

## TEN-TEC MODEL 1254 HF DUAL CONVERSION SUPERHETERODYNE RADIO KIT

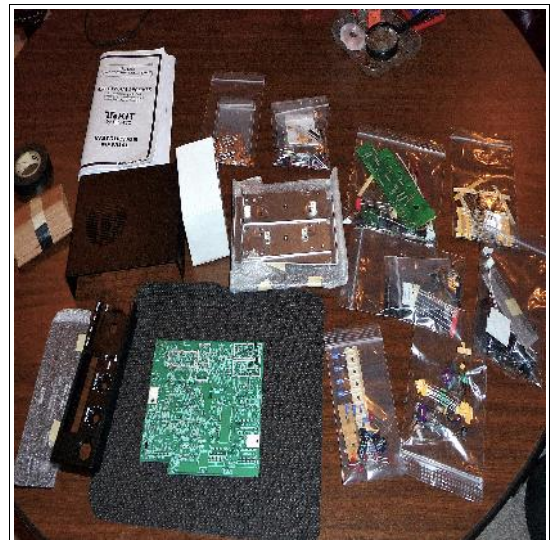
### Overview:

With only moderate previous kit building experience, I built the Ten-Tec Model 1254 HF dual conversion, superheterodyne radio kit in a many short sessions spread out over several months. More experienced kit builders would be expected to complete this kit in much less time, but I took my time and worked at a leisurely pace, often taking several days off between sessions.

Overall, a good kit experience.

A few Suggestions, Minor Concerns, and Issues Encountered:

1. A hasty count indicates the kit contains approximately 402 discrete parts.
2. The kit included all required parts, which were packaged in several zip-lock plastic bags. It has a LOT of small parts and it took quite some time to identify and inventory all the parts. The parts are organized in separate bags roughly according to their purpose or their type. For example, one bag contains resistors, another capacitors, and so on. One bag contained the parts to the front control and display panel, so it was easy to find those parts when building that part of the radio kit. The mechanical hardware was similarly sequestered in a separate bag, and so forth. This makes it much easier to locate and identify various parts during construction.

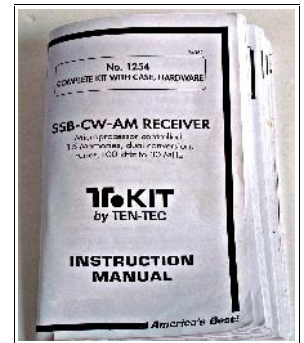


All components before commencing assembly.

3. It is ESSENTIAL the builder identify, separate and label the various components – before commencing construction. I separated resistors, capacitors, inductors, diodes and other parts in partitioned plastic trays, and taped the diodes to a sheet of paper, annotating their respective values, before installing any of them. The diodes are particularly difficult to manage because they are very small and often do not have full ID markings. Some have no discernible markings at all, and they would be extremely difficult to sort out mid way through the kit building experience.

Table 1-C		
Diode Identification Guide		
The Main Board uses six 1N4148 switching diodes easily recognized as identical to the 4 diodes installed on the Display Board. The zener, PIN, and varactor diodes must be identified exactly. Here's some help:		
TYPE	BODY TYPE/COLOR	CATHODE BAND
1N4148 (6)	Glass, copper-color inside	black
Zener (3)	Silver-gray	grayish black
	6.2V marked "1N 75 3A-nnn" (06,D7)	
	3.9V marked "1N 74 8A-nnn" (01,T7)	
1SV90 (2)	Glass, green middle band	red
1SB135 (2)	Glass, rounded ends	gray (near but not "on" end)
BB911A (3)	Dark, white middle band	red

