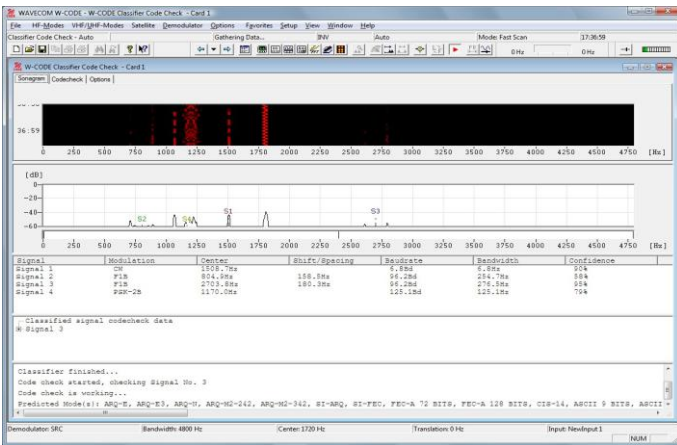
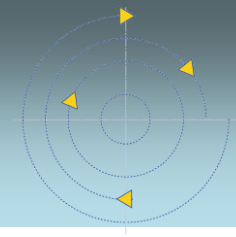


W61PC W61LAN-MK2

Hard- & Software Solution for Decoding, Signal Classification, Analysis & Processing



W-61PC/LAN-MK2



W61PC

General description

The W61 is available in two versions:

- **W61PC:** A half length PCI card that can be installed in a standard PC under Windows XP / VISTA and Server 2003 (Windows7 and Server 2008 planned).
- **W61LAN-MK2:** A W61PC integrated into a complete single board computer system operating under Windows XP.

The W61PC decoder offers all functions required to analyze, decode, and process radio data communications in the HF, VHF, UHF and SHF ranges.

The W61PC software is designed to work with your existing equipment as it provides analogue and digital inputs. It allows seamless integration with SDR (Software Defined Radio) receivers with IQ data or digital audio outputs, TCP/IP streams and sound cards.

The W61PC provides:

- An signal overview using real-time spectrum and waterfall display
- Demodulation, decoding to content level of known signals. Decoded output can be saved to files or picked up from the remote control interface
- Manual signal measurement
- Automatic classification and CodeCheck of unknown signals

Features

- Impressive list of currently implemented modes (see specifications), including:
 - ✓ INMARSAT B/M/mM/Aero
 - ✓ Modem and FAX modes
 - ✓ Robust-Packet
 - ✓ CLOVER-2
 - ✓ CLOVER-2000
 - ✓ PACTOR-3
 - ✓ CODAN-9001
- High performance wideband analog front end with three wideband AF/IF Inputs covering 50 Hz -25 MHz. Fully reconfigurable regarding FPGA, DSP, bandwidth, IF frequency.
- Fully tunable 70 MHz IF (52.5 MHz - 87.5 MHz with SAW filter) input for satellite monitoring with no external receivers
- TCP/IP data input (LAN) for IQ or PCM coded data. Data conversion to the WAVECOM format is done

- A versatile XML Remote Control Interface with the same command set used by the W51PC and the W61PC.

The COMINT solution for:

- Government agencies
- Homeland and government security agencies, defense contractors
- Telecommunications authorities
- Defense signal corps

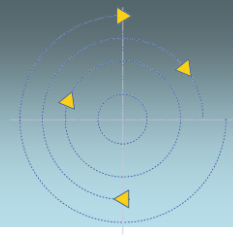


W61PC PCI card

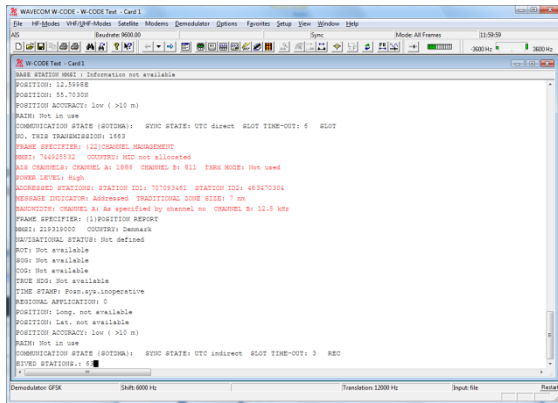
by a separate, external application. Source code available on request

