WAVECOM
NACHRICHTENTECHNIK

Product Specification

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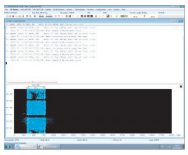
W-CODE  p. 5

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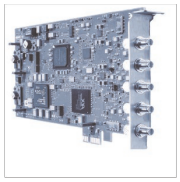
W-PCI  p. 25

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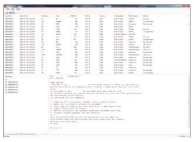
for Windows and Linux  p. 20

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Technical Overview and Specification Summary

WAVECOM NACHRICHTENTECHNIK

W-SPECTRA Software Characteristics

Direct Receiver Control

Support Wavecom receiver W-PCIe and WiNRADiO G3xDDC, e.g., G33DDC and G39DDC
Instantaneous bi-directional receiver control
Spectrum display wideband (up to 2 MHz) and narrowband (96 kHz)

W-SPECTRA Operation Modes

	Direct Mode	Memory Scan	Frequency Search
Description	Classify and decode a signal by setting a receiver frequency manually. Use “Sweep” mode to catch a signal in small range	Recan and verify signals according to database entries. New result can be inserted or overwritten into the database	Automatic search signals (detect, classify and code check) over a predefined frequency band according to a search strategy. Results automatically inserted into a database
Start button	Start to sweep over a defined frequency range	Start to rescan the spectrum according to the database entries	Start to search signals in a wide range of frequency
Stop button	Stop sweeping	Stop rescan	Stop searching signals
Previous button	Jump to the previous frequency according to the step size	Jump to the previous database entry	Jump to the previous frequency according to the step size
Next button	Jump to the next frequency according to the step size	Jump to the next database entry	Jump to the next frequency according to the step size
Default (recommended) values	Sweep range: 3000 Hz Step size: 100 Hz Dwell period: 1 sec	Time interval: 15 sec	Step size: 1000 Hz Time interval: 15 sec

Decoder Modes in W-SPECTRA

All HF, VHF/UHF, SHF and SATELLITE modes as in W-CODE (see “W-CODE Mode Overview”)

Spectrum Analysis Specification

See “W-Spectrum Analysis (SA)”

Wideband Classifier Specification

See “W-Classifier-WB Technical Data”

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WAVECOM NACHRICHTENTECHNIK

W-SPECTRA Software Characteristics

Classifier Code Check (CCC) with look-up table and XML-editor for all modulation variants

Process steps	P0	Spectrum analysis is running, no detail classification
	P1	Signal classification is performed, no decoding
	P2	Classification and table check are performed, no decoding
	P3	Classification, table check and code check are performed, no decoding
	P4	Classification and table check are performed and finally the signal is decoded if a mode with an associated, valid detector is found
	P5	Classification, table check and code check are performed and finally the signal is decoded if a mode with an associated, valid detector is found
Scan delay		When CCC gets the first result, the automatic scan will hold on until the entire result is delivered

Signal Recording and Playback

Media Player/Recorder	Wideband	Narrowband
Recording format	IQ PXGF	IQ PXGF and IQ WAV
Bandwidth	Up to 2 MHz	96 kHz
Bits per sample	16 bits each I and Q	32 bits each I and Q
On the fly side information	Receiver frequency (Rx Freq), recording bandwidth and timestamp	Receiver frequency (Rx Freq), recording bandwidth and timestamp for PXGF format
Playback	♦ WB spectrum display with side information ♦ A selected 96 kHz band displayed in NB spectrum and processed by the classifier and decoder ♦ Signal output to speaker for acoustic monitoring	♦ Signal displayed in NB spectrum with side information ♦ Selected signal processed by the classifier and decoder ♦ Signal output to speaker for acoustic monitoring
Typical recording size	♦ 0.5 Gigabytes for 1 minute ♦ 30 Gigabytes for 1 hour ♦ 720 Gigabytes for 1 day (24 hours)	♦ 46 MB for 1 minute ♦ 2.7 Gigabytes for 1 hour ♦ 64 Gigabytes for 1 day (24 hours)

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WAVECOM NACHRICHTENTECHNIK

User Configurable Database

Database in XML format	Date & Time	Burst Specs	Remote Name
Eight mandatory fields	**23 optional fields**	Operator	Polarisation
Rx Frequency (receiver frequency)	Frequency 2	Direction	Satellite Name
Mode (decoder or classifier running)	Date & Time 2	Longitude	Satellite Position
Offset	Callsign	Latitude	Links to Templates
Center	Location	SNR	Links to Files
Bandwidth	Baudrate	Antenna	Links to Internet
Shift	Modulation	Elevation	**Three free editable custom fields**
Remarks	Frame Format	ITU Designator	

Spectra Editing Tool (W-SPEED)

Sonagram bandwidth	250 kHz, 500 kHz, 1 MHz, 1.5 MHz up to 30 MHz
Axis label	X-axis labeled with the absolute receiver (Rx) frequency when it is not changed in the whole recording, otherwise it is labeled with the relative frequency +/- half of the display bandwidth Y-axis labeled with the recording timestamp
Spot display	A cross cursor displays the Rx frequency and recording timestamp instantaneously when moving over the entire sonogram
Zoom-in view	Maximum 32 x zoom-in view, making the max. visible frequency resolution of 60 Hz per pixel
Free navigation	Two-dimensional free navigation and positioning over the entire sonagram
Select a signal and process	Mark a 96 kHz wide stripe over an interesting signal and send it to W-SPECTRA or other Wavecom decoders for detail processing

Recording Splitter Tool

- Split a PXGF recording into max. 10 equal size recording files
- The minimum size of recordings after split is 1 GB
- The minimum size of a recording which can be split is 2 GB

Convert a WAV Recording

- Convert a WAV recording into PXGF format
- Implant meta-data „receiver frequency“ and „timestamp“ into the PXGF file
- The sampling rate of the WAV recording should be between 48 kHz and 4 MHz

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Technical Overview and Specification Summary

W-CODE Mode Overview

Mode Search Term	Designation	Recognition	Availability	Modulation	Signal-Library	Comment
HF Modes						
3012 CHIRP	» CODAN-9001 CHIRP	√	-	PSK	√	
4+4	» CHN4+4	√	√	PSK	√	
44	» CHN4+4	√	√	PSK	√	
ACARS-HF	» HF-ACARS	√	√	PSK	√	
ALCATEL 801H		√	-	MFSK	√	CCC Recognition
ALE 2G	» MIL-188-141A	√	√	MFSK	√	
ALE 3G	» MIL-188-141B	√	√	PSK	√	
ALE-400		√	√	MFSK	√	
ALF-RDS		√	√	PSK	√	DGPS
ALIS		√	√	FSK	√	
ALIS-2		√	√	MFSK	√	
AMOR	» CIS-14	√	√	FSK	√	
AMOR-96	» CIS-14	√	√	FSK	√	
AMTOR	» SITOR-ARQ » SITOR-FEC	√	√	FSK	√	SITOR-AUTO
ANNEX-10	» ICAO-SELCAL	√	√	MFSK	√	
ANUM-13	» AUM-13	√	√	MFSK	√	
ARINC	» ICAO-SELCAL	√	√	MFSK	√	
ARINC 635-2	» HF-ACARS	√	√	PSK	√	
ARQ-1000	» ARQ-N	√	√	FSK	√	
ARQ-1000 DUPLEX	» ARQ-E, ARQ-N	√	√	FSK	√	
ARQ-1000S	» SI-ARQ	√	√	FSK	√	
ARQ-28	» ARQ-M2-242 » ARQ-M2-342	√	√	FSK	√	
ARQ-4	» ARQ-M4-342	√	√	FSK	√	
ARQ-56	» ARQ-M4-242 » ARQ-M4-342	√	√	FSK	√	
ARQ-625	» SITOR-ARQ	√	√	FSK	√	
ARQ6-70	» SI-ARQ	√	√	FSK	√	
ARQ6-90		√	√	FSK	√	
ARQ6-98		√	√	FSK	√	
ARQ-DUPLEX	» DUP-ARQ	√	√	FSK	√	
ARQ-E		√	√	FSK	√	
ARQ-E3		√	√	FSK	√	
ARQ-FAE	» ALE-400	√	√	MFSK	√	
ARQ-M	» ARQ-E3	√	√	FSK	√	
ARQ-M1	» ARQ-E3	√	√	FSK	√	
ARQ-M2-242		√	√	FSK	√	
ARQ-M2-342		√	√	FSK	√	
ARQ-M4-242		√	√	FSK	√	
ARQ-M4-342		√	√	FSK	√	
ARQ-N		√	√	FSK	√	
ARQ-POL	» POL-ARQ	√	√	FSK	√	
ARQ-S	» SI-ARQ	√	√	FSK	√	
ARQ-SWE	» SWED-ARQ	√	√	FSK	√	

