



SPECTRUM

SYSTEMENTWICKLUNG MICROELECTRONIC GMBH

Newsletter No 4

May 2003

Dear customers, interested persons, partners,



Gisela Hassler
managing director

Welcome to our first newsletter of 2003! The 12 months since our last newsletter has been an especially busy period for Spectrum. A lot of new boards have been developed and we have also released many new enhancements. Because we now have so much new information to share with you, we have decided to create separate German and English newsletters.

To our new and existing customers, we would like to express our thanks for placing your trust in our company and products. This has allowed us to grow dramatically during the last three years and has provided the possibility for our intensive development efforts. We especially appreciate your comments and suggestions for new products and look forward to receiving more of these in the future.

Best regards

Gisela Hassler
managing director

Here are some of the new products which are introduced in this issue

Mobile instrumentation for Laptop PC's



The addition of a complete line of PCI docking stations enhances the application range of the Spectrum boards. One to three of our fast measurement boards can be used with a Laptop PC for field services or in-vehicle measurements.

New PCI Arbitrary Waveform Generators



60 MS/s and 125 MS/s.

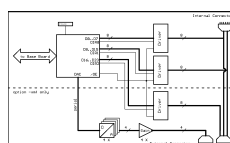
The new ARB series MI.60xx generates free programmable waveforms on up to four channels. It's 8 versions offer samplerates of 20 MS/s,

New 14 Bit A/D boards have high bandwidth



The six different products of the MI.40xx series are equipped with one, two or four synchronous A/D channels with 14 bit resolution. The 20 MS/s or 50 MS/s samplerate allows the recording of high dynamic range signals.

Controlling external systems while recording fast signals



The Extra I/O module is a new option for all MI boards to control external instruments. Therefore it offers 24 digital I/O channels and 4 analogue outputs.

Enhanced data transfer to FlexPro 6

SBench now includes a new export filter called "FlexPro COM" that provides an easier connection to the FlexPro 6 professional analysis software. The filter uses state-of-the-art COM technology to allow recorded data to be directly written to the database of FlexPro via a selected sub-directory. From this the data can be used for calculation, analysis and display with the full functionality of FlexPro. The export module handles up to 64 signals at one time.

MI boards to use external reference clock

The extensive clock generation possibilities available on the MI boards have been further enhanced due to customer requests. It is now possible to feed in a high-quality reference clock to the external clock connector. This allows the sampling rate to be synchronised with external instruments and can also enhance the clock accuracy when using a high-accuracy reference clock. Once the driver has been given the reference clock frequency, which can be in the range of 600 kHz and 125 MHz, the board will automatically multiply and divide the reference clock to generate the requested sampling rate for the active channels.

Mobile instrumentation for Laptop PC's



3 Slot PCI Docking Station

One of the most popular requests that we have received in recent years is to provide a solution that would allow the Spectrum cards to be used with Laptop PC's for field service or in-vehicle measurements. We are pleased to introduce two new PCI docking stations that

include a compact one-slot chassis and a universal three-slot version that has additional retaining parts so that the laptop can be securely mounted on top.

The docking stations can be supplied with a PCMCIA card and cable that connects the docking station to the laptop PC, or a half-length PCI interface card and cable that can be used for embedded systems where a full-length PCI card cannot be installed. The docking stations may be powered using the 110..220VAC external power adapter or there is an option to power the chassis from a VDC supply, such as the car cigar lighter adapter for in-vehicle use.

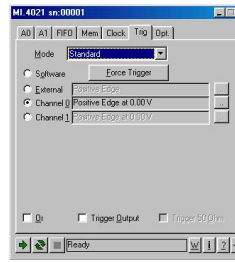
The docking stations are compatible with all of the Spectrum PCI boards, although the laptop must be running Windows 98/ME/2000/XP. Using the docking station is straightforward as the Spectrum driver supports hot-plugging so that each time that the docking station is connected to the PC, the Spectrum cards will be found automatically and can be used immediately.

Internet: www.spec.de/dock_e.htm

Using Spectrum boards with Excel/VBA

Excel is the most popular calculation and presentation tool for engineers and scientists world-wide, having the benefits that it is already installed on most PC's and is easy to use. It has always been possible to load recorded data that has been exported, perhaps by SBench, as an ASCII file - but with only a little more effort and some basic programming skills you can automate this process using Excel's Visual Basic for Applications and impress your colleagues! The starting point for this is to use the standard Spectrum VB drivers which can be fully accessed from within VBA together with the examples we have provided on our website at www.spec.de/download.htm.

