DECODIO

ReX

EMISSION DETECTION

SIGNAL EXTRACTION / CHANNELIZATION

ANALYSIS

DEMODULATION

IQ SIGNAL RECORDING

Decodio

www.decodio.com

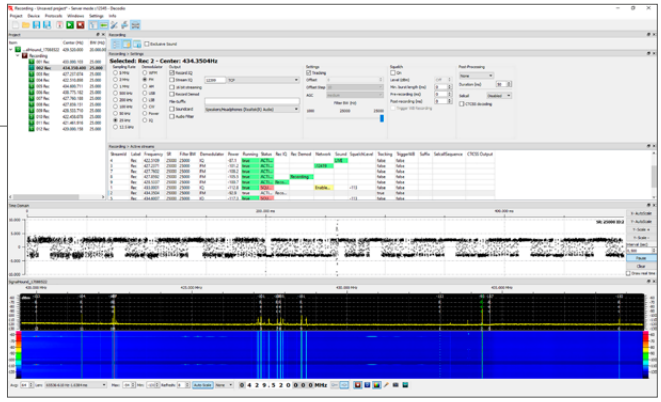
DETECT | DECODE | VISUALIZE

DECODIO ReX

Decodio ReX is a high-performance PC-based software solution for **wideband signal acquisition, channelization, demodulation and streaming** based on **Decodio RED**.

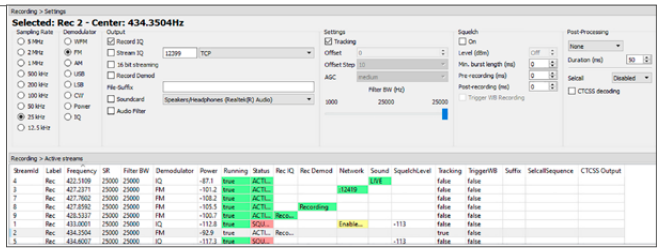
It runs on a conventional PC and does not require specialized hardware, which makes it a very flexible RF-recording solution. **Decodio ReX** also supports multiple wideband input signals in parallel to cover an extremely wide frequency range.

The application provides a plug-in interface based on a **C/C++ API for easy integration** of custom decoding algorithms and RF receivers. This functionality allows the user to easily adapt **Decodio ReX** to their own needs. In addition **Decodio ReX** instances can be used as signal sources in a **TDOA**-based location finding system.



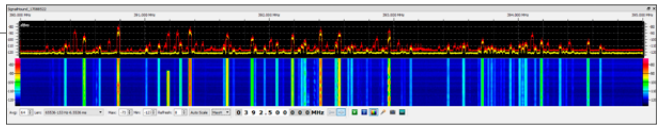
PARALLEL PROCESSING

With **Decodio ReX**, up to 512 narrowband channels can be extracted, processed and recorded in parallel over an extremely wide frequency range thanks to the multi-receiver support. **Extracted signals can be streamed over network** for further processing in third-party software.



DEMODULATION AND RECORDING

Each channel can be assigned individual settings for demodulation, bandwidth, streaming and recording (both IQ and demodulated). **An adjustable filter makes it easy to precisely match any signal bandwidth**. Per-channel squelch settings can be used as recording trigger, with pre- and post-recording intervals and automatic wideband recording. Moreover CTCSS and Selcall decoding are available for all variants.

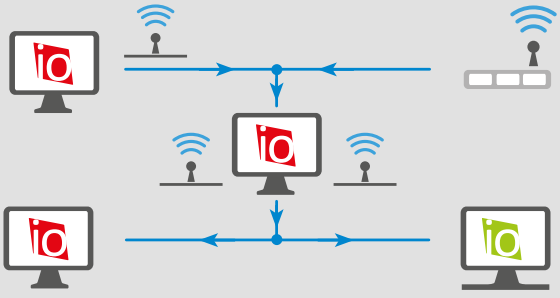


SPECTRUM VISUALIZATION

Powerful visualization tools in both time and frequency domains (including min and max-hold, easy zooming and panning, bandwidth and power measurements) make it very easy to analyze the acquired signal and to perform measurements. **An integrated spectrum overlay feature** is used to compare previously recorded spectra with the actual signal to quickly spot missing or unexpected signals. The overlaid spectrum can be displayed with power and/or frequency offsets.

