Amateur Radio

Frontiers

The first thing on your mind is probably RTTY as you start to read this, but apparently the extraordinarily poor conditions on the bands have kept things from going at their usual rate and I have had fewer reports of activities lately. There should be quite a spurt during the Christmas holidays though. Most of the low frequency activity has been among the out-of-town fellows and the urbanites have pretty much stuck to the more reliable high frequencies. Here in New York there are more stations on RTTY than ever before, but still no one else on the low frequencies. Even so, more and more stations are getting on the air and the demand has kept up for equipment.

The Karlson Ultra-Fidelity Enclosure business has been more and more demanding on my time. We gave a demonstration at the audio show in Philadelphia last month and have been busy shipping out orders to that area ever since. Trade papers say that we had the outstanding exhibit of the show. Business has been increasing 50% per month for the last four months. Be sure and read our feature article in the January issue of Radio and Television News which shows that the Karlson Enclosure in the bass range is superior to a horn 31 feet long with a 12½ foot mouth. We also have an ad in the same issue announcing the availability of our kit model for $45. Those of you that read the Saturday Review of Literature will find an article by C.G. Burke, one of the leading men in the audio field today, who has tested the Karlson for several months in comparison with every other system on the market.

Bulletin

DECEMBER 1953
JANUARY 1954
No. 30 & 31
and gives us sensational raves. In California you can see and hear this revolutionary invention at Kierulf's. We are going to ship Cap Kierulf a six unit Karlson display demonstrator in the next few days to go with the six units we already sent out a few weeks ago.

Though I haven't heard from them in a long long time it seems that the Southern California TT Society is finding out what a problem it is to keep a bulletin coming out every month regularly. They had a fine idea in the September issue for a Sweepstakes Contest for RTTY stations. The contest period was set for October 1st and November 1st.....but I received my copy of their bulletin about the whole thing on November second! Drat! I don't know what the results of the contest were because no one in New York has yet gotten their October or November or December copies.

As forewarned in the last Bulletin, the first installment of the Roster of Amateurs interested in teleprinter operation starts in the issue. The center page is removable and is separately numbered so that eventually you will have a full list of everyone that has shown an interest in RTTY. Each issue of the Bulletin will carry another page of this list until all the names are in print. If you know of any names that are missing from the list please send them in for listing in the addenda.

W4SQP/Korea, Capt. A. J. Sabel, "I have been assigned as Radio Officer, Eighth Army. Its primarily staff work, but I control the operations of RTT-CW and phone nets (mostly tactical) in Eighth Army, plus the allocation of frequencies in the Eighth Army area.

Just recently MARS has been authorized over here (I'm also MARS Director Eighth Army) but so far no amateur operation although I understand there are negotiations being made with the Korean Ministry of Communications so that some amateur operation will be allowed.

I am setting up an AN/GRC-26 as part of the MARS station here, and have requested TOKYO to allow 1.11 FL emission on some MARS nets.

Best 73's to all the "typers".

Radio Technician Held for Robbery

WORCESTER, Sept. 22—Frederick W. Muckenhoupt, 23, of Stamford, Ct., a radio technician, yesterday was held in $5000 on charges growing out of the theft of a telegraph machine and radio equipment at Radio Station WCTR in Paxton on Dec. 24, 1951.

Muckenhoupt, a former employee of the station according to the State Police, pleaded not guilty to charges of breaking and entering in the nighttime and larceny when arraigned before Judge Frank L. Riley.

RTTY activity in the New England area has taken a slight setback. It is suggested that considerable care be exercised in the "borrowing" of TT printers since ineptness in this critical phase of setting up your station can be deeply embarrassing.

W9NRC and W9BG have set up their machines on 146.91 mc PM. They are planning on shifting to 147.96 AM later on. Both also have transmitters all set to go on F.S.K.
While it is possible to use the transmitting distributor of the Model 12 Keyboard as a tape distributor after making certain modifications it is highly unrecommended. The shortage of Keyboards being what it is and the modifications being as delicate as they are there is an excellent chance that the Keyboard might be ruined and you would be off the air until you built a keyboard out of an old typewriter. There is no shortage of distributors. WLBGW has a good system for using the Keyboard for a distributor without the danger of damage.