Additional features strengthen SBench's oscilloscope capabilities

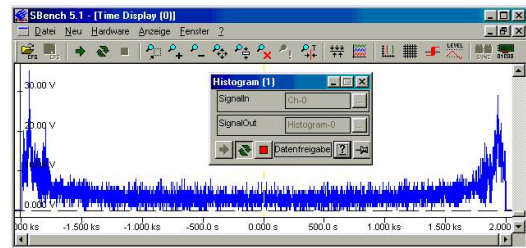


SBench: Force Trigger

A number of new features have recently been added to the Spectrum hardware and software drivers that provide the user with more possibilities when using the boards for oscilloscope-like applications. These features are also available in SBench – the latest version (5.2.10a) can be downloaded from our website.

From hardware version V 7.x, a new "force trigger" command has been added that will allow a trigger event to be manually forced if the board does not detect the event by itself. SBench's new Auto Trigger function is based on this command.

We have also modified the drivers so that they manage the input amplifier offset parameters in a more effective way. Now it's only necessary to select the offset directly as a percentage value of the input range, the driver automatically performs the re-calculation. The advantage of this is that because the offset shifting is done in hardware, the complete vertical resolution of the input channel is still available. The offset can be set independently for each channel.



SBench – Histogramm display of a sine signal

Other new SBench features include the formula interpreter that can be used to enter free-form calculations for complex analysis of one or more recorded signals; a new "histogram" mode that allows signal parameters to be sorted and displayed graphically; and improved export functions that can now process up to 64 signals at one time and create files in the ASCII, SBench 5 or FlexPro COM formats.

Internet: www.spec.de/download.htm

8-bit A/D boards sample up to 200 MS/s

8 bit A/D	1 channel	2 channels	4 channels
MI.2020	50 MS/s	50 MS/s	
MI.2021	50 MS/s	50 MS/s	50 MS/s
MI.2030	200 MS/s	100 MS/s	
MI.2031	200 MS/s	200 MS/s	100 MS/s

The four different MI.2xxx boards are a software compatible successor for the PCI.208 and provide increased versatility. The new board series has two or four 8-bit A/D channels with maximum sampling rates of 50 MS/s, 100 MS/s or 200 MS/s making them especially suitable for applications involving lasers, ultrasound and medical instruments. Like all of our most recent designs, the boards can be configured with a wide variety of options that include digital I/O and time stamp measurements, together with Multiple Recording and Gated Sampling recording modes.

Internet: www.spec.de/mi20xx_e.htm

New PCI Arbitrary Waveform Generators

- 20 MS/s, 60 MS/s or 125 MS/s
- One, two or four channel versions
- Simultaneous output on all channels
- Up to 256 MSample (512 MByte) memory
- FIFO mode

For many years the DAP116 ISA-board was the only analogue output board from Spectrum. While this remains in production and has many OEM customers, it was important for the future that a new range of PCI boards to be released. The MI.60xx series has eight models to choose from, each using high-resolution 14 bit D/A converters with maximum sampling rates of 20MS/s, 60MS/s or 125 MS/s and up to four output channels. Each board is supplied with 8MSample of on-board signal memory and can be expanded up to 256 MSamples memory allowing long, complex signals to be generated at the highest speeds.

All of the output channels are synchronised and can be used to generate different waveforms through independent amplifiers that can generate up to ± 3 V into 50 Ohms. The amplitude and offset of the output can also be adjusted in increments of 1 mV using onboard software controlled hardware that retains the full 14-bit resolution in the output signal. In addition, each channel has three software selectable filters that can be software selected for signal smoothing.

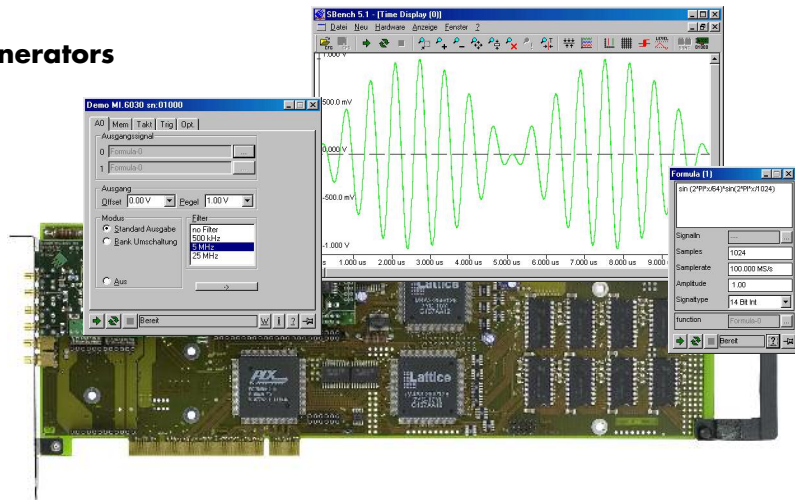
The MI.60xx series also has a unique digital interface that allows up to 16 boards to be synchronised in a larger system. It is also possible to include the MI series data acquisition and digital I/O boards while retaining full clock and trigger synchronisation.