IQ-STREAMING AND REMOTE CONTROL

Thanks to its network streaming capabilities **Decodio ReX** can be easily integrated into existing infrastructures. Input signal streams are accepted over TCP/UDP in the VITA49 or Decodio's proprietary format. In addition **Decodio ReX** can be deployed on machines without graphical interface and controlled remotely. This makes it possible to distribute the computing load among multiple instances running in parallel.



FAST EMISSION DECTECTION

TDOA-READY WITH GNSS TIMESTAMPING SUPPORT

MULTICHANNEL ANALYSIS, STREAMING AND RECORDING

ANALOG DEMODULATION

IQ SIGNAL EXTRACTION AND NETWORK STREAMING

POST-PROCESSING FOR MODULATION ANALYSIS

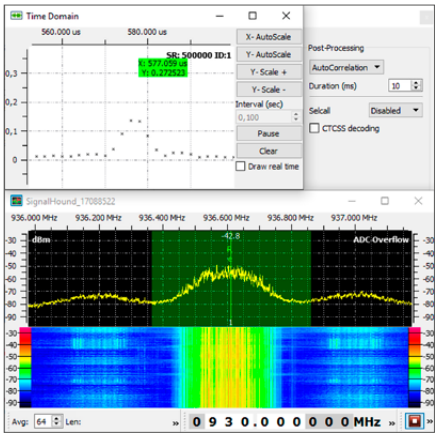
COMPARISON AGAINST REFERENCE SPECTRUM

WIDE RANGE OF SUPPORTED RECEIVERS

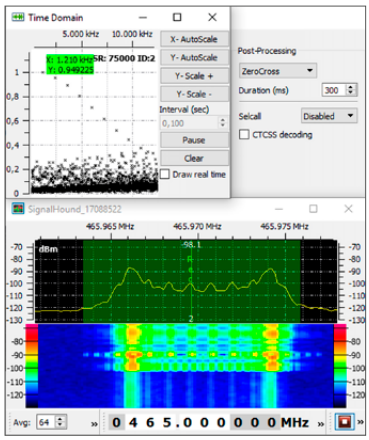
HIGH RESOLUTION MEASUREMENTS IN TIME AND FREQUENCY DOMAIN

HIGH RESOLUTION TIME AND FREQUENCY ANALYSIS

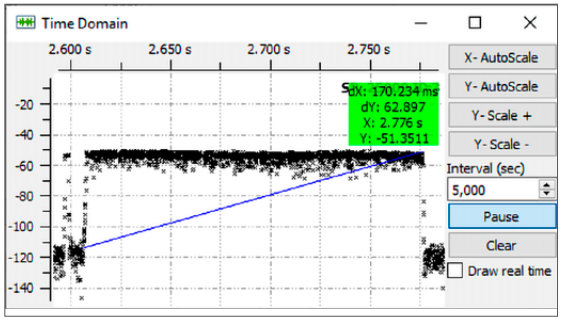
The signal analysis functions in **Decodio ReX** are not only limited to direct time signal measurements like burst duration or signal power. Several post processing functions can be applied to extract signal information like **time slot duration or symbol rate**.



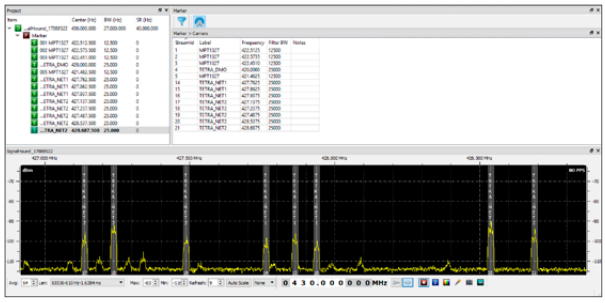
The **auto-correlation** of a signal can be calculated to find the repetition rate of preambles and training sequences, or measure the time slot lengths of a TDMA signal.



