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Introduction

The FRG-100 is still up to date an excellent receiver, but it lacks any DSP. Well, this kit gives you the capabilities of a full DSP and much more.

This document describes the procedure for installing an LIF (Low Intermediate Frequency [9 – 18kHz]) port in to the Yaesu FRG-100 receiver (also know as the Frog). Because we tap from the optional CW port available inside the FRG-100 the installation complexity can be kept to a minimum.

When we want to use the LIF port we set the receiver to CW/N (CW narrow). This activates the port hence output the 455 KHz signal to the LIF. Simple! For the 20kHz maximum IF bandwidth of this receiver the MDSR provides a real-time spectrum analyzer. Connecting it to the MDSR has also the advantages of improving audio clarity and the reduction of hiss on low level signals and all mode. Full DSP! The noise reduction system of Frog is not bad, but limited to change and DSP is not available. The MDSR has the advantage that it runs on a PC, which has a much more powerful processor, easy to use user interface and sharper digital filters at the IF level and gives you DSP power, even if your receiver does not support certain modulation modes. It also work on almost any DSP/SDR software, like: HSDR, SDRradio...

Note: To able to calibrate the MDSR software, the receiver needs to be run in CW/Narrow mode. This means the mode is always set and MDSR will set any other mode it supports! Mode and filter bandwidth are changed using the MDSR software.

Note: The FRG-100 model provides one RS-232 port. This makes it very easy to use the receiver using CAT software designed for the FRG-100. Omnirig (CAT software) does support the Yaesu FRG-100 receiver!

This procedure requires a level of expertise to dismantle the receiver and to solder. Nonetheless, the installation is straightforward and should not cause any difficulties for the moderate experienced HAM operator.

It is important to unplug all connectors and power before working on any transceiver. It is also important to be grounded to avoid static discharges.

Note: This receiver uses an IF of 455 KHz perfect for the LIF.

Note: No responsibility or liability will be accepted by the author of this document for any damage or malfunction caused by user modifications.

LIF port installation

Dismantling the Receiver

This is very simple, just remove the to cover screws. The manual also describes in detail how to open the receiver.

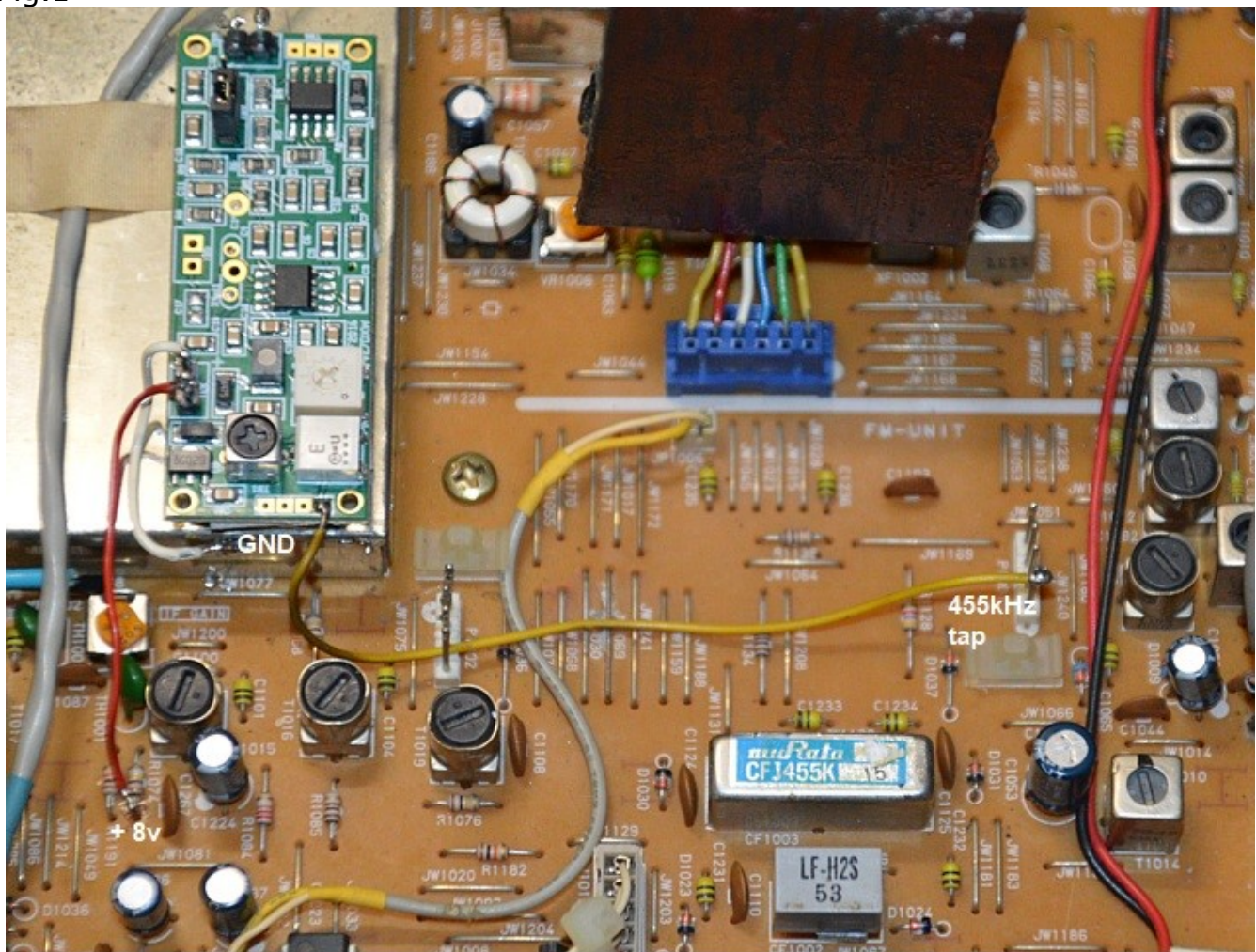
Because we are using the CW/N option port connections we do not need to make any difficult injection taps. (see picture below). The connector P1001 is marked with JW1240.

