Ten-Tec 1253: A Great First Radio Project!

By Robert Gulley AK3Q

Have you ever read about folks whose interest in radio started when they built their first receiver, usually under the watchful eyes of their father? I must confess to a bit of envy whenever I read stories like that, because I always wanted to build a radio as a kid, but never got the opportunity.

The ‘50s and ‘60s were in some ways the golden era of amateur radio, because of the many build-it-yourself kits available on the market. Unfortunately, the advent of miniaturized circuits and the like served to discourage kit building projects for a number of years. After all, most folks want the latest technology!

Whether through nostalgia, a desire for simpler times, or merely a desire to be more hands-on with all things radio, kits are making a very welcome comeback. One such kit, the Ten-Tec 1253 nine-band regenerative shortwave receiver, helped this amateur radio operator fulfill a 35-year-old dream of building a working shortwave radio, and it was a blast!

For those of us who never had the experience of building a radio, the 1253 kit strikes a great balance between being challenging and yet “do-able.” While I messed around with radios as a kid, building a modern radio was intimidating to me. Being used to large components and bulky soldering irons, modern kits looked a little scary.

However, once I made it past the soldering hurdle, I gained the necessary confidence to move ahead, and the whole experience was a rewarding one. Now, far from being intimidated by a kit building project, I am already looking forward to my next one!

Ten-Tec 1253: Old Meets New

The 1253 is what is known as a regenerative receiver, a technology that has been around since the early days of radio. The concept is pretty simple, as well as inspired: received signals are regenerated (fed back) into the receiver until their strength is powerful enough to be sent to the audio portion of the radio and out to the listener. This process allows for a relatively simple, yet quite ingenious circuit layout. Where vacuum tubes were once used, small, more efficient transistors have replaced them, allowing more radio in a much smaller size (see photo 1).

The 1253 kit comes with all parts well organized and divided by components and/or by section, and for the most part they should be left this way. A few components were unfamiliar to me, so I had to identify them by process of elimination (there, I have admitted to the world I am not an electronics genius . . . confession really is good for the soul!)

When identifying the various resistors (and there are a lot of them!) orient them all in the same way on a strip of wide masking tape so they can be easily retrieved later (see photo 2). Because the resistors are small and the colored bands are sometimes hard to read (especially if the markings are wearing down like mine), use a magnifying glass or a photo/jeweler’s loupe to identify them properly.

Tools and Set-up Tips

In addition to the loupe mentioned above, soldering will require a low-wattage (15-25W), fine point soldering iron and some thin (.032") 60/40 resin-core solder. While this kit does not use surface-mount components, the soldering requires a very fine point to avoid connecting two unrelated traces. I also purchased an inexpensive soldering station to hold the heated iron securely, as a safety precaution when not in use and as a place to occasionally wipe the tip.

If you have never tackled a project like this before, I would encourage you to go to your local Radio Shack or similar store and buy a few resistors and a small piece of “breadboard” (jargon for plastic circuit boards on which components are soldered) and firm up your soldering technique. I purchased $2 worth of parts to practice soldering a few resistors, and this helped me to overcome the fear of messing something up in the kit. But, even if something gets messed up, replacement parts are available from Ten-Tec or are likely available from the local Radio Shack store. I have included a picture of what a soldering joint should look like (see photo 3). Don’t worry if every joint is not a perfect teardrop — mine certainly aren’t, but this is the general shape to shoot for.

Manual and Printed Circuit Board

Having never built anything like this before, I was determined to go slowly, both as a means of understanding and enjoying the process and as a means of making sure I didn’t make too many mistakes! I had waited 35 years to build my first radio, so a few more weeks wouldn’t kill me. After all, there’s no prize for getting the project done all in one night!

The manual is divided up into seven phases, each phase more or less building on the last. At several points you are encouraged to perform some basic tests to make sure everything is go-

Photo 1. Ten-Tec 1253 Regenerative Radio Kit

Photo 2. Resistors arranged on wide masking tape for easy access

Photo 3. Here is an example of how a soldering joint should look.
ing along as it should. While I did not do every test, I did do the test which indicated whether or not the receiver worked on one specific band and the test to determine that power was being applied properly.

I have included photos of each major stage when completed, both as an indicator of how each phase comes together and as a photographic reference for what each phase actually looks like when complete, something I wish the manual had included (see “phase photos”).

The circuit board is very detailed with component markings and orientation markers as needed (see photo 4). It definitely pays to double check your work as you install various components, and following the markings on the board makes everything much easier. Care taken along each step will reap rewards later, and you will have the satisfaction of hearing your radio come to life when everything is finally in the proper place.

