

WAVECOM® W-BitView



Today, the possibility to analyze and process demodulated signals with unknown protocols is important. W-BitView is a stand alone application for analyzing unknown signal. Signals with unknown protocols can be further analyzed and processed to retrieve the transmitted data. The software can also be used as a postprocessor for decoded data.



W-BitView

Bit Stream Analysis Software



W-BitView Overview

- Direct data import from the W-PCI, W-PCIe, W -CODE, W61PC or W51PC decoder
- .NET application
- User can add own functions (MatLab or C#)
- Offline, stand-alone application
- Bit manipulation tool
- Bit display tools (text, graphics)
- Multiple analyses may be processed simultaneously

What is Bit Analysis?

Bit analysis is the process of finding patterns in a seemingly random and incoherent stream of bits. The goal is to transform the bit stream into clear text, or into reliable, cryptographic text, for further processing – these objectives require that all

framing, protocol overhead, checksums, and other extraneous data should be removed. The BitView provides the user with a set of sophisticated and highly specialized tools to ease and accelerate this process, and facilitate the recovery of useful data.

Auto-update functionality

Drag and drop of functions

Toolboxes for all functions

Re-arrange functions in tree view

(ASCII or XML)

Nested docking

Auto hide

• Report generator for parameter and data

What W-BitView Offers

BitView enables the user to analyze bit streams. The range of available functions includes the display of a bit stream in various formats, simple bit stream manipulations, as well as statistical and mathematical functions, and functions based on coding theory. The tools are directed at users with experience in both coding theory and mathematics; in particular, to fully exploit some of the more complex functions a comprehensive mathematical knowledge is a requirement.

All analysis and processing steps, including the necessary parameters involved, are logged as is

each function used and its parameters. The log file is saved in ASCII (XML) format as may be edited with most text editors. It may be loaded to repeat the saved analysis steps, which enables analysis sessions to be documented and stored for later automatic rerunning, without user intervention.

The W-BitView Tool is an excellent companion to other Wavecom decoder products. W-BitView is a native .NET C# Winforms application. W-BitView offers the important feature of using custom project templates and all MATLAB Toolboxes. W-BitView Bit Stream Analysis Software



Using W-BitView

The initial steps in the bit analysis process depend on what is known about the signal, and on the skill and experience level of the use. Prior knowledge of the source, language, frequency, modulation mode, time of capture, etc. are useful pieces of information which may facilitate the analysis of the bit stream.

The various classification tools available from the Wavecom decoders should then be used. These allow a fully automatic determination of modulation type and coding format, or at least the determination of certain essential parameters of the signal, e.g. baud rate and frequency shift.

Using the autocorrelation function will tell the operator whether the bit stream contains repeating patterns, e.g. synchronization words, HDLC flags or start-stop bits.

While the Wavecom decoders contain a wealth of tools and modes, their focus is on real-time analysis; BitView gives the user the opportunity to analyze and experiment repeatedly offline with captured data in order to recover the signal content.

| WAVECOM W-BV - pocsag1200Baud.x | ml | |
|---|--|--------------------------------|
| File Edit View Window Too | ls Setup Help | |
| | 2 🛐 🔭 🔹 | |
| New Open Save Print Help Too | olbox History Property Recalc Report | |
| Toolbox 4 × | Extraction Mirroring ASCI 200 POCSAG 1200 Baud | Properties 4 X |
| Source/Sink | 111111111111111111111111111111111111111 | Start Import |
| Synchronisation | 101111111111111011111111111111111111111 | Stop |
| Binary Modulation | 111111111111111111111111111111111111111 | |
| Bit Manipulation | 110111000000000000000000000000000000000 | |
| and De-Starring (HDLC) | 000000000000000000000000000000000000000 | Configuration A |
| Mirroring | 10 | Import Server Selection |
| Rotation | | RCI Timeout [s] 5 |
| Shift | | Recording Duration 0 |
| Polarity | | Configuration W61PC |
| De-Interleaving Block | 01 | Decoder Bitstream Type HF |
| De-Interleaving Stream | 10 | IP Address W61PC 127.0.0.1 |
| AND/OR/XOR/NOT | 01 | Port Number W61PC 33234 |
| AND/OR/XOR/NOT Range | 10 | W61PC Card/Device Number 1 |
| Extraction (Mask) | 01 | Configuration W-CODE |
| Extraction (Range) | 110000011001011011110101000100111110110 | Decoder Bitstream Type HF |
| 225 Cutting | 011101111010011111001011001010100000110000 | IP Address W-CODE 127.0.0.1 + |
| Decoding/Equalizer | | Configuration |
| CRC & Polynomial | 0110100101010000101000010100001100000011010 | 10000 |
| Unpacking/Decompress | 0111101101011101000000100010010011101010 | pocsagi200Baud.xml 4 X |
| Descrambler | 010001100101011101000100110000001110010000 | POCSAG 1200 Baud |
| Channel Encoding | 100110000101101000011101000011110100100 | Extraction (Range) |
| Channel Decoding (Protocol) | 0001100110100001010100010011011000110000 | Polarity |
| Source Decoding (Alphabet) | 0011001011011110101000100111001011110000 | Extraction (Range) |
| Analysis Tools | | Parity (Even/Odd/Mark/Space) |
| Custom Library | 0000.0010H FF | Extraction |
| A lest customLID Matlab | 0000.0020H FF | E-V Mirroring |
| test Symbol Transcoding | 0000.0030H FF | ASCII |
| test Simulate STANAG-4285 | 0000.0050H FF FF FF FF DF FF FF FF FF FF FF FF FF | E Z Extraction |
| test STANAG-4285 DeInterleaver | 0000.0060H FF FF FF 7F FF FF FF FF FF FF FF FF FF | Parity from Polynomial |
| test STANAG 4285 Descrambler | 0000.0070H FF FD FF F7 FF | V Parity (Even/Odd/Mark/Space) |
| test Stream setup for Viterbi | 0000.0090H FF FF FF FF FF FF FF FF 7B BF 03 00 00 00 00 00 0 | E-V. Cutting |
| test CustLibFuncBuiltIn | 0000.00A0H 00 00 00 00 00 00 54 55 55 55 55 55 55 55 | Extraction (Range) |
| test CustLibFuncText | | Cutting |
| test CustomLibFunction | 0000.00D0H 55 55 55 55 55 55 55 55 55 55 55 55 55 | E V Kiraction |
| test VDL2 Deinterleaver | 0000.00E0H 55 55 55 55 55 55 55 55 55 55 55 55 55 | |
| | 10000.00000 35 55 55 55 65 69 AF C6 B7 9F C1 CD BD 7C 9A 96 0000.1 | |
| Currer Bost Lo-1 Col-1 Pit index (0. St | lasted Channel [] | |

