PROCITEC®
HOUSE OF SIGNALS

Technical Specifications

Analysis Suite

Product Version v24.1

November, 2023

ANALYSIS SUITE PRODUCT CONFIGURATIONS	
go2DECODE STANDARD	• Software for detection, demodulation, decoding and analysis of known and unknown radio signals • Knowledge based recognition approach • Automatic production of signal content • Speech detection and recording • Standard set of demodulators and decoders HF/VHF/UHF/SAT • Allows parameterization of decoders • Display for signal monitoring • Handling of modem lists • Universal configurable demodulators • Displays and tools for signal analysis
go2DECODE PROFESSIONAL	• Software for detection, demodulation, decoding and analysis of known and unknown radio signals. • Integrated decoder development environment for the development of customer decoders or the adaption of existing decoders (based on the decoder description language pyDDL). • Knowledge based recognition approach • Automatic production of signal content • Speech detection and recording • Standard set of demodulators and decoders HF/VHF/UHF/SAT • Allows parameterization of decoders • Display for signal monitoring • Handling of modem lists • Universal configurable demodulators and editable decoders • Displays and tools for signal analysis • Software based modulation generator (SOMO) • Decoder Development
go2DECODE LIGHT	• Software for detection, demodulation and decoding of known radio signals • Knowledge based recognition approach • Automatic production of signal content • Speech detection and recording • Standard set of demodulators and decoders HF/VHF/UHF/SAT • Display for signal monitoring
SIGNAL ANALYZER	• Software for manual and automated modulation analysis • Measure parameters for FSK, PSK, Multi-tone, Multi channel, etc. modulated signal • Integrated automatic Modulation Classifier with Modem Classification feature • Multiple predefined analysis sets for modulation type specific signal analysis • Preprocessing with integrated DDC, FM and AM demodulation • Audio demodulation and replay • Multiple analysis displays like Waterfall, Spectrum, Histogram, Autocorrelation, Constellation, Scatter, Bit, etc. • Set of x-, y-, z-cursors in difference or harmonic measurement modes • Universal demodulator for FSK, PSK and Multi-tone modulation (includes burst and multi channel)
SIGNAL ANALYZER OPTION OFDM	• Additional toolset for Signal Analyzer software for OFDM signal analysis and demodulation • Tu/Ts duration measurement • Scatter displays for amplitude and phase over time and carriers • Multiple I/Q constellation diagrams • Multicarrier phase correction • Demodulation PSK2-PSK16, QAM4 and QAM16 with Bit display

ANALYSIS SUITE PRODUCT CONFIGURATIONS	
go2ANALYSE	• Software for analysis, evaluation and manipulation of recorded bitstreams to determine the characteristics of the coding used • Configurable bit displays • Functions for editing, manipulation and analysis • Logical operations • Search of periodics and bit pattern • Handling of LFSR • Complete and partial autocorrelation • Testing against codes • Deinterleaving and demultiplexing • Recording and replay of analysis operations • Configurable code tables • Functionality partly adaptable by a scripting language
go2key	• Finds the used keys for ARC4 encryption (e.g. Motorola Enhanced) for DMR radios • Works with data records from go2signals DMR decoders, short records are sufficient • The keys found can be used to decrypt future transmissions as well, e.g. in go2signals • The search speed depends on the computing power of the used computer • Requires export approval prior to supply

go2DECODE	
DATA ACQUISITION	• Digital IF stream (complex baseband I/Q); Soundcard (real or complex) • Digital IF/AF recordings (real / complex WAV 8, 16, 32 Bit)
LANGUAGE	• English or German
RECOMMENDED PC HARDWARE	• Notebook or Desktop; CPU: Intel i5 or higher, min. 2.6 GHz; • Memory: ≥ 4 GByte RAM, HDD: ≥ 10 GB, • Screen Resolution min. 1280 x 1024 Pixel, • Soundcard for analogue IF input, 1 GBit/s Ethernet for digital IF input
OS	• Windows 10/11 de/en, 64 bit • CentOS Linux 7 (7.5 or higher, 7.5 is recommended), 64 bit • Red Hat Enterprise Linux RHEL 8 (8.4 or higher, 8.4 recommended), 64 bit • Ubuntu 22.04 LTS (22.04.2 or higher, 22.04.2 recommended), 64 bit
LICENSE	• USB-Dongle (CodeMeter) as default • Optional: License sharing with license server • The AMBE+2™ voice coding Technology embodied in this product is protected by intellectual property rights including patent rights, copyrights and trade secrets of Digital Voice Systems, Inc. This voice coding Technology is licensed solely for use within this Licensed Product. The user of this Technology is explicitly prohibited from attempting to extract, remove, decompile, reverse engineer, or disassemble the object code, or in any other way convert the Object Code into a human-readable form. US Patent Nos. #8,595,002, #8,359,197, #8,315,860, #8,200,497, #7,970,606, #6,912,495 B2, #6,199,037.
ISO 9001:2015	• Company is certified

