

Radio Mechanics Fourth Year

Module 8 Staying Alive (Troubleshooting Radio Receivers)

What this module is about

This module dwells primarily on identifying and analyzing troubles and trouble symptoms of defective radio receivers. It includes the basic principles of troubleshooting and the application of basic troubleshooting techniques. To enhance your skill in troubleshooting, you are advised to report to your teacher in school for actual troubleshooting and repair work.

After you are through with this module, you are expected to be able to do the following:

1. Explain the steps in troubleshooting radio receivers.
2. Repair defective radio receivers.
3. Compute material cost and labor cost in servicing defective receivers.

How to learn from this module

For maximum benefit from this module, observe all the given instructions strictly.

1. Work through this module in the sequence of its contents.
2. After reading the objectives, answer all the questions in the pretest as well as you can.
3. Check your answers by comparing these with the key to answers. Consult your teacher regarding your test results.
4. Read and understand each lesson. Try to do the given activities and do the self-check to determine whether you understood what you have read.
5. Answer the posttest and compare your answers with the key to answers. You must get a score of at least 80% in order to move on to the next module.

PRETEST

Directions: Write a word or group of words that could best answer each statement in the blank before each number. Choose your answer from the group of words inside the big square below.

labor	costly	convenient	useful
expensive	cheap	valuable	practical
easy	difficult	simple	complex
basic	advanced	modern	old-fashioned

.....

.....

.....

.....
.....

.....
.....
.....

.....

.....
.....

.....
.....
.....

.....
.....

.....
.....

.....
.....
.....

.....
.....

.....of this, cut the
wires or copper foil of a PCB to isolate a certain part of the circuit. You can also use extra wires to
ground a circuit. You can do this as the need arises.

Modified click test method - This method is done by applying small momentary DC voltage on the collector of the transistor used in the preceding stage. If a click is heard when the test is performed, it indicates that the signal path is good from this point to the loudspeaker. When using this test on a dead receiver, start at the loudspeaker and work towards the antenna.

Discovery of the defective parts - Once you have located the defective area, check the DC voltage and find the defective component. You may pull it out from the circuit and have it tested. Apply the resistance (continuity) test and if found defective, replace with a new one of the same value.

After replacing the defective part, make the necessary adjustment until everything is normal. Turn on the system for several hours to make sure that the fault has been corrected.

Following standards - When servicing any appliance comply with the provisions of the Electrical Appliance and Material Control law. For instance, the use of correct rated fuses and specially rated wires.

Activity 1

Report to your teacher in school. Bring your assembled AM radio receiver project. Be sure that it functions normally. Borrow one (1) functional voltmeter from your teacher and get a data sheet to record your test results. With the help of your teacher, measure the operating voltages of the transistors in your radio receiver project. Record test results on your data sheet to serve as your reference in troubleshooting.

Self-check

Answer the following questions.

1. What are the advantages of following a systematic procedure of troubleshooting?
2. Is it necessary to know the functions of electronic components as well as the stages of a system in troubleshooting? Why?
3. Give the general procedure in troubleshooting, arranged in proper order.

Lesson 2

Repairing Defective Radio Receivers

One important rule in repairing is to make a good visual inspection of the whole system you are troubleshooting. This would help you to see some loose connections and disconnections that would possibly speed up and simplify the repair. As previously discussed, knowledge of the different stages or blocks of the system you are working on is necessary. Sufficient skill in reading and interpreting schematic symbols and diagrams is also needed. Similarly, knowledge of the functions of different electronic components is a must. With all of these, your skill in using various test instruments to test good and defective components is undeniable.

In repairing defective radio receiver, the following approaches are suggested to facilitate the task:

1. Quick Checks - This method of locating the trouble is done by making a simple diagnosis of the system. For instance, you have a dead receiver set, the first thing that comes to your mind is a defective speaker or power supply. To remedy this trouble quickly, measure the resistance (continuity) of the AC plug to determine any open point on the plug itself. You may also apply a click check on the speaker. This is done by connecting the terminals of the speaker to a dry cell or to the R x 1 range of the ohmmeter.

To find out if the local oscillator of your radio receiver is operating, a quick check can also be done.

You can get another radio receiver that is operating normally and set the frequency of the at the middle of the band. Turn on the suspected defective radio receiver and vary the frequency tuner. If you hear a squealing sound when you vary the frequency, this means that the local oscillator of your radio receiver is in good condition.

2. The Mapping Technique or Signal Tracing - In this method, you can use a block or schematic diagram as guide in tracing the flow of signals in the radio receiver. The schematic diagram gives information about test points and the operating voltages of the circuit. Using a voltmeter, signal injector or signal generator, the signal break can be determined. Signal tracing is done by inspecting the signal flow stage by stage, starting from the output stage and tracing back to the first stage. Whenever the signal stops, it is where the problem lies.
3. The Trouble Flow Chart - This is a very useful chart that indicates the analysis of troubles based on given symptoms. This is used by experienced and expert technicians in the field. In this method, symptoms are placed at the beginning of the chart and directional arrows guide the user to what is expected to be encountered. Below is an example of a trouble flow chart.