WLBGW, Jack Berman, Boston, sends this in:
After obtaining an old UW 7-B tape head the old problem of a distributor once again arose. With limited facilities the source of 368 RPM from a model 12 keyboard looked good. The article by W6NWM in the March 1953 issue of RTTY seemed like a good deal. After dismantling the TD contacts found that it was no easy matter to separate them due to large holes drilled at the base. This would leave some contacts without enough metal at base to fasten back in mounting. About this time found the threaded hole in the back end of the 12 TD shaft. This hole took a 4-40 screw (not sure of this size). By mounting a disc with segments over the hole and making a shaft extension to work the brush arm we were in business. These discs were well described in ARTS bulletins No. 9 and 14. To work the tape advance magnet another segment was needed. This was added outside the stop pulse segment as shown in fig. 1. The rotating brush arm uses an additional brush to make contact. See circuit. Listen in on 3620 kc any night and hear it.

W6JIE, Dale Hammersly, "Good copy of W6AEE near anchorage Alaska 40 meters. Heard W1AW with good signals but was re-working my converter at the time and couldn't try out the printer. Haven't heard W9TCJ since that copy in the Gulf of Mexico - have made good copy on the W6'S tho and got a W6 but couldn't identify due to time difference up here, 40 meter signs don't come thru well enough while its still daylight here to make copy. Got the Polar relay noise whipped with a 2 MFD and a 30 resistor but still have noise feeding back thru power lines from printer motor. Sure glad we don't have any television receivers on board. Hi."

JANUARY
W5IJC, Baity Bartel, Dallas,"Please lend an ear for answer to question on last line, page 1 of Bulletin No. 27 concerning availability of toroid cores. I have been writing different manufacturers and making a few phone calls and have a few facts which will, I'm sure, be of general interest. The Toroid Design Charts mentioned in Bulletin No. 27 are on Pages 193, 194 and 196 of August issue of Electronics. Various kinds of cores in these sizes are listed in an advertisement of the Arnold Engineering Company on page 186 of the June 1953 Electronics' Guide. This last reference makes a handy cross reference because the first three digits of the Arnold Engineering Co. toroids are the same as the last three digits of corresponding Western Electric toroids. The last three digits of the AEGO part number is the nominal inductance in MH/1000 turns. I have a complete list of all sizes of Western Electric cores available through Graybar and their prices if anyone wants them. The Graybar people don't seem to have the dope on size permeability, etc. only number so you almost have to have a cross-reference to see what you want. AEGO has a free bulletin No. FC-104 dated August 15, 1953 which lists all the cores they make and tells how they are made. It has 14 pages of story, curves, graphs and tables - most useful dope I have found to date. Write Arnold Engineering Co., P.O. Box G, Marengo, Illinois, for free copy. A couple of excellent articles have appeared on winding toroids in the range of 20 KC. See 1. QST June 1949 page 29-35, "A Filter Design for the SSB Transmitter" by Fred M. Berry W2XNN of 1200 E. 49th Terrace, Kansas City, Missouri. Phone Jackson 8867. 2. QST Nov. 1951 pp29-31 102,104 "One DB per Cycle" by John Kaye W6YR - Dorothy Kaye W6YIR. Other references: The General Radio Experimenter - July 1949 A New Decade Inductor (using toroids) The Lenkurt Electric Sales Co., Inc. make powdered iron cores but not molybdenum permalloy types. Prices run along same lines as listed in table for same size, minumum order $5. Bulletins available free TC-P4-352 and Form 1C-PB. The dope is a little hard to sift through. Recommend we stick to molybdenum permalloy cores since Graybar has offices in more cities. I wrote ARRL a letter on July 31 asking help on toroid design. (Design curves in Electronics came out about two days later). They answered on August 7 and August 18 referred me to the June 1949 QST and said quote your suggestion of an article in QST on this subject sounds like a good one. We'll have to see if we can dig up the necessary information unquote.

