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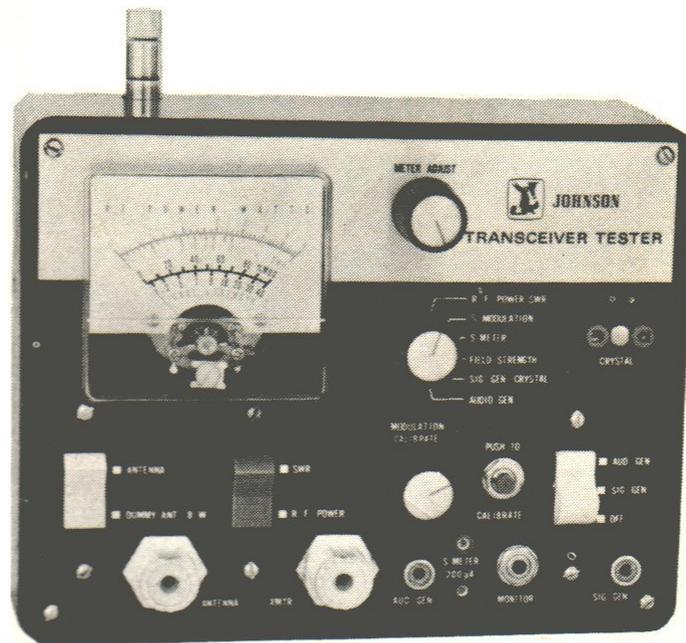
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JOHNSON

TRANSCEIVER TESTER



PART NO. 250-0718-001

OPERATING MANUAL

**THE JOHNSON
ONE YEAR
GUARANTEE**

**WITHIN ONE YEAR OF PURCHASE THE
E. F. JOHNSON COMPANY WILL PRO-
VIDE THE PARTS AND LABOR TO
REPAIR YOUR JOHNSON EQUIPMENT
IF IT IS DEFECTIVE IN MATERIAL OR
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**E. F. JOHNSON COMPANY
299 10th Avenue S. W.
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COAXIAL CONNECTORS

RG-8/U



Cut end of cable even. Remove vinyl jacket 1-1/8", except 83-1SP plug remove vinyl jacket 1-1/4".



Bare 5/8" of center conductor. Trim braided shield. Slide coupling ring on cable. Tin exposed center conductor and braid.



Screw the plug sub-assembly on cable. Solder assembly to braid through solder holes, making a good bond between braid and shell. Solder conductor to contact. Do not use excessive heat.



For final assembly, screw coupling ring on plug sub-assembly.

RG-58A/U



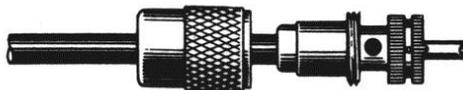
Cut end of cable even. Remove vinyl jacket 3/4". Slide coupling ring and adapter on cable.



Fan braid slightly and fold back as shown.



Position adapter to dimensions shown. Press braid down over body of adapter and trim to 3/8". Bare 5/8" of conductor. Tin exposed center conductor.



Screw plug sub-assembly on adapter. Solder braid to shell through solder holes. Use enough heat to create bond of braid to shell. Solder conductor to contact.



For final assembly, screw coupling ring on plug sub-assembly.

GENERAL INFORMATION

INTRODUCTION

The Johnson Transceiver Tester is a compact, versatile instrument which can be used as a complete multi-function base station accessory and as a portable tester for CB transceivers. Its conservative design and rugged construction ensure you of continuing dependable service even under demanding field conditions.

The Transceiver Tester is shipped with a 9 volt "transistor radio" battery installed. This battery, NEDA number 1604 (Eveready number 216), is readily available and, with proper operation, can power the Transceiver Tester for months. The operator need only be sure that the white rocker switch is always set to OFF except when making tests requiring the SIG GEN (signal generator) or AUD GEN (audio generator) functions. The white rocker switch should be set to OFF during all other tests and when the Transceiver Tester is not in use.

The multimeter on your Transceiver Tester is a precision movement ($\pm 5\%$ of full scale accuracy) linear scale device having a highly sensitive $200 \mu\text{A}$ movement. The Transceiver Tester can be left in a 50 or 52 ohm transmission line while measuring such parameters as relative RF power output, SWR, percent modulation, etc., indefinitely without causing any significant power loss or increase in SWR. It can help you make full use of your base station or mobile unit and help you master any operating situation.

