



SPECTRUM
SYSTEMENTWICKLUNG MICROELECTRONIC GMBH

Newsletter No 5

March 2004

Dear customers, interested persons, partners



Last year you showed us that we are heading in the right direction with our products. At the beginning of April 2004 we will move

to a new, larger and modern office with purpose-built production area. This additional space will allow us to increase our staff again, so that we can continue to provide the highest quality of service and support. In addition to the new office, we have been working hard in the development department and would like to share this news with you. We would like to express our thanks for placing your trust in our company and products. We especially appreciate your comments and suggestions for new products and look forward to receiving more of these in the future.

Best regards

Gisela Häbler
Managing Director

New address from 4th April 2004:

**SPECTRUM GMBH
AHRENSFELDER WEG 13-17
22927 GROSSHANSDORF
GERMANY**

**TEL +49 (0) 4102-6956-0
FAX +49 (0) 4102-6956-66**

All numbers of direct lines stay the same.

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

New Website

In February 2004 our website was re-launched. The new pages offer a wide variety of information to the visitor. There are detailed data sheets, a technical glossary, a powerful search function and of course all literature is available as standard pdf files.



New: Pattern Generator with programmable Levels



With the new 72xx digital pattern generator boards it is possible to program the low and high level of the output between -2 and +10 volts. The four models can be used to control different logic families and for semi-conductor tests. The outputs generate up to 100 mA.

New: 8 Bit Arbitrary Generators

The 61xx series are cost-effective arbitrary waveform generators that are optimised for generating long signals at a high continuous throughput. With up to 512 MByte onboard signal memory it is possible to create 4 seconds of output at 125 MS/s.

90 PXI and CompactPCI Models

30 new PXI products and 60 CompactPCI boards enlarge the Spectrum product range. All these instruments have been designed in-house for high-speed data acquisition and signal generation. The products are used for DSO, transient recorders, data loggers, signal generators, arbitrary generators, pattern generators and digital I/O.



New: Model 7005 - 1, 2, 4, 8 or 16 Digital Bits



Until now, when recording or replaying only a few digital bits there was the problem that standard digital I/O boards used 16 or even 32 bit of data even when only a few channels were required.

The new 7005 cards eliminate this problem. With these boards one can select by software 1, 2, 4, 8 or 16 bit. Data is written to memory in this width without wasting any space. This multiplies the possible memory depth and at the same time reduces the required PCI bus data transfer rate, so even longer signals can be recorded.

30 PXI Boards

The PXI bus (PCI eXtensions for Instrumentation) is a modular platform especially designed for instrumentation and automation with additional lines for instrumentation requirements. This includes a high-quality 10 MHz reference clock, a star trigger and a trigger bus. The Spectrum boards support all of these features. The reference clock and the star trigger module make it possible to combine products from different companies.



Spectrum has ported most of the PCI products to PXI bus. There are 30 new PXI products available for analog and digital high-speed data acquisition and signal generation. Common to all boards is a 128 MByte on-board memory and a high-speed FIFO transfer rate to

PC memory of up to 100 MB/s. The PXI products can be used as a DSO, transient recorder, data logger, spectrum analyser, arbitrary waveform generator, pattern generator or digital I/O. On the software side it is possible to access a wide choice of tools and drivers. For users who like text based programming there are drivers and examples for C/C++, Delphi, Basic, MATLAB or LabWindows/CVI. The users of graphical programming languages have the choice between drivers of LabVIEW, DASyLab and Agilent VEE.

Version	Series
MX.20xx	2 Channels 8 Bit A/D from 50 MS/s up to 200 MS/s
MX.30xx	1-2 Channels 12 Bit A/D from 40 MS/s up to 100 MS/s
MX.31xx	2-4 Channels 12 Bit A/D from 1 MS/s up to 25 MS/s
MX.40xx	1-2 Channels 14 Bit A/D from 20 MS/s up to 50 MS/s
MX.45xx	2 Channels 16 Bit A/D from 200 kS/s up to 1 MS/s
MX.60xx	1-2 Channels 14 Bit D/A from 20 MS/s up to 125 MS/s
MX.61xx	2 Channels 8 Bit D/A with 125 MS/s
MX.70xx	1-32 Bit Standard Digital I/O with 125 MS/s
MX.72xx	8-16 Bit Pattern Generator from 10 MS/s up to 40 MS/s

Internet: www.spec.de/pxi_products.html

6U CompactPCI Boards

In addition to the new PXI boards there are now also 60 new CompactPCI versions of the PCI boards available. CompactPCI combines the advantages of the PCI bus with the needs of the industrial user. CompactPCI uses a well-known and stable 19" technology that offers robust systems for industrial requirements. This 19" technology has proved its industrial capabilities for many years. The cPCI systems have a defined cooling power and a robust connector, which both extend the life of the product.