go2DECODE PRODUCT FEATURES	
ALPHABETS	• Can be added to the decoder source code, free configurable (requires go2DECODE Professional)
DECODERS	• Our list of standard, military and PMR decoders is subject to continuous development. See the list of available decoders: www.procitec.com/go2signals-decoderlist - MIL and PMR decoders may need an End-User-Certificate (depending on the country of the user) - If not implemented automatic sideband detection can be achieved via two modems set to inverse sidebands - A gap between message bursts and acknowledge burst must be detectable - Separation of slow selcall types cannot be guaranteed - Slow multitone modems are recommended to operate with fixed nominal frequency
VOICE DETECTION, DEMODULATION, RECORDING	• Modulation types: AM, FM, USB, LSB • Detection: voice yes / no • Nominal frequency • Voice Pitch • Automatic audio demodulation and recording
DEMODULATORS	• Automatic frequency, amplitude and symbol rate control • Fast equalizer using known training sequences (via pyDDL) • Primary demodulation USB/LSB/AM/FM • Automatic burst synchronization • List of demodulators see further back in this brochure
GUI	• Easy and intuitive to operate • Input spectrogram with live audio • Manual and automatic demodulator and decoder control • Different analysis displays for manual signal analysis • Specialized signals analysis cursor measurement functions • Modem editor with demodulator and decoder settings • Decoder editor and debugger (pyDDL, Option Professional)
INPUT FILES (DANA)	• Digital IF (complex baseband I/Q 32 Bit), from 2kHz up to 10 MHz sampling rate (note: functionality may be limited for sampling rates higher than 2 MHz) • Playback of standard wav files. • Digital IF/AF (real / complex WAV 8, 16, 32 Bit) • Playback of Perseus and WiNRADiO WAV recordings with correct frequency display
INPUT AUDIO (DANA)	• Playlist (files) • Loop mode • Complex IQ / • Audio files • Remove DC • Filtering • Mirror • FM demodulation • Time source (File / System clock) • Sample rate converter • Centre frequency tuning • Streaming TCP/IP • Configurable replay speed

go2DECODE PRODUCT FEATURES	
INPUT, TCP/IP STREAMING	• From 2 kHz up to 10 MHz sampling rate (note: functionality may be limited for sampling rates higher than 2 MHz) • Generic PROCITEC / PLATH format • VITA 49
SIGNAL RECORDINGS	• Types: IF/AF • Start / Stop - Manual by operator - Automatic by trigger • Trigger types - Configurable squelch level - Signal detected - Transmission method recognized - Transmission method unknown - Voice / Morse detected • File formats: WAV
OUTPUT	• Decoding results • TXT-File with decoded text • XML-File with decoded text and metadata • Signal recordings • Voice recordings • Bitstream *.rec files (bits and quality of each bit) • Bitstream *.txt files (bits)
SONAGRAM VIEWER (SOVI)	• Standalone application for spectrum / spectrogram display
RESULT VIEWING (PMO)	• Display of: - Decoder output - Demodulated audio files (CW, TETRA etc.) - Text output (ALE, HFDL, etc.) - Binary files
SIGNAL GENERATOR (SOMO)	• For standard test signals. Requires go2DECODE-Professional; • Detailed description see further back in this brochure
DECODER DEVELOPMENT	• Modification of standard decoders • Definition of new decoders • Integration of existing decoders, requires go2DECODE-Professional; • Detailed description see further back in this brochure
SOUNDCARD INTERFACE (DANA)	• Analogue input • WiNRADiO VSC • Virtual-Audio-Cable (VAC) etc.
THIRD PARTY DECODER	• Interface to the DDC channel output • Interface to the bitstream output • Streaming and control interface with pyDDL