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Mode Search Term	Designation	Recognition	Availability	Modulation	Signal-Library	Comment
ARTRAC	» DUP-ARQ	√	√	FSK	√	
ASCII		√	√	FSK	√	
ASCII 7 BIT	» ASCII	√	√	FSK	√	
ASCII 8 BIT	» ASCII	√	√	FSK	√	
ASCII-ARQ	» BULG-ASCII	√	√	FSK	√	
ASYNC FSK	» BAUDOT	√	√	FSK	√	
AT3004D	» CIS-12	√	√	PSK	√	
AT3104D	» CIS-12	√	√	PSK	√	
ATIS-HF	» GMDSS/DSC-HF	√	√	FSK	√	
AUM-13		√	√	MFSK	√	
AUTOSPEC		√	√	FSK	√	
AUTOSPEC	» SPREAD-11 » SPREAD-21 » SPREAD-51	√	√	FSK	√	
AX.25	» PACKET-300	√	√	FSK		
BAUDOT		√	√	FSK	√	
BAUDOT ASYNC	» BAUDOT	√	√	FSK	√	
BAUDOT F7B		√	-	MFSK	√	CCC Recognition, Encrypted
BAUDOT F7BBN	» BAUDOT F7B	√	-	MFSK	√	CCC Recognition
BAUDOT PARITY		√	-	FSK	-	CCC Recognition
BAUDOT SYNC		√	-	FSK	-	CCC Recognition
BAUDOT TWINPLEX	» BAUDOT F7B	√	-	MFSK	-	
BAUDOT_VAR_STOP	» BAUDOT	√	√	FSK	√	
BEE	» CIS-36-50	√	√	FSK	√	
BEE 36-50	» CIS-36-50	√	√	FSK	√	
BF6 BAUDO	» BAUDOT F7B	√	-	MFSK	√	CCC Recognition
BPSK63	» PSK-63	√	√	PSK	√	
BR-6028		√	√	FSK	√	ITA-2 and ITA-5
BULG-ASCII		√	√	FSK	√	
CALM SELCALL	» CODAN-9001 CHIRP	√	-	PSK	√	
CCIR 242	» ARQ-M2-242 » ARQ-M4-242	√	√	FSK	√	
CCIR 342-2	» ARQ-M2-342 » ARQ-M4-342	√	√	FSK	√	
CCIR 342-4	» ARQ-M4-342	√	√	FSK	√	
CCIR 476 A	» SITOR-ARQ	√	√	FSK	√	
CCIR 476 B	» SITOR-FEC	√	√	FSK	√	
CCIR 493-4	» GMDSS/DSC-HF	√	√	FSK	√	
CCIR 518 VARIANT	» POL-ARQ » ARQ6-90 » ARQ6-98 » SWED-ARQ	√	√	FSK	√	
CCIR 519 VARIANT	» ARQ-E3	√	√	FSK	√	
CCIR M.493	» GMDSS/DSC-HF	√	√	FSK	√	
CHIP128		√	-	DBPSK	√	Amateur, CCC Recognition
CHIP64		√	-	DBPSK	√	Amateur, CCC Recognition
CHN4+4		√	√	PSK	√	
CHP-200		√	-	FSK	√	CCC Recognition

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W-CODE Mode Overview

Mode Search Term	Designation	Recognition	Availability	Modulation	Signal-Library	Comment
CHU		√	√	FSK	√	
CIS 10-11-11 MFSK	» CIS-36	√	√	MFSK	√	
CIS 405 395		√	-	FSK	√	Encrypted, CCC Recognition
CIS-11		√	√	FSK	√	
CIS-12		√	√	PSK	√	
CIS-14		√	√	FSK	√	
CIS-20	» CIS-12	√	√	PSK	√	
CIS-36		√	√	MFSK	√	
CIS-36-50		√	√	FSK	√	
CIS-40.5 PSEUDO	» CIS 405 395	√	-	FSK	√	
CIS-50-50		√	√	FSK	√	
CIS-81	» CIS-81-81	√	-	FSK	√	
CIS-81-29		√	-	FSK	-	Encrypted, CCC Recognition
CIS-81-81		√	-	FSK	√	Encrypted, CCC Recognition
CIS-96	» CIS-14	√	√	FSK	√	
CLANSMAN		√	-	FSK	√	
CLOVER	» CLOVER-2	√	√	PSK	√	
CLOVER-2		√	√	PSK	√	
CLOVER-2000		√	√	PSK	√	
CLOVER-2500		√	√	PSK	√	CCC Recognition
CLOVER-II	» CLOVER-2	√	√	PSK	√	
CODAN 3012	» CODAN-9001	√	√	PSK	√	
CODAN 3012 CHIRP	» CODAN 9001 CHIRP	√	√	PSK	√	CCC Recognition
CODAN 3012 PSK	» CODAN-9001	√	√	PSK	√	
CODAN 3212		√	√	PSK	√	
CODAN 8580	» CODAN-SELCAL	√	√	FSK	√	
CODAN 9001 CHIRP		√	-	PSK	√	CCC Recognition
CODAN ALE	» CODAN 9001 CHIRP	√	√	PSK	√	
CODAN-3012 16Ch PSK	» CODAN-9001	√	√	PSK	√	
CODAN-8500	» CODAN-SELCAL	√	√	FSK	√	
CODAN-9001		√	√	PSK	√	
CODAN-9001 16Ch PSK	» CODAN-9001	√	√	PSK	√	
CODAN-9002 16Ch PSK	» CODAN-9001	√	√	PSK	√	
CODAN-SELCAL		√	√	FSK	√	
CONTESTIA		√	-	MFSK	√	Amateur, CCC Recognition
COQUELET-100	» ALCATEL 801H	√	-	MFSK	-	
COQUELET-13		√	√	MFSK	√	
COQUELET-8		√	√	MFSK	√	
COQUELET-8 FEC	» COQUELET-80	√	√	MFSK	√	
COQUELET-80		√	√	MFSK	√	
COQUELET-MK1	» COQUELET-13	√	√	MFSK	√	
CROWD-36	» CIS-36	√	√	MFSK	√	
CROWD-36 ECC	» CIS-36	√	√	MFSK	√	
CV-786		√	√	FSK	√	
CW	» CW-MORSE	√	√	AM	√	
CW-MORSE		√	√	AM	√	
CW-MORSE F7B		√	-	AM	-	CCC Recognition
CW-MORSE FSK		√	√	FSK	√	

