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# **Modification of Sony ICF-SW77 for DRM Software receiver**

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# 1 Introduction

## 1.1 Purpose of this document

This document describes how to modify a Sony ICF-SW77 short wave receiver to be able to receive a DRM signal. Therefore the DRM – Miniature Mixer Unit from Sat-Service Schneider is used, to mix down the 455 kHz IF of the receiver to a 12 kHz IF. This 12 kHz IF is feed to a PC sound card.

Please note that the manufacturer's warranty will be discarded if you do this modification.

## 1.2 Organization of this document

**Chapter 1** provides an introduction to the document.

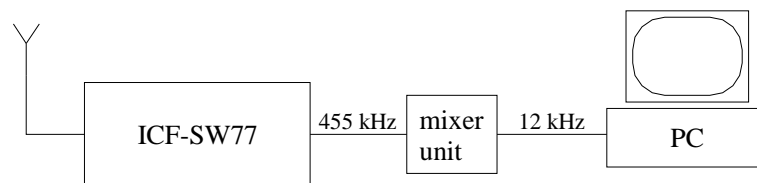
**Chapter 2** provides an overview of the system.

**Chapter 3** describes how the IF filter of the ICF-SW77 has to be changed.

**Chapter 4** describes how the DRM Miniature Mixer Unit has to be connected to the receiver.

## 2 System overview

The 2. IF (455 kHz) of the ICF-SW77 receiver is feed to the miniature mixer unit and down converted to a 12 kHz IF. This IF signal is then connected to the input of a PC sound card. This PC decodes the DRM signal with a decoder software.



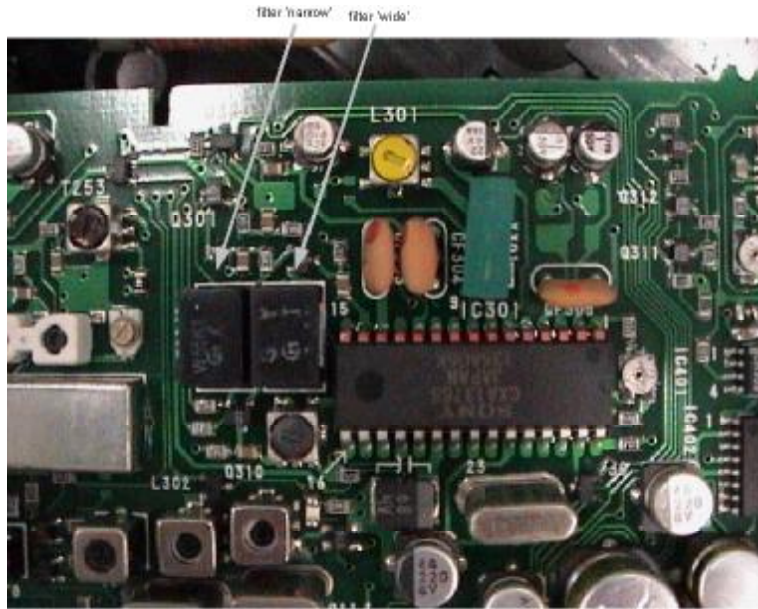
## 3 Change of 455 kHz IF filter

The bandwidth of the ICF-SW77 receiver is too small to receive a DRM signal. Therefore the IF filter has to be changed.