- Decoding from PC soundcard with sampling rates up to 192 kHz
- Internal sampling rate converter
- Direct decoding from audio files
- Virtual Audio Cable (VAC) support
- High-speed DSP (TMS320C6414, 5760 MIPS) with 14 bit/92.16 MSps analog to digital converter (ADC), external 128 Mb SDRAM and 1 Mb FLASH RAM.
- Half-size PCI card with SMA input connectors.
- Automatic level control to achieve a maximum dynamic range and overrun protection.
- 60 dB input dynamic range
- Digital Down Conversion (DDC) with 96 dB dynamic range (16 bits) and configurable bandwidth from 5 kHz to 500 kHz

W-61PC/LAN-MK2



- XML Remote Control Interface with the same command set as the W51PC and W-CODE
- Powerful 48 and 96 kHz wide band FFT.



Decoding AIS from a 12 kHz IF file

- Optional classifier with 4 and 8 kHz bandwidth and automatic code check.
- Optional BitViewer Tool.
- Optional INMARSAT B/M/mM Monitoring mode for data, fax and voice (single or multi-channel if more than on card is used).
- Adaptive Equalizer for high-speed PSK protocols.
- Tested with a number of Software Defined Radios e.g. WiNRADiO, Perseus, SDR14/SDRIQ, AOR AR-ALPHA, R&S receivers (using AllAudio and VAC), IZT
- Optional software classifier plug-in with 4 and 8 kHz bandwidth and FSK, MFSK, PKS, and OFDM support
- Pass band filters to mitigate poor propagation conditions or process wideband receiver input
- Worldwide support

Functions

General

The easy-to-use graphical user interface (GUI) with well structured pull-down menus allows an operator to become familiar with the W61PC in a short time. A high degree of operator proficiency can quickly be achieved.

The decoder can be used in a number of configurations:

- Local use as a PC application
- Remote use via a LAN with standard W61PC application instances in a client-server mode
- Remote control using TCP/IP and XML
- Remote use with a "Remote Desktop connection"

These features allow the system to be adapted to the client's requirements and applications.

The implementation of complex systems for monitoring on a large scale is only limited by the number of decoders and the performance of the hardware and software.

Analysis

The determination of signal characteristics is assisted by a large number of analysis and measurement functions operating over a wide range of signal parameters.

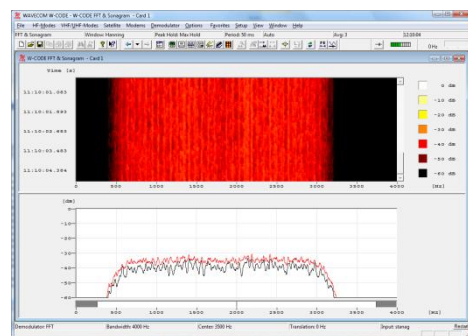
All of the integrated analysis tools contain many different methods and viewing options. The GUI assists the operator in analyzing the important signal parameters. Exact measurements are easily made using adjustable cursors with associated numerical displays. Dynamic zoom functions allow magnification of details in any selected window. The scroll buffering feature makes it possible to move back and forward in signal history.

The configuration of the system components can be completely adapted to the requirements of the customer.

A wide range of system default settings can be configured, e.g., input signal level, measuring interval, centre frequency and demodulator type.