POCSAG Decoding Example

W-BitView Bit Stream Analysis Software



Custom Functions

The user may expand the functionality of BitView by adding custom functions developed in Visual Studio C# .NET. Project templates are included with the BitView package. The user may use these templates as a starting point for his development work. The .NET DLL templates come in two flavors, with and without MATLAB linking. This feature allows bit stream manipulation in MATLAB to be included in a custom function. The procedure is described in detail in the BitView manual. A MATLAB Runtime is installed together with BitView and is required in order to allow a MATLAB function to work in a .NET environment without the user acquiring a complete MATLAB system.

MATLAB[™] Runtime Library

MATLAB includes numerous toolboxes with several thousand functions for a multitude of applications. One such toolbox is called the Communications Toolbox including error detection and correction, interleaving, modulation and demodulation, equalizing and many other functions. Similar functions developed in C# are also found in BitView, e.g. a Reed-Solomon Decoder. Although complex features like block code analysis are found in MATLAB, they must be developed by the user in the proprietary programming language of MATLAB. To do so the built-in functions are used. For instance way a clever student has in this way developed a MATLAB program for the analysis of block codes and convolutional codes, which was published with his master thesis. This feature would have been very difficult to realize in .NET C# and was the reason for the integration of MATLAB in W-BitView. For the experienced MATLAB user this combination is very useful.



Reed-Solomon Example

W-BitView

Bit Stream Analysis Software





Flow chart with VDL-M2

W-BitView Analysis Set Examples

| Analysis_BCH63_51Analysis_BVTest.zipAnalysis_ConvDataR1-2-K7Analysis_Packet-300_2-V11Analysis_RUM-FEC_164_ScrambledAnalysis_s4285_5N1_V11Baudot150Fec-a-96-sreg72GenPseudoLargeReedSolomon204-188NEWNewDepuncturingTestpocsag1200Baud | | | | |
|--|---------|--|---|----|
| Examplepsk-31reed-solomon-testNEWrumfec-164sitor-AStanag Scrambling sequenceStanag4285-600-long-newStanag4285Simulation_300bps_longStanag4285Simulation_1200bps_longStanag4285Simulation_2400bps_longStanag4285Simulation_2400bps_longStanag4285Simulation_2400bps_longStanag4285Simulation_2400bps_longVdl2newRSvdl2newRS | 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 Stanag42855imulation_1200bps_long Stanag4285Simulation_2400bps_long_Nois unzip | se |





W-BitView Toolbox Functions

| Signal Source/Sink | Import Text Data Import Hex Data Import Binary Data Import "Demodulated Bitstream" from W-CODE, W-PCIe, W-PCI, W74PC 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 (132) 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 File Information Graphic Layout Configuration HexView Configuration Input Device Configuration for W-CODE, W-PCI, W-PCIe, W74PC or W61PC |
|----------|---|
|----------|---|





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/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 and Ordering Information

| | Minimum | Recommended |
|--------------|-------------------------------------|--------------------------------------|
| CPU | P4 Dual-Core 2.4 GHz | Core i5 or Core i7 2.8 GHz |
| Memory | 2 GB RAM | 4 - 8 GB RAM |
| OS | Windows XP | Windows 7 32-bit or Windows 7 64-bit |
| | | |
| Product Code | Description | |
| WBV | Stand alone bit-level analysis tool | |

Distributors and Regional Contacts

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



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