400v	300v	-125v	100ma	5.Oma	28wt

That same December 36 QST carried an article on "An All-Band 'Phone Transmitter Using Beam Power Tubes," in which the tri-tet oscillator and the buffer/doubler were the new, glass 6L6Gs, the final a pair of RK-39s in push-pull and the modulators a pair of 6L6s. The 6L6G buffer ran with 600 volts on its plate! There was also an article, "Operating Notes on the Transmitting-Type Beam Power Tube, An Experimental Exciter-Low Power Transmitter Using the 807" which featured a two-stage, 89 tri-tet oscillator, 807 power amplifier rig that was good enough to show up later in the 1938 Handbook.

As might be expected, the next issue of QST had still more on the 807. January 1937 offered "The 807 as a Crystal Oscillator" which featured an XGTP circuit that ran as much as 40 watts input and was reported to be more stable and efficient than the 6L6.

That I can believe, since the 6L6 was rated only to 10mc in the 1952 Handbook while the 807 was fully rated to 60mc. There was also "A 50-Watt Rack-Mounted 'Phone Using Beam-Type Tubes." The rf lineup was a 6F6 XGTP oscillator, 6L6 buffer and parallel (neutralized) 807s in the final. The modulator featured a pair of AB2 6L6s, what else?

Febuary 1937 offered a much needed set of "Operating Notes on Power Crystal Oscillators, Safe Crystal Conditions for High-Power Beam, Pentode and Triode Tube Circuits," by George Grammer, which along with Lamb's previously mentioned article on various tubes in the tri-tet oscillator in April brought some sanity to the hams rush to run ever more power to one stage oscillators. Ever hear an old timer talk about "rock criushers?" September 1937 added still more cautions with an article on "Modes of Fracture in Piezo-Electric Crystals" in which one 3000 kc X-cut crystal was reported to "become somewhat luminous when viewed in a dark room" and it was also noted that "When ar. X-cut crystal cracks it does so sometimes with explosive violence."

From then on, rigs featuring 6L6s and 807s became quite common in QST. One that looks rather exciting is "A Versatile Emergency Transmitter" offered in October 1937. It has a 6L6G tri-tet driving a pair of parallel, zero bias, triode-connected 6L6Gs. The final runs as much as 750 volts and 110ma, and according to the schematic it is directly coupled to the antenna without so much as a capacitor to block the dc!

But so much for ancient history. By the (more modern) time when I got one of the early novice tickets in 1952, there were an abundance of 807s in home brew and commercial ham rigs. The WW11 Command Set Transmitters (remember?) used a pair of 12 volt filament 807s known as 1625s in their amplifier stage, and as a result you could buy surplus 1625s for as little as 25 or 50 cents! At home in my Classic Collection I have two Command Sets, a Millen 90800 which runs a 6L6 tri-tet to an 807 power amp vintage '41/'46, a McMurdo Silver 701 from the later '40s with a 6AQ5 tri-tet to an 807, A Meissner Signal Shifter vfo with an 807 in the output, and a rather interesting Harvey Wells Bandmaster Senior which was popular among the novices of my day because it was bandswitching all the way from 80 to 2 meters, CW and AM phone, with (what else) an 807 in the final and a pair of 6L6s in the modulator. My Collins 32V3 and Hallicrafters HT-20 both feature a pair of 807s in their modulators as well. 6L6s also abound. The HT-20 uses one as an rf buffer/double, and I have to select tubes carefully to get ones that will work on 10 meters. I have two earlier vintage Meissner Signal Shifters (Drifters) and a Hallicrafters HT-17, all low power vfos that use 6L6 output amps. My Elmac AF-68 which uses a 6146 rf final has 6L6 modulators. And my 275 watt Globe King (!!!) which gets by far the best reports for audio quality of all of my AM rigs uses four, push-pull parallel, triode-connected zero bias 6L6s in its modulator.

So.... heres a belated happy 50th birthday greeting to the 6L6 and the 807. Without them and a number of their younger Beam Power cousins, ham radio wouldn't have been half as much fun for me from the fifties through now.

A Tip for the Hamshack

Martin Heiman , K7BDY sent me a tip that I think is well worth passing along. He says that he arranges his gear on small-tables with casters that he picks up at thrift stores , garage sales etc. He tries to find tables that are sturdy and with a lower shelf beneath the table top. He puts the receiver on top with the speaker, watt meter, antenna tuner, microphone etc. Underneath he puts the transmitter. He makes all the hook-ups to the change over relay. When he wants to operate that station he just wheels it into position, makes the power and antenna connections and he's ready to go.

ARRL NATIONAL CONVENTION/HAMCOM

PHOTOS AND STORY BY MIKE PALMER K5FZ

The ARRL National Convention/Hamcom held at the Arlington, Texas Convention Center in early June was again a big hamfest as it attracted many from neighboring states.

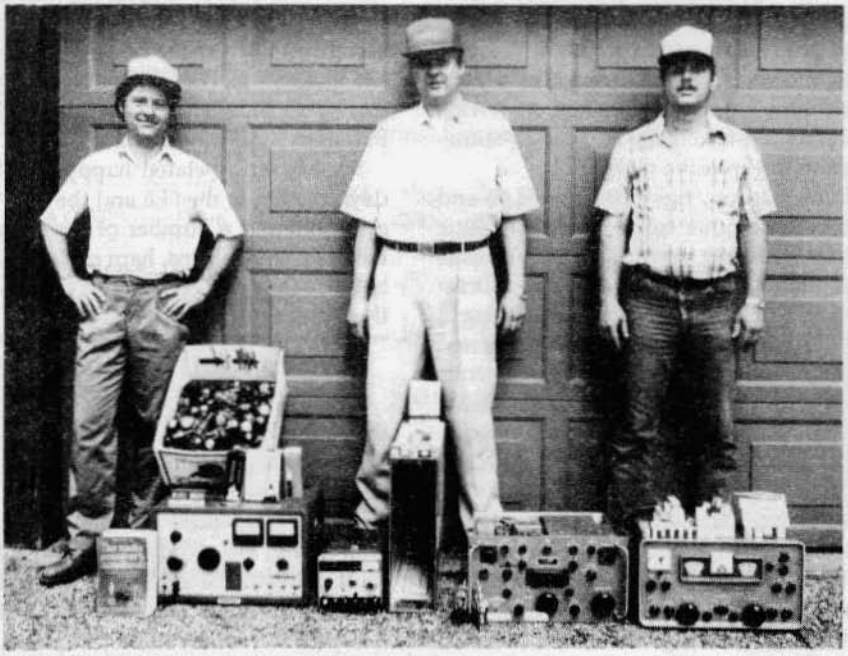
K5FZ, WA5VGO and WØVT attended for the thrid year in a row. For those of us looking for the older equipment and parts, less has been seen each time we attend. We saw many tubes for sale but the lack of older gear compared to previous times was disappointing.

