
WAVECOM Decoder

W-CODE Specifications

V6.8.11

By WAVECOM ELEKTRONIK AG



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W-CODE Specification

List of Abbreviations, Remarks	
CC	CodeCheck
CL	HF-Classfier
*	Currently being developed
xxx	New in List
	Parameters depend on the selected protocol. The full parameter ranges can only be used, when working with the source code
	Specifications may be changed without prior notice

HF-Protocols

HF-Protocols (will be expanded in the future)	CL	CC
ALE-400	✓	✓
ALF-RDS	✓	
ALIS		✓
ALIS-2		
ARQ6-90	✓	✓
ARQ6-98		✓
ARQ-E	✓	✓
ARQ-E3	✓	✓
ARQ-M2-242	✓	✓
ARQ-M2-342	✓	✓
ARQ-M4-242	✓	✓
ARQ-M4-342	✓	✓
ARQ-N	✓	✓
ASCII	✓	✓
AUM-13		
AUTOSPEC	✓	✓
BAUDOT	✓	✓
BULG-ASCII	✓	
CHU		
CIS-11	✓	✓
CIS-12 (HEX output)		
CIS-14	✓	✓
CIS-36		
CIS-36-50	✓	
CIS-50-50	✓	
CLOVER-2000 (Option, ARQ,all CRC's)	✓	
CLOVER-2 (Option, ARQ, all CRC's)	✓	
CODAN (SELCAL)	✓	✓
CODAN-9001 (Option)		
COQUELET-13	✓	

HF-Protocols (will be expanded in the future)	CL	CC
COQUELET-8	✓	
COQUELET-80	✓	
CV-786	✓	
CW-MORSE	✓	
DCS SELCAL		✓
DGPS	✓	✓
DUP-ARQ	✓	✓
DUP-ARQ-2	✓	✓
DUP-FEC-2	✓	✓
EFR	✓	
FEC-A	✓	✓
FELDHELL		
FM-HELL		
GMDSS/DSC-HF	✓	
G-TOR	✓	✓
GW-FSK	✓	✓
GW-PSK	✓	
HC-ARQ	✓	✓
HF-ACARS (HF DL)		
HNG-FEC	✓	✓
ICAO-SELCAL (ANNEX 10)		
MD-674	✓	
MFSK-16	✓	
MFSK-20		
MFSK-8	✓	
MIL-188-110-16TONE (-110A/B App. A)	✓	
MIL-188-110-39TONE (-110A/B App. B)		
MIL-188-110A, Serial Tones, 75-4800 bps	✓	
MIL-188-110B (App. C), STANAG 4539		
MIL-188-110B, 3200-12800 bps		
MIL-188-141A (ALE)	✓	
MIL-188-141B (BW0, BW1, BW4 data)		
MIL-188-141B (BW2 & BW3 id only)		
MIL-M-55529 NB/WB	✓	
OLIVIA	✓	
PACKET-300/600	✓	✓
PACTOR (all CRC's)	✓	✓
PACTOR-FEC (all CRC's)	✓	✓
PACTOR-II (all CRC's)	✓	
PACTOR-II-FEC (all CRC's)	✓	
PACTOR-III (Option, all CRC's)	✓	
PICCOLO-MK12	✓	
PICCOLO-MK6	✓	
POL-ARQ	✓	✓
PRESS-FAX		
PSK-10		

HF-Protocols (will be expanded in the future)	CL	CC
PSK-125F	✓	
PSK-220F	✓	
PSK-31 (BPSK, QPSK)	✓	
PSK-63 (BPSK, QPSK) and FLARC extension	✓	
PSK-125 (BPSK, QPSK) and FLARC extension	✓	
PSK-250 (BPSK, QPSK) and FLARC extension	✓	
PSK-31-FEC	✓	
PSK-63F	✓	
PSK-AM	✓	
ROBUST-PACKET		
RUM-FEC	✓	✓
SI-ARQ	✓	
SI-AUTO	✓	
SI-FEC	✓	✓
SITOR-ARQ	✓	✓
SITOR-AUTO	✓	✓
SITOR-FEC	✓	✓
SP-14		
SPREAD-11	✓	✓
SPREAD-21	✓	✓
SPREAD-51	✓	✓
SSTV Automatic		
SSTV Martin 1, 2, 3 & 4		
SSTV Robot 8s, 12s, 24s & 36s		
SSTV SC-1 16 & 32s		
SSTV SC-1 8s, 16s & 32s		
SSTV Scottie 1, 2, 3 & 4		
SSTV Wraase SC-1 24s, 48s & 96s		
SSTV Wraase SC-2 20s, 60s, 120s & 180s		
STANAG 4285 75-3600 bps	✓	
STANAG 4415 75 bps (NATO ROBUST)		
STANAG 4481-FSK (KG-84)	✓	
STANAG 4481-PSK		
STANAG 4529 75-1800 bps		
STANAG 4539 3200-12800 bps		
STANAG 5065-FSK		✓
SWED-ARQ	✓	✓
TWINPLEX ARQ		
VISEL		
WEATHER-FAX		

