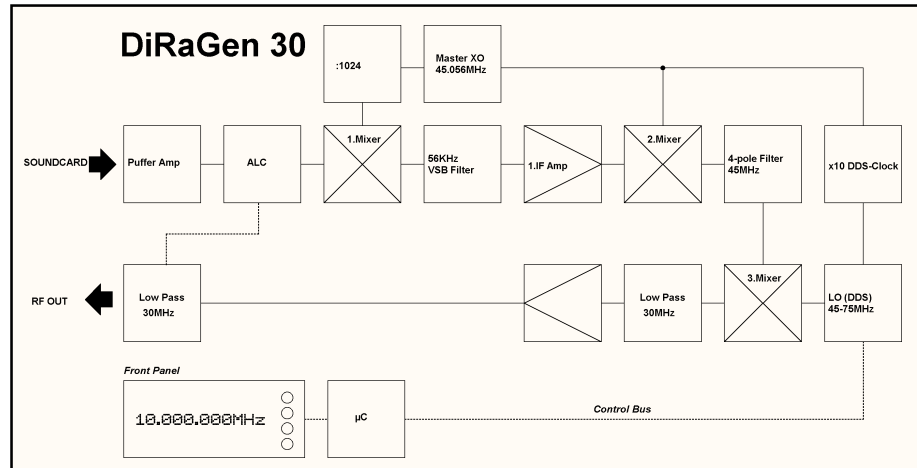


Due to a high performance design with triple frequency conversion in combination with efficient filtering very good unwanted sideband rejection and carrier suppression values are achieved.

All internal frequencies are derived from a stable crystal clock generator (master clock) to prevent odd frequency drifting effects.

A Direct Digital Synthesizer (DDS) acts as VCO combining good phase-noise and short time stability. We use this reliable principle already for our PC-controlled shortwave receivers.



## TECHNICAL DATA

Tuning Range: 130KHz - 30MHz (continuous)  
 Smallest Tuning Step: 1Hz  
 RF Output Connector / Impedance: BNC socket / 50Ohms  
 Output Level: -10dBm eff. +/- 3dB typ. (thermal measurement)  
 Audio / IF Input Level: 0.1Vss @ 1KOhm via 3.5mm stereo phone jack socket  
 DRM Output SNR: >40dB, typ. 45dB (max. value / measured via SoDiRa 072 & DREAM Transmitter)

Unwanted Sideband Suppression (-112KHz): > 60dB  
 Carrier Suppression (-56KHz): >50dB (0.5 - 27MHz); typ. 65dB  
 Harmonics Suppressions: 0-30MHz >40dB; over 30MHz >60dB  
 Spurious Signals Suppression (0-30MHz): >35dB  
 Frequency Stability (15min. warm-up period): +/- 1ppm typ. (20°C)

Max. Baseband Bandwidth (Audio/IF): 15KHz @12KHz IF center frequency  
 Power Supply / Connector: 12 - 15V DC max. 250mA / 2.1mm DC power socket (positive inner)  
 Operating Temperature: 0 - 40°C  
 Dimensions / Weight: 125 x 71 x 31mm / 0.20kg

What`s included ?

DiRaGen 30

Please note: Plug-Power Supply, application software and connecting cables are not included!

Edition 02/2009

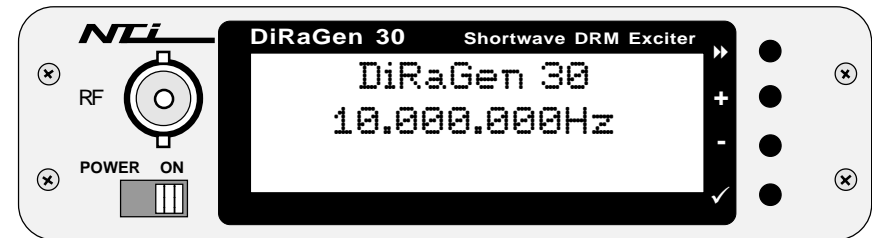
# DiRaGen 30

## Shortwave DRM Exciter

### 130KHz - 30MHz

- Testing of DRM receivers, laboratories & testing facilities
- Generating a standard DRM signal for demonstration purposes
- Education
- DRM transmission tests

## Instruction Manual Version V2.0



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## Generating Shortwave DRM Radio Signals

The DiRaGen 30 is an exciter which converts a PC-generated DRM signal to the shortwave range.