The new CompactPCI product family MC.xxxx includes:

- A/D boards with 8 bit, 14 bit and 16 bit resolution and sampling rates up to 200 MS/s
- D/A boards with 8 bit up to 14 bit and up to 125 MS/s
- Digital I/O boards up to 125 MS/s
- Pattern generators

The new boards for analog data acquisition, analog signal generation and digital I/O are well suited for applications in the field of RADAR, SONAR, LIDAR, LASER, ultrasound, automation, production tests, research and development and medical equipment. All boards have a common memory interface with a maximum on-board memory of 512 MB and a fast FIFO mode with a sustained data transfer of 100 MB/s between board and PC memory. In addition all these boards can be easily synchronised using the reference clock that is useful for applications that require synchronous high-speed systems containing of analog and digital I/O components. Systems with up to 16 MC series cards can be configured to a maximum of 128 channels.

Version	Series
MC.20xx	2-4 Channels 8 Bit A/D with 50 MS/s up to 200 MS/s
MC.30xx	1-4 Channels 12 Bit A/D from 40 MS/s up to 200 MS/s
MC.31xx	2-8 Channels 12 Bit A/D from 1 MS/s up to 25 MS/s
MC.40xx	1-4 Channels 14 Bit A/D from 20 MS/s up to 50 MS/s
MC.45xx	2-4 Channels 16 Bit A/D from 200 kS/s up to 1 MS/s
MC.60xx	1-4 Channels 14 Bit D/A from 20 MS/s up to 125 MS/s
MC.61xx	2-4 Channels 8 Bit D/A with 125 MS/s
MC.70xx	1-64 Bit Standard Digital I/O with 125 MS/s
MC.72xx	8-32 Bit Pattern Generator from 10 MS/s up to 40 MS/s

Internet: www.spec.de/cpci_products.html

7005 Series: 1-16 bit Digital Streaming



Until now when recording or replaying only a few digital bits there was the problem that standard digital I/O boards from most manufacturers used 16 or even 32 bit of data even when only a few channels were required, with the consequence that memory was wasted and a reduced FIFO mode data transfer. The new 7005 series eliminates these problems.

Even the MI, MC and MX 7000 series had a minimum data-width of 8-bits. Therefore a task needing only 2 bits of data produced 6 bit of overhead (compared with up to 30 bit with other manufacturers boards).

The new MI.7005 (PCI bus), MX.7005 (PXI bus) and MC.7005 (CompactPCI bus) allow the user to select 1, 2, 4, 8 or 16 bit. Data is written to memory in this width without wasting any space. This multiplies the possible memory depth and at the same time reduces the required transfer rate. For example, when recording 1 bit at 100 MBit/s the 7005 requires a transfer rate of 12.5 MBytes/s, compared to 100 MBytes/s using the 7000 series.

The boards can be programmed for sampling rates between 1 kS/s and 125 MS/s. Data is stored in the on-board memory that can be expanded up to 512 MByte or the data can be transferred continuously to the PC using the FIFO mode. There are drivers for Windows and Linux delivered with the board together with examples for Visual Basic, Visual C++, Delphi or Borland C++. As an option the boards can be programmed using one of the standard measurement software packages like LabVIEW, LabWindows/CVI, DASyLab, Agilent VEE or MATLAB.

Internet: www.spec.de/mi7005.html

New Website



Our new website became available to the public in February 2004 and offers easy access to all information. We focused on producing a unique design coupled with a fast menu structure. Based on a state-of-the-art content management system all

news and additional product information can now be added immediately without programming, due to the underlying database structure.

The new pages offer a wide variety of information and a detailed description of all products. Now each product is described in detail and literature is available for fast pdf download. Each option is described in detail in the glossary helping new customers to find the right solution.

