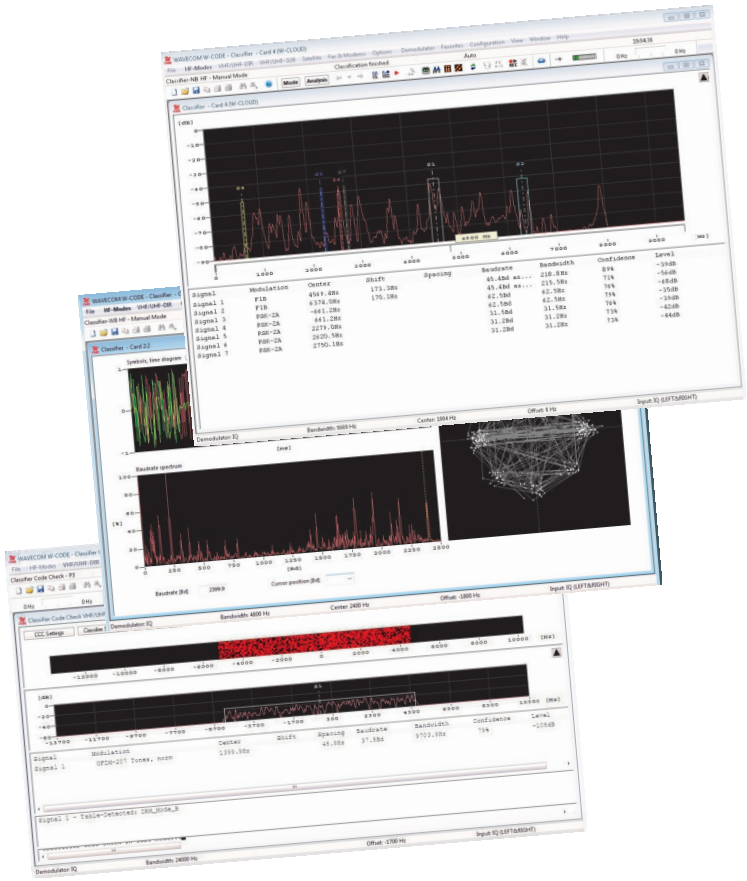
WAVECOM
NACHRICHTENTECHNIK

# WAVECOM® W61PC Classifier-NB



The ability to rapidly identify unknown signals has become an essential requirement in signal analysis. The W61PC Classifier-NB provides all functions required to automatically classify multiple signals throughout the full radio spectrum from HF to SHF.

# W61PC Classifier-NB

Automatic Signal Classification

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## W61PC Classifier-NB Overview

The automation of the signal classification process relieves the operator from manual evaluation, which otherwise requires considerable skill and experience.

*W61PC Classifier-NB supports these functions*

- Modulation type
- Baud rate or symbol rate
- Signal center frequency
- Number of carriers
- Frequency shift
- Carrier spacing or distance
- CW-Morse detection
- 8 kHz bandwidth for the Narrowband Classifier
- All signals within the classifier bandwidth are processed

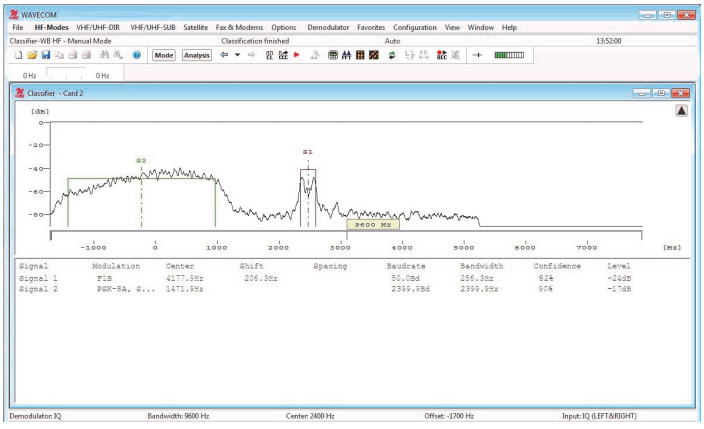
## Application

The classifier can be used in a number of configurations

- Local use as a PC application
- Remote use via LAN with standard W61PC application instances in client-server mode
- Remote control from other applications using third party software (using TCP/IP and XML)
- Remote control via Microsoft Remote Desktop Protocol

## Spectrum Display

The monitored frequency band is displayed in a spectrum pane. After classification has completed, the classified signals are listed below the spectrum display.