go2DECODE SIGNAL ANALYSIS FUNCTIONS

DISPLAYS	• Spectrum • Spectrogram / Sonagram • Autocorrelation • I/Q Constellation • Eye pattern • Time domain (oscilloscope) with additional histogram • Analysis (magnitude, frequency and phase) with additional histogram • Hell • Bit
SIGNAL SQUARING	• Squaring: 0, 1, 2, 3
WINDOWING	• Rectangle • Hanning • Hamming • Kaiser • Flat Top • Blackman
CURSORS	• Harmonic • Crosshair • 2 cursor modes
CENTRE FREQUENCY	• Adjustable
OPERATION MODES	• Online • Offline

go2DECODE DEMODULATORS

AM/A3E (Voice)	OFDM
Analogue Selcal	OQPSK
ASK 2 (OOK), 4, 8	Pactor II, III, 4
Chirp	PSK 2, 4, 8, 16 A/B
Clover II	PSK data aided
Clover 2000	QAMn 16, 32, 36, 64, 128, 144, 256
Clover 2500	QAMn var: • APSK16_dvbs2 • ASK2PSK2 abs/diff • ASK2PSK4 abs/diff • ASK2PSK8 abs/diff • ASK2PSK16 diff • QAM 8 • QAM 16 circle/square • QAM 16 v17 abs/diff • QAM 16 v22 abs/diff • QAM 32 circle • QAM 64 circle/square • QAM 256 square
Coquelet	
DPSK 2, 4, 8, 16 A/B	
F1A	
FM/F3E (Voice)	
F7B/F7W	
FSK 2 matched	
FSK 2, 4, 8 disc.	
FSK 2,3 auto shift	
MSK/GMSK	
Hybrid	
J3E (USB, LSB) (Voice)	
LINK11*	
MDPSK 2, 4, 8, 16 A/B	
MCFSK 2	
Morse (A1A, A2A, F1A, F2A)	Robust Packet
MPSK 2, 4, 8, 16 A/B	TFM3
MT63	THROB / THROBX
MultiModem	Wideband HF*(MIL 110 App.D)
MultiTone (FSKn, single or simultaneous tones)	

* requires optional product feature MIL decoder package

go2DECODE SUPPORTED RECEIVERS

Receiver	Windows supported	Linux supported
AirSpy	•	
CommsAudit CA7851	•	•
Grintek GRX Lan	•	
IZT R3xxx series	•	•
IZT R4000 (SignalSuite)	•	•
IZT R507x series	•	•
Microtelecom PERSEUS	•	
narda® NRA-3000 RX	•	•
narda® NRA-6000 RX	•	•
narda® IDA 2	•	•
narda® SignalShark® 3310	•	•
PLATH SIR 5110/5115	•	•
R&S EB 500/510	•	•
R&S EM100/PR100	•	•
R&S ESMD	•	•
RFSPACE NetSDR	•	•
RFSPACE SDR-14	•	
RTLSDR/Noxon USB-sticks	•	
SDRplay RSP1 & RSP2	•	
SignalHound BB60C/D	•	•
SignalHound SM200 A/B	•	•
ThinkRF R5500-408	•	•
ThinkRF R5500-427	•	•
ThinkRF WSA5000-408	•	•
ThinkRF WSA5000-427	•	•
USRP X310	•	• (not Ubuntu)
WiNRADiO G31DDC, G33DDC, G35DDC, G39DDC	•	
Generic VITA 49 receiver support	•	•
Other generic „Winrad ExtIO“ supported receivers	•	

DECODER DEVELOPMENT (INCLUDED ONLY IN GO2DECODE PROFESSIONAL)

BASIC FUNCTIONS	• Modification of standard decoders • Definition of new decoders • Integration of existing decoders
FUNCTION LIBRARY	• Preprocessing • Symbol conversions • Descrambling procedures • Channel selections • Pattern search • Burst detection • Forward/backward time jumps • Deinterleaving • Check and correction procedures: • CRC, Hamming, Viterbi, BCH, Reed-Solomon • Elementary arithmetic and bit manipulations • Table handling • Various output formats, alphabets, channels • Control of demodulation and decoding • Setting of demodulator parameters • Selected voice codecs • Branches and sub-routines • Soft decision • Expandable with third party Python modules or C libraries (pyDDL only)
DECODER EDITOR SPYDER	• Automatic command completion • Content related help • Syntax highlighting
DEBUGGER SPYDER	• Debugging - Breakpoints on lines of code - Single-step mode for lines of code - Display of variable contents in various formats and displays - Editing of variable contents - Display of all input data packages - Display of internal data buffer and current read position • Advanced analysis of recognition, demodulation and decoding - Breakpoints in several decoders for one modem list - Comparison of the decoder behavior in search phase / decoding phase - Monitoring the current demodulator state