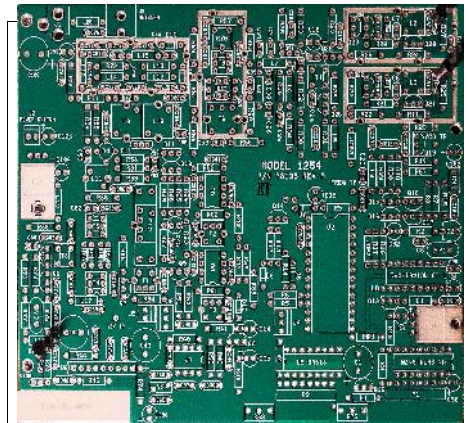
4. This process was rendered more difficult than necessary, because some included parts were not as listed in the instruction manual. Some substitutions parts were identified and explained in multiple several errata and change slips printed on separate sheets of paper. Others were not indicated at all. In particular, the list of diodes, was not correctly stated in the instruction manual, and there was no correction sheet. TenTec service sent me a revised list of diodes actually included in the kit. This was, of course, a source of confusion and frustration.
5. The builder is well advised to pay attention to the several separate error corrections and updates printed on separate sheets of paper, and he MUST take time to mark all such changes and updates in the main instruction booklet before starting construction. It would be more helpful if the changes were all listed on a single sheet, or as few sheets as possible, and if it stated only only one change per paragraph.
6. The instruction booklet is reasonably intelligible, generally adequate to guide a novice builder. Nevertheless, the instruction manual leaves a lot to be desired. It appears to have been reproduced on an old copy machine, so not all pages present crisp, sharp print, and many pages are severely skewed, making it difficult to read. It came in a booklet form, with four pages per sheet of paper – I would have preferred single or double pages on full size paper, as booklet was folded and it was difficult to keep it open to the current page I was working on along the way. Images, including photos and schematic diagrams, are poorly rendered and difficult to read. The entire manual should have higher print clarity and quality.



Comment – Considering we live in an era of modern computer word processing and inexpensive, high resolution laser printers, there is no excuse for not producing all documents with these applications. All updates or changes should be documented in the main instruction manual and reprinted before shipment to the builder. I suspect these kits were put up some time ago, so I doubt it would be profitable to rewrite this manual unless and until current supplies run out or major revisions in design or component parts are made that necessitate overhauling the instruction manual. Nevertheless, I would do it, if only to update the look and feel of the kit to the builder. Other kit producers have updated their manuals – it behooves TT do follow suit.

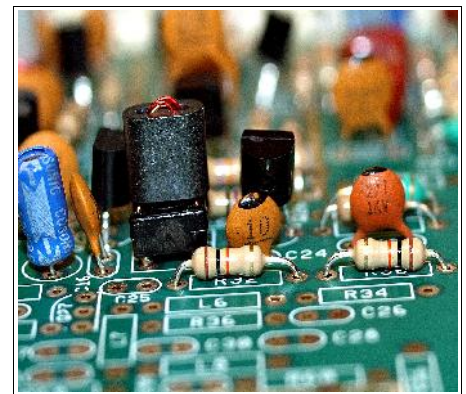
7. The Manual is fairly well thought out and comprehensive. Section 1 provides a good introduction to the receiver design, and has good tips on the kit assembly process. Section 2 contains all the individual construction details and instructions. Section 3 contains a boat load of information about receiver design and theory of operation, as well as a comprehensive set of operating instructions, and practical operating information. It contains a brief, and to the point, piece on SWL basics, and provides suggestions for simple antennas, all of which would be pertinent and useful for the novice kit builder. A separate document constitutes a Quick Reference with additional information about SW listening, including a handy band plan of the SW and Ham bands, including a sample log book to help the builder use the radio as a general coverage communications receiver.
8. The circuit board is fairly crowded and components are closely spaced. The builder is well advised to check his work and look for cold solder joints and solder bridges as he goes along. A magnifying glass is an essential tool. The builder must have a steady hand, as some components are very close to other components. While not unduly difficult, this does makes it a challenging and rewarding experience.

9. The builder MUST clean the board before installing components. It is essential that all dirt, oil, and oxidation be removed from the solder pads before construction begins. I used a little denatured alcohol (i.e., isopropyl alcohol) on a swath of terry cloth as a non-hydrous cleaning agent to remove oil and similar foreign substances, and then scrubbed each pad with a high quality Pentel Hi-Polymer drafting eraser, as an ersatz burnishing tool. (I misplaced my trusty \$3 RadioShack burnishing tool some time ago...) Failure to do this may yield poorly formed, cold solder joints that are be difficult to locate and repair later.

