ELECTRIC RADIO

celebrating a bygone era

Number 8 December 1989

A CHRISTMAS TO REMEMBER

ELECTRIC RADIO
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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 CW 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.

EDITOR'S COMMENTS

Barry Wiseman N6CSW/Ø

Those of you who have a Second Class subscription will notice that for the first time you have received your magazine Second Class. And those of you who subscribed First Class should continue to receive ER First Class and if you don't, drop me a card and we'll straighten the records out.

I hope you all enjoy this Christmas issue. I think Bob Beasley did a great job with the cover. It certainly conveys a Christmas feeling to me. In a letter accompanying the drawing Bob says," I am sure you recognize the receiver I have drawn. It would not be much by today's standards, but when I was that age I would have given most anything for a Hallicrafters S-38. When I started out in amateur radio my communications receiver was the inner workings of an old Zenith All-Wave console rcvr, you know, the one with the little green eye. A friend helped me build and install a BFO circuit so I could copy CW, and I was in business. It was dead in the upper bands, but all I wanted was 40 & 80 CW, (No bandspread,Hi). My first contact was with a Canadian station, and it scared the hell out of me.

continued on page 29

TABLE OF CONTENTS

Fred Huntley's, (W6RNC) , Reflections Down The Feed-line, arrived too late for this issue. I regret that I couldn't get it in. I knoweveryone enjoys this column. Editor

Cover: by Robert Beasley, K6BJH.

Biographical Notes

Born 1911, St. Paul, MN. Married 1936 to Marcella Misak. Three daughters, seven grandchildren.

Education: University of Minnesota, BSME, 1933
Northwestern University, MSEE, 1947
PhD, EE, 1949

Honors: IEEE; Fellow (Citation - "For leadership in research and development in the field of radio communication", Jan.1, 1957)

Early Radio Experience: Crystal BC receivers, early tube BC and SW receivers, CW ham xmtr, class B amateur radio licence W9RAD, 1933 (expired)

Professional Experience:

1934 - 1938,

Collins Radio Co., Cedar Rapids, Iowa (Radio Engineer)

Collaborated in design and manufacture of Collins' first aircraft radios - 15A,16A and 17A for Republic of Colombia, S.A. Traveled to Colombia in 1935 for checkout and installation.

Collaborated with Art Collins in design and manufacture of first "Autotune" aircraft transmitter - 17D. Developed improvements in AM transmitters, receivers, and remote control methods - air and ground applications.

1938 - 1946,

Hallicrafters Co., Chicago

Joined Hallicrafters in April, 1938, to create a line of transmitters to add to their now-popular receivers. Personally designed and built first prototype of all HT models from HT-1 to HT-12. 1940 promoted to Chief Engineer, (later Eng. V.P.) Directed development of Signal Corps Radios: SCR-299, SCR-399, SCR-543; and Air Force ECM equipment.

1946 - 1950,

Pres. Voice and Vision Inc., Chicago

Custom design and installation of high-fi radio and TV systems. During same period, studied for graduate degrees at Northwestern University.

1950 - 1976,

Motorola, Government Electronics Division, Phoenix, AZ

1950 - 1951,

Member of technical staff. Developed Signal Corps VHF receiver R-220.

1952 -1959,

Became Chief Engineer. Expanded and organized engineering department tenfold; to respond to needs for new and sophisticated military and space communications, guidance, navigation, and ordnance control.

1959 - 1976,

Became director of R&D for the division.

1976 - Present,

Retired; Activities include travelling (USA by motorhome and Europe by Eurailpass), home improvements (electrical, electronic automatic controls, "wood-butchering") gardening, trout fishing plus keeping up with an active wife and circle of friends.

RECOLLECTIONS OF A RADIO ENGINEER

by Dr. R.E.(Bob) Samuelson
4553 E. Orange Drive,
Phoenix, AZ 85018

Definition (per my old Mechanical Engineering classmates): A Radio Engineer is a guy who will pass up a sexy blonde to look at a variable condensor!

My Early Interest And Experience In Radio

The first ham station I ever saw was at the age of 7, just before the end of WW-I - a friend of my folks showed me his rig, which included a spark transmitter! I remember only the big "pancake" inductors wound with shiny copper strip, and a "rotary"spark gap, the combination of which provided rf for the antenna, besides providing spectacular sound and light effects inside the shack. (I only saw a brief demonstration, since the war had the rigs off the air.) (No TVI problem; no TV!)

I expressed so much interest that my folks got me a copy of "Harpers Wireless Book", which I read avidly and kept for years. Then a neighbor gave me my first radio receiver, a 2-slide tuning coil and a crystal detector mounted on a wood base. With a pair of headphones and a simple antenna, I could listen to early broadcast stations. I began to read the "how to" articles in Popular Radio, Popular Science. etc.,and by the mid-20's I had progressed to building my own vacuum-tube receivers. The first was a single-tube broadcast-band regenerative set using a UV199 battery triode.

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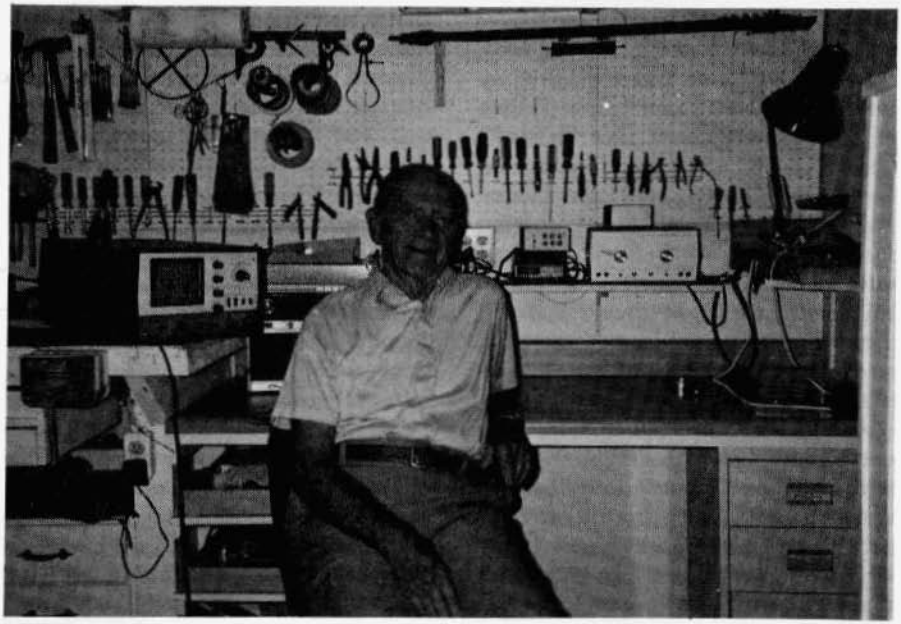


Bob Samuelson in his home workshop

I had saved my allowance to buy the tube; imagine my feelings when I hooked it up the first time with 22 volts of B-battery across the filament! Two weeks later, the replacement tube, carefully connected, began to give me my first taste of DX reception.

I became deeply interested in studying and constructing different "hookups" (such as the Ultraudio and Cockaday regeneratives), progressing to plug-in coils for the shortwave bands, and eventually to superheterodyne receivers. By the time I was a senior in college (1930-31) I had a quite respectable multi-band receiver, with which I logged many foreign SW broadcast stations, as well as many hams. Several of my classmates at U of Minnesota were hams, so an interest in ham radio followed naturally.

One of my classmates, Chet Ofelt, had a ham license, but no room for a rig in his rooming house. We built a primative 40 meter CW transmitter (using a 203A, I believe) in my basement, and set it up in my upstairs bedroom. With an inadequate ground connection, and an unbalanced antenna, there was enough stray rf to light our front porch light each time the key was depressed. We managed quite a few good QSL's until Chet moved to another city and took his rig with him. Between school and an outside job (doing concrete research at the Minn. Highway Dept. Laboratory), I didn't have time to replace the rig right away, but did sharpen up on my code, took the test, and got my Class B ham ticket (W9RAD) in Feb. 1934.

As it turned out, I never did set up my own complete ham station; the challenges of radio equipment design became more fascinating than going after DX and QSL's, so I let the license expire.

During my years in college, I had studied aeronautical and mechanical engineering, and received a B.Sc. degree in M.E. in 1933. Due, however, to my great interest in radio, I had begun to take E.E. courses, majoring in communications. I was working towards a graduate Masters Degree in EE, when in the spring of 1934 I received a phone call that changed my life.

A close friend and classmate, Loren Toogood, had returned to his home in Cedar Rapids, Iowa, and had become associated with his boyhood friend, Art Collins. Art's radio business was picking up, partly due to the well-known success of Collins Radio equipment with Admiral Byrd at the South Pole. Art wanted to hire a few engineers, and was I interested? I hopped a bus from St. Paul down to C.R. to talk to Art (whom I had met briefly at a Hamfest in St. Paul in '33), and found myself hired. I finished my winter semester studies at the U of M, and began work at Collins as a RADIO ENGINEER on April 1, 1934.

AT Collins Radio Co. 1934-1938

In 1933, Collins Radio, with 8 employees, became a corporation, and moved out of Art's basement into new quarters that it occupied for many years. When I joined in 1934, we had maybe 16 employees, a well-equipped shop, and a line of four or five short-wave transmitters that had become well-known: for example, for providing the communication link with Admiral Byrd at the South Pole. Two months after I started, Art brought in several other young engineers from the June graduation classes; Roy Olson, then Walt Wirkler, Merrill Smith, Roger Pieracci, Frank Davis: later, other great guys like Bill Stewart (now K6HV).

As a natural kind of question occurring to most new grads, I asked myself, "Here I am, a wet-behind-the-ears mechanical engineer; what can I contribute to this radio job?" The answers came as I found myself busier than ever before in my life: (1) My E.E. lab courses had taught me to use modern test equipment and electrical measurement methods.

One of my first big jobs was to design and build much improved test facilities, including a calibrated audio test oscillator, test racks with multiple AC & DC variable voltage sources, and other setups for measuring power output, frequency response, etc. (2) I had made myself knowledgable as to modern radio receiver design. Collins had started as a maker of fine transmitters, but was beginning to get requests for special receiving equipment to accompany special transmitters. Suddenly I found myself actively designing and building receivers. Now, how about (3) Mechanical engineering? As it turned out, this knowledge has been one of the greatest assets I have had in my career. Note that all electrical circuits must be supported and protected mechanically, and isn't every electrical failure mechanical in nature?

I got into active receiver work sooner than I expected. Collins equipment was beginning to make friends in Latin America - for example, the 20B was being adapted for short-wave broadcasting stations in Mexico, Venezuela, and Colombia; and the latter soon turned up as a big customer! It seems that Colombia and Peru got into a boundary dispute over ownership of a jungle area at the headwaters of the Amazon that might result in a shooting war. Both countries came to the USA for arms and war instructors, buying military airplanes and hiring pilots and mechanics to train their people. Needing radios to communicate with bases and between planes, they came to Collins with a set of specs (I still have a copy) for three types of radios to equip about 50 planes. We got the order - the largest one for Collins to date. None of the sets was yet on the drawing board! Walt Wirkler, Roy Olson, and I got the assignment (I did the receiver design: note that at this time I was about to take my first airplane ride!)

A brief description of the three models might be of interest (note: I have a copy of the instruction book for each model, with photos and schematics):

Type 15A (for Curtis Hawk fighters) 5-10 watts ph/cw, 2 bands at 35 & 50 meters, (type 46 final, Class B mod by 53 dual triode) receiver range 200 to 30 meters in 3 bands.

Type 16A for Curtiss Falcon Observation and Attack planes) 35 w phone, 100 w CW, 3 bands at 35, 50, and 200 meters, (2 RK20, suppressor-grid modulated). Receiver same as 15A.

Type 17A (Transports and Bombers - Curtis Condors, Bellanca Transports, Junkers, JU-53 from Germany) 50 w phone, 150 w CW, 3 parallel RK20's,suppressor grid modulation,same bands as 16A plus long-wave band 500-1000 meters (300-600kc). Same receiver, in separate cabinet, plus 300-600kc band.