Our photos of the giant indoor flea market area indicate the size of this well attended hamfest. Of course there was the usual display of new amateur gear, accessories, and necessities in an equally large but separate area.

The "Radio Treasures" we brought back included a Hewlett-Packard vhf/hf sweep generator, R390A, HP HF signal generator, old ARRL handbooks and many spare tubes.

We again met our friends Bill, K5LLK, and the two father-son teams; Leonard Shelton, KA5FGS & John Shelton, WD5EHS; Jim Little, K5BAI & Mike Little, KB5IWX.

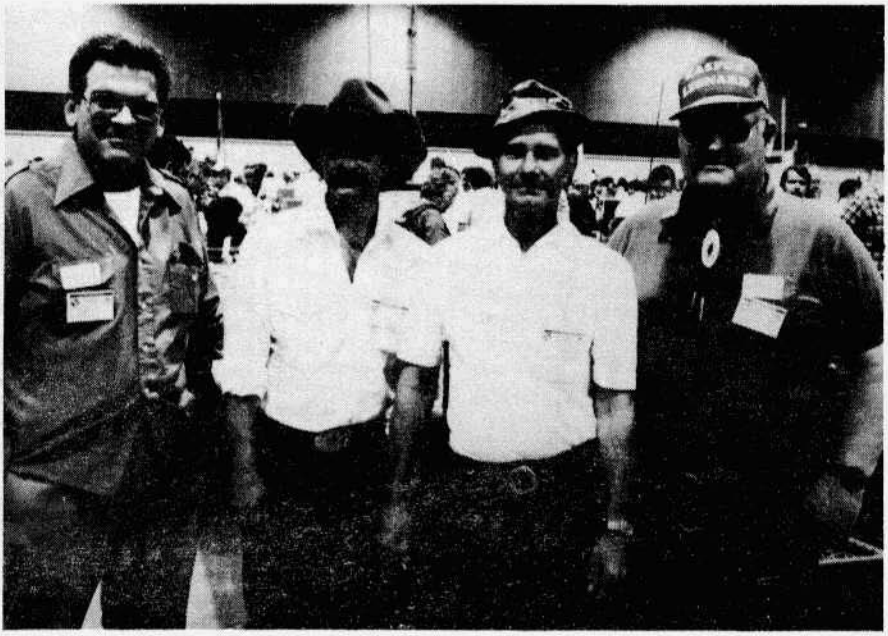
Of course we will go again but are we assuming incorrectly that the great gear of yesteryear is getting harder to find?



Left to Right: Mike Palmer, K5FZ, Lee Bahr, WØVT
Darrell Brooks, WA5VGO

Bill Ross K5LLK

Mike Linger WA5MOE and son Steven



Fathers and Sons Left to right: John Shelton WD5EHS, Mike Little KB5IWX, Jim Little K5BAI, Leonard Shelton KA5PGS


R S R

W2HBE Bob Dennison

I was born and raised in Salina, KS. In 1930 my mother bought a Philco 90 console. I was nine years old and fell in love with radio. I went through the usual period of electric trains, chemistry sets, Ford coils, telegraph and telephone experiments and collecting old radio sets.

By the time I was in 6th grade I had my first homemade radio—a 24A detector and 27 audio amplifier. The power supply used an 80 to half-wave rectify the line voltage. Two train transformers were used to light the filaments. I took the radio to school and all the kids in 6th grade took turns listening.

