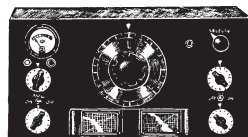


THE COMMUNICATIONS RECEIVER



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The Pilot AC Super Wasp Receiver

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Barry's biography will be found in "About Our Authors" for October, 2010.

Introduction

The Pilot Radio and Tube Corporation of Lawrence, Mass., later named the Pilot Radio Corporation, was in the radio business from 1926 when they marketed the Universal Wasp, through to 1949 when they produced the Pilot Candid TV set. However, of special interest to radio historians are the Wasp, the Super Wasp, and the AC Super Wasp. In the January column, author Barry Williams discussed the battery version Super Wasp. Here he continues the series with the AC Super Wasp.

By 1928 "socket power" was becoming available, and radio manufacturers moved to access the new radio market with sets that no longer needed batteries, but instead could simply plug into the AC mains. Robert Kruse and his partners, Robert Hertzberg and John Geloso, building upon the excellent reputation of the Super Wasp, created the AC Super Wasp, which was almost an exact look-alike. The change-over was not without its challenges, however. Author Williams tells the story in this follow-up to his article on the battery version in the last issue. —WF

AC and DC Differences

Writing an AC Super Wasp article to follow-up my previous story on the DC Super Wasp appeared, at first glance, to be to be a quick and easy job. The AC Super Wasp simply looked like the DC Super Wasp with tubes utilizing AC voltage on the filaments. However, when I first compared the schematics, I noticed that the audio stages differed. In the

AC version several capacitors had been added to bypass RF to ground.

I then read Robert Kruse's article about the year of development that was spent on making the Super Wasp work with the new tubes. In reality it must have been only about six months, as the ads for the AC Super Wasp came out only about six months after the announcement of the new 224 tube that would be critical to its development. Pilot's pioneering new receiver was the first AC-operated short wave receiver to cover the full frequency range with hum levels low enough to allow use with either headphones or a speaker.

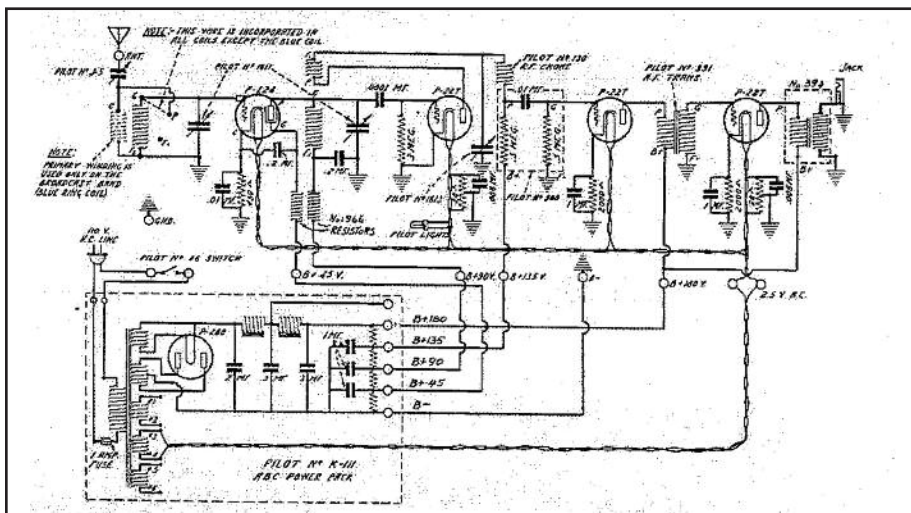
One of the first steps towards AC operation of the filament was the development of the equipotential cathode in 1919. However cost and manufacturing problems retarded its production.



Front and back views of the AC Super Wasp with lids of shield cans removed to show construction.

The DC Super Wasp required the use of an external output transformer to operate the speaker. The AC version, however, was equipped with an internal output transformer. And the output for the headphones is also taken from the transformer rather than from the first audio stage, which was popular at the time. This keeps the B+ off the headphones. My 2,000 ohm headphones worked very well from the out-

It was found that these circuits in the detector and the final audio amplifier were sources of tunable hum. The problem was addressed by adding a capacitor across one side of these resistances. One



Schematic of the AC Super Wasp and the K-111 power supply.

other set of circuit change in the AC Super Wasp was the use of a cathode resistance to provide bias for the grids. These cathode resistors were bypassed at signal frequency with fixed capacitors.

