

Once again G4BXD offers us a rare glimpse of history. Some of the equipment, although 60 years old, is quite innovative and remarkable for its time. Ben also maintains and is curator of the *Military Wireless In The Midlands Museum*.

Radios of The Rising Sun

BY BEN NOCK*, G4BXD

One of the nice things about the collecting hobby is that one never knows what will arrive next. So it was that a couple of additions to the collection appeared, and being somewhat unusual, prompted this short account.

Japanese war-time sets are few and far between. I had seen several in other well-established museums and at the odd auction, but had never—until now—owned one. The day came when I took delivery of these two war-time sets (in fact, made pre-war) to add to a post-war Japanese receiver I already had.

The war sets were comprised of a mule-carried HF receiver transmitter and a man-carried short-range VHF transceiver, while the post-war set was a large tabletop-model HF receiver. The post-war receiver (mid-1950s) was delivered in very good condition, with the exception of the fact that the lid of the receiver had been pushed in during its trip from Japan to England. A couple of hefty screwdrivers and a lot of strength later the lid was pried back to its correct position, with thankfully no permanent damage having been done.

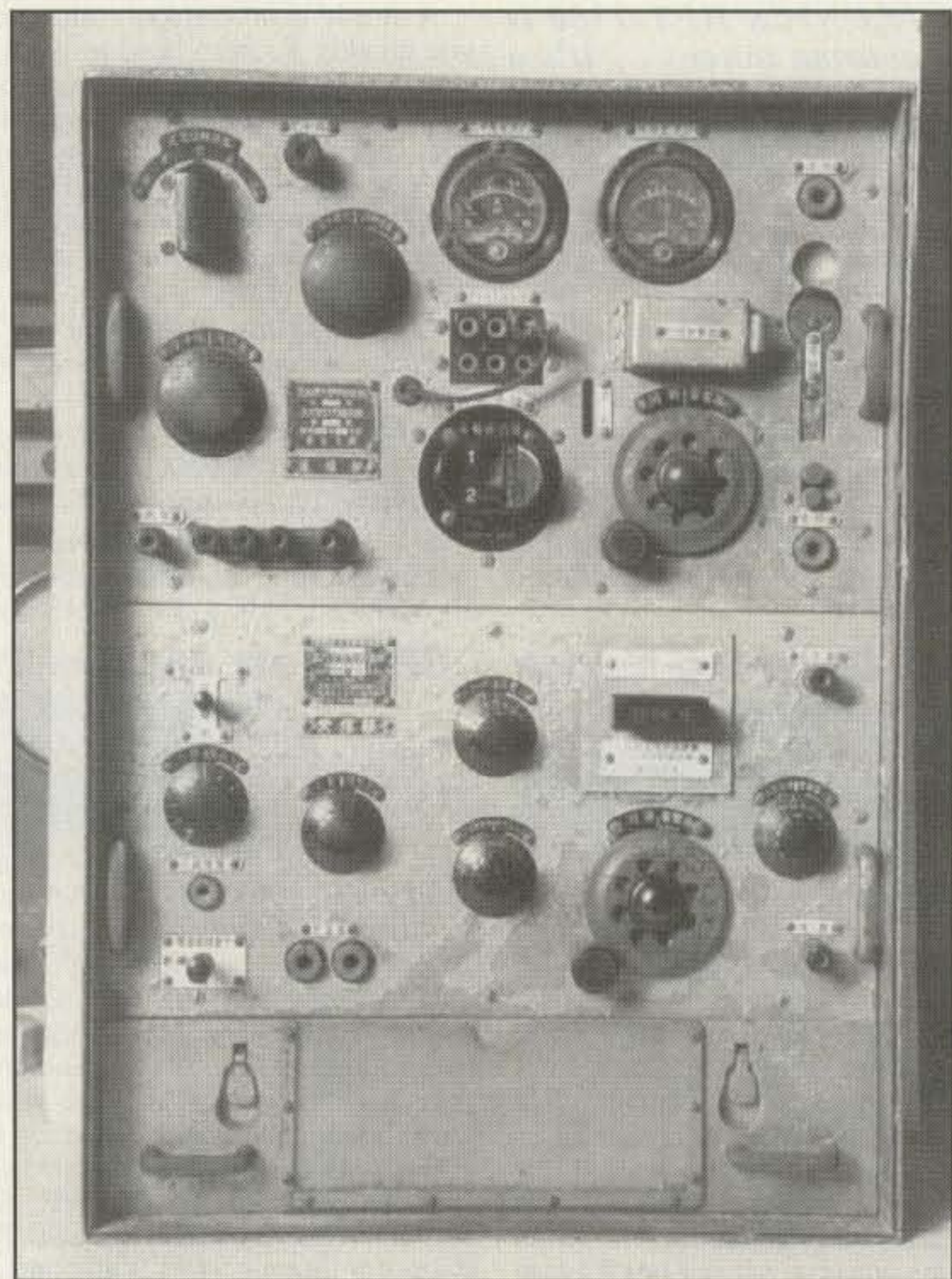
The two pre-war sets arrived in a totally different state—paint flaking off, dirty, cobwebs galore, and many years of dust. They needed a lot of cleaning to even get them into presentable shape, long before thoughts of getting them working.