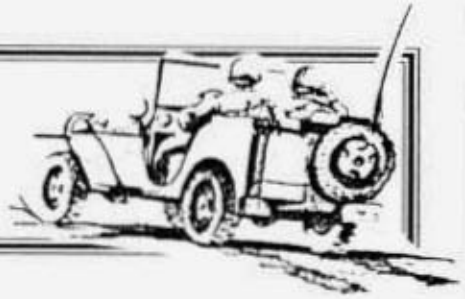
All sets used dynamotors for plate power.

When it came to the mechanical design of the cabinets, chassis etc., I found my M.E. background quickly put to work. Collins ground stations were built with sheet steel cabinets and chassis (plated or painted) and heavy aluminum rack panels. We needed to save weight in aircraft sets, without loss of strength or rigidity. On the side I had been making a study of the properties of new aluminum alloys such as 17ST duraluminum, strong and light weight - but when we tried it for a sample chassis we found it was brittle; corner bends cracked. I finally located a 24ST alloy sheet that solved the problem. Going back to my textbooks on airplane structures, I came up with cabinets and chassis that were light weight, rigid, and easy to fabricate in our shop. Rather than paint, we found "anodyzing" to be a treatment that resisted corrosion and looked good.

Another technical problem was that of how to best tune the transmitter to an "electrically short antenna", as found on a plane, in the long wave band (300-600kc). Such an antenna has a radiation

continued on page 27

ELECTRIC RADIO IN UNIFORM



by Walt Hutchens, KJ4KV
3123 N. Military Rd.
Arlington, VA 22207

Some Challenges of Old Military Radios

Regardless of which military radio takes your fancy, many of the same questions come up. This month we'll try to deal with a few of the common ones.

Where To Find Sets

Mine have come about equally from four sources:

1) **Dealers,** of which Fair Radio Sales is the best. If you have read this far and you are not on their mailing list, pick up the phone, dial (419) 227-6573 or 223-2196, and ask for a catalog.

Fair always seems to have a few "repairable" old military sets, they have repro manuals and diagrams for most sets that they ever had, and they have many connectors, critical accessories, and parts. Some of their stuff is truly unbelievable: how 'bout a new, in the original box, phantom antenna (old name for a dummy load) for the GP-- a Navy aircraft set which was obsolescent at the start of WW-II?

They have some items which aren't in the catalog; when you get desperate for a connector (etc.), write (with SASE), giving full information (for a connector, that means a sketch of the pin layout, as well as what it is for and any nomenclature you have) and they'll search the archives for you. The have batted about 50% on my "weird ones", a score I consider amazing.

Another dealer worth knowing about is Mil-Com Exchange Electronics. They're smaller and have only occasional older sets, but I have gotten several good items from them. The phone number is (904) 276-3568. From time to time other dealers pop up; watch the classified ads in ER, QST, the Ham Trader Yellow Sheets, and similar publications.

2) **Flea markets** -- Attend every large hamfest you can reach. Arrive early. If it is a two-day affair, go both days. Look under tables, in the back of the truck and in other corners. Dig through junk box too; they're a good source for that knob, rare connector, or original antenna terminal you need. After all, when the hams of the 40's removed these parts to "improve" your set, what do you think they did with them?

3) **Other collectors** – get to know other collectors and help them out whenever you can. Even when you compete for some of the same sets you can often help each other by finding items the other guys needs and you don't. And – as with other areas of ham radio -- the people you meet can be more than half the fun.

You will find a few collectors who are also dealers. Someone who sends mass mailing, buys and sells the same item at the same time and wants "top dollar" when selling, is a dealer, whatever he calls himself.

4) **"Want" ads** placed by you in Ham Trader Yellow Sheets and other publications. Most people reading these ads know little about military gear so they

work best when you are looking for "almost anything". They are not cheap, either.

Other sources will produce occasional results. A few possibilities: local "want ads" and giveaway columns, auctions or sales at a local ARC, classifieds in the club bulletin and non-collector friends. On the East coast tune in the "AM Swap Net" which meets on Thursdays at 1930 Eastern Time at or near 3885 kcs. I understand there are also swap nets for old gear in other parts of the country.

Should You Buy This Radio

There it is, "dirty but solid"; beautiful in its fifty year old black wrinkle varnish. Should you? If you know exactly what you want down to the level of a certain set, or even in such terms as "every radio in the B-17" this may be a simple decision. However, when the target is less clear, I find there are some considerations which I sometimes forget "in the passion of the moment".

First, very few of the sets you see in a flea market or in an ad today will come around again in the next year, especially if "rare", complete or extra clean. About the second hamfest I ever went to, I saw and passed up two brand new TBX-8's at $5 each. In the several years since, I have never seen another TBX-8 at a hamfest.

If you are sure you will want it someday and it is here today -- buy it.

Second, the item you don't buy may meet an unfortunate end. In the Spring of '87 I watched a set of crystals for the BC-669 -- in excellent condition in the original two-drawer case -- go to several hamfests in this area. Then one chilly Sunday, I found just the crystals on a table at a much lower price. As I put them in my bag, the seller allowed as how my purchases made his "new toolbox" really cheap.

When you see a "choice item" go begging, consider buying it to help another collector. It may be gone forever, if you don't.

Third, the number of dollars isn't the whole story. Storage space, and any necessary packing, hauling or shipping are part of the price, even if you don't pay them in cash.

There can also be serious hidden problems. I once hauled back from Dayton an ARR-15 which I believed to be in "repairable" condition. Too bad I didn't pull it all the way out of the case... At home I found that a small rodent had used it. I sold the remains for "parts" for a fraction of what I paid.

When the seller says "It worked the last time I turned it on", he often means "but because of the amount of smoke, I doubt it would work now". When you hear this statement, ask a lot more questions. (Someday I will tell my "worked the last time" PRC-47 story!) Buying a set with known problems is okay but you want to learn as much as you can about them and the price should reflect the problems.

On the other hand, a radio you don't need may have an accessory, connector, tube, or part which makes it a "must". A command receiver "junker" at $10 is overpriced but if it has the original knob or the C-24 (Army FT-260) local control adapter, it is a bargain or a "steal", respectively.

Think carefully about the "price". There can be both hidden values and hidden costs. Look inside the case, ask questions, and consider the whole picture when bargaining.

How Do You Get It Clean?

I just opened the latest Antique Wireless Association bulletin to find an item talking about restoring command sets which says they "easily survive sloshing in warm water and detergent". Well, perhaps they survive, but in most cases this technique will convert a good radio to a "collectible" -- about as functional as one of those painted china plates. **DO NOT DO THIS.**

continued on page 22

THOUGHTS ON THE COLLINS S-LINE

by Bill Kleronomos, KDØHG
POB 1456
Lyons, CO 80540

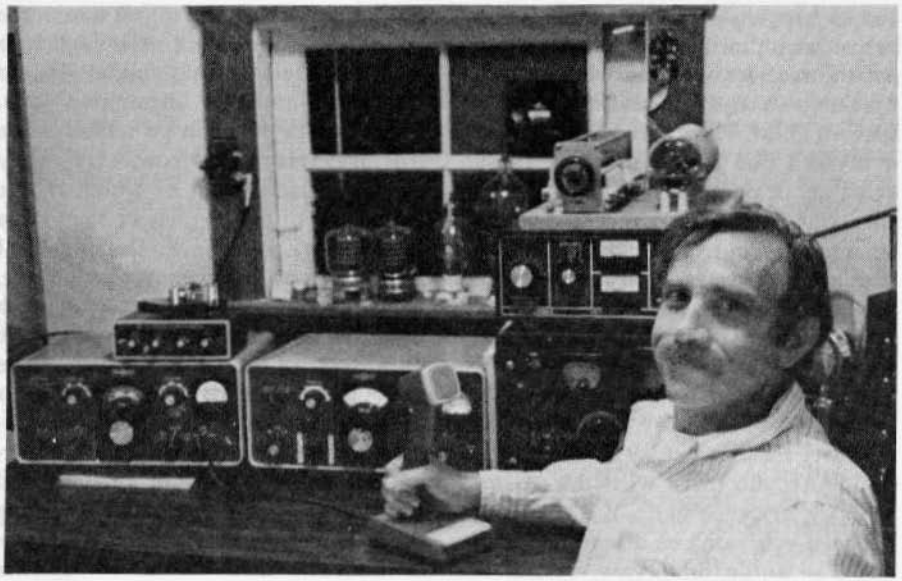
It has been said that the only difference between men and boys is the cost of their toys. This was certainly true in my case when several months ago, a friend of mine needing funds for college decided to sell his S-line for a reasonable price and made sure he let me know about it. After 20 or 30 milliseconds of intense weighing of the cost vs. entertainment value, as well as other factors such as the reliability of my 15 year old Kenwood TS-510 and my love of hollow state equipment, I decided to go for it. Actually, I was glad to have an excuse to donate a "real" sideband rig to a school ham club struggling along with an old Eico transmitter.

After using my new toys on the air a few hours I noticed a few technical problems that were related to a few ham-handed repairs made by a previous owner and a few bad components. Over the next month or so, I got quite an education on this line of Collins gear.

I had never looked inside an S-line before, let alone even touched one. As a punk teenager ham it always seemed to me that they were invariably owned by the proverbial doctors, lawyers, and Indian Chiefs as well as the big gun and well heeled contesters. As such, and being darned expensive, I had expected there to be a good 50 to 100 tubes in each unit, components made of Krytonite and gold plated wiring. I was shocked to see that inside each box was lots of wide open space and just a handful of standard miniature tubes. Where's the radio, I asked myself? After completing my repairs, I eventually found out. More on that later.

Other than alignment and a few weak tubes (the originals dated 1964) the major defect I found was a bad mechanical filter in the receiver. Somehow, the center frequency of the filter had shifted some 700 Hz so that LSB signals sounded good, but USB signals were extremely tinny sounding. Where to find a filter? Rockwell still makes them, but at $350 each. Responding to an ad, I purchased what was claimed to be a"factory new" filter from a parts place in Omaha for $135. My education began when I found the filter that I had received to be date-coded some 18 years ago, was in a box that appreared to have been to at least fifty hamfests and opened by at least ten people at each one, and was totally dead anyway. The dealer refused to refund my money, and had the gall to ask if I wanted to buy another such "factory new" unit from him instead. Fortunately, my bank got me back my money through the magic of mail order and credit laws.

I started looking through the pages of the Ham Trader with more interest than ever before. Surely someone had a filter. Then there it was - manna from heaven! "For sale, Collins filters, F455Y21, F455Y30, $45 each." I called this gentleman and his first comment was, "Hope you don't want a 3 KC filter, they all went to Japan". He went on to explain that the Japanese have a tremendous fondness for Collins equipment, and there's been just a ton shipped over there through dealers and individuals. It turns out that this fellow was just one of a number of individual S-Line fanatics around the country who have been collecting, and have amassed, just incredible amounts of spare parts for this equipment. I mean what kind of guy would just happen to have a few dozen



Bill Kleronomos, KDØHG

mechanical filters laying around the house? What kind of maniacs are these anyway, who have every item and accessory Collins ever made for the S-Line several times over?

It turns out, after all, that many S-Line owners are utterly intoxicated with their equipment, and the equipment has become a fetish. I mean, some of these guys will actually pay $20 for just one replacement knob! I've seen a weighted spinner knob go for over $100. These guys can tell you off the top of their heads such things as the exact date the 75S3 replaced the 75S-1, and on and on. I'm beginning to believe the story that the winged emblems on the equipment actually rust off from excessive salivation.

So, what's the cause of this obscession? After using the equipment for the last six months or so, I have a pretty good idea why. The Collins S-Line might very well be the best sideband equipment ever built.

First is the electrical design. Nothing is perfect, but this stuff works incredibly well. As I mentioned, there's not a large number of tubes in the units. The circuit design is extremely simple by today's standards. I found, during my work on this equipment using lab equipment, that the Collins engineers did a brilliant engineering job. First, the receiver, a 75S3-A. Because of the low plate voltage used, the noise floor is incredibly low. There is literally zero thermal hiss to be heard on a dummy load. The noise is so low that unless you are on an antenna, you cannot tune the preselector by peaking on noise. The next best thing is the mechanical filter. The skirts and passband ripple are superb. You don't hear any residual beat note from even an ungodly strong signal that you're tuned away from. Being tube equipment, the dynamic range is excellent. The receiver will not overload or cross modulate except under the most extreme provocation. Since

continued next page

the oscillators are either crystal or a tube type PTO, there is no phase noise generated as happens with our modern synthesized equipment. These factors mean that the receiver works extremely well at picking out weak signals from between layers of QRM. The desired signal won't be masked due to the effects of noisy oscillators or poor skirt selectivity. Let's talk about the PTO. Yes, it is as stable as the rumors about the Collins PTO say. After a few minutes warm up, you can zero beat WWV and still be within a few Hz hours later. Bounce the receiver on the table. It'll still be zero beat. There is no, and I mean no, tuning dial backlash. The tuning is extremely precise with a good feel making it easy to tune sideband. After all, that's what this equipment was designed to do. If AM is your bag, then you won't be disappointed either. The audio fidelity is very, very good.