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Mode Search Term	Designation	Recognition	Availability	Modulation	Signal-Library	Comment
DATATRAC	» DGPS	√	√	FSK	√	
DCF77		-	-	AM	√	Time Signal DL
DGPS		√	-	PSK	√	
DGPS		√	√	FSK	√	
DIGI-SSTV	» SSTV-DIG	-	-	QAM	√	
DIGITAL-FAX		√	-	FSK	√	
DOMINOEX		√	-	MFSK	√	Amateur
DRM		√	-	OFDM	√	Classifier, CCC Recognition
DRM-A		√	-	OFDM	√	Classifier, CCC Recognition
DRM-B		√	-	OFDM	√	Classifier, CCC Recognition
DSC-HF	» GMDSS/DSC-HF	√	√	FSK	√	
DUP-ARQ		√	√	FSK	√	
DUP-ARQ-2		√	√	FSK	√	
DUPFEC	» DUP-FEC-2	√	√	FSK	√	
DUP-FEC-2		√	√	FSK	√	
EFR		√	√	FSK	√	
F7B	» TWINPLEX	√	√	FSK	√	
F7B BAUDOT	» BAUDOT F7B		-	MFSK	√	
F7B MORSE	» CW-MORSE F7B	√	-	AM	-	
FACSIMILE	» WEATHER-FAX	-	√	FM	√	
FACSIMILE B&W	» WEATHER-FAX	-	√	FM	√	
FEC 100	» FEC-A	√	√	FSK	√	
FEC 100A	» FEC-A	√	√	FSK	√	
FEC 101	» FEC-A	√	√	FSK	√	
FEC 12	» VISEL	√	√	FSK	√	
FEC- 625	» SITOR-FEC	√	√	FSK	√	
FEC-100 DIRTY	» FEC-A	√	√	FSK	√	Variable Interleaving
FEC-100 RAW	» FEC-A	√	√	FSK	√	No Sync Sequence
FEC-1000S	» SI-FEC	√	√	FSK	√	
FEC-A		√	√	FSK	√	
FEC-B	» SITOR-FEC	√	√	FSK	√	
FEC-S	» SI-FEC	√	√	FSK	√	
FELD-HELL		–	√	AM	√	
FIRE	» CIS-12	√	√	PSK	√	
FM-HELL		√	√	FSK	√	
FRENCH-BAUDOT	» BAUDOT PARITY	√	-	FSK	-	
FROST	» CIS-81-81	√	-	FSK	√	
FROST1	» CIS 405 395	√	-	FSK	-	
FT8		√	√	MFSK	√	
GL-5100 FSK	» GW-FSK	√	√	FSK	√	
GL-5100 OFDM	» GW-OFDM	-	√	OFDM	√	
GL-5100 PSK	» GW-PSK	√	√	PSK	√	
GLOBE WIRELESS Clover	» GW-PSK	√	√	PSK	√	
GLOBE WIRELESS FSK	» GW-FSK	√	√	FSK	√	
GLOBE WIRELESS Pactor	» GW-FSK	√	√	FSK	√	
GLOBE WIRELESS PSK	» GW-PSK	√	√	PSK	√	
GM856C1	» ALIS	√	√	FSK	√	
GMDSS	» GMDSS/DSC-HF	√	√	FSK	√	

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Mode Search Term	Designation	Recognition	Availability	Modulation	Signal-Library	Comment
GMDSS/DSC-HF		√	√	FSK	√	
GMDSS-HF	» GMDSS/DSC-HF	√	√	FSK	√	
GOLAY-TOR	» G-TOR	√	√	FSK	√	
G-TOR		√	√	FSK	√	
GW-DATAPLEX	» GW-FSK	√	√	FSK	√	
GW-FSK		√	√	FSK	√	
GW-OFDM		-	√	OFDM	√	Adaptiv 12-32 Carrier
GW-PSK		√	√	PSK	√	
HAEGELIN-CRYPTO	» HC-ARQ	√	√	FSK	√	
HC-ARQ		√	√	FSK	√	
HELL-80	» FM-HELL	√	√	FSK	√	
HELL-CMT		√	-	FSK	√	CCC Recognition
HELL-DUPLO	» FM-HELL	√	√	FSK	√	
HELL-GL72		√	-	FSK	√	CCC Recognition
HELLSCHREIBER	» FELD-HELL	–	√	AM	√	
HF-ACARS		√	√	PSK	√	
HF-DATALINK	» HF-ACARS	√	√	PSK	√	
HFDL	» HF-ACARS	√	√	PSK	√	
HF-FAX	» WEATHER-FAX	-	√	FM	√	
HNG-FEC		√	√	FSK	√	
ICAO-SELCAL		√	√	MFSK	√	
INTEL		√	-	FSK	√	Classifier, CCC Recognition
IRA-ARQ	» BULG-ASCII » ASCII	√	√	FSK	√	
ITA-2	» BAUDOT	√	√	FSK	√	
ITA-2 TWIN	» BAUDOT F7B	√	√	FSK	-	
ITA-5 / IRA	» ASCII	√	√	FSK	√	
ITU M.823 DIFF GPS	» DGPS	√	√	FSK	√	
ITU-M R.493 DSC	» GMDSS/DSC-HF	√	√	FSK	√	
IVSU		√	-	FSK	-	Classifier, CCC Recognition
LESW	» LINK-11-SLEW	√	-	PSK	√	
LINEA SITOR-A	» SITOR-ARQ	√	√	FSK	√	
LINEA-SITOR-B	» SITOR-FEC	√	√	FSK	√	
LINK-11-CLEW		√	√	PSK	√	
LINK-11-SLEW		√	√	PSK	√	
M.823 GPS	» DGPS	√	√	FSK	√	
MD522	» MIL-M-55529A	√	√	FSK	√	
MD-674		√	√	FSK	√	
MD-674 ASYNC	» MD-674	√	√	FSK	√	
MERLIN	» ALIS-2	√	√	FSK	√	
MEROD	» RAC-ARQ	√	-	FSK	√	
MFSK-16		√	√	MFSK	√	
MFSK-20		√	√	MFSK	√	
MFSK-8		√	√	MFSK	√	
MIL-188-110-16T		√	√	PSK	√	
MIL-188-110-39T		√	√	PSK	√	
MIL-188-110A		√	√	PSK	√	

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Mode Search Term	Designation	Recognition	Availability	Modulation	Signal-Library	Comment
MIL-188-110A hybrid		√	√	PSK	√	
MIL-188-110A mod		√	√	PSK	√	
MIL-188-110B		√	√	PSK	√	
MIL-188-141A		√	√	MFSK	√	
MIL-188-141B		√	√	PSK	√	
MIL-188-203-1A	» LINK-11-CLEW	√	√	PSK	√	
MIL-M-55529A		√	√	FSK	√	
MIL-STD-188-110A	» MIL-188-110A	√	√	PSK	√	
MIL-STD-188-110A (App. B)	» MIL-188-110-39T	√	√	PSK	√	
MIL-STD-188-110B (App. C)	» MIL-188-14 B	√	√	PSK	√	
MIL-STD-188-141A	» MIL-188-141A	√	√	MFSK	√	
MIL-STD-188-141B (App. C)	» MIL-188-141B	√	√	PSK	√	
MK1	» COQUELET-13	√	√	MFSK	√	
MK2	» COQUELET-8	√	√	MFSK	√	
MORSE	» CW-MORSE	√	√	AM	√	
MS5	» CIS-12	√	√	PSK	√	
MSF-TIME-SIGNAL		-	-	AM	-	Rugby Time Signal GB
MT-63		√	-	PSK	√	Amateur
MTONE	» ALIS-2	√	√	MFSK	√	
NATO-ROBUST	» STANAG-4415	√	√	PSK	√	
NAVTEX	» SITOR-FEC	√	√	FSK	√	
NUM-13	» SP-14	√	√	MFSK	√	
OLIVIA		√	√	MFSK	√	
PACKET 300-4800	» PACKET-300	√	√	FSK	√	
PACKET AX.25	» PACKET-300	√	√	FSK	√	
PACKET RADIO 300	» PACKET-300	√	√	FSK	√	
PACKET-300		√	√	FSK	√	
PACTOR		√	√	FSK	√	
PACTOR-FEC		√	√	FSK	√	
PACTOR-I	» PACTOR	√	√	FSK	√	
PACTOR-I-FEC	» PACTOR-FEC	√	√	FSK	√	
PACTOR-II		√	√	PSK	√	
PACTOR-II+III	» PACTOR-II » PACTOR-III	√	√	PSK	√	Multi-Mode
PACTOR-II-AUTO		√	√	PSK	√	
PACTOR-II-FEC		√	√	PSK	√	
PACTOR-III		√	√	PSK	√	
PACTOR-IV	» PACTOR-4	√	√	PSK	√	CCC Recognition
PARITY14	» CIS-14	√	√	FSK	√	
PAX		√	-	MFSK	-	Amateur
PAX2		√	-	MFSK	-	Amateur
PICCOLO 12	» PICCOLO-MK12	√	√	MFSK	√	
PICCOLO 6	» PICCOLO-MK6	√	√	MFSK	√	
PICCOLO ITA-2	» PICCOLO-MK6	√	√	MFSK	√	
PICCOLO ITA-5	» PICCOLO-MK12	√	√	MFSK	√	
PICCOLO-MK12		√	√	MFSK	√	
PICCOLO-MK6		√	√	MFSK	√	

