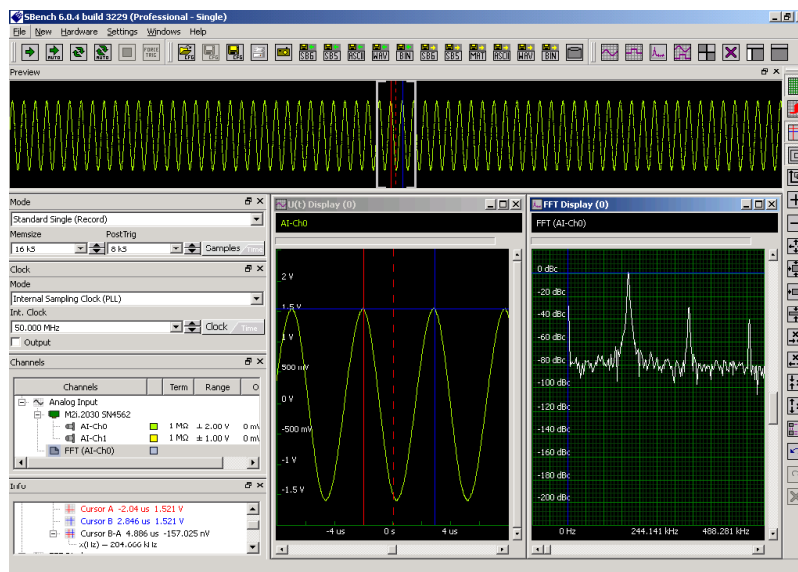


## SBench 6 – The fast and easy data acquisition software

### General Information

SBench6 provides a way for the user of Spectrum hardware to have a powerful and versatile software package for viewing, logging and post processing of captured signals. No text programming is required and the set up is very rapid. An easy-to-use pull down menu allows full control over the hardware set up, logging settings, type and size of displays, export functions and post processing. Here is a summary of the features:-

- Designed to acquire and handle GBytes of data
- Fast data acquisition includes support for RAID Disk arrays
- Fast data preview function of big files; isolate areas and zoom in!
- Handles analog, digital and frequency spectrum data
- Y(t), FFT and logic analyzer displays
- Enhanced display cursor functions with dynamic XY values
- Integrated signal analysis functions
- Import and export filter for data files
- Free Base version
- Upgrade possible for enhanced post processing and multiple cards
- Fully functional 30-day Professional version trial available
- Available for Windows 2000/XP/Vista/Win7 plus Linux KDE/Gnome



SBench6 supports almost all current Spectrum analog and digital cards (current list follows on page 3). Windows and the Linux version are equally provided for, both versions being based on the same source code.

### Using SBench6

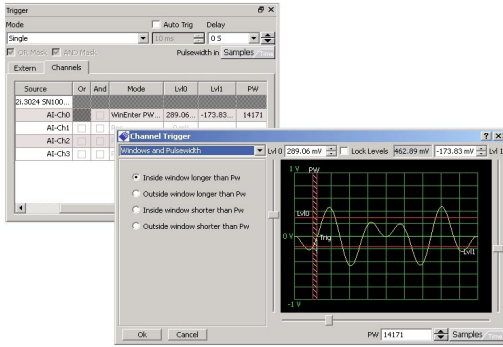
#### Hardware set up windows

All hardware settings can be accessed using neat yet sophisticated setup windows for many aspects of the card operation, this includes sample (clock) rate, desired number of samples, trigger type and card capture mode (short capture or continuous streaming). Individual card channel amplification and impedance can be set and any channel disabled to reduce memory requirements. The target for data storage can be selected, be it cards own memory or the PC memory. If more than one card is used in a system individual sampling rate and memory settings can be assigned (licence option SBench6-Multi required).

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## Triggers

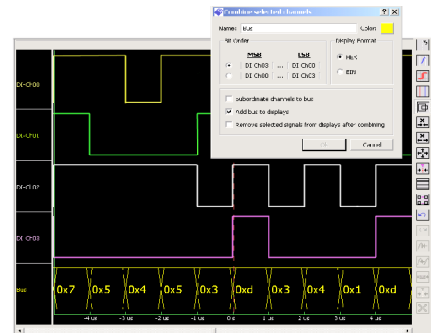


One of the main strengths of Spectrum hardware is the versatility and variety of available trigger options. SBenCh allows access to all the trigger options including edge, level, steepness, pulse width and window. New for version 6 are illustrative windows to help in the selection of trigger type, level(s) and time (pulse width).