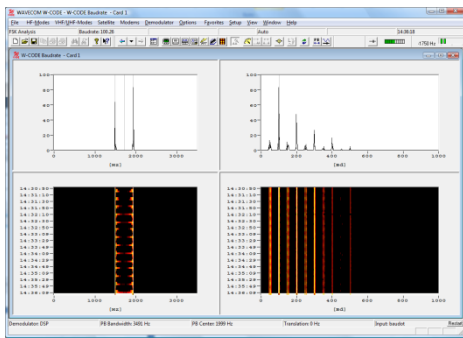
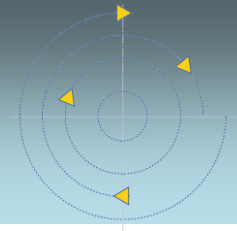
A W61PC decoder may be controlled from everywhere in the network and its output may be sent to one or more applications on the network.

In order to process the data output, control the decoder and the code parameters, an integrated remote control interface allows easy control of the W61PC from a customer application.

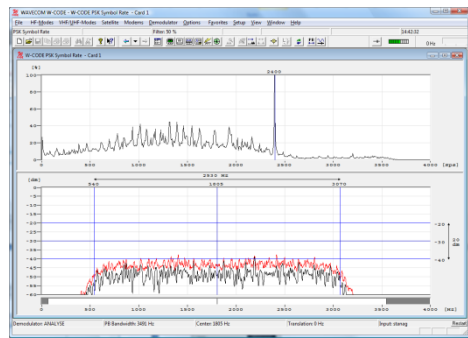


Spectrum (FFT/Sonagram)

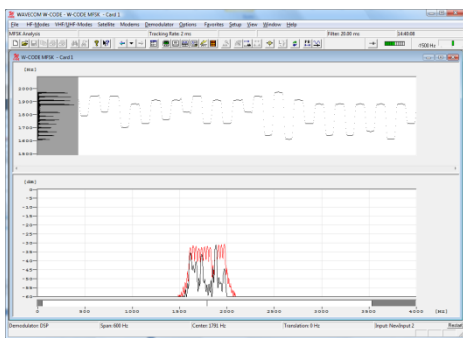
W-61PC/LAN-MK2



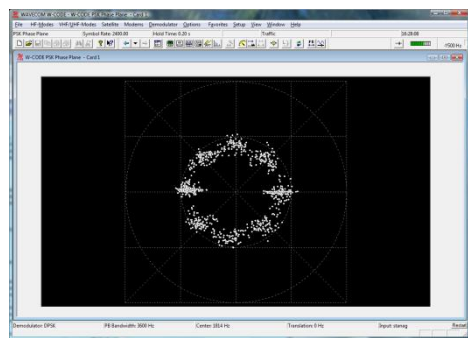
FSK-Analysis



PSK-Symbol rate-Analysis



MFSK-Analysis



PSK-Phase plane-Analysis

Demodulation and Decoding

If a decoder for a protocol is selected, then the demodulator can be tuned by the following ways:

- Automatically (for FSK)

Services

For authorized government agencies WAVECOM is able to provide:

- Additional customer specific modes

Applications

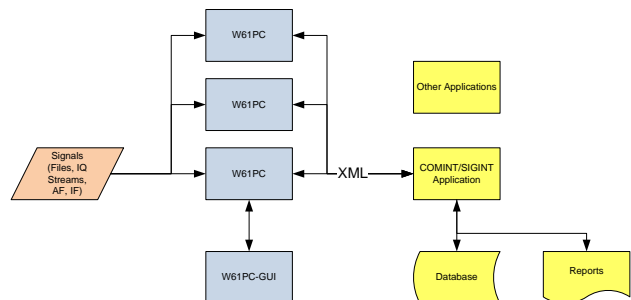
Typical fields of applications for the WAVECOM decoders include:

- Manual or automated monitoring of radio data communications in the HF/VHF/UHF/SHF (satellite) bands
- Signal intelligence
- Signal analysis and classification

For government agencies, and telecommunications authorities, the applications range from stationary monitoring of one transmission with a single system to fully automated broadband monitoring employing many systems.

