Telephony 101 – Touchtone Dialing March 15, 2013

Hello All,

As always, please send any questions about the reading assignment directly to me at oldtimetelephones@goeaston.net. I will bundle questions if necessary, repeat the questions, and give answers in an e-mail to the TCI List Server before moving on to the next reading assignment. This way everyone will benefit from these questions and answers. By sending questions directly to me, we will avoid unnecessary clutter on the List Server. Previous reading assignments, notes, questions, and answers are available in the TCI Library at http://www.telephonecollectors.info/index.php/telephony101 (this is a new URL, but the old one will eventually get you there).

Please read the section on Touchtone Dials starting on the bottom of page 170 and going to the last paragraph on page 174. If you're only interested in the basic principles of telephone operation, you can skip this section. However, this is probably the only place you will find a plain-English description of how the complicated touchtone dials work. Also in this section is a description of a polarity guard, which is truly simple.

Bell Laboratories invented the transistor and got a Nobel prize for it, so it is not surprising that they used a transistor in the new touchtone dials. Remember from Chapter 7 that these dials have to generate two specific frequencies at a time, so we are going to have to use the transistor to generate the two frequencies. To do this, the transistor is put in a circuit that produces voltages (and of course currents) that go up and down at these frequencies. This circuit with the transistor is called an oscillator. To make an oscillator, you start with a transistor amplifier, give it some feedback (i.e., send some of the output back to the input), and it goes nuts (oscillates). If you tune the load on the output side of this circuit to the desired frequency, it will oscillate at this tuned frequency. If you put two tuned loads on the output of this oscillating amplifier, it will oscillate at both frequencies at the same time. Go figure.

All of the early touchtone dials (Nos. 25, 35, and 82) use the circuit described in the book. These old dials have one noticeable problem, though. They won't work if the line polarity is reversed. The later dials (Nos. 72 and 83) use a 10-transistor chip, and I have no idea how these dials work. But the later dials incorporated a so-called "polarity guard" that eliminates the problem of line polarity. Further, Western Electric made a stand-alone polarity guard that could be back-fitted to phones with the earlier touchtone dials. The way a polarity guard works is simple and cute, so it is also covered in the book (see Fig. 19-15).

If there are any questions about the current reading assignment, we will deal with the questions before moving on to the next reading assignment.

Ralph

Telephony 101 – Touchtone Dialing March 17, 2013

Hello Again,

One of our readers pointed out that original WE polarity guards are not always readily available and that you can use any bridge rectifier (also called a Graetz circuit). These are inexpensive and available from many sources including Radio Shack. You would hook them up at terminals F(+) and C(-) just as you would hook up a WE polarity guard. Wikipedia has more information on bridge rectifiers if you are interested.

Also, if you didn't carefully read Steph Kerman's comment of 3/15/2013, you might have missed that I misspoke when I referred to a later dial as a No. 79 when it is a No. 72. That error did not occur in the book, and I will correct it in the archive version of the e-mails.

Ralph