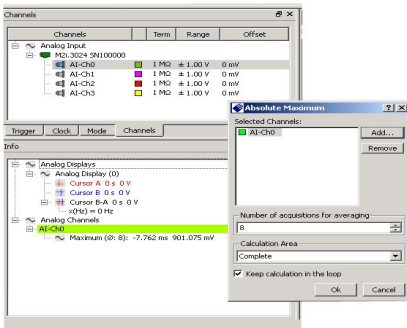
## Signal display

The SBenCh screen is comprised of a signal overview window and one or more additional windows to zoom in on interesting sections. Whilst zoomed in, the overview window has an active frame giving the user the location of zoom, this makes searching for interesting / anomalous events fast and easier. The displays in SBenCh can deal with signals from analog Spectrum A/D and digital I/O cards. For more specialised analog signal analysis Fast Fourier and histogram displays are provided. All zoom windows have Precise XY cursors, with two simultaneous cursors allowing amplitude max/min comparisons and frequency analysis.

For SBenCh version 6 the introduction of a new logic analyzer enhancement to the digital vs. time display allows signals from any digital inputs to be combined into a bus timing diagram, so allowing the logic state on individual bits to be compared, not just in trace form but with bus-wide hexadecimal or binary values too - which ever the viewer prefers. The user can individually colour and name traces for best clarity.

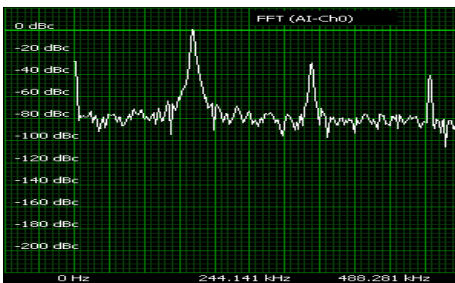


## Analysis, calculation and measurement



A special info window shows extended information on the current cursor positions on the signal trace. With only one mouse click it is possible to use additional calculation routines on any signal. The signal used as calculation base can be any acquired signal, any loaded signal or even a freshly calculated signal like FFT. The calculation area can be selected to be the whole signal, visible display window area, or that defined by two cursor positions. The version overview on the next page shows the available calculation routines and suggestions for new calculation routines are always welcome!

## FFT Analysis and Display (Professional Version)



Using the FFT calculation adds a Spectrum analyzer to SBenCh's time-based oscilloscope functionality, with FFT analysis providing the frequency domain information of the signal. The input signal can be weighted by different window functions such as Hanning, Hamming, Blackman, (many being available). The resulting FFT plot is shown as dBc, dBFS, dBuV, dBm or plain voltage. The FFT signal can be used for further calculations, such as SNR, THD, MAX value - with others available. A harmonics cursor is available for FFT display in addition to the standard measurement cursor. This cursor shows a programmable number of harmonics based on the current cursor position.

## Data Storage

The SBenCh6 Engine controls the complete data transfer to the PC. This software component has been designed for fast data transfer. The strict separation within SBenCh between the display layer and hardware control provides maximum performance for data acquisition; this

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allows the same average streaming speed that is also possible with standard C++ text programming. Data is stored in an intelligent and compact data format allowing maximum system performance. To make post process of data even more manageable, the Professional version allows data to be automatically split into multiple files at set size intervals. Capture to the limit of the cards on-board memory can be utilised with no restriction on sample speed. Long-term continuous data storage to current hard disks of multi GByte files is possible too and when combined with RAID real-time transfer speeds in excess of 100 MB/s are easily achieved. Data exports are possible, currently SBench5 & 6, MATLAB, ASCII, Wave (\*.wav) and binary.

### Supported Cards and Features

The following table lists all cards and features that are supported by SBench 6. Note that it may be necessary to purchase a Professional licence to use the feature, so please refer to the following version overview for more information SBench 6 is under permanent development - please check the latest version of the data sheet on the Internet at [www.spec.de/sbench6.html](http://www.spec.de/sbench6.html) to see which new features are supported

#### Supported Cards

M2i.20xx + M2i.20xx-Exp series	MI/MC/MX.20xx series
M2i.30xx + M2i.30xx-Exp series	MI/MC/MX.30xx series
M2i.31xx + M2i.31xx-Exp series	MI/MC/MX.31xx series
M2i.40xx + M2i.40xx-Exp series	MI/MC/MX.40xx series
M2i.46xx + M2i.46xx-Exp series	MI/MC/MX.45xx series
M2i.47xx + M2i.47xx-Exp series	MC/MX.46xx series
M3i.32xx + M3i.32xx-Exp series	MC/MX.47xx series
M3i.41xx + M3i.41xx-Exp series	MI/MC/MX.70xx series
M2i.70xx + M2i.70xx-Exp series	

#### Supported Features

All analog input settings (range, termination, coupling, offset)	Multiple Recording
Synchronization Star-Hub (one system)	Gated Sampling (not M3i)
Digital Inputs	All trigger settings
BaseXIO Trigger Lines	All clock settings
All memory, pretrigger, posttrigger, segment settings	Standard + FIFO Mode settings
All card memory options up to 2 GSample (4 GByte)	ABA Mode

### Version Options

The Base version (with no time limit) is included in the delivery of each card and can also be freely downloaded from Web page [www.spec.de/sbench6.html](http://www.spec.de/sbench6.html). The Professional version requires a licence purchase. Updates within an SBench version can be downloaded from the web page at any time free of charge to take advantage of software operational improvements.