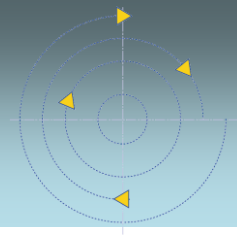
Decoded data can be imported from third-party applications running on the same or another computer in the network.

- Manually
- Using the results from the classifier
- Software source code and a complete development environment
- Training



Decoding system with external control application

Software generated time stamps may be automatically added to each line of decoded data to ensure precise backtracking of any signal.



W61LAN-MK2

High portability and quick setup makes this WAVECOM® decoder the first choice for:

- Notebook users
- Mobile units
- Units, "ready to go"
- Outdoor monitoring
- Use in vehicles like planes, ships, cars etc.
- Environments with changing users/computers.



W61LAN-MK2 front

The full support of all W61PC functions lets the W61LAN easily communicate with other applications. Real DSP technology is combined with today's PC power

General description

The W61LAN decoder offers all the functions of the W61PC plus all the advantages of a small computer sys-

tem. The complete electronic circuitry is realized in a metallic, shielded box. It can be connected to a PC or laptop via LAN or can run as a normal standalone system. As the W61LAN-MK2 operates at 12-30V DC power, it is very well suited for mobile use.

The W61LAN may be operated in a number of modes:

- With the WAVECOM user interface from any computer connected to the LAN or the Internet
- With Windows XP "Remote Desktop Service"
- As a self contained computer system
- With third party remote control software

W61LAN-MK2 hardware

W61LAN contains a W61PC, a complete single board computer system, hard disk, VGA, USB, soundcard and LAN. Multiple systems can be connected to one laptop/PC. It is also possible to use a W61LAN together with other WAVECOM products.

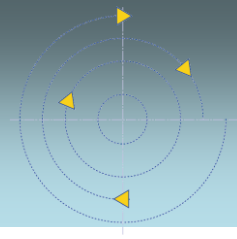
W61LAN-MK2 software

The standard W61PC user interface is able to communicate with a W61LAN unit over the network. The W61LAN application is exactly the same software used for the W61PC.



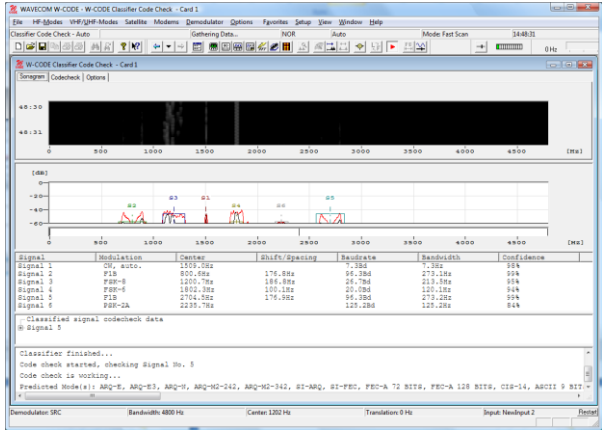
W61LAN-MK2 back

W-61PC/LAN-MK2



W61CL Classification (Option)

The ability to rapidly identify unknown signals has become an essential requirement in signal analysis.



Spectrum, Classifier and Code-Check Windows

The automation of the signal classification process relieves the operator from manual evaluation, which otherwise requires considerable skills and experience. The combination of a classifier and a decoder thus satisfies the requirement for an automatic system that is able to rapidly and reliably determine the characteristics of radio data transmissions within the signal spectrum being monitored.

The classification algorithm determines the accurate center frequency, speed (symbol rate), shift, bandwidth and modulation.

The detection and classification results are displayed in a list together with all parameters and are fully integrated into the WAVECOM® user interface.

