

MODULE 32**PTT, VOX, SIMPLEX OPERATION, POWER OUTPUT TESTS,
AND 599H-2 TESTS AND ALIGNMENTS****OBJECTIVES**

1. Given TO 31S1-2TSC60-16WC-1, perform the PTT, VOX, simplex operation, and power output tests IAW cards 1-050 thru 1-057.

2. Given TO 31S1-2TSC60-12, test and align the 599H-2 audio oscillator IAW para 5-269 thru 5-288 and Table 5-72.

PREREQUISITES

1. Must complete Modules 1, 2, 3, 15, 20, 21, 25, 29, 30, and 31.

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

- a. HP-204C Audio Oscillator
- b. HP-3400A True Reading RMS Voltmeter
- c. HP-5245L Frequency Counter
- d. HP-410C Voltmeter
- e. Tektronix 454 Oscilloscope
- f. HP-11005A Balanced Transformer

INFORMATION

This module covers part of the 56-day inspection. In this module you'll check the Transmitter output power and the VOX, PTT, and simplex mute circuits. Then we will go into the 599H-2 tests and alignments. Before we discuss the

procedures, get TO 31S1-2TSC60-16WC-1 and read cards 1-050 thru 1-057.

We hope you noticed that the cards you read cover two different PMI routines. The first one tests the Transmitter output power in AM and CW operation and with full carrier applied.

The first eight steps of the procedure have you turn on the equipment and get everything set up to do the test. You actually start the test in step 9.

The first thing you do is set the transmit frequency to 16.0000MHz. You don't need to worry about the frequency being authorized because you will transmit into the dummy load. In this first step you are also checking that the Transmitter performs a complete tune cycle by watching for the OPR lamp on the control head.

Step 10 tells you to turn off all four sideband switches (A1, A2, B1, and B2). By doing this you prevent any modulation from going through the Transmitter. But this is a single-sideband Transmitter, and without modulation there is no transmit power, right?

That is right, but the Transmitter has a feature built in to allow you to transmit a pure carrier. The CARR Level control on the Transmit Control Head controls this carrier. Notice it is marked in 3dB steps from 0 to -30. This control is used as an attenuator. That is, 0 indicates no attenuation and, therefore, a full 2.5kW carrier; -3 indicates 3dB attenuation, which would produce a carrier of 1250 watts (half power). Each 3dB increase in attenuation would reduce the carrier power in half down to -30dB, which is about 5 watts. The last position on the switch turns the carrier completely off.

Now the question arises, "What would this be used for?" Actually, it is not used in today's communications. Just about the only use for the carrier is to check the Transmitter's output power and frequency. If the output power is incorrect while transmitting only a carrier, adjustment of the TGC circuit is indicated. Module 26 discusses using the transmit carrier to check frequency.

Step 12 has you checking the AM transmit power. AM is another mode that is practically not used any more, but you want to maintain the capability if the need does arise.

Steps 14 and 15 check the output in the two available CW modes. Here again, you will be checking a mode that is rarely used, but you need to ensure the capability is there.

The remainder of this routine repeats the tests using the other Transmitter. Now let's go through the routine that starts on card 1-054.

This routine checks the microphone push-to-talk (PTT), voice-operated transmit (VOX), and Receiver simplex mute circuits. The first 13 steps of the routine instruct you to turn on the equipment and set the controls as necessary to perform the first test.

In this first test, the Transmitter and Receiver are both tuned to the same frequency. You will first transmit on the A1 sideband and listen for your voice in the Receiver speaker. Then you repeat the test for the other three sidebands. This verifies that the PTT circuits and the voice transmit and receive circuits are all functioning properly.

Notice in step 12D you are instructed to set the Simplex/Duplex switch to DUPLEX. In the duplex mode, the Receiver and Transmitter are both turned on all the time. So, if they are both tuned to the same frequency, you can hear your transmissions in the Receiver.

Normally, you would use the duplex mode to talk to a distant station and listen to them talk back to you at the same time, just like you would on the telephone. In simplex mode you can either talk or listen, but not both at the same time. Simplex is normally used with a single antenna. Your CB radio is an example of a simplex unit.

Step 16 tells you to set the Simplex/Duplex switch to SIMPLEX. Now when you key the Transmitter, the Receiver should go quiet. To verify that you are transmitting, watch the RF Wattmeter while you talk into the microphone.

In step 17 you return to duplex operation so you can hear yourself, and set the VOX-CW/PTT switch to VOX. As we said earlier, VOX stands for voice-operated transmit. That is, your voice keys the Transmitter. You don't need the PTT switch. If you use the desk microphone, the PTT switch must be closed to pass audio. The headset-microphone set has a "hot" microphone (i.e., no PTT switch) and will pass audio to key the Transmitter. VOX has advantages and disadvantages.

The big advantage of VOX is you don't have to have one hand holding the PTT switch while talking. This leaves both hands free to shuffle papers or whatever. The main disadvantage is that when you smash your finger and yell various obscenities at yourself, everything you say goes out over the air. Ooops!!

Step 20 tells you to repeat the tests using the other radio group. Don't forget to have the Maintenance Display Multimeter set to some position other than Forward Power when reading RF output power on the RF Patch Panel Wattmeter. Remember, if both meters are set to read forward power at the same time, each will read half of the power.

Now let's take a look at the 599H-2 audio oscillator tests and alignments. The function of the 599H-2 was covered in Module 30, so we won't go into it here. You might want to review this module to refresh your memory. After this, take a look at Table 5-72 in the -12 TO, which covers the performance test for this slice. Then read the procedures for performing the alignments in para 5-269 thru 5-288.

Did these tests and alignments seem familiar to you? They are basically the same you already did for the 599H-3 radio test set in Module 24. The only difference is that for the 599H-2 you check and adjust VOX levels, and for the 599H-3 you check and adjust the anti-VOX levels. Also, in the 599H-2 you check and adjust the 1000Hz tone level used for self test and CW operation. Basically, if you can perform the tests and alignments for the 599H-3, you should have no problems with the 599H-2.

ADDITIONAL INSTRUCTIONS

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

REVIEW QUESTIONS

1. With the CARR Level control in the 0 position, the output power reads 2450 watts. What should the output power read with the CARR Level control set to -3?
2. Explain the difference between simplex and duplex operation.
3. What is the main advantage of VOX transmission?
4. You are performing the first test (transmit carrier level) and the RF Patch Panel Wattmeter reads half power. What is the most likely cause?
5. Which TO Figure shows all the 599H-2 adjustment points?
6. The A1 VOX sensitivity is set at what level?
7. The A7 audio source card is set for what output?

PERFORMANCE PROCEDURES

Have your trainer demonstrate performance of these tasks. Then practice under the supervision of your trainer until you feel confident. Your trainer will annotate your training records when he/she feels you are proficient.