I called Fred Berry on the phone Sunday August 23 and talked to him about his article. He gave a few pointers on winding toroid coils and he also sells the cores at slightly higher prices than shown in the table so as to cover his handling charges. He recommended that two wires be threaded through the toroid on a spindle or stick each time so that the job would only take half as long. Also putting the toroid on the wire to start with and sliding it down to the middle and winding from the two ends - gives less bulk and wire to fool with. You must be careful though, after winding all the wire from one end that the remaining wire is wound in the same direction! He said he had a simpler filter than in the June 49 QST that he was working on for SSB. I fed the signal from the phone jack on my HQ-129-X receiver into the grid of

Cont'd on page 9
W4ZC/2 FSK-MAB CONVERTER

W4ZC/2, Stu Davis, Newark," Here's the dope on the MAB/FSK converter using the pulse system. Other types of gear will perform as well FSK-WISE, but I've never had one that seemed to deliver equal performance on MAB signals.

Possibly the troubles you mention other folks have with the pulse type converter stem from not realizing that the over-all gain from input to output is very high, and that adequate precautions must be taken in layout and decoupling to insure stable operation. This is perhaps more important in pulse work than in the more conventional forms of gear. As you know, I had a converter designed around the 6BN6 gated beam tube which I considered superior to anything used here - especially on MAB signals, so when I say that this arrangement beats 'em all, you'll understand my enthusiasm.

The diagram is largely self-explanatory. The input stage is arranged for bridging or high impedance connection to the receiver. If the unit is to be fed by a low 'Z' line or output transformer, it will probably prove better to arrange the input as suggested in the dotted line enclosed sketch. The only really critical components in the system are the inductor L101 and its associated tuning capacitor. This inductor must be of high-Q. The actual inductance value can lie anywhere between 1/4 and 1 Henry. Assuming that one is going to pick a mark frequency between 2000 and 3000 cps. Naturally, the value of tuning capacitor will depend upon the selection of L. It is recommended that this capacitor be made variable as indicated so that the center frequency can be easily adjusted. This is best done by use of a scope, but it is not absolutely essential. Procedure is to first, tune in a good steady FSK signal and with the scope connected as shown, adjust the capacitor for equal pulse heights on mark and space signals. Do not make the common mistake of adjusting for maximum pulse amplitude.

Now for the heart of the MAB device. This is the spacing bias generator indicated on the diagram. Fortunately, there are no critical components involved. It is only necessary to adjust the generator frequency to lie within the pass band of the inductor L101, on the nominal spacing signal side. -- and to have complete control over the signal injection. Both of these adjustments are easy to make. No coupling other than that existing from stray capacitances has been found necessary. The 100K Pot provides complete control over the signal. Tuning-in 'MAB' signals simply involves setting the receiver to the mark frequency and turning up the bias control until perfect copy is had. This is not critical except for very weak signals really down in the mud. You will be amazed and pleased how weak and hashed-up a signal can be and still provide perfect morse or printer copy with this simple addition. The reason is simple - - we are taking advantage of the "capture" effect of FM, and it is only necessary for the mark signal TKO be equal or a trifle stronger than the bias signal for it to "take over" 100 percent. This is not the only usefulness of this device on FSK signals which are fading rapidly, by careful adjustment of the bias generator good copy can frequently be obtained from signals that otherwise were hopeless. In this case, one should try tuning to both the mark and space signal to pick the better of the two.
55  FSK-MAB CONVERTER
DAVIS.....W4ZC/2
W4ZC/2 Continued.....

It is often possible to narrow the receiver pass band width to only a few hundred cycles and go merrily on your way when with conventional FSK systems the wide band requirements makes successful work through QRM impossible. The system is practically immune to automobile QRN and neon sign noise.

Two of the bugaboos I am faced with here in Newark.

Balance of the circuit requires no particular comment.

Voltage ratios should be approximated when duplicating this converter using the parts shown.

Will be glad to answer any questions and help anyone who requests it."

W2VDM, Harry Green, White Plains, N.Y., backed up his claims to ill health by keeling over with a first-class heart attack a couple months ago. His doctor promptly retired him permanently from the business world, almost. Harry puzzled over this problem for a few weeks and decided that he would see what he could do at home. The upshot of the extended brainwork was his ordering a toroid coil winders so that he could turn out toroid coils for RTTY converters and such.

He can wind any toroid from 3/4" to 3" in diameter and has a complete collection of cores on hand for any job. At long last we have a source of filters that will deliver while we are still young. In addition to filters Harry is set up to do all sorts of metal work and panel engraving. He will build any type of converter you want for a reasonable price.