### What is needed ?

#### 1. DRM-Transmitter Software

Actually the following transmitter software is available for generating a DRM signal via PC & sound card:

- DREAM (Transmitter Mode)
- SPARK DRM Transmitter

DREAM the pioneer for DRM open source software contains an additional DRM-transmitter module which allows transmission of text & image files. SPARK is an actual real-time software modulator. The software is very comprehensive and is available on request from the author. There is also a commercial version with additional features available.

#### 2. PC

A PC or notebook equipped with a standard (AC 97) sound card allows the generation of a DRM signal.

A low-frequency DRM Baseband signal is available at the line output of the sound card as OFDM (Orthogonal Frequency Division Multiplex) signal. The standard center frequency of the OFDM signal is 12KHz.

#### 3. DiRaGen 30

The sound card OFDM signal is connected to the audio/IF input and converted in the shortwave range.

#### Please note:

For assessing the performance of the RF DRM signal we recommend our SDR receiver SDR 32 PREMIUM with guaranteed DRM-SNR >40dB in combination with the SDR software SoDiRa.

## Frequency tuning

After switching on the current software version number is shown; this information is important for later software upgrades.



Any RF output frequency can be selected within 130KHz to 30MHz directly via the integrated keyboard. Tuning step width is 1Hz.

### • Changing output frequency

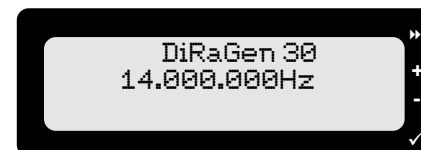
Press the "✓" key. The last selected frequency is shown and the first digit is simultaneously blinking.



To adjust the numerical value press either the "+" key or the "." key.

The upper "»" key allows the selection of the next corresponding digit, while the "+/-" keys allow again the variation. After adjusting all corresponding digits confirmation is done by pressing the "✓" key.

The last selected frequency is stored automatically and is permanently visible at the front display:



## Preliminary testing

Before connecting the PC's sound card signal to the exciter it is recommended to check the SNR quality.

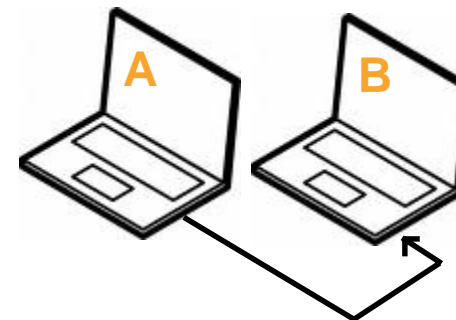
Therefore the following configuration is chosen:

#### A: PC with transmitter software

(e.g. DREAM Transmitter Mode)  
Adjustings: Robustness Mode B, MSC Protection Level 0, MSC Interleaver Mode 2s, Bandwidth 9KHz, IF 12KHz

#### B: PC with DRM decoder software

(e.g. SoDiRa)  
The soundcard output of A is connected to the soundcard input of B.



The indicated SNR value of B should be at least >50dB. Values >55dB are excellent.

## Input level adjusting

**In order to achieve the highest possible signal-to-noise ratio (SNR) the conversion must be absolutely linear. Overloading or compression degrades the SNR severely.**

The DiRaGen 30 has an easy-to-read integrated overload control (red LED) at the rear panel.

Adjust the PC volume (audio level) control settings until the LED starts just to flicker. This is the optimum level to reach the highest possible SNR.

Higher input levels lead to compression effects and degrade the output SNR.

**Conclusion: Less is more !**

**In case of further amplification of the RF output signal additional selective filters must be inserted.**

**Additional amplifiers must be operated within their linear range.**

**This is guaranteed when the RMS output power level (measured thermally) is about 10dB below the declared compression point (P-1dB) for peak envelope power (PEP).**

## Rear panel connections

Power supply Input (from sound card) Peak level indication (red LED)