GENERAL INFORMATION (Cont'd)

FEATURES

The Transceiver Tester permits you to:

- Measure true RF output into the built-in dummy load and relative RF power on the air.
- Measure percent modulation while speaking. This test can be performed into the built-in dummy load or on the air.
- Measure antenna voltage standing wave ratio (SWR).
- Use the Transceiver Tester as an RF and audio signal generator.
- Monitor the relative field strength of your own or any other nearby transmitters.
- Check Citizens Radio crystals for relative activity.
- Check the audio quality of your own transmitted signal.

SPECIFICATIONS

Frequency Range	26.965 to 27.255 MHz
Power Source	Internal 9 volt battery, NEDA number 1604
Dummy Antenna:	
Impedance	50 ohms, unbalanced
Power Handling Capability	12 watts continuous (8 watt carrier with 100% sine wave amplitude modulation)
Meter:	0-200 μ A DC, $\pm 5\%$, of full scale reading. Resistance 750 ohms $\pm 10\%$
Weight:	1.8 pounds

Measurement Functions

RF power from 0 to 6 watts into an internal 50 ohm dummy antenna.

Relative RF power into an external 50 ohm load, such as a CB antenna.

SWR (voltage standing wave ratio) from 1:1 to 10:1 on an external load. Reference 50 ohms. Carrier range 1.0 to 6.0 watts.

% modulation of AM carrier in the range 1.0 to 6.0 watts with internal 50 ohm load, 1.0 to 50 watts with external load or antenna.

S meter. Permits use of the 200 μ A meter as an external S meter for properly adapted transceivers.

Relative field strength. Permits measurements of local RF signals (up to about 100 feet from the antenna of a 5 watt CB transmitter).

Crystal activity. Indicates relative crystal activity by increased meter deflection with insertion of a crystal in one of the CRYSTAL sockets.

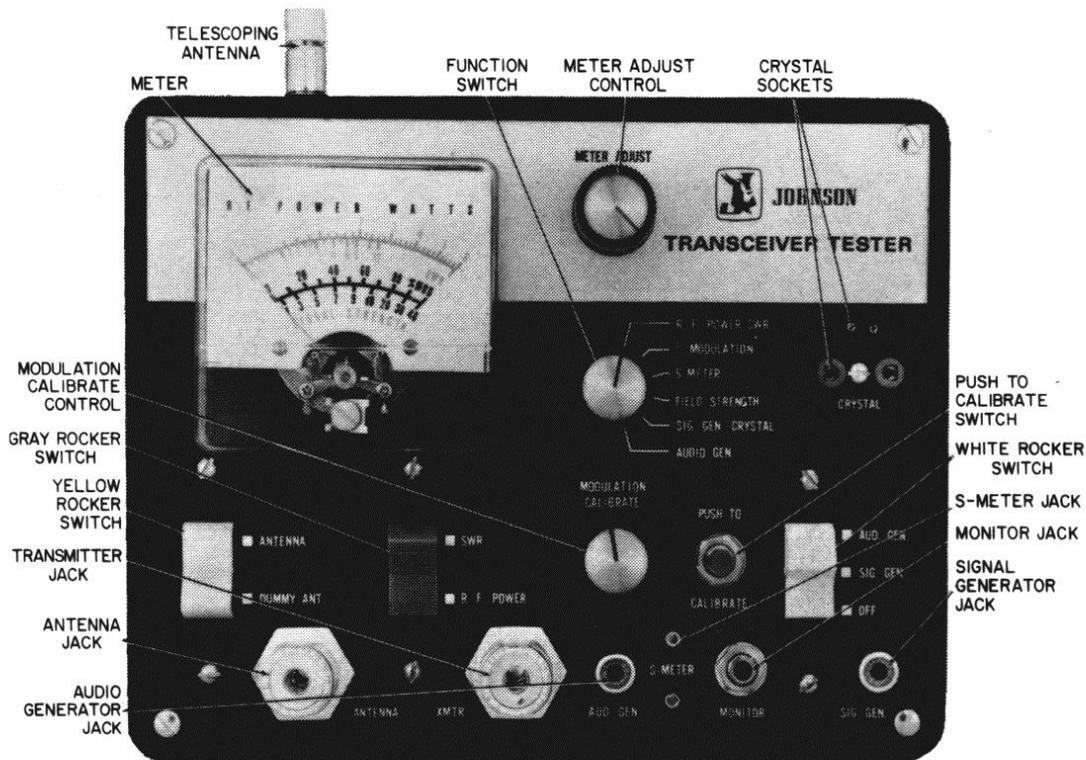
Generator Functions

RF signal controlled by external plug-in crystal. Output into a 50 ohm resistive load is about 500 μ V. The METER ADJUST control reduces output at least 10 dB.