The transmitter design is also excellent. It turns out that Collins is using an RF inverse feedback system. This works exactly like inverse feedback in an audio amplifier and reduces distortion products to extremely low levels. Combined with a reasonably wide (not the 1.7 Khz filters so popular today) mechanical filter, with it's excellent phase shift characteristics as compared to a crystal filter, and low passband ripple, the audio quality is very, very good for sideband. Using a D-104 microphone, I have actually had people ask me why my audio sounds so good. It might be coincidence, but no one ever asked that about my Kenwood. I do, of course, have all the whiz bang features available in more modern equipment, such as break in CW, split or transceive operation and the like. By using the auxillary crystal pack coverage in the receiver (the transmitter and receiver can be made to share the same hetrodyne oscillator), I have full WARC band coverage. In fact, I can operate on any frequency between 3.4 and 30 Mhz except for around 5 Mhz.

The S-Line is a "survivalist's" radio. This seems a strange statement to make, but an important one if you live in the boondocks somewhere. It is repairable at home. There are no special IC's, no transistors and few uncommon parts. There is little that can go wrong inside that an alert ham can't fix with commonly available parts, most of which can be looted out of old TV sets or found at a Radio Shack in a pinch. The alignment procedures at first were a shock to me. While, of course, you can use a full bench of test equipment, the Collins procedure uses nothing more than a little home made test jig; a resistor and capacitor, a VOM, and the crystal callibrator and oscillators built into the rig. That's it. Forget the scope, spectrum analyzer and tracking generator. Forget about waiting for an IC from a single overseas source. You can almost fix this gear while you're talking on it (apologies to W5PYT), and with it's excellent workmanship, it doesn't break very often.

Finally, there's the price. Cheap - by today's standards. A complete S-Line, or KWM-2 transceiver, a close cousin, can be had for prices ranging from $450 to $800, depending of course, on condition and vintage. There is a premium charged by sellers for things such as "Round Emblem", which means a relatively new unit. (Collins changed the emblem style from winged to round around 1970 or thereabouts). Rarer items and accessories can go for high to outrageous prices. As always, it really pays to shop around and not jump on the first unit you find unless you know what you are doing. Parts are easy to find if you don't want one tomorrow. The military still has many new S-Lines and parts in storage, and they are issued to MARS stations and the like periodically. In fact, the Army just released several hundred to MARS stations several months ago. The military's fascination with the S-Line is mostly because of it's immunity to the

continued on page 28

AM PROFILE FOR ARS

by Dave Taylor, WA6PBJ
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Scottsdale, AZ 85254

I've been building a KW AM rig and wondered whether the FCC specifies an AM (A3A) signal profile for Amateur Radio equipment. Also, this is especially interesting to me since I am the Product Safety/Regulatory Engineer for a company called AG Communications Systems, a joint venture between GTE and AT&T. An example of what I was seeking is found in FCC Part 73 of Title 47 of the Code of the Federal Register which specifies the following profile for Commercial AM Broadcast Service:

* 15 kc to 30 kc: 25 dB down
* 30 kc to 75 kc: 35 dB down
* 75 kc +: 80 dB or 43 + 10 log (power)

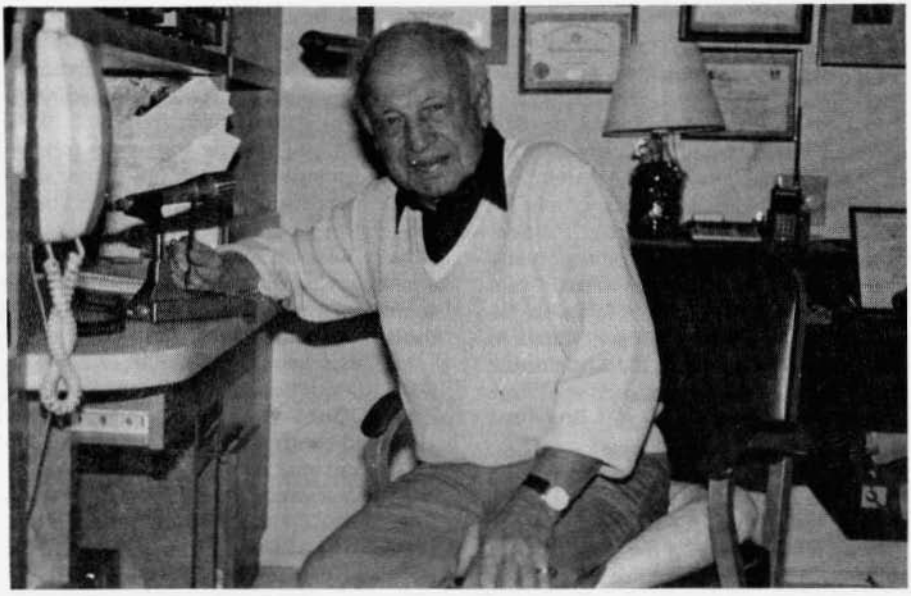
My search began with the ARRL. I was advised that the bandwidth of an AM signal in the Amateur Radio Service (ARS) is regulated, in part, by "good operating practices and engineering judgement" and Commercial AM Service (not music) commonly serves as a model for homebrewers. No BW figure could be quoted from the FCC rules for ARS however. Also not in the rules is the figure of 40 dB my friend volunteered for the number of dB down at +/- 3 kc of the center frequency. This I believed to be too stringent however.

Next, I spoke with a technician at the Livermore FCC lab in California on this same subject of profile for AM in Amateur Radio. He happened upon an ARRL publication that didn't specify the number of dB down the AM should be at the edges but reiterated the "good operating practices and engineering judgement" clause in Part 97 (speaks to the objective of ARS). On the side, he affirmed that the Part 97 rules were written to allow amateurs some degree of freedom relative to Commercial Services, that the Part 97 rules are intentionally somewhat vague, as I perceived as I searched for my question's answer, in order that we might fulfill the stated 'objective' of the ARS. We discussed the fact that bandwidth is naturally limited by component roll-offs, such at that rendered by our modulation transformers and tank Q's. Besides, our chosen mode of operation is somewhat controlled by the self-regulating aspect of the amateur body itself. If your correctly adjusted AM signal, in spite of Commercial like quality, is ever considered wide by adjacent channel users, they will likely either run you off the frequency (ungraciously trounce on you) or QRM your QSO by their increased power. To me, this interestingly suggested that my AM signal may be very wide so long as it does not interfere with adjacent channels, with which he somewhat agreed, as long as I am within the band of course.

My brief search of Title 47 of the CFR (FCC rules) revealed some interesting facts. Part 2 , Subpart C, "Emissions", defines 'occupied bandwidth' and 'necessary band for Commercial Services, including AM. A table of necessary bandwidths shows that Commercial Quality AM (not music) is permitted to be 6 kc wide. This means that the upper most modulating frequency is 3 kc. Per the definition for 'occupied bandwidth', I calculated that the signal edges should be 23 dB down from center frequency. The compliance requirements for manufacturers of commercial Amateur Radio gear include Article 2.1005 but even here, I do not see a state AM profile for ARS (I believe they design per the Commercial Service however).

So, I gather that my homebrew rig's AM signal profile might be 6 kc wide and have edges that are 23 dB down from the center frequency. But, I believe "good engineering judgement" allows us to exceed this. We are legally permitted by Part 97 to experiment. Besides, there are just too few AMer's to constitute worry about a bandwidth of maybe +/- 4 kc. However, I know that AM is a 'curiosity' today. By and large, the majority of today's Hams consider AM to be an obsolete voice mode -- it is twice as wide as SSB and produces that obnoxious and nerve racking carrier and .... should be ruled illegal. I guess if your experiments are restricted to appliance operation of SSB imports and weekend DX contesting, your 'one of the real hams'.

continued on page 30



Leo Meyerson, WØGFQ in his hamshack at his winter home in Cathedral City, CA

The Globe Scout 680

NOTES ON THE GLOBE SCOUT 680
and more on the history of WRL

by Barry Wiseman, N6CSW/Ø

Sometime back I acquired a Globe Scout 680. It had been stored outside under a tarp and was showing some effects from moisture. I brought it home and stuck it on a shelf. It sat there for several weeks until one evening I thought I'd put it on the bench and check it out. I took it out of the cabinet and was initially impressed with the size of the power transformer; quite large for a rig using a single 6146. The other components also looked substantial.

When I turned it over the first thing I saw was a couple of charred resistors. Everything else looked okay. I replaced the resistors and throwing caution to the wind I plugged it in. It came to life with no smoke, the tubes all lit so I hooked it up to a dummy load, stuck a crystal into the socket and tuned it up. I had expected some problems at this point but I was mistaken; the old rig seemed to be right on line; the power out was about 40 watts tuned up into the dummy load.

Now I started to wonder what the audio might sound like on AM. I screwed a D-104 on to the mike receptacle, tuned a receiver on frequency and with earphones on, I monitored the audio. Not bad. In fact very good. The rig uses Heising modulation like all the Scout series (a 6L6 modulator). Now for an on the air check.

The next day I tuned it up on 10 meters and worked a few stations. The audio reports I received were all excellent. Most stations were surprised when I told them I was running a Globe Scout.

The little transmitter really made an impression on me. It was well made, with good components, well designed and nicely laid out. It's very repairable and it has good audio. What more could you ask for at a price of about 80 or 90 dollars?

I decided to call Leo Meyerson, WØGFQ and get some more information. Leo was very pleased to hear I liked his Globe Scout. I asked him about the history on the units and this is what I got. At Leo's suggestion I also talked with Al McMillan, WØJJK. He joined WRL in 1950 and was with that company right up till the end. And actually passed the end. He purchased the manuals and some parts from Leo's son Larry when he finally got out of the amateur business. Today Al has a company called Hi-Manuals that most of us are familiar with. He sells manuals for most vintage gear.

Basically the post-war production started with the Globe Trotter in 1947. About 1000 of these were produced. Then the 40 Trotter came out in 1951. Again about a 1000 units were produced. The name was changed from Globe Trotter to Trotter because another company had a copyright on Globe Trotter. Neither of these sets were designed by WRL. The design with parts were purchased from another company - there's some uncertainty as to what company this was - so WRL could get into production quickly after the war.

The first Scout-the Scout 40-came out in 1952. It had plug-in coils. The Scout 40A, which came out in 1953, was upgraded to a Pi-network. Throughout the rest of the series - 65 in '54, 65A in '55, 65B in '56, 680 in '57, 66 in '57, and the 680A in '58 - there were small changes. Overall production of all models was something like 48,000 units. The rig was very popular with hams looking for a "basic" transmitter at a reasonable price.

continued next page 29

A CHRISTMAS STORY

Anonymous

It was Christmas Eve. Frank Johnson stretched in his reclining chair soaking in the luxurious warmth of the wood stove, feeling good about the day's accomplishments. Earlier in the day he and his wife, Irma, had gone into the hills above Steamboat Springs and cut their own Christmas tree. It felt good, he thought, stomping around all day in the fresh powder snow in search of the perfect tree, and by golly, they found one. The tree sat in the corner of the living room in all it's resplendent glory. Feeling a draft, Frank got up and walked over to the window to glance at the outdoor thermometer. Scraping the frost off the corner of the window, he saw it indicating twelve degrees above zero, and it was only 8:00 PM. Deciding another armful of firewood would be essential for the long cold night ahead, Frank tossed on his overcoat and walked out the back door in the direction of the two cords of fir he had stacked back in August. It was a clear, cold, Colorado high-country night and Frank could see thousands upon thousands of pinpoints of light against a black velvet background as he looked skyward. Frank began to think of his days as a teenage ham in the 1930's when he waited all year, it seemed, for nights like this one to fire up his rig on 160. Yeah, 160 - Frank began to smile. What a great band. A guy could ragchew for hours across the whole country with a hundred watts on a night like this.