### 3.1 Schematic

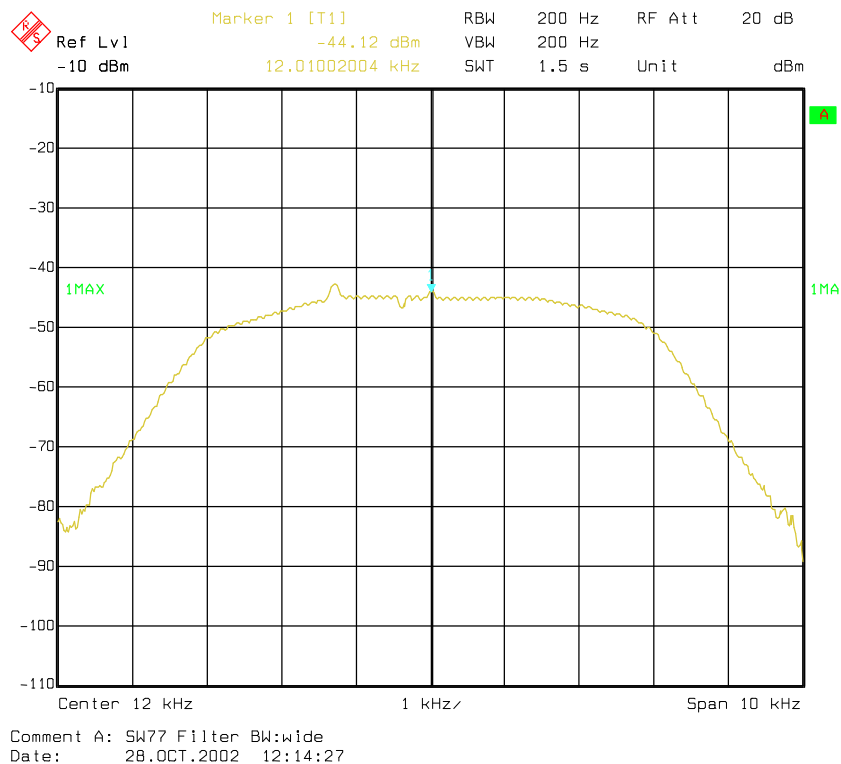
The following diagram shows the schematic of the SW 77 IF section.



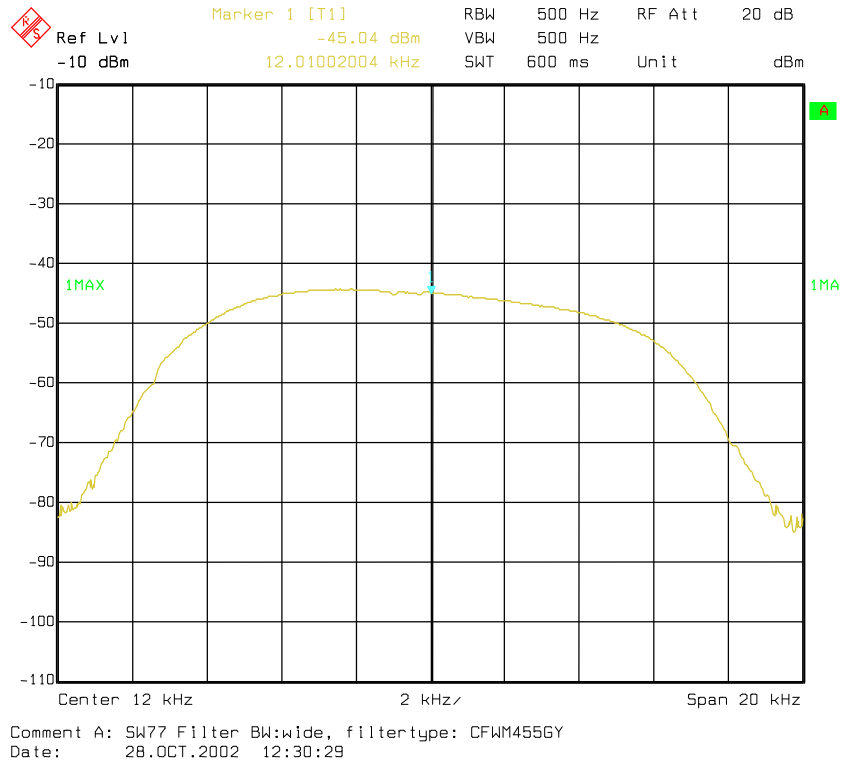


### 3.2 Filter bandwidth

The with the receiver supplied wide band IF filter has a bandwidth of appr. +/- 3 kHz. The bandwidth is shown in following diagram:



The recommended replacement filter is a Murata CFWM455GY, which has the same footprint as the original filter, but a bandwidth of appr. +/- 4,5 kHz. The bandwidth is shown in following diagram:



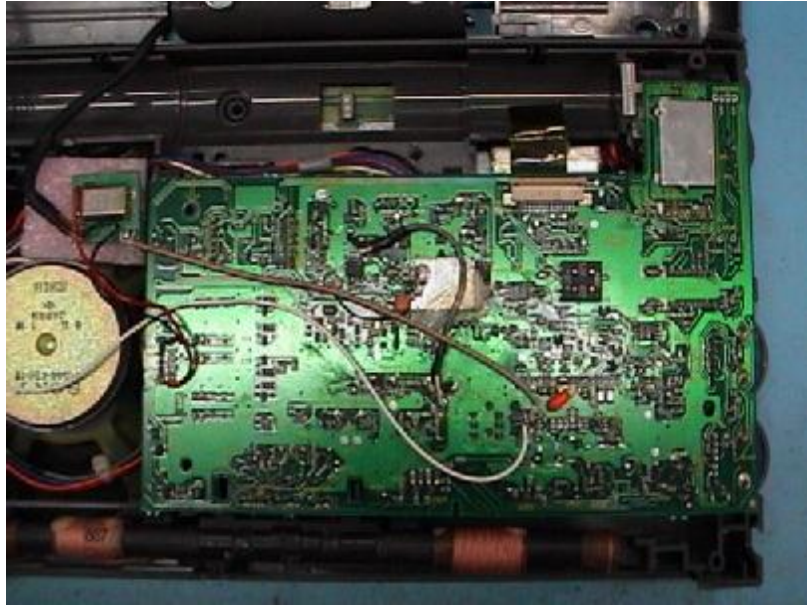
### 3.3 IF Filter types

The following Murata filter types are fitting into the IF filter footprint in the SW77 receiver:

<i>Part Number</i>	<i>6 dB bandwidth</i>
CFWM455G	+/- 4.5 kHz
CFWM455F	+/- 6.0 kHz
CFWM455E	+/- 7.5 kHz

## 4 Connection of DRM Miniature Mixer Unit

The IF frequency is 455 kHz in the SW77 receiver. Therefore the mixer unit with a 467,0 kHz oscillator is needed. It is recommended to use the mixer unit with the crystal oscillator.

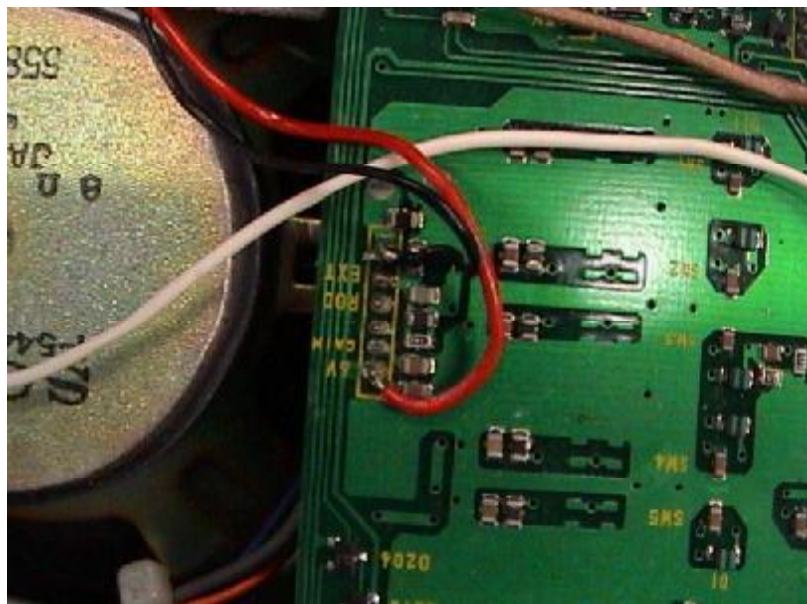


#### 4.1 Power supply

The mixer unit needs a power supply with 7-20 V DC. Unfortunately the receiver supplies a maximum voltage of 6 V. Test showed that it is possible to use the 6V instead of the 7-20 V to run the mixer unit. An other possibility is to remove the voltage regulator on the mixer unit and replace it with a diode (e.g. 1N4007).

The 6V power lines of the mixer unit can be connected to the connector at the right side of the PCB (back view). The +6V line is the most top solder point. The ground can be connected to the last solder point of the connector.

It is recommended to use the external power supply and not the batteries when the receiver is used as a DRM front end.



#### 4.2 IF connection

The 'hot' line of the IF input should be connected to pin 14 of IC301. The ground connection of the IF input should be connected to pin 12 of IC301.







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