All software drivers and examples for the different compiler are available for immediate download and without pre-registration. We are now working on further enhancements such as extending the glossary, a newsletter module, and enhanced information regarding the drivers and support. It's worth making a visit from time-to-time as a lot of information will be added over the next months.

Internet: www.spec.de

New Catalogues

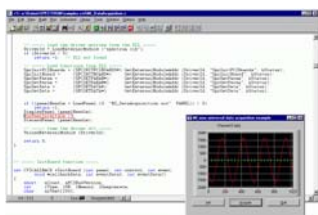
We have recently created new data sheets, a colour brochure and a revised catalog, with the main focus being on a clear layout and providing detailed information. The 4-colour brochure has 24 pages and is designed to provide a fast overview. The 100 page catalogue provides in-depth information and product datasheets. Both are available in English or German.

We will be more than happy to post the brochure or catalogue on request, or you can download the pdf versions directly from our new homepage.



Internet: www.spec.de/catalog_download.html

LabWindows/CVI Support



LabWindows/CVI is well known within the electronic test industry as it offers easy-to-use graphical elements for hardware control and displaying measured data, combined with a universal C compiler. We now offer some examples showing how to include the Spectrum

driver. This allows LabWindows/CVI to access the complete functionality of the boards. The examples for LabWindows/CVI can also be easily combined with the standard C++ examples.

Internet: www.spec.de/labwindows.html

New: Digital Pattern Generator with programmable Logic Levels

- Programmable output levels from -2.0 V up to +10.0 V
- Low and high programmable levels for every 4 bits
- Up to 40 MS/s with up to 32 bits
- Memory saving 8 bit mode also available
- Outputs can be disabled separately (tristate buffers)
- Hardware controlled differential output available



The development of new logic families and the requests for a universal and fast control solution for digital components have inspired us to develop the 72xx card series. Possi-

ble application areas are chip, printer or display production, controlling of special D/A converters, research and development.

The main difference compared to a standard pattern generator is the possibility to program different low and high levels with an accuracy of 10 mV. The levels can be set between -2.0 V and +10.0 V for each four output pins (one nibble). There are no sampling rate restrictions when using different levels. A high current of 100 mA per pin can be generated (max 200 mA per nibble). The 72xx series can be used with different logic families like ECL, PECL, TTL, LVDS, LVTTTL, CMSO, LVCMOS directly and can also test components in their extreme range. In addition there is the possibility to have differential output signals generated in hardware. This mode only needs one data bit for a differential pair of lines.

The boards of the 72xx series are accessed in the same easy way as the existing 70xx models through the Spectrum drivers for Windows or Linux, or by using special drivers for LabVIEW, DASYLab, MATLAB, Agilent VEE or LabWindows/CVI.

The boards are available in two different speed ranges to cover all possible application areas.

	8 Bit	16 Bit	32 Bit
MI.7210	10 MS/s	10 MS/s	
MI.7211	10 MS/s	10 MS/s	5 MS/s
MI.7220	40 MS/s	40 MS/s	
MI.7221	40 MS/s	40 MS/s	40 MS/s

The 7210 and 7211 versions are working with sampling rates of up to 10 MS/s and do not require an additional power supply nor an additional system slot. They are focused on customers who need a large number of different output levels but who don't need high-speed signals. Up to 16 of these boards can be synchronized in one system using the existing Star Hub option.

For users who need faster output speeds, the 7220 and 7221 boards offer up to 40 MS/s. To obtain sufficient power to drive the output stage at its maximum capability a cable is supplied that needs to be connected to a free PC power connector (e.g. a spare harddisk connector). To ensure reliability in different environments and when driving at the maximum current, active cooling is provided with cooling fans from Pabst. As a consequence these boards require two adjacent PCI slots because of the height of the cooling fans.

All of the standard Spectrum features are also available with this series. This includes the large on-board memory of up to 512 MByte, the possibility of continuous FIFO data transfer, the external clocking and triggering, and the option to feed in a reference clock.

New Features of the Standard Drivers

At Spectrum we take the responsibility of customer satisfaction very seriously and actively listen to our customer's suggestions. One aspect of this that almost every month new features are added to our standard drivers. The link at the end of this article leads directly to the download page.