VHF/UHF-Protocols

VHF/UHF-Protocols (will be expanded in the future)	CC
ACARS	
AIS	
ASCII	✓

ATIS (Selcal Digital)	
BIIS	
CCITT (Selcal Analog)	
CTCSS (Selcal Analog)	
DCS SELCAL	✓
DGPS	✓
DMR (Digital Mobile Radio)	
DTMF (Selcal Analog)	
DZVEI (Selcal Analog)	
EEA (Selcal Analog)	
EIA (Selcal Analog)	
ERMES	
EURO (Selcal Analog)	
FLEX	✓
FMS-BOS (Selcal Digital)	
GMDSS/DSC-VHF/UHF	
GOLAY	✓
MOBITEX-1200 (with partial OVLS extension)	
MOBITEX-8000	
MODAT (Selcal Analog)	
MPT-1327	
NATEL (Selcal Analog)	
NMT-450	
NWR-SAME	
PACKET-1200	✓
PACKET-9600	
PCCIR (Selcal Analog)	
PDZVEI (Selcal Analog)	
POCSAG	✓
PZVEI (Selcal Analog)	✓
SKYPER (POCSAG)	
VDEW (Selcal Analog)	
VDL-M2	
ZVEI-1 (Selcal Analog)	
ZVEI-2 (Selcal Analog)	
ZVEI-3 (Selcal Analog)	
ZVEI-VDEW (Selcal Digital)	

SAT-Protocols

SAT Protocols (INMARSAT protocols are optional)

AMSAT-P3-D
METEOSAT
NOAA-GEOSAT
ORBCOMM
SAT-AERO (Aero-I), Beta Version
SAT-A-TELEX
SAT-B/M/mM (INMARSAT™, return)*

SAT Protocols (INMARSAT protocols are optional)
SAT-B-C-TFC (INMARSAT™, C-Band return fixed ch)
SAT-B-Data (INMARSAT™, forward)
SAT-B-FAX (INMARSAT™, forward)
SAT-B-HSD (INMARSAT™, forward, High Speed Data)
SAT-B-TEL (INMARSAT™, forward)
SAT-B-TELEX-MM (INMARSAT™, forward)
SAT-B-TELEX-SM (INMARSAT™, forward)
SAT-C-EGC (INMARSAT™, Enhanced Group Calls)
SAT-C-TDM (INMARSAT™)
SAT-C-TDMA (INMARSAT™)
SAT-M-DATA (INMARSAT™, forward)
SAT-M-FAX (INMARSAT™, forward)
SAT-mM-DATA(INMARSAT™, forward)
SAT-mM-FAX(INMARSAT™, forward)
SAT-mM-TEL (INMARSAT™, forward) ask
SAT-M-TEL (INMARSAT™, forward)

FAX and Modem Protocols

FAX and Modem Protocols
FAX-G3 T4 / T6 / JPEG / JBIG T.30 protocol with ECMM
FAX-G3-V.17
FAX-G3-V.27ter
FAX-G3-V.29
FAX-G3-V.34hdx
BELL103
BELL212A
V.21
V.22 / V22bis
V.23
V.26 /V26bis
V.32 / V.32bis
V.34
V.90
V.92

List of Alphabet

List of Alphabets
Chinese (7Bit ASCII)
HEX
ITA-1 Latin
ITA-2 Baghdad70 Arabic
ITA-2 Baghdad80 Arabic
ITA-2 Cyrillic
ITA-2 Danish-Norwegian
ITA-2 Hebrew