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W-CODE Mode Overview

Mode Search Term	Designation	Recognition	Availability	Modulation	Signal-Library	Comment
POL_ARQ_RC4	» POL-ARQ	√	√	FSK	√	Request Cycle Autodetect
POL_ARQ_RC5	» POL-ARQ	√	√	FSK	√	Request Cycle Autodetect
POL_ARQ_RC6	» POL-ARQ	√	√	FSK	√	Request Cycle Autodetect
POL-ARQ		√	√	FSK	√	
PRC 4+4	» CHN4+4	√	√	PSK	√	
PRC/PLAADF 4+4	» CHN4+4	√	√	PSK	√	
PRESSFAX	» PRESS-FAX	-	√	FM	√	
PRESS-FAX		-	√	FM	√	
PSK-10		√	√	PSK	√	
PSK-10-AM	» PSK-AM	√	√	AM	√	
PSK-125		√	√	PSK	√	
PSK-125F		√	√	PSK	√	
PSK-125-FEC	» PSK-125F	√	√	PSK	√	
PSK-220F		√	√	PSK	√	
PSK-220-FEC	» PSK-220F	√	√	PSK	√	
PSK-250		√	√	PSK	√	
PSK-31		√	√	PSK	√	
PSK-31_BPSK	» PSK-31	√	√	PSK	√	
PSK-31_QPSK	» PSK-31	√	√	PSK	√	
PSK-31-AM	» PSK-AM	√	√	AM	√	
PSK-31-FEC		√	√	PSK	√	
PSK-50-AM	» PSK-AM	√	√	AM	√	
PSK-63		√	√	PSK	√	
PSK-63F		√	√	PSK	√	
PSK-63-FEC	» PSK-63F	√	√	PSK	√	
PSK-AM		√	√	PSK	√	
PSKWT	» CHN4+4	√	√	PSK	√	
QPSK-125	» PSK-125	√	√	PSK	√	
QPSK-250	» PSK-250	√	√	PSK	√	
QPSK-31	» PSK-31	√	√	PSK	√	
QPSK63	» PSK-63	√	√	PSK	√	
QPSK-63	» PSK-63	√	√	PSK	√	
RACAL MSM	» SKYFAX	√	-	FSK	√	
RACAL/THALES ARQ 150	» MEROD	√	-	FSK	√	
RACAL-ARQ	» MEROD	√	-	FSK	√	
RAC-ARQ		√	-	FSK	√	CCC Recognition
RC 5000	» SKYFAX	√	-	FSK	√	
ROBUST-PACKET		√	√	OFDM	√	Auto DQPSK and DBPSK
ROS		-	-	MFSK	√	Amateur
ROU-FEC	» RUM-FEC	√	√	FSK	√	
RS-ARQ	» ALIS	√	√	FSK	√	
RS-ARQ 240	» ALIS-2	√	√	MFSK	√	
RS-ARQ-2	» ALIS-2	√	√	MFSK	√	
RTCM SC-104	» DGPS	√	√	FSK	√	
RTTY	» BAUDOT	√	√	FSK	√	Amateur
RTTY5	» BAUDOT	√	√	FSK	√	
RTTY7	» ASCII	√	√	FSK	√	

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W-CODE Mode Overview

Mode Search Term	Designation	Recognition	Availability	Modulation	Signal-Library	Comment
RTTY8	» ASCII	√	√	FSK	√	
RUM-FEC		√	√	FSK	√	
RUSSIAN PICCOLO	» CIS-36	√	√	MFSK	√	
SAUD-FEC	» RUM-FEC	√	√	FSK	√	
SI-ARQ		√	√	FSK	√	
SI-AUTO		√	√	FSK	√	Auto ARQ and FEC
SIEMENS ARQ1000	» SI-ARQ	√	√	FSK	√	
SIEMENS CHP SELCAL	» CHP-200	√	-	FSK	√	
SI-FEC		√	√	FSK	√	
SITOR-A	» SITOR-ARQ	√	√	FSK	√	
SITOR-A/B 109.5 Bd ARQ	» SITOR-ARQ	√	√	FSK	√	
SITOR-A/B 109.5 Bd FEC	» SITOR-FEC	√	√	FSK	√	
SITOR-ARQ		√	√	FSK	√	
SITOR-AUTO		√	√	FSK	√	Auto ARQ and FEC
SITOR-B	» SITOR-FEC	√	√	FSK	√	
SITOR-FEC		√	√	FSK	√	
SKYFAX		√	-	FSK	√	CCC Recognition
SP-14		√	√	MFSK	√	
SPREAD	» SPREAD-51	√	√	FSK	√	
SPREAD-11		√	√	FSK	-	
SPREAD-21		√	√	FSK	√	
SPREAD-51		√	√	FSK	√	
SSTV		√	√	FM	√	15 Modes, Auto Detection
SSTV AUTO	» SSTV	√	√	FM	√	15 Modes, Auto Detection
SSTV-DIG		-	-	QAM	√	
STANAG-4285		√	√	PSK	√	All Submodes & STANAG-5066
STANAG-4415		√	√	PSK	√	Part of MIL-188-110A
STANAG-4481-FSK		√	√	FSK	√	
STANAG-4481-PSK		√	√	PSK	√	
STANAG-4529		√	√	PSK	√	All Submodes & STANAG-5066
STANAG-4539	» MIL-188-110A	√	√	PSK	√	App. C
STANAG-4539 HDR	» MIL-188-110B	√	-	PSK	-	App. C
STANAG-5065-FSK		√	√	FSK	√	Part of MIL-188-110A
STANAG-5066		√	√	PSK	√	Protocol Interpreter of STANAG-4285 and 4529
STANAG-5511	» LINK-11-CLEW	√	√	PSK	√	
STANAG-5511 SLEW	» LINK-11-SLEW	√	-	PSK	√	
SWED-ARQ		√	√	FSK	√	
T-600	» CIS-36-50	√	√	FSK	√	
TADIL A	» LINK-11-CLEW	√	√	PSK	√	
TADIL B	» LINK-11-CLEW	√	√	PSK	√	
TDF-TIME-SIGNAL		-	-	PSK	-	Time Signal French
TDM 242	» ARQ-M2-242 » ARQ-M4-242	√	√	FSK	√	
TDM 342	» ARQ-M2-342 » ARQ-M4-342	√	√	FSK	√	
TDM 342 1 CHANNEL	» ARQ-E3	√	√	FSK	√	

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Mode Search Term	Designation	Recognition	Availability	Modulation	Signal-Library	Comment
THOR		√	-	MFSK	√	Amateur
THROB		√	√	MFSK	√	Amateur
THROBX		√	√	MFSK	√	Amateur
TONE34	» CIS-36	√	√	MFSK	√	
TOR DIRTY	» SITOR-FEC	√	√	FSK	-	Without Sync Sequence
TORG 10/11	» CIS-11	√	√	FSK	√	
TORG 14	» CIS-14	√	√	FSK	√	
TT1585	» TWINPLEX	√	√	MFSK	√	
TT2300		√	-	MFSK	√	
TWINPLEX		√	√	MFSK	√	All V1 / V2 Combinations
TWINPLEX ARQ (F7B)	» TWINPLEX	√	√	MFSK	√	
TWINPLEX Baudot	» TWINPLEX	√	√	MFSK	√	
TWINPLEX-SITOR	» TWINPLEX	√	√	MFSK	√	
URS MULTITONE	» CIS-36	√	√	MFSK	√	
VISEL		√	√	FSK	√	
WEATHER-FAX		-	√	FM	√	
WSJT		√	-	MFSK	√	FSK441, JT6M, JT65, Amateur
YUG-MIL	» VISEL	√	√	FSK	√	