The W6AEE converter with toroid filters is available on a 5½ inch panel (engraved) complete with power supply for $100. Add $20 for a tuning indicator circuit (less cathode-ray tube). The price is a bit higher with a.f.c. built in. A super-convertor of the AN/FOC-1 style, complete with every improvement known to man, is available for $400. A two frequency oscillator (self-powered) for the FT tones is $25. A toroid coil will be wound to any specs for $4. A set of two filters for converters $16 ready for you to tune with your own external condenser or $22 all tuned up right on the RTTY tones. Bandpass filters with five toroids are $30 and you can have any passband you want (normally 1700-3500 cycles).

Harry will engrave panels for you, make dials, build or engrave any special units, etc. Write him for further information and special prices. SSB filters coming up soon too.

Write Harry Green, 292 Old Kensico Road, White Plains, N.Y.

W4VRI, Bob Vardeman, Gainesville, Ga., is looking for a printer with or without a keyboard, something that he can at least monitor with to start.

W4LSU, Wm Crosby, Charlotte, N.C., has a complete model 12 machine in A-1 condition which he will sell for $200 or will trade for camera equipment. Customer must pick up as Bill has little interest in trying to crate it.

W4GXL, Bill Alexander, Jacksonville, Fla., has some Model 26 printers for sale, a 100W bandswitching phone rig in a table top cabinet for $100, a 6-9.1 mc Command Receiver (unconvert- ed) in good condition for $10, a 200-500 kc Command Receiver without tubes for $10, and a 3-6 mc Command Receiver with a power supply for $15.
the V2 thru a .01 MFD mica condenser. The tuned circuit in the plate of V4 consisted of a Western Electric E1C4 toroid with approximate capacity to tune 2550 cycles. With everything connected up and working into the Model 26 -- it wouldn't work. I decided to see just what was happening and put an audio oscillator on the input and checked the overall operation around the flip-over frequency of 2550 cycles. I used an old relay in place of the printer magnet in the Model 26 so I could see what was happening. The flip-flop circuit worked OK at 2550 cycles, but the relay would chatter when the audio oscillator was tuned to any sub-multiple of 2550 cycles (i.e. 1775, 687.5, 443.75, 221.875 and 110.9375 cycles). The amount of chatter and the severity at the different frequencies was different for different levels of tone fed in. For instance 443 would chatter the relay in the output with the gain on the audio oscillator near minimum and at some other frequency it would take considerably more input. No rhyme or reason. I next tried a band pass section from a Western Electric EB channel unit (which I borrowed) but I still couldn't make the thing print. It did cut off all frequencies below 2000 cycles but the impedances in and out were not matched so good. It seems that the clipping and limiting action of V2 and V3 plus the high Q of the Western Electric E1C4 toroid made the overall circuit susceptible to the sub-harmonic frequencies. The gadget was finally made to work by shunting the E1C4 toroid with a 75,000 ohm resistor. On Sept. 10, I got it working - I should say we - W5RJG, and W5HZP brought a 19C oscillator and oscilloscope over and we ended up using only the 19C oscillator. By pooling brainpower we finally got the 152 panel working and as proof we copied VDL, the copy being forwarded with my last letter. The input from the panel was connected direct into the phone jack on the HQ-129-X without the band-pass filter in the circuit. I had originally intended to juggle the voltage divider resistors in the screens of V7 and V10 until I came up with 60 ma into the selector magnet on the Model 26. I did this but have since substituted 6V6, 6L6, and 6W6 for these tubes on try-outs of various kinds and changed the output current. From a practical standpoint I'm sure the 50,000 ohm pot is the best and will be adding one soon as I can adjust to 60 ma with whatever tubes I happen to have on hand. I used Western Electric 400A varistors in place of the IN54 diodes. They work swell. Some of the phone company boys may be able "procure" them. If tossed around in the junk box the markings come off. I tried the one in the voltage divider circuit of V4 output reversed in the circuit to see what would happen. If I remember correctly, the relay in the output chattered continuously, regardless of the input frequency. Of course, the 400A used for bias from the filament can be checked for polarity very quickly with a voltmeter. I used all octal tubes, 6SN7 and 6SL7 and 6X5's. I used a 6X5 in place of the IRC special selenium rectifier. Ended up with about 410 volts bias measuring across the 1.0 MF filter condenser in this circuit. The whole shebang including power supply is built on a 3" high aluminum chassis about 9"x12". One of the fellows in my office was asking about a 6AL7 tube the other day. This looks like a natural for tuning teletype signals as you can see both mark and space at same
time. I'm going to try one and obtain voltage by tapping down on the 155,000 ohm grid resistors of the flip-flop tube V6. I had been thinking about using a couple of surplus 1629 tubes, but having both signals in one small space such as screen of 6AL7 sounds like a better idea. Incidentally, I had the WZBFZ converter that I have built up for two years all lined up and receiving on the same night we tried out the new converter. The Northern Radio panel seems to do the better job and is not so critical of the received signal as far as having exactly 850 cycle shift. (Maybe this should be expected.) In looking back over all the issues of the Bulletin, I have come to the sad conclusion that not one soul has thought enough about his outboard IF amplifier and BFO with calibrated bandspread. I know John uses one and probably many others, but it has been completely slighted in both description and diagram. I, for one, would like to see more information on the above. Tuning in the stations seems to be the biggest bugaboo and the building of converters is not the problem. (I now have two converters which will both print if I sit over them and keep tuning the receiver. The 152 is better in this respect as mentioned previously.)