SOMO SIGNAL GENERATOR (INCLUDED ONLY IN GO2DECODE PROFESSIONAL)

MODULATION GENERATION	• Single and multichannel, continuous and short-duration / burst signals • Waveform and digital modulation (using ITU emission designators): - ASKn - PSKn (single and multi channel) - QAMn (single and multi channel) - ASKnPSKm (single and multi channel) - NCPFSKn (Non-Continuous-Phase FSK) - FSKn (single and multi channel) - MSK (single and multi channel) - GMSK (single and multi channel) - OFDM - F7B (FM with 2 or more digital channels) - TFM 3/5 (Tamed Frequency Modulation) - Morse - Sine - Rectangle - Sawtooth - Triangular • Analogue modulation: - AM, SSB (LSB / USB), FM • Variable modulation parameters: - Attenuation - Center frequency - Baud rate - Pulse shapes: RC pulse, RC/RRC spectrum, Gauss pulse - Short-duration / burst parameters
CODING GENERATION	• Binary, Baudot, ASCII, HC ARQ, ITA2 • Differential / absolute coding • Convolutional encoding / Viterbi • CCITT standards V.17 … V.33 • Variable bitstream, bit order, parity • Various scrambling algorithms and recursive sequences
CHANNEL SIMULATION	• AWGN • Multipath propagation: Watterson (ITU) and enhanced ITS model • Doppler Shift (parametrizable shape type, amplitude, phase)
OUTPUT	• Soundcard • Wav Files • Network stream

FEATURE COMPARISON TABLE go2DECODE

FEATURE	go2DECODE LIGHT	go2DECODE STANDARD	go2DECODE PROFESSIONAL
Automatic processing	•	•	•
Signal Analysis functions		•	•
Decoder Development			•
SOMO Signal Generator			•
Recording / replay	•	•	•
Standard decoder package	•	•	•
PMR decoder package[1]	o	o	o
MIL decoder package[2]	o	o	o

• = included
° = as option available

EXPORT CONDITIONS:

1) In case of an export from the Federal Republic of Germany an export permission must be granted by the German authorities. Enduser certificate is required.

2) In case of an export from the European Union an export permission must be granted by the German authorities. Enduser certificate is required.

SIGNAL ANALYZER	
DATA ACQUISITION	• Digital IF/AF recordings (real / complex WAV 8, 16, 32 Bit)
LANGUAGE	• English
RECOMMENDED PC HARDWARE	• Notebook or Desktop; CPU: Intel i5 or higher, min. 2.6 GHz; • Memory: ≥ 2 GByte RAM, HDD: ≥ 10 GB, • Screen Resolution min. 1280 x 1024 Pixel
OS	• Windows 10/11 de/en, 64 bit with Media Feature Pack • CentOS Linux 7 (7.5 or higher, 7.5 is recommended), 64 bit • Red Hat Enterprise Linux RHEL 8 (8.4 or higher, 8.4 recommended), 64 bit • Ubuntu 22.04 LTS (22.04.2 or higher, 22.04.2 recommended), 64 bit
LICENSE	• USB-Dongle (CodeMeter) as default • Optional: License sharing with license server
ISO 9001:2015	• Company is certified