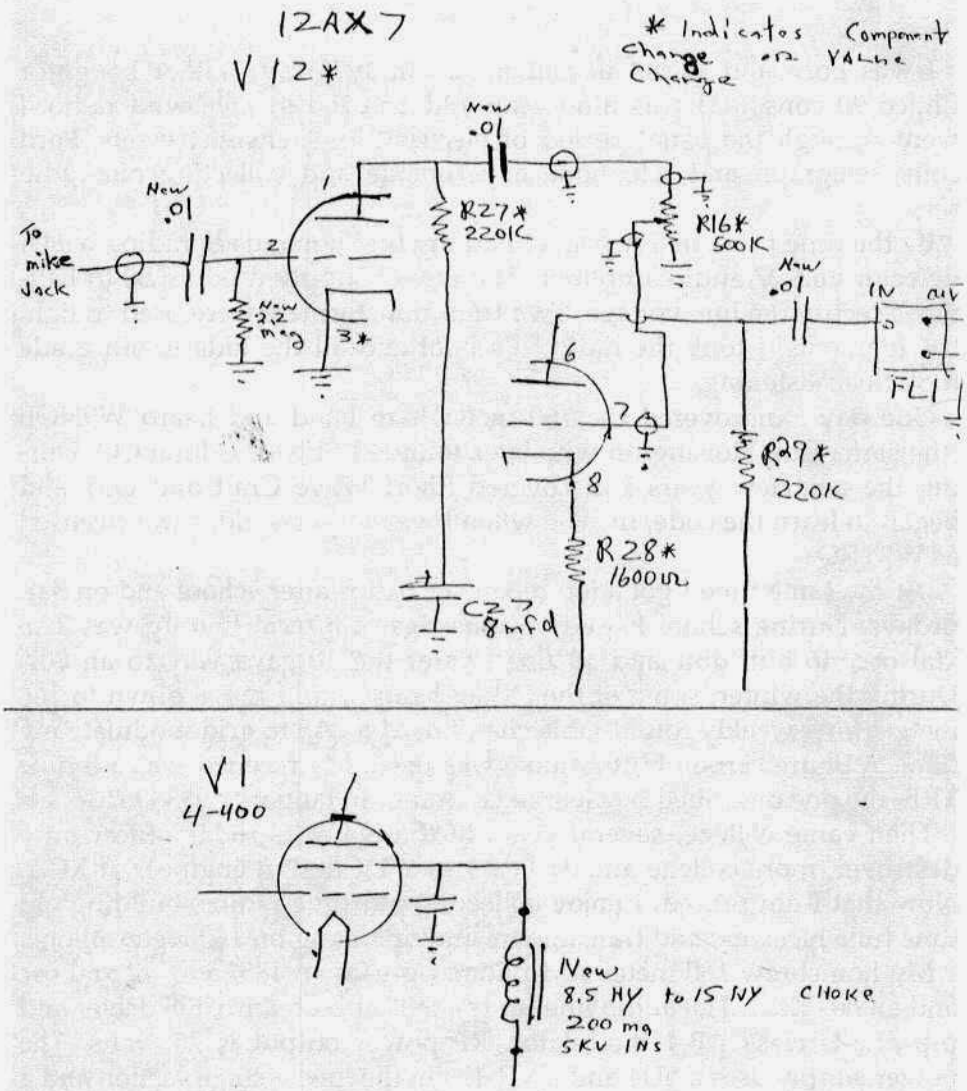
One day I discovered the 160 meter ham band and heard W9NOE (the same Don Hoisington who later founded SPAM) calling CQ. During the next few years I discovered Short Wave Craft and QST and began to learn the code. In 1936 when I was 15 years old, I was licensed as W9YRQ.

At the same time I got a job repairing radios after school and on Saturdays. During school I used various rigs- a typical line up was 2A5 xtal osc, 46 buff-dblr and 10 final. Later the 10 gave way to an 807. During the winter, some of the Salina hams would move down to 160 meters for a weekly round-table chat. I used a 2A5 to grid modulate my final. A Shure carbon button mike was used. My receiver was a 3-tube TRF- the one described by George Grammer in January 1933 QST.

Then came college, several years in the Navy as radar officer on a destroyer, more college and 31 years as a TV design engineer at RCA. Now that I am retired, I enjoy collecting old time radios, building old time tube receivers and transmitters and operating on 160 meter phone.

My homebrew 160 meter AM phone rig uses an 1852 vfo, 42 xtal osc and an 807 final. The audio line-up is a 6SJ7 speech-amp, 6J5 driver and p-p 6L6-G class AB-1 modulator. RF power output is 25 watts. The power supply uses a 5U4 and a VR-150 in the low-voltage section and a 5R4 in the high voltage portion. Nine states have been worked so far.

I have a sked every Monday night with WB2KMW (ex W9ZFS). Jack and I grew up in Salina and we enjoy rehashing the weeks events just like we did back in the thirties.


12AX7
V12*
* Indicates Component Change or Value Change
New .01
To mike Jack
New .01
New 22 meg
R27* 220K
R16* 500K
New .01
IN
FL1
R29* 220K
R28* 1600Ω
C27 8 mfd

V1
4-400
New
8.5 HY to 15 HY CHOKE
200 ma
5KV INS

T-368-C AUDIO MODS

by Bob Sitterley, K7POF

I made the following mods to my T368-C URT transmitter to facillate the use of a hi-impedance mike in place of the original carbon mike. The reports on the air are pretty good, not Hi-Fi but lots better than in the original state.

Most of the mods are in and around the first mike amp V12. Replace V12 with 12AX7. Ground pin 3 of V12 discard L12 and C44 on pin 2 of V12. Add .01 disc cap between pin 2 V12 and J5, add 2.2 meg 1/2 watt resistor between pin 2 V12 and ground. Remove R17 (600 ohm line gain pot) from front panel of modulator drawer, replace with your choice of Mike jack and wire approiately with existing coax from P5. Also wire new jack PTT line from terminal F of existing mike jack. (Existing mike jack could be used if you have mateing plug and so desire to). Remove C22A from pin 1 of V12 leaving other wire on that pin. Remove and discard C45 and L11 from pin 7 of V12 and J4. Run new .01 disc cap from pin 1 V12 to J4. Remove R16 (carbon mike gain pot) also remove C20 .5 mfd cap from R16 and don't re-hook this up. Replace R16 with 500K pot. Ground low end of new R16 and terminate end of coax from P4 on other end of R16. (Of course all of the coax shields are grounded to the nearest possible place). Run new coax from wiper of R16 to pin 7 of V12 (this is the only wire on pin 7 of V12). Remove C22B from pin 6 of V12 and discard along with C2 2a leaving one wire on pin 6. Run new .01 disc cap from pin 6 of V12 to the input terminal on FL1, this should be the only wire on input term of FL1. On the terminal board near V12 change R27 to 220K, R28 to 1600, R29 to 220K.

That is the speach amp mods that I have made. One could probably eliminate the FL1 and FL2 filters for broader audio, however I opted not to.

I also swapped the locations of R44 and R47 to make the clipper R44 pot easier to get at with drawer open.

In addition to the following I installed a 8.5 Hy choke in the screen lead of the 4-400 final tube to help increase the modulation %. I did this on the recommendation of others and not sure if it did really help, but left it there.