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W-CODE Mode Overview

Mode Search Term	Designation	Recognition	Availability	Modulation	Signal-Library	Comment
VHF, UHF and SHF Modes						
ACARS		√	√	MSK	√	
ACARS-VHF	» ACARS	√	√	MSK	√	
ACARS-VUHF	» ACARS	√	√	MSK	√	
AIS		√	√	GFSK	√	
APCO-25		√	√	C4FM	√	Live Voice, IMBE Codec
ATIS		√	√	FFSK	√	FSK Analysis
AX.25 1200 Bd	» PACKET-1200	√	√	FSK	√	
AX.25 9600 Bd	» PACKET-9600	√	√	GFSK	√	
BAA 1382	» BIIS	√	√	FFSK	√	
BIIS		√	√	FFSK	√	
Buendelfunknetz	» MPT-1327	√	√	FFSK	√	
CCIR 493-4	» GMDSS / DSC-VHF	√	√	FSK	√	
CCIR 541-2	» GMDSS / DSC-VHF	√	√	FSK	√	
CCIR-1		√	√	SELCAL	√	Selcal Analysis
CCIR-2		√	√	SELCAL	√	Selcal Analysis
CCIR-7		√	√	SELCAL	√	Selcal Analysis
CCITT		√	√	SELCAL	√	Selcal Analysis
CHEKKER	» MPT-1327	√	√	FFSK	√	
CITYRUF	» POCSAG	√	√	FFSK	√	
CTCSS		√	√	SELCAL	√	Subtone, Selcal Analysis
DCSS	» DCS-SELCAL	√	√	FSK	√	
DCS-SELCAL		√	√	FSK	√	
DIGITAL SELECTIVE CALL	» DCS-SELCAL	√	√	FSK	√	
DMR		√	√	4FSK	√	Decryption (basic, ARC-4 and AES-256), Live Voice, AMBE Codec, WB Classifier
dPMR		√	√	4FSK	√	Live Voice, AMBE Codec, Wideband Classifier
DSC-VHF/UHF	» GMDSS / DSC-VHF	√	√	FSK	√	
D-STAR		√	-	GMSK	√	Unpublished AMBE Codec
DTMF		√	√	SELCAL	√	Dual-Tone, Selcal Analysis
DZVEI		√	√	SELCAL	√	Selcal Analysis
EEA		√	√	SELCAL	√	Selcal Analyis
EIA		√	√	SELCAL	√	Selcal Analysis
ERMES		√	√	4FSK	√	FSK Analysis
EURO		√	√	SELCAL	√	Paging, Selcal Analysis
EURO5	» EURO	√	√	SELCAL	√	
EUROPIEP	» EURO	√	√	SELCAL	√	
FLEX		√	√	4FSK	√	FSK Analysis
FMS-BOS		√	√	FSK	√	FSK Analysis
GMDSS / DSC-VHF		√	√	FSK	√	
GMDSS VHF	» GMDSS / DSC-VHF	√	√	FSK	√	
GOLAY / GSC		√	√	FSK	√	
GOLAY PAGER	» GOLAY / GSC	√	√	FSK	√	
ICAO VDL Mode 2	» VDL-M2	√	√	D8PSK	√	
ICAO VDL Mode 3	» VDL-M3	√	√	D8PSK	√	
IDAS	» NXDN	√	√	4FSK	√	

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W-CODE Mode Overview

Mode Search Term	Designation	Recognition	Availability	Modulation	Signal-Library	Comment
LINK-11-CLEW		√	√	PSK	-	Included in HF Modes
LINK-11-SLEW		√	-	PSK	√	
M.1159 DSC	» GMDSS / DSC-VHF	√	√	FSK	√	
M.1371-1 AIS 9600 Bd	» AIS	√	√	GFSK	√	
M.825 VTS SELCAL	» GMDSS / DSC-VHF	√	√	FSK	√	
MDC-1200		√	-	FFSK	-	
MOBITEX-1200		√	√	FFSK	√	
MOBITEX-8000		√	√	GMSK	√	FSK Analysis
MODAT		√	√	SELCAL	√	Selcal Analysis
MOTOROLA MotoTRBO	» DMR	√	√	4FSK	√	
MPT-1306	» CTCSS	√	√	SELCAL	√	
MPT-1316	» EEA	√	√	SELCAL	√	
MPT-1327		√	√	FFSK	√	
MPT-1343	» MPT-1327	√	√	FFSK	√	
MPT-1381	» DCS-SELCAL	√	√	FSK	√	
NATEL		√	√	SELCAL	√	Selcal Analysis
NEXEDGE	» NXDN	√	√	4FSK	√	
NMT-450		√	√	FFSK	√	
NOAA WEATHER RADIO	» NWR-SAME	√	√	FSK	√	
NWR-SAME		√	√	FSK	√	
NXDN		√	√	4FSK	√	Decryption (basic, DES and AES), Live Voice, WB Classifier
P-25	» APCO-25	√	√	C4FM	√	Live Voice, IMBE Codec
PACKET-1200		√	√	FSK	√	
PACKET-9600		√	√	GFSK	√	
PCCIR		√	√	SELCAL	√	Selcal Analysis
PDZVEI		√	√	SELCAL	√	Selcal Analysis
POCSAG		√	√	FFSK	√	
POCSAG SKYPE		√	√	FFSK	-	
POCSAG/FLEX	» POCSAG » FLEX	√	√	FFSK	-	Multi Mode
PROJECT 25	» APCO-25	√	√	C4FM	√	
PZVEI		√	√	SELCAL	√	Selcal Analysis
REFLEX	» FLEX	√	√	MFSK	√	
RHEINFUNKNETZ	» ATIS	√	√	FSK	√	
SELCAL	» SELCAL analog	√	√	SELCAL	√	Selcal Analysis
SENAO		√	-	MFSK	√	FSK Analysis
SITA	» ACARS	√	√	MFSK	√	
SUPER POCSAG	» POCSAG	√	√	FFSK	√	
TETRA		√	√	DQPSK	√	Live Voice, WB Classifier
TETRAPOL		√	√	OQPSK GMSK	√	Live Voice, Wideband Classifier
TRUNKED RADIO	» MPT-1327	√	√	FFSK	√	
VDEW		√	√	SELCAL	√	Selcal Analysis
VDL-2	» VDL-M2	√	√	D8PSK	√	
VDL-3	» VDL-M3	√	√	D8PSK	√	
VDL-M2		√	√	D8PSK	√	PSK Phase Plane
VDL-M3		√	√	D8PSK	√	Data, PSK Phase Plane

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W-CODE Mode Overview

Mode Search Term	Designation	Recognition	Availability	Modulation	Signal-Library	Comment
VERTEX VXD	» DMR	√	√	4FSK	√	
VHF DSC	» GMDSS / DSC-VHF	√	√	FSK	√	
X.25		√	√	FSK	√	
ZVEI-1		√	√	SELCAL	√	Selcal Analysis
ZVEI1-13	» ZVEI-1	√	√	SELCAL	√	
ZVEI-2		√	√	SELCAL	√	Selcal Analysis
ZVEI-2 XX TONES	» ZVEI-2	√	√	SELCAL	√	
ZVEI-3		√	√	SELCAL	√	Selcal Analysis
ZVEI-VDEW		√	√	FSK	√	Selcal Digital

FAX-G3 and MODEM Modes

BELL105		√	√	FSK	-	Auto Mode
BELL212A		√	√	PSK	-	Auto Mode
FAX-G3 T4 / T6 / JPEG / JBIG T.30 with ECMM		√	√	QAM	√	Auto Mode
FAX-G3-V.27ter		√	√	PSK	√	Auto Mode
FAX-G3-V.29		√	√	QAM	√	Auto Mode
FAX-G3-V.34hdx		√	√	QAM	√	Auto Mode
V.21		√	√	FSK	√	Auto Mode
V.22		√	√	PSK	√	Auto Mode
V.22bis		√	√	QAM	√	Auto Mode
V.23		√	√	FSK	√	Auto Mode
V.26 / V.26bis		√	√	PSK	√	Auto Mode
V.32		√	√	QAM	√	Auto Mode
V.32bis		√	√	TCM	√	Auto Mode
V.34 / V.34bis		√	√	TCM	√	Auto Mode
V.90		√	√	PCM	√	Auto Mode
V.92		√	√	PCM	√	Auto Mode