Inspired to action, Frank returned with an armful of wood he deposited next to the stove. "Irma, I'll be in the shop a while" he said, while purposely striding upstairs toward the attic. He swung the door open and turned on the light, looking for a non-descript black box. Finding what he was looking for, he returned to his ham shack with the dusty box. He dusted off his prize, an old National SW-3 receiver that his folks had gotten for him as a Christmas gift back in 1932. Lifting the lid, he found the 160 meter coil was still plugged in, just as he had left it back before he was drafted in 1942. He closed the lid and, half anticipating the explosion, he plugged it in, but nothing more exciting happened than the dial light coming on with a soft amber glow. Encouraged and excited, Frank clipped his long wire onto the antenna post and slipped the headphones over his ears. Turning up the regeneration control, he was even more encouraged to hear the rush of the detector start up. Great, he thought- this thing might even work.

Frank began to tune around with the creaky old knob, and stopped where a loud whistle and garbled speech caught his attention. Hmm, AM, he thought, as he backed off on the regeneration control. Sure enough, as the detector stopped oscillating, he could hear a good AM signal. "Calling CQ, CQ, 160 meters from W1MK, Whiskey One Mike Kilo standing by for any call". How about that; 2000 miles and clear as could be? He looked around the shack sadly. He was dying to answer the CQ but had sold his AM rig back in 1955. His eyes scanned past his new Kenwood all mode, all band transceiver. "Hey - that 940S has AM in it, there's a selector button for AM". While listening to another CQ, he switched on the Kenwood, selected the 160 meter band, and keyed the mike while turning up the carrier control a bit. Frank was really getting excited now as he zero-beated the CQ in his headphones with the tuning knob on the Kenwood. At the end of the next CQ, he keyed his mike, turned down the audio on the SW-3, after being reminded by the loud feedback from his own transmitter.

He answered the CQ. "W1MK, W1MK, this is WØABG, Whiskey Zero Able Bravo Golf, over".

He released the PTT switch on the microphone, and almost forgetting, turned up the volume on the old National. "WØABG, this is W1MK. Pleased to meet you Frank, the name here is Tom and I'm located in Hartford, Connecticut. Your signal is just fine, a good Q5, and the transmitter here is a Heising modulated 203A running about a 100 watts. So back to you. WØABG from W1MK-- over". Frank was absolutely thrilled. Wait a minute, he thought, how did Tom know his name? Did he ever work this W1MK before? Well, if he did, it was an awful long time ago, but the call did sound sort of familiar, now that he thought of it a bit. He picked up the microphone and made a transmission, introducing himself and outlining his equipment. He asked Tom why he was still using a transmitter that was obsolete by 1940. "My goodness", he asked,"a 203A? Where the dickens do you get one in this day and age? He commented on the weather and the good band conditions and turned it over to Tom back in Hartford. Frank turned up the volume on the SW-3 again and settled back to some more armchair copy.

"WØABG, this is W1MK. All right on everything Frank. Yes, OK on the Kenwood transceiver you're using for a transmitter. You know, that reminds me of what I wanted to talk about. You asked me about my 'obsolete' transmitter. Please don't take it personally Frank, but what you said crystallizes what I think is wrong with ham radio today. I built this transmitter with my own hands from parts from the radio store. And using it has been an absolute thrill for me. Imagine, taking a pile of inert parts and assembling them into a machine that talks for thousands of miles to good people like you. That's a feeling you'll never get by plunking down cash on the counter to buy a ready made transceiver that all you need to make work is plug it in. Did you learn anything by buying that rig? Of course not. In fact, the people who made that rig probably could care the less if you learn any radio or not - all they want is your money. And I'll bet you've been bored with ham radio the last few years, too. Want to know why? Because you listened to the "experts" at the League so much about being modern and state of the art that you forgot about the learning and having fun parts of ham radio. That Kenwood of yours takes about as much technical knowledge to operate as a toaster with a built-in timer,or your phone that dials the numbers for you. There's no magicin that. You can't see what made it work. The League spends all its time trying to be modern and selling modern foreign made radios that need no thought whatsoever to use and aren't any kind of thrill to use anyway. And then they wonder why kids just aren't interested in ham radio. Well, they engineered the fun out of it. It's become a mindless activity that doesn't appeal to the smart kids anymore than talking on the phone. The smart kids, now, they're writing software. That takes smarts and gives them the same thrill this radio gives me when the stuff works.Do you know I hear guys on the air these days that don't know how to dip a final's plate current, and worse yet, don't know why? Or worst of all, don't care?"

Frank stirred in his chair, fumbled for his matches, and lit his pipe. This guy really knows something, he thought. Hey -- wait a minute -- how did he know he'd taken a phone apart when he was a kid? To think about it, that's what interested him enough to get his job with the phone company, a long time ago.

Tom continued with his "old buzzard transmission"as Frank listened with intense interest. "You knowFrank, probably the best thing QST could do would

continued next page

A Christmas Story from previous page
be to run articles on building equipment like a 6L6 - 807 transmitter. Thats something easy to build, has good power, and a kid could get a sense of accomplishment and pride out of using it. But the League won't, because it's not "state of the art". Even though ohms law doesn't change, nor the rules of impedance transformation, or the physics of electromagnetics when you go to solid state, they won't do it. I guarantee you that some of the kids would be enthralled. I think they'd care less if you showed them a two meter handie talkie that you could talk across town on. Hell, that's what a cellular phone can do, too, and you don't need a license. No Frank, the ARRL is looking at the easy way out with this no code license -it won't work. The League was started by a bunch of teenagers and young men who didn't have money to spend on ready-made equipment.They had a ball and learned their stuff on the cast off parts laughed at as obsolete by the commercials. Their enthusiasm was unbounded. Now, the League is run by a group of middle aged guys more interested in the bottom line of the Leagues' finances than in the art of radio. Few if any directors have any major technical or operational accomplishments to their credit. No director that I know of actively uses a homebrew transmitter or receiver. In fact, I rarely hear them on the air talking to their constituents in a give and take manner. No, they've got paid operators at W1AW to do that for them. Their bottom line is how effective the paid ads in QST are for the foreign equipment manufacturers. Their measure of the success of ham radio is the sales volume of ready made radio equipment."

"Well, look Frank, I've gone on long enough with what I wanted to say. Sorry I was so long winded, but I don't get on the air much anymore. Over to you. WØABG from W1MK".

Frank slowly picked up his microphone and tried to collect his thoughts. He blew out a long streamer of smoke from his pipe and watched it drift lazily towards the ceiling. Yes, he thought, Tom was right about a lot of things, and made it clear why there wasn't so much magic in ham radio for him these days. Frank hit the push to talk button.

"W1MK from WØABG. Ok Tom, well, there's a lot of merit to what you say. You sound like you've been in this game for a while. You ought to consider running for League office. Maybe your different perspective is what the League and amateur radio needs. Anyway, I'm wondering how you knew my name and that I took a phone apart in the '30's? Do I know you from a QSO a long time ago? Your call sounds kind of familiar but I just can't place it."

Irma had crept into the room unnoticed and put her arm around Frank's shoulders. "Honey, I don't mean to interrupt, but we need to get up early in the morning. How about turning in?"

"Well, Tom, I guess you heard that. I guess I'll wrap this up and say 73. All the best to you. Believe me, I've had a ball. We need to do this again sometime. 73. W1MK from WØABG, over". Frank released the mike switch and leaned back into his chair again.

The clear voice came to him again through the thousands of miles of cold winter night, down the inverted "L", through the 60 year old receiver, and into the hard bakelite headphones.

"WØABG, from W1MK. OK Frank". There was a chuckle in Tom's voice."I really don't think I can or want to run for League office, doggone it, I doubt that they'd listen to an old buzzard like me. As for knowing your name, and the deal about the telephone, I did talk with you a long time ago but you probably don't remember my voice from the years. I used to use a couple of different calls, and I'm not at my home station right now. Let me wrap it up by saying that there's a true magic to ham radio, one

that can't be bought for any money at any ham store. The good Lord provided the natural means for us to take stuff from the earth and use the sky to communicate our thoughts, hopes, and dreams for our betterment. You know, Frank, that us hams are lucky in another sense, too, in that we take on immortality when we use a radio transmitter. Everything we say on the air, that is the essence of what we are, travels into space forever in an ever widening circle to the end of infinity. Somewhere in the universe your very voice will exist on, not to be stopped, until the end of time. Remember that Frank. I have enjoyed our contact tremendously. All the best to you in the future. 73. WØABG from W1MK signing off and clear". The carrier disappeared with a click and Frank listened to the background noise and the occasional far off static crash from a storm in South America for half a minute.

As he reached to turn off the Kenwood, he happened to glance at the digital frequency readout that he had ignored in the excitement and rush of getting on the air earlier that evening. My gosh, he thought, I'm in deep trouble. I was on 1720 kc,way outside the band. Then a strange feeling came to him as several things in the back of his mind started to gel. 1720 kc was in the old pre-war 160 meter band. Hams haven't been authorized to use that frequency for over 50 years. He reached for his callbook to look up W1MK. He looked and looked, there was W1MJ, and W1ML but no W1MK. Yet, the call rang a bell. It was an old call, and the guy using it wasn't a new extra class, for sure. Then, Frank remembered, as he hurriedly pulled a 1934 ARRL handbook off the shelf -yes. There it was, on page 2, a picture of W1MK, the ARRL Headquarters station in the '30's! Of course! The text under the yellowed picture read, " On the table is the 3500 - 4000 kc transmitter using two type 04-A tubes in a self excited TGTP circuit, and the 1715 - 2000 kc transmitter using a 203-A and a Heising Modulator for phone...."Frank sat down and felt very light headed. This couldn't be for real! Some clever bootlegger was pulling his leg, for sure. That thought calmed him as he rationalized the whole QSO. He got up, went to bed, and finally fell asleep, with some difficulty.

The next day Christmas morning dawned bright and clear, and Frank reflected on his QSO over breakfast coffee with Irma. "You know", Frank pondered out loud, "I've still got some old radio parts in the attic. I'll bet I could still slap a rig together pretty easy. I think- yeah, you can still get crystals ground somewhere. I think I need a good dose of rosin smoke. An 807 ought to put out as much as my Kenwood". Frank mused out loud while designing a transmitter on a paper napkin.

Irma was smiling at Frank's childlike enthusiasm. "Frank, you haven't been collecting those QSL cards for a while. In fact, one came in the mail yesterday for you that I forgot to give you". She got up, and a moment later returned from the living room with the card and handed it to Frank. W1AW, it said, Headquarters Station of the American Radio Relay League. The call and big League emblem was emblazoned on the front. "That's odd", Frank thought, " I haven't worked W1AW lately". He turned over the card and read the inscription written on the back with what appeared to be an old Parker nib pen. " Many thanks for the FB QSO, Frank. See you down the log." The card was signed T.O.M. and dated December 23, 1934.

Frank wanted to think about it for a while.

"T.O.M., The Old Man", he said half out loud," how did Maxim pull this one off anyway"?

A STORY OF TWO RECEIVERS

by Bob Hohertz, W5PYT and Barry Wiseman, N6CSW/Ø

One evening a few weeks back, when Bob returned home fromwork there was a telephone message waiting for him from Mike Palmer, K5FZ. The message was that Mike had spotted an ad for two RCA AR-88 receivers- new in the original box- and knowing Bob was interested, wanted to pass the info along. The fellow with the AR-88's was Bob Snyder, W9GT in Lockport, IL.

Bob got on the phone immediately and called W9GT but he was too late; the AR-88's were spoken for. Bob was heartbroken. For the longest while he had wanted an AR-88 to add to his collection of over 50 communications receivers. Bob left his number with W9GT and asked him to call him collect if the other deal should fall through.

About two weeks later Bob called W9GT and learned that because of the freight expense the other fellow had cancelled his offer. Bob said, "I will send you a certified check for $500 immediately, hold the receivers".

Another two weeks elapsed before the two wooden crates arrived in Ozona. The freight for the 2 receivers plus original wooden crates was $120. The receivers weigh 98 lbs. by themselves.

