

Welcome to the forum!

A 140AL is a nice way to start a phone collection.

And with that you are digging in deep into the operation of telephones. As you discovered, your candlestick contains a transmitter, a receiver, and a hookswitch. Your resistance measurements show that your components appear to be in serviceable condition. The resistances of the transmitter and receiver are in line with what to expect.

However, these types of telephones also needed at least one additional component to work properly, an induction coil. The induction coil is a transformer that performs two functions. It adjusts the audio impedance of the receiver and transmitter to match the combination of the transmission line (local loop) and the impedance on the central office end, and thereby optimizes the transmission of electrical energy. It also functions as a hybrid to convert the four wires of the receiver (two wires) and the transmitter (two wires) to two wires of the local loop.

The induction coil was provided inside a wall- or deskmounted desk set box, or subscriber set (subset).

A typical subscriber set for your 140AL would be a model 634A or a 684A subset.

There are many pictures here on the forum of such subsets, and many discussions on wiring them.

A subscriber set also provided a ringer to alert you to incoming calls. The ringer circuit is rather separate from the audio part of the telephone and is optional if there is already a ringer on the line.

Your 140AL is an upgraded version of the 40AL desk stand. The addition of the "1" in front of the model number indicates that it was converted to an anti-sidetone circuit. Such a circuit eliminates most of the electrical feedback from the transmitter to the set's own receiver, so that the users hear themselves only well enough that they realize the set is actually working, but not too loudly as was the case with previous technology. The goal was to provide just enough sidetone comparable to the experience when talking to person face-to-face. It would be odd if you couldn't hear yourself when talking to someone in front of you. The anti-sidetone feature was implemented in the Bell System starting ca. 1930, while the 40AL was already used in the 10s and 20s. 140s were never manufactured newly, only upgraded during refurbishing.

Because of the electrical intricacy of an anti-sidetone (AST) telephone circuit and the electrical design of the receiver elements by the 1920s, such a circuit also needs at least one capacitor (=condenser) to block direct current from entering the receiver. Another capacitor is needed for the ringing circuit. Earlier circuits, the sidetone circuits, could work with only one capacitor, but a Western Electric AST circuit required two.

Here is an article that shows a matching 634A subscriber

set: <http://www.classicrotaryphones.com/forum/index.php?topic=12494.0>

The 634A subset shown in that thread uses a 101A induction coil which didn't find widespread distribution until ca. 1935. Between 1930 and 1935 these subsets used a No. 146 induction coil, and you will find examples of that also in the forum.

For your reference, here is the official diagram of the 140AL desk stand from a Bell System publication, BSP C63.373 Issue 2 of 1937.

The second diagram is the circuit of a 634 or 684 subscriber set. The difference between these two is really just the form factor of the package, the circuit is the same.

High-lighted in the diagram is the induction coil in the broken box, and the mounting cord to the desk stand and the line connections, tip and ring.

You also see the the two capacitors, one in the ringer circuit (left side) and one in the audio circuit. The ringing circuit is connected via terminals L1 and L2, which are physically the same as those of the audio side, but I showed them separately for illustration.

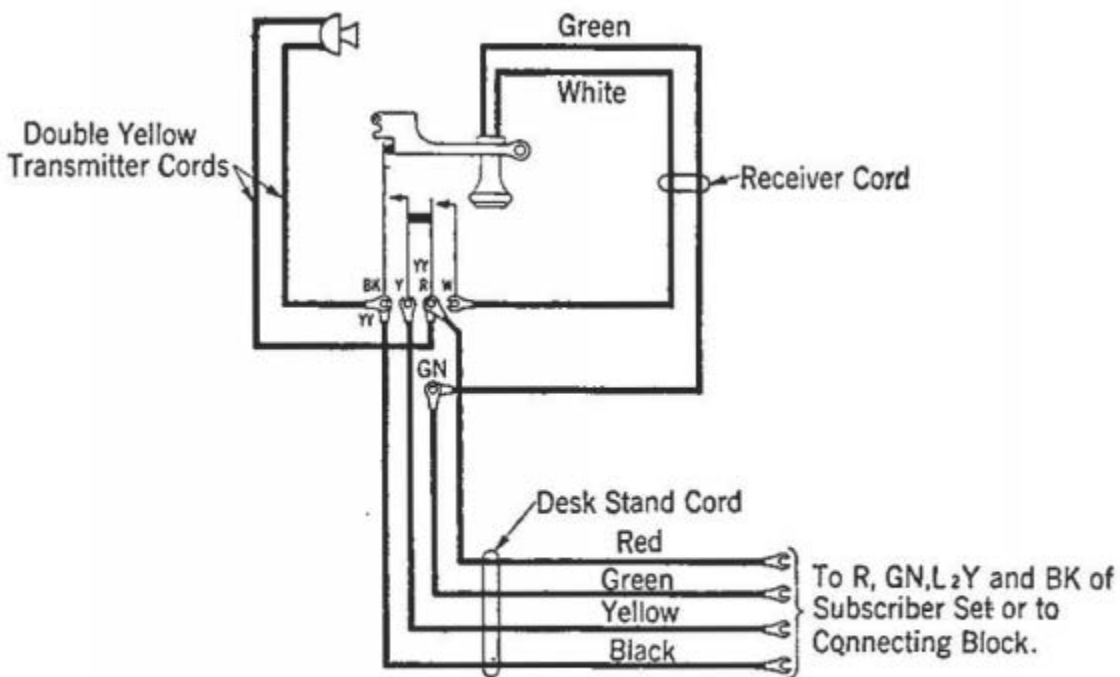



Fig. 5—140AL or 120AL Anti-Sidetone Desk Stands

 [WE140AL--BSP C63.373 i2.png](#) (248.02 kB, 1000x700 - viewed 0 times.)

