

Welcome to GRC-9

Solid State Modules for the GRC-9 Receiver

Current Projects

I have been working on solid state modules to replace the tubes in the RT-77/GRC-9. The objective of this work is to provide collectors and amateur radio operators a method whereby they can actually operate this classic radio more easily without worrying about battery issues or replacement tubes.

The design work is based upon using commercial JFET transistors and bias circuitry mounted in 7-pin miniature tube bases. The single most important design parameter was that a minimum of circuitry modifications were to be made on the RT-77/GRC-9 chassis so that the radio would retain collector value. The second most important design consideration was very low power consumption.

As of 25 November 2005, one prototype is operational. The first prototype is a 1955 French made RT-77/GRC-9F. The prototype operates on a small battery pack consisting of three 9V batteries connected in series and one AA alkaline battery. The 9V batteries provide the basic operating voltage while the AA battery allows the use of the internal dial light. The total battery drain is only 7 mA at 27 VDC (70 mA with the dial light) which should allow at least 50 hours of operation on standard alkaline batteries. The batteries are connected to the GRC-9 receiver rear connector as follows:

1. +27 VDC, Pin-3, Pin-4
2. +1.5VDC, Pin-6,
3. -1.5, -27 VDC, Pin-5 (Ground)

Please note that the original prototype included an internal battery pack but it was learned that a minute current drain exists in the receiver circuitry that will drain the 9 VDC battery pack after several weeks. Therefore, the battery pack is now external instead of internal. This is also the best configuration to retain collectible value.

The latest version of the solid state module schematics can be [viewed here](#) and are designed to use commonly available electronic components. For best stability of the RF amplifier, install a 220 ohm resistor across the antenna terminals to provide a known and stable input impedance to the V1 module. This change can either be down internally or externally at the antenna jack.

The performance of the completed receiver exceeds the manufacturer's specification with CW sensitivity of around one microvolt and AM Phone sensitivity around three microvolts. Audio quality is good and the AVC and RF Gain control functions well on strong signals.

Only two minor chassis circuit changes were necessary to upgrade the RT-77 to solid state and these are shown in the photo to the right. The first was to cut the selenium regulator cathode lead in order to allow the use of a small 1.5V AA battery to run the dial lamp with minimal extra current.

The second circuit change was to parallel a 20pf capacitor to the 7pf BFO coupling capacitor to increase the BFO injection level and is shown in the image to the right. Even though the BFO worked



Solid State RT77/GRC-9 Prototype



Chassis with Solid State Modules



Regulator and BFO Changes



with the stock coupling capacitor, the increased injection level made the BFO more effective on stronger CW and SSB signals.

On 7 Dec 2005 I got the opportunity to test the RT-77 receiver on a simple, untuned active antenna, the MFJ-1022. The results were impressive with no intermodulation products or broadcast band interference noted, indicating that the RT-77 receiver has good dynamic range. The MFJ-1022 is an interesting addition to the receiver package because it makes portable short-wave and amateur listening very easy. The low cost is also impressive with the \$50.00 new price of the MFJ-1022 and its metal case making it quite rugged for field trips.

On 10 December 2005, minor changes were made to the V1, V3, V4 and V6 modules to improve strong signal handling, AVC action, IF stability and audio fidelity. It should now be possible to remove the receiver tubes and install the solid state modules with little or no alignment necessary.

If you are interested in upgrading your RT-77/GRC-9 to solid state, please [Contact Me](#). If you are interested in my background and qualifications, they can be [found here](#).

Solid State GRC-9 Receiver For Sale