W6EMT, Roy Gregson, "While I am in the Navy and working with RTTY quite a bit (my rating is Radioman) I may be able to give some information that puzzles you. The gear that we work is a newer type, although not the latest. The gear we have is considered old, and many ships are making way for the newer Model 28. We have the Model 15 and the 19. There isn't much difference except that the Model 19 is mounted on a table and has a tape cutter and keying head. Our converters are Navy type FRA and URA, the URA being the latest type. They both seem to work equally well, except that the URA is easier to tune."

W1DKR, Bill Grella, Greene, R.I., "Been sick for a while so haven't been too active. I'm now in the process of rewiring my #12 printer as all the wire in it was brittle and oil-soaked. Hi."

W6JIE, Dale Hammersly, Norwalk, Cal., "I need an instruction maintenance manual for the Model 26 printer. Also, how do I go about changing the fractions over to punctuations?" (I believe that the new type pallets are available from the Teletype Corporation for a moderate fee and that they can be installed without too much strain. .......wayne)

W9THE, Bill Mitchell, Kleinschmidt Labs, Deerfield, Ill., has a complete setup right at the plant which is operated during the day anytime from 8:30 AM until 5 PM. What an arrangement! Wonder if they need any more employees?

FLASH....SEATTLE NOW ON RTTY. Twenty Model 26 machines getting ready to operate. A local group, fashioned after the VHF Teletype Society, has been formed. They need converters and polar relays to help them get going. .......(suggest you gentlemen get in touch with WZVDM or W40YG about converters since they are both interested in building them for you. The polar relays I can round up for you nearby I am sure...wayne)
WØPRL/F, Floyd E. Lent, France, "I am writing in regards to your article in CQ, December 1952. I am trying to get on the air with teletype in France and I am having quite a time. I am following the set up as described by you and Merrill Swan, W6AEE. I cannot find a BC-733D or R89/ARN5, to get the filters out of. I wondered if you could either help me or lead me to someone who could get these parts for me and then I could send them the money for just the parts that I need. I don't care to have those receivers sent over here complete subject to the French importation taxes. I would like to have those two filters sent and the transformers from the BC-456B and also the switch for the AFSK oscillator and the 8000 ohm sigma relay.

With these components I could very easily complete the rest of the circuits. My license from the French is still pending but I have written the VHF teletype and requested the information as to the shipment of the machine. I would like very much to try to get on the air this winter if the 11 meter band opens up good over here. I believe that I could get quite a few contacts with teletype. Nobody goes in for much of that over here as the parts and everything is so hard to get. I have an HRO Rx and a Johnson Viking I transmitter to hook up with if I can get these other parts to build the teletype conversion rig I can go on the air in about three months probably."

W7MLV, Gerald Mott, Tacoma, Wash., has completed a W2PAT converter and will soon have his 709D/1 finished. All he lacks now is a keyboard, and that should be coming along pretty soon.