The main uses for the MI.60xx will be to generate signals for research, development or production. The on-board memory can be programmed with any waveform and the signals generated using the single-shot or continuous modes. At slower signal generation speeds – this means up to 45 MS/s sum sampling rate – the FIFO mode can be used to transfer the waveform continuously from the PC memory to the MI.6xxx board.

14 bit D/A	1 channel	2 channels	4 channels
MI.6011	20 MS/s	20 MS/s	
MI.6012	20 MS/s	20 MS/s	20 MS/s
MI.6021	60 MS/s	60 MS/s	
MI.6022	60 MS/s	60 MS/s	60 MS/s
MI.6030	125 MS/s		
MI.6031	125 MS/s	125 MS/s	
MI.6033	125 MS/s	60 MS/s	
MI.6034	125 MS/s	125 MS/s	60 MS/s

The board is delivered with drivers for Windows and Linux and with program examples for Visual C++, Borland Delphi and Visual Basic. For individual tests and for controlling the hardware in laboratory environment the free-of-charge SBench software can also be used. SBench can output signals from external ASCII files that have been created using other programs such as MATLAB or recorded by data acquisition software. It is also possible to generate new signals using the new SBench "signal generator" and "formula" functions. The simple generator may be used to create standard waveforms like sine, rectangle, triangle and sawtooth, while the formula interpreter can be used to create signals from standard mathematical functions that may also include existing signals in the formulas. The formula interpreter can also be used without signal generation hardware to analyse recorded data.

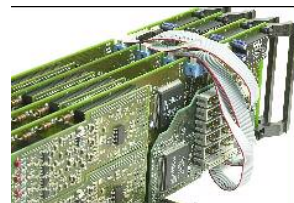
Internet: www.spec.de/mi60xx_e.htm



Up to 128 synchronous channels in one system

This is now possible with the new "Star Hub" daughterboard module that can be added as an option to any of the MI boards. Unlike other multi-card configurations, Star Hub has one other major advantage – there is absolutely no clock delay or time skew between any of the channels.

Using Star Hub up to 16 boards can be configured in a suitable industrial PC with complete channel synchronisation and board triggering. When using the 8-channel MI31xx boards this provides a maximum configuration of 128 channels with 12 bit resolution and 25 MS/s



32 channels 12 bit A/D with StarHub

rate. Alternatively using the MI.7xxx boards, systems of 512 digital I/O channels with maximum sampling rates of 125 MS/s are possible. Star Hub is completely flexible and allows you to mix-and-match different A/D, D/A and Digital I/O boards to achieve the required configuration. It is also smart enough to permit different boards to be set with different sampling rates. From the software, the user defines one of the boards to be the 'Clock Master'; this board then distributes the sampling clock reference to all other 'Clock Slave' boards. As each board has its own clock divider hardware, different sampling rates are possible for each board. Any of the boards may also be programmed to be the 'Trigger Master'. On receipt of the pre-defined trigger event, this board will issue trigger synchronisation signals to all of the other boards to start the recording / generation process as one harmonious system.

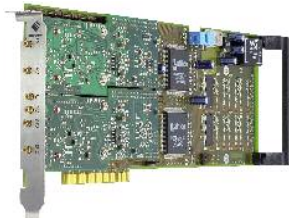
Internet: www.spec.de/starhub_e.htm

Linux driver now has FIFO support

Version 3.00 of the driver now supports FIFO data transfer for all of the MI boards, so that data can be transferred to the PC during the measurement. The driver includes an interrupt-controlled mode that reduces the processing time and allows any other tasks, like real-time calculations to use this time. The programming interface is the same for both Windows and Linux, which reduces the need for changes to the hardware interface when porting an application. The Linux drivers are compatible with kernel version ≥ 2.2 and have been tested with the popular SUSE and RedHat distributions.