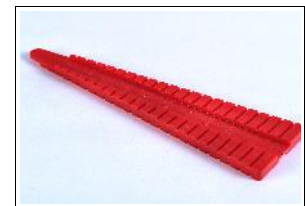


*Main Circuit Board*

10. I try to install all resistors, axial inductors, and similarly marked components with the same orientation (I put the gold band on the LEFT side of a horizontal location, and on the bottom of a vertical location, to make it easier to troubleshoot and check my work as I go along. I orient the markings on all disc capacitors and similarly marked components toward the bottom edge or the right edge of the board for the same reason. This saves me from having to turn the board around as I review my work.



11. I use a handy plastic tool I purchased for \$5 from Morse Express ([www.morseex.com](http://www.morseex.com)) to consistently bend the axial leads to the required spacing, without stressing the point where the leads exit the component.

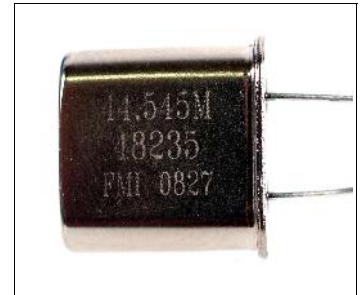


12. Some builders eschew the specified in-progress tests, but I recommend doing all such tests TenTec recommends. It is much easier to troubleshoot a small, isolated section of the overall circuit, than the entire circuit, if something is amiss after final construction. The progress testing is an annoyance, but only because it is holding the builder up from commencing the next stage of assembly. The tests, themselves, are not particularly complicated or difficult to perform.

13. One problem was a temporary show stopper. The U3 IC chip installed in Phase 1 failed an early progress test. Ten-Tec agreed it was defective, and quickly shipped provided a replacement part. It is hard to beat Ten-Tec customer service. The service technicians are just a phone call away, and are patient, courteous and helpful. That was the good news. The bad news was TenTec did not supply any IC mounts, and I damaged the circuit board removing the IC. I sent the board to a good friend K4LXP in New Mexico who is a professional at this sort of thing.

14. Another temporary show stopper – the small T3 MC1305P IC amplifier chip failed diagnostic testing, so I purchased a comparable replacement chip from a local supplier for around \$3.50.

15. Not a big deal, but several included parts bore markings which varied from that stated in the instruction manual. For example, the voltage regulator was identified as a 7805CV in the manual, but was marked 7805 CT on the part and the “455 KHz oscillator device ... marked 455BK,” is pictured at right, bearing the marking “44.545M.” Other parts bore markings which varied from that stated in the instruction manual. Searching the Internet confirmed the parts included in the kit were equivalent substitutes for the components named in written parts list. This is probably a non-issue for the experienced builder, but is a little disconcerting for the novice builder.



16. The mechanical assembly – building the circuit boards and other parts into the metal cabinet – went smoothly and without issue. The metal cabinet is somewhat complicated, but it goes together well and feels quite sturdy when fully assembled.

17. Although my board passed all progress tests in each of the final three solder building phases, the radio did not operate properly after it was fully assembled in the metal cabinet. With assistance from a local friend, AJ8W, we discovered I had reversed the polarity of diode and misplaced a couple of other parts. Once those errors were corrected, the radio came to life and we completed the alignment procedure using Station WWV as a standard frequency reference.

18. Unfortunately, there was STILL something wrong as the radio did not tune or operate well, and failed one of the troubleshooting tests listed in the Troubleshooting Guide on Page 37 of the Section 3 - Reference Section of the Instruction Manual. Eventually, I was able to resolve this, with the assistance of the TenTec Service Department.

19. Some builders replace the RCA phono jack (antenna jack) with a more robust BNC or UHF (PL-250=9) jack. This is easier to accomplish during initial construction, than afterward. This seems a good suggestion as either of the recommended replacement jacks are more robust and sturdy than the supplied RCA jack, and can be expected to take more stress and abuse before failure, especially if the builder uses a stiff, heavy duty coax cable such as ham operators typically use.

20. Reserved.

21. Reserved.

Interior view of completed Model 1254 receiver kit.