Servicing Chart for FM and AM Detector and AGC Circuits

Trouble	Possible Cause	Check to be Made
Low Volume	Incorrectly biased transistor Incorrectly biased diode detector	Check transistor's or diodes's forward bias. If in correct by 10 to 20% volume will drop. This trouble is usually accompanied by distortion. Check for defective transistor or diode by replacement with known good component. Resistance-check base, emitter, and collector circuits with transistor out of circuit.
	Defective AGC filter capacitor	Check for opens in AGC filter capacitor. If condition is present, decrease receiver sensitivity results, often accompanied by regeneration. Check by paralleling with known good unit and observing polarity.

Costing Repair Work

There are no specific standards in costing electronics repair work. The cost of labor depends primarily on the simplicity or complexity of work to be done. For instance, the labor cost of repairing television, VHS players, VCD and DVD players, stereo system and mini components ranges from P500 to P1000. For small items such as cassette players, radio receivers, and simple appliances, labor cost ranges from P 250 to P400. In both instances the cost of the component to be replaced is excluded. In more complex repair work that includes computers, periodic maintenance and removal of viruses will cost you P300 to P500.

Activity 2

Report to your teacher in school. Bring your assembled AM radio project with its schematic diagram. Your teacher will give at least two troubles in your project. You will be provided with tools and test instruments. Do the troubleshooting within one (1) hour. Record the troubles and the approaches you have applied as you go through the process.

Self-check

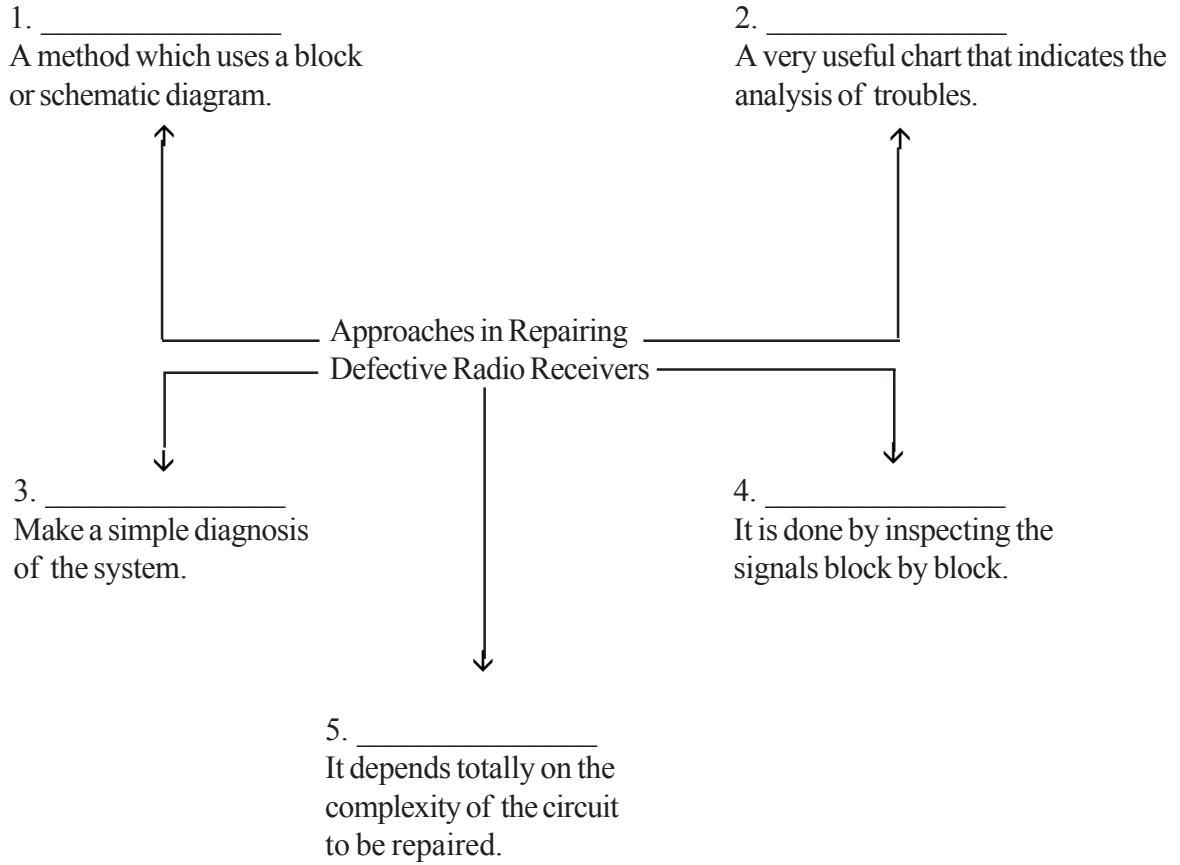
Explain how the quick check method can be applied in finding out if the local oscillator of your radio receiver is functioning.

LET'S SUMMARIZE

- To succeed in troubleshooting, a systematic approach or procedure is very essential.
- Basic knowledge of the functions of the different electronic components as well as the operation of the different stages or blocks of the system you are working on is necessary.
- In repairing defective radio receivers, you must make a good visual inspection of the whole system you are troubleshooting. You must be equipped with the skills of using the different test instruments for checking good or defective electronic components. You must follow the suggested approaches in repairing defective radio sets to speed up the task.

POSTTEST

Directions: Read the statements written below that describes the different approaches in repairing radio receivers. Write your answer on the blank.



KEY TO ANSWERS

Pretest

- 1. trouble flow chart
- 2. signal tracing
- 3. mapping technique
- 4. quick check
- 5. labor cost

Posttest

1. mapping technique
2. trouble flow chart
3. quick check
4. signal tracing
5. labor cost