*Classifier: 50 Baud F1B Signal and 2,400 Baud PSK-8A*

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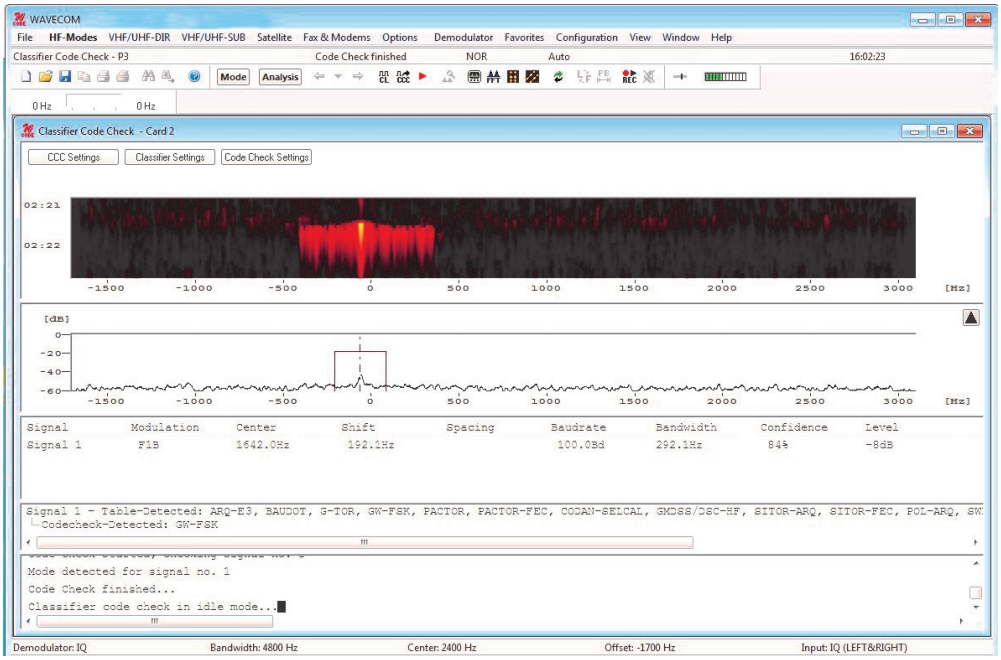
## CLASSIFIER-CODE-CHECK (CCC)

The Classifier-Code-Check is a versatile analysis tool for the classification of known and unknown signals and the determination of the mode (protocol) in use. The CCC will attempt to process all signals within the bandwidth of the narrow-band or wideband classifier. The classifier attempts to classify the input signals according to their modulation formats. The table check will check the signal against the entries of an XML-formatted mode list. The code check will attempt to synchronise against classified modes. Finally the signal may be forwarded to a decoder for output.