List of Alphabets

ITA-2 Latin
ITA-2 Latin Transparent
ITA-2 Swedish
ITA-2 TASS Cyrillic
ITA-2 Third Shift Cyrillic
ITA-2 Third Shift Greek
ITA-5 Bulgarian
ITA-5 Danish-Norwegian
ITA-5 French
ITA-5 German
ITA-5 Swedish
ITA-5 US
Morse Arabic
Morse Cyrillic
Morse Greek
Morse Hebrew
Morse Latin
Morse Scandinavian
Morse Spanish
User defined 5-bit Alphabets based on UNICODE

Demodulator

Demodulators (Biterror rate within 3 dB of theory (white Gaussian noise, non fading channel))

AM for METEOSAT and NOAA-GEOASAT FAX transmissions
BPSK, 10-12000 symbols/s
BR6028 Modem, 7 FDM channels S 85 Hz, Pilot-Tone 561 Hz
CTCSS
CW Morse, 10-500 WPM, Center freq. 0.5 kHz-3.5 kHz, BW 100 Hz-1.2 kHz
DPSK, DBPSK, DQPSK, D8PSK, D16PSK, 10-12000 symbols/s
DTMF
DXPSK, dual carrier adaptive modulation, 2DPSK-D16PSK, 100 Baud
FFSK, 10-12000 Baud, Shift 50 Hz-16 kHz
FSK, 10-2400 Baud, Shift 50 Hz-3.5 kHz, Center freq. 0.5 kHz-3.5 kHz
GFSK, 10-12000 Baud, Shift 50 Hz-16 kHz
FAX-G3-V.17, FAX-G3-V.27ter, FAX-G3-V.29, FAX-G3-V.34hdx, BELL103, BELL212A, V.21, V.22 / V22bis, V.23, V.26 / V26bis, V.32 / V.32bis, V.34, V.90, V.92
Mark-Space FSK, 10-300 Baud, Shift 50 Hz-3.5 kHz, Center freq. 0.5 kHz-3.5 kHz
MFSK, Tone length 4-1000 ms / max. 64 Tones, Shift 50 Hz-3.5 kHz
OQPSK, 10-12000 symbols/s
QPSK, 10-12000 symbols/s
Software AM/ FM Demodulator for IF Inputs

Analysis Function

Analysis Functions

Autocorrelation up to 200'000 bits
Automatic analysis & decoding software for all data and FAX-G3 modulations

Analysis Functions
Automatic CRC recognition of all PACTOR-II and PACTRO-II-FEC systems
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 with bit pattern display
Code check for FSK codes
FSK analysis
Manual measurement of the frequency shift(s) with movable cursors
MFSK analysis for HF: Graphical display of MFSK tones with histogram.
Oscilloscope, real time, resolution up to 200 us/div
Phase plane display, HF, VHF/UHF Indirect BPSK, QPSK, OQPSK DPSK, 25-2400 Baud
Phase plane display, VHF/UHF Direct BPSK, DPSK, QPSK, OQPSK, 100-12000 Baud
Real-time FFT, averaging: 1-64 values, bandwidth 0.5, 1, 2, 4, 24, 48 kHz & 96 kHz and adjustable cursors, 20 frames/sec
Sonagram, real time display with cursor functions and history (full scrolling)
Sonagram and FFT tuning display
Symbol rate HF, VHF/UHF Indirect, Analysis 30-4000 Baud
Symbol rate VHF/UHF Direct, Analysis 30-24000 Baud
VHF/UHF Selcal analysis: Graphical display of FSK data for Selcal signal analysis.
Waterfall, real time display with cursor functions

General Software Characteristics

General Software Characteristics
Media Player/Recorder, direct recording and playback of WAV files
ALARM MONITOR, automatic detected text-string saving to HD or LAN, SMS output
Automatic insertion of time stamps
Bitstream: raw, synchronized FSK bitstream available through remote control interface.
Bitstream: raw, synchronized none adaptive PSK bitstream available through remote control interface.
File formats: TXT, BMP, Unicode, WAVECOM (with timestamps)
FSK baudrate history display with full graphical recall / averaging and cursor functions
FSK shift history display with graphical recall/averaging, cursor functions
Message type for most MIL-STD and STANAG codes (sync/async, data bits, parity bits, stop bits, MSB/LSB, ITA2/ITA5(ASCII)/HEX/STANAG5066
Pass-band filters in most codes
Pass-band tuning in FFT display in most codes
SERIAL LINK, serial data output over COM1-16 with
Sound card input, 16bit, 48 kHz, Stereo
STANAG5066 parser in MIL-STD and STANAG codes
TCP/IP direct data (IQ and PCM) interface for streaming and digital receivers (PXGF, IP-CONF)
TCP/IP Remote Control with WAVECOM GUI, full functionality over LAN/Internet (encrypted and speed optimized)
Unlimited scroll back buffers for text and graphic
Up to 8 decoders/computer
USB-License-Dongle
Virtual Audio Cable (VAC) support
WAV files playback and decoding, loop mode
XML Remote Control (API for C++ and C#, XML over TCP/IP)

