

## **DRM – modification guide for YAESU FRG-100**

Last updated: October 24, 2002

### **Bill of materials:**

- Our DRM mixer (see web address at end of article for details) = 467 kHz (Quartz version recommended)
- 3.5mm jack plug
- Resistor 2.7kOhm
- Ceramic filter Murata CFW 455F
- Piece of LF shielded cable
- Optional small trimmer 4 to 20 pF

### **Measurement equipment:**

- Stable, level-adjustable HF generator at a shortwave frequency.
- Wideband noise generator.
- PC with soundcard and spectrum analyzer software.
- Low frequency level meter or Fraunhofer software radio.

### **Modification:**

- Remove the upper part of the housing.
- Using a signal with a stable level at a defined frequency in AM mode (wide) obtain an S-meter reading of S3 to S4, do not change this level or frequency!
- Disconnect the connectors, and de-solder the antenna connector.
- Remove the HF board.
- Drill a hole for the 3.5mm jack plug, seen from the back as far left as possible and at the same height next to the 12V connector and mount the jack plug.
- Solder the mixer board using 3 copper wires on top of the tin shielding box close to VR1002 (serves also as ground connection).
- Solder a wire from the connection of R1074 (+9V) closest to the front to the UB connection of the mixer board.
- Solder a resistor of 2.7k Ohm between the left (hot) connection of VR1002 as seen from the front panel to the IF input of the mixer.
- Replace the CF1002 (CFW 455I) filter by the CFW455F filter. The 10 kHz wide DRM mode will now be selected in AM Narrow! mode! Attention, do not attempt to solder the wide filter in the CF1001 location! The normal AM filter at this location (6kHz, AM wide) is also used for the FM mode.
- Remount the HF board (do not forget to solder the antenna connection!).
- Solder the shielded wire between the mixer output and the jack plug.
- Connect the PC with soundcard and spectrum analyzer software (e.g. Spectralab) to the 12 kHz jack plug. Connect the HF noise generator to the antenna input.
- Select AM narrow mode. Tune the receiver to a high frequency close to 30MHz.
- Turn the adjustment on the mixer board counterclockwise close to the left stop – maximum gain.
- Set the analyzer software for a high or infinite averaging value and small bandwidth (< 50Hz; preferably around 10Hz). The filter curve is now shown dominantly.

- If this is very asymmetric or rippled try to achieve improvement by adjusting filters T1014; T1019 (strong response on the filter curve) as well as T1007; T1008 (less strong response on the filter curve).
- Possibly replace C1048 by a trimmer and try to achieve improvement.
- Within a 10 kHz band (+- 5 kHz symmetric to 12 kHz) a ripple of less than 4 dB must be achieved.
- Reconnect the signal generator used at the start and reestablish in AM – wide mode by means of VR1002 the earlier obtained S-meter reading.
- Connect the decoder software or a level meter to the 12 kHz IF output.
- Tune to a good DRM signal. Adjust the adjustment on the mixer board for a DRM-signal of approximately 50mV RMS, by no means more than 100mV! Attention, AM signals produce a significantly higher RMS value! In the Fraunhofer software radio and line-input the first yellow level mark at -18dB should just not be reached.
- Close the housing (do not forget to reconnect the speaker).

**Attention! The modification will be done at your own risk! You may loose vendor warranty and liability!**

**We will be pleased to perform the modification of your receiver at a fixed price.**

**Editors note:** sat-schneider also sell new (modified) **YAESU FRG-100's**



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