

TSG-17 RF Signal Generator

User Manual

1. Introduction

The **TSG-17 RF Signal Generator** is a compact, benchtop radio frequency signal source designed for testing and troubleshooting RF circuits, radios, and communication equipment. It generates stable, calibrated RF and AM modulated signals across a wide frequency range, making it ideal for hobbyists, technicians, and educational applications.

2. Key Specifications

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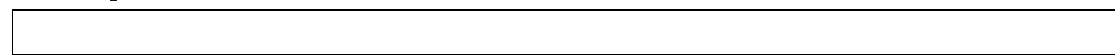
Parameter	Specification
Frequency Range	100 kHz - 150 MHz (divided into 6 bands)
Harmonic Range	Up to 450 MHz (3rd harmonic)
Output Waveforms	Sine wave (RF) / Amplitude-modulated (AM) wave
Output Level	≥ 10 Vp-p (max)
Modulation	Internal 1 kHz (80 - 100% modulation) / External modulation (50 Hz - 20 kHz)
Output Impedance	600 Ω
Frequency Accuracy	±5%
Power Supply	110/220 V AC (selectable)
Operating Temperature	0° C - 40° C

3. Front Panel Overview

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Component	Function
Frequency Dial	Main rotary knob for fine-tuning frequency within the selected band
Range Buttons (A – F)	6 frequency bands: • A: 100 kHz – 300 kHz • B: 300 kHz – 1 MHz • C: 1 – 3.2 MHz • D: 3 – 10 MHz • E: 10 – 35 MHz • F: 35 – 150 MHz
RF Level	Adjusts the amplitude of the output RF signal
Mod Level	Controls the depth of internal/external AM modulation
Mod Frequency	Adjusts the internal modulation frequency (default: 1 kHz)
Mod Mode Switch	Selects between RF (unmodulated), AM (internal modulation), and External Modulation
Power Switch	Turns the instrument on/off (red indicator light confirms power)
RF Output BNC	Main signal output connector
Mod Input BNC	For connecting external modulation sources (audio signals)



4. Step-by-Step Operation

4.1 Power-Up

1. Connect the power cord to the rear panel and a grounded outlet (verify voltage setting: 110V or 220V).
2. Press the power switch; the red indicator light will illuminate.
3. Allow the unit to warm up for 5–10 minutes for optimal stability.

4.2 Generating Unmodulated RF Signals

1. Select the appropriate frequency band using the Range buttons (A–F).
2. Turn the main frequency dial to set the desired frequency (use a frequency counter for precise calibration if needed).
3. Adjust the RF Level knob to set the output amplitude (start at the lowest setting to avoid damaging test circuits).
4. Connect the output to your device via the BNC-to-clip cable.

4.3 Generating AM-Modulated Signals

1. Follow steps 1–3 above to set the carrier frequency and level.
2. Press the Mod Mode switch to select **Internal AM**.
3. Adjust the Mod Level knob to set modulation depth (80–100% recommended for most tests).
4. Adjust Mod Frequency if needed (default 1 kHz works for standard radio alignment).

4.4 Using External Modulation

1. Set the carrier frequency and RF level as above.
2. Connect an external audio source (e.g., a function generator or audio player) to the `Mod Input` BNC port.
3. Select **External Modulation** via the `Mod Mode` switch.
4. Adjust the external audio level and `Mod Level` knob to control modulation depth.

5. Safety & Usage Tips

- **Never connect external power to the RF output** – this will damage the generator’s internal circuitry.
- Start with the lowest RF level when testing unknown circuits to prevent overload.
- Use shielded cables for all connections to minimize interference.
- Avoid operating near strong magnetic fields or other EMI sources.
- Keep the unit clean and dry; store in a cool, dust-free environment when not in use.

6. Troubleshooting

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Issue	Possible Cause	Solution
No output signal	Power not connected; faulty cable	Check power supply; test with another BNC cable
Unstable frequency	Low warm-up time; dirty dial contacts	Allow warm-up; clean the frequency dial with a dry cloth
Weak/No modulation	Incorrect Mod Mode; low external audio level	Verify mode selection; increase external audio or Mod Level
Distorted output	Overloaded test circuit; incorrect impedance	Reduce RF level; use matching impedance loads

7. Maintenance

- Clean the exterior with a soft, dry cloth.
- Inspect cables and connectors regularly for wear or damage.
- Calibrate the frequency dial annually using a frequency counter for precision work.