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W-CODE Mode Overview

Mode Search Term	Designation	Recognition	Availability	Modulation	Signal-Library	Comment
SATELLITE Modes						
AMSAT-P3-D		√	√	BPSK	√	
NOAA-GEOSAT		√	√	AM	√	
ORBCOMM		√	√	DPSK	√	
SAT-A		√	-	FM	√	Voice, Fax, Modem
SAT-AERO		√	√	PSK	√	Channel Types C, P, R, T
SAT-B		√	√	PSK	√	All Modes
SAT-B-C-TFC		√	√	OQPSK	√	C-Band Return
SAT-B-Data		√	√	BPSK	√	
SAT-B-FAX		√	√	BPSK	√	
SAT-B-HSD		√	√	OQPSK	√	High Speed
SAT-B-TEL		√	√	BPSK	√	Live Voice, APC Codec
SAT-B-TELEX-MM		√	√	BPSK	-	
SAT-B-TELEX-SM		√	√	BPSK	-	
SAT-C-EGC		√	√	BPSK	√	Enhanced Group Call
SAT-C-TDM		√	√	BPSK	√	
SAT-C-TDMA		√	√	BPSK	√	C-Band Return
SAT-D		√	-	MFSK	√	
SAT-M		√	√	BPSK	√	All Modes
SAT-M4-IPDS		√	-	QAM	√	
SAT-M-DATA		√	√	BPSK	√	
SAT-M-TEL		√	√	PSK	√	Live Voice, IMBE
SAT-M-FAX		√	√	BPSK	√	
SAT-mM		√	√	PSK	√	All Modes
SAT-mM-DATA		√	√	PSK	√	
SAT-mM-FAX		√	√	PSK	√	
SAT-mM-TEL		√	-	PSK	√	Unpublished AMBE Codec
SAT-mM-HSD (High Speed Data)		√	√	PSK	√	
SAT-mM-C-HSD (C band High Speed Data)		√	√	QAM	√	

Product Specification

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WAVECOM NACHRICHTENTECHNIK

W-CODE Analysis Functions

- Autocorrelation up to 200.000 bits
- Automatic analysis and decoding software for all data and FAX-G3 modulation types
- Automatic CRC recognition of all PACTOR-II and PACTOR-II -FEC systems
- Automatic message type detection (ITA-2, ITA-5 and sync/ async), LSB/MSB for STANAG and MIL-STD modes
- Bit correlation analysis. Raw FSK analysis - graphical display of demodulated data on a raster time line. For visual recognition of character and block lengths
- Bit length analysis. Graphical display of demodulated data, with automatic calculation of bit length and bit pattern display
- Code check for PSK, FSK, MFSK and MIL-STANAG modes
- Manual measurement of the frequency shift(s) with movable cursors
- Oscilloscope, real time, resolution up to 200 us/div
- MFSK analysis graphical display of MFSK tone spectrum with histogram
- Phase plane analysis HF BPSK, QPSK, OQPSK, DPSK and I/Q 10-2400 Baud
- Phase plane analysis VHF/UHF-DIR BPSK, DPSK, QPSK and OQPSK 100-12000 Baud
- Phase plane analysis VHF/UHF-SUB BPSK, QPSK, OQPSK, DPSK and I/Q 50-4000 Baud
- Real-time FFT, averaging: 1-64 values, bandwidth 0.5, 1, 2, 4, 24, 48 kHz and 96 kHz and adjustable cursors, 20 frames/sec
- Sonagram and FFT tuning display
- Sonagram, real-time display with cursor functions and history (full scrolling)
- Sound card calibration tool
- Graphical data display for selcal signal analysis
- Waterfall, real-time display with cursor functions

W-CODE Software Characteristics

- Media Player/Recorder, recording and playback of signals
- ALARM MONITOR, automatically detected text-string saving to HD or network SMS output
- Automatic insertion of time stamps (in 1 ms)
- Synchronized PSK and FSK raw bitstream available through remote control interface
- File formats TXT, JPG, BMP, Unicode, WAVECOM (with timestamps)
- PSK, FSK and MFSK baudrate history display with full graphical recall, averaging and cursor functions
- FSK shift history display with graphical recall, averaging and cursor functions
- Configurable message type for most MIL-STD and STANAG codes
- Pass-band filters in most modes
- Pass-band tuning in FFT display in most modes
- End-to-end decryption option to get clear voice and text output
- Live voice to output decoded / decrypted voice to the speaker in real-time
- SERIAL LINK, serial data output to PC serial interface COM 1 - 16
- STANAG5066 parser in MIL-STD and STANAG codes
- TCP/IP direct data (IQ and PCM) interface for streaming and for digital receivers (PXGF, IP-CONF, VITA-49)
- TCP/IP remote control with Wavecom GUI, full functionality over LAN or Internet (encrypted and speed optimized)
- Unlimited scroll-back buffers for text and graphics
- Up to 8 decoders may be installed in one host PC
- WiNRadio VSC and Virtual Audio Cable (VAC) support
- Sound card input, 8-bit and 16-bit, 8 kHz to 192 kHz, stereo and mono left/right
- License on a USB dongle or SD card
- WAV files playback and decoding, loop mode
- XML Remote Control Interface API for C++ and C#, XML over TCP/IP

Product Specification

Technical Overview and Specification Summary

WAVECOM NACHRICHTENTECHNIK

W-CODE Alphabets

Chinese (7-bit ASCII)	ITA-2 Swedish	Morse Arabic
HEX	ITA-2 TASS Cyrillic	Morse Cyrillic
ITA-1 Latin	ITA-2 Third Shift Cyrillic	Morse Greek
ITA-2 Baghdad70 Arabic	ITA-2 Third Shift Greek	Morse Hebrew
ITA-2 Baghdad80 Arabic	ITA-5 Bulgarian	Morse Latin
ITA-2 Cyrillic	ITA-5 Danish-Norwegian	Morse Scandinavian
ITA-2 Danish-Norwegian	ITA-5 French	Morse Spanish
ITA-2 Hebrew	ITA-5 German	User defined 5-bit alphabets based on UNICODE
ITA-2 Latin	ITA-5 Swedish	
ITA-2 Latin Transparent	ITA-5 US	

W-CODE Demodulators

AM for METEOSAT and NOAA-GEOSAT FAX transmissions	FFSK, 10-12000 Baud, Shift 50 Hz-16 kHz
BPSK, 10-12000 symbols/s	FSK, 10-2400 Baud, Shift 50 Hz-3.5 kHz Center frequency 0.5 kHz-3.5 kHz
CTCSS	GFSK, 10-12000 Baud, Shift 50 Hz-16 kHz
CW Morse, 10-500 WPM, Center frequency 0.5 kHz—3.5 kHz, Bandwidth 100 Hz-1.2 kHz, AFC On/Off	Mark-Space FSK, 10-300 Baud, Shift 50 Hz-3.5 kHz Center frequency 0.5 kHz-3.5 kHz
DPSK, DBPSK, DQPSK, D8PSK, D16PSK, 10-12000 symbols/s	MFSK, Tone length 4-1000 ms, max. 64 Tones Shift 50 Hz-3.5 kHz
DTMF	OFDM, 12-32 carriers, DQPSK, 62.5 symbols/s
DXPSK, dual carrier adaptive modulation, 2DPSK-D16PSK, 100 Baud	OQPSK, 10-12000 symbols/s
FAX-G3-V.17, FAX-G3-V.27ter, FAX-G3-V.29 FAX-G3-V.34hdx	QPSK, 10-12000 symbols/s
BELL103, BELL212A, V.21, V.22/V22bis, V.23 V.26/V26bis, V.32/V.32bis, V.34, V.90, V.92	Software AM demodulator for VHF/UHF SUB IF inputs
	Software FM demodulator for VHF/UHF SUB IF inputs

W-CLOUD

W-CLOUD is a remote decoding option available in all Wavecom decoders (SW and HW). This feature enables the user to stream signals from a remote site over internet or intranet for local decoding. During the streaming, no compression is made. This ensures a lossless data decoding as if the signal were received directly at the local site where the decoder sits.
The upload bandwidth of the remote site should be more than 2M bps.