To those that might come in contact with this I hope that it might be of service to you. I think that it would work equally well on all of the T368 rigs A, B, C. And possibly later ones too.

REFLECTIONS DOWN THE FEEDLINE

by Fred Huntley W6RNC

"Boat Anchors"—AM wouldn't be the same without these heavyweight receivers and transmitters of yester-year. This equipment of a by-gone era, has many features that aren't made available nowdays: solid construction, ability to take abuse, good accessibility for making repairs, and not excessively complicated to understand operationally.

Usually, working on these old sets is both pleasurable and relaxing. One doesn't need a magnifying glass to see components, such as frequently is the case with working on the new solid state stuff.

AM'ers are fortunate that Boat Anchors are looked upon with disdain by the enthusiasts of Asian radio appliances. That gives us a clear field to make all these good deals and acquire good operating radio equipment at 5% or 10% of the cost of the modern electronic imports.

Many of the Boat Anchors of yester-year are today's radio classics. Collins, National, World Radio Labs, EF Johnson and Hallicrafters, etc made them like they aren't made anymore.

Even with the power turned off, Boat Anchors can give the owner visual pleasure, just like any other kind of masterpiece of human artistic creativity does.

Heavy Iron, like glass vacuum transmitting bottles, projects an aura of mystique and fascination for many members of the AM fraternity.

What with the record price for a European old master oil painting at $43 million, and very high prices for rare guns, coins, cars, etc, now is the time to stock up on classic Boat Anchors—while the getting is good.

Fred Huntley, W6RNC, "RADIO NEVADA CITY"

AM FREQUENCIES

2 meters: most activity nationwide occurs on 144.4 but other frequencies are also used. I have a report that in the metro Boston area there is a Wednesday nite net starting at 8.30 pm local on 145.710. Please send in information from your area.

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6 meters: 50.4 nationwide. Monitor this frequency in your area. I have received reports of activity all over the country and this is the season for sporadic e openings.

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10 Meters: usually all AM activity takes place in the "AM window" between 29.0 and 29.2 but there are some operators -most notably W8VYZ -operating at 28.304. There has been some good sporadic E openings recently and some gooddx openings.

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20 Meters: 14.286 SPAM net starting at about 5.30 pm CA time and carrying on till about 8pm CA time usually. All checkins are welcome.The regulars here are W6HDU, Sam in Alameda CA, K8MLV/Ø,Rick in Pueblo CO, VE4BX, Doug in Hamiota, Manitoba, WA4IRE, Marc in Ponte Verde Beach FL, W8VYZ, Bill in Ashtabula Ohio, W6PSS, David in Chula Vista CA, and K6HQI, Les, mobile in FL.

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40 Meters: Sunday afternoons at 4pm CA time listen up for the 40 SPAM net on 7160. Mostly stations from CA and AZ. Late night activity on west coast on 7160, 7195 and 7290. On the east coast -mostly on week-ends- the activity is on 7285,7290 and 7295.

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80 Meters: nationwide the activity is concentrated between 3870 and 3890 mostly in the last evening. The west coast SPAM group meets on 3870 every Wednesday night at 9pm CA time. The AM'ers in the northeast meet on 3885 at 7.30pm local Thursday evenings.

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160 Meters: 1885, 1895, 1990, 1995. More activity in winter than in summer but there are very many local groups across the country that remain active year round. This is the band that features the heavy iron. There are many broadcast engineers here operating vintage broadcast transmitters. Some of the audio is better than you'll hear from AM broadcast stations.

This month I put together a more complete AM FREQUENCIES page. I'd like to have more info for the future. Please let me know what's happening on what frequencies in your area. Starting next month ER will have an OPERATING NEWS column. I'd like to get input from the whole country. So if any of you would like to contribute I would like to hear from you. A postcard or a phone call would be the easiest way to get the information to me. I'm also going to add a TECHNICAL TIPS column so keep that in mind as well. Shelly, K6VHP, was just too busy in his shop to get the restoration article to me for this issue. He says he will have it for the August issue. I'm still working on the stories/interviews on Al Gross and Stewart Meyer. One of those should be ready for next month. And I've got about 20 other magazine projects in the works.

I am very grateful for the help I'm receiving from everyone. Articles, photos, letters and ideas are coming in at a rate that absolutely amazes me. I think that most of my subscribers really feel they are a part of ELECTRIC RADIO. This is the most gratifying aspect of this project. I want everyone to know I am very thankful and very grateful.

LETTERS

Barry,

I've been so darned busy around here that some things simply slip away from me not to be recalled to memory sometimes for several weeks. This morning I was lying in bed, half awake, half asleep thinking about the 1.5 zillion things which need to be addressed when, suddenly, it hit me like a good shot of B+."My gawd, I don't think I subscribed to Electric Radio!!!" I sprang from bed as though I had just heard a peddler in the street giving away brand new 4D32s and, moments later here I sit, writing this note. Good grief, the "40 weight" isn't even on yet, but, first things first.

Your magazine is absolutely GREAT, but , then, somehow I just kind of knew it would be. It's hard to miss with subject matter like you've chosen. I've been hamming for nearly 30 years and I've never enjoyed myself or the hobby more than since I took up old radios (about 10 years ago). Collecting, restoring, operating, researching, discussing, looking at, walking among, seeking, feeling the presence of, showing, explaining, preserving, and remembering old radios has elevated an already wonderful hobby to heights which virtually defy explanation. No one but a fellow collector can ever hope to understand that feeling of excitement when you obtain yet another old radio and carefully nestle it onto a shelf where many of its cousins already reside, now safe, out of harm's way. Only vintage radio appreciators can know the feeling of wonderment and belonging when operating your favorite old radio set and imagining the original owner's thrill when that radio was purchased brand new, or wondering just how many QSO's that 85 pound beauty has been involved in over the years. On page 33 of the November, 1966 issue, QST magazine published a poem entitled, "Little Black Box" by Max P.Vander Horck. In 1966, Max was not writting about old radios, but, now some 23 years later, he was, indeed. "A little black box of jewels and rocks, with lanterns that flicker and glow,...". If that strikes a chord, I suggest you take that old QST down off the shelf and read the entire poem yourself.