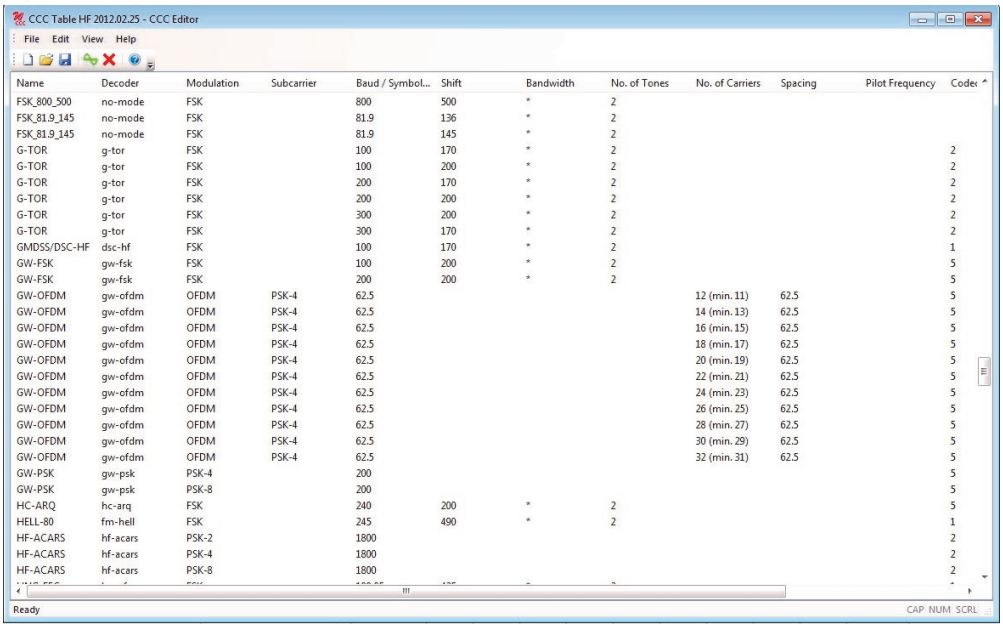

*Classifier-Code-Check (CCC) with table detected GW-FSK*

**Classifier-Code Check process levels**

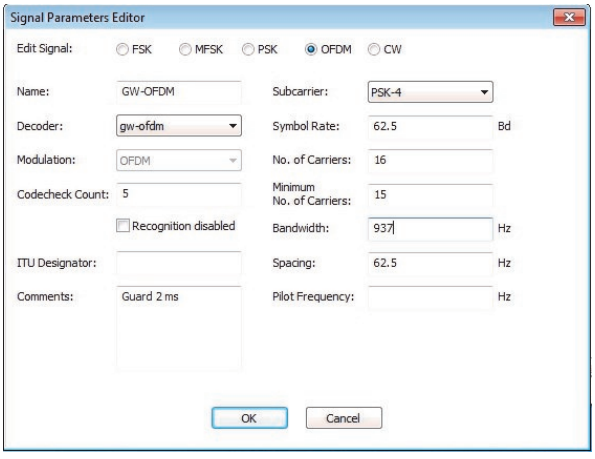
| | | |
|---|---|---|
| Process Level | P1 | Classification is performed, but no decoding |
| | P2 | Classification and table check are performed, but no decoding |
| | P3 | Classification, table check and code check are performed, but no decoding |
| | P4 | Classification and table check are performed and finally the signal is decoded if a mode with an associated, valid detector was found |
| | P5 | Classification, table check and code check are performed and finally the signal is decoded if a mode with an associated, valid detector was found |

## CLASSIFIER-CODE-CHECK (CCC) EDITOR

An XML table editor is provided which allows extending, modifying or deleting records in the XML table used for mode look up. An input template containing all important parameters is available for each modulation type. All parameters, record name and file name is user selectable.

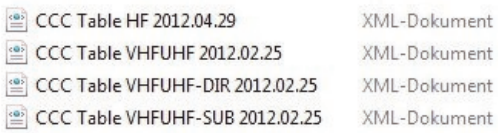



*User defined list of modes for automatic recognition*




*Classifier-Code-Check Editor input template*

An unlimited number of XML tables may be set up. Any table may be loaded from the “Code-Check-Settings” menu.