Classifier-Code-Check (CCC)

An FSK/PSK or MFSK code check of the classified signal is started to further determine the protocol of the signal. After the code check has completed, the classifier and code-check results are used to automatically parameterize the code and start decoding.

Spectrum display

In this pane the monitored frequency spectrum is displayed. After classification has completed the classified signals are indicated in the spectrum display.

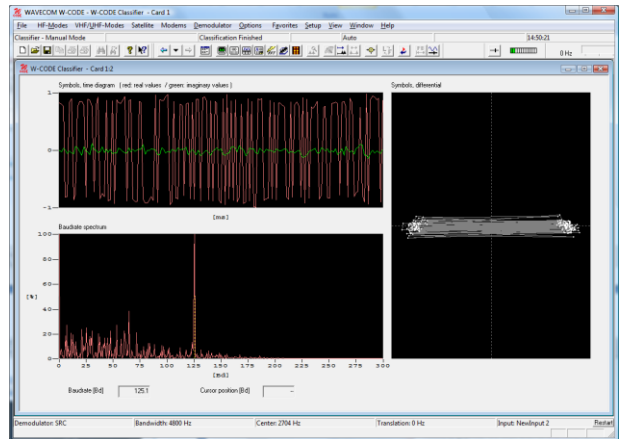
Classification

The results of the classification are shown as a list in a second pane. The following parameters are provided for each classified signal:

- Modulation type
- Center frequency of the signal
- Number of carriers in the case of multi-carrier FSK
- Baud rate in the case of FSK or PSK signal
- Frequency shift in the case of FSK signal
- Bandwidth

Additional information

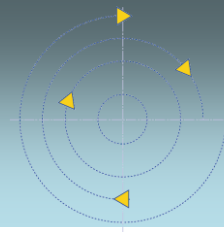
Additional graphical FSK, MFSK and PSK information on symbol timing and constellation, baud rate and frequency vs. time is displayed in a separate window when a classified signal is selected from the list.



Classifier data analysis

Classified signals

For a list of classified signals, please see the section "Specification".



W61SAT (INMARSAT Option)

The W61PC-SAT, together with the W61PC hardware is the first choice to build a cost efficient satellite monitoring system for INMARSAT.

The user interface of the WAVECOM satellite modes is fully integrated as a software module in the existing hardware and professional software.

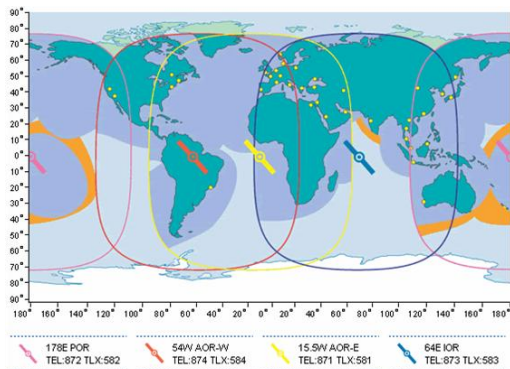
Additional functions are:

- Remote Control, to enable the customer to build his own customized system.
- INMARSAT B/M/mM, L-Band only, forward channel monitoring (does not require a large C-Band antenna).

INMARSAT B/M/mM

These modes offer video, data and fax service at different speeds.

The software monitors the control channel, and upon initiation of a new session with a mobile terminal, automatically switches to the assigned traffic channel for monitoring.



Satellite locations

To limit the volume of monitored traffic, a watch list may be created containing target MES IDs.

Monitored fax and data sessions are stored in files. A fax viewer is included in the software. INMARSAT B and M Voice are supported (mM on request).

INMARSAT B-C-TFC

SAT-B-C-TFC is used to monitor the return signal of SAT-B. This signal can be the uplink L-Band signal, or the downlink C-Band signal.

INMARSAT B-HSD

HSD (High Speed Data) Service using Inmarsat-B enables high-speed data communications between an INMARSAT terminal and a land-side ISDN terminal or between two Inmarsat terminals via 64 (56) kbps or 128 (112) kbps circuit.