Input of W-CLOUD on W-CODE	BW (in Hz)	Network load (in Byte/sec)
AF LEFT or RIGHT / *IQ*	24k	48k / *98k*
	48k	98k / *198k*
	96k	98k / *198k*
	<= 4k	48k / *98k*
Input of W-CLOUD on Wavecom HW decoders		
AF / *IF70*	24k	48k / *98k*
	48k	98k / *192k*
	96k	98k / *192k*
	<= 4k	12k / *20k*

W-SAT-email-Decoder Application for Windows and Linux

AMOS *	Rydex *	Xdatos (partially)
Blast (format detection)	se@COMM (partially)	ZModem **
Dualog *	SkyFile *	* (Mails and attachments)
GlobeWireless *	UUCP **	** (Transmitted files)
GTMail *	UUPlus **	
MS-RAS	WireShark Interface	

W-Spectrum Analysis (SA)

Available in FFT and FFT/Sonagram displays for all radio bands (HF, VUHF and SAT)	Detected signals and their sub-signals are marked with their parameters in the display
Detect and measure all signals in a selected bandwidth (4k, 24k, 48k and 96kHz)	All results are delivered on the XML remote control interface (XML RCI) for third-party development
Measuring parameters: signal center (Hz), bandwidth (Hz), level (dB) and detection confidence (in percent)	Detected signals can be saved with their time-stamp as an XML file for database compatible display and analysis
Each signal can be detected in detail containing a number of sub-signals with their parameters	

Product Specification

Technical Overview and Specification Summary

WAVECOM NACHRICHTENTECHNIK

W-Classifier-NB and W61PC Classifier-NB Technical Data

Bandwidth HF	4 kHz or 8 kHz (complex: 9.6 kHz)
Sampling interval (Ts)	1.6 sec or 3.2 sec
FSK	30 to 3000 Bd , Shift ≤ 3500 Hz Modulation index: 0.5-20 Signal must be continuously present during sampling interval
FSK-4 (F7B)	30 to 300 Bd, Shift ≤ 3500 Hz
MFSK	4-36 tones
PSK 2/4 Variant A/B	30 to 3000 Bd
PSK 8/16 Variant A/B	30 to 3000 Bd
MIL/STANAG	Classified to protocol (available in W-Classifier-NB only)
CIS-12	120 Bd, classified as one signal (available in W-Classifier-NB only)
OFDM	25-512 carriers Tg/Tu = 1/1 to 1/8 ≥ 25 Bd
OQPSK	25 Bd to 30 kBd
CW-Morse	Ts = 1.6 s: 6 to 60 Bd Ts = 3.2 s: 3 to 60 Bd
Voice	No
Operation	FFT display of classified signals Continuous and single-pass mode Classifier Code Check with look-up table

W-Classifier-NB and W61PC Classifier-NB Quality of Modulation Classification

FSK	m = 0.8: 100-2400 Bd m = 0.8: 50 Bd m ≥ 2: 100-2400 Bd m ≥ 2: 50 Bd	12 dB (Eb/N0) 15 dB (Eb/N0) 14 dB (Eb/N0) 16 dB (Eb/N0)
PSK 2/4 Variant A/B	100-2400 Bd	14 dB (Eb/N0)
PSK 8/16 Variant A/B	100-2400 Bd	16 dB (Eb/N0)
CW-Morse	8-50 Bd	18 dB (Eb/N0)

W-Classifier-NB and W61PC Classifier-NB Accuracy of Measured Parameters

FSK	baud rate center frequency	0.3 % 2 % of baud rate
PSK	baud rate center frequency	0.2 % 0.15 % of baud rate
CW-Morse	baud rate	5 %

Product Specification

Technical Overview and Specification Summary

WAVECOM NACHRICHTENTECHNIK

W-Classifier-WB Technical Data

Bandwidth HF/VHF/UHF/SHF	500 Hz to 96 kHz (complex: 160 kHz)
Sampling interval (Ts)	1.6 sec or 3.2 sec
FSK	30 to 60 kBd , Shift ≤ 30 kHz Modulation index: m = 0.5-20 Signal must be continuously present during sampling interval
4-FSK (F7B)	30 to 300 Bd, Shift ≤ 3500 Hz
MFSK	4-36 tones
PSK 2/4 Variant A/B	30 Bd to 60 kBd
PSK 8/16 Variant A/B	30 Bd to 60 kBd
MIL/STANAG	Classified to protocol
CIS-12	120 Bd, classified as one signal
OFDM	25 - 512 carriers Tg/Tu = 1/1 to 1/8 ≥ 25 Bd
OQPSK	25 Bd to 30 kBd
CW-Morse	Ts = 1.6 s: 6 to 60 Bd Ts = 3.2 s: 3 to 60 Bd
Voice	AM, FM, USB, LSB
Operation	FFT display of classified signals Continuous and single-pass mode Classifier Code Check with look-up table

W-Classifier-WB Quality of Modulation Classification

FSK	m = 0.8: 100-2400 Bd m = 0.8: 50 Bd m ≥ 2: 100-2400 Bd m ≥ 2: 50 Bd	12 dB (Eb/N0) 15 dB (Eb/N0) 14 dB (Eb/N0) 16 dB (Eb/N0)
PSK 2/4 Variant A/B	100-2400 Bd	14 dB (Eb/N0)
PSK 8/16 Variant A/B	100-2400 Bd	16 dB (Eb/N0)
CW-Morse	8-50 Bd	18 dB (Eb/N0)

W-Classifier-WB Accuracy of Measured Parameters

FSK 100 - 60 kBd	baud rate center frequency	0.3 % 2 % of baud rate
PSK 100 - 60 kBd	baud rate center frequency	0.2 % 0.15 % of baud rate
CW-Morse 6 - 50 Bd	baud rate	5 %

W-BitView Toolbox Functions

Signal Source/Sink	Import Text Data Import Hex Data Import Binary Data Import "Demodulated Bitstream" from W-CODE, W74PC, W-PCIe, W-PCI or W61PC Export Text Data Generate Pseudo-Noise
Synchronization	Preamble
Binary Modulation	NRZ-I NRZ-M NRZ-S Bi-Phase-L (Manchester) Bi-Phase-M Bi-Phase-S DBi-Phase-M DBi-Phase-S
Bit Manipulation	De-Stuffing (HDLC) Mirroring Rotation Shift Polarity De-Interleaving Block De-Interleaving Stream AND/OR/XOR/NOT AND/OR/XOR/NOT Range Extraction (Mask) Extraction (Range) Cutting
Decoding/Equalizer	Viterbi-Decoding De-Puncturing Standard De-puncturing Difference-Decoding BCH-Decoding Block-Code-Analysis Convolutional-Code-Analysis General-Reed-Solomon-Decoding
CRC & Polynomial	CRC (1...32) CRC-8 CRC-10 CRC-12 CRC-16 CRC-CCITT CRC-32 Parity (Even/Odd/Mark/Space) Parity from H-matrix Parity from polynominal
Unpacking/Decompress	Unzip
Descrambler	Descrambler (PN)

W-BitView Toolbox Functions

Channel Encoding	Convolutional Encoding	
Channel Decoding (Protocol)	ARQ-E FEC-A HNG-FEC ITA-3 (M.342) PSK-31 (Varicode)	SITOR BAUER RUM-FEC ITA-5
Source-Decoding (Alphabet)	Latin (5 bit) Third-Shift-Cyrillic (5 bit) Arabic-Baghdad-70 (5 bit) Bulgarian (5 bit) Swedish (5 bit) Danish-Norwegian (5 bit) German ITA-2 US ITA-2 UNICODE (16 bit) UTF-8 Pager-Numeric	Tass-Cyrillic (5 bit) Hebrew (5 bit) Arabic-Baghdad-80 (ATU-80) (5 bit) Bulgarian (8 bit) Swedish (7 bit) Danish-Norwegian (7 bit) French ITA2 ASCII ITA-5 UTF-7 Code Page Decoding
Analysis Tools	Symbol Statistics Signal Duration	Autocorrelation Bit Sync Analysis
Custom Library	Test CustomLib Matlab Simulate STANAG-4285 Stream setup for Viterbi Test CustLibFuncText Test VDL2 Deinterleaver	Symbol Transcoding STANAG-4285 Descrambler Test CustLibFuncBuildIn Test CustLibFunction

W-BitView Properties and Configuration

Function	Configuration Input Server Bit Counter Graphic Display Configuration Bit & Text Display Configuration	Configuration W-CODE or W61PC File Information Graphic Layout HexView Configuration