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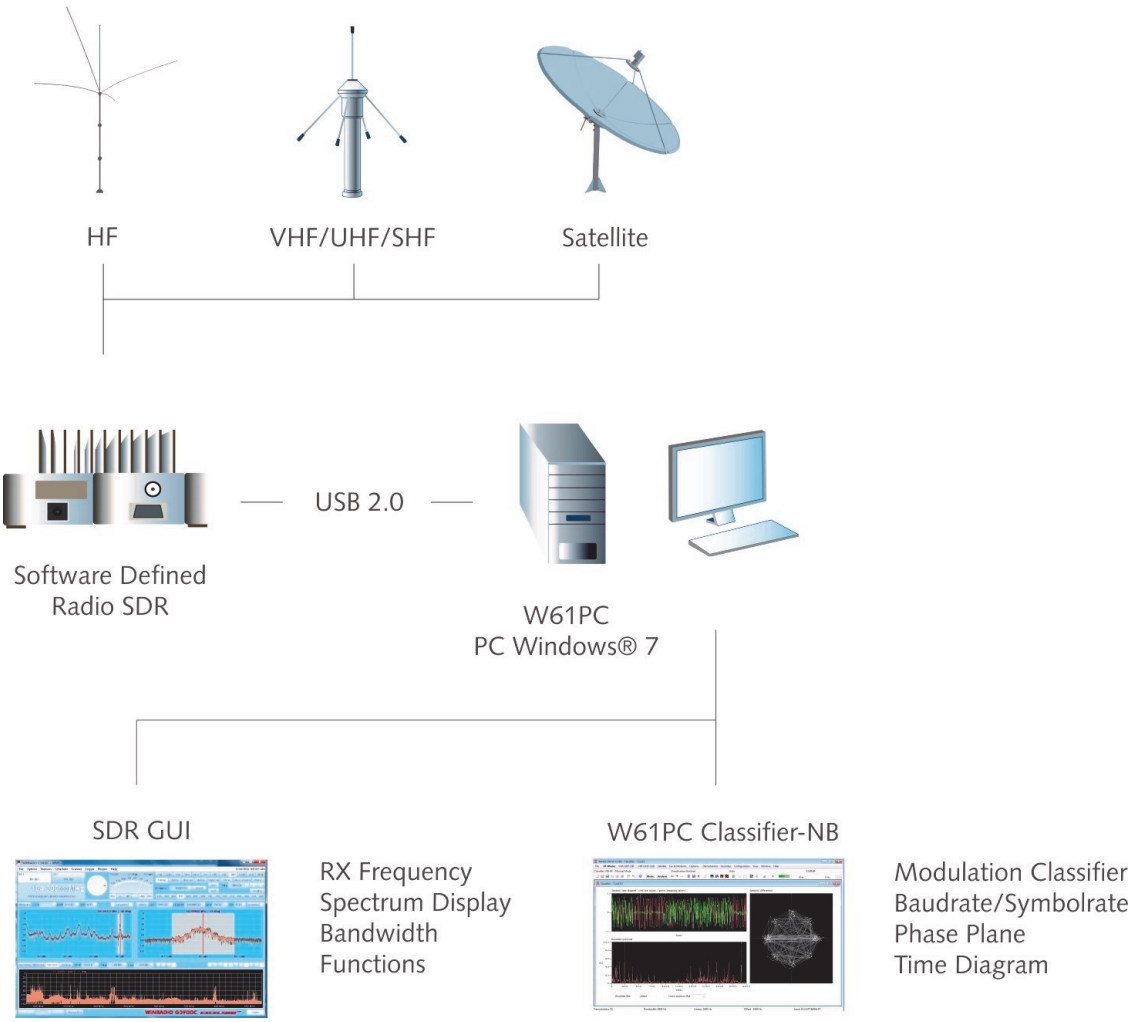
## W61PC Classifier-NB Application in Conjunction with a Modern SDR




W61PC Classifier-NB accepts input from a number of SDRs, analog or digital audio outputs, WAV files, I/Q data or TCP/IP streams. W61PC and Classifier-NB provides all functions required to analyze, decode and process radio data communications throughout the radio spectrum.

