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.



DiRaGen 30 USB

## TECHNICAL DATA

Tuning Range: 130KHz - 30MHz (continous)
Smallest Tuning Step: 1KHz via SPARK (1Hz eff.)
RF Output Connector / Impedance: BNC socket / 50Ohms
Output Level: -15dBm eff. +/- 3dB typ. (thermal measurement)
Audio / IF Input Level: 0.1Vss @ 1KOhm via 3.5mm stereo phone jack socket
DRM Output SNR: MER >45dB/ measured via SoDiRa 072 & DREAM Transmitter)
USB connector: USB-B (socket) USB 2.0 (backward-compatible)
Unwanted Sideband Suppression ( -112KHz): > 60dB
Carrier Suppression (-56KHz): >55dB
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): 20KHz
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 USB
Please note: Plug-Power Supply, application software and connecting cables are not included!

# DiRaGen 30 USB

## Multimode Shortwave Exciter
## 130KHz - 30MHz

# & SPARK-Modulator Software

SPARK
DRM-MODULATOR

## Instruction Manual
## Version V2.0

DiRaGen 30 USB
Multimode Shortwave Exciter
NTi
                                    ON AIR
RF
                                    CONNECTED
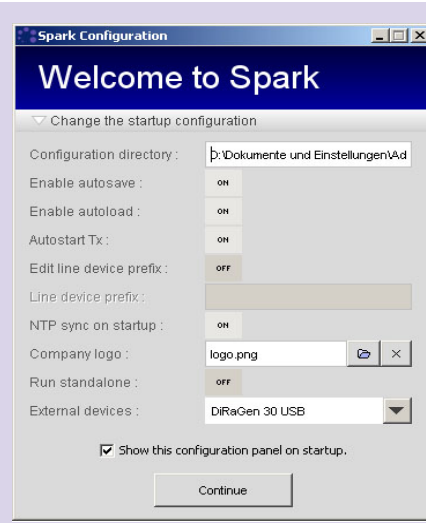POWER  ON                           USB

NTi ®

The DiRaGen 30 USB unit is completely remote controlled via USB.

Before generating an output signal all the required unique settings have to be set. After this procedure these settings are automatically loaded when starting the program again. All settings can over-written individually.

Additionally a brief explanation of each option is given as the mouse passes over it.

It is also possible to store a time-controlled automatic switching configuration, e.g from AM to DRM.

The DiRaGen is recognized automatically by SPARK as external device and will be found under >>> External Devices of the start & configuration screen.
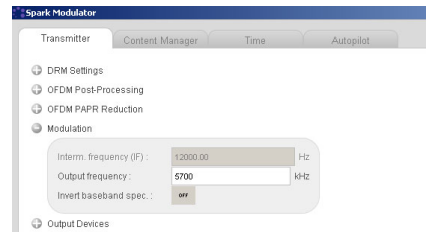
**Spark Configuration**

## Welcome to Spark

▽ Change the startup configuration

| | |
|---|---|
| Configuration directory : | D:\Dokumente und Einstellungen\Ad |
| Enable autosave : | ON |
| Enable autoload : | ON |
| Autostart Tx : | ON |
| Edit line device prefix : | OFF |
| Line device prefix : | |
| NTP sync on startup : | ON |
| Company logo : | logo.png |
| Run standalone : | OFF |
| External devices : | DiRaGen 30 USB |

☑ Show this configuration panel on startup.

Continue

## Output frequency setting:

The output frequency of the DiRaGen 30 USB is directly selected (units KHz) within the configuration menu of SPARK: Transmitter >>> Modulation >>> Output Frequency
In our example screenshot the output frequency was set to 5700KHz = 5.700MHz.
The corresponding intermediate frequency (IF) value is set automatically due to the selected DRM bandwidth.

**Spark Modulator**

Transmitter | Content Manager | Time | Autopilot

○ DRM Settings
○ OFDM Post-Processing
○ OFDM PAPR Reduction
○ Modulation

| | | |
|---|---|---|
| Interm. frequency (IF) : | 12000.00 | Hz |
| Output frequency : | 5700 | kHz |
| Invert baseband spec. : | OFF | |

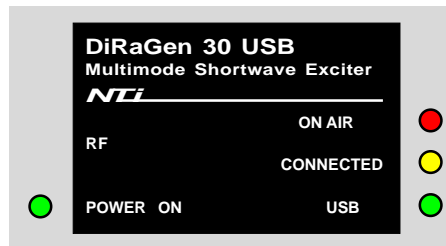○ Output Devices

## Starting transmission:

After the application configuration has been finished, the transmission can be started by pressing the start button:

SPARK transfers the frequency information to the DiRaGen 30 USB.
First the yellow CONNECTED-LED does light up followed by the red ON AIR-LED.
The transmission can be stopped by pressing the corresponding red button symbol.

**DiRaGen 30 USB**
**Multimode Shortwave Exciter**
**NTi**

RF — ON AIR ●(red)
— CONNECTED ●(yellow)
●(green) POWER ON — USB ●(green)

An integrated watchdog function of SPARK checks continously the connection to the DiRaGen device.

In case of a detected interruption or distortion (e.g. power loss) the DiRaGen is automatically reinitalized.

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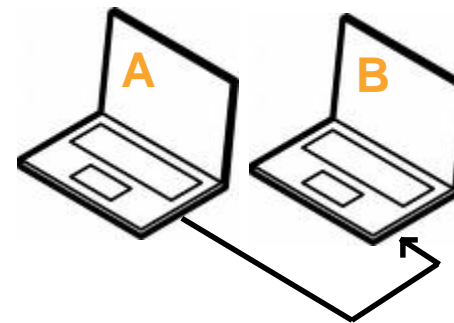
### A: PC with transmitter software
(e.g. DREAM Transmitter Mode)
Adjustings: Robustness Mode B, MSC Protection Level 0, MSC Interleaver Mode 2s, Bandwidth 9KHz, IF 12KHz

### B: PC with DRM decoder software
(e.g.. SoDiRa)
The soundcard output of A is connected to the soundcard input of B.

**A** **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 severly.**

!

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 thermically) 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)

RS - 232

| | |
|---|---|
| **12V DC** | **DiRaGen 30    Multimode Shortwave Exciter (Baseband Bandwidth 20KHz)** |
| **+-⊙-** | **Audio/IF  in    Peak  Level    © 2009 NTi    Made  in  Germany** |

C E