W-BitView Analysis Set Examples

Example	Analysis_BCH63_51 Analysis_ConvDataR1-2-K7 Analysis_RUM-FEC_164_Scrambled Baudot150 GenPseudo NewDepuncturingTest psk-31 rumfec-164 Stanag Scrambling sequence Stanag4285Simulation_300bps_long Stanag4285Simulation_2400bps_long Stanag4285Simulation_2400bps_short vdl2newRS	Analysis_BVTest.zip Analysis_Packet-300_2-V11 Analysis_s4285_5N1_V11 Fec-a-96-sreg72 LargeReedSolomon204-188NEW pocsag1200Baud reed-solomon-testNEW sitor-A Stanag4285-600-long-new Stanag4285Simulation_1200bps_long Stanag4285Simulation_2400bps_long_Noise unzip

Product Specification

Technical Overview and Specification Summary

WAVECOM NACHRICHTENTECHNIK

W74PC Card Specifications and Technical Data

Inputs	AFIF#1 — AFIF#4	IF70#1 — IF70#4
Connector	SMA female	SMA female
Frequency range	50 Hz to 25 MHz	52.5 MHz to 87.5 MHz (SAW filter)
Bandwidth	5 kHz to 500 kHz	5 kHz to 500 kHz
Frequency raster DDC	1.0 Hz	1.0 Hz
Signal level	2 mVrms to 0.5 Vrms	20 mVrms to 2.5 Vrms
Input impedance	> 1 kOhm	50 Ohm
Input max sampling rate	98.304 MHz	98.304 MHz
Input sampling rate jitter	< 1 ps (RMS 12 kHz to 20 MHz)	< 1 ps (RMS 12 kHz to 20 MHz)
Available for mode group	HF / VHF / UHF / Fax and Modem	HF / VHF / UHF / SAT

Card type	Half-size PCIe card (PCI Express x 4 slot)
Number of concurrent, independent inputs	Four SMA connectors: AFIF/IF70#1 — AFIF/IF70#4, each switchable by a mini signal relay
Dimensions (L x W x H)	168 x 106 x 22 mm
Weight	0.15 kg
Power requirement (typical values)	< 25 W
Bus interface	PCIe x4 Link 2 Gbit/s
Operating temperature range	0 °C to 50 °C
Case temperature range	0 °C to 55 °C
Storage temperature range	0 °C to 70 °C
Relative humidity	10 to 90 % (non-condensing)
A/D converter	2 x AD9268 dual 16 bit ADC
Dynamic range	> 60 dB
Digital down converter DDC	FPGA Cyclone IV
Oscillator and clock	High stability temperature compensated crystal oscillator Low phase noise clock distribution
Watchdog for on-board generated voltages	Yes
License key	Built-in license, no external USB dongle necessary
Conformity	CE ISO 9001 ISO 14001 RoHS

Product Specification

Technical Overview and Specification Summary

WAVECOM NACHRICHTENTECHNIK

W-PCIe and W-PCI Card Specifications and Technical Data

Inputs	AFIF#1 and AFIF#2	IF70#1a, IF70#1b and IF70#2
Connector	SMA female	SMA female
Frequency range	50 Hz to 25 MHz	52.5 MHz to 87.5 MHz (SAW filter)
Bandwidth	5 kHz to 500 kHz	5 kHz to 500 kHz
Frequency raster DDC	1.0 Hz	1.0 Hz
Signal level	2 mVrms to 0.5 Vrms 20 mVrms to 2.5 Vrms with 20 dB attenuator (jumpered)	20 mVrms to 2.5 Vrms
Input impedance	> 1 kOhm	50 Ohm
Input max sampling rate	92.16 MHz	92.16 MHz
Input sampling rate jitter	1 ps (RMS 12 kHz to 20 MHz)	1 ps (RMS 12 kHz to 20 MHz)
Available for mode group	HF / VHF / UHF / Fax and Modem	HF / VHF / UHF / SAT

Card type	Half-size PCIe (PCI express) card resp. Half-size PCI card
Number of concurrent, independent inputs	2 AFIF#1 or IF70#1a or IF70#1b -with- AFIF#2 or IF70#2
Dimensions (L x W x H)	168 x 106 x 22 mm
Weight	0.15 kg
Power requirement (typical values)	+3.3V @ 1.0 A +12V @ 0.4 A
Bus interface	PCIe x1 Link, 2 Gbit/s (W-PCIe) 32-bit 3.3V PCI slot, 100 Mbytes/s (W-PCI)
Operating temperature range	0 °C to 50 °C
Case temperature range	0 °C to 55 °C
Storage temperature range	0 °C to 70 °C
Relative humidity	10 to 90 % (non-condensing)
A/D converter	AD9268 dual 16 bit ADC
Dynamic range	> 60 dB
Digital down converter DDC	FPGA Cyclone IV 55K (W-PCIe), II 50K (W-PCI)
DSP	TI DSP320C6454
Watchdog for on-board generated voltages	Yes
Conformity	CE ISO 9001 ISO 14001 RoHS

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Technical Overview and Specification Summary

WAVECOM NACHRICHTENTECHNIK

W-SPECTRA-LAN, W74LAN, W-PCIe-LAN and W-PCI-LAN Computer Specifications and Technical Data

Dimensions (L x H x W)	227 x 126 x 216 mm
Weight	7.0 kg
DC power requirement (typical values)	9—48 V DC, 120 W, 24 V / 5 A
AC power requirement (typical values)	100—240 V, 50—60 Hz, 1.4 A
Operating temperature	-40 °C to 70 °C (According to IEC60068-2-1, IEC60068-2-2, IEC60068-2-14) Typically 55 °C at full decoding and monitoring operation
Case temperature range	-40 °C to 70 °C
Storage temperature range	-40 °C to 85 °C
Relative humidity	10 to 93 % (non-condensing)
Operating system (OS)	Windows 7 Professional, 64-bit, English
CPU	Intel® Core™ i7-6700TE, 8 MB cache, Quad-core
CPU Clock	2.4 GHz
Controller	Desktop Intel® Q170 Platform Controller Hub
Memory	16 GB DDR4-RAM, PC2133, 260-pin memory DIMM
Hard disk (HDD) for operating system	250 GB, 7200, 64MB cache, 24h/7d
Solid state disk (SSD) for data storage	1000 GB, 540 MB/s, 1 GB cache
W-PCI-LAN	1 slot for W-PCI card 1 PCIe x 16 slot free
W-PCIe-LAN / W74LAN / W-SPECTRA-LAN	1 slot PCIe x 16 for W-PCIe resp. W74PC card 1 PCI slot free
Ethernet / LAN	2 x 10MB/100MB/1GB
USB	2 x USB 3.0 (front), 4 x USB 3.0 (rear)
Serial ports	2 x RS232/422/485 (rear)
Audio	1 x Mic-in 1 x Line-out
Video	1 x DVI-I port, 2 x Display Ports (1 x front, 1 x rear) Intel® HF Graphics 530
Keyboard/Mouse	1 x PS/2 or USB
Conformity	CE FC Trade Name NEXCOM Model Number Nise 3500P2 Tested To Comply with FCC Standards CENELEC EN 60601 Compliant RoHS

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Technical Overview and Specification Summary

WAVECOM NACHRICHTENTECHNIK

Since more than thirty years Wavecom Elektronik AG has developed, manufactured and distributed high quality devices and software for the decoding and retrieval of information from wireless data communication in all frequency bands. The nature of the data communication may be arbitrary, but commonly contains text, images and voice. The company is internationally established within this industry and maintains a longstanding, world-wide network of distributors and business partners.

Product Information

Products	http://www.wavecom.ch/product-summary.php
Datasheets	http://www.wavecom.ch/brochures.php
Specifications	http://www.wavecom.ch/product-specifications.php
Documentation	http://www.wavecom.ch/manuals.php
Online help	http://www.wavecom.ch/content/ext/MonitoingSystemOnlineHelp/default.htm http://www.wavecom.ch/content/ext/DecoderOnlineHelp/default.htm
Software warranty	One year free releases and bug fixes, update by DVD
Hardware warranty	Two years hardware warranty
Prices	http://www.wavecom.ch/contact-us.php

System Requirements

	Minimum	*Recommended*
CPU	Core i5 or Core i7 2.8 GHz	Core i7-6700 3.4 GHz
Memory	4 - 8 GB RAM	16 - 32 GB RAM
OS	Windows 7	Windows 10 32-bit or 64-bit

Distributors and Regional Contacts

You will find a list of distributors and regional contacts at http://www.wavecom.ch/distributors.php

WAVECOM NACHRICHTENTECHNIK

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