The Pre-War Sets

Japanese pre-war and war-time sets apparently were far behind those of the British and American equivalents in technology and finish. Little faith in their own equipment seems to have been demonstrated, as typical spares kits, carried with the sets, even included nuts, bolts, washers, oil, and repairing insulating tape.

Some copying is evident in some of the design features of Japanese sets. British,

*62 Cobden St., Kidderminster, Worcs DY11 6RP, England



The S-P3A set as it arrived (although after an initial cleaning) had flaking paint and odd broken bits. It was a sorry little set. The transmitter is on the top, receiver in the middle, and battery tray on the bottom.

US, and even German sets obviously supplied ideas which were incorporated into Japanese war-time sets. Even some of the components were surplus stock purchased from suppliers in other countries.

The mule set, designated S-P3A, is very similar to the British Wireless sets No. 18/48/68 in some respects, in that it

has three components: a receiver, a transmitter, and a battery space. In addition to the batteries carried within the set, an external hand-cranked generator was needed to power the transmitter. Designed as a guerrilla warfare set, it was carried either by the mule, poor thing, or by a four-man team who carried the set

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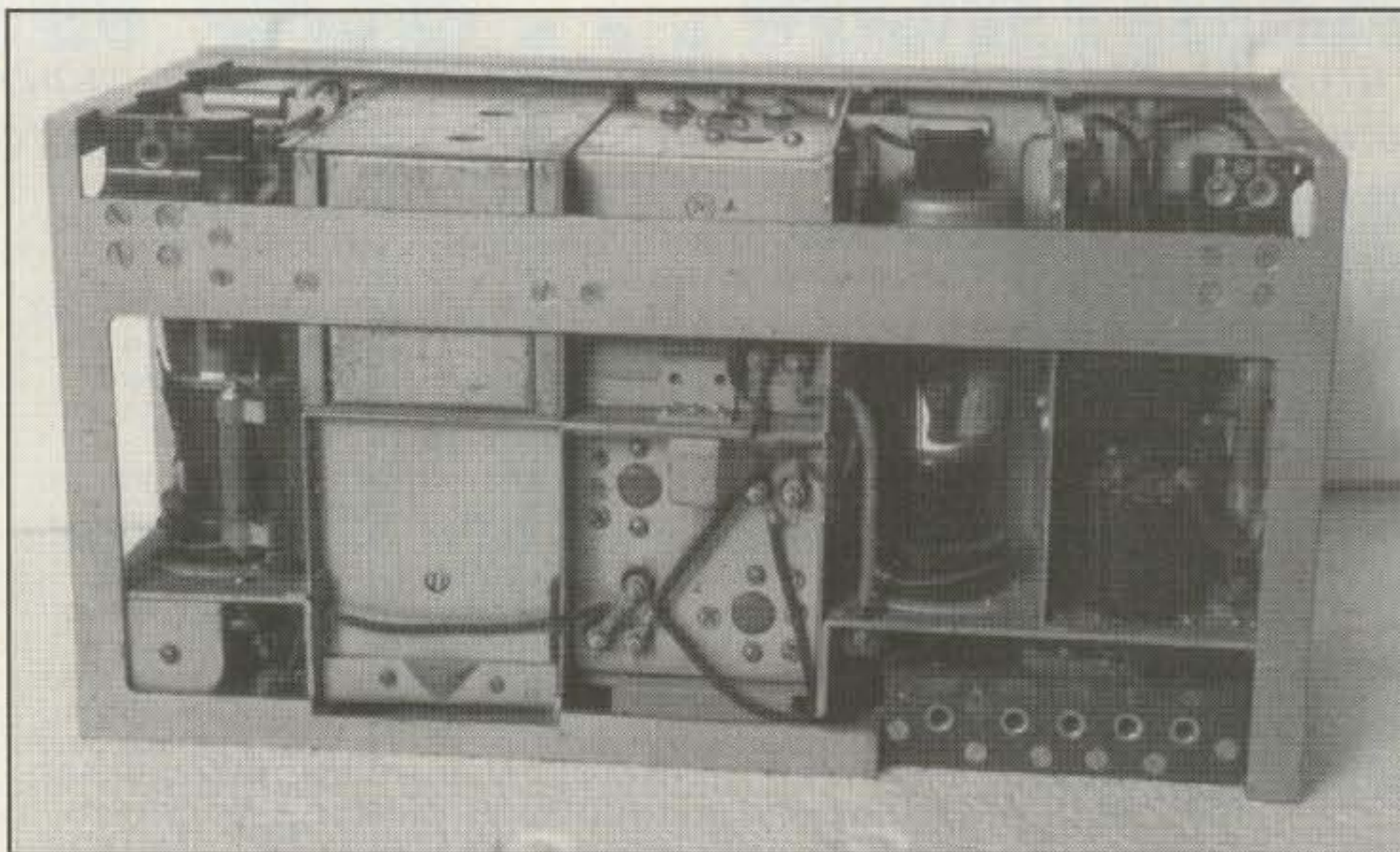
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Rear of the receiver showing the supply board. This connects with a similar plug in the case, which then connects with the battery tray.

and accessories between them on bamboo poles.