SIGNAL ANALYZER PRODUCT FEATURES	
GUI	• Easy and intuitive to operate • Automate typical analysis steps for quick measurement • Use prepared Analysis Windows, support all necessary analysis methods at once • Combine practical experience of users and our experts • Support experts, but also users who take their first steps in Modulation Analysis
SIGNAL SELECTION	• Manual specify time and frequency range for analysis in sonagram • Walk through signal function, find good signal parts and changing parameters • Multiple selections possible to compare signal parts
CROP PREPROCESSING	• Used to "crop" (DDC) a specific time-frequency region from an input file • Possibility to swap lower and higher sideband • The result is shown in sonagram/spectrum display • The output signal can be used as input signal for further analysis
FM DEMODULATION	• Used to remove a primary FM modulation • Demodulates the selected input signal with an FM demodulator • The result is shown in sonagram/spectrum display • The demodulated output signal can be used as input signal for further analysis
AM DEMODULATION	• Used to remove a primary AM modulation • Demodulates the selected input signal with an AM demodulator • The result is shown in sonagram/spectrum display • The demodulated output signal can be used as input signal for further analysis
ANALYSIS DISPLAYS	• Autorange and zoom function • Spectrogram / Sonagram • Spectrum (linear, logarithmic, average, Welch, A3, F3, n'th power, etc.) • Vector/Time (magnitude, phase, frequency, etc.) • Histogram (phase, frequency, etc.) • I/Q-Plot (absolute, differential) • Autocorrelation (input data, frequency, amplitude, weighted frequency, etc.) • Circulation/Hell (frequency, amplitude, weighted frequency, etc.)
CURSOR	• Adapted to the display type cursor functions are available for parameter measurement • X-, Y-, Z-, XY-Cursor • Harmonic, Centered and Mirrored multiple cursor mode • Time, frequency, phase, magnitude, symbol rate, bandwidth, SNR, channel count, channel distance, etc. measurement
TIME ANALYSIS	• Various time domain plots to manually assess basic emission property, e.g. the modulation type of an emission • Initial configured for time behavior of instantaneous magnitude, phase and frequency comparison (AM, PM and FM demodulation) • Additional instantaneous signals (amplitude, in-phase, quadrature, power and level) selectable • Each plot with additional histogram
PERIODICITY ANALYSIS	• Allows to detect repetitive signal parts, such as regularly sent synchronization sequences, bit frames, etc. • Several analysis signals like instantaneous frequency, weighted frequency, differential phase and magnitude • Autocorrelation display to measure repetition circulation time • Circulation (Hell) display synchronized with autocorrelation measurement

SIGNAL ANALYZER PRODUCT FEATURES	
CLASSIFIER	• Automatic modulation classification of a signal contained within a selection • Includes modem classification • See table for supported modulation and modem types
AUDIO PLAYER	• Audio replay of selected signal • Demodulator for CW, USB, LSB, AM and FM • Parametrizable in signal start and end, frequency and bandwidth
PSK ANALYSIS	• Provides a set of tools specialized in the analysis of PSK modulated signals • Multiple squared signal spectra display with automatic frequency correction • N'th power spectrum of phase center offset frequency measurement • A3 Spectrum symbol rate measurement • Absolut I/Q display with PLL and differential I/Q display • Differential phase histogram
FSK ANALYSIS	• Provides a set of tools specialized in the analysis of FSK modulated signals • Welch zoom spectrum • Weighted frequency histogram • Weighted frequency trace display • F3 spectrum symbol rate measurement
MULTITONE ANALYSIS	• Provides a set of tools specialized in the analysis of MFSK (multi tone) modulated signals • Spectrogram with automatic tone marking • Histogram over tone frequencies for tone distance measurement • Tone number histogram • F3 spectrum symbol rate measurement
MULTICARRIER PSK/QAM	• Provides a set of tools specialized in the analysis of multicarrier PSK and QAM modulated signals • Autocorrelation channel/carrier count and distance measurement • Average spectrum with channel position markers, numbers and selection • A3 Spectrum symbol rate measurement of selected channel/carrier • Differential I/Q display of selected channel/carrier
UNIVERSAL DEMODULATOR	• Demodulation of FSK 2, 4 disc., FSK 2 matched, FSK 2 autoshift, PSK 2, 4, 8, 16 A/B and Multi-tone signals • Demodulation of bursted signals • Demodulation of multi channel signals (FSK, PSK) • Parametrizable in modulation type, symbol rate, shift, channels, channel distance, symbol table, burst parameters, etc. • Bit display with parametrizable columns per row, burst sync., quality and different styles • Symbol and modem export

SIGNAL ANALYZER PRODUCT FEATURES

OPTION OFDM ANALYSIS AND DEMODULATION	• Provides an optional available set of tools specialized in the analysis and demodulation of Orthogonal Frequency Division Multiplexing (OFDM) modulated signals • Automatic parameter estimation for easy analysis • Autocorrelation Tu duration measurement • Autocorrelation of clock recovery Ts duration measurement • Clock recovery, sampling position, frequency and sampling position time behavior plots • Carrier scatter plots for differential phase, absolute phase and magnitude • Time behavior scatter plots for differential phase, absolute phase and magnitude • Multicarrier absolute and differential I/Q display • Decision directed PLL absolute and differential demodulation for PSK2, PSK4, PSK8, PSK16, QAM4 and QAM16 modulation • Multicarrier absolute and differential soft decisions symbols I/Q display • Bit display for demodulation result • Special multicarrier PSK/QAM mode with phase and pulse form correction • Analysis result export to go2MONITOR and go2DECODE as modem description or demodulator parameter file