	Base	Professional
<b>Operating Systems</b>		
Windows XP/Vista 32 Bit	Supported	Supported
Linux + KDE Environment	Supported	Supported
Linux + Gnome Environment	Supported	Supported
<b>Card + Configuration</b>		
Single Card	Supported	Supported
Multiple Cards (one system)	n.a.	Option -Multi
License	free	purchase
Configuration Load/Store	Supported	Supported
<b>Modes and Features</b>		
Standard Acquisition	Supported	Supported
FIFO Acq of several GSamples	n.a.	Supported
Multiple Recording	Simple display	Segmented display planned
Gated Sampling	Simple display	
ABA Mode	n.a.	Planned
Timestamp	n.a.	Planned
Digital Inputs	Supported	Supported
BaseXIO trigger lines	n.a.	Supported
<b>Setup Functions</b>		
Channel Setup	Included	Included
Clock Setup	Included	Included
Trigger Setup	Included	Included
Mode + Memory Setup	Included	Included
Streaming Setup	n.a.	Included
<b>Display Functions</b>		
Preview Display	Included	Included
Analog Waveform Display	Included	Included
Digital Waveform Display	Included	Included
History Mode	Included	Included
FFT Display	n.a.	Included
Cursor Measurement Functions	Included	Included
Physical Units	n.a.	Included
Layout/Auto Layout Functions	Included	Included
Define Shortcuts	Fixed set	Configurable

	License
<b>File functions</b>	
Auto Storage	Prof.
Split Files	Prof.
<b>Acquisition format</b>	
SBench 6	Base.
Wave File (*.wav)	Prof.
Pure Binary File	Prof.
<b>Export Functions</b>	
Screenshot	Prof.
SBench 6	Base
MATLAB	Prof.
SBench 5.	Prof.
ASCII	Prof.
Wave File (*.wav)	Prof.
Pure Binary File	Prof.
Signal cut-off	Prof.
<b>Import Functions</b>	
SBench 6	Base
SBench 5	Prof.
ASCII	Prof.
Wave File (*.wav)	Prof.
Pure Binary File	Prof.

	License
<b>Basic Calculations</b>	
Min/Max	Base
Average	Base
Peak-Peak	Base
Effective	Base
Signal Info	Base
<b>Cycle based calc</b>	
Number of Cycles	Prof
Frequency/Period	Prof
Duty Cycle	Prof
Pos/Neg Width	Prof
Cycle Min/Max	Prof
Cycle Average	Prof
Cycle Peak-Peak	Prof
Cycle Effective	Prof
Cycle Rise/Fall Time	Prof
<b>Math Signals</b>	
ADD/SUB/MUL/DIV	Prof.
Signal Averaging	Prof.
<b>Frequency calc</b>	
FFT	Prof.
SNR/THD/SINAD	Prof.
SFDR, ENOB	Prof.
<b>Enhanced Calc</b>	
RMS Noise	Prof.
Histogram	Prof.

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SBench 6 can be used with a Spectrum virtual demo card to allow a test of all software options on the Professional version without time limitation. If you would like to test SBench 6 Professional with your pre-purchased Spectrum hardware it is possible to obtain a demo licence that can be used for 30 starts of the Professional version. Newly delivered cards automatically come with this 30-day Professional trial on CD.

A free download of this software is available at <http://www.spec.de/sbench6.html> as well as a PDF manual.

### Order information

This shows all versions as well as the option for a system of multiple cards, please read the ordering hints below for further information.

Order no.	
SBench6	Base version which support standard mode for one card
SBench6-Pro	Professional version for one card: FIFO mode, export/import, calculation functions
SBench6-Pro3	3 licences of Professional version for one card each
SBench6-Pro5	5 licences of Professional version for one card each
SBench6-Pro10	10 licences of Professional version for one card each
SBench6-Multi	Option Multiple Cards: needs Professional version. Handles multiple synchronized cards in one system.
SBench6-Mul3	3 licences of option Multiple Cards
SBench6-Mul5	5 licences of option Multiple Cards
SBench6-Mul10	10 licences of option Multiple Cards

### Ordering hints

- The software licence is stored on-board the Spectrum card and cannot be transferred to another card
- Each single independent card needs its own Professional licence
- Systems with multiple synchronised cards (Star-Hub) only need one Professional (Pro) and one Multi (-Multi) licence
- Systems of multiple synchronised cards that are equipped with a Professional and Multi licence can be extended with no extra cost
- Licence packages – with multiple licences - can be combined in any way to get the desired number of licences

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