I especially enjoyed the interview with Leo Meyerson. Back in my early years in the hobby, Leo was among the first individuals, other than personal acquaintances, who I associated with ham radio. I wanted a Globe Scout Deluxe in the worst way when I was a Novice, but, of course couldn't afford one. In fact, I still don't have one, but , I do have some other interesting Globe/WRL/ Galaxy equipment in the collection.

73, Mike Sewell, KØCRX

CLASSIFIEDS

Free Classified Ads

We will publish classified ads for vintage equipment or related products at no charge. Please limit the ads to 20 or 30 words. At this time there is no requirement that you be a subscriber. If your ad is not in by our deadline for that month's issue we will automatically include it in the one following. You can either send it by mail or phone it to us.

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DEADLINE FOR THE AUG. ISSUE: JULY 30

WANTED: Switch (SW5) plate & grid for Johnson Navigator; also need 80ufd-450v electrolytics, 8 if possible. Don, KA1KDS, (207) 924-3220, anytime, collect.

WANTED: SW5, SW3 or AGS National receiver. Bob Mattson, KC2LK, 10 Janewood Rd., Highland, NY 12528. (914) 691-6247.

FOR SALE or TRADE: Aerovox model 76 capacity & resistance bridge, with manual. Works and is in good condition. Joe Cook, K5VDD, 2151 FM 740 N, Forney, TX 75126. (214) 722-3551.

WANTED: The "A" coil for HRO-60. Russ Dworakowski, WB3FAU, 4112 Lake Pleasant Rt., Erie, PA 16504.

WANTED: Old magazines; Radio and R/9. John Martin, W4KYL, RFD 2 Box 171-A-1, Montrose, PA 18801.

FOR SALE: WRL Globetrotter-$30; 680-A-$30; Eico 730 modulator, MINT-$40; Lysco B-175-$15. Marcus Frisch, WA9IXP, (414) 545-5237.

FOR SALE: Electron Tubes, all types-microwave, transmitting, receiving, obsolete, military----Large inventory. **Daily Electronics Corp**, P.O.Box 5029, Compton, CA 90224.(213) 774-1255; (800) 346-6667.

FOR SALE: Gonset G43 6 band GC receiver w/man-$65; Sylvania mod. 132Z 7" scope-$35; postage extra. W3NCX, 1005 Wyoming St., Allentown, PA 18103.

WANTED: 75th tubes, Johnson Viking mobile vfo, Heath HP-10 & instruction manual, Drake DC-4 power supply, Collins 32W-1 exciter, Collins 30K xmtr. Richard Smith, KF6EA- W9LDB, 2245 Felspar St, San Diego, CA 92109. (619) 483-9330.

CLASSIFIEDS

Swan model 700CX transceiver, reconditioned, like new-$525.
Swan vfo 508, like new - $125.
Both above for - $600.
Hallicrafters model HT-37 transmitter, like new, - $135.
Heathkit model DX60B transmitter, not tested, - $90.
Heathkit model VF-1, vfo, - $100.
National model 270 receiver, good condition - $125.
All above include manual and schematics.
Eico model 723 transmitter with 8 crystals, good for cw, collectors item - $100.
Johnson Valiant 2 transmitter, cabinet good condition, (not tested) - $85.
BUYER PAYS SHIPPING (MONEY ORDER OR CASHIERS CHECK)

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silver PL 259 - $2.
silver reducer RG58 (#UG-175) - $1.35
silver reducer RG59 (UG-176) - $1.40
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FOR SALE: New reprint of manual for Viking Thunderbolt, including fold-outs; several pages of Johnson product advertising and complete spec sheets for Penta PL-175A final tubes, all in a nice leatherette comb binding-$15. Only 2 available so don't send check until it arrives. **WANTED:** Reprints or suggestions for any audio mods for Viking Valiant Two and Heath TX-1 Apache. James Viele, N8IRL, 161 Fox St., Hubbard, OH 44425-2122.

WANTED: 2-250 TH tubes. Reasonably priced. Ed Crosby, K1GWT, 29 Chestnut Hill Rd.,Stafford Springs, CT 06076 (203) 684-9590.

FOR SALE: Elmac model A-54 50w AM/CW transmitter with manual-$65; Clegg 22'er receiver/transmitter with manual-$30; Jackson Dynamic tube tester model 715 with instructions, xlnt-$40; Partridge electronic Joymatch LO-Z 500 antenna tuner-$50. Ward Becht, W6IRK, 625 Tufts, Burbank, CA 91504. (818) 842-3444.

WANTED: Telegraph bugs, keys and old paddles for private collection. I need most models pre-1960. I also need old bugs for parts. Herb Spivey, NF5Y, PO Box 27, Baldwyn, MS 38824. (601) 365-5594.

NEW AMATEUR RADIO CENTER: BUY, SELL, TRADE new and used amateur equipment. Call for buying or sales quotes. Expert service shop available for all major brands. We locate equipment. (703) 430-5555 or PO Box 267, Sterling, VA 22170.

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One Item or Entire Collection

New Wireless Pioneers
6270 Clinton, Elma, NY 14059 USA
(716) 681-3186

FOR SALE: Cleaning out shack, lots of old vintage radio and test equipment. LSASE for list. Gary Cain, 1775 Grand #302, St Paul, MN 55102.

WANTED: Manuals for NC-183D, DX-100, Apache, Tor, Interceptor. Also "AM Press Exchange" back issues. Will buy or pay to copy and return. John Morehead, N9HRS, 1415 Volkamer Trail, Elk Grove, IL 60007.