Different Linux Versions



With SuSE version 9.0 and Redhat version 9.0 the most popular Linux distributions are supported. The driver is delivered as a loadable kernel module and supports all current PCI cards as well as older ISA and PCI cards. Detailed examples are also supplied for standard mode and FIFO mode operation.

If another distribution is installed or a special system environment makes problems with the drivers, the driver sources are available on request. This is especially useful for customers who want to use the newest kernel version or a multi processor system (SMP).

FIFO Mode supports now up to 256 Software Buffers

Starting with version 3.04 the driver supports up to 256 software buffers in FIFO mode. This enhances the flexibility of applications and guarantees a continuous data transfer even on systems that run at the limit.

Read out of Timestamps extremely enhanced

A fundamental redesign of the timestamp read out routines led to a speed-up of the reading process by a factor of more than 20. The new driver now has a real speed advantage especially in FIFO mode.

Overrange Check for MI.40xx Series

The enhanced overrange check tests the data at run time for the occurrence of out-of-range samples. After reading the data a simple look in a register provides a status of the overrange check. This status states for each channel whether a the signal was out of range or whether it was within limits.

Internet: www.spec.de/driver.html

Series 61xx - 8 Bit Arbitrary Generators



In many analog output applications it's not necessary to have a high vertical resolution but it is necessary to handle a very long signal or to maximize the transfer speed. The 61xx series 8 bit arbitrary waveform generators have been specifically designed for these situa-

tions. These boards have two or four output channels that have a maximum channel output rate of up to 125 MS/s. Compared to our 14-bit D/A resolution cards, the 61xx series make it possible to generate signals that have twice the number of points when using the same amount of memory. The maximum memory of 512 MByte is then enough for more than 4 seconds of arbitrary signals when using 125 MS/s output speed.

The boards are available for PCI bus (MI.6110 and MI.6111), CompactPCI bus (MC.6110 and MC.6111) and PXI bus (MX.6110).

Internet: www.spec.de/mi6110.html

Application Notes

We are in the process of generating a library of applications notes that will address some of the more common questions and explain some of the design features in greater depth than is currently available in the manuals. The first series of these can now be downloaded from our website.

Internet: www.spec.de/literature_downloads.html

Measuring Dynamic Parameters (SNR, THD)

Great care is needed when comparing the SNR and THD specifications published by different high-speed instrument manufacturers, as the method used to obtain these is open to wide interpretation and 'adjustment' to obtain better figures. At Spectrum we actively encourage you to compare our products against our competitors; not only because we're convinced of our product quality but also because we understand the level of knowledge required to develop low noise designs. To help you, we have created the AN 002 application note that explains how we use a standard measurement technique to obtain our specifications, so that you can now compare the results from different competitors cards.

Internet: www.spec.de/literature_downloads.html

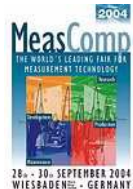
Aerospace Testing Expo 2004 in Hamburg



You are very welcome to visit us at the second Aerospace Testing Expo in the exhibition centre of Hamburg from the 30th of March until the 1st of April 2004. Call us or send an email to request your free entrance tickets.

MeasComp 2004 in Wiesbaden

From the 28th of September until the 30th of September the MeasComp exhibition is located in Wiesbaden. At this, the worlds' leading fair for measurement technology you can find nearly all of the main test and measurement manufacturers at one location. On our stand number 66 in hall 1, it is possible to discuss your application with some of our design engineers who can also show you our latest products. If you would like us to demonstrate specific products or features that are important for your application, it would be helpful for us to know this in advance so that we can optimise your time. We can also provide you with free entrance tickets on receipt of a simple mail or a telephone call.



Electronica 2004 in Munich



We are also exhibiting this year at Electronica 2004. The worlds' biggest electronic fair takes place from the 9th December 2004 to the 12th December at the exhibition area in Munich. You'll find about 3000 companies from the electronics sector at one location, including a complete hall full of measurement companies.

Internet: www.spec.de/exhibitions.html

Please make a note of our new address and telephone numbers:

**SPECTRUM GMBH
AHRENSFELDER WEG 13-17
22927 GROSSHANS DORF
GERMANY**

**TEL. +49 (0) 4102-6956-0
FAX +49 (0) 4102-6956-66**