Bob described some of the difficulties he had moving them around and getting them out of the crates. The first thing he did was buy a new nail puller so as not to damage the crates. He then turned the crates on their sides and slid the receivers out. Bob said he lifted them "very carefully" and "very slowly".

A rough outline of the history of the receivers from Bob,W9GT is as follows: They were manufactured in the US, probably in the spring of 1945 and shipped to London, England, for the War effort. The war was over before the receivers were put to use. Sometime later - probably in 46 or 47- they were sent to

continued on page 30

Bob Hohertz (Oxona Bob), W5PYT with has RCA AR-88 receiver.

AM FREQUENCIES

2 Meters: the national calling frequency is 144.4. There is local activity in all major cities across the country.

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6 Meters: the national calling frequency is 50.4. There are some local nets but most activity occurs during sporadic E openings. This is a band where AM activity is definitely on the increase.

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10 Meters: the AM window here is 29.0 to 29.2. The calling frequency is 29.0. We should remember to move off the calling frequency once contact is made with another station. There is also activity at the bottom of the band between 28.304 and 28.325.

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12 Meters: the calling frequency here is 24.985. This is a band with great potential. All we need is more people operating here.

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15 Meters: a number of operators are attempting to revive AM activity on this band. The calling frequency is 21.385. I think we should all attempt to use this band more as an alternative to 10 and 20 meters.

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17 Meters: the calling frequency is 18.150. This band is gaining in popularity amongst AM'ers. Check it out.

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20 Meters: almost all the activity here occurs on 14.286. The SPAM 20 meter net starts about 5:30 westcoast time every evening and carries on until about 8 or 9 usually. The net welcomes check-ins. The group has grown so large that another frequency has been activated; now 14.296 is another 20 meter SPAM frequency.

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40 Meters: the 40 meter westcoast SPAM net happens every Sunday afternoon starting at about 4:00 pm westcoast time. Late night activity around the country usually occurs on 7160, 7195 or 7290. On the eastcoast -mostly on week-ends- the activity is on 7285, 7290, and 7295. Westcoast Sat. nite BASH--7193

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80 Meters: nationwide the activity is concentrated between 3870 and 3890, mostly in the late evening. The westcoast SPAM group meets on 3870 every Wednesday night at 9:00 PM CA time. The northeast SPAM group meets on 3885 at 7:30 local, Thurday evenings. There is a very interesting net in the Northeast: called appropriately; the Northeast Swap Net. This swap net is every Thursday nite at 7:30 PM EST. It handles vintage equipment and parts only. **Another frequency now used for AM operation is 3835. Some operators have moved down here to escape the congestion on the usual AM frequencies.**

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160 Meters: 1885, 1895, 1990, 1950, 1995. Nightly activity on these frequencies and others across the country. Winter is here nowand conditions on 160 are excellent although, other than during the Jamboree, there seems to be less activity than what one would expect.

THE TNT TRANSMITTER

by Neil Weigand, WA5VLZ
911 North Bend Drive,
Austin, TX 78758

I've owned a variety of gear since my first QSO as a novice in 1966. My rig then was a WW-II surplus BC-342 and an Eico 720. That pair brought the world into my ham shack.

Today I find working with the older gear more fun than watching the LCD readouts and flicking through the memories of a modern transceiver.

I've been actively collecting/restoring/operating vintage gear for only three or four years. My primary interest is the plug-in coil ham equipment of the late 20's thru the 30's. I also enjoy building ham radio projects using vintage parts.

When I decided to build a classic breadboard rig I settled on the Tuned-plate-Not-Tuned-grid or TNT transmitter. It was one of the favorites of the early 30's. The November 1930 issue of QST featured a version using two type 45's in push-pull. They billed it as capable of delivering as much power to the antenna as a single type 10 and with better stability. Cost was kept down by designing it around broadcast receiver type parts including the tubes, capacitors and power transformer. Here was the rig for the ham on a budget and it could get out to work plenty of DX.

I wanted to duplicate the original QST version as closely as possible. The 500 uufd Cardwell variables, 14 gauge rubber covered wire and one 45 came from my junque box. Advertising brought me the needed brown beehive insulators, tube sockets and Sangamo micas. A friend of mine contributed the second 45. Close study of photos in the original QST article led me to lay mine out on a 8"x 20" piece of shellacked ash.The copper tubing in the tank circuit is not just for looks.

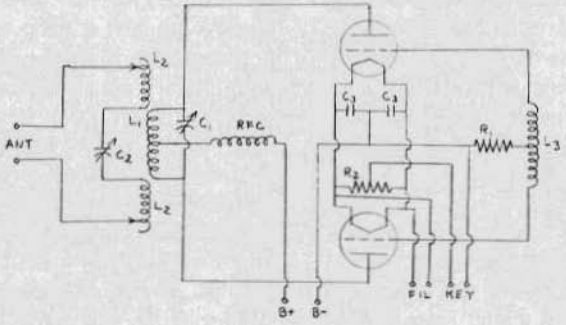
This is a high C circuit. A lot of current flows in that tank circuit. The grid coil needs to be adjusted so that with no load the plate current dips at 7 Mhz. This should be with the plate capacitor near maximum. The loading can be adjusted for maximum output and a clean sounding signal. Once tuned up, back off the loading coils to 75% of maximum output. This minimizes the antenna's effect on the stability of your signal.

My transmitter is shown in the photos. I've used it (tubed with sturdier VT-25's) on 40 meter CW running about 10 watts to work 5 states including Indiana. It's surprisingly stable and sounds good on the air. It's a blast to operate. It does have a certain amount of personality though. It's microphonic, sensative to hand capacity and hard to get on frequency. One sweep of the dial covers 6.9 to 11 Mhz. 40 meters is crammed into a few degrees at the bottom end of the dial. I use my transceiver to make sure that I'm in the band. Microphonics were cured by keeping it on a table separate from my operating position. Hand capacity is lived with, but I do have a 6" insulated shaft extension that helps a lot. I power it using a regulated 315 volt supply. This rig is a real attention getter at the local swap meets. I've set it out with my SW-3 for show-and-tell and have generated many interesting and enjoyable eyeball QSO's.

More information is available to anyone interested in duplicating my effort in the November 1930 issue of QST. Alternatively, construction of this transmitter (and a companion 24/27 regenerative receiver) is covered in Golden Classics of Yesteryear, available from Dave Ingram, K4TWJ.

continued on page 29

Neil's TNT transmitter. Also pictured is a 1930 QST where the transmitter was originally described and the AWA award Neil received in their old equipment contest.



C1 - 500 uufd
C2 - 500 uufd
C3 - 250 uufd mica
R1 - 50K

R2 - 75 ohm center tapped
L1 - 8 turns 1/4" copper tubing 1 5/8" ID, 4 1/2" long
L2 - 7 turns 1/4" copper tubing 1 5/8" ID, 3" long
(L1 and L2 must all be wound in the same direction)
L3 - 64 turns 22 gauge enamel 7/8" dia. center tapped

In Uniform from page 7

Start by removing the radio from its case or cover. If you have trouble, find help. Military radios "button up" in dozens of different ways and many of the schemes are not self-evident. Often even the manual doesn't help -- they assume you have had the four week maintenance school at Ft. Monmouth or Treasure Island!

In my younger days (that seems to mean "less than 75% of my current age"!) I tried to get things "clean as new" but after ruining a couple of sets with excessive zeal and water, I decided a tiny bit of dirt was a lesser price. Now I remove everything that pulls out -- tubes, plug in assemblies -- and brush and vacuum the chassis. Wiping with Q-Tips and/or a soft damp cloth is the next step. It takes a long time, but you can come close to "clean as new" with little risk of ruining anything.

Very rarely I get a set which is so dirty that it can't be cleaned this way. On these, I recommend starting with a vacuum and brush and then carefully washing with water, as follows:

In addition to tubes and plug in assemblies, remove or cover with masking tape and plastic wrap all transformers, and open frame relays and coils. Remove panel meters unless they are the modern "sealed unit" type; moisture in a meter will convert it to junk in a few hours. All assemblies having gears or bearings and all tuning capacitors must be removed or covered.

Set the radio in the position (usually upright) in which the least water will get on the wiring. Start at the top and spray sparingly with plain water. I use a Windex spray bottle for smaller radios, and a garden hose set for a fine spray on big rigs. Except in the worst cases (heavy oily dirt), do not use soap or detergent -- you cannot get them completely off and they absorb moisture. Brush to loosen the dirt while spraying to flush it away.

Immediately dry the set as thoroughly as possible with an old terrycloth towel. Then remove the plastic wrap and masking tape.

I have seen oven drying recommended, but I don't think it is a good idea. Some home ovens lack a setting which will reliably hold a low enough temperature and all have minimal through-flow of air. The best technique I have found is to place the set in a current of air at a temperature which is warm but not uncomfortable to the hand -- such as a home heating system "supply" register. A couple of days of this isn't too much.

Even after several days of hot air, the radio won't be really dry. Don't do final calibration until you have ten or twenty hours with power on. Another reason for waiting -- in the first few hours there may be failure which will require replacing a part affecting calibration.

The front panel may need more cleaning. Remove all knobs, and nameplates, remove or cover any meters and seal with tape any connectors, phone jacks, and so on. The best cleaning tool for wrinkle varnish or bare aluminum is a soft toothbrush; on smooth paint use a piece of terrycloth. Use a dish of warm water with just a drop of dishwashing detergent. Start at the top and do the whole panel "once over", rinse, wipe with a towel, and let it dry. Repeat until satisfied.

There are lots of stronger cleaners which will work faster but all of them are likely to damage paint. Most, for example, will quickly dull black wrinkle varnish. Any alkali (ammonia in window cleaner, oven cleaner) will dissolve the orange inspection stamps on Army sets. You can open and clean the inside of panel meters but the markings on many older meters are shellac-based paint; if you use alcohol you will wash the scale off.

What About A Power Supply?

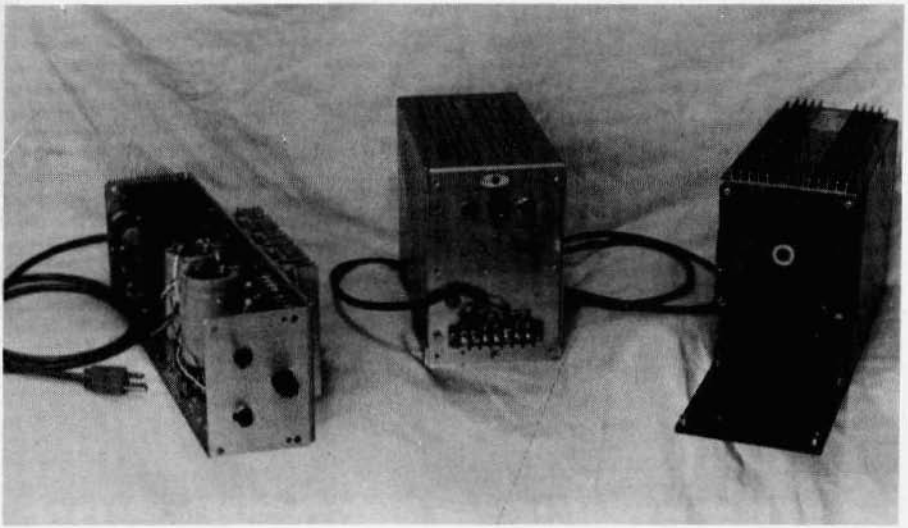
When "surplus" military sets were popular ham sets right after the war, the first step in any conversion was to change the power supply arrangements. Filaments were rewired to use AC and (often) more popular voltages, 12 volt tubes were replaced with 6 volt types, and dynamotors were tossed out in favor of plate voltages from homebrew AC supplies. Why? Well mainly because silicon diodes and transistors didn't exist, so low voltage DC supplies were impractically large, expensive, and heavy.

Today, however, DC supplies are practical. Most DC military radios run on either 12-14 volts or 24-28 volts; one or two (at most a few) power supplies for these voltages will handle many different sets, making it simple to power up a new "find". You may want a small or medium size supply without a fan for use with receivers and low powered sets (up to a "command" or TCS transmitter and associated receiver) but a separate supply with fan will probably be needed for the larger transmitters, such as the ART-13, T-195.