Hardware System

Hardware/System	
Concept	Software only solution
Sound card input: maximum sampling rate	192 kHz
Sound card sampling rate precision	<100 ppm, <20ppm recommended
Screen Resolution (SVGA)	min. 800x600
Minimum CPU requirements	P4,1.6 GHz
Minimum RAM requirements	512 MB
OS WINDOWS XP/VISTA 32-bit	Tested with English version

W-CODE-CL (HF Classifier Option)

W-CODE-CL Classifier Option (each option requires a separate license)	
Classification Bandwidth	4 kHz or 8 kHz
Classification Sample Time	1.6 or 3.2 sec
Classified signals:	CW FSK-2: Modulation index: 0.5-20; shift: 25-2000 Hz; speed 25-2500 Baud F7B: shift: 25-2000 Hz; speed 25-300 Baud MFSK: Max. 34 carriers, 25-300 Baud PSK2/4/8/16, A&B: speed 25-2400 Baud; S/N=16 db, using a non-cooperative equalizer OQPSK: speed 25-2400 Baud OFDM: shift>25Hz; max. 500 channels; subcarrier spacing/symbol rate range 1.1-2.5 Accuracy: FSK speed: 0.3 % FSK center frequency: 2% of speed PSK-speed: 0.2 % PSK center frequency: 0.15 % of speed Sensitivity of classification FSK-2: m=0.8: 100-2400 Baud, S/N=12 dB FSK-2: m=0.8: 50-100 Baud, S/N=15 dB PSK2/4: 100-2400 Baud S/N=14 dB PSK8: 100-2400 Baud S/N=16 dB,
Operating	Display of classified signals in FFT Continuous mode for HF-classifier (CCC) Integrated classifier-code-check

W-CODE-SAT (INMARSAT Option)

SAT INMARSAT Option (each option requires a separate license)	
SAT-A /B/C/M/mM, details see code table	
W-CODE-SAT requires an external receiver and interface for the IF.	
Single channel INMARSAT C/B/M/mM Monitoring System, with FAX/Voice/Data File-Recording, FAX-Viewer for B/M/mM, B Voice-Playback. External receiver and interface required.	

W-CLOVER-2000 (Option)

CLOVER-2000 Option (each option requires a separate license)	
System	Half-duplex ARQ
AFC	±400 Hz, with max. single step ±10 Hz

CLOVER-2000 Option (each option requires a separate license)

Speed	62.5 Baud
Modulation	PSK2A, PSK4A, PSK8A, PSK16A, ASK2PSK8, ASK4PSK16, 2DPSK2A; 8 tones
Alphabet	ITA-5

W-CLOVER-2 (Option)

CLOVER-2 Option (each option requires a separate license)

System	Half-duplex ARQ
AFC	± 200 Hz, with max. single step ± 15 Hz
Speed	31.25 Baud
Modulation	PSK2A, PSK4A, PSK8A, PSK16A, ASK2PSK8, ASK4PSK16, 2DPSK2A; 4 tones
Alphabet	ITA-5

W-PACTOR-III (Option)

PACTOR-III Option (each option requires a separate license)

System	Half-duplex synchronous ARQ
AFC	± 50 Hz
Speed	100.0 Baud
Modulation	DBPSK, DQPSK; 2, 6, 14, 16, or 18 tones
Alphabet	ITA-5 with block coding, CRC is displayed

W-CODAN-9001 (Option)

CODAN-9001 Option (each option requires a separate license)

System	Half-duplex asynchronous adaptive ARQ
AFC	± 9 Hz
Speed	16 x 75 Baud
Modulation	Differential PSK4A; 16 tones
Alphabet	RAW DATA, TEXT DATA (CODAN data compression in preparation)

Ordering Information

Ordering Information

Documentation	English User Manual
Online Help	English
Software	Installation CD with latest software version and WAV signal samples
Updates	Software update by CD or Internet http://www.wavecom.ch
Source Code	As an option, only available to official government bodies only, against a written certificate
Warranty	2 years

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