MODULE 50
OW-43 RING TONE FAULT ISOLATION

OBJECTIVE

Given TO 31S1-2TSC60-12, isolate Signaling Termination Unit ring tone faults IAW Table 5-3.

PREREQUISITES

1. Must complete QTP Modules 1, 8, 47, 48, and 49.

2. Must be able to operate the following test equipment:

   a. HP-204C Audio Oscillator
   b. HP-5245L Frequency Counter
   c. AN/PSM-6 Multimeter
   d. HP-3400A True RMS Voltmeter

INFORMATION

The ring tone test is used to isolate ring tone faults of a Signaling Termination Unit (STU). This test should be performed on any unit that failed the back-to-back signaling test discussed in Module 49. This test should also be performed periodically at the discretion of the maintenance supervisor.

To perform this test you apply a receive signaling tone and observe that the STU converts that signaling tone to a ring tone of either 20 or 50Hz at 90VAC to ring the telephone. Figure 50-1 shows the equipment connections.

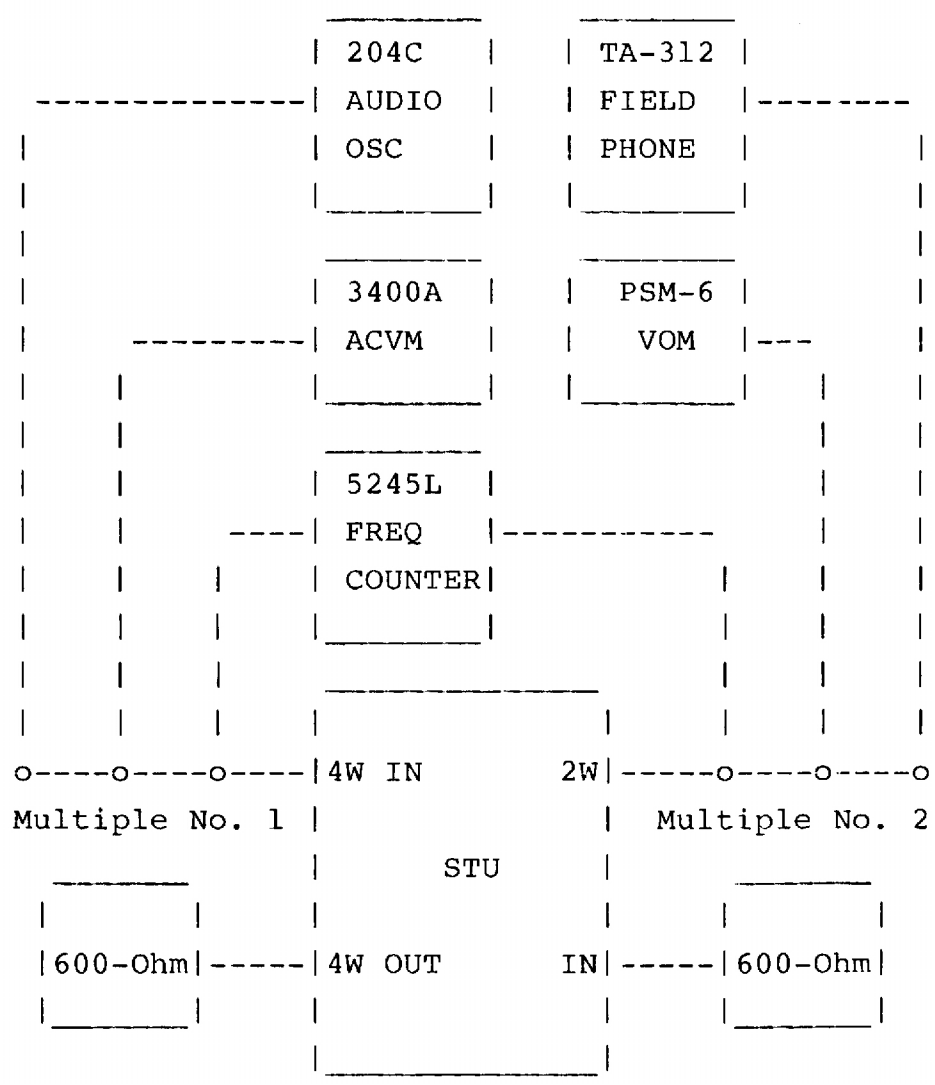

Figure 50-1. Ring Tone Test Setup

The first step in the performance test (after the test equipment is connected) is to adjust the Audio Oscillator to 1600Hz. To do this you must set the level of the Oscillator high enough for the Frequency Counter to measure it. The procedure calls for a level of -15dBm. If you do not get stable readings on the Frequency Counter at that level, try increasing the output of the oscillator.

Once the frequency of the Oscillator is set, the level can be reduced to -25dBm, the level required for testing.

At this point, the patchcord for the Frequency Counter is moved to the output of the STU (Multiple No. 2). If everything is going well, the field phone should be ringing, you should measure 90VAC on the Multimeter, and the Frequency Counter should read 20Hz.

Let's discuss what to do if you **don't** get the proper readings. Look at Figure 31 of the Diagrams booklet. There are three basic circuits in the receive side of the STU: (1) 20/50Hz ringing generator, (2) hybrid network, and (3) VF signaling detector. Your first task would be to determine which of these three circuits is defective.

In this test you are not using the hybrid network circuit. So, this circuit can be eliminated from the list of possibilities.

The function of the signaling detector circuit can be observed by looking at the receive relay (K2). If this relay is energizing when the signaling tone is applied, the VF signaling detector circuit is OK. If the relay is **not** energizing, you need to troubleshoot the VF signaling detector circuit. You can isolate malfunctions in the VF signaling detector by looking at the output of each of the circuits shown on the block diagram