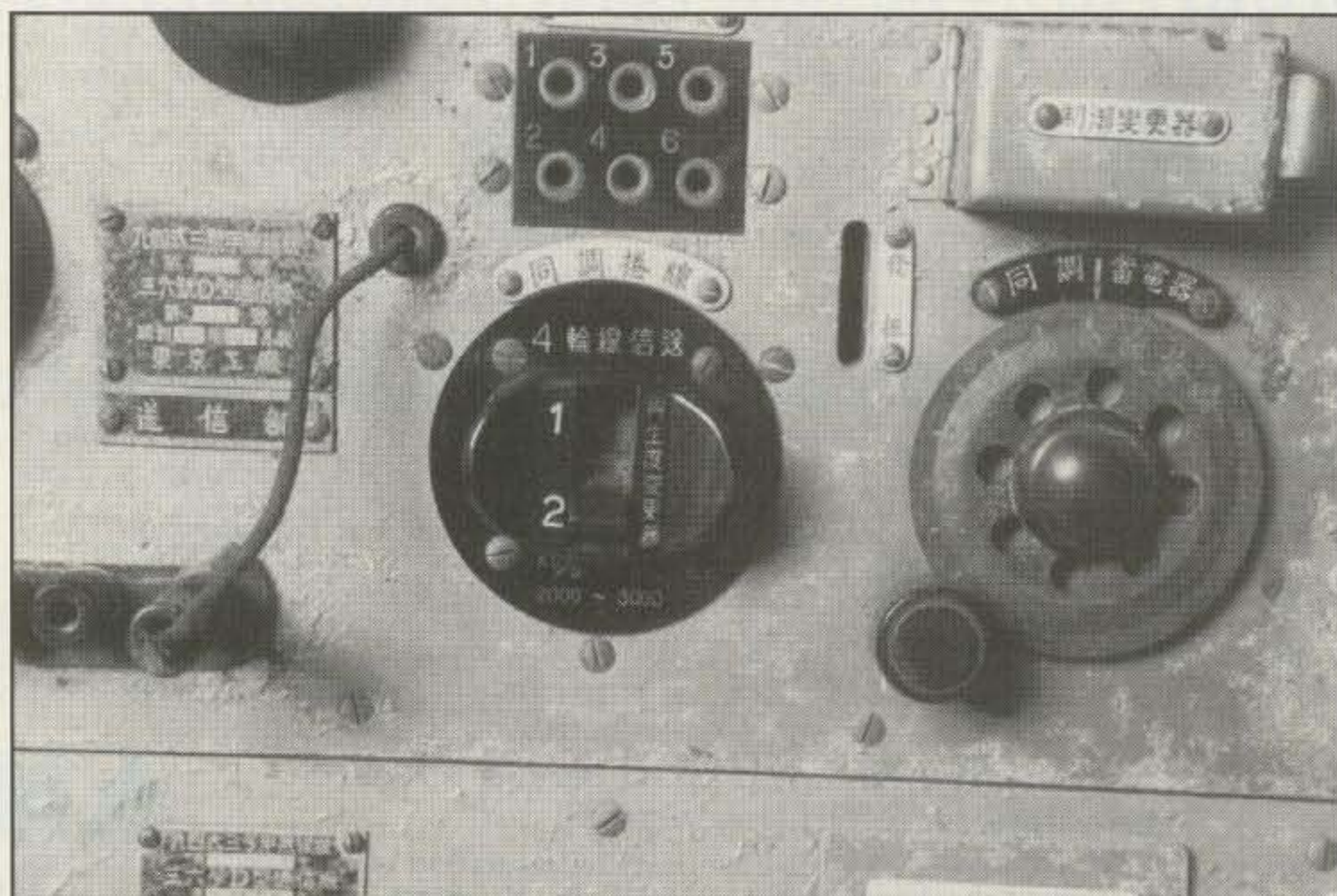
The S-P3A differs from the British WS No. 18 breed in that the transmit power is around 10 to 15 watts, CW only. The transmitter uses a single tube, while the receiver uses five tubes in a standard superhet design.

The nomenclature plates on the case and transmitter date them as May 1939, while the receiver is dated December 1938, although this set seems to have been around since at least 1932. The serial numbers for the case and transmitter match, while that of the receiver is different. Much like the No. 18 sets, when they went in for repair, a unit would have been

removed and replaced with a working example. This is why many No. 18 sets have different numbers for the case and transmitter and receiver units.

Presumably, the original case and set went in for repair during the years, and the matching receiver was removed and a working example fitted. The unit then was returned to active service, probably as quickly as possible.

Dating Japanese equipment is a little different from dating western units. There is a number on the plate, something like 13 and then another number—say, 12. This makes the date the 12th month of the 13th year of the reign of the Emperor, or the Showa. As the war-time emperor Hiro-



Close-up of the transmitter dial and coil unit. This coil is marked 2000-3000 kHz. The plug board above the coil is for antenna taps. The crystal, if fitted, goes behind the small door above the tuning dial.