ZL2RF, B.E. Graham Goodger, Wellington, N.Z., "I am dropping you a line to let you know that your column in CQ is appreciated in this neck of the woods altho at present any activity is not possible due to lack of printer equipment. I have dropped W2BFD a line to see if there is any available outside the $ area as the mighty $ is not easy to come by here in this day and age.

You have made reference to filter design in Nov. '46 CQ several times. Unfortunately, I have not got that issue nor have I been able to get hold of one. I have the facilities for winding the necessary chokes providing they are not toroids because these are not available here. Can you let me have the information? There are several of us here interested and would be on the air if the equipment was available.

I am with the Civil Aviation organization as a Radio Technician and recently was out on one of our stations when I had the opportunity of chattering over the landline TT and altho I felt as tho I was sending with my feet for a start I enjoyed the experience except for the fact that it made me chew my nails because I couldn't put it on the Hambands!!! Unfortunately, altho I work in an organization which has plenty of TT gear both landline and radio it is not possible to get any of it for Hamming! It makes us drool out here to see photos of some setups you guys have and to read of the facilities available to you there.

Well OM that is all I have to say for myself for now so I'll say cheerio and keep up the good work in CQ."

JANUARY
Amateur Radio Teletype Society

Wayne Green, W2NSD
1379 East 15th Street
Brooklyn 30, N.Y.

POSTMASTER: If address is removed and new address is known, notify sender on FORM 3547, postage for which is guaranteed.

The plans for ending publication of the Bulletin with the 36th issue still hold. Several offers have been received for continuing the publication and it seems likely that it will be published under someone else's motive power. I have several sets of back issues still available so that you can have a complete file of RTTY circuits and information for future use. In stock are #1-12-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29. These are available for 20¢ each or six at a time, looseleaf bound, for $1.00, complete with the binding. Please state which issues you want and if you want them bound or not.

Those of you that are interested in high-fidelity will be glad to hear that I have my finger in another project, an Audiophile Bulletin. This will be a monthly publication and will carry consumer information about high-fidelity equipment and records as well as swap ads. This will be the only publication in the field that does not carry advertisements and thus can give both the pro's and con's about equipment. This bulletin will be invaluable to anyone who is going to buy any audio equipment or records for they will be able to find out all about their equipment before buying it. The subscription is only $2.00 a year. The format will be similar to this Bulletin and will be offset printed. The first issue will be January 1954, so send your $2.00 right away and be sure not to miss it. Send it to the Audiophile Bulletin, 1379 E 15th St. Brooklyn 30, N.Y.

W6JXY, Jake Mirigian, Fresno, has a model 15 keyboard and wants a typing unit to go with it.

W2FHA, Bill Scolnik, Albany, has several 3C22 thyatron rectifiers available for $10 each, which sum he wishes to invest in TT gear.
Amateur Radio
Teletype Society

ROSTER OF RADIO AMATEURS WHO HAVE SHOWN AN INTEREST IN TELEPRINTER OPERATIONS.

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WLKAA     Joe Colletti     Thompsonville     Conn.
WLKBQ     Richard Arnold     Haverhill     Mass.
WLKJB     Armand Gamache     Springfield     Mass.
WLKNW     Elbert Powell     Arlington     Mass.
WLMFY     Fred Hollowell     West Acton     Mass.
WLMPO     Adwin Ruszczek     Wallingford     Conn.
WLNBPI     Charles Archibald     Niantic     Conn.
WLQFM     Bob Weaver     Lexington     Mass.
WLQSI     Richard Harvey     Braintree     Mass.
WLQTH     Bob Dougherty     Cambridge     Mass.
WLQUG     Gordon Stanys     Stamford     Conn.
WLQGZ     Roger Perry     South Portland     Maine
WLPIL     Wilfred Pilon     Worcester     Mass.
WLPSI     Justin Winer     Brookline     Mass.
WLQYOS     Bob Fairbrother     Greenfield     Mass.
WLQHC     Mort Bardfield     Dorchester     Mass.
WLQII     Joe Chirnitch     New Haven     Conn.
WLQQJ     Marc Finkel     Chelsea     Mass.
WLQBF     Ken Payne     Plainville     Conn.
WLRIA     Don Babyok     Holyoke     Mass.
WLRSIM     Port Hale R. C.     New Haven     Conn.
WLRSNN     Stirling Olberg     Allston     Mass.
WLSSU     Elwin Rybak     Morrisville     Vt.
WLSSUR     John Koukel     Mansfield     Mass.
WLSSWQ     Pthr Harrington     Newton     Mass.
WLTEQ     Irving Finley     Bridgeport     Conn.
WLTIMI     Art Swenson     Riverside     Conn.
WLTWP     Tom Dale     Portsmouth     N.H.
WLUGA     J. Gilbert Damon     Cambridge     Mass.
WLUHFE     Norman Patenude     N. Tiverton     R.I.
WLVXV     Robert Boyd     Sebago Lake     Maine
WLWB     John Blackburn     Belmont     Mass.
WLWII     Arthur Beebe     New London     Conn.
WLFYM     C. Gregory     Greenwich     Conn.
WLYGJ     Rane Curl     Brookline     Mass.
W2AILJ/1     Mark Moynahan     Cambridge     Mass.
W2VSM/1     Lt. G. Ephrom     Portsmouth     R.I.
W9ADE/1     John Doremus     West Hartford     Conn.