WANTED: Early National receivers, FBX, SW-4, SW-3, AGS, SW-5, SW-58, RME-9, Collins transmitter 4A. Steve, K6PFW, 848 N. Silverwood, Upland, CA 91786.

WANTED: Very old or unusual Hallicrafter equipment, entire 1934 "H" & "Z" line of Silver-Marshall. Parts, memorabilia and manuals. Chuck Dachis, "The Hallicrafter Collector", WD5EOG, 4500 Russell Dr, Austin, TX 78745.

FOR SALE or Swap: Dumont RA-103 Rumson with manual, circa 1950, working (cannot ship); German WW11 FG 11 LF transmitter; Western Electric 9-D receiver, circa 1933. **WANTED:** Collins 51J4, National 101X, Halliacrafters 5" pan. Eddystone 1000. Nicholas Oland, W3DSE, 821 Kenhorst Blvd, Reading, PA 19611. (215) 264-4563 Days.

WANTED: BC-1031 panadaptor or Hallicrafters S-35 panoramic receiver (has 5" panadaptor with SX-28). Has anyone ever seen one? Sam, W6HDU, Box 101, Alameda, CA 94501.

FOR SALE: Knight T-150 in near mint condition with manual-$75. Jim Stafford, W4QO, 11395 West Rd, Roswell, GA 30075. (404) 993-9500.

WANTED: SX-88 Owners, former owners, enthusiasts interested in formation of a SIG for this breed and its lore and TLC are invited to drop a line to: Bob Forman, W9RJH, Box 68, Monmouth, IL 61462.

WANTED: Military radios and reliable equipment, WW11 vintage. Need DY 43 for SCR506. Also seek documentary 16mm WW11 military films. Collections or single items. Charlie, KA1GON, 501 Mystic Valley Pkwy, Medford, MA 02155

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WANTED: "E" & "F" coils for HRO-7. W6RIQ, 2371 Porter, Altadena, CA 91001.

BUY, SELL, COLLECT & Restore early tube equipment? Early receivers, tubes and telegraph gear? Join the "Antique Wireless Association" which sponsors old-time "meets" and flea markets, museum and journal with technical articles and free want ads. Membership and annual dues only $10. Write for information and Museum hours: Bruce Kelley, W2ICE, Rt 3, Holcomb, NY 14469.

WANTED: Manual for HRO-5TA1,(also have tuning units for 80, 40, 20 & 10); 160 and any other available , especially info on converting one for 15 or 30 meters and LW covering 1750 meters. Al James, K8CFC, 1240 Galaxy Dr, Cleveland, OH 44109. (216) 741-8999.

FOR SALE: 68 yrs collection: 10,000+ items; antiques, radios, televisions, phonos, sound, military, ham, catalogs, books, flyers, brochures. 48 page list-$1 refundable. F. Younker, W2IBH, 7 Old Farm Rd, Saddle River, NJ 07458. (201) 825-1895.

WANTED: Johnson 500 or Globe King 500. Will pick up within one day drive of Buffalo, NY. Also want pair of AX9909 tubes. Ken McArtney, N2BAU, 194 Royal Parkway West, Williamsville, NY 14221. (716) 634-9533.

FOR SALE or TRADE: Marconi "Atalanta" general purpose Marine receiver type 2207C with manual; Marconi "Reliance" Marine transmitter with manual. Both sets in excellent condition with tubes. Phil Weingarten, 67-61 Alderton St, Forest Hills, NY 11374. (718) 896-3545.

FOR SALE: QRO tubes and amplifier parts, send SASE; Ranger-#75; Viking 11-$60; Stancor SRT-120--$75. Parker, W1YG, 87 Cove Rd., Lyme, CT 06371. (203) 434-7783.

WANTED: National NTX-30 transmitter for restoration and to write article for the "Old Timers Bulletin" of the "Antique Wireless Assoc." William Fizette, K3ZJW, Rd 1 Box 55, Henryville, PA 18332. (717) 629-0637 evenings.

FOR SALE: AM components all new unused: Thordarson 15D77 15w multimatch driver and T-11M76 (original wood box) multimatch modulation xfmr, Utah 7843 modulation transformer. Send best offer on QSL. JAN304TL new in box-$15. All plus UPS. Ed Gable, K2MP, 737 Latta Rd, Rochester, NY 14612.

WANTED all that old WW11 surplus equipment you bought in the 1940's, 50's and 60's and never used; receivers, transmitters, control boxes, mounts, dynamotors, cables, manuals, etc. Want new/unused in original boxes. If you are in the area stop by and see the WW1-WW11 equipment display. August Link, 2215 Faraday Ave, Ste. A, Carlsbad, CA 92008. (619) 438-4420, days/Mon-Sat.

FOR SALE: B & W 5100 transmitter; Collins 75A2-A (like 75A3), needs 2 plug-in filters, mint; Hallicrafters SX-100,parts; S106; Hammarlund HQ170; SP600-JX14 (SN 9342); National NC173 with matching speaker; RME HF-10 10/15/20 meter converter, works with station rcvr as preamp; Heath Q-Mult; Heath Ant/SWR bridge; National NC155, parts; much more. SASE to Rod, N9IDF, 719 Arlington, Des Plaines, IL 60016. (312) 824-2292, calling is best.

CLASSIFIEDS

WANTED: TMC GPR-90, TMC GPR-92, T-631 transmitter, T-368 transmitter, R-808 receiver. Mike, (409) 693-1461.

WANTED: Collecting National regenerative receivers, parts and accessories. Glad to correspond with other "Thrill Box" owners. Dean Showalter, WA6PJR, 36308 Panorama Dr, Yucaipa, CA 92399. (714) 797-1782.