Photo 4. Circuit board with detailed markings for components and circuit layout

Phase One: Getting Your Feet Wet

Phase one helped me in two ways. First, it allowed me to “get my feet wet” by working on a small, yet interrelated section. As I followed the trace lines and thought through the process, I began to see the relationship between the components, which was very educational. The second way it helped was by providing an early test of the unit so I could check my work right away. Once I knew phase one was completed properly, I had the confidence to move forward.

If you’re going to build this kit, my advice is to stop after phase one and give yourself a break, both to enjoy your accomplishment and to study the circuitry in order to understand what is going on with the radio. Radio theory is great, but there is no substitute for seeing the components connecting together to form a circuit path.

Assembly Tips

During the assembly process you will need to shape some of the components to fit properly into the circuit board. When shaping the resistors or the inductors, I recommend using your thumbnail as a bending fulcrum (see photo 5). Use smooth, slow movements and, if adjustments are needed, just straighten the wires and begin again.

In preparation for soldering components, I often found spreading the leads apart helped keep the piece secure while soldering. Press the component down gently until it sits solidly on the board, and then spread the leads apart underneath. Two or three pieces may be soldered as a group this way. In particularly tight places, I found doing a “test run” with the positioning of the iron and the solder helped ensure quick, accurate soldering.

Once a component is soldered properly, the leads may be trimmed back as close to the solder joint as possible. Just make sure to allow sufficient time for the joint to harden. I typically soldered two or three pieces together and then trimmed the leads.

Phases 2-4: A Radio Is Born

In the next two phases, a significant portion of the radio is assembled. Phase 2 deals with DC voltage control, while Phase 3 builds the RF amplifier section, the regenerative detector, and the varactor tuning section. What this means is that when Phase 3 is complete, the radio is ready to be tested on a single band (Phase 4).

At this point I had things held together with clips and tape (see photo 6), but by golly, it worked! My first listening experience brought in several stations from Cuba, and I couldn’t have been more excited! Even my wife got a thrill out of it.

Photo 6. Phase 4 testing stage with tape and clips to hold it together, but it works!

Photo 7. Phase 1 completed

Phases 5-7 deal with assembling the band switching daughterboard/main board connections, LEDs, final wiring, and the cabinet assembly (see Phase photos). Again, take your time! There are a lot of steps involved in cutting wires to the right length, placing and adjusting LEDs, and arranging components together properly so that everything fits as it should. This is a lot of radio in a fairly small space!

Photo 8. Phase 3 completed

Photo 9. LEDs completed (daughterboard)

Photo 10. Phase 5 completed
fore, and so I was not prepared for the increased sensitivity to tuning this type of radio requires. At first I thought I must have done something wrong, even though my test in phase 4 was a success. As it turned out, a bit more reading in the operations side of the manual gave me the answer (imagine that!), and I started tuning with a much more deliberate hand. I soon started hearing all kinds of stations coming in, including single sideband (SSB) amateur radio signals.

Having been used to using some sort of beat frequency oscillator (BFO) or similar tuning procedure with my other rigs, I was pleasantly surprised to discover all SSB reception requires on a regenerative radio is just an adjustment of the fine tuning control. What does take some getting used to is the sensitivity of the “REGEN” control.

While standard for this type of radio, it still came as something of a surprise to me. The slightest movement can change reception drastically, but this just adds to the fun and to the challenge. I love the feeling of working with a radio with such a history as the regenerative radio. This project has truly given me a deeper appreciation for those who came before us.

I hope you give this kit a try as your first radio project or as just a great addition to your shortwave radio collection. The completed radio not only looks professional in its design, but it also performs quite well. And the best part of all? You will be quite proud to say “I built this myself!”

The Ten-Tec 1253 kit is available for $69 from Ten-Tec.

Ten-Tec provides on-line technical tips via its “Knowledge Base” page on its web site. Answers to customer questions on a wide range of topics covering all Ten-Tec products new and old may be found there. In addition, their service line (965-428-0364) is available from 8:00 am to 5:00 pm ET Monday through Friday. You may also e-mail your service-related questions to service@tentec.com.

About the Author:
Robert Gulley’s interest in amateur radio and shortwave listening began as a young boy, but he did not get his Technician license until 2007. He then quickly upgraded to General Class (Dec. 07) and then Extra Class (May of 08). He has never lost his fascination for all things radio, and regularly listens to shortwave, AM, DX, and police scanners, as well as chasing DX on the amateur bands. He is also developing a passion for “boat anchors” and plans to restore several Swan 350s as time allows.

Robert writes a monthly column for antennaX magazine focusing on antenna topics for beginners. He has also written several articles for QST magazine. When not using one of his many radios, Robert is a writer, adjunct college professor and a retired minister. He also teaches classes in woodturning and dabbling in photography, digital imaging and computers. You may contact him at AK3Q@ak3q.com

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