The only other connection we need is the power (anything between 10V...15V will do, and there are many places to tap).

The GND can be used from anywhere. I used the chassis where I mounted the LIF kit (closest connection).

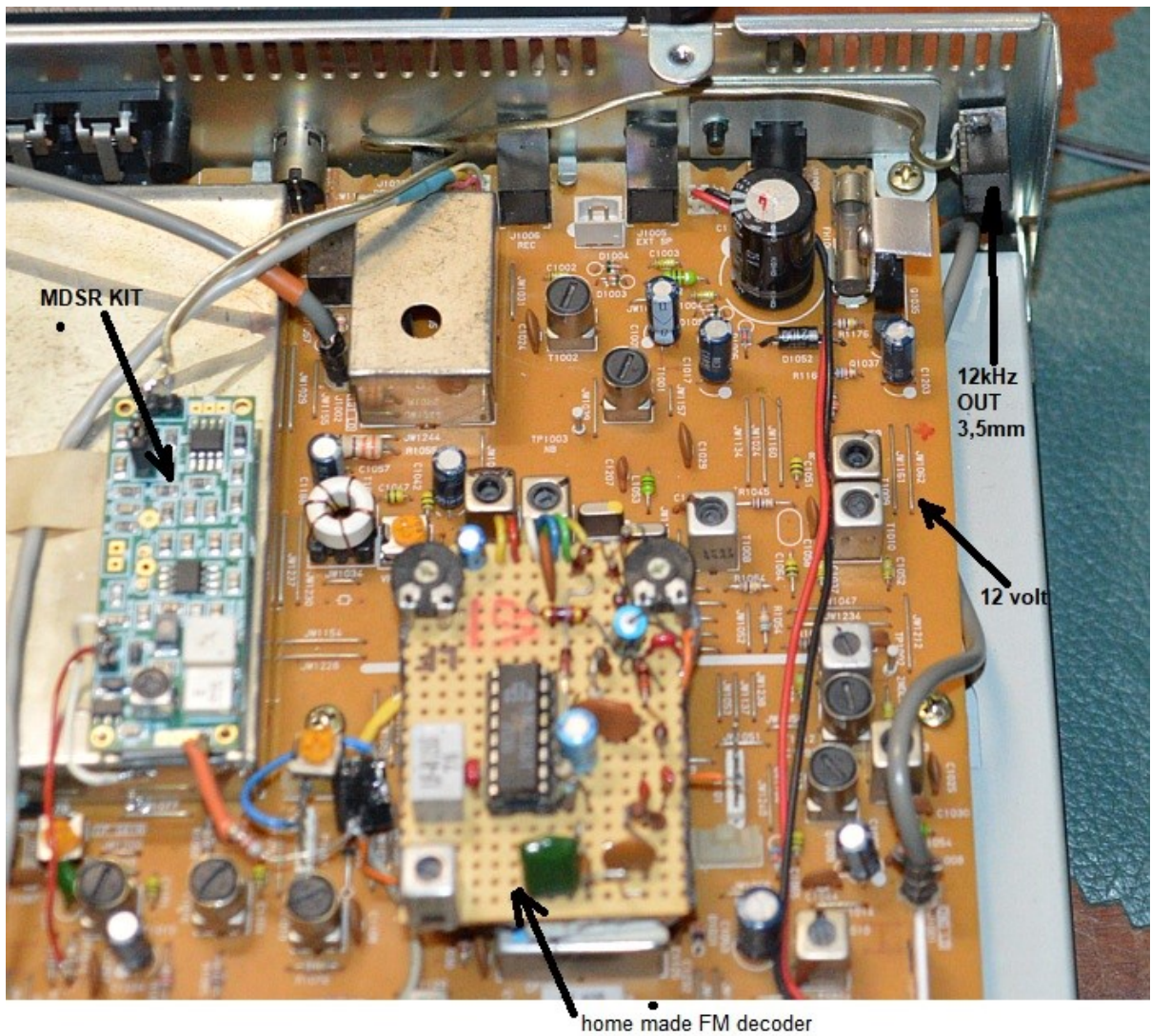
12 volts... This can be tapped inside the rig on several places. One is on bridge wire JW1062 (see fig.2)

Fig.1



You can also tap your voltage closer at R1074 (see Fig1) but at this point it only supplies 8 volts, still enough for the LIF kit though.