"REAL RADIO GLOWS IN THE DARK" Bumper Stickers - $1 each with a #10 SASE. We service American made amateur radio equipment, circa 1940, 50, 60 & 70's. Collins, Drake, Swan, Hallicrafters, Hammarlunds, National, B & W, Johnson, Gonset, WRL, Millen, Technical Materials Corp, Harvey Wells and so forth. QRP to QRO. Call or write for a quote on your servicing. **Classic Radio,** PO Box 3486, Eureka, CA 95502. 24 hr phone (707) 444-3911.

WANTED: GLB Electron 400-B Crystal Chanelizer. Howard Wright, WBØCIS, 116 John St, Coffeyville, KS 67337. (316) 251-6847.

WANTED: SW3 and/or bandspread coils, other plug-in coil ham receivers or transmitters; factory or home-brew pre WW11 vintage parts. Neil Wiegand, WA5VLZ, 911 N Bend, Austin, TX 78758.

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FOR SALE: New 100ths-$50; used but good-$25; good used 4X150A's-$20.
WANTED: Collins 75-A or 75A-1; 304Th's, state condition & price. Bill Kleronomos, KDØHG, PO Box 1456, Lyons, CO 80540. (303) 823-6438.

WANTED: A pair of new or good used 250th tubes. Corky Crosby, K1GWT, 29 Chestnut Hill Rd, Stafford Springs, CT 06076. (203) 684-9590.

FOR SALE: Early books & magazines on radio, television, telegraphy and electricity. To get on our mailing list, please let us know what your specific wants are. **New Wireless Pioneers,** James Kreuzer, N2GHD, Box 398, Elma, NY 14059. (716) 681-3186.

WANTED: My first receiver Howard 430. Also Hallicrafter HT-6; Stancor 10P, working or for parts; Thordarson kit transmitter; Collins 32V for parts. Have parts list stamp please. R. Olmsted, K4UJZ, 608 W. Thompson Ln, Murfreesboro, TN 37129.

WANTED: KØCRX "collects radios exclusively", specializing in 50's/60's amateur radio transmitters, receivers, accessories, manuals and periodicals. Mike Sewell, KØCRX, 35795 Oriole Ave., Lindstrom, MN 55045. (612) 257-1675.

WANTED: Older HRO-5, 7 etc, mint condition. Also Collins 32V series TX. NE Ohio area. K8CFC, (216) 741-8999.

WANTED: UTC, CVM series mod transformers for various radio projects; plate transformer 400 mls, 2400 volts center tapped, 110 primary; Hammarlund Sp-600JX and/or cabinet. Jim Whitlock, N1FGO, 16 Parker St, Charlestown, MA 02129. (617) 242-3248.

CLASSIFIEDS

WANTED: Serviceable VHF 2-way radios for donation to Salvation Army vehicles & emergency communications. Also inexpensive service monitor. IRS credit receipts & shipping UPS available. S. Scott Lee, W9NSR, Central Communications, Coon Valley, WI 54623. (608) 452-3230.

WANTED: Hammarlund HQ 150 and Drake 2C12CQ. Will pay top dollar for clean, nicely maintained units. Harry Helms, AA6FW, 7445 Andasol St, San Diego, CA 92126.

WANTED: ARRL (or other) Amateur Handbooks, 20's thru 60's. MacKnight, WK7U, 3414 Keir Ln, Helena, MT 59601. (406) 475-3355.

WANTED: SX-88, HQ 180A, HQ 140X, HRO, NC 400, NC 183, plus speakers; large SX-71 knob; NOS receiving tubes. Lee Bahr, WØVT, 914 Golden Bear Ln, Kingwood, TX 77339. (713) 780-4360 wrk; (713) 359-5284 res.

FOR SALE: National RAO-7 1945 multi-Navy receiver with metal box speaker; also good used tubes, ask for list. Joseph Zambri, RD4 Box 216, Towanda, PA 18848.

WANTED: Clean BC-348 receiver; Ranger 11; 75-A3; SX-88; SX-101A; SX-111A; or other Hallicrafters receivers. **FOR SALE:** 3kw roller inductor antenna tuner, HD-73 rotator (rotor new). Andy Howard, WA4KCY, 105 Sweet Bay Ln, Carrollton, GA 30117. (404) 832-0202.

FOR SALE: Antique and Ham radio tubes, parts, books, knobs, variable caps. Send LSASE with 5-25 cent stamps for 8 lists. Dick Dreher, W5VTJ, PO Box 691443, Tulsa, OK 74169. (918) 627-7481, evenings and week-ends.

FOR SALE: RCA ARC 155 SW receiver, works, clean-$125; Hallicrafters SX42-$125, untested both of these sets. Pick up only; Gonset Comm IV, untested-$40; #807 tubes-$4 each + shipping via UPS. Krantz, 100 Osage Ave, Somerdale, NJ 08083.

FOR SALE: NC 183 receiver, looks new-$150; SX25 receiver-$25, needs work; Mosley CM-1 receiver with speaker-$50; SX 28-$95; Central Electronics amplifier 600L-$225. Jerry Boles, N5KYE, 14857 Redbud Ln, Piedmont, OK 73078. (405) 373-2228.

WANTED: Manual or manufacturing date for receiver R366/TRR-5, Serial 342, made for USN by Espey, Contract NObsr43229. Also need cw bandwidth filter for 75A4. Jim Hanlon, W8KGI, 5560 Linworth Rd, Columbus, OH 43225.

WANTED: Some old TV's including National, 7"RCA 621TS, Spanton mirror-in-the-lid, or what? Want good AR-88 with cabinet and good complete HRO-7. Still need 249B or C and 75th tubes and cabinet from SP-600. Sam, W6HDU, Box 101, Alameda, CA 94501. (415) 521-1429.

WANTED: For HRO-60, dial scale for band AC, part #P136-14. **FOR SALE:** National NC-173, new by-passes, good tubes, re-aligned and re-finished with original manual-$100 + shipping. Chick, W3BPZ, 1039 N 21st St, Allentown, PA 18104. (215) 437-1608.