A few sets offer nasty problems if you don't use the intended supply; the T-195 dynamotors produce some 115 volt 400 cycle AC as well as several DC voltages and (since the dynamotors are built in) there's no connector to get all these voltages into the set if you want to use an external supply.

One disadvantage of using a DC supply is that dynamotors make noise. With receivers (BC-348, "command" receivers) and small transmitters like the "command" transmitters, we are talking somewhere between a barely audible hum and a pleasant "purr" which isn't much of a problem. The ART-13 is louder, but by covering the dynamotor with a folded blanket you can get it down to a tolerable level. During and after the war, however, dynamotor armatures were not balanced as well as formerly and power densities were greatly increased by the use of internal cooling fans; both changes increased the noise level. On larger and later sets -- the ARC-38 and T-195 come to mind -- the dynamotor ranges from "fairly loud" to "hard of hearing neighbors required".

continued next page



Typical "computer" supplies. Left, converted for 13 volt 15 amp output, center, 27 volt 8 amp output, right, unconverted.

In Uniform from previous page

Moreover, when using a dynamotor, your power supply must furnish a starting current of five or more times the running current for a second or so. During this surge the voltage must not drop below about 60% of the nominal value or the relays in the radio will release.

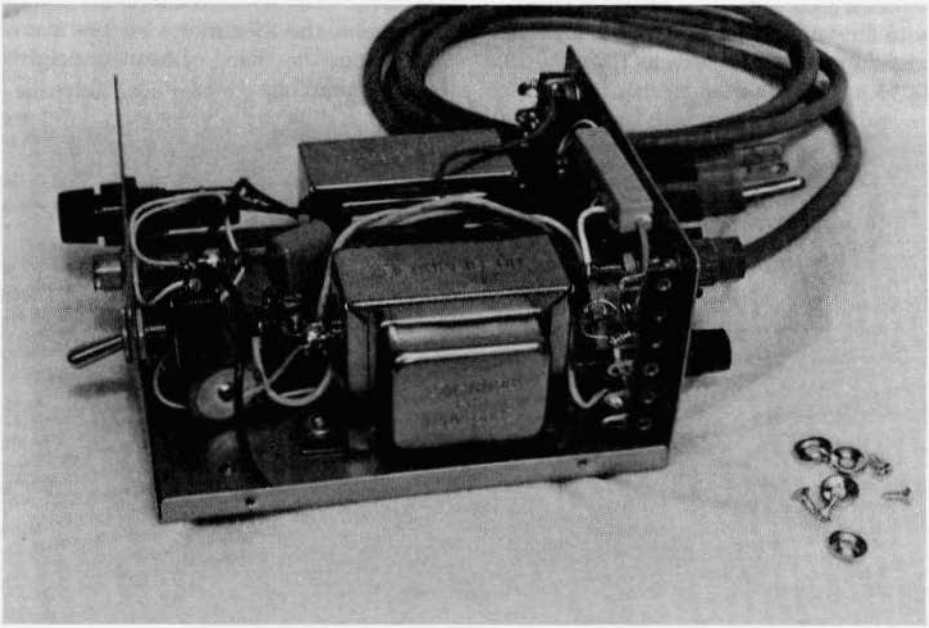
Even if your eventual plan is an AC supply, try to get the original dynamotor (or other power supply) and use it for checkout. If you decide that "this Bud is not for you",you haven't spent time and money building a complicated AC supply -- and many collectors will pay a premium for a set with the "right" military supply.

There are several ways to provide a DC supply. One I do not recommend is a storage battery and charger arrangement. Except for a mobile installation, the maintenance and safety problems of this system are just too great.

A scheme which is used successfully by some collectors is an unregulated transformer and rectifier supply with a variac on the input. The problem with this approach is that the output voltage depends on the load; if you connect a small set in place of a large one without reducing the variac you may "fry" something. And -- since the supply isn't regulated -- the voltage will vary when you key the transmitter, adjust the loading, etc.

I use regulated supplies. While these are more complicated, the difference isn't great and the extra parts are both easily available and not very expensive. All my supplies use the same simple regulator circuit -- one which works well (and easily!) and for which all parts can be found at Radio Shack.

continued on page 26

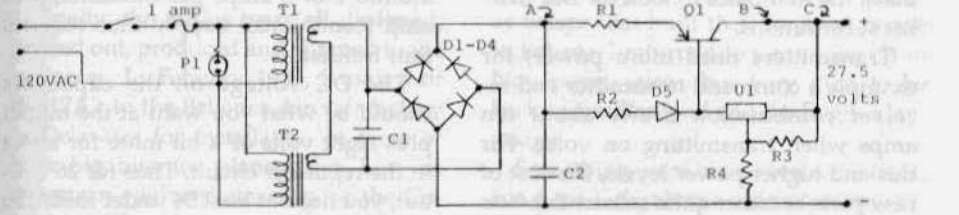


The Low power regulated supply described .The heat sink shown isn't large enough and will be replaced with a larger one in the near future.

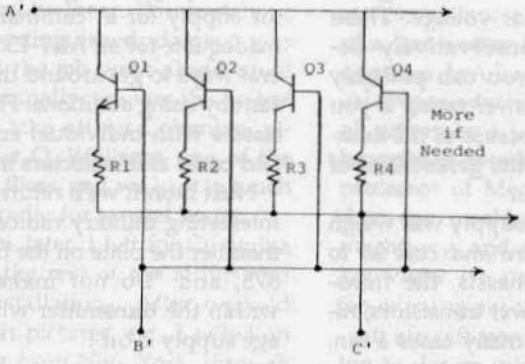
Here is a low power supply I use for receivers. It delivers 27 volts at 2 or 3 amps continuously, and several times that for short periods, making it suitable for "command" receivers, the BC-348, and similar sets. It incorporates "simple" current limiting (output current won't exceed a set value); the limit current will start most dynamotors for which the supply can handle the running current. All parts are heavy enough to handle the limit current long enough to blow the line fuse in case of a short

Parts List: (Numbers in parenthesis are Radio Shack part numbers)

C1 -- 1.0 mf, 200 wv (272-1055)
C2 -- 2200 mf, 50 wv (272-1048)
D1-D4 -- 25 amp, 50 piv (276-1048)
D5 -- 3 amp, 50 piv (276-1141)
P1 -- 120 volt pilot lamp (272-705)
Q1 -- MJ 2955 (276-2043)
R1 -- 0.15 ohm, 10 watt (3 271-130 in pl
R2 -- 1.0 ohm, 10 watt (271-131)
R3 -- 220 ohm, 1/2 watt (271-015)
R4 -- 4700 ohm, 1/2 watt (271-030)
U1 -- LM 371T regulator (276-1778)
T1,T2 -- 18 VAC, 2 amp xfmrs (273-1515)



Low power regulated DC supply. Letters "A","B", and "C" are connections for an emitter follower for use when regulating higher currents; see below.



The regulator circuit from the low power supply above can be used to drive this "emitter follower" circuit.

Parts -- Q1=Q2=Q3....2N3055; R1=R2=R3... 0.33 ohm, 5 watt

Use this with the low power regulator above by connecting A' to A, B' to B and C' to C and breaking the connection between B and C.

In Uniform from page 24

If you haven't built solid state power supplies before, the chapter "Power Supply Projects" in recent ARRL handbooks will help you get familiar with the considerations.

Particularly in the larger sizes, a supply of this type can deliver enough current to instantly melt small metal objects. In addition to the usual cautions about exposed AC line voltages, don't reach inside with metal tools or with jewelry (watches, rings) on your hand when power is on.

If you must purchase all parts from Radio Shack, this unit will cost around $40. The transformers are $9 each so that's the first place to look for flea market substitutions.

Transmitters need more power; for example a command transmitter and receiver combination draws about ten amps when transmitting on voice. For this and higher power levels, the cost of new parts becomes quite substantial. You can beat this with an old "computer" power supply from a flea market. Look for the kind with a big heavy transformer, not a modern "switching" supply. You want a supply with a single output at the voltage you want or one which can be reconnected from a full wave center tapped rectifier circuit to a bridge (or vice-versa) to give that voltage. These supplies are very conservatively designed; for ham use you can probably double or triple the power rating if you beef up a few parts. Because of the number of variables, only the generalities of a design are given here.

A typical computer supply will weigh fifteen pounds or more and cost $5 to $30. It will have a chassis, the transformer, heat sinks, power transistors, filter capacitors, and in many cases a fan. The regulator circuit will almost always have "fold back" current limiting (if load current exceeds a set value, output voltage is reduced until very little current flows). This is not what you need to start a dynamotor so you will have to replace the control part of the regulator circuit. This is usually on a separate circuit board so it is easy to find and replace. Often the rectifiers must be replaced, either because of too low a rating or changing the rectifier circuit. You must also provide a line cord, fuse, switch, and pilot light.

Transistors Q1.... are "as many as needed" to carry your intended load current. The 2N3055 is nearly universal in flea market "computer" supplies and it is rated at 15 amps, however you should approach this value only during "peak" operation. For continuous operation, stay around 2 or 3 amps per transistor; a 10 amp (continuous) supply thus requires four transistors.

The DC voltage on the capacitors should be what you want at the output plus eight volts or a bit more for losses in the regulator circuit. Thus for 26 volts out, you need at least 34 under load. The filter caps must be able to take the no load voltage of 50 to 60 volts or so.

During peak operation, the current gain of the output transistors will be 10 or less. The low power regulator shown above delivers about 8 amps peak; using it as a driver you will be limited to 10x8 = 80 amps peak -- plenty for a 4 transistor supply for a "command" set rig but inadequate for an ART-13. There are several ways to get around this but I would start by using additional PNP driver transistors with individual emitter resistors and bases and collectors in parallel.

Next month we'll return to our tour of interesting military radios. Till then, remember the plate on the front of the BC-375, and "Do not make adjustments within the transmitter while High Voltage supply is on"!

Recollections Of A Radio Engineer from page 5

resistance of an ohm or two, in series with a small capacitance of several hundred ohms reactance. The famed Collins "PI network" turned out to be inefficient- so Wirkler and I did a theoretical study which led to a simple series loading coil, tuned as closely as possible to the antenna capacity, as the best solution. With a 100 watt transmitter, if you will crank in the numbers, you'll come up with 10,000 volts or so of rf on the antenna. Sure was fun to draw long arcs with a lead pencil! I mention this here , as the lessons I learned showed me how to approach the design of the BC939 Antenna Tuner, six years later, in order to match the BC610 to a 16 ft. whip.

Finally, the radios were all designed, proved out, produced and shipped to the customer. In Febuary 1935, I took 3 of the 17A's to the Bellanca Aircraft factory in Delaware for installation in three of their big bimotor planes. Bob Lee, an American engineer working for the Colombian War Ministry, met me there to help. Everything went fine except for the day we decided to test out the long-wave band on the ground, not knowing that a workman had moved an antenna wire within an inch of one aileron! Our efficient tuning circuit provided a healthy spark, set the fabric-covered wing on fire, and all hell broke loose. Fortunately, it was quickly extinguished; damage was minimal, and the job went ahead more carefully. Eventually, we saw the first of the Bellancas take off for Colombia, piloted by Roger Q. Williams, one of the early Atlantic fliers, and we kept in touch with his 17A radio for several hours.

Two months later, I left for Colombia to check out the rest of the radios and make first installations. After typhoid shots, passport pictures, etc., I sailed on the Santa Inez from New York, through the Panama Canal to Buenaventura; by narrow gauge railroad to Cali, then Medellin, where I paused to help put a Collins 20B on the air as "HJ4ABD, La Voz de Antioquia" for SW broadcast. Then by Ford Trimotor plane to Bogota for indoctrination, then another "Tin Goose" to the Air Base, in the jungle at Palanguero on the Magdalena river. Here I hung my hat for the next 6 months, with an occasional weekend R&R in Bogota. Quite a change for a simple lad from Minnesota!

The story of this job is a fascinating one, but too long to include here. I came back with a wealth of practical experience and info as to what makes good radio design, aircraft and otherwise, including solutions to such problems as vibration, generator interference, tropical humidity (to 100%), INSECTS (such as wasps that built their nests in phone jacks), etc. I returned to Cedar Rapids in November, wiser, but very glad to be back to familiar food and the English language.