The signal from the Audio Oscillator is fed through the transformer and the limiter to the pass filter. The pass filter contains two filters. The output of one of the filters is the AM tone path. If you were to look at this output with an O'scope while varying the frequency of the Audio Oscillator, you should see a peak as the output passes through the frequency selected with the VF Signaling switch. If not, the pass filter is defective.

From the pass filter, the signal is applied to the positive rectifier. This circuit should apply a positive DC voltage to R72 when the signaling tone is present from the pass filter.

There should be no signal to the negative rectifier for our test conditions. Therefore, the output of the negative rectifier should be zero.

From the junction of R72 and R73, the positive DC signal is applied to the input of the detector circuit. From the output of the detector circuit, the signal is applied to the amplifier and then to the relay driver. You should be able to connect an O'scope to any of these points and observe the DC signal as the Audio Oscillator frequency is varied from the signaling frequency.

If you can observe the signal all the way to the relay, the relay should be energizing. If not, the defect is either in the K2 relay, or the -48VDC applied to it.

If the signaling tone detector circuit is functioning properly, the defect may be in the 20/50Hz ringing generator circuit. This circuit is a simple multivibrator followed by two amplifier stages. You could verify operation of the multivibrator with an O'scope. If the multivibrator is functioning properly, tracing the signal through the buffer driver and the power amplifier stages should be relatively simple.

Read over the procedure in Table 5-3 of the -12 TO. Ask your trainer to clarify any portion of the procedure that you don't understand. When ready, proceed to the additional instructions.

ADDITIONAL INSTRUCTIONS

Answer the review questions and check your answers with the confirmation key. Review the material in the module for any questions you missed. Next, ask your trainer for the KEP questions. After your trainer checks your answers and reviews the questions missed with you, go on to the performance procedures.

REVIEW QUESTIONS

1. If an STU fails the ring tone performance test, how can you quickly identify whether or not the problem is in the signaling tone detector circuit?

2. Why is it necessary to set the level of the Audio Oscillator to -15dBm in the initial steps of the procedure?

3. Explain what the ring tone performance test accomplishes.

4. Which signaling tone function is **not** checked with the ring tone test?

PERFORMANCE PROCEDURES

Have your trainer demonstrate performance of the ring tone test. Next, practice performing this test under the supervision of your trainer until you feel confident. Your trainer will annotate your training records when he/she feels you are proficient.