SIGNAL ANALYZER MODULATION CLASSIFIER*

Modulation	Spec. general	Spec. HF	Spec. V/UHF	Recognition quality (Eb/No) for a detection rate > 90% and false alarms < 1%
Max. signal bandwidth		50 kHz	50 kHz – 80% of input bandwidth	
Signal energy detection min. SNR		6 dB	6 dB	
Analogue modulated voice detection (no SELCALS)		• USB J3E • LSB J3E • AM A3E • DSB-SC	• USB J3E • LSB J3E • AM A3E • NFM F3E (Radio frequency ≥ 25 MHz) • DSB-SC	
ASK 2/4			100 Bd - 50 kBd	14 -18 dB
FSK 2	m = 1 - 10	25 - 4800 Bd	1.2 - 25 kBd	11 - 15 dB
FSK 2	m = 0.75 - 1.5		25 - 75 kBd	≥ 25 dB
FSK 4	(shift > sr)	25 - 4800 Bd	1.2 - 25 kBd	14 - 16 dB
GMSK	m = 0.5	300 - 4800 Bd	1.2 - 125 kBd	14 - 16 dB
MCFSK2	m ≥ 1; 2 - 64 channels	40 - 250 Bd 120 - 1000 Hz channel spacing (min. 2x shift)	40 - 250 Bd 120 - 1000 Hz channel spacing (min. 2x shift)	17 dB
MORSE		30 - 250 CPM	30 - 250 CPM	
MSK	m = 0.5	100 - 4800 Bd	1.2 - 125 kBd	14 - 16 dB
Multitone FSKn	5 - 64 tones (shift > sr)	3 - 200 ms (5 - 330 Bd)	3 - 200 ms (5 - 330 Bd)	14 - 16 dB
OFDM		**Bandwidth ≤ 50 kHz** • 25 - 512 Channels • Tg/Tu 0.125 - 1 • Max. channel spacing 250 Hz Min. 25 Bd (Tested with PSK8 channel modulation	**Bandwidth ≤ 50 kHz** • See Spec. HF **Bandwidth > 50 kHz - 12.5MHz** • 128 - 32768 Channels • Tg/Tu 0.0625 - 0.25 • Max. channel spacing 15 kHz Min. 50 Bd (Tested with PSK8 channel modulation)	14 - 18 dB
OTH Radar	FM-CW variants only	Detection only		

* Measurement conditions: Typically, 4 seconds sample and correct segmentation of emission. Signal bandwidth is not more than 80% of the input bandwidth.
Shift is defined as frequency difference between neighboring tones.

SIGNAL ANALYZER MODULATION CLASSIFIER*

Modulation	Spec. general	Spec. HF	Spec. V/UHF	Recognition quality (Eb/No) for a detection rate > 90% and false alarms < 1%
Multichannel (D)PSK 2, 4 A/B	max. 10 kHz signal bandwidth; 2 - 64 channels	31.25 - 250 Bd 50 - 300 Hz channel spacing	31.25 - 250 Bd 50 - 300 Hz channel spacing	13 - 15 dB
(D)PSK 2 A/B		31.25 - 4800 Bd	1.2 kBd - 50 MBd	7 - 10 dB, A/B Decision: 8 - 15 dB
(D)PSK 4 A/B		31.25 - 4800 Bd	1.2 kBd - 50 MBd	8 - 12 dB, A/B Decision: 10 - 15 dB
(D)PSK 8 A/B		31.25 - 4800 Bd	1.2 kBd - 50 MBd	HF: 8 - 12 dB, A/B Decision: 10 - 15 dB V/UHF: 10 - 14 dB, A/B Decision: 12 - 15 dB
OQPSK **			100 Bd – 50 MBd	10 dB
PSK 16		300 - 4800 Bd	1.2 kBd - 50 MBd	14 - 16 dB
QAM	Order: 16, 32, 64 Rectangular constellations only	1600 - 4800Bd	1.6 - 25 kBd	22 dB
WFM (FM Broadcast only)			Radio frequency: 65 MHz - 108 MHz Bandwidth: 50 kHz - 300 kHz	

* Measurement conditions: Typically, 4 seconds sample and correct segmentation of emission. Signal bandwidth is not more than 80% of the input bandwidth.
Shift is defined as frequency difference between neighboring tones.