Something must have been done right, since the Colombians ordered more 16A sets for some Trimotor Fords they bought that winter. I went East to Floyd Bennett Field on Long Island in early '36, met some of my old friends from Palanguero (who had come up to fly the planes back) and checked out the sets.

About this time, Art Collins got the idea for the "Autotune", a method for remotely setting all tuning adjustments of a transmitter to any of 10 preset frequencies, involving a precision mechanical device attached to each tuning shaft, all driven by a pair of small motors. He brought in Pete Morrison, an Ohio State professor of Mech. Engineering, to update our machine shop with precision machinery, and give us the specialized knowhow we needed. I was given the job of marrying the mechanisms to a 100 watt aircraft transmitter that I was helping to design, plus the design of the 10 frequency control system, using telephone type relays and switching gear. The operator's control was to be simply a press-to-talk mike and a standard 10

continued next page

Recollections Of A Radio Engineer from previous page
digit telephone dial./

The 17D transmitter, as it was called, found it's first customer with Braniff Airlines, who had just bought a number of Douglas DC2 transport planes. In June of 1937, after installation and checkout of the first set, I was a guest on the inaugural flight, visiting cities of Texas. The set became popular with the pilots, with its ease of operation and the extra punch from the powerful Class B AM modulation. (After returning from Colombia, I had continued to work with AM aircraft transmitters, and had made a study of Class B modulation; the latter proved to deliver a much-stronger undistorted signal than the grid-or suppressor-modulated methods common at the time.)

Two rather interesting sidelights of the 17D are worth relating:

1) We had a problem with our first high-altitude flight tests; the oil in the miniature Autotune ball-bearings congealed from the cold, and the mechanism froze up. We didn't have a test chamber, so ingenuity had to serve. We packed our test setup on a big teacart, wheeled it across the street to the Dutch Girl Icecream Parlor, and into their zero cold room, where we could check out various solutions. Then Art Collins called Admiral Byrd (now back in the USA) to find out what kind of oil worked best at the South Pole. Byrd sent us a quart sample (enough for many, many 17D's) which worked perfectly in the bearings and solved the problem.

2) Collins hadn't obtained a license under the DeForest patents covering vacuum-tube oscillators. As the company began to prosper,someone lowered the boom, negotiations stalled, and how can you make a transmitter without an oscillator? Art found that a Dr. Robert Goddard (who became famous as the daddy of space rocketry) had invented a triode with the control element outside of the glass envelope. That became the Collins 100D oscillator tube, didn't infringe on patents, and was used first in the 17D transmitter. It was a bit tricky to keep in adjustment; with the small production, individual tubes varied. We were solemnly forbidden to hint to our customers that a strategically-placed bit of feedback wire would make the following buffer stage into a dandy DeForest oscillator.

I continued to work with the Autotune, and applied it to short-wave ground transmitters like the 202BA.

In the meantime I had taken flying lessons, soloed, then quit flying to fall in love and get married. We both enjoyed Cedar Rapids, but we also were venturesome, and began to cast glances at the world outside. Then in early 1938 came a phone call that changed our lives; my old friend Toogood, who had left Collins in 1936 to join the Hallicrafters Co. in Chicago, called to say that Bill Halligan wanted to add transmitters to his line of ham receivers; would I be interested in being the designer? Would I! To be brief, Marcy and I packed up, moved to Chicago, and I joined Hallicrafters in April of 1938.

Editor's note: In coming months we will have further chapters in the career of Robert Samuelson. The next one will deal with his years at Hallicrafters.

S-line story from page 10

electromagnetic pulses generated by nuclear bombs where solid state equipment is not.

So, if you're looking for a sideband rig built to the highest caliber here in the USA, and you are willing to revive and live with the now obscure arts of peaking the grid, dipping the plate, and reading an analog dial, then I'd suggest checking out the S-Line. You won't be disappointed.

Scout story from page 13

The price varied through the years from about $50 for the kit to $90 for a factory wired unit.

The Globe Scout Deluxe, which was produced after Textron had taken over Globe in 1960, sold for about $150. I have one of these and to my mind it is a lesser rig than original Scout models. It has a modern look, a plastic meter, cheaper knobs, and a rotary function switch, which according to Al McMillan gave them many problems particularly on the early production models. About 2000 of these were produced according to Al. In an earlier interview with Leo Meyerson (Issue #1), I published a figure of 200. Either Leo erred with this info or I misprinted it.

Overall, the Scout's figured big in the financial success of WRL. Some days, Leo said, they sold over a 100 kits. And Al McMillan told me it was remarkably trouble free. Very rarely did they have any problems reported. Incidentally Al also told me that the problem rate on Collins gear they sold was about 5% and on Drake equipment about .5 %. This was in the late '50's and early '60's.

It was very interesting talking to Leo and Al about the Scouts. I took the opportunity when I was talking to Leo to ask him for a recent photo. Many people have commented that they would like to see a good, recent photograph of him. The photo on page 12 was taken in November of this year.

TNT Transmitter from page 20

Be warned, vintage homebrew is addicting. Your craftmanship isn't buried inside a metal or (heaven forbid) plastic cabinet. It's there for all to admire. Mine sounds great and, as you can see, makes a fine wall plaque when it is not in use. Few things beat a breadboard transmitter as an impressive rig.

Editor's Comments from page one

I figured I would just get someone in town. Radio has indeed come a long way, but it seemed like more fun in the old days."Everyone enjoys Bob's cartoons and I think they give ER a real touch of "class". Thanks, Bob.

The Christmas Story in this issue, came to me with a letter saying that if I would not publish it anonymously, that I could not publish it at all. The author- who revealed his identity to me-said that he felt that if his name were over the story it would "bring him some heat and notoriety" that he didn't want. I was hesitant at first to publish the story anonymously; particularly because it is rather critical of the ARRL. Then I decided that since I agree with everything he says (and I think it's a good story) that I would print it. But I think it will be the last anonymous story for a while.

Speaking of stories: If you have submitted a story to ER and I haven't sent it back to you that means it will be printed. It may be a while - until it fits in an issue - but it will be printed. Another thing, please put your name on the manuscript and also on photos. Don't write directly on the photo but use a sticky backed piece of note paper.

A while back someone sent me an article describing a solid state replacement for the 3TF7 ballast tube in the R-390 receiver. It arrived without a name on the manuscript and became separated from the envelope and cover letter. Would that person drop me a card? I would really like to print the article but think I should wait until I know who the author is.

Here's what we have for upcoming issues:

* The KW-1 issue will probably replace the regular March issue. I was very optomistic regarding the time required when I first announced my plans. I had no idea what was involved. I have most of the key articles and key photos but I'm still waiting on other material.

continued next page

A Story Of Two Receivers from page 18

Tangiers which was a British colony or protectorate. From there - and they weren't used there either for some reason - they were shipped back to England. This information was gathered mostly from the RSGB.

Several years ago Bob, W9GT, who was working in the North Sea oilfields and living in Norway, found them in a shop in London. He used them in Norway, "Mostly for listening to the BBC and VOA" and when he returned to the U.S. he brought them with him. Recently he had a heart attack and says, "they're just too heavy to move around". He also said, if I had not had the heart attack there was no amount of money that would have pried them loose from me".

Bob is absolutely ecstatic to have the two AR-88s. He says, "they are the best receivers I have,' bar none'". He is most impressed with their signal to noise ratio, sensitivity and audio output. He allows that there are other receivers more stable and selective. At the moment Bob is gathering more information on the receivers and sometime in the future he and I will do a more detailed article on them.

Editor's Comments from previous page

* A story on "Ashtibula Bill". This will definetely appear in the January issue.

* A story on the broadcast transmitters in Sam Thompson, W6HDU's collection.

* More from Dr. Robert Samuelson on his career.

*In the Januay issue: letters and comments on the power limitation issue and on the SPAM first draft of a petition for rule change. If you have any comments or ideas, send them in.

* A detailed description of the design and construction of Bill Kleronomos's (KDØHG) home brew Killowatt rig.

* A story by Skip Green, K7YOO on the Johnson 500 designed by John Foster.

* A story on the old VOA, Crosley transmitters by Bill Diggins, WA8LXJ

* Plus many other stories and articles that are in the planning stages.

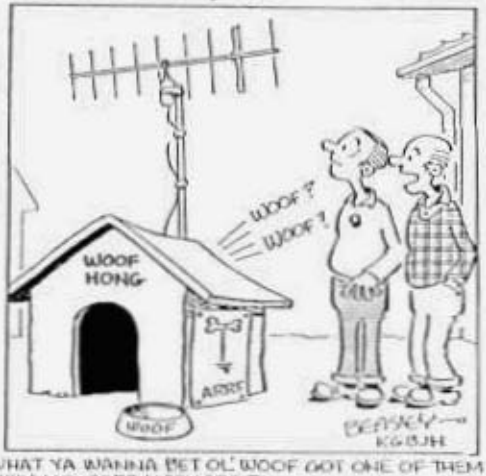
The 160/10 meter SPAM Jamboree: on Thanksgiving day I went out to my shack about 9:00 AM. From 29.0 to 29.100 there was solid activity. I had to go above 100 to find a hole to call CQ. It was absolutely great. I think that everyone got a real "kick" out of the Jamboree.

Marty Drifty, WB2FOU/5 will be doing a talk and slide show at the Dallas Ham-Com in June. The subject will be AM/Vintage operation. He would like anyone interested in helping out to send slides and desciptions of their stations along with some information on themselves. He also said in his letter that the Dallas Ham-Com is the #2 ham convention in the U.S.

A Merry Christmas and a Happy New Year to everyone. CU in 90!

AM Profile from page 11

In that we are a minority in a harsh, unfair and intolerant communications environment, even perhaps the last bastion of 'real hams', I believe we better be certain our AM rigs are 'clean', and that we do not overmodulate or splatter.



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DEADLINE FOR THE JAN. ISSUE: JAN.7

FOR SALE: BC-639 WW-II VHF receiver, w/pwer supply, 100-150 Mc - $30; AC power supply, BC-779 or Hammarlund SP-400 receiver, perfect - $25; 75S-1, 32S-1, 516F-2, 312B-4, re-tubed, near mint - $500; MBF tuning meter - $15; 6' rack for 19" panels - $75; new rotator for light weight beam - $35; Henry 30S, 2 meter, solid state, 12 volt amplifier, 1 watt in/30 out, - $45; new H.V. replacement for 813 - $15 ea; 4X150B - $15 ea; new 4CX250 - $45 ea; 6 and 8 Mc, 243 xtals - $1 ea; (for AM VHF) .10 meter MBF - $35; new ARC-5, 3-4 Mc receiver - $35. K6KYB, (714) 523-1587.

WANTED: Manual for Lafayette HA-410, 10 meter transceiver. Also need a manual for the National NC-57. Alvin Bernard, NI4Q, POB 690098, Orlando, FL 32869-0098. (407) 351-5536

WANTED: Pr. of 4-400s.Barry,N6CSW/Ø, (303) 247-4935

FOR SALE: Sylvania 7" scope model 1327 and Eico 5"scope model 460 - $22.50 each, plus shipping. W3NCX, 1005 Wyoming, Allentown, PA 18103. (215) 435-3276

FOR SALE: Vibroplex Collector's Guide. Contains history of every key, identification guide, complete patents, more. Only $14.95 plus $2.00 S&H. Mass. res. add .75 tax. Artifax Books, Box 88-E, Maynard, MA 01754.

FOR SALE: Hallicrafter's Service Manuals - $4.50 postpaid. Also some Hammarlund. Will accept best offer on Panoramic PCA-2T-200 Panadaptor. Miller Radio Service, POB 6604 Erie, PA 16512.

WANTED: For restoration to operating condition: BC-375 Mark II (British model 19),units and/or parts. Ken Lakin, KD6B, 2601 Oakwood Rd.,Ames, IA 50010. (515) 292-5068

CLASSIFIEDS

FOR SALE: McMurdo-Silver vacuum tube voltmeter - $75 or best offer. Dick, KC5KW, (505) 265-2721.