The name plate on the case. The top line says "Military Secret." The date, 14:5, is clearly visible, making it the fifth month of the fourteenth year of Showa—1939.

hito was crowned in 1925, the number 13 makes the year of manufacture 1938.

Translation of the name plates on the case and set (kindly undertaken by my friend Ikuo Fujimura in Japan) revealed the set to be Wireless Set Type 94, No. 3A. There also seems to have been B, C, and possibly other variants. It was also known as Communication Set 36D (?), made in May 1939 (on the case and transmitter plates) by the Tokyo Works For Military. I would also like to acknowledge the assistance of Toshiki Matsuura in Japan in obtaining the missing power amplifier tube for the set.

The receiver plate stated the same type numbers but with the date of December 1938. A trademark is shown, along with the name Nippon Communication Industries Co. Ltd., Ohmori Branch Office, San-yo Works.

The transmitter uses a single tube (UY510B) as a self-oscillating power amplifier stage, either fully tunable or crystal controlled. Various plug-in coils allow a range of between 400 and 5700 kHz. The keying line is in the high-voltage feed; hence the chirp and drift must have been quite evident. A small pull-down Morse key is fitted to the front of the transmitter, with a jack socket allowing an external key to be used if need be.

A power output of about 10 watts or so could be expected to give—into a 90 foot long wire antenna with two 65 foot counterpoise wires—a possible range of 20 to 500 miles, depending upon frequency and time of day, of course. High voltage was 500 volts with filaments at 7 volts. The power for the transmitter was provided by a hand-cranked generator.

The receiver again has a plug-in coil unit, five in all, giving a coverage of 350 kHz to 6 MHz. It is noticeable, though, that on the plug-in coil packs there are only three holes, allowing the adjustment of

trimming capacitors. No provision seems evident to adjust the inductance, and hence obtain a good tracking of the tuned circuits.

Both tuning dials, on the receiver and transmitter, are simply marked 0–100. There is provision on the front of the battery tray for a chart to be mounted, similar to that used on the HRO receiver, where the frequency can be read off a scale to correspond with the dial marks.

The receiver uses 5 tubes in all—types UF134, UF109, UZ133, and UZ135 (two UF134's are used). The set is a single-conversion superhet with an IF of 265 kHz. It had a quoted sensitivity of 7 to 15 uV on CW and 7 to 90 uV on AM, depending upon the band, for a 20 dB signal-to-noise ratio using regeneration in the IF stages to increase gain. The lower compartment of the case houses the receiver batteries.

The construction of the set is quite different from that used in typical British equipment. The first impression was that it was similar to those methods used in German war-time sets—very compartmentalized, very straight wiring, lots of cast bits. The wiring goes north and south, east and west—i.e., it turns at right angles quite a lot rather than meandering across the set like crazy spaghetti.

Considering the climate and conditions in which these sets were expected to

work, it is interesting to note that these sets are not "tropicalized" as we know British sets to be. True, some consideration of humidity has been incorporated. The tuning capacitors have plastic (?) covers around them, all the resistors in the P3A are mounted in holders (much like fuses), and there is plenty of room between wires. However, the various coils and wound components do not have that well-loved covering of varnish found in our sets. Cotton-covered wire seems to be used quite a lot, and the capacitors resemble German types of the period in their construction. The transformers used in this set seem of very poor construction. Indeed, measurements of other units have shown a poor response.

Small Man Pack Set

Another recent acquisition is a much smaller Japanese rig, obviously a man pack, this time VHF judging by the size of the coils. It is a very interesting piece of equipment. Not having any details at all on this rig, I posed the question to an internet group that has members who also have an interest in military gear.

Bob, NA4G, a member of the group, responded with the following:

"Your little Japanese rig sounds like the man pack VHF set that used the clone of the type 19 tube. It covered about 60–70

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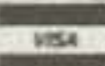


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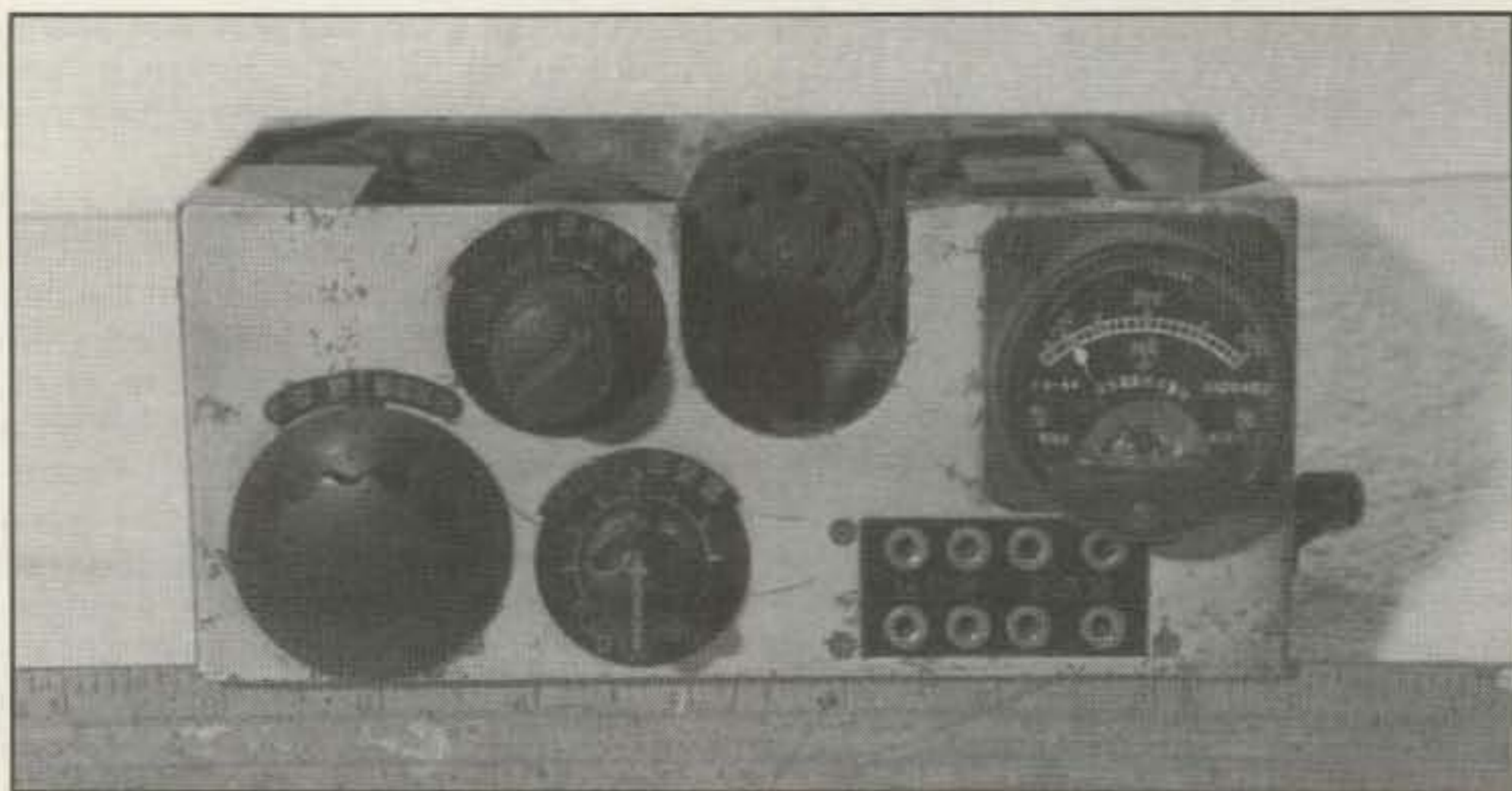


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The front of the small portable unit showing the tube base behind. The meter measures antenna current. The eight-way plug board is for headphones and microphone. The tuning knob is on the lower left.

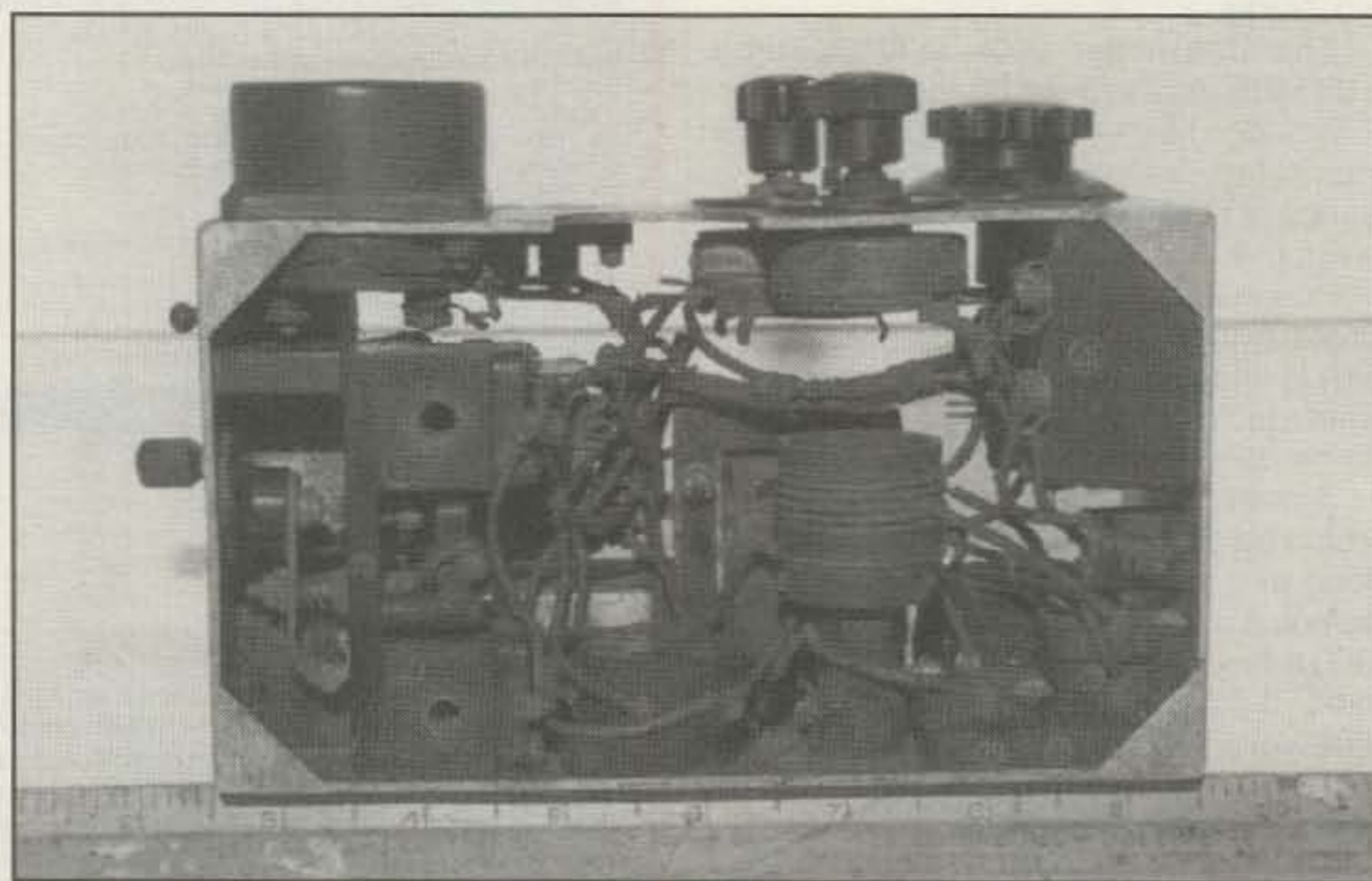
MHz or so and was a complete single-tube transceiver (after the amateur 5 meter style of the mid 1930s) in a small aluminum case about 5" x 8" x 3" with a leather cover. It is a beautifully designed little set that would make a nice play toy if you can get it up and running. The problem is that the headset and microphone connectors are usually long gone (as were mine), as is the antenna (a diamond loop thing that clipped onto the set about 3 feet square).

"The type 19 tube was used as a detector and audio in one switch position and I think a dual oscillator or oscillator and modulator in the other position. A small hand-crank generator set was used with it for power. The small Morse key button on the side of the case was what intrigued me when I ran across the one I had at a

hamfest about ten years back. A marvel of engineering in the mid-30s."

Another member, Mac, WØNAX, said, "I have one of these also and I'm sure it is a walkie-talkie. Mine came with the tube, a dual triode UZ30MC, one half of which is used as a grid-plate (?) oscillator, the other half as modulator. The meter does read up to 300 mA and is in series with the antenna, which plugs into jack #1. I have a hand-drawn schematic by whom-ever owned it before me, and I'd be happy to send you a copy for whatever it is worth if you send me your postal address." He kindly sent it to me.

Member Steve Finelli passed on the following info: "I looked through my WW II directory of Japanese equipment entitled *Japanese Radio Communication Equip-*



Inside the small set, sockets one and two are where the antenna went. The main tuning coil is visible in the bottom center of the photo. The Morse key is just visible on the lower left.



The P3A proudly on display. I fabricated a replacement chart for the battery-tray holder, guessing on its likely appearance.

ment TME 11 - 227A dated December 1944. It pictures a set similar to your description. Model 94 Mark 6 Wireless Set: Mark 23 Type H Transmitter (walkie-talkie). It uses one type UZ 30MC tube. It has a 300 mA meter in the upper right corner. Under it are the eight jacks. The tube socket is in upper center. There is a total of four knobs to its left. Frequency coverage is 24.0 to 47.0 MHz; output is 0.2 watts; size is 7³/₈H x 5³/₈W x 3³/₈D. Use was as a walkie-talkie for short-distance two-way communication: It was designed for regimental headquarters, used in lower echelons. Power requirements: 135 V @ 40 mA and 3 V @ 250 mA. Of the eight jacks, four on the left are for microphones, and four on the right are for headphones."

While most of Steve's comments are interesting, the set he mentioned has four knobs. This one only has three knobs. It is quite likely, though, that they are of the same family of sets, perhaps with a different mark or version.

Restoration

Restoration was relatively easy. Since all the dial plates were screwed to the front panel, they all came off, as did all the knobs—with the exception of one, which proved to be a real pain to free up. Eventually all the knobs, labels, meters,

and terminals came off, leaving a nice flat surface on which to work. Rubbing down and re-spraying was easy—much easier than trying to work around lettering on the front panel that you could never replace. The brass handles were polished and all the Bakelite knobs and fittings cleaned up nicely, as did the name plates for the case, transmitter, and receiver.

Reassembly was easy. All the little screws had been cleaned and replaced. The knobs and terminals went back, as did the meters. The finished unit does look very smart on a shelf in the house. Even though I had the missing power amplifier tube replaced by my friend in Japan, I do not think I will fire up the set. Even if it works, the performance of the receiver and transmitter will be far below that needed on today's crowded bands. It is better the set remains as an example of the technology and design of that far away land, in that far away time. It is a real museum piece.

Acknowledgements

I must thank Jack Jenner, G3ETJ, for giving me the opportunity to acquire such interesting sets; members of the Boat-Anchours Internet group; and Toshiki Mat-suura and Ikuo Fujimura for their help in researching these sets. ■

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