# W61PC Classifier-NB

Automatic Signal Classification

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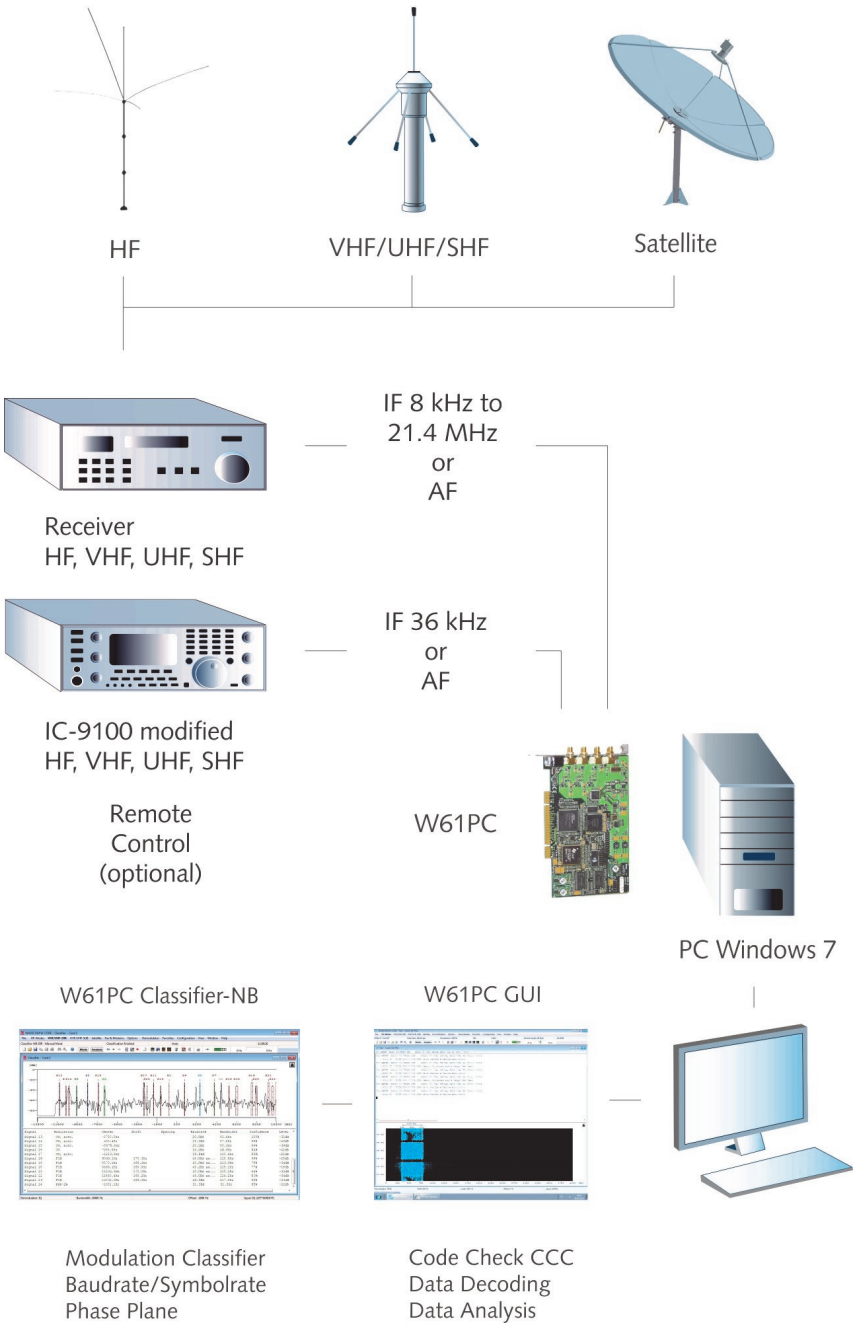
## W61PC and Wideband Receiver Configuration



# W61PC Classifier-NB

Automatic Signal Classification

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## 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<br>Modulation index: 0.5-20<br>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 |
| CIS-12 | 120 Bd |
| OFDM | 25-512 carriers<br>Tg/Tu = 1/1 to 1/8<br>≥ 25 Bd |
| OQPSK | 25 Bd to 30 kBd |
| CW-Morse | Ts = 1.6 s: 6 to 60 Bd<br>Ts = 3.2 s: 3 to 60 Bd |
| Voice | No |
| Operation | FFT display of classified signals<br>Continuous and single-pass mode<br>Classifier Code Check with look-up table |

## W61PC Classifier-NB Quality of Modulation Classification

| | | |
|---|---|---|
| FSK | m = 0.8: 100-2400 Bd<br>m = 0.8: 50 Bd<br>m ≥ 2: 100-2400 Bd<br>m ≥ 2: 50 Bd | 12 db (Eb/N0)<br>15 db (Eb/N0)<br>14 db (Eb/N0)<br>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) |

## W61PC Classifier-NB Accuracy of Measured Parameters

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

# W61PC Classifier-NB

Automatic Signal Classification

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 |
|---|---|
| WCL61PC | Narrowband signal classifier (8 kHz bandwidth) for W61PC card |

## Distributors and Regional Contacts

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

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