W2AKE     Andy Stavros     S. Ozone Park     LINY
W2ANB     John Longly     Slingerlands     N.Y.
K2AQE     Bill Gane     Brooklyn     N.Y.
<table>
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<th>Callsign</th>
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<td>Leon Held</td>
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W2KZM  John Puk       Brooklyn          N.Y.
W2LRW  Marcel Reeds  Schenectady    N.Y.
W2MIB  Harry Evans   Brooklyn        N.Y.
W2MKO  Charles Opitz Westfield      N.Y.
W2MYL  Graham Claytor New York       N.Y.
W2NIV  Lambert LeMaire Schenectady    N.Y.
W2NSD  Wayne S. Green Land of Oz    N.J.
W2NUL  LeRoy Nordblom  Patterson     N.J.
W2OCL  Ed Ricca      Brooklyn        N.Y.
W2OGU  Ken Cortright Sewaren        N.J.
W2OOG  Cecil Bastian Freehold       N.J.
W2PAT  Marvin Bernstein Eatontown    N.J.
W2PAU  Edwin Brown   Collingswood    N.J.
W2PCD  Ren McMann    New York        N.Y.
W2PCO  Ralph Barrett  Wantaugh       LINY
W2PCQ  Harold Miles  Middletown      N.Y.
W2PPV  Vic Samardza  Bronx           N.Y.
W2PXR  Walt Knoop    Essex Falls     N.J.
W2QCF  Fran Sherwood Fairport        N.Y.
W2QGH  Bill Knott    Larchmont       N.Y.
W2QND  Dave Henderson Red Bank       N.J.
W2QUF  Joe Moulton    West Orange    LINY
W2RHN  Louis Letendre Flushing        LINY
W2RWV  Leonard Rawles Mickleton       N.J.
W2SAH  David Wexler   Islip Terrace   LINY
W2SDE  O.D. Glenn    Lockport        N.Y.
W2SHE  Sam Semel      Forest Hills    N.Y.
W2SKK  Gene Locke     Glen Cove       LINY
W2SLL  Ted Arken     Washingtonville N.Y.
W2TKO  Roy Weise      Buffalo         N.Y.
W2TLX  Pete Selmer   New York        N.Y.
W2UFU  Russ Spera    Long Island City N.Y.
W2UGZ  Walter Bieder Brooklyn        N.Y.
W2UTH  Henry Blodgett Rochester      N.Y.
W2UMM  Sy Blatt      New York        N.Y.
W2VDM  Harry Green   White Plains    N.Y.
W2VE  James Meade    Far Rockaway    N.Y.
W2VL  Maurice Gutman Oceanside       LINY
W2WCE  Tom Fallon    New York        N.Y.
W2WIA  Ed Kuligowsky Brooklyn        N.Y.
W2YKG  Bill Tyrrel    Brooklyn       N.Y.
W2YMB  Bill Garrecht  Horseheads     N.Y.
W2YP  L.G. Cumming   New York        N.Y.
W2YZL  Thorolf Hjorth Summit         N.J.
W2ZEW  Ron Schwendt  Trenton         N.J.
W2ZGU  John Campbell Mountainside   N.J.
W2JKV  Felix Esteban Elmhurst        LINY