The **zero-crossing rate** of a digital signal can be measured in order to estimate the symbol rate and distinguish between signals with similar spectral shapes.



Time domain analysis can be performed to precisely measure burst duration and signal power over time.



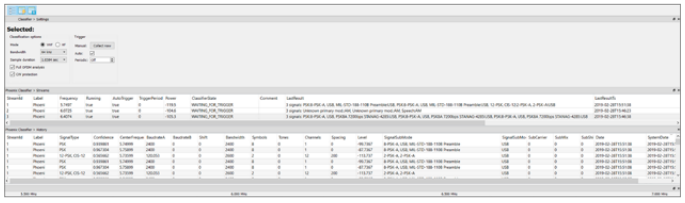
Markers can be defined in the spectrum to highlight known signals. Each marker has its own label, center frequency and bandwidth. Additional information such as signal origin and type can be added.

Different lists of markers can be saved to files and loaded depending on the scenario.

TECHNICAL DATA

Decodio Software Components	**Decodio RED** (**BLUE**, **PINK**, **GREEN** and **TDOA** as options)
Maximum number of parallel narrow-band channels	Depends on license and processing power (typically 512)
Narrow-band channel sampling rate	Variable from 8 kHz up to 5 MHz
Filter width for narrowband channels	Minimum 1/20th of the sampling rate, maximum full sampling rate
Analog demodulators	CW, USB, LSB, AM, FM, WFM
CTCSS and Selcall decoding	EIA, EEA, CCIR, PZVEI, DZVEI, ZVEI_1, ZVEI_2
Analysis and post-processing features	Zero crossing, DFT, DFT^2, DFT^4, Cepstrum, Autocorrelation, CTCSS and Selcall decoding, manual time and frequency domain measurements
Frequency offset	For CW, USB and LSB
AFC (frequency tracking)	Available for AM, FM and WFW
AGC (automatic gain control)	For demodulated waveform output
Adjustable minimum burst-length, pre- and post-recording intervals for squelch-triggered recordings	From 0 ms up to 10 sec
IQ inputs	Files, network streams, RF receivers
Supported file formats	WAV or RF64 (IQ signal), raw files (8 bit unsigned / 8, 16, 24, 32 bit signed / 32, 64 bit floating-point)
Supported IQ streaming formats	Input and output streams over TCP and UDP, in both VITA 49 and Decodio's proprietary format
Supported RF receivers	Information available on request
Remote control interface	JSON-based TCP interface
Operating system	Windows (Linux on request)

OPTIONS

Decodio BLUE	Web-based front-end to the spectrum monitoring system and database infrastructure. Additional browser-based visualization features including time series charts for long-term signal power monitoring.
Decodio PINK	User-specific alarming. Based on different triggers, actions like SNMP traps or user defined TCP messages can be generated.
Decodio GREEN	Decodio GREEN provides a plugin-based C/C++ application programming interface (API) to Decodio RED and is the perfect tool for custom signal processing. Narrowband signals are sent to a user defined DLL for IQ-signal processing. This allows the integration of Decodio's powerful channelization capability into own applications.
Decodio TDOA	Signal-type independent location finding system using minimum three Decodio ReX instances based on time-difference-of-arrival method.
Classifier	 Powerful signal classifier for CW, FSK (incl. F7B), PSK (DPSK, QPSK, 8PSK, 16PSK, 8QAM, 16QAM and OPSK), OFDM and several transmission modes like MIL-STD-188-110, MIL-STD-188-141B or STANAG-4285 (details on request).

APPLICATIONS

SIGNAL COLLECTION / ANALYSIS

SIGINT / COMINT

AIR TRAFFIC CONTROL VOICE COLLECTION

ACADEMIC / RESEARCH

TEST AND MEASUREMENT

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