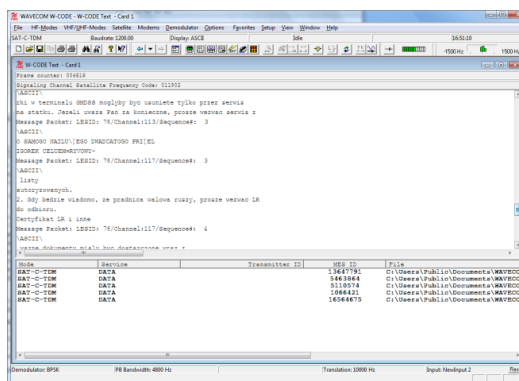


Sat Dishes for monitoring

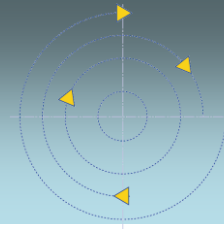
INMARSAT C-TDM

INMARSAT C is a store-and-forward, low speed message transmission system. Currently it is one of the most reliable and most used systems for today's communication.

This is traffic going to the MES. Data output is in ASCII, HEX or Baudot.



INMARSAT C-TDM traffic



INMARSAT-C-TDM-EGC

The INMARSAT C maritime mobile satellite system has an inherent capability, known as Enhanced Group Call (EGC), which allows broadcast messages to be made to selected groups of ship stations located anywhere within a satellite's coverage. Four geostationary satellites provide worldwide coverage for these types of broadcasts. Two types of EGC services are available: Safety NET and Fleet NET.

INMARSAT-C-TDMA

INMARSAT-C return channel traffic to the LES.

INMARSAT-AERO

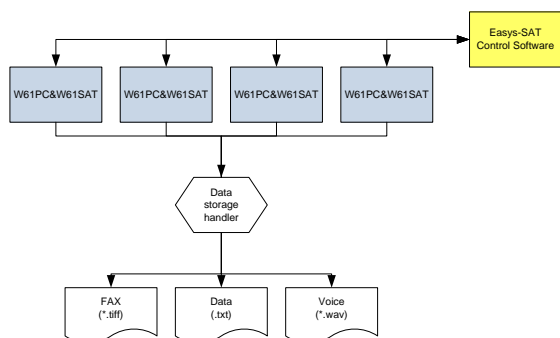
The SAT-AERO system carries different services between aeronautical Ground Earth Stations (GES) and Aircraft Earth Stations (AES). At the moment only the P channel can be decoded.

System Requirements

The following items are required to monitor INMARSAT traffic:

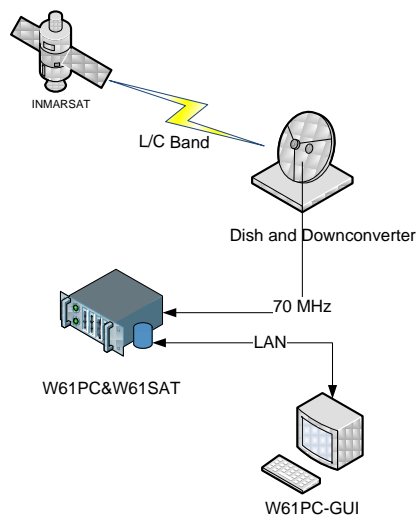
- Antenna (L- or C-Band)

Easy-SAT-Control Software



Easy-SAT multi-channel monitoring system

- LNA or LNB
- Standard Down Converter to 70 MHz
- Computer(s)
- W61PC decoder(s) with W61PC-SAT option



INMARSAT system

As part of the INMARSAT software the Easy-SAT-Control software is included. It contains a small control application that allows multi-channel monitoring of INMARSAT B/M/mM.

Detailed specifications: See separate document (also published on www.wavecom.ch)

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