RF signal modulated 30% with 1000 Hz.

AF signal, 1000 Hz sine wave. Output is about 80 millivolts across 600 ohms.

GENERAL INFORMATION (Cont'd)



TRANSCEIVER TESTER
FRONT VIEW
FIGURE I

INSPECTION

Carefully inspect your Transceiver Tester for possible shipping damages. Report any damage immediately to the transportation service--not to the E. F. Johnson Company. The shipping carton contains the Transceiver Tester, this operating manual, the telescoping whip antenna and a schematic diagram of the Transceiver Tester.

Examine all packaging material carefully to avoid discarding any of these items. Save the carton and packaging material for future use, such as service return, storage, etc.

SUMMARY OF OPERATION

NOTE

Only control and switch settings which affect each test are listed. Refer to General Operation where necessary. Connect a 50 ohm CB antenna to the Transceiver Tester ANTENNA jack and the transmitter output to the XMTR jack using RG58A/U cable and PL259 connectors in all tests except where noted.

To Measure RF Power into Dummy Load:

- Rotate the METER ADJUST control full clockwise.
- Rotate the function switch to RF POWER/SWR.
- Push the yellow rocker switch to DUMMY ANTenna.
- Push the gray rocker switch to RF POWER.
- Depress the transceiver microphone push-to-talk switch (key the transmitter without modulation) and observe the top meter scale. The meter indicates true RF power in watts into the 50 ohm dummy load.

To Measure Relative RF Power into Antenna :

- Rotate the METER ADJUST control counterclockwise to protect the meter.
- Rotate the function switch to RF POWER/SWR.
- Depress the yellow rocker switch to the ANTENNA position.
- Key the transmitter and rotate the METER ADJUST control for a reading matching that obtained when measuring RF power into a dummy load.
- The meter is now calibrated to read relative RF power into the antenna (as indicated on the top meter scale).

SUMMARY OF OPERATION (Cont'd) _____

To Measure Percent Modulation:

- Rotate the METER ADJUST control full clockwise.
- Rotate the function switch to % MODULATION.
- Connect a properly mounted external 50 ohm CB antenna to the Transceiver Tester ANTENNA jack.
- Set the yellow rocker switch to ANTENNA for on-the-air monitoring of percent modulation or to DUMMY ANTenna for an off-the-air check.
- Key the transmitter without modulation while pushing the red Transceiver Tester PUSH-TO-CALIBRATE switch. Adjust the MODULATION CALIBRATE control for full scale deflection on the % MOD meter scale.
- Release the PUSH-TO-CALIBRATE switch and read % modulation while speaking into the microphone. Try to keep meter readings peaking at half scale or a little less. See page 15.
- Always recalibrate when changing antennas or dummy loads, or when changing from a dummy load to an antenna (or vice versa).

To Measure Antenna SWR:

- Rotate the function switch to RF POWER/SWR.
- Depress the yellow rocker switch to the ANTENNA position and the gray rocker switch to RF power.
- Key the transmitter without modulation and adjust the METER ADJUST control for a full scale meter reading.
- Push the gray rocker switch to the SWR position.
- Key the transmitter without modulation and read SWR directly on the meter SWR scale.

To Use the RF Signal Generator :

- Rotate the function switch to the SIG. GEN./CRYSTAL position and plug a CB transmit crystal into one of the crystal sockets.
- Set the yellow rocker switch to DUMMY ANTENNA and the white rocker switch to SIG. GEN.
- Rotate the METER ADJUST control, to keep the meter deflection near to or less than full scale.
- To add 1 kHz audio to the RF signal at 30% modulation, push the white rocker switch to AUD. GEN.
- To increase RF signal generator output, connect the SIG. GEN. jack to the transceiver antenna jack, using the RG-58A/U cable and a standard phono plug, such as Switchcraft part no. 3502 at the tester and a coax connector at the transceiver antenna jack.
- At the conclusion of the test, return the white rocker switch to OFF to conserve battery power.

To Use the Audio Signal Generator:

- Rotate the function switch to the AUD. GEN. position.
- Push the white rocker switch to the AUD. GEN. position.
- Plug a phono plug into the AUD. GEN. jack. Use shielded wire to the device under test.
- The AUD. GEN. output is a 1 kHz audio tone at about 80 mV across a 600 ohm load.
- At the conclusion of the test, return the white rocker switch to OFF to conserve battery power.