** Includes ML/AI technology

SIGNAL ANALYZER MODEM CLASSIFIER

HF	V/UHF
ALE 3G	ACARS-VHF
ALE 4G	APCO-25
CHN 4+4	APCO-25 Phase 2 Downlink
CHN hybrid	DAB
CIS Akula	DECT
CIS-45 (33 / 45 Bd)	DMR
CIS-60	DMR Continuous
CIS-93	dPMR
CIS-112	D-STAR
CIS-128	DVB-T (8 MHz Mode only)
CODAN 3212 16 Channel PSK	Flex
CODAN 3012 16 Channel PSK	GSM (<3G), UMTS, LTE
HFDL	Inmarsat Satphone Uplink
LINK11 (CLEW and SLEW)	Iridium Satphone Uplink
LINK 22	MPT1327 1200Bd MSK
MIL-STD-188-110A Serial (singletone) mode (a.k.a. STANAG 4539)	NXDN 2400 Bd, 4800 Bd
MIL-STD-188-110B/C App. C (a.k.a. STANAG 4539 HDR)	TETRA Downlink
MIL-STD-188-110C App. D	TETRA Uplink
PACTOR (I, II, II FEC, III, 4)	TETRAPOL
STANAG 4285/4481 (PSK)	Thuraya Satphone Uplink
STANAG 4529	VDL-2
STANAG 4539	Yaesu System Fusion

go2ANALYSE	
DATA ACQUISITION	• Text-based bitstream file • Packed binary file • Bitstream recording from Signal Analyzer, go2DECODE and go2MONITOR
LANGUAGE	• English; Others on request
RECOMMENDED PC HARDWARE	• Min. Intel I5 or higher, 2 cores, 2.6 GHz • Min. 4 GB RAM, 16 GB recommended • HDD: min. 50 GB recommended (depends on binary file input) • Screen Resolution: min. 1280 x 1024 pixels
OS	• Windows 10/11 de/en, 64 bit
LICENSE	• USB-Dongle (CodeMeter)
ISO 9001:2015	• Company is certified

go2ANALYSE FEATURES	
BITSTREAM VISUALIZATION	• x/-, L/H, ./1, 1/0 • Font size changeable • Graphical bit display • Circulation length • Bit offset • Tag bits with different colors • Show difference of two bitstreams • Alignment: Burst/Circulation length • Cut • Copy / Paste • Undo / Redo • Bits with quality • Symbols of bits
ANALYSIS	• Autocorrelation • Crosscorrelation • Bit length analysis • 0/1 ratio • Automatic search for periodic sequences • Automatic search for non-periodic sequences • Repeated patterns • Mark start, stop and parity bits • Testing against codes: Hamming, • Reed-Solomon, BCH, Golay, CRC
MANIPULATION / TRANSFORMATION	• Deinterleaving • Decimation • Demultiplexing • Logic: AND, OR, NOT, XOR selected bits, XOR two bistreams • Inversion: Mirror / NOT • Cutting • Viterbi correction • Descrambling • Destuffing
TOOLS FOR LFSR	• Analysis and handling of linear feedback shift registers • Berlekamp-Massey • Linear complexities
BINARY MODULATION	• NRZ-M • NRZ-S • BIPH-L Manchester • BIPH-M • BIPH-S

go2ANALYSE FEATURES	
MAP BITS TO TEXT	• MSB/LSB • Normal / Inverse • predefined code tables e.g.: - ASCII8 - Baudot - Baudot-3 - Shift-CYR - HEX - Morse - ITA2P • User defined code tables
WORKFLOW MANAGEMENT	• Complete workflow recorded • Displayed as tree of commands and results • Undo / Redo (several steps) • Save / Load workflow • Replay saved workflow with different bitstreams • Change command parameters in workflow • Delete individual commands
INTEGRATE EXTERNAL TOOLS	• Open selected bits in external tool (configurable)

PROCITEC®
HOUSE OF SIGNALS

PROCITEC GmbH
Rastatter Strasse 41
75179 Pforzheim
Germany

Phone +49 7231 155 61-0
Fax +49 7231 155 61-11
sales@procitec.com
www.go2signals.de / www.procitec.com