WANTED: Desperately need National XCU-27, 100 kc, xtal calibrator for my NCX-3 and NCX-5. Chick Dressel, W3BPZ, 1039 N. 21st St., Allentown, PA 18104. (215) 437-1608

FOR SALE: AN/PRC-47 - $150; AN/GRR-17 with book, belt kit - $350; Danish "Sailor" RT-143, VHF RT - $75. All listed are clean and repairable. Mike Murphy, 11621 Valle Vista Rd., Lakeside, CA 92040-1041. (619) 561-2726

WANTED: QSL cards 1930 - 1969; Lafayette Voyager and Starflite xmtrs; small CW xmtr ie, WRL CW 7 etc; Globe Chief Deluxe and LA-1 Linear; Ameco PS-3, AC supply and AC-1 xmtr; Philmore CR-5 RX; Matric model 50 xmtr; Rockhound and 8040B RX; Top $ for excellent to mint units. Gary, K3OMI, 11124 Oak Hollow Rd., Knoxville, TN 37932. (615) 690-4217 days

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WANTED: Mosley CM-1 receiver, any condition; schematic for Altec Lansing 438A compressor; supplemental tube data for Precision model 10-54 tube tester. Mick Koch, WB2KPH, RR 4, Box 20, Hagerstown, MD 21740. (301) 791-2131

WANTED: Cover for HRO power supply (6 volt, type 697), would consider complete supply. Gary Norman, 17 Ridge Road, Granby, CT 06035. (203) 653-6373

WANTED: Need general coverage, 3 gang, variable capacitor for Howard 440. Not the band spread, 3 gang, cap. Also looking for Howard 450A receiver. Woody Binford, W6LHH, 561 Atherton Ave., Novato, CA 94945.

FOR SALE: Howard 490 receiver, Millen side arm VFO, model 90700. Vance Lockenour, W9CNL, RR 15, Box 932, Beford, IN 47421. (812) 275-4836

FOR SALE: UTC Transformers,brand new in factory cartons,100 different types: transmitting, filament, chokes and modulation transformers. Also audio interstage and outputs etc. Commerical, military and amateur grades. Send #10 SASE for catalog and inventory to: Len Crispino, POB 702, Hudson Falls, NY 12839. (518) 638-8199

WANTED: Any ARC-5 receivers; schematics on Gonset converters; Globe Scout 65-A; mobile transmitter and receiver; 4 and 5 pin plug in coils. Jack, K4GYK, (904) 755-0318 nights.

WANTED: Manual for the SP-600 receiver, also known as the R-274C. I will copy and return yours. Also want Heathkit AT-1 transmitter w/manual. Gary Babcock, WA5BMN, 1104 Cauthern, Alamagordo, NM 88310.

WANTED: Clean National SW-3 and WE 212-D tube. Have clean Collins 75A-4 and UV 204-A tube to trade, respectively. Leland Smith, HCR-31, Box 147, Jasper, AR 72641. (501) 428-5967

CLASSIFIEDS

FOR SALE: WW-II equipment, shipping prepaid. GE SCR-515A, Navy ABA-1 with operating manual, in original box, export packing - $100; Bendix type MP-741 power supply with dynamotor - $20; ARC receiver R-15 (28V) with dynamotor - $20; GE dynamotor 5DY82AB1 - $7.50. James Fred, R 1, Cutler, IN 46920.

WANTED: Johnson VFO, model 122 in operational condition; Viking Ranger or DX-100 or Valiant. Bernie, WA6HDY, (818) 445-2891.

WANTED: GPR-92, GPR-90, NC-400, Valiant 2, Ranger 2. W7IYG, 16306 Midland Blvd., Nampa, ID 83687. (208) 466-2803 after 8:30 MST

FOR SALE: Collins 75A-4 with all filters, manual, matching speaker, mint condition - $350; Hammarlund HQ-170 with clock - $100. Artie, WA2YBG, (516) 884-8527 after 4 PM local

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WANTED: Metal bezel for Johnson Ranger VFO; original manuals for Collins 75S-3B/C and 51S-1 receivers; Collins S/line cabinets and miscellaneous parts/accessories. Jerry, AB8U, 3041 Rising Springs, Bellbrook, OH 45305 (513) 429-5457

FOR SALE: Johnson electronic TR switch - $25; antenna rotator CDR model AR-40 with control box, new boxed - $85; Drake W4 wattmeter, 2000 watts - $40; Heath 4 element triband beam, model SA7010, never assembled - best offer; muffin fans, 110 volt - $8; computer grade, high capacity electrolytics, 50 volt, for low voltage supplies - $3; regulator tubes, OD3, OC3, OA3 - $2 each, enquire on others. Levy, The Tube Man, 7600 Blanco Road, San Antonio, TX 78216. (512) 341-9549

WANTS: RCA AR-88 receiver with S meter,could use a nice one or a parts one;two 12 mfd, 2000 volt oil caps; some HRO 50 & 60 coils. Sam, W6HDU, Box 101, Alameda, CA 94501. (415) 521-1429

WANTED: Multi-match 75/100 watt modulation transformer with specs. Vic, W8TYW, (313) 349-2324.

WANTED: B&W TVH or Bud VLS coils with adjustable center line base for 80 and 40. James T. Schliestett, W4IMQ, POB 93, Cedartown, GA 30125. (404) 748-5968

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

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WANTED: National HRO-50T1 junker for power transformer and filter choke. Also need G,H,J,AA and AB coil sets. Rudy Lazzazero, W2ZIA, 3411 Home Rd., Alden, NY 14004. (716) 937-9279

WANTED: Military transmitters and transceivers, 30's - 60's, particularly GP,ATB, PRC-7, ARC-21, ARC-65, and TBW. Walt Hutchens, KJ4KV, 3123 N. Military Rd., Arlington, VA 22207.

WANTED: Manual (copy) for National NC-57 and the Lafayette HA-410; 1600 Kc IF transformer (Miller 612-W4). **FOR SALE OR TRADE:** Drake 1A; RME-45; NC-183D; Howard 436 and a Knight R-55A. Al Bernard, N14Q, Box 690098, Orlando, FL 32869-0098. (407) 351-5536

FOR SALE: Hammarlund HQ-170AC, near mint condition - $175. **WANTED:** Hammarlund HQ-200 or HQX-300. Call Charlie, KD4AJ, (404) 396-0276.

WANTED: 32V2 or 32V3; DX100B; 2AS speaker for 2B; manual for Viking II CDC; 75A1; excellent condition only. Quote price first letter. Pickup on large items within 300 miles of Denver. Don Hilliard, POB 563, Boulder, CO 80306.

FOR SALE: 68 years collection: 10,000 + items: antiques, radios, televisions, phonos, sound, military, ham, catalogs, flyers, books, brochures. 48 page list - $1. refundable. F. Yonkers, W2IBH, 7 Old Farms Rd., Saddle River, NJ 07458.

WANTED: Collins/Drake general coverage receivers. **FOR SALE:** 40's BCB/SW radios. Levy, 8 Waterloo, Morris Plains, NJ 07950. (201) 285-0233

WANTED: S meter and bandswitch gear assy. for Collins R-388 receiver. Will definetely consider complete receiver, working or not. Mike Blazek, 16737 Monitor, Baton Rouge, LA 70817 (504) 293-7194

FOR SALE: Hallicrafters SX-42, untested, pickup only - $100; microwave frequency meter; Lavoie Labs model 1055 M, TS-127U, 375 to 725 Mc, portable, less batts. - $40; plus shipping. Krantz, 100 Osage Ave., Somerdale, NJ 08083.

FOR SALE: Dynamotors: DM-64, 42, 65, 101C, DS-125, BD-77 ; much misc. WW-II military gear; large manuals list. Henry Engstrom, POB 5846, Santa Rosa, CA 95402. (707) 579-2070

FOR SALE: Xerox manual ACR-175 comm. receiver - $6.50 PPD; Pyramid capacitor/resistor analyzer, model CRA-2, w/manual - $43; Triplett model 625NA VOM, nice - $23. Ward Becht, 625 Tufts Ave., Burbank, CA 91504. (818) 842-3444

WANTED: Information leading to a Collins S-line antenna direction control - clock unit. Model? Vintage mid-60's. Will buy working or not. J. Orgnero, Box 32, Site 7-SS1, Calgary, Alberta, Canada T2M 4N3.

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FOR SALE: 50 ham radio projects that work. Most cost under $5 or build them from junk! Send a SASE for free list to: Jim Braddy, WA4DSO, 3037 Audrey Dr., Gastonia, NC 28054.

WANTED: Eico 723 parts (knobs, "function" switch, meter face); Heath manuals, VF-1, PS-23; Heath 400 Hz CW filter. Dean, KC5NG, (817) 497-5365.

FOR SALE: T-368C/URT, AM/CW, transmitter, 400 W plus, w/manuals, caster base, good condition - $425. Ken, (205) 745-3761.

FOR SALE: 400+ Radio/Radar/Electronics manuals, military/commercial, many aircraft related, 1940's to 1960's. Send SASE for December 1989 list. Rainy Day Books, POB 775, Fitzwilliam, NH 03447. (603) 585-3448

TRADE: My FB-7. **WANTED:** SW3 coils, pre WW-II National transmitters, Radio handbooks. Niel Wiegand, WA5VLZ, 911 North Bend, Austin, TX 78758. (512) 837-2492.

WANTED: Pre- 1942 transmitter. Any condition or part considered. Examples: Gross, Stancor, Collins, Thordarson etc. Bob Mattson, KC2LK, 10 Janewood, Highland, NY 12528. (914) 691-6247

FOR SALE: Transmitting/receiving tubes, new and used, mostly old surplus. SASE for list. I also collect old and unique tubes of any type. Maybe you have something to trade? John H. Walker Jr., 16112 W. 125th St., Olathe, KS 66062. (913) 782-6455

WANTED: 810 tubes. Bill, KDØHG. (303) 823-6438

WANTED

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FOR MUSEUM

Do you have any old amateur or commercial transmitting tubes worthy of saving for posterity? If yes, help us do same. Contact:

Al Jones K6DIA

Ye Olde Transmitting Tube Museum

P.O. Box 97, Crescent City, CA 95531

FOR SALE: Antique radios, parts, tubes, books, vibrators, knobs, amateur, testers, transmitter crystals, etc. Eleven lists. LSASE plus $2 cash (no checks). Richard & Rose's Radio Mart, POB 691443, Tulsa, OK 74169.

WANTED: Hammarlund Comet Pro or Super Pro; Johnson 122 VFO manual (xerox ok); factory wired Johnson Navigator; Ranger or Ranger power transformer. Brian Roberts, 3068 Evergreen, Pittsburgh, PA 15237. (412) 931-4646

WANTED: Heathkit AT-1 meter. Steve Sauer,WA9ASZ, 1274 Londonerry Lane, Greenwood, IN 46142. (317) 882-4598

WANTED: SB-10 adaptor; TU-5 with case; U-7/U plug; manuals for TBW and BC-348 K series,Viking II and VFO-122. **FOR SALE:** 211 tubes - $15 a pair or trade for 813s, 811s or 811As; BC-939 tuner - $100; ME-165, new - $125. Surplus Steve, KD2NX, (718) 265-2390

WANTED: Pilot Wasp or Super Wasp radio, with or without coils, any condition; also Ranger 1 crystal knob cover. Stuart T. Carter II, W4NHC, POB 033177, Indialantic, FL 32903-0177. (407) 727-3015

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

FOR SALE: Receiving tubes, power tubes, crt's older models plus later numbers UL and CSE recognized. Donna O'Connor, 824 Main St., Belleville, NJ 07109. (201) 751-2591

FOR SALE: Ham building parts or 1940's: coils, tubes, relays, pots, switches, condensors, transformers, sockets, chassis, and cabinets. Everything! F. Yonker, 7 Old Farms Rd., Saddle River, NJ 07458

WANTED: Espionage equipment. Historian purchases spy radios, code and cipher machines and any equipment, devises or manuals pertaining to the world's intelligence organizations. Keith Melton, Box 5755, Bossier City, LA 71171 (318) 747-9616

WANTED: Million Radio and Television Laboratories products; test equipment and sound systems manufactured in 1930's. Sloan Million, 102 Ithaca, Colorado Springs, CO 80911. (719) 392-5605

WANTED: Parts and equipment to restore the SCR-299 radio truck and SCR-499 field set. Paul Thekan, N6FEC, 335 Rutherford, Redwood City, CA 94061. (415) 367-1499 after 7pm PST.

WANTED: SST-5 (WW-II small CW xmtr). Also any radio designated SST-1, SST-2 etc. Gary Cain, 1775 Grand, St. Paul, MN 55105

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