New 14 Bit A/D boards have high bandwidth

When your measurement task has demands for both high speed and high resolution, the new MI.40xx series from Spectrum may be the ideal solution. Using the latest 14-bit A/D converters, the boards deliver a high dynamic range even at the highest sampling rates of 20 MS/s or 50 MS/s and a maximum bandwidth of 25 MS/s.



MI.4032 – 4 channel 50 MS/s 14 bit A/D

There are six software selectable input ranges from ± 200 mV to ± 10 V together with programmable input termination of 50Ω or $1 M\Omega$. In addition to the analogue signals it's also possible to simultaneously record

two digital inputs for each of the analog channels, for example status signals from external equipment. Advanced trigger recognition capabilities enhance the versatility of the board and ensure that meaningful signals are recorded. The user can select the recording to be started either from an external TTL signal or by examining the analogue signal for edge, level, window, pulsewidth or steepness. To select the area of interest before or behind the trigger event, the memsize, pre- and posttrigger parameters can be defined. An additional benefit of the board is the high amplifier offset range of up to $\pm 200\%$ that can be added to the input signals. The MI.4xxx boards are supplied with 8 MSamples signal memory as standard, but this can be increased to 256 MSamples if very long signals need to be captured at the highest sampling rates. The boards provide two different recording modes. In standard mode the signals are recorded to the on-board memory at any of the board supported sampling rates. In FIFO mode the digitised signals are buffered by the onboard memory and then transferred to the PC during the measurement so the data is accessible while the recording is still running. Both recording modes can be used together with the Multiple Recording or Gated Sampling modes when fast measurement repetition rates or online data reduction is required.

14 bit A/D	1 channel	2 channels	4 channels
MI.4020	20 MS/s		
MI.4021	20 MS/s	20 MS/s	
MI.4022	20 MS/s	20 MS/s	20 MS/s
MI.4030	50 MS/s		
MI.4031	50 MS/s	50 MS/s	
MI.4032	50 MS/s	50 MS/s	50 MS/s

Internet: www.spec.de/mi40xx_e.htm

Under development: PXI/CompactPCI versions of the MI boards

When the MI series was in the first stages of conceptual design, one of the original design criteria was that it should be possible to use the same A/D, D/A or Digital I/O interface daughterboards on any future CompactPCI / PXI carrier board. This step is now ever closer with the intended launch of the new formats later this year. To suit all customer requirements two different carrier boards are planned: the classical small PXI board with the 3U form factor and the larger 6U carrier that will allow a larger number of interface daughterboards to be configured. The 3U carrier will be compatible with the existing MI boards that currently use one daughterboard module, while the 6U format will be compatible with all of the current MI range.

Controlling external systems while recording fast signals.

The Extra I/O module is a new option for the MI boards that provides additional analog output and digital I/O lines that can be used to control external instruments, drive motors, modify external amplifier settings, read status signals or to route different test signals to the board. This new



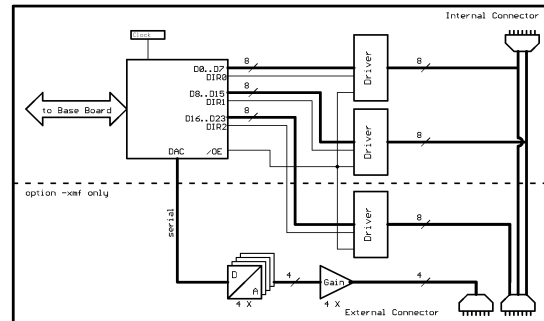
MI-board with additional 24 Bit digital I/O and 4 analogue outputs

option will be of special interest for OEM applications where extra hardware such as laser source has to be controlled. The module has 24 digital I/O's that are configured as input or output in groups of eight channels. It also includes 4 analogue outputs with 12 bit resolution and ± 10 V output range.

Compared to a solution where a second fast multi-functional board is used, this option has some advantages:

- Cost reduction
- Requires fewer PCI slots
- Simple programming interface
- Identical software interface as the main instrumentation board
- Complete solution from one hardware supplier

The External I/O daughterboard module is programmed in the same easy way as the main MI board using the Spectrum standard drivers for Windows/Linux. The drivers allow the External I/O to be accessed from C/C++, VB and Delphi, or from LabVIEW, DASyLab, Agilent VEE or MATLAB.



Block diagram of Extra I/O module

Internet: www.spec.de/extraio_e.htm

Further exhibition dates 2003

We are looking forward to introduce our new products to you during one of the forthcoming exhibitions or to discuss any technical problem with you. Please visit us at :

- Sensor and Test Nürnberg 13.05. – 15.05.
- MeasComp Wiesbaden 23.09 – 25.09.