WANTED: National NC-66; Knight "Span Master", Ocean Hopper, Space Spanner; Regency ATC-1, TCR-2B; Morrow MB-6, MB-565; Globe DSB-100, Chief Deluxe. Al Bernard, NI4Q, PO Box 690098, Orlando, FL 32869-0098. (407) 351-5536.

CLASSIFIEDS

J. Earl Scaramella
P.O. Box 1
Woonsocket, RI 02895-0001

FOR SALE: Harvey Wells Bandmaster with vfo and manual, best offer; Collins 75A-2-$130. Art Rideout, WA6IPD, 2235 Gum Tree Ln, Fallbrook, CA 92028. (619) 728-6834.

WANTED: A front panel for an RCA AR-88 receiver. **FOR SALE:** Tubes, chokes, transformers, send me your list. Howard, W3HM, Rt#3 Box 712, Harpers Ferry, WV 25425. (304) 876-6483, after 8PM.

WANTED: Barker & Williamson 410 distortion meter manual; Waveforms 512 audio oscillator manual; General Radio 740-B capacitance bridge manual. Copies OK. Alan Kriss, 1872 Portsmouth Way, Union, NJ 07083. (201) 688-2092.

WANTED: Any info on a Jaro 6 meter double sideband rig model 6MJ. It has a pair of 6146's and is either a linear or a transmitting converter. HRO-50-T1 coils G, H, J, AC. Schematic for Hallicrafters SX-101 Mark 3, S-94 Mark 2 (12 volt, not 6); S-62A front top panel and main tuning knob. Steve, WA9ASZ, 1274 Londonerry Ln, Greenwood, IN 46142. (317) 882-4598 evenings.

FOR SALE: National Radio Manuals and NCL-2000 factory parts lists. SASE. Max Fuchs, 11 Plymouth Ln., Swampscott, MA 01907.

FOR SALE: Original manuals for HRO-7, HRO-50-$10 ea; RME 69, RME 4350, HQ-129X, SP-400X-$6: many more including National, Hammarlund, RME, Hallicrafters. Sheldon Wheaton, KCØCW, 14708 Murray Ln, Olathe, KS 66062. (913) 764-5436.

FOR SALE: National/Navy RBL-2 VLF receiver-$75; Teletype converter CV-115B/URR, excellent condition completely aligned-$100; Grey krinkle table-top cabinet for R-390 size receiver or transmitter-$30; misc test equipment. Shelly Rubin, KT2L, 117 N Ridge St, Rye Brook, NY 10573. (914) 964-2879 wrk; (914) 937-2535 res.

WANTED: Type 10 tube with plate cap on top such as Triad T-10S. Also 6L6-G with white ceramic base. Duds OK. Bob Dennison, W2HBE, 82 Virginia Ave., Westmont, NJ 08108.

FOR SALE: SR-42A (2 meter transceiver); SR-46A (6 meter transceiver); HA-26 vfo good condition-$35 for all 3; A-3 tri-band beam, used 6 months-$125. Bob DeRosa, WA2VMO, 91 Robinson Ave, Staten Island, NY 10312. (718) 984-4170.

WANTED

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Al Jones K6DIA
Ye Olde Transmitting Tube Museum
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CLASSIFIEDS

FOR SALE: Used untested 460 octal tubes from late 1930's to 1950's, plus 95 lock in tubes. Asking $138 plus postage. Fothe, 10 Jackson St., Sloatsburg, NY 10974. (914) 753-2090

WANTED: Collins KWM1, working condition. Jim Cranshaw, N5FSL, The Horn Speaker, PO Box 1193, Mabank, TX 75147.

FOR SALE: Technical Manual for BC610 - $9. Have many other Gov't and commercial T/M's. What are you looking for? SASE. Complete TM (op, service, schematics) for Zenith Transoceanic receiver (original) $8 each. Manual sent post-paid. Large surplus Electronics catalog-$1. D. Testa, Box 9064-ER, Newark, NJ 07104.

WANTED: Historian seeking data and equipment on 1930's television. Also Electronics magazine of the 30's. R. Brewster, 454 Diable Dr., PGH, PA 15241.

For Sale: Ham building parts of 1940's-coils, switches , condensers, transformers, tubes, sockets, chassis and cabinets. Everything! F. Yonker, 7 Old Farms Rd. Saddle River, N.Y. 07458 (201) 825-1895.

FOR SALE: KWM2/516F2 (round)-$650; KWM2A (round) with 516F2 (winged)-$750; NC303 with XCU303 calibrator-$165; NC300 with XCU300 calibrator-$140; Gross 50 watt plate AM modulator (vintage late 30's)-$50. All in excellent condition with manuals. KØOCC, 8240 Grogan Ferry Rd, Atlanta, GA 30350. (404) 396-1312.

FOR SALE: Collins (we) 75S1 & 32S1 & 516F2 in excellent condition, sell only as a set of 3-$575 + shipping; 30L1 linear (re) excellent-$600+shipping. Chick Dressell, W3BPZ, (215) 437-1608.

FOR SALE: Transmitter-Central Electronics model 100V, Excellent condition with transmt relay-$125. L. Hawes, KA4QZQ, 436 Bradenton Rd, Venice, FL 34293. (813) 493-8238, after 7pm.

FOR SALE: HT-37, very nice-$175; HQ-180AC, excellent, just re-tubed-$375; SR-75 to restore, w/ manual-$75. Frank Vardeman, 4612 Eddy Dr, Tampa, FL 33603. (813) 871-2134.

FOR TRADE: My SW3/SW5 general coverage coils #15 and 16. **WANTED:** 80 and 40 meter bandspread coils # 13A and 14A. Neil Wiegand, WA5VLZ, 911 N. Bend Dr, Austin, TX 78758. (512) 837-2492.

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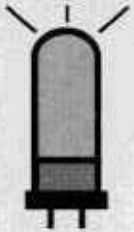

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