SUMMARY OF OPERATION (Cont'd) —

To Measure Relative Field Strength :

- Remove cables for portable operation.
- Rotate the function switch to the FIELD STRENGTH position.
- Carefully insert the telescoping antenna into the transceiver tester case and rotate it clockwise into the threaded insert at the bottom of the transceiver tester case. Extend the antenna to its full length.
- The Transceiver Tester meter indicates relative signal strength of transmitters up to 100 feet distant. The antenna input circuit is tuned to the 27 MHz Citizens Band but the Transceiver Tester will read other signals which are sufficiently strong. Off-scale readings can be brought on scale by adjusting the METER ADJUST control.
- To monitor signals aurally, connect headphones to the MONITOR jack.

To Use the Crystal Tester:

- Rotate the function switch to the SIG. GEN./CRYSTAL position.
- Insert a 26.510 to 27.255 MHz crystal into one of the crystal sockets.
- Push the white rocker switch to the SIG. GEN. position.
- Set the METER ADJUST control for a full scale meter reading.
- Remove the crystal from the socket. The meter reading should change slightly. The change shows that the crystal is working, but not necessarily on frequency.
- At the conclusion of your crystal tests, push the white rocker switch to OFF to conserve battery power.

GENERAL OPERATION

The Johnson Transceiver Tester is equipped with two adjustable controls, five switches, five jacks and two sets of crystal sockets. If you follow a consistent, step by step operating procedure you will soon find yourself in command of all functions of this versatile instrument.

We will outline the functions of the Transceiver Tester controls, switches and jacks singly before explaining in detail the operation of the unit.

CONTROLS

METER ADJUST Control

The METER ADJUST control adjusts the sensitivity of the Transceiver Tester meter.

FUNCTION Switch

The FUNCTION switch selects meter and circuitry functions.

MODULATION CALIBRATE Control

The MODULATION calibrate control adjusts the meter sensitivity when the FUNCTION switch is in the % MODULATION position, the METER ADJUST control is full CW and the PUSH-TO-CALIBRATE switch is depressed.

PUSH TO CALIBRATE Switch

Must be pushed to adjust the MODULATION CALIBRATE control.

GENERAL OPERATION (Cont'd) ---

WHITE ROCKER Switch

Selects either unmodulated (SIG. GEN. position) or modulated (AUD. GEN. position) RF carrier when a crystal is inserted into one of the CRYSTAL sockets and the function switch is rotated to SIG. GEN./CRYSTAL. Selects the audio generator function only when it and the FUNCTION switch are set to AUD. GEN.

GRAY ROCKER Switch

Selects SWR or RF Power functions when the FUNCTION switch is in the RF POWER/SWR position.

YELLOW ROCKER Switch

Selects ANTENNA or DUMMY ANTenna functions.

ANTENNA Jack

Connect to a 50 ohm Citizens Radio antenna using RG-8/U, RG-58/AU or similar 50 ohm coaxial cable and PL259 plugs. Refer to Figure 0-0.

XMTR Jack

Connect to the transceiver antenna jack using two PL259 plugs and RG-58A/U cable for tests involving SWR, or power output or % modulation. This jack is also useful for a reduced RF signal generator output to the transceiver.

AUDIO GENERator Jack

Connect to the device to be tested using a "phono plug", Switchcraft part no. 3508.

MONITOR Jack

Useful for monitoring your own signals or for monitoring

the signals of other local transmitters. Connect a pair of headphones or earphones to the MONITOR jack using a miniature phone plug, Switchcraft part no. 750 or equivalent. For maximum FIELD STRENGTH meter sensitivity, disconnect the phones.

SIG GEN Jack

Connect to the transceiver antenna jack using a RG-58A/U cable with a PL259 plug at the transceiver end and a "phono plug", such as a Switchcraft part no. 3508 plug, at the Transceiver Tester end.

% MODULATION MEASUREMENT

The importance of proper modulation to good communications cannot be overemphasized. The experienced radio operator recognizes that careful enunciation at full levels of modulation is more desirable than speaking so loudly that clipping - or worse - overmodulation occurs.

We suggest that you keep the Transceiver Tester in the transmission line, indicating percent modulation during normal operation. Switch to RF Power/SWR to the antenna occasionally to check for proper station functioning, but return to percent modulation as your normal operating mode. RF output and SWR will not change much during a normal operating session but % modulation changes whenever you speak.

When you transmit, try to keep the % modulation meter readings peaking at about half scale. Half scale meter readings on voice modulation correspond to 100% modulation on voice peaks. Any meter movement has a certain amount of inertia which keeps the meter from indicating voice peaks. If you have access to a high frequency oscilloscope you can check modulation peaks, but a good rule of thumb is to limit the peak meter indication to half scale.

When transmitting over short ranges or under good condi-