Fig.2

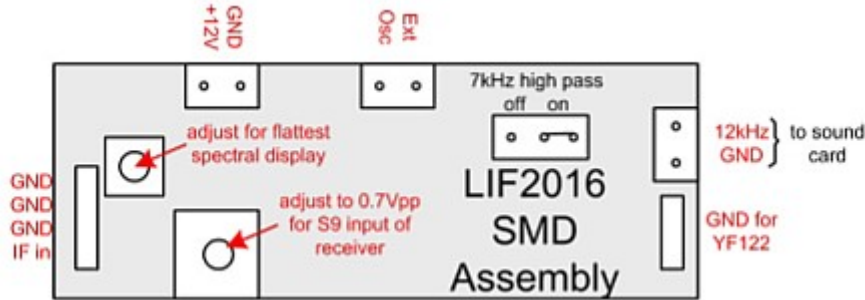


The kit is mounted with strong double sided tape. A 3.5 mm female connector is mounted on the left side. Routing the cable to the back where a hole needs to be drilled to mount a 3.5mm jack. There we'll connect the 12khz output from the LIF. Use a shielded RG-174. Secure the cable with a tie-wrap to the back of the chassis.

Fig.3



Connection of the LIF converter (RX-only)



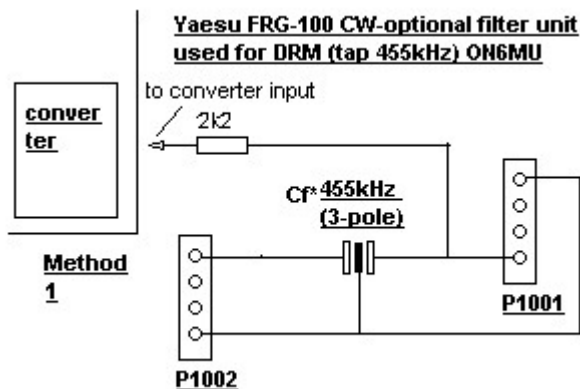
The LIF RX output of the receiver connects to the IN port (IF in TB1) of the LIF assembly and the audio Line out (12KHz + GND TB3) connects to the tip 3.5mm jack on the back of the receiver and goes to the line-in of the sound card.

Power needs to be provided to TB2 (+12V). TB5 is not used for the RX- only version. A jumper has to be placed on TB4 between 1-2 to bypass the 7kHz high pass filter or between 2-3 to enable it (recommended for DRM use).

To monitor when the FRog is in the CW/N selection (optional)

Ceramic resonator:

Cf is a simple 455 kHz ceramic filter (3 pin or 2 pin version can be used). These can sometimes be found in an AM/FM transistor radio, old wireless telephones etc.



TIP: any 455 kHz filter can be mounted there! There are many out there that can be used, even from low cost materials/CB etc. Also those that have a smaller bandwidth! It will not influence the MDSR kit, only what you hear when switching to CW/N.

The easiest way to "hear" anything coming from the CW/N port is by using an 100pF capacitor instead of the ceramic filter.

Remember: this is not mandatory to use the 12kHz output and the LIF capabilities!! Optional.

OmniRig Setup for the Yaesu FRG-100 Receivers....

OmniRig has the capability for users to compose a small text-file that will translate the incoming data so that OmniRig can work with the FRG-100. For more information please go to: <http://www.dxatlas.com/OmniRig/> to see how this is done and how you can help in implementing the FRG-100 receiver into the OmniRig protocol.

The baud rate for the receiver is 4800 baud and can be controlled extensively via CAT control!

For the RS232 connection a straight through cable is used. If the computer used, does not have a RS-232 port, a virtual USB to RS232 converter can be used.

Before starting the Calibration of the MDSR Software

All of the bandwidth and mode controls are now moved over to the DSP of MDSR Software.

- Tune to the desired band and frequency.
MDSR software allows tuning via software as long as OmniRig supports the receiver.
 - The receiver must run in "CW/N" (CW narrow Mode)
 - Frequency dial on RIG still usable
 - Scan and Memory functions still work and update RX frequency
 - Modes are only changed at the software level
 - RX Audio should now come from the computer speakers; the AF can be turned off at the receiver
- Note: If these settings change, the receiver frequency will not match the MDSR setup.

That completes the installation of the LIF port of the Yaesu FRG-100. The MDSR team wishes you all the best. You will be surprised about the new DSP capabilities of your rig using MDSR kit and software!

If you like the performance of the MDSR software, please tell all your friends about it. Thank you!

73"

The MDSR development team

To order the PCB kit or for more information please go to;
<http://users.skynet.be/myspace/mdsr>

For more mods on the FRG-100 please visit:
<http://users.belgacom.net/hamradio>