Operation of the AC Super Wasp

I spent two weeks operating the AC Super Wasp with the K-111 power supply. Initially it was quite difficult to tune in stations on the short wave bands. Eventually, using a signal generator, I tuned to signals at half a dozen points across each band, and from this I was able to build a table of settings for the RF amp and the detector that would get me close to the correct ones for the desired frequency. I could then adjust the antenna coupling to get the maximum signal strength, then go back and touch up the tuning.

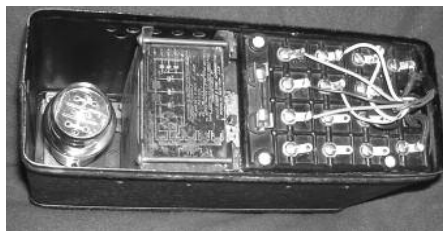
I normally use the set with the detector just past the point of oscillation. Even with the RF amplifier a strong AM signal will pull the detector enough to zero beat and allow hearing the signal very well. The pulling of the oscillator was only about one dial division with a strong signal, so I did have to tune carefully to get to zero beat. But once locked on the setting usually stayed with the signal for moderately long periods (10 minutes or more). Even with this amount of pulling one could also adjust the detector to have a beat note, but the stability was not as impressive.

The RF amplifier does help a great deal in the selectivity of the receiver. I used a Variac on the input of the K-111 power supply to adjust signal levels, as there is no volume control. A less effective method is to detune the RF amplifier on strong signals, but on weaker signals this reduces the selectivity.

The tuning rate of the Super Wasp is much too fast. The dials have a reduction of about 4 to 1, so two or three turns of the tuning knobs covers the complete frequency band for the coil in use. The 40 meter CW band covers only a couple of divisions on the 0-100 dial. I did find one article from the 1930s that mentions using a second vernier between the tuning knob and shaft. This would have required adding onto the front panel, but so far I have not seen one that has been modified in this manner.

I also found that the coils in my boxed set were not well matched. In the worst case a setting of 18 on the RF amplifier corresponded to a setting of 0 on the detector. At the other end of the scale a setting of 100 on the RF amplifier corresponded with a setting of 88 on the detector. I have several other sets of coils, and will try to come up with a better matched pair.

The coils are not well marked, so if you have a bunch of mixed coils you will have to look at



The K-111 power supply with cover removed.

the windings to determine what coil you are looking at. The RF amplifier coil on the Super Wasp has one winding, with the exception of the AM Broadcast band which has two windings. The detector coils have two windings in all cases. The Wasp coil has three windings on each coil. The Super Wasp coils have the tickler windings for the detector on the bottom of the form, while the RF amplifier coil has the smaller winding (primary) on the top of the coil.

K-111 Power Supply

The power supply recommended for the AC Super Wasp is the Pilot K-111. This unit is capable of supplying all voltages for the receiver, and is also capable of providing voltages for a type 171A power tube. However, the literature does not mention substitution of the 171A for the 227 final audio tube. It does mention that the voltages delivered by the power supply are generally somewhat higher than the terminals would indicate.

The power supply uses a transformer, type 80 rectifier tube, and a capacitor input filter with two inductances and three capacitors. The voltages are picked off a multi-tap resistor with a filter capacitor on each tap. The voltages are 220, 180, 135, 90, and 45. The filament winding provides 2.5 volts at 8 amperes, and there is also a 1.5-volt winding for type 226 tubes and a 5-volt winding for type 171A tubes.

I ran mine from a Variac set to 110 volts, at which point the filament voltages were very close to the correct values, but with the light loading the other voltages were as much as 20 percent high. Pilot added series resistors at the various supply points in order to take care of this problem.

In general, this was probably the best short wave receiver available in 1929. Today, if the tuning were slower, you would be able to tune CW or SSB signals as long as they are stronger than other nearby signals. You will also find that after a couple of weeks you can pick out one of the several CW signals coming in on top of each other when the band is busy. The selectivity allows listening to any of